


Green Infrastructure for Surface Water Protection



What is Green Infrastructure?

Green infrastructure uses vegetation, soils, and natural processes to manage water in a way which mimics the natural hydrology of an area. At the landscape level it is a network of connected green space, forests, wetlands, lakes and river corridors that provide multiple ecological benefits. At the local level it refers to stormwater management systems that mimic nature by soaking up and storing water to replicate the naturally occurring mechanisms lost due to development.

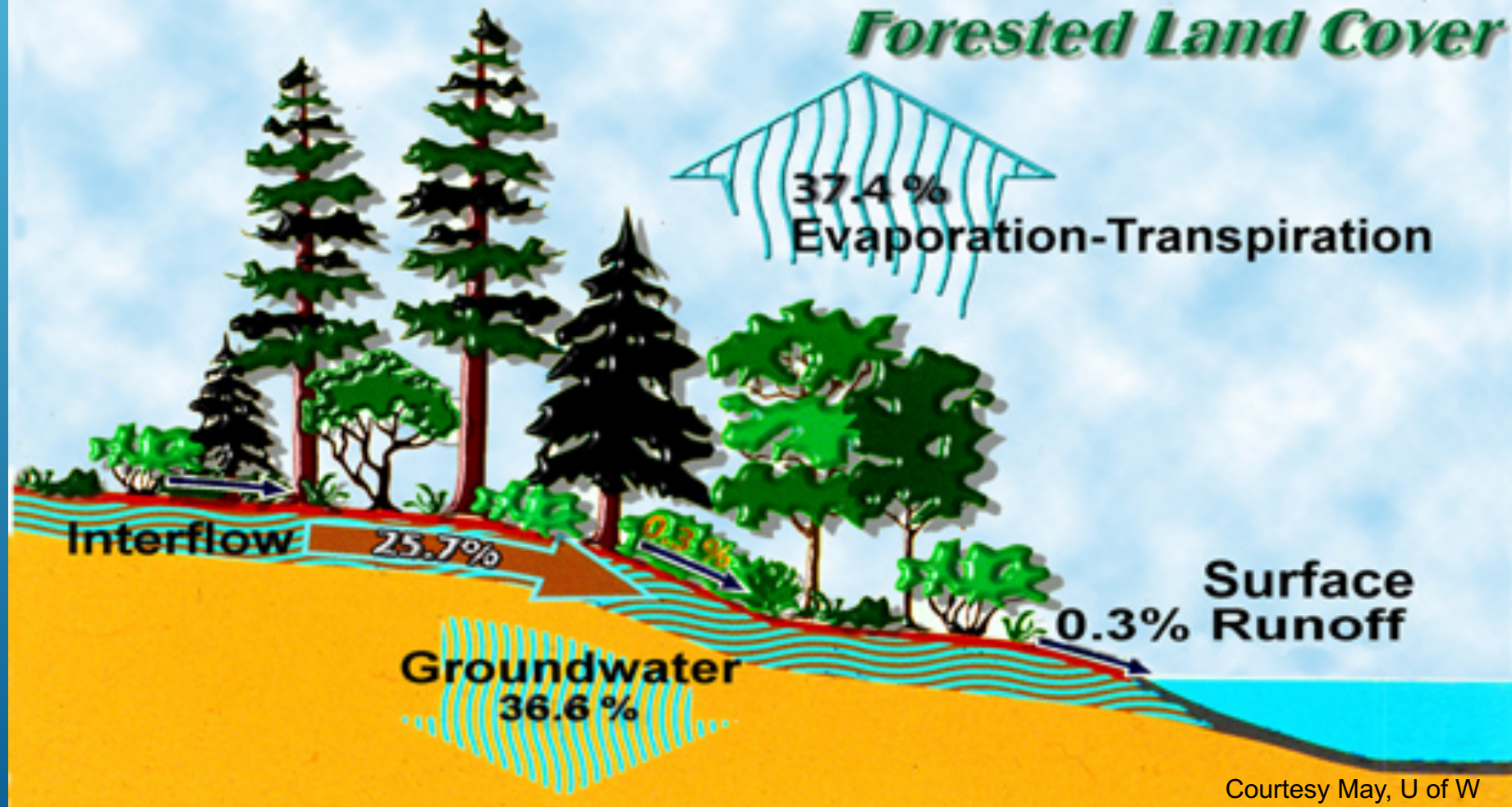
A series of white lines of varying lengths and orientations are positioned on the right side of the slide, creating a modern, abstract graphic element.

Green Infrastructure is used to;

- ▶ Remove pollutants from storm runoff
- ▶ Maintain or restore natural site hydrology
- ▶ Maintain stream and wetland integrity
- ▶ Prevent erosion and sedimentation
- ▶ Bring peace and restore health

Typical Annual Water Budget

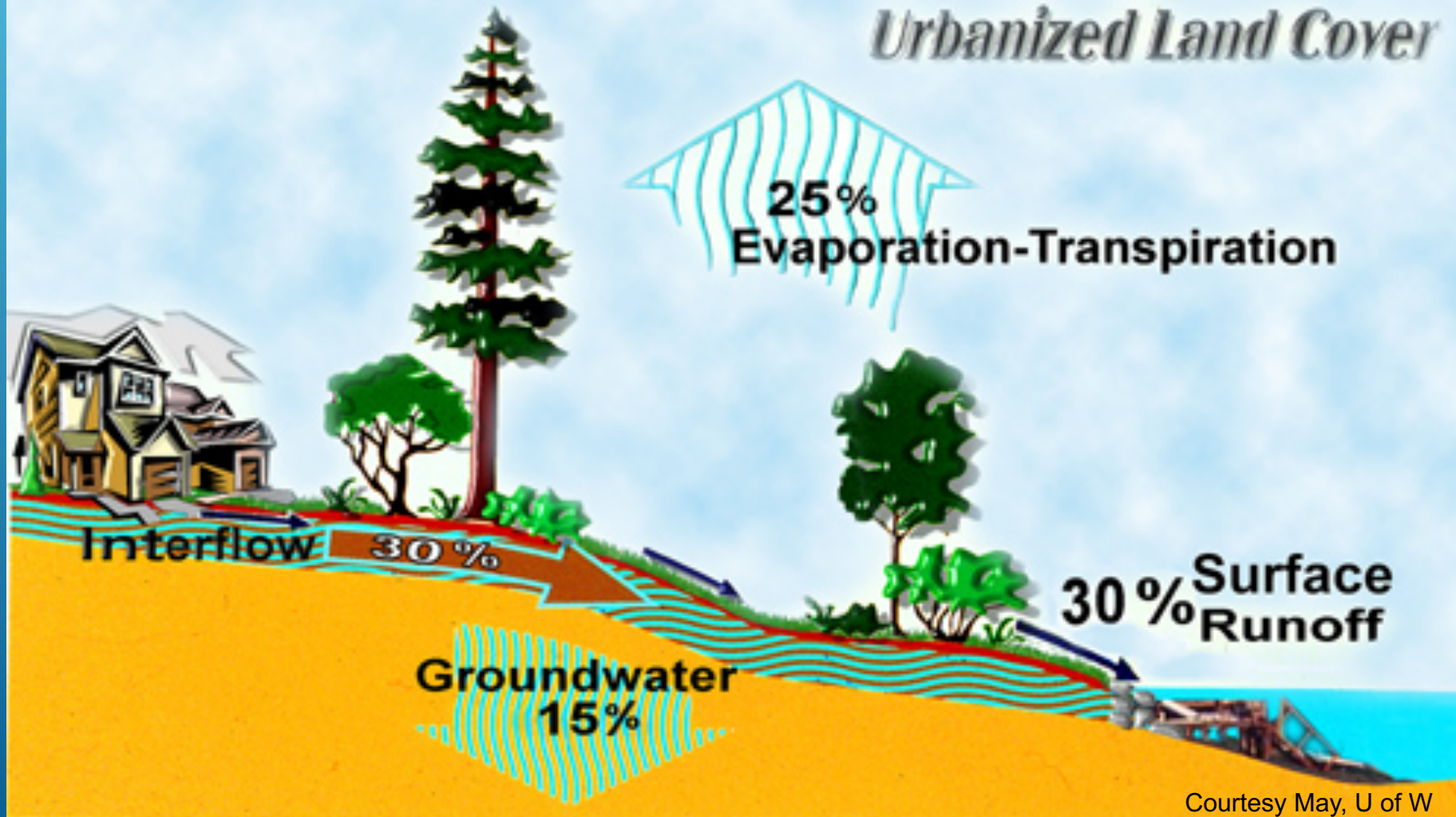
Forested Land Cover



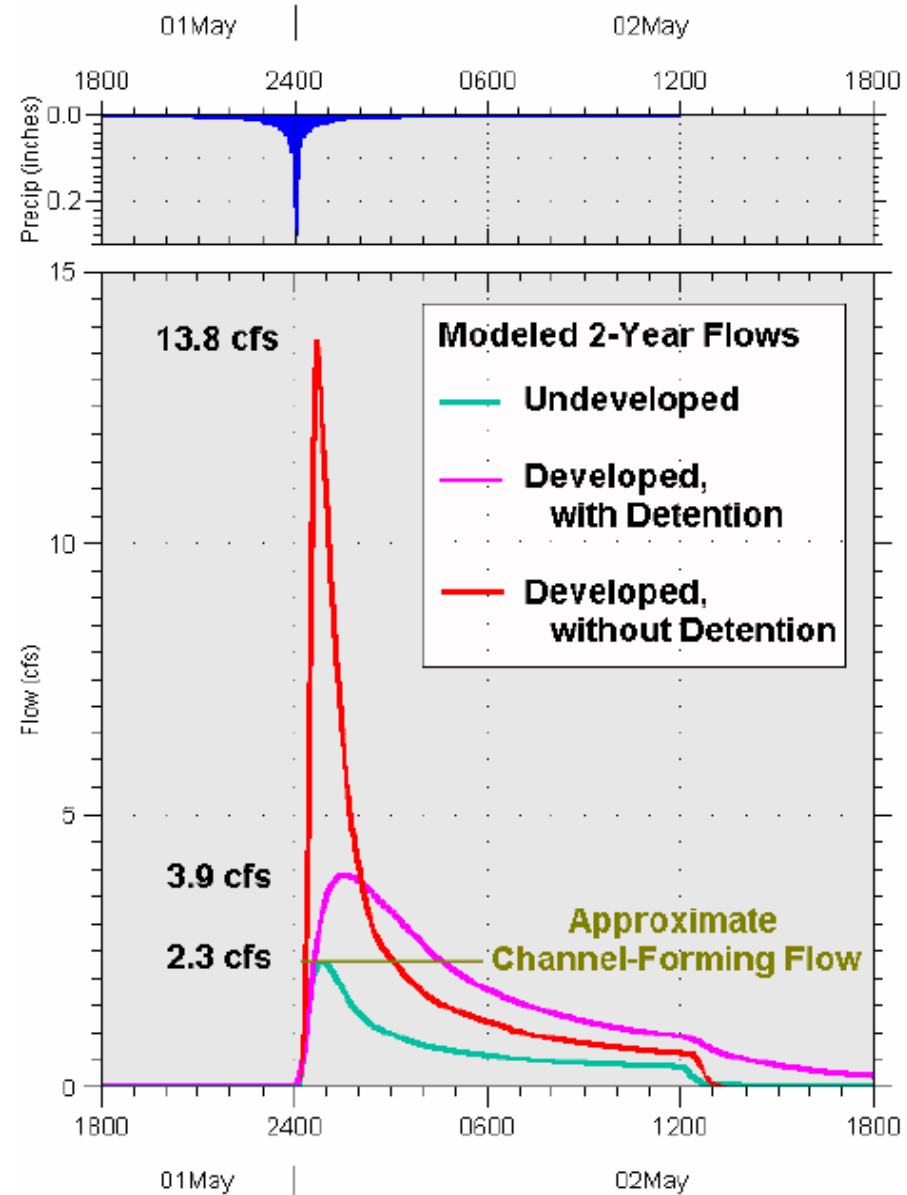
Courtesy May, U of W

Typical Annual Water Budget

Urbanized Land Cover

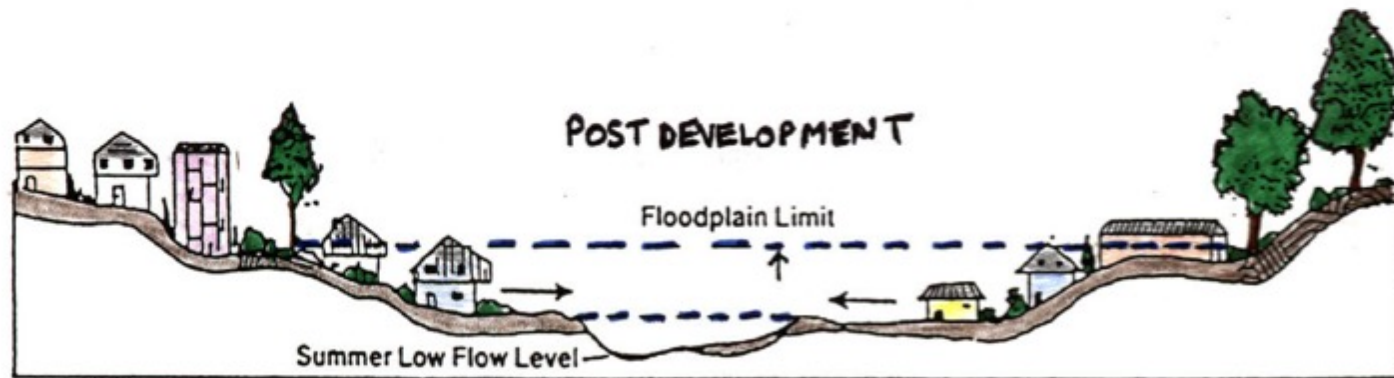
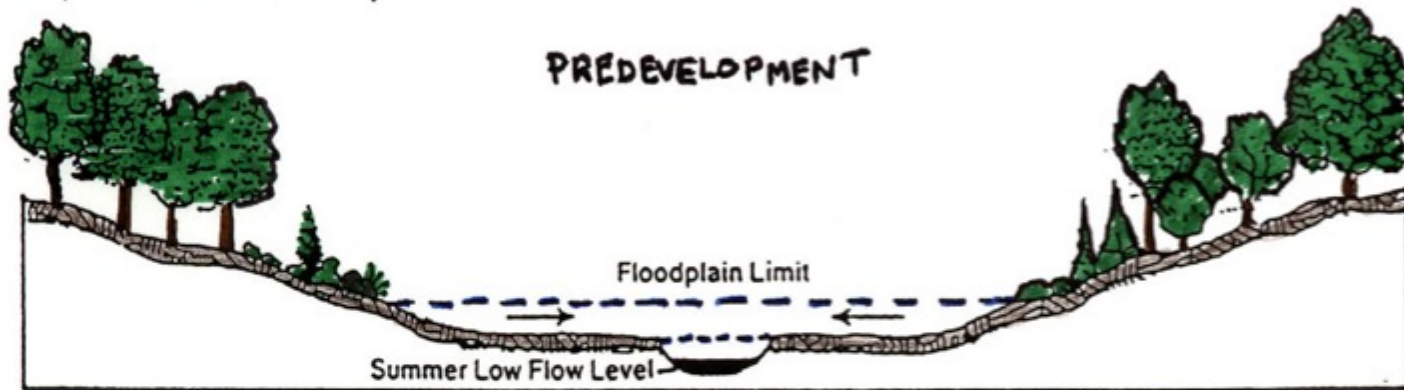


Courtesy May, U of W

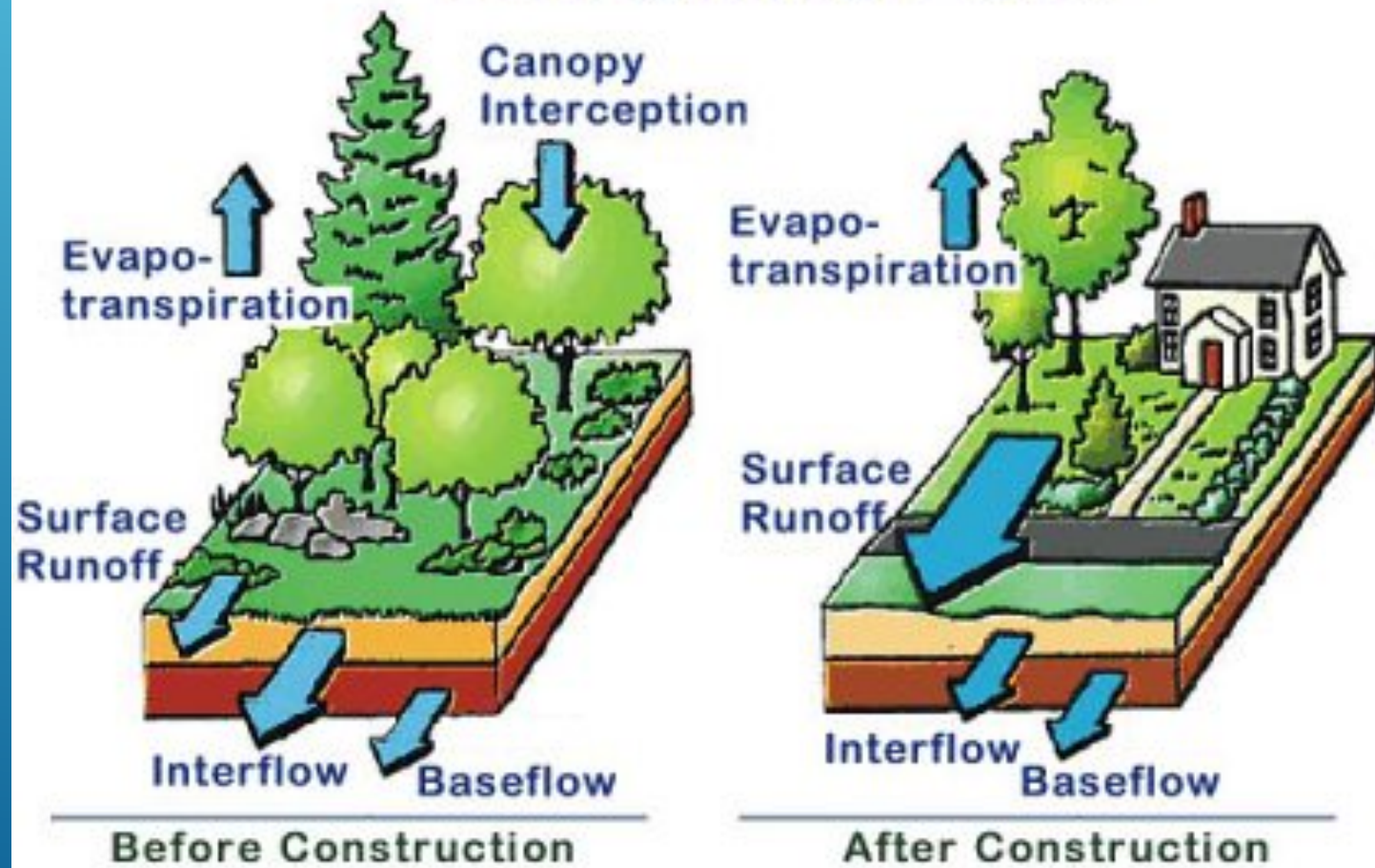


THE STREAM AND ITS FLOODPLAIN, BEFORE AND AFTER DEVELOPMENT

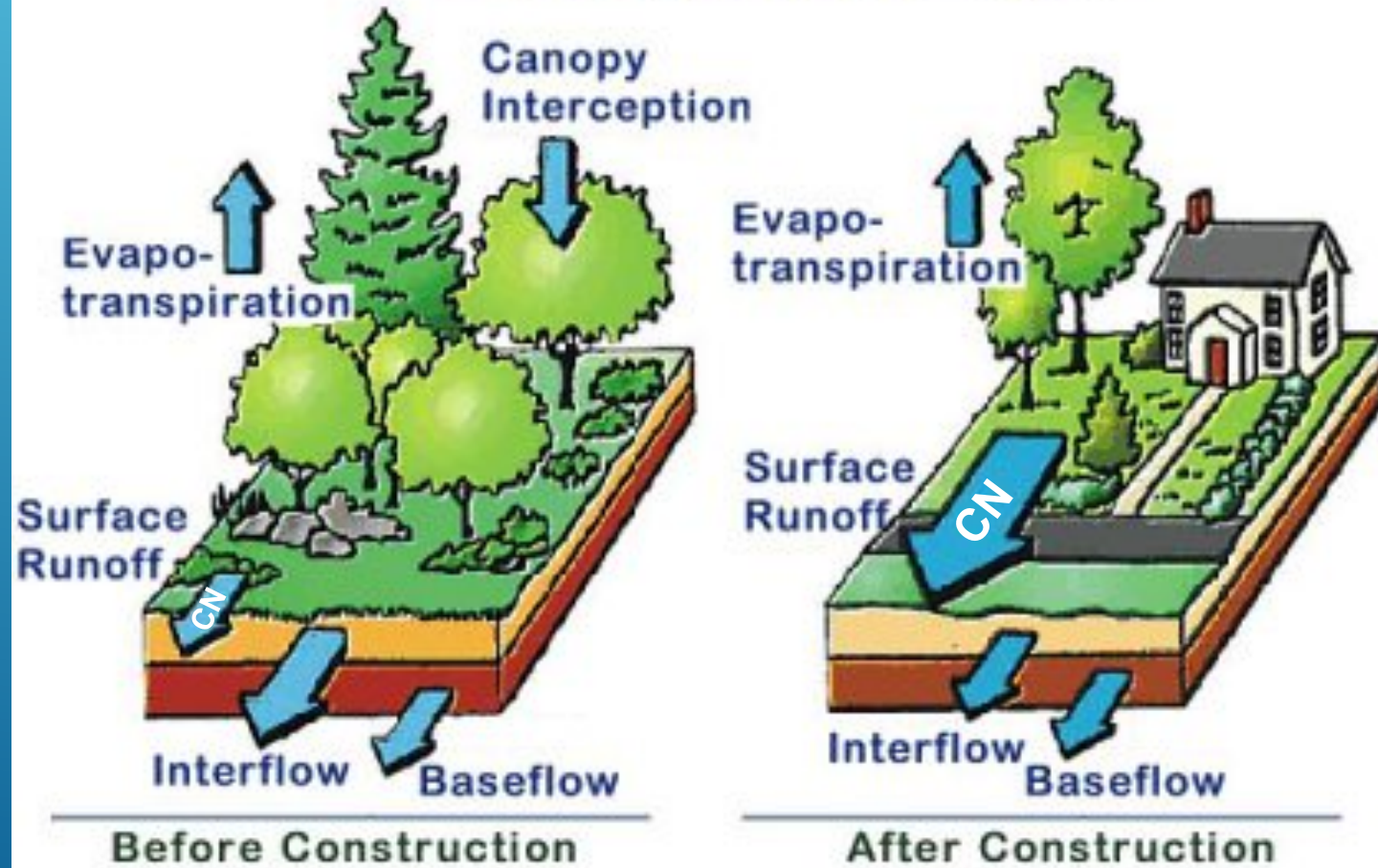
Response of Stream Geometry



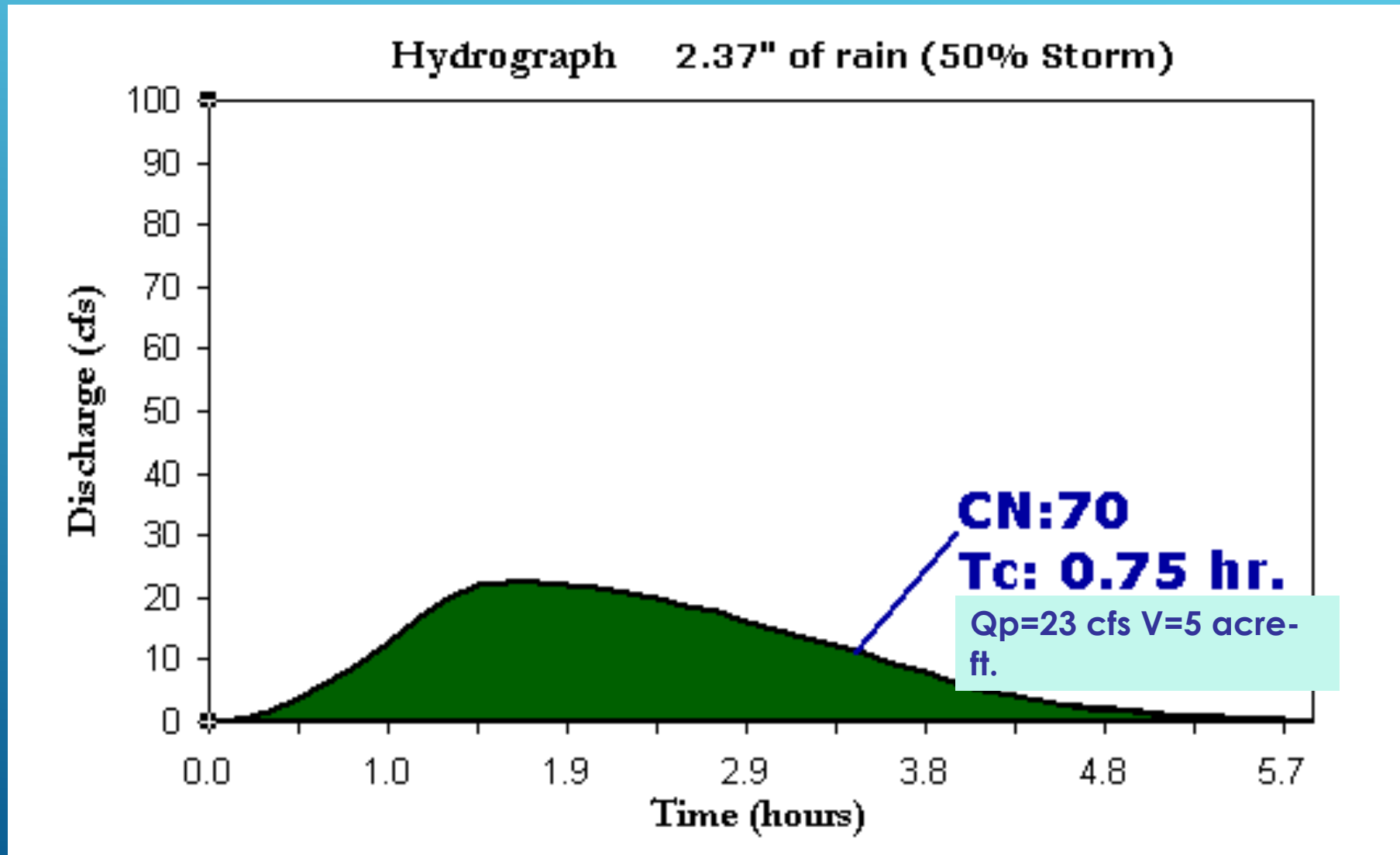
Local Hydrologic Cycle



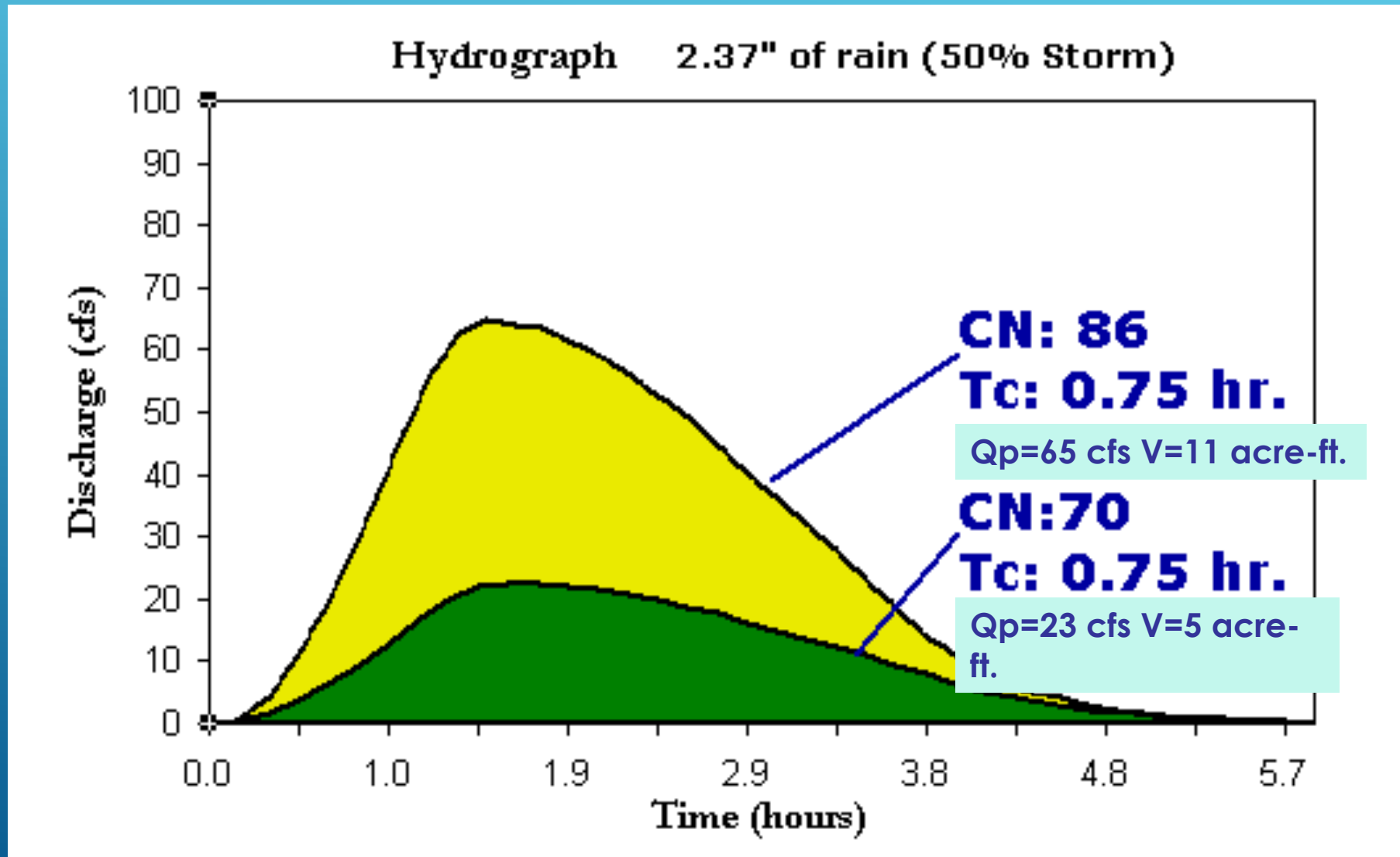
Local Hydrologic Cycle



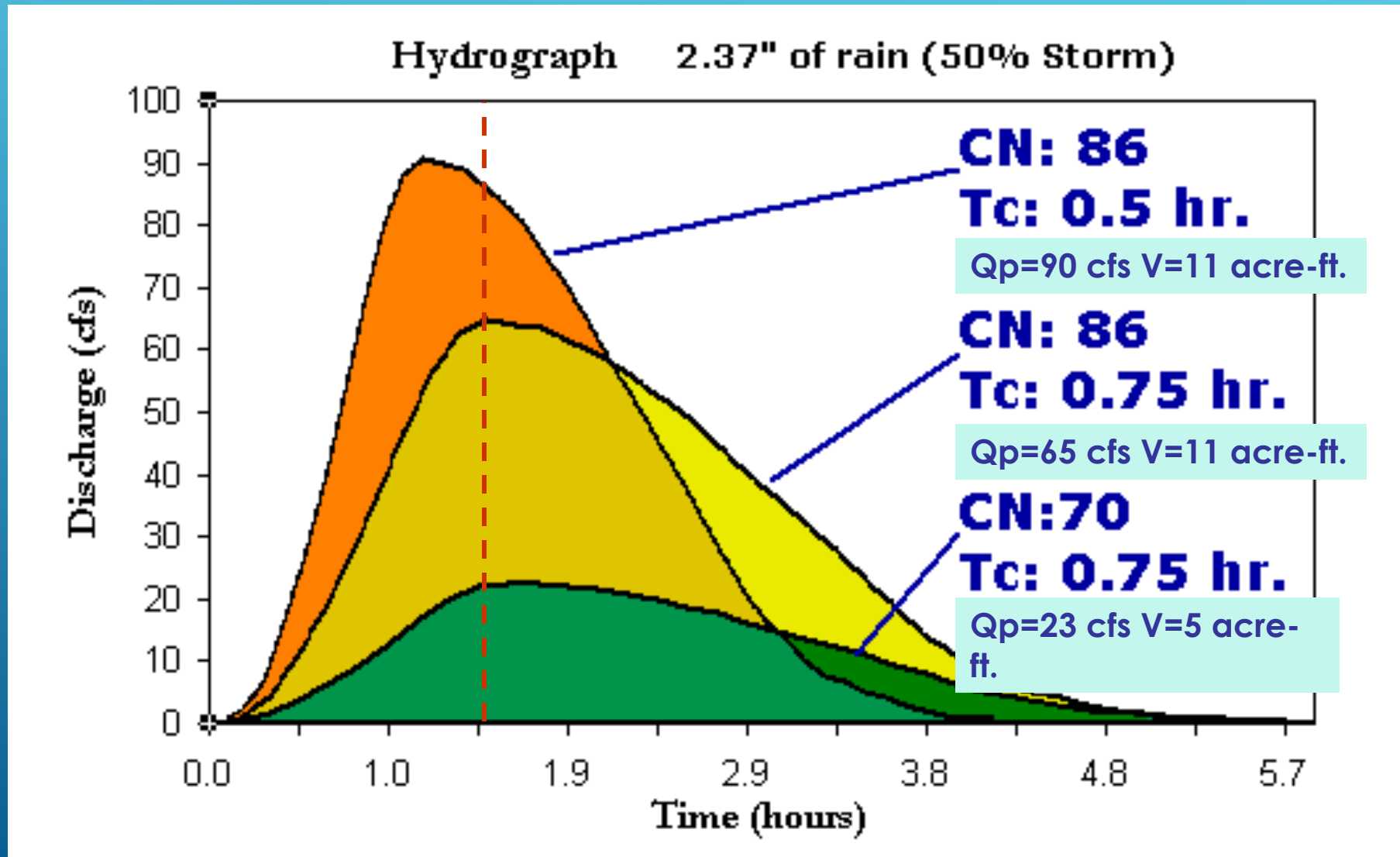
Hydrograph for a farm on sandy soil or woods on loamy soil.



Loss of infiltration due to development increases total runoff volume and peak flows.

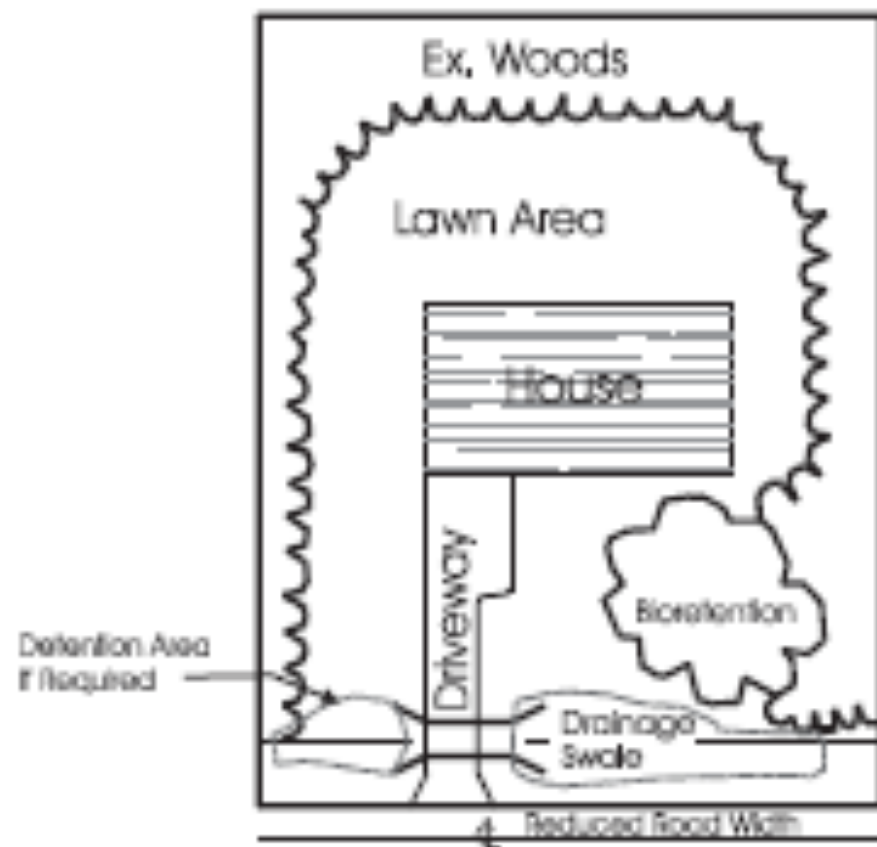
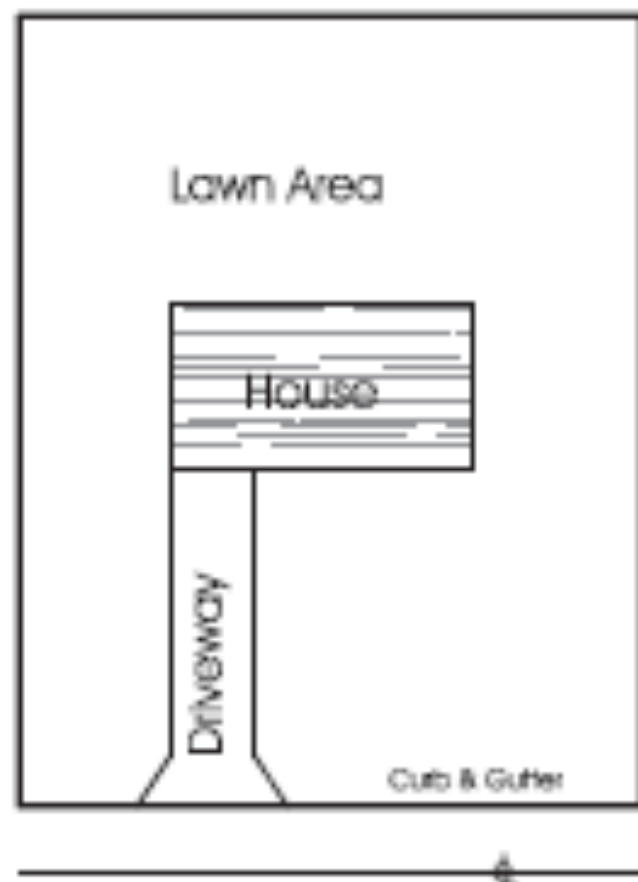


More rapid runoff further increases peak flows.



Green Infrastructure at the site level

- ▶ Conservation of existing critical features
- ▶ Minimization of impacts
- ▶ Maintaining predevelopment hydrology
- ▶ Applying Integrated Management Practices that infiltrate, filter, detain, evaporate, and reuse stormwater at its source.



Maintaining Hydrology

- ▶ **Time of Concentration (T_c)**

- ▶ The time it takes water to get from the farthest point in a watershed to a point of collection.

- ▶ **Volume**

- ▶ The quantity of water that runs off a site during a storm event.

- ▶ **Peak Flow Rate**

- ▶ The highest flow rate of a storm event.

Design Volume

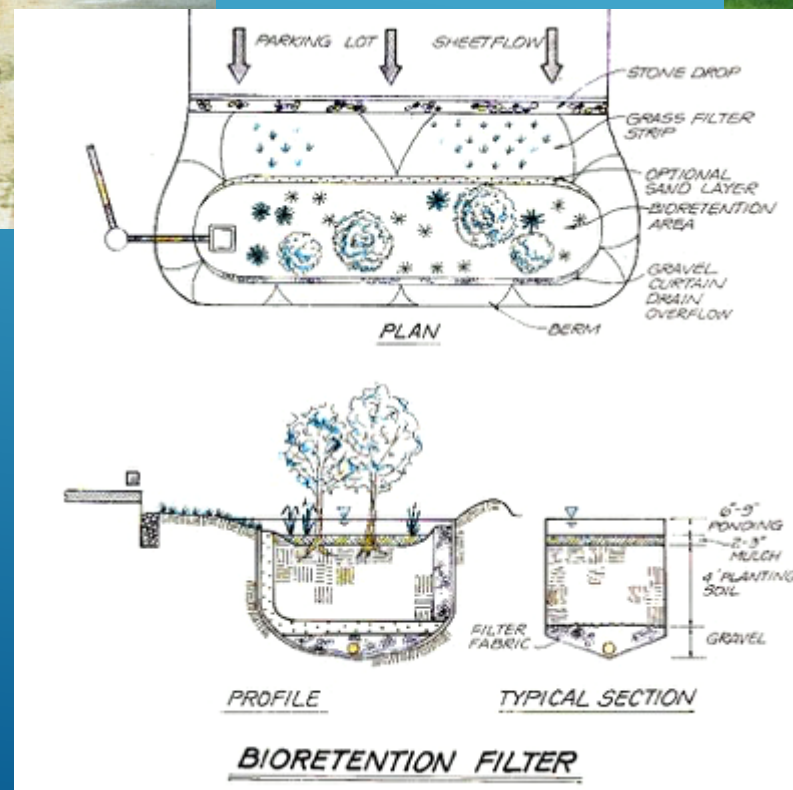
- ▶ **0.75 to 1 inch of rain** – Water Quality
- ▶ **1-2 year storm** – Stream channel protection
- ▶ **5-10 year storm** – Storm sewer design, common drainage.
- ▶ **100 year storm** – Most flood plain limitations

Controlling Time of Concentration

- ▶ Maintain Natural Drainage Paths
- ▶ Use open swales
- ▶ Increase surface roughness
- ▶ Detain flows
- ▶ Minimize disturbance
- ▶ Flatten grades in disturbed areas
- ▶ Disconnect imperviousness
- ▶ Connect pervious and vegetated areas



Rain Gardens and Bioretention

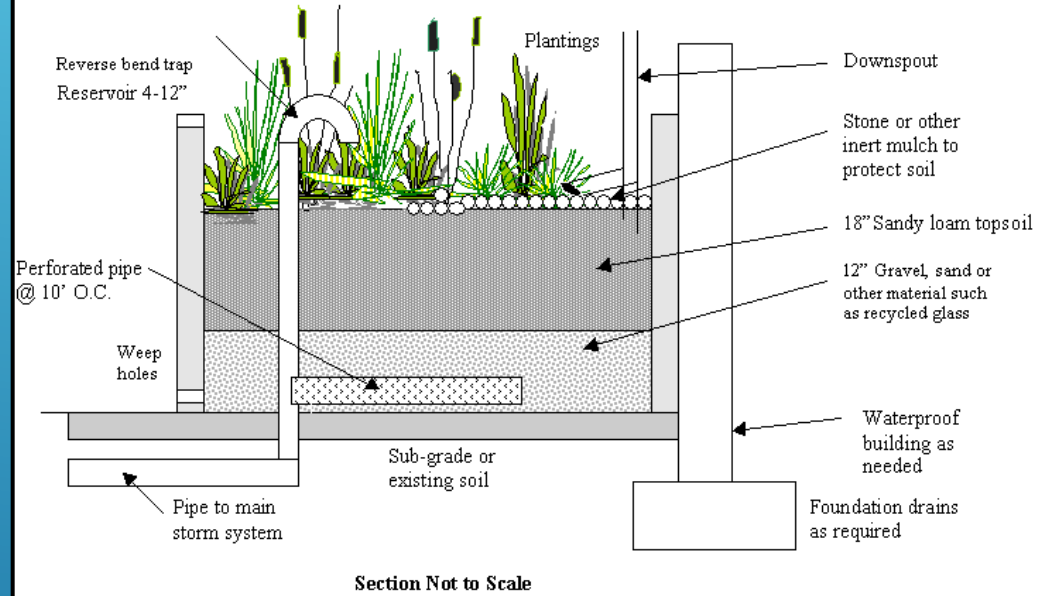


BIOREMEDIATION





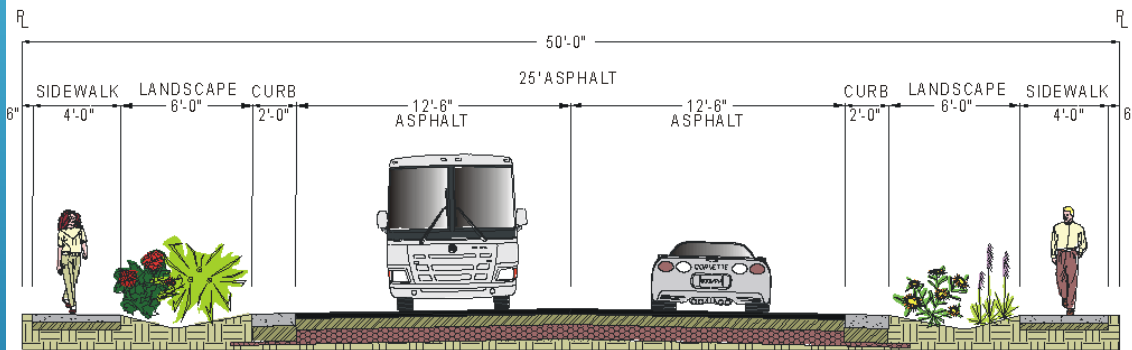
Stormwater Planter CD





Transportation

NEW 50' RIGHT-OF-WAY SERVICE UP TO 25 RESIDENCES



LOW IMPACT RESULTS

- 17% LESS ASPHALT SURFACE
- 5-8% STORM WATER RUNOFF REDUCTION
- 86% INCREASE IN GREEN SPACE



After Completion - January 2001

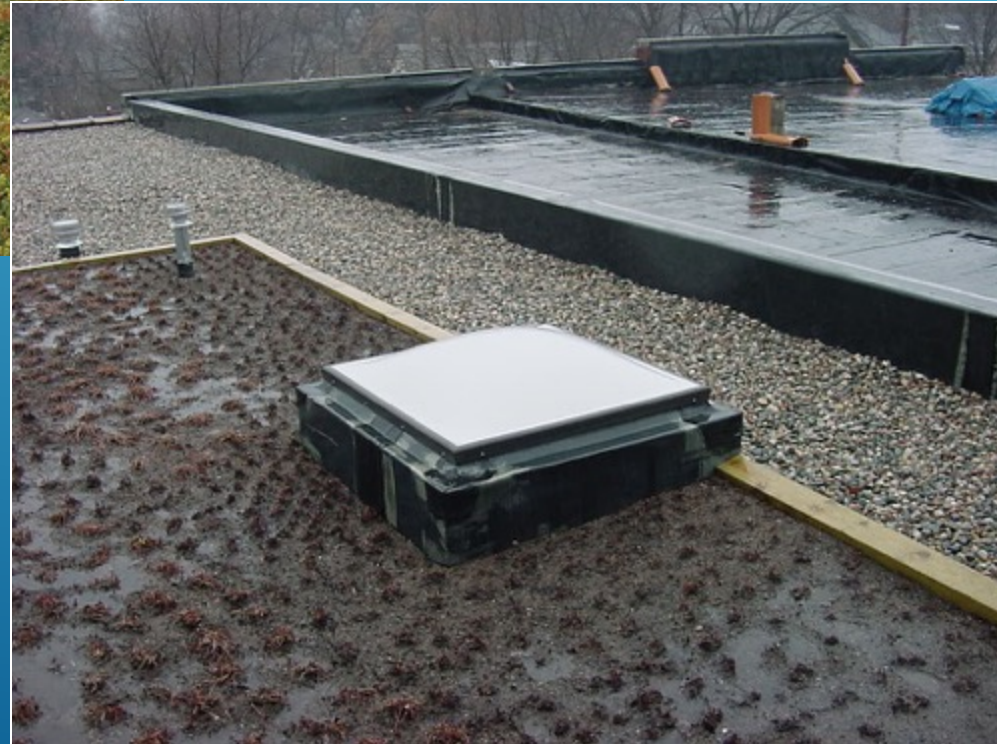


Pervious Pavement





Green Roofs





MAY 29 2001



1 Acre Site on C Soils

