



Appendix: Stormwater Guidelines for Low Impact Developments

The waterways surrounding the Village of Yellow Springs are an important part of the community. They provide recreational opportunities, drinking water and habitat for our native plants and animals. As development occurs in the Village, it will cause an increase in stormwater that can potentially contaminate the surrounding waterways and overwhelm the Village's storm sewer collection system. In an effort to help alleviate any negative effects from this increased stormwater, the Village of Yellow Springs is providing a guide to require new developments of less than one acre of impervious surface to follow low-cost best management practices.

The Village encourages sustainable stormwater management solutions in the design phase and encourages the preservation and protection of natural assets to be treated as amenities of homes, entryways, and play areas.

This guide will help homeowners, business owners and contractors to improve and protect water quality and manage their stormwater runoff. These practices prevent runoff from occurring by helping to slow down, filter and infiltrate the stormwater into the ground, minimizing the negative effects of new development on the Village's storm sewer collection system and the surrounding tributaries.

Part 1: Stormwater Calculation

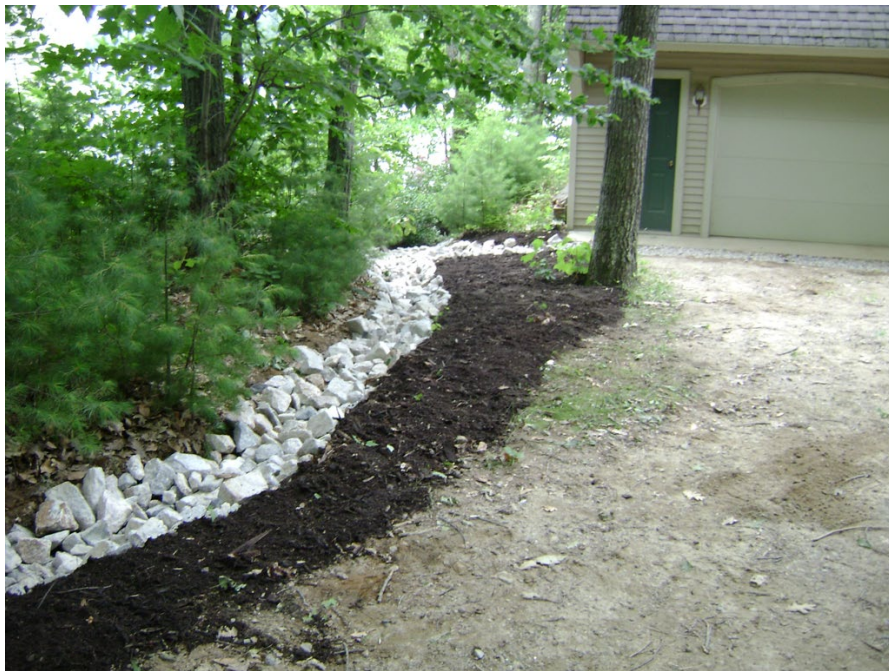
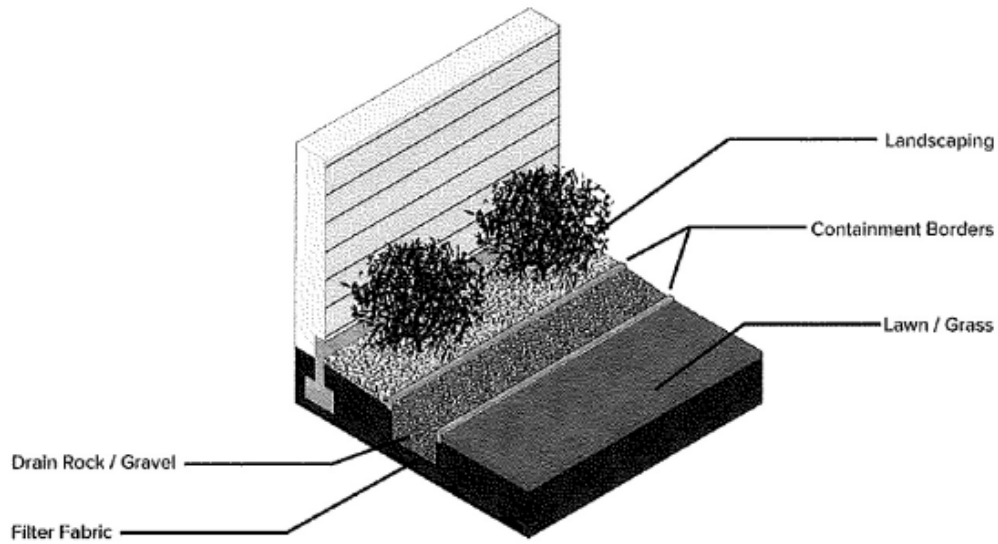
STORMWATER CALCULATION WORK SHEET

Impervious Area (Square Feet)	Stormwater Treatment Volume (Gallons)	Stormwater Treatment Volume (Cubic Feet)
100	62	8.3
200	124	16.6
300	186	24.9
400	248	33.2
500	310	41.4
600	372	49.7
700	434	58.0
800	496	66.3
900	558	74.6
1000	620	82.9
1100	682	91.2
1200	744	99.5
1300	806	107.8
1400	868	116.0
1500	930	124.3

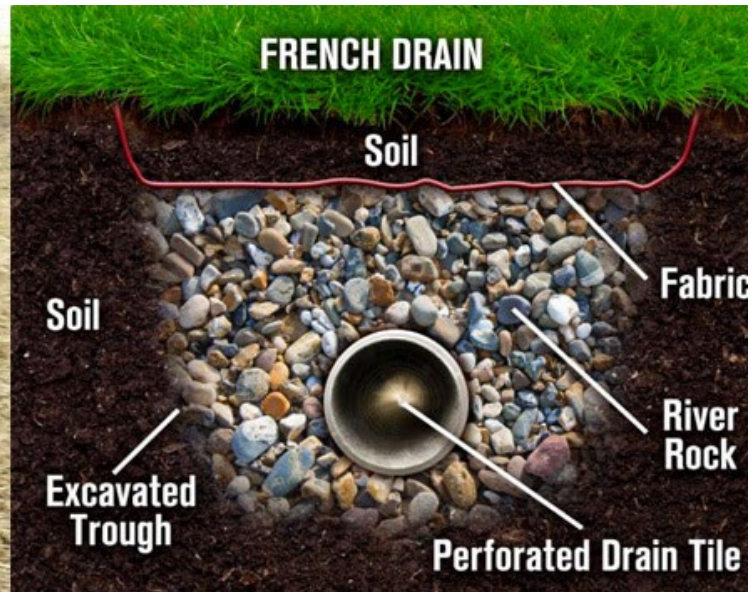
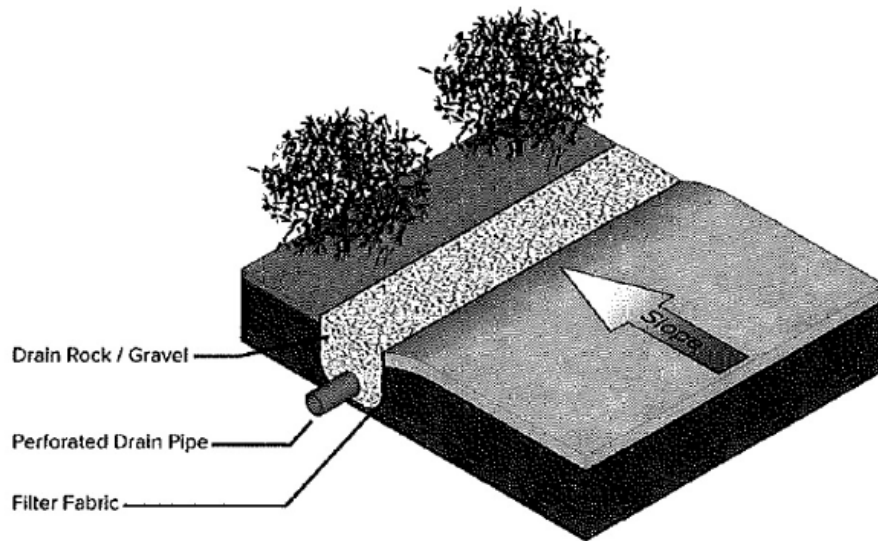
**If your square footage exceeds the chart above, use the following formula to determine the stormwater treatment volume in gallons: (total square feet of impervious area) x .0833 x 7.48 = gallons of runoff (.0833 converts inches to feet) (7.48 = number of gallons per cubic foot)

Part 2: Stormwater Management Methods

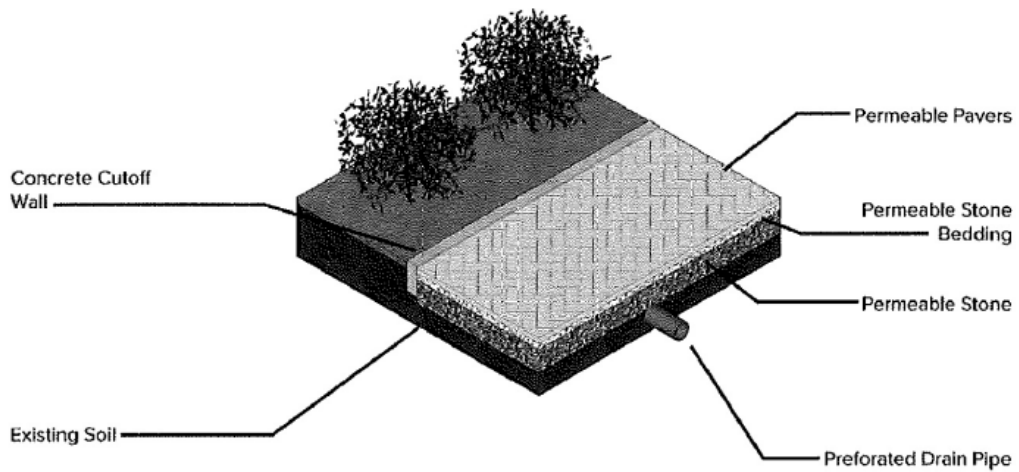
Dripline Infiltration Trench – A trench that collects and infiltrates stormwater from the roof until it soaks into the ground. Typically, 8-12 inches deep and 2-3 feet wide of crushed stone placed wherever runoff falls from the roof



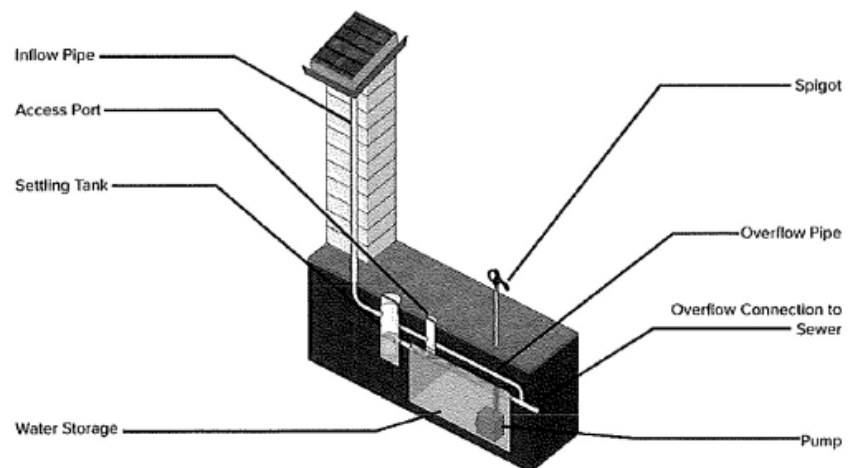
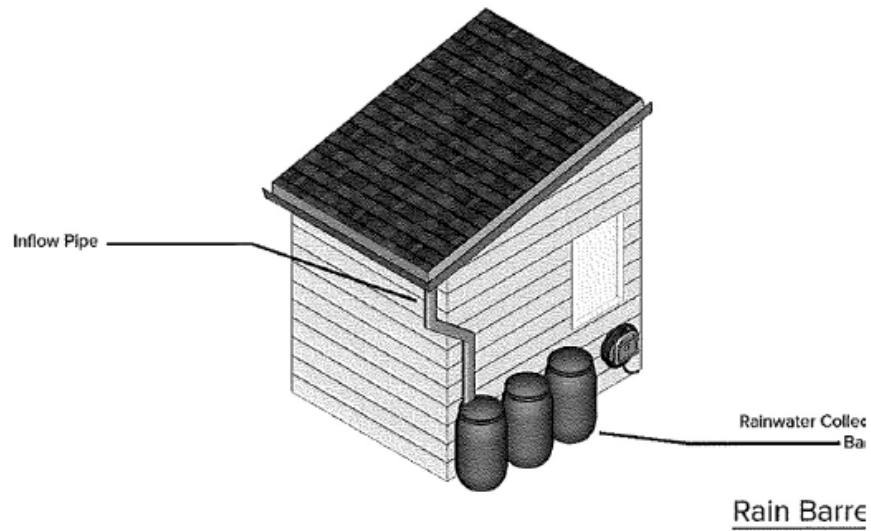
Driveway Infiltration Trench/French Drain – A trench along the side of a driveway that collects and infiltrates stormwater runoff, allowing it to soak into the ground. Dig along the side of the driveway at least eight inches deep and 2-3 feet wide. Place fill with crushed stone for well-draining soils and place four inches perforated pipe in the bottom for slowly draining soils.



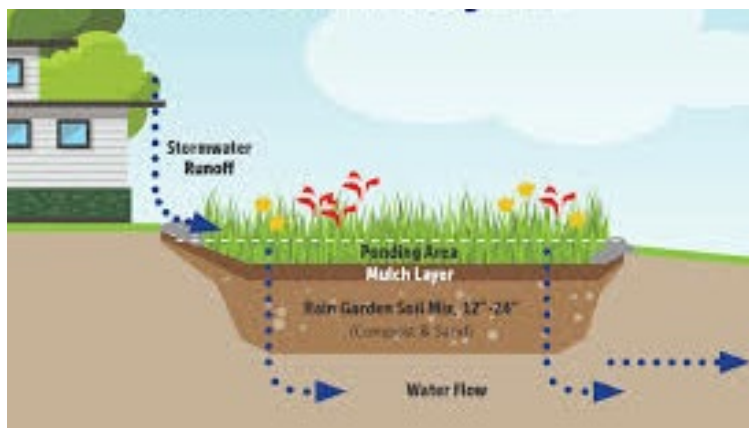
Pervious Pavers – Have the appearance of traditional pavers but can absorb and store rain and snow runoff. Subbase materials below pavers are typically twelve inches of crushed stone and six inches of pea gravel. Fill voids with sand.



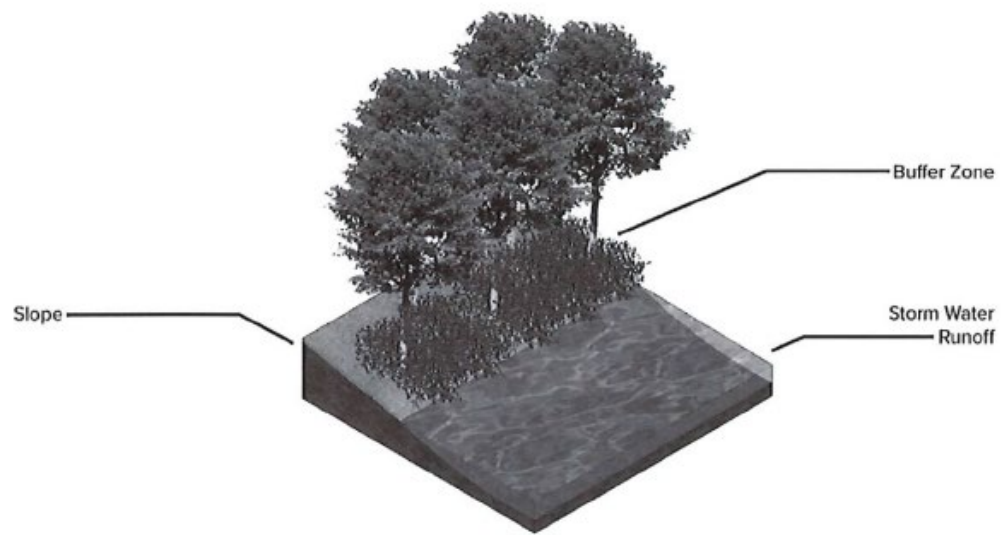
Rain Barrels/Cisterns – Captures rainwater from your roof or downspout, to allow you to use water later for lawns, gardens, etc. Cisterns may be installed underground.



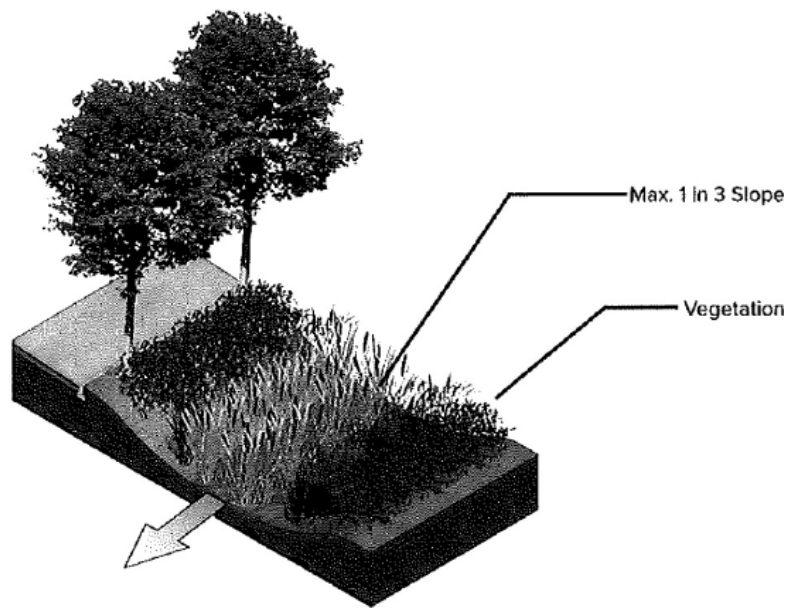
Rain Garden – Sunken, flat bottomed garden that uses specific soils and plants to absorb and treat stormwater. Must be located at least ten (10) feet from foundations.



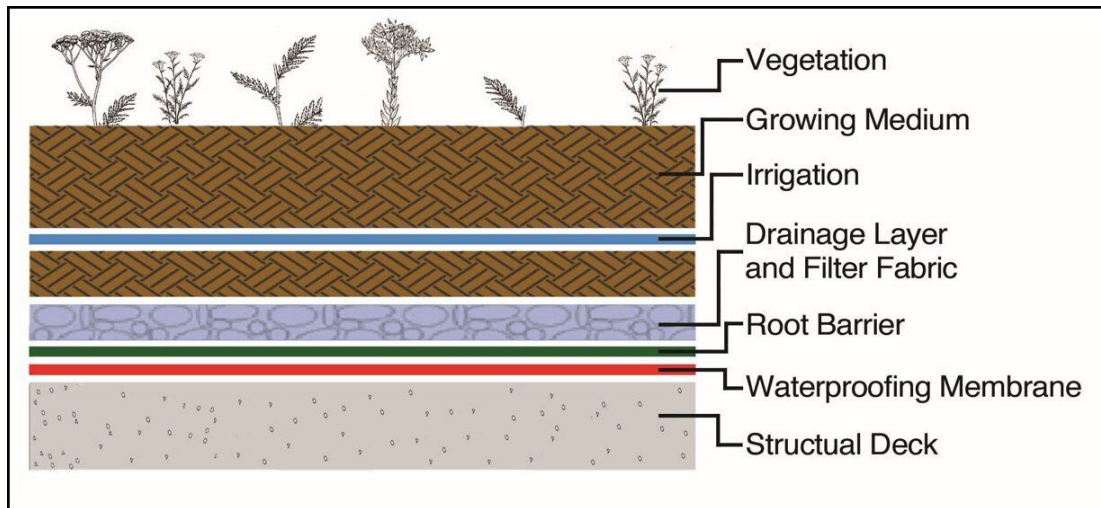
Vegetated Buffer – Planted along a body of water, or runoff area that stabilizes slopes, helps slow down and clean stormwater runoff.



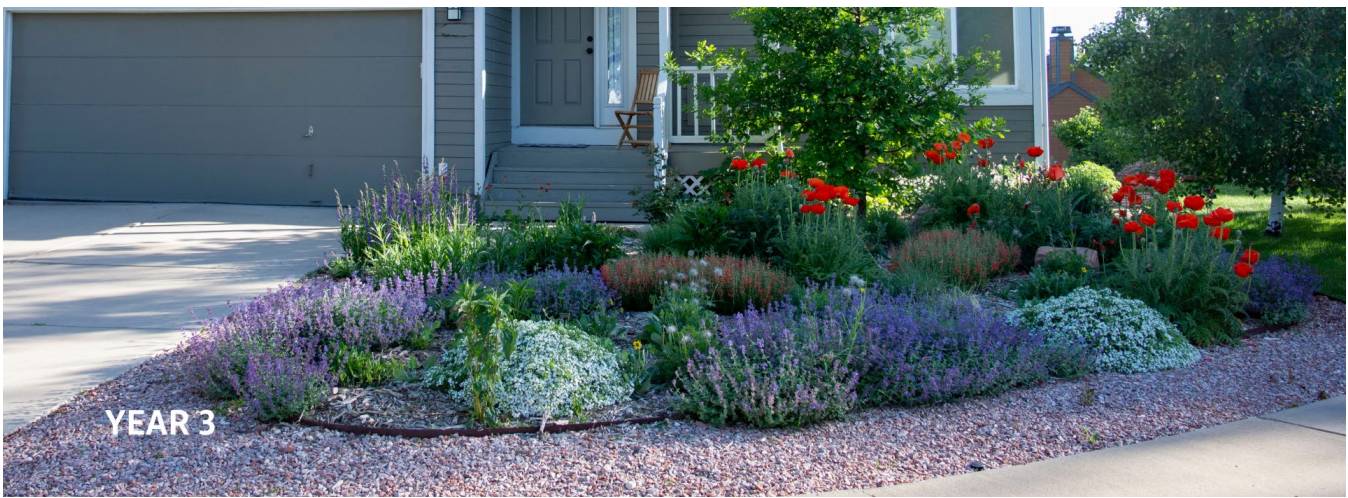
Vegetated Swale – Shallow channel that slows runoff and directs it to an area where it can infiltrate. Minimum three feet wide.



Green Roof – A living roof of a building or home that is partially or completely covered with a layer of growing medium. Planted over a waterproofing membrane. Green roofs may also contain additional layers, such as a root barrier and drainage systems.



Managed Natural Landscape – A designated area with intentionally planted and maintained areas, kept free of noxious weeds, to allow for slow infiltration of stormwater.



Part 3: Stormwater Management Calculation by Type

Tree Planting: 1 Tree = 150 Gallons. Determine the number of trees needed with the following calculation: $\text{SW Volume} \div 150 = \# \text{ of Trees}$

Driveway Infiltration Trench: $\text{Trench Length} \times \text{Trench Width} \times \text{Trench Depth} = \text{Trench Volume}$ (Cubic Feet). Vary the design of the trench length, width, and depth to achieve an equivalent trench volume.

Infiltration Trench: $\text{Trench Length} \times \text{Trench Width} \times \text{Trench Depth} = \text{Trench Volume}$ (Cubic Feet). Vary the length and width of the rain garden design to achieve an equivalent trench volume.

Rain Garden: $\text{SW Volume (Gallons)} \div 7.48 \text{ Square Feet of Rain Garden (at 12" deep)} = \text{Square Footage}$. Vary the length and width of the rain garden design to achieve an equivalent square footage.

Rain Barrel/Cistern: $\text{SW Volume (Gallons)} \div \text{Rain Barrel/Cistern storage capacity} = \text{Number of Rain Barrels/Cisterns needed}$. Vary the size and number of Rain Barrels or Cisterns to achieve an equivalent storage volume.

Vegetated Buffer: Determine slope percentage draining into buffer: 0-1%=25' buffer, 2-5%=35' buffer, 6-9%=50' buffer, 10-12%=65' buffer, 13-15%=75' buffer. Length is determined by length of property.

Vegetated Swale: $\text{SW Volume (Gallons)} \div 7.48 = \text{Square feet of swale (at 12" deep)}$. Vary the length and width of the swale design to achieve an equivalent square footage.

Pervious Pavers: $(\text{Gallons of water} \times 2) \div 7.48 = \text{Square feet of space (at 12" gravel depth)}$. Determine the SW volume and multiply by two to get the required treatment volume. Divide by 7.48 to get the required square footage of pervious pavers. Vary the length and width of the pervious paver area to design to achieve an equivalent square footage.

Green Roof: Equal to the amount of new development square footage. Subtract this amount of impervious area when determining the required SW Volume.

Managed Natural Landscape: Equal to half the amount of new development square footage.