



“Smart Growth” / Economic Development Initiative

Evaluation of Low Impact Development (LID) Techniques

Town of Littleton, Massachusetts

July 20, 2006

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Outline

- **Littleton's Goal: "Smart Growth"**
- **Overview of Low Impact Development (LID)**
- **Development of a Stormwater Management Manual**
- **Next Steps**

Goals of “Smart Growth”

- Economic Development
- Water Resources Management and Protection



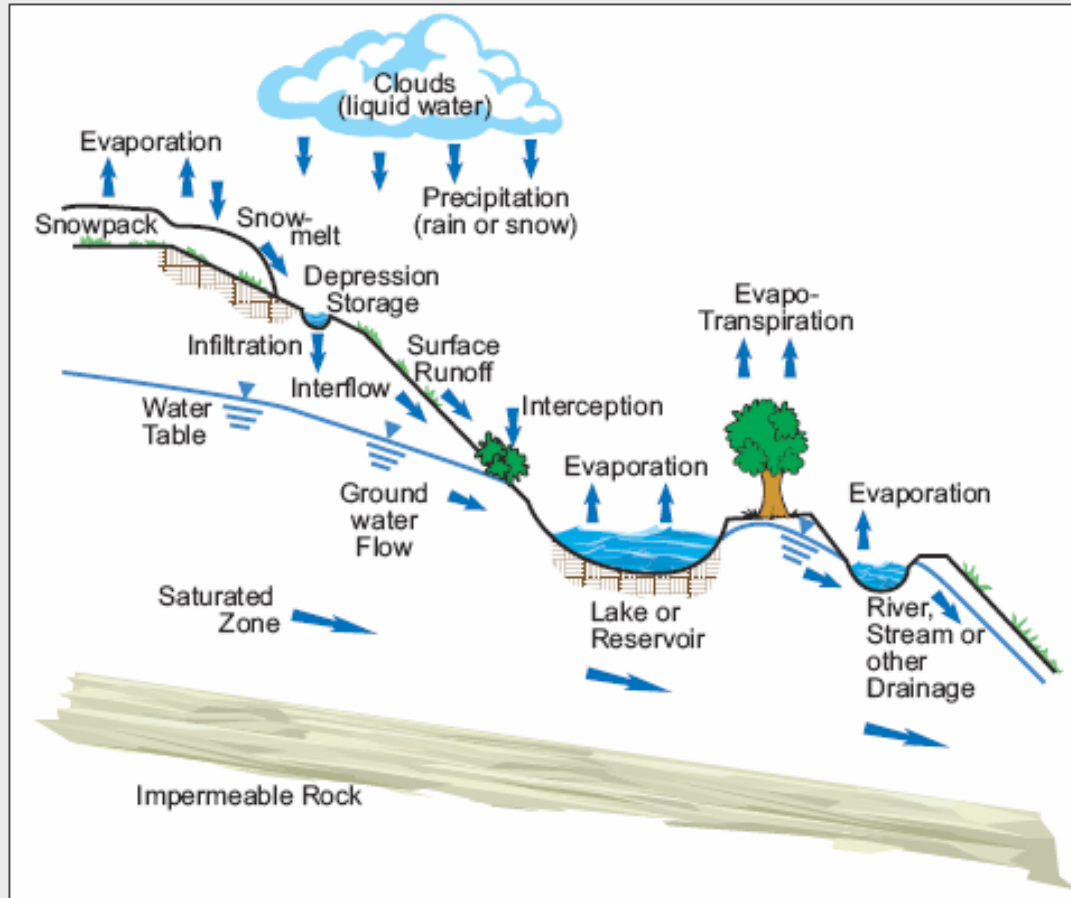
Littleton's Objectives

- **Ensure protection of water resources**
- **Improve stormwater management**
- **Maintain water *quality* and *quantity* relative to pre- and post-development**
- **Encourage economic development**
- **Minimize cost impact to developers**

Achieving the Objectives using Low Impact Development (LID) Techniques

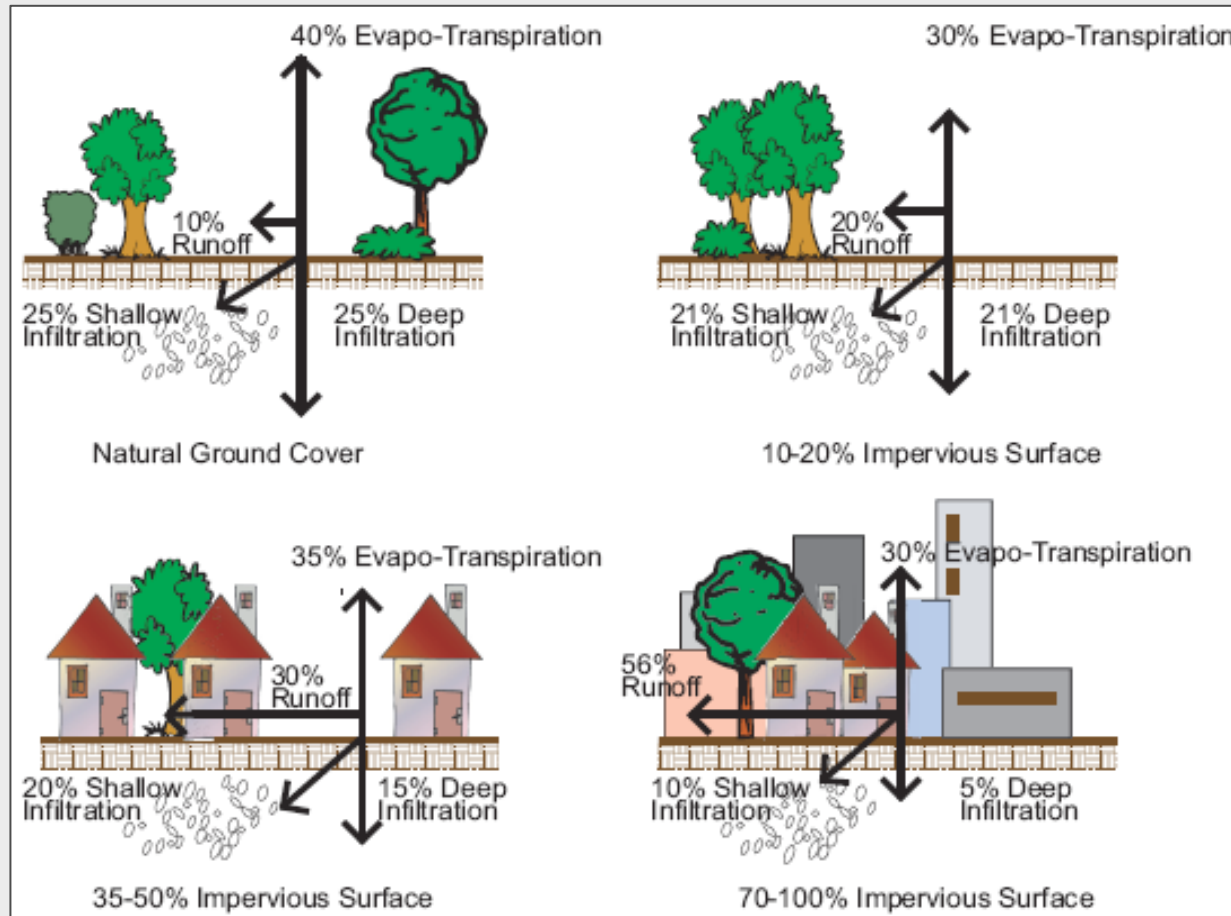
- LID is a component of Smart Growth
- LID uses techniques to mimic the site's pre-development hydrologic conditions through “Best Management Practices” (BMPs)
- Address *infiltration, attenuation, and treatment* according to site needs

Infiltration, Attenuation & Treatment



Source: Welsh, 1998

Development's Impact



Source: EPA, 1993

Mitigating the Impact of Development

- **Using stormwater Best Management Practices (BMPs)**
 - Provide groundwater recharge
 - Attenuate peak flows
 - Provide stormwater treatment to maintain water quality

BMP examples: Infiltration

*Primarily addresses **infiltration**, secondarily addresses storage and quality*

- Porous pavement
- Pedestal sidewalks
- Parking groves
- Vegetated swales
- Infiltration basin



Vegetated swale at Long Lake

BMP examples: Detention/Retention

*Primarily addresses **storage**, secondarily addresses infiltration and quality*

- **Dry Ponds**
- **Wet Ponds**
- **Above-ground rain barrels**
- **Below-ground rain barrels**



Wet ponds can also have aesthetic and habitat benefits. A great blue heron is lurking in the reeds of this pond.

BMP examples: Bioremediation

*Primarily addresses **quality**, secondarily addresses infiltration and storage*

- **Bioretention cells, raingardens**
- **Tree box filters**
- **Constructed wetlands**
- **Green roofs**



Raingarden at a Littleton Residence

Developing a Stormwater Management Policy for Littleton

- **Endorse BMP/LID techniques**
- **Bylaw modifications**
- **Develop a Stormwater Management Manual**
 - **Preferred BMPs for Littleton**
 - **Stormwater credit program that allows increased impervious surface for development**

Littleton LID Matrix (partial)

Low-Impact Development Technique	Effect on Stormwater			Compatible Soil Types		Land Use		Type of Construction		Space	O & M	Aesth
	Infil	Atten	Treat	Sand	Till	Resid	Com / Ind	New	Retro			
Bioretention												
Bioretention cells/ biofilters/raingardens	Green	Yellow	Green	Green	Yellow	Green	Green	Green	Green	Green	Yellow	Green
Tree box filters/stormwater planters	Green	Red	Green	Green	Yellow	Green	Green	Green	Green	Green	Green	Green
Dry ponds (extended detention ponds)	Red	Green	Yellow	Green	Yellow	Yellow	Green	Green	Yellow	Red	Yellow	Red
Wet ponds (retention ponds)	Red	Green	Green	Yellow	Green	Yellow	Green	Green	Yellow	Red	Yellow	Green
Sand/organic filters	Green	Yellow	Green	Green	Green	Green	Green	Green	Green	Green	Red	Yellow
Open Vegetated Channels												
Dry swale/underdrain grassed channel	Green	Green	Yellow	Green	Green	Green	Green	Green	Green	Yellow	Green	Yellow
Wet swale	Green	Green	Yellow	Green	Green	Green	Green	Green	Green	Yellow	Green	Yellow

Goals

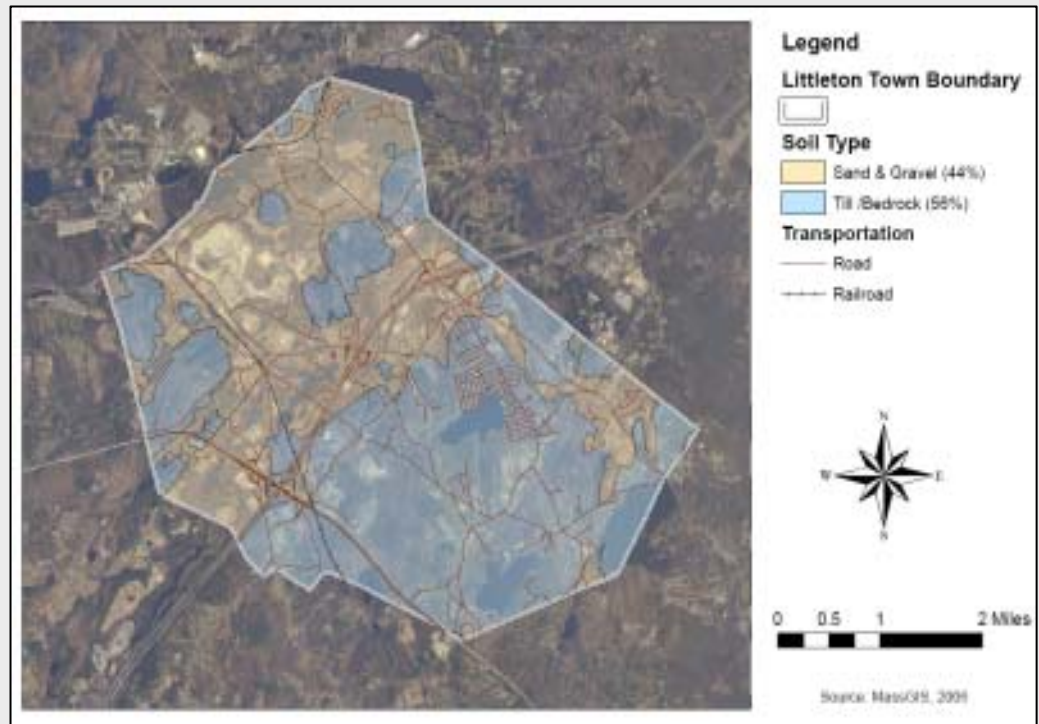
Overview of LID

Stormwater Management Manual

Next Steps

BMP Evaluation Criteria

- **The BMPs' Effect on Stormwater: Infiltration, attenuation, treatment**
- **Compatible Soil Types**
 - **Sand and Gravel (very permeable)**
 - **Glacial Till (less permeable)**



BMP Evaluation Criteria *(con't)*

- **Compatible Land Uses**
 - Residential
 - Commercial/ Industrial
- **Appropriate for New vs. Existing Construction**
- **Space Requirements**
- **Operation and Maintenance**
- **Aesthetic Improvements**



BMP/LID Stormwater Management Manual

- **Matrix and policy recommendations will be compiled into a Stormwater Management Manual**
- **Manual could include a Stormwater Credit program to allow impervious development of site to greater than the current limit (20%)**

Next Steps

- **Research stormwater credit programs**
- **Develop stormwater credit program for Littleton**
- **Recommend amendment or update of bylaws to incorporate the new program**

Questions & Comments



Long Lake Restoration Project

The goal for the restoration of Long Lake is to improve water quality and reduce the amount of phosphorus entering the lake. This will help to reduce the amount of algae blooms and improve the overall health of the lake. The project includes several key components:

- The Best Launch was redesigned:** 
- Rain Barrels were installed throughout the watershed:** 
- A Wetland Park was created:** 
- Filter strips were installed in the launch parking lot:** 
- Rain gardens were installed in various locations within the watershed:** 

The project was funded by the State of Michigan and the local community. For more information, visit www.longlake.org.

Partners: Michigan Department of Environment and Natural Resources, Washtenaw County, and the Long Lake Community Association.

Logos: Michigan Department of Environment and Natural Resources, Washtenaw County, and Long Lake Community Association.

