

EAST MARLBOROUGH TOWNSHIP  
STORMWATER MANAGEMENT  
ORDINANCE

APPENDIX 1

SIMPLIFIED METHOD FOR  
SMALL PROJECTS

Small projects below the thresholds listed in Section 106.D of the East Marlborough Township Stormwater Management Ordinance may use a simplified approach to stormwater management. The intent of this provision is to give residents the option to avoid engaging a licensed professional for design of stormwater management for small projects that do not meet the exemption requirements of Table 106.1. Applicants wishing to use the Simplified Method must contact the Township Secretary and arrange for an initial consultation with the Township Engineer, for the purpose of:

- Confirming the eligibility to use the Simplified Method;
- Determining what components of the proposed project are considered as impervious surface; and,
- Determining if there are known site or other issues that would preclude use of the Simplified Method for their project.

Applicants shall prepare and submit drawings and calculations illustrating compliance with the requirements of the Simplified Method.

- Hand sketches are acceptable, given that they clearly show all relevant information such as:
  - Property lines, existing site features (septic, well, other utilities etc.), existing and proposed impervious area, the directions of existing and proposed drainage patterns, location of proposed stormwater management facility, detail of proposed stormwater management facility, illustrating materials, size, means of conveying runoff to facility, overflow measures, and maintenance and cleaning provisions.
- Calculations should be based on the method given below.
- Erosion and Sediment Control may be required under Ordinance \_\_\_\_\_ of the Township Code.

The Township Engineer will review the applicant's submission, and either approve it, or issue a letter indicating required revisions.

### **Requirements of the Simplified Method**

Provide infiltration capacity for a volume equivalent to one inch of runoff from all new impervious surfaces (as defined in this Ordinance). The total infiltration volume may be divided over multiple facilities if necessary, given that all facilities are within the same drainage area as the proposed impervious area they are to manage.

### How to Size Infiltration facility for one inch of runoff

Take the new Impervious area square footage (Ia) and divide by twelve (12) to get the volume of water (cubic feet (Wv)) produced by 1 inch of runoff. Divide Wv by 0.4 (the void ratio of the stone bed) to get the required volume (Rv) of the infiltration bed. Divide the volume of the bed by the depth (typically 2 feet) to get the required footprint (Fp) of the bed in square feet. The bed may be any length (L) and width (W), given that the product of L times W equals Fp (and all setbacks and other location criteria are met).

$$Ia / 12 = Wv \text{ (volume of runoff, cubic feet)}$$

$$Wv/0.4 = Rv \text{ (volume of bed, cubic feet)}$$

$$Rv/\text{Depth} = Fp \text{ (Footprint of bed, square feet)}$$

$$L \times W = Fp$$

For convenience, required bed volumes for selected areas of proposed impervious surface are listed below.

<b>Sq. Ft. of Impervious</b>	<b>Bed volume using #4 stone</b>
500	104 cubic feet
600	125 cubic feet
700	146 cubic feet
800	167 cubic feet
900	188 cubic feet
1000	208 cubic feet
1100	229 cubic feet
1200	250 cubic feet
1300	271 cubic feet
1400	292 cubic feet
1500	313 cubic feet

As an example, a resident wishes to construct a room addition of 1,200 square feet:

1 inch of rain over 1,200 square feet gives  
 $1,200/12 = 100$  cubic feet of runoff to be managed = Wv

A seepage bed capable of infiltrating 100 cubic feet will need to be installed.

In a stone seepage bed, the cracks or voids between the stones provide space for runoff to be stored, while it slowly seeps out the bottom of the bed into the ground. The typical void ratio for stone is 40% (60% of the bed volume is taken up by the stone itself, only 40% of the volume is available for storage), so the applicant needs a bed that is 1/40% larger than the  $W_v$ .

$$W_v/0.4 = R_v$$

$$100/0.4 = 250 \text{ cubic feet} = R_v$$

If the applicant decides the bed will be 2 feet deep, then the minimum required footprint is:

$$R_v/\text{depth} = F_p$$

$$250/2 = 125 \text{ square feet} = F_p$$

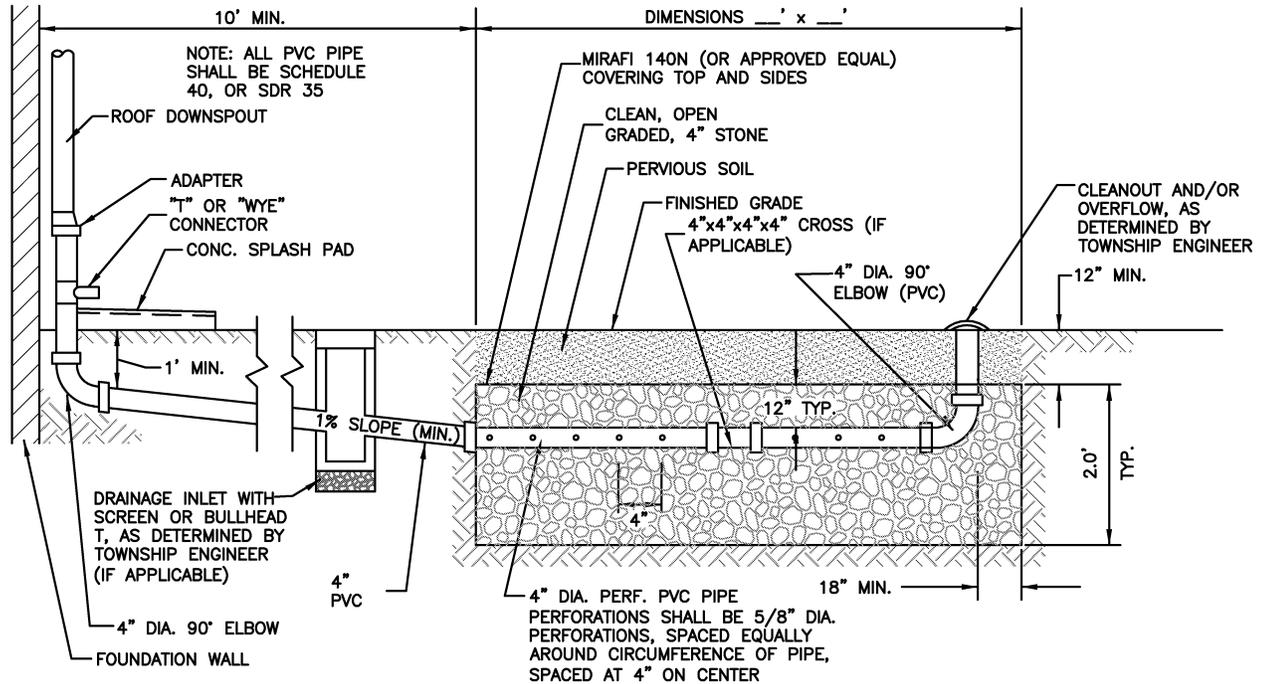
Then, the bed area, (width and length), could be 10 feet by 12.5 feet, or 5 by 25 feet, or any other configuration, as long as the product of length times width is greater than or equal to  $F_p$ .

### **Typical Construction Detail**

There are a few specific items that must be incorporated into the construction of the seepage bed to ensure its functionality. These include:

- Including leaf guards on gutters, or leaf and debris strainers in downspouts, or sumped inlets to screen and collect debris and prevent the debris from entering and clogging the seepage bed;
- Proper construction techniques for the excavation of the bed and the preparation of the soils at the bottom of the bed;
- Using a clean, washed, uniformly graded stone in the bed;
- Using a geotextile fabric between the stone and the soil on the tops and sides of the seepage bed; and,
- Providing a means of overflow if the seepage bed has reached its capacity.

A typical detail for an infiltration bed is provided on the next page.



**NOTES:**

1. ACTUAL DESIGN MAY VARY FROM THAT SHOWN ABOVE, BASED ON SITE CONSTRAINTS, OR AS REQUIRED BY THE TOWNSHIP ENGINEER.
2. INFILTRATION BED SHALL BE A MINIMUM OF 10' FROM ANY SEPTIC SYSTEM, 25' FROM ANY WELL, AND 10' FROM ANY STRUCTURE FOUNDATION.
3. IF UNFAVORABLE CONDITIONS (BEDROCK, HIGH GROUNDWATER, ETC.) ARE FOUND AT THE TIME OF INSTALLATION, CONTACT THE TOWNSHIP ENGINEER IMMEDIATELY.
4. THE INDIVIDUAL LOT OWNER IS RESPONSIBLE FOR OPERATION AND MAINTENANCE OF THE SEEPAGE BED.
5. THE EXCAVATION AND FABRIC SHALL BE KEPT CLEAN OF SOIL AND SEDIMENT DURING THE INSTALLATION PROCESS. IF INSPECTIONS INDICATE THAT SOIL/SEDIMENT HAS ENTERED THE FACILITY DURING CONSTRUCTION, REMEDIAL WORK, POSSIBLY INCLUDING REMOVAL AND REPLACEMENT OF THE ENTIRE SYSTEM, MAY BE REQUIRED.
6. THE BOTTOM AND SIDES OF THE EXCAVATION SHALL BE SCARIFIED PRIOR TO INSTALLING THE FABRIC AND STONE.
7. ALL STONE SHALL BE UNIFORMLY GRADED CLEAN AGGREGATE. THE TOWNSHIP ENGINEER SHALL INSPECT ALL STONE PRIOR TO INSTALLATION. ANY STONE CONTAINING EXCESSIVE FINES WILL BE REJECTED.
8. THE SEEPAGE BED SHOULD BE CONSTRUCTED WHEN NO RAIN IS FORECAST. CONSTRUCTION SHALL BE CONTINUOUS AFTER INSTALLATION OF THE GEOTEXTILE.
9. SOIL FROM EXCAVATION OF THE BED SHALL BE PLACES UPSLOPE TO FORM A BERM DIVERTING RUNOFF AROUND THE SEEPAGE BED LOCATION.
10. IF THE SEEPAGE BED CONTAINS A YARD DRAIN, ALL AREA TRIBUTARY TO THE YARD DRAIN SHALL BE VEGETATIVELY STABILIZED, PRIOR TO ALLOWING RUNOFF TO ENTER THE SEEPAGE BED.
11. INFLOW AND OUTFLOW POINTS SHALL BE KEPT CLEAR OF LEAVES AND OTHER DEBRIS THAT WOULD NEGATIVELY IMPACT THE FUNCTION OF THE SEEPAGE BED.
12. SEEPAGE BED SIZE \_\_\_' x \_\_\_' x \_\_\_'

**TYPICAL SEEPAGE BED DETAIL**

NOT TO SCALE