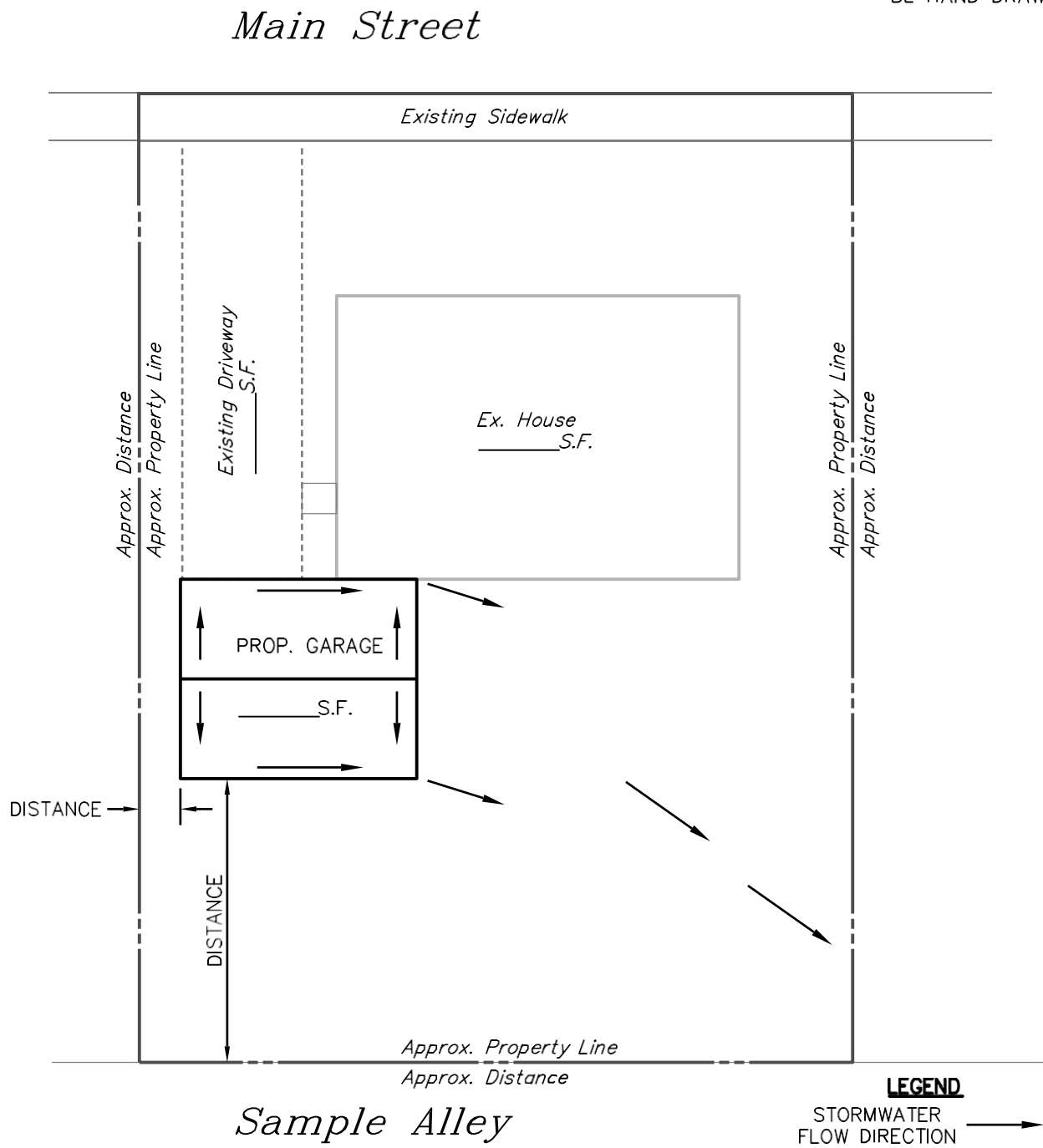




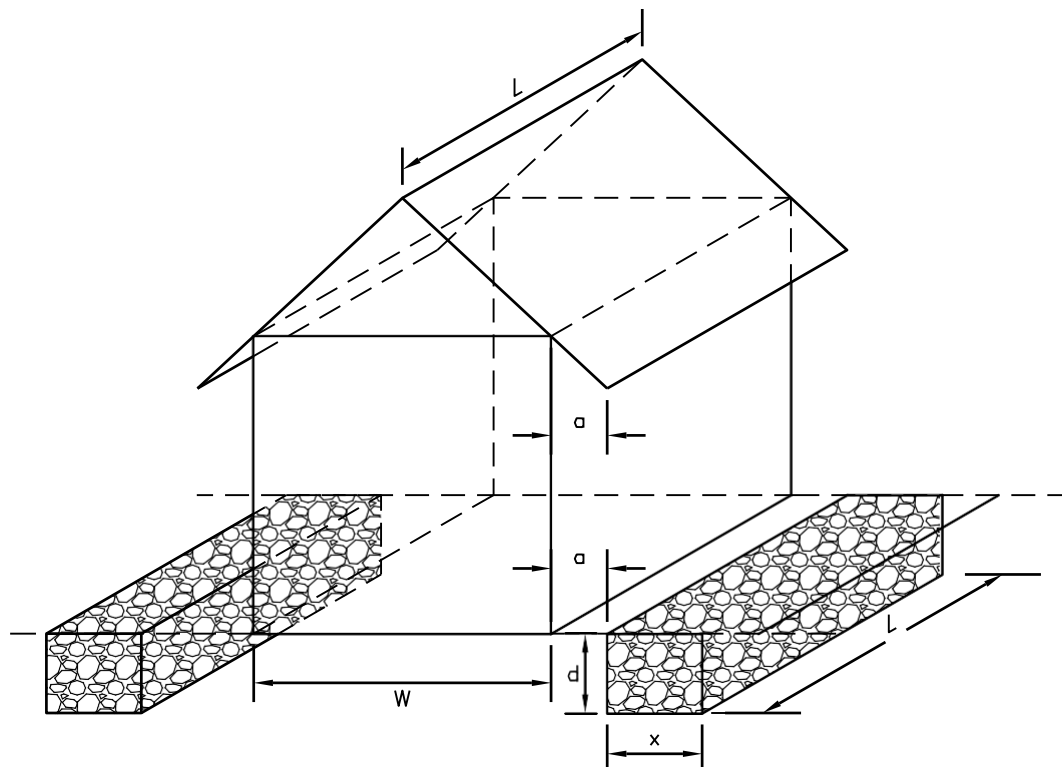
Stormwater Management Small Projects Guide 2024

For Projects 501 sq ft to 2000 sq ft of New Impervious Surface

NOTE:
THIS PLAN CAN
BE HAND DRAWN.



SAMPLE SKETCH/ SITE PLAN



KEY

- L = LENGTH OF STRUCTURE = LENGTH OF SEEPAGE TRENCH (FT.)
 W = WIDTH STRUCTURE (FT.)
 a = EAVE OVERHANG (FT) = TRENCH DISTANCE FROM STRUCTURE (FT)
 x = WIDTH OF SEEPAGE TRENCH (FT)
 d = DEPTH OF SEEPAGE TRENCH (FT) = 2'

REQUIRED STORAGE VOLUME

Impervious Area (SF)	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
Total Required Storage (CF)	83	100	117	133	150	167	183	200	217	233	250	267	283	300	317	333
Required Storage Volume Per Pit (CF)	42	50	58	67	75	83	92	100	108	117	125	133	142	150	158	167

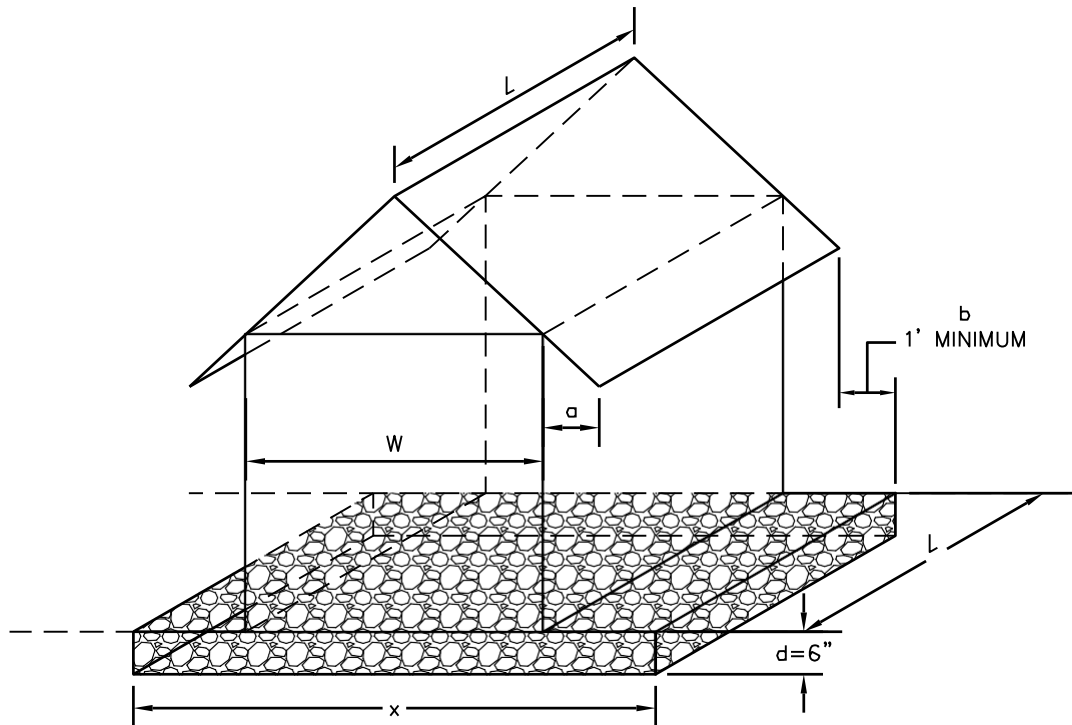
Required Pit Size

		Pit Width (x)									
		1	2	3	4	5	6	7	8	9	10
Pit Length (L)	10	8	16	24	32	40	48	56	64	72	80
	15	12	24	36	48	60	72	84	96	108	120
	20	16	32	48	64	80	96	112	128	144	160
	25	20	40	60	80	100	120	140	160	180	-
	30	24	48	72	96	120	144	168	192	-	-
	35	28	56	84	112	140	168	196	-	-	-
	40	32	64	96	128	160	192	-	-	-	-
	45	36	72	108	144	180	-	-	-	-	-
	50	40	80	120	160	-	-	-	-	-	-
	55	44	88	132	176	-	-	-	-	-	-

NOTES

1. TRENCH MUST BE PROVIDED ON EACH SIDE OF STRUCTURE.
2. SIDE OF TRENCH TO BE WRAPPED IN CLASS 1 GEOTEXTILE.
3. TRENCH TO BE FILLED WITH CLEAN STONE (3/4" MIN. SIZE).
4. TRENCH TO BE CONSTRUCTED AT 0% SLOPE ON UNDISTURBED SOIL.
5. TRENCH TO BE CHECKED REGULARLY TO MAINTAIN PROPER OPERATION.

STRUCTURES WITHOUT GUTTERS A



KEY

L = LENGTH OF STRUCTURE = LENGTH OF SEEPAGE BED (FT.)

W = WIDTH OF STRUCTURE (FT)

a = EAVE OVERHANG (FT)

b = DISTANCE FROM EAVE OVERHANG TO EDGE OF SEEPAGE BED (FT) = 1' MINIMUM

x = WIDTH OF SEEPAGE BED (FT)

$x = W + 2 \text{ FT}$

d = DEPTH OF SEEPAGE BED = 6"

REQUIRED STORAGE VOLUME

Impervious Area (SF)	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
Required Storage Volume Per Pit (CF)	42	50	58	67	75	83	92	100	108	117	125	133	142	150	158	167

NOTES

- 1.) SIDE OF BED TO BE WRAPPED IN CLASS 1 GEOTEXTILE.
- 2.) BED TO BE FILLED WITH CLEAN STONE (3/4" MIN. SIZE).
- 3.) BED TO BE CONSTRUCTED AT 0% SLOPE ON UNDISTURBED SOIL.
- 4.) BED TO BE CHECKED REGULARLY TO MAINTAIN PROPER OPERATION.

STRUCTURES WITHOUT GUTTERS B

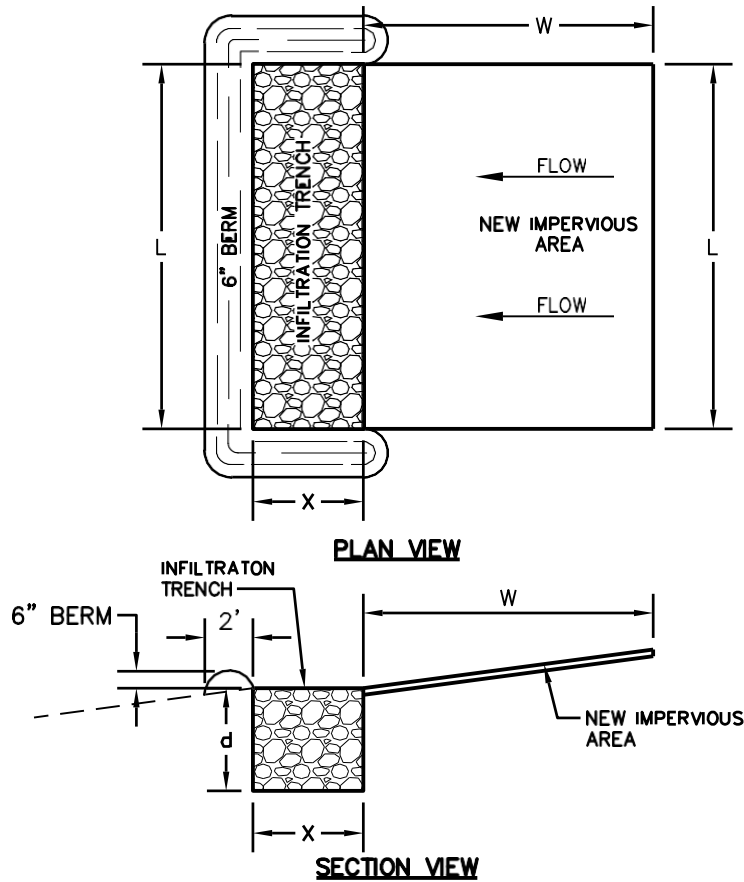


REQUIRED STORAGE VOLUME																
Impervious Area (SF)	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
Required Storage Volume Per Pit (CF)	42	50	58	67	75	83	92	100	108	117	125	133	142	150	158	167

Required Pit Size											
		Pit Width (x)									
		5	6	7	8	9	10	11	12	15	20
Pit Length (Y)	5	35	42	49	56	63	70	77	84	105	140
	6	42	50	59	67	76	84	92	101	126	168
	7	49	59	69	78	88	98	108	118	147	196
	8	56	67	78	90	101	112	123	134	168	-
	9	63	76	88	101	113	126	139	151	189	-
	10	70	84	98	112	126	140	154	168	-	-
	11	77	92	108	123	139	154	169	185	-	-
	12	84	101	118	134	151	168	185	-	-	-
	15	105	126	147	168	189	-	-	-	-	-
	20	140	168	196	-	-	-	-	-	-	-

- NOTES**
1. BOTTOM OF BED ELEVATION TO BE 4.5' BELOW SURFACE TO ACCOUNT FOR 1' OF TOPSOIL OVER INFILTRATION BED.
 2. PIPE TO BE APPROPRIATELY SIZED TO CARRY ROOF WATER. PVC PIPE SHALL HAVE A MIN. DIAMETER OF 4".
 3. PIPING AND CLEANOUTS TO BE CENTERED WITHIN INFILTRATION BED.
 4. BED TO BE CHECKED REGULARLY TO MAINTAIN PROPER OPERATION.

STRUCTURES WITH GUTTERS



KEY

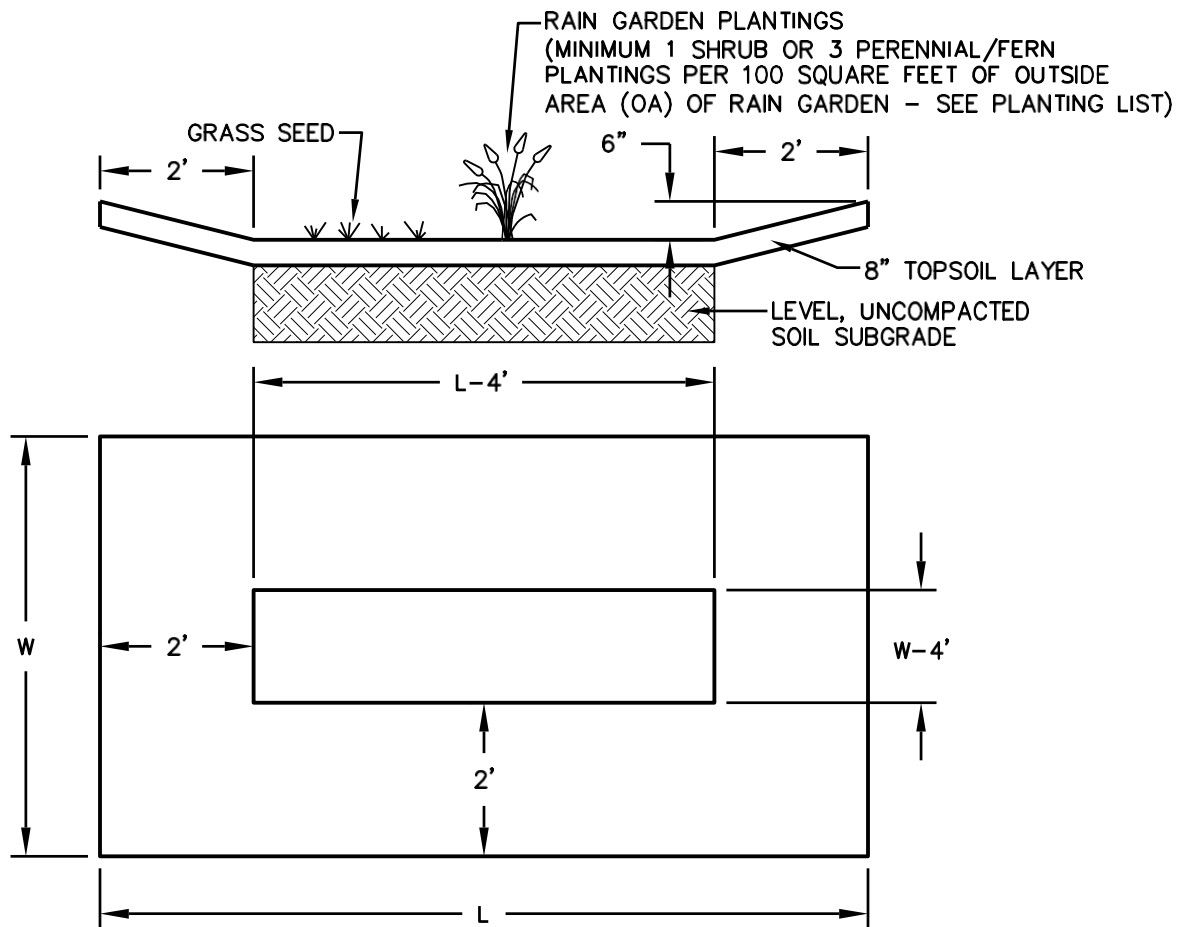
L = LENGTH OF NEW IMPERVIOUS SURFACE (FT) = LENGTH OF INFILTRATION TRENCH
W = WIDTH OF NEW IMPERVIOUS SURFACE TRENCH
X = WIDTH OF SEEPAGE TRENCH (FT)
d = DEPTH OF SEEPAGE TRENCH (FT) = 3'

NOTES

- 1.) SIDE OF TRENCH TO BE WRAPPED IN PENNDOT CLASS 1 GEOTEXTILE.
- 2.) TRENCH TO BE FILLED WITH CLEAN STONE (3/4" MIN. SIZE).
- 3.) TRENCH TO BE CONSTRUCTED AT 0% SLOPE ON UNDISTURBED SOIL.
- 4.) TRENCH TO BE CHECKED REGULARLY TO MAINTAIN PROPER OPERATION.
- 5.) 6" BERM MAY BE REMOVED AS DEEMED APPROPRIATE BY THE MUNICIPALITY

Required Storage Volume															
Impervious Area Width (Ft) - W	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
Required Pit Width (Ft) - X	0.7	1.4	2.1	2.8	3.5	4.2	4.9	5.6	6.3	7.0	7.7	8.4	9.1	9.8	10.5

AT GRADE IMPERVIOUS



REQUIRED STORAGE VOLUME

Impervious Area (SF)	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
Required Storage Volume of Rain Garden (CF)	42	50	58	67	75	83	92	100	108	117	125	133	142	150	158	167

Required Rain Garden Size

		Width (x)									
		10	11	12	13	14	15	18	20	25	30
Length (L)	10	34	38	42	46	50	54	66	74	94	114
	11	38	43	47	52	56	61	74	83	106	128
	12	42	47	52	57	62	67	82	92	117	142
	13	46	52	57	63	68	74	90	101	129	156
	14	50	56	62	68	74	80	98	110	140	170
	15	54	61	67	74	80	87	106	119	152	-
	18	66	74	82	90	98	106	130	146	186	-
	20	74	83	92	101	110	119	146	164	-	-
	25	94	106	117	129	140	152	186	-	-	-
	30	114	128	142	156	170	-	-	-	-	-

RAIN GARDEN

Rain Garden Native Planting List

Perennials and Ferns:

Blue false indigo (*Baptisia australis*)
Blue flag iris (*Iris versicolor*)
Blue star (*Amsonia tabernaemontana*)
Blue vervain (*Verbena hastata*)
Boltonia (*Boltonia asteroides*)
Boneset (*Eupatorium perfoliatum*)
Bottlebrush grass (*Hystrix patula*)
Broomsedge (*Andropogon virginicus*)
Cardinal flower (*Lobelia cardinalis*)
Cinnamon fern (*Osmunda cinnamomea*)
Culvers root (*Veronicastrum virginicum*)
Golden ragwort (*Senecio aureus*)
Goldenrod (*Solidago patula*, *S. rugosa*)
Great blue lobelia (*Lobelia siphilitica*)
Green bullrush (*Scirpus atrovirens*)
Horsetail (*Equisetum* species)
Marsh marigold (*Caltha palustris*)
Mistflower (*Eupatorium coelestinum*)
Monkey flower (*Mimulus ringens*)
New England aster (*Aster novae-angliae*)
New York aster (*Aster novi-belgii*)
Obedient plant (*Physotegia virginiana*)
Royal fern (*Osmunda regalis*)
Seedbox (*Ludwigia alternifolia*)
Sensitive fern (*Onoclea sensibilis*)
Sneezeweed (*Helenium autumnale*)
Soft rush (*Juncus effusus*)
Swamp milkweed (*Asclepias incarnata*)
Swamp rose mallow (*Hibiscus moscheutos*)
Swamp sunflower (*Helianthus angustifolius*)
Switchgrass (*Panicum virgatum*)
Threadleaf coreopsis (*Coreopsis verticillata*)
Tussock sedge (*Carex stricta*)
White turtlehead (*Chelone glabra*)
Woolgrass (*Scirpus cyperinus*)

Shrubs:

American beautyberry (*Callicarpa americana*)
Arrowwood (*Viburnum dentatum*)
Black chokeberry (*Aronia melanocarpa*)
Broad-leaved meadowsweet (*Spirea latifolia*)
Buttonbush (*Cephalanthus occidentalis*)
Elderberry (*Sambucus canadensis*)
Inkberry (*Ilex glabra*)
Narrow-leaved meadowsweet (*Spirea alba*)
Ninebark (*Physocarpus opulifolius*)
Possumhaw (*Viburnum nudum*)
Red-osier dogwood (*Cornus sericea*)
St. Johnswort (*Hypericum densiflorum*)
Silky dogwood (*Cornus amomum*)
Smooth alder (*Alnus serrulata*)
Spicebush (*Lindera benzoin*)
Swamp azalea (*Rhododendron viscosum*)
Swamp rose (*Rosa palustris*)
Sweet pepperbush (*Clethra alnifolia*)
Wild raisin (*Viburnum cassinoides*)
Winterberry (*Ilex verticillata*)
Virginia sweetspire (*Itea virginica*)

Small Projects Guide - Sample Operation & Maintenance Plan**Construction:**

1. Install erosion and sedimentation control facilities.
2. Stormwater Management Facility shall be installed before impervious areas are completed. If earthwork is involved during the construction of the impervious area, then extreme caution shall be taken so that sediment does not wash into the SWM Facility.
3. Mark the locations of the SWM facility.
4. Excavate the SWM Facility to the required depth. Contact municipality for inspection prior to filling. If standing water is encountered, a SWM Site Plan may need to be submitted; contact Municipal Engineer. All excavated materials shall be removed from the site or stabilized.

For Stone Infiltration Structures

5. Line excavation with Geotextile.
6. Backfill SWM Facility with required stone. If required: Install piping, cleanouts and associated facilities as detailed.
7. If required: Close geotextile material over stone bedding.
8. If required: Place topsoil over trench.
9. Stabilize and seed all disturbed areas.

For Rain Gardens

5. Place topsoil over excavated area.
6. Install plantings as shown on the plan.
7. Stabilize and seed all disturbed areas.

Maintenance:

1. The SWM Facility shall be checked regularly to ensure that no standing water exists in the facility 3 days after a rain event. If water is encountered, the facility may need to be modified. Notification of the municipality is required if facility is not functioning before any modifications are made.
2. Monitor the SWM facility to ensure that no sediment, grass clippings, leaves, and other similar accumulations occur on top of, and/or within, the SWM Facility.
3. Homeowner to submit an inspection report to the Township one year after construction and every 3rd year thereafter.

I have read and agree to the above Operation and Maintenance Plan. I, as the property owner, am responsible for the proper construction and operation and maintenance for the SWM Facilities. If I fail to adhere to any of these tasks, the Township may perform the services required and charge the appropriate fees. Nonpayment of the fees may result in a lien against my property.

Applicant Name (Printed)_____
Signature_____
Date

Appendix 19-B

Disconnected Impervious Area (DIA)

B.1 Rooftop Disconnection

When rooftop downspouts are directed to a pervious area that allows for infiltration, filtration, and increased time of concentration, the rooftop may qualify as completely or partially DIA and a portion of the impervious rooftop area may be excluded from the calculation of total impervious area.

A rooftop is considered to be completely or partially disconnected if it meets the requirements listed below:

- The contributing area of rooftop to each disconnected discharge is 500 square feet or less, and
- The soil, in proximity of the roof water discharge area, is not designated as hydrologic soil group "0" or equivalent, and
- The overland flow path from roof water discharge area has a positive slope of 5% or less, and
- The total proposed disconnection does not total an amount greater than 5,000 square feet or does not exceed more than 5% of the tract area, whichever is greater.

For designs that meet these requirements, the portion of the roof that may be considered disconnected depends on the length of the overland path as designated in Table B.1.

Table B.1: Partial Rooftop Disconnection	
Length of Pervious Flow Path*	Roof Area Treated as Disconnected
Table B.1: Partial Rooftop Disconnection	
Length of Pervious Flow Path*	Roof Area Treated as Disconnected
(ft)	(% of contributing area)
0 – 14	0
15 – 29	20
30 – 44	40
45 – 59	60
60 – 74	80
75 or more	100
* Flow path cannot include impervious surfaces and must be at least 15 feet from any impervious surfaces.	

B.2 Pavement Disconnection

When pavement runoff is directed to a pervious area that allows for infiltration, filtration, and increased time of concentration, the contributing pavement area may qualify as a DIA that may be excluded from the calculation of total impervious area. This applies generally only to small or narrow pavement structures such as driveways and narrow pathways through otherwise pervious areas (e.g., a walkway or bike path through a park).

Pavement is disconnected if the pavement, or area adjacent to the pavement, meets the requirements below:

- The contributing flow path over impervious area is not more than 75 feet, and
- The length of overland flow is greater than or equal to the contributing length, and
- The soil is not designated as hydrologic soil group "0" or equivalent, and
- The slope of the contributing impervious area is 5% or less, and
- The slope of the overland flow path is 5% or less, and
- The total proposed disconnection does not total an amount greater than 5,000 square feet or does not exceed more than 5% of the tract area, whichever is greater.

If the discharge is concentrated at one or more discrete points, no more than 1,000 square feet may discharge to anyone point. In addition, a gravel strip or other spreading device is required for concentrated discharges. For nonconcentrated discharges along the edge of the pavement, this requirement is waived; however, there must be a provision for the establishment of vegetation along the pavement edge and temporary stabilization of the area until vegetation becomes stabilized.

REFERENCE

Philadelphia Water Department. 2006. *Stormwater Management Guidance Manual*.

Section 4.2.2: Integrated Site Design. Philadelphia, PA.

(Ord. 2022-01, 7/25/2022)