This guide is intended to assist the property owner in completing a Stormwater Management (SWM) Permit Application for single lot “small” projects not requiring a SWM Site Plan(1) such as installing a shed, building a small extension to a house, installing or expanding a driveway, or enclosing a deck or patio.

A SWM Site Plan will be required for single lot projects:
- involving 1,000 sq. ft or more of new impervious surface
- involving less than 1,000 square feet of new impervious surface when SWM cannot be achieved by utilizing the BMPs(2) found in Dover Township’s “Small Project Guide” (this document).
- if the project site is considered unsuitable for the BMPs found in the Dover Township “Small Project Guide”.

There are basically 3 Stormwater Management options available to you in the “Small Project Guide”.
1) Disconnected Impervious Area (DIA)
2) Stone Infiltration Structure (which includes beds and trenches)
3) Rain Garden

The “Small Project Guide” provides examples of stone infiltration structures and a rain garden. If you intend to use one of these BMPs include a copy of the example BMP with your application and sketch plan. Township Staff is available to assist you with sizing an infiltration structure or rain garden.

Disconnected Impervious Area (DIA)
If you choose to utilize an DIA as your Stormwater Management option, you must demonstrate on the Sketch Plan that the following DIA criteria can be met:

For Structures:
☐ Is there less than 500ft² (of roof top) draining to an individual downspout?

☐ Is there a 75’ pervious flow path available on the same property?

☐ Is the flow path < 5% slope?

For Pavement/Patios/At-grade Impervious Areas:
☐ Is the WIDTH of the impervious area less than 75’?

☐ Is the pervious flow path greater than the length of impervious surface?

☐ Is the flow path < 5% slope?

If you have any questions or need additional information, you may call (292-3634) or email mfleming@dovertownship.org.

Mike Fleming
Director of Public Works
**SWM Site Plan** Stormwater Management Site Plan – the requirements for a Stormwater Management Site Plan are listed in Dover Township Stormwater Management Ordinance Section 19-401 Plan Requirements. The SWM Site Plan must be prepared by a qualified professional person and must be reviewed by the Township’s Engineer.

**BMPs** Best Management Practices – activities, facilities, designs, measures or procedures used to manage stormwater impacts from regulated activities, to meet state water quality requirements, to promote groundwater recharged, and to otherwise meet conditions of the Dover Township SWM Ordinance.

**DIA** Disconnected Impervious Area – an impervious or impermeable surface that is disconnected from any stormwater drainage or conveyance system and is redirected or directed to a pervious area, which allows for infiltration, filtration, and increased time of concentration.
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)

REQUIRED VOLUME OF TRENCH => \( L \cdot W \cdot 2/12 = L \cdot x \cdot d \cdot 0.4 \) => \( x = 0.28W \) (ASSUMING \( d = 1.5' \))

RATIO: 3.6 TO 1 (IMPERVIOUS AREA TO INFILTRATION AREA)

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)
v = x + 2 FT
D = DEPTH OF SEEPAGE BED = 6"

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
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.

KEY
L = LENGTH OF STRUCTURE ROOF (FT)
W = WIDTH OF ENTIRE ROOF (FT)
X = WIDTH OF INFILTRATION BED (FT)
Y = LENGTH OF INFILTRATION BED (FT)

REQUIRED VOLUME OF BED = \( \frac{L \times W^2}{12} \)
ASSUME: \( X = W, D = 3.5' \)
\( Y = 0.12L \)
RATIO: 4.76 TO 1 (IMPERVIOUS TO INFILTRATION)

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) = 1.5'

REQUIRED VOLUME OF TRENCH = \( \frac{W^2 L^2}{12} \) = \( K^2 \), \( K = 0.4 \rightarrow X = 0.28L \) (D = 1.5')

NOTES
1.) SIDE OF TRENCH TO BE WRAPPED IN PENNDOT CLASS I 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.

AT GRADE IMPERVIOUS
1. Calculate required rain garden volume (V)
   \[ RV = \text{square feet of new impervious area} \times 0.17 \]
   \[ RV = \underline{\underline{93}} \]

2. Calculate outside area of rain garden (OA)
   \[ OA = \text{length (L)} \times \text{width (W)} \]
   \[ OA = \underline{\underline{62}} \]

3. Calculate inside area of rain garden (IA)
   \[ IA = \frac{L-2}{2} \times \frac{W-2}{2} \]
   \[ IA = \underline{\underline{62}} \]

4. Calculate average area of rain garden (AA)
   \[ AA = \frac{OA+IA}{2} \]
   \[ AA = \underline{\underline{62}} \]

5. Calculate storage volume (SV)
   \[ SV = AA \times 0.5 \]
   \[ SV = \underline{\underline{31}} \]

6. Check for adequate storage
   Storage volume (SV) must be greater than required volume (RV)
   \[ SV = \underline{\underline{31}} \times RV = \underline{\underline{93}} \]

7. Adjust rain garden size
   If storage volume (SV) is not greater than required volume (RV), increase the size of the rain garden and repeat steps 2-6.

RAIN GARDEN
Rain Garden Native Planting List

**Perennials and Ferns:**
- Blue false indigo (Baptisia australis)
- Blue flag iris (Iris versicolor)
- Blue star (Ansonia 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 (Physostegia 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 (Arctostaphylos uva-ursi)
- Broad-leaved meadowsweet (Spiraea latifolia)
- Buttonbush (Cephalanthus occidentalis)
- Elderberry (Sambucus canadensis)
- Inkberry (Ilex glabra)
- Narrow-leaved meadowsweet (Spiraea alba)
- Ninebark (Physocarpus opulifolius)
- Possumhaw (Viburnum nudum)
- Red-osier dogwood (Cornus sericea)
- St. Johnswort (Hypericum densiflorum)
- Silky dogwood (Cornus sericea)
- 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)