



## GREEN STORMWATER INFRASTRUCTURE (GSI) FACT SHEET

### GSI CONCEPT #2

# Evapotranspiration

#### WHAT IS IT?

Evapotranspiration (ET) is a process by which water is transferred from the earth's surface into the atmosphere. ET is the sum of water surface evaporation, soil moisture evaporation, plant surface evaporation, and plant transpiration, a process in which trees and other plants absorb water through their roots and transfer it up to the atmosphere through leaf pores.

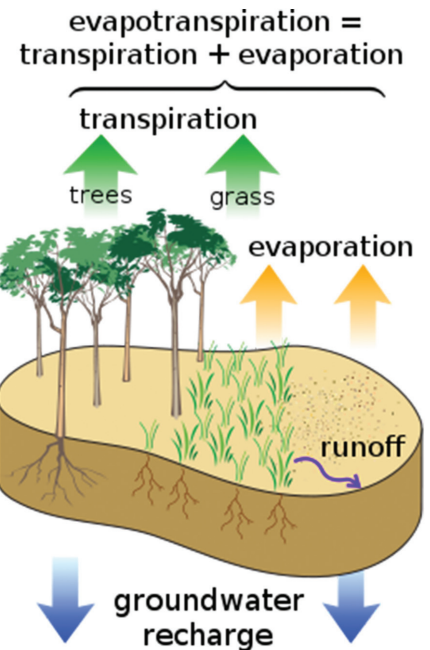
Evapotranspiration happens naturally and is an important and critical part of the water cycle because it represents a considerable loss of water from a watershed.



#### HOW CAN IT ASSIST IN THE MANAGEMENT OF STORMWATER?

The process of evapotranspiration can be used in a variety of ways to control stormwater runoff volumes and protect and restore natural hydrology. Surface vegetation and sprawling trees canopies provide a large surface area for evaporation and by planting trees and maintaining surface vegetation, rainwater can be intercepted before it hits the ground. Additionally,

robust root systems pull water from underlying soils and transpire it into the atmosphere, decreasing soil saturation levels. Furthermore, by protecting, restoring, and mimicking natural wetlands, runoff is slowed and dispersed over the landscape, increasing surface water losses and providing opportunities for increased plant uptake.



#### WHAT FACTORS AFFECT IT?

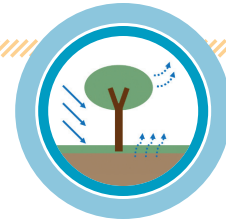
Evapotranspiration is affected by a variety of environmental factors including air temperature, wind speed, relative humidity, soil moisture, and solar radiation. It can also be affected by plant characteristics such as plant type, size, age, and health. Geographic factors such as latitude, longitude, and elevation may also play a role as does season and time of year.

Factsheet prepared by the Vermont Green Infrastructure Initiative, a program of the Watershed Management Division of the VT Department of Environmental Conservation (<http://watershedmanagement.vt.gov/>).



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## GSI CONCEPT #2: EVAPOTRANSPIRATION



### PUTTING THE CONCEPT TO WORK

A variety of green stormwater infrastructure (GSI) systems and practices utilize evapotranspiration to manage stormwater. While the complexities of each differ, the basic goals are the same: increase surface area to promote evaporation and maintain healthy and robust vegetative cover to support transpiration. Below are a few examples of GSI best management practices that utilize evapotranspiration. Additional BMP's can be viewed at: [http://www.watershedmanagement.vt.gov/stormwater/htm/sw\\_green\\_infrastructure.htm](http://www.watershedmanagement.vt.gov/stormwater/htm/sw_green_infrastructure.htm).



### Green Roof

#### BENEFITS

- > Reduced energy use
- > Recreational enjoyment
- > Roof longevity

A green roof is the roof of a building that is partially or completely covered with vegetation. Green roofs serve many purposes, one of which is stormwater management. They are capable of absorbing, storing, and evapotranspiring a great deal of water. In cold climates, architectural/engineering consultation is extremely important due to the additional weight of snow and ice.



### Constructed Wetland

#### BENEFITS

- > Wildlife and aquatic habitat
- > Cost effectiveness
- > Water quality

A constructed wetland is a shallow retention pond designed to permit the growth of wetland plants such as rushes, willows, and cattails. Constructed wetlands slow runoff and allow time for sedimentation, filtering, and biological uptake. Constructed wetlands are designed specifically to mimic natural wetland environments. They are heavily vegetated and thus have high evapotranspiration rates.



### Stormwater Tree Pit

#### BENEFITS

- > Decreased maintenance
- > Shade to nearby buildings

Stormwater tree pit systems use engineered soils to infiltrate and filter stormwater. They are particularly useful in tight urban and downtown locations. Some systems allow for increased soil volume to grow large mature trees resulting in increased ET and other benefits. Most of these systems are able to promote vigorous root growth beneath existing infrastructure such as roads and sidewalks with little to no conflict.

### REFERENCES

The Water Cycle: Evapotranspiration, U.S. Department of the Interior, U.S. Geologic Survey, <http://ga.water.usgs.gov/edu/watercycleevapotranspiration.html>

Gulliver, J.S., A.J. Erickson, and P.T. Weiss (editors). 2010. "Stormwater Treatment: Assessment and Maintenance." University of Minnesota

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