



Small Residential Project Stormwater Worksheet

This worksheet assists with determining sizing requirements for compliance with District Rule 2.4.1 for residential projects. This worksheet shall accompany a site plan that includes location and sufficient stormwater routing to treat the majority (~80%) of the site's impervious surfaces. Multiple raingardens may be needed.

Project Address _____

Date _____

Determine Water Quality and Volume Control Standard

STEP 1: Determine & Quantify all Existing Impervious Surfaces.

(a) All Existing Impervious Surfaces on the Parcel: _____ SF

“Impervious surface” as defined by the District is a compacted surface, or a surface covered with material (i.e., gravel, asphalt, concrete, Class 5, etc.) that increases the depth of runoff compared to natural soils and land cover. Including but not limited to roads, driveways¹, parking areas, sidewalks and trails, patios, decks, courts, pools, roofed structures, and other structures. Permeable hard surfaces are considered impervious surfaces but may receive treatment volume credit if designed in accordance with District guidance.

STEP 2: Quantify Impervious Surfaces being Reconstructed?

(b) Existing Impervious being Reconstructed: _____ SF

STEP 3: Are you reconstructing greater than 50% of lots Existing Impervious Surfaces?

If (b)/(a) = 0.5 or greater, Yes. If (b)/(a) is less than 0.5, No.

Yes. Stormwater management is required for all impervious surface on-site.
Quantify STEP 4(c) then proceed to STEP 5.

No. Stormwater management is required for only the new and reconstructed impervious surface.
Quantify STEP 4(f) then proceed to STEP 5.

STEP 4: Quantify the Surfaces Requiring Stormwater Management¹.

(c) Total Impervious (Final Proposed for Parcel): _____ SF

(d) New Impervious: _____ SF

(e) Reconstructed Impervious: _____ SF

(f) Sum of (d) & (e): _____ SF

STEP 5: Determine the Treatment Volume Requirement.

_____ SF × 0.15* = _____ cubic feet (g)
STEP 4 (c) or (f)

* Substitute 0.21 if the BMP is located in a buffer (Rule 4.5.2(dii));

* Substitute 0.315-inches if the BMP is tributary to a landlocked basin (Rule 2.4.1(b)).

¹ Treatment volume requirements may be waived for private drives on residential lots at least 10 acres in size if the drive is bordered downgradient by vegetated open space or a vegetated filter strip with a minimum width of 5 feet and runoff does not discharge directly to wetland, groundwater-dependent natural resource, or public water.



BMP Selection and Siting

STEP 6: Preliminary Identification of Onsite Soils.

(Circle) The HSG of onsite soils are predominantly: **A B C D**

- Identify the Hydrologic Soil Group (HSG) of onsite soils based on the Washington County Soil Survey published by the NRCS hosted on the District's webmap at: <https://www.cmscwd.org/watershed-map>. Turn on 'Parcel' and 'Soils Group' layers.

Soil

Soil Groups +

Hydric Soils +

Municipal

Counties +

Municipal +

Parcels +

STEP 7: Select the Appropriate BMP Design.

Select a Best Management Practices (BMPs) from Table 1 and enter into Table 2. Cross reference Step 6 for credit multiplier in Table 1.

TABLE 1. BMP, Treatment Volume Credit Multiplier, and Primary Design Assumptions.

BMP	Treatment Volume Credit Multiplier (CF/SF unless otherwise noted)				Primary Design Assumptions*
	Hydrologic Soil Group (HSG)				
	A	B	C	D	
Amended Soils with Depressional Storage	0.4				<ul style="list-style-type: none"> Shallow surface storage (3-inches) Compost-amended soil depth (6-inches) Bulk density testing required unless District staff observes soil amendment process
Raingardens (Bioretention & Biofiltration)	2.1	1.8	1.5	1.5	<ul style="list-style-type: none"> Surface ponding depth of 18-inches (HSG A, C & D) Surface ponding depth of 15-inches (HSG B) Perforated underdrain (HSG C & D)
Vegetated Swale with Check Dams	600 CF / check dam	500 CF / check dam	400 CF / check dam	400 CF / check dam	<ul style="list-style-type: none"> 4-ft channel bottom with 3:1 side slopes 2% channel slope with earthen check dam every 60 or 75-ft based on soil HSG Over-excavate 30 in and backfill with engineered planting medium Perforated underdrain (HSG C & D)
Permeable Hard Surfaces (e.g., Permeable Paver Patio, Porous Concrete Driveway)	0.6	0.6	0.4	0.4	<ul style="list-style-type: none"> 18-inches of rock storage 18-inch sand layer required for HSG C and D soils Perforated underdrain (HSG C & D)
Infiltration Trench / French Drain	1.2	1.2	0.8	0.8	<ul style="list-style-type: none"> 3-ft of rock storage 4-ft wide

* See District Design Details for each practice for specific design criteria to receive treatment volume credit. The District can provide detailed design cross sections. Treatment volume credit for BMPs is identified in Table 1 on a per unit surface area basis.

BMP Siting and Sizing Guidelines: Site BMPs downslope of impervious surfaces in most permeable soils. Site BMPs in HSG A and B soils wherever feasible to maximize credit by providing infiltration of stormwater. Rooftop downspouts provide flexibility to direct runoff to a variety of BMPs. In particular, raingardens must accept rooftop or driveway runoff, where feasible.



STEP 8: Calculating Proposed Treatment Credit

Use **TABLE 1** and the BMP guidelines above to fill in the proposed BMP design in **TABLE 2** below. **TOTAL Treatment Volume Credit (h)** must meet or exceed the **Treatment Volume Requirement Step 5 (g)**.

TABLE 2. Proposed BMP's Treatment Volume Credit.

COLUMN: A	B	C	D	E
BMP	HSG	BMP Surface Area (SF) or No. of Check Dams (No.)	Credit Multiplier from Table 1 (CF/SF or CF/check dam)	Treatment Volume Credit (CF) [Column C x Column D]
<i>Example: Raingarden 1</i>	<i>B</i>	<i>200 SF BMP Surface Area</i>	<i>1.8</i>	<i>360 CF</i>
TOTAL Treatment Volume Credit (CF)				(h)

STEP 9: Onsite Soil Verification

Soil borings are recommended in the locations of proposed BMPs in order to assess the infiltration capacity of the soil as characterized by the hydrologic soil group (HSG). Soil boring results guide the selection of the BMP(s) and helps to ensure the BMP(s) will function properly. In lieu of borings, soil verification may be achieved by review of other applicable data (septic system percolation tests/soil logs, test pits, etc.).

STEP 10: Ensuring Proposed Treatment meets or exceeds Required Treatment.

Proposed raingarden treatment volume credit must meet or exceed required volume to meet District Rules and be considered for a permit.

Does **STEP 8 (h)** meet or exceed **STEP 5 (g)**? Yes, proceed to STEP 11. No, repeat STEPS 7 & 8.

STEP 11: Ensuring Stormwater will be Routed to the BMP(s)

Proposed BMP location(s) must receive stormwater from the majority (~80%) of required impervious surfaces. Do your submitted site plans clearly demonstrate stormwater routing from required impervious surfaces will be directed into the BMP(s)?

- Yes.** Submit this worksheet and your site plans to the District for review.
- No.** Consider adding greater routing features (i.e. relocation, grading details, catch basins & piping, swales, downspouts) to the proposed BMP(s). Repeat STEP 11.
- No and routing alterations are not sufficient.** Add an additional BMP and repeat STEPS 7 - 10.