Putting a LID on Stormwater Pollution

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Water Quality Division

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Outline

- Brief Regulatory History
- Conventional vs. Green Practices
- LID/GI Controls in Use

Clean Water Act

- First passed in 1972
- Established the National Pollutant Discharge Elimination System (NPDES)
- Focus on point source discharges
  - Pipes, drains, other easily identified points of discharge
- Amended in 1987
  - Addressed more diffuse sources of pollution, such as stormwater discharges
- Goals:
  - To restore and maintain the chemical, physical, and biological integrity of the nation's waters
  - Swimmable, fishable waters

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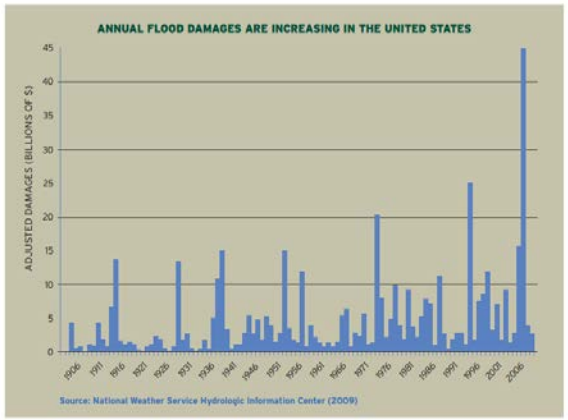
Some Facts

- 55% of U.S. streams and rivers are in poor condition
  - 40% have excessive phosphorus levels
  - Over 25% have excessive nitrogen levels

- Frequency of flooding events is increasing
  - Increase in heavy rainfall events
  - Increase in damages from flooding



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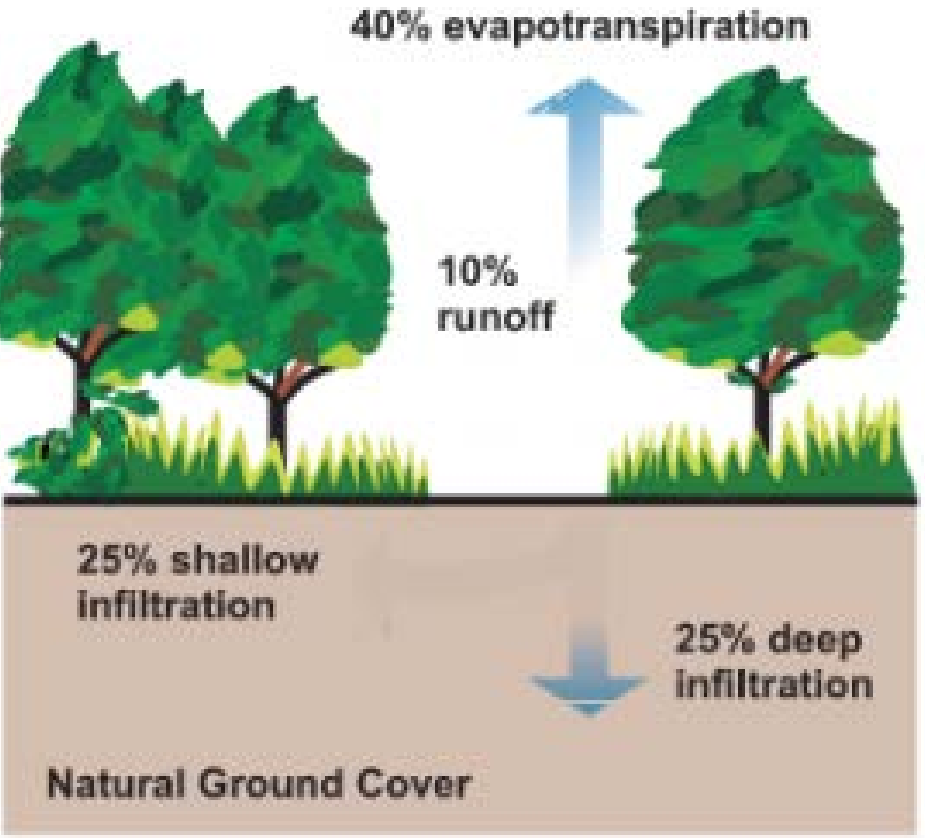
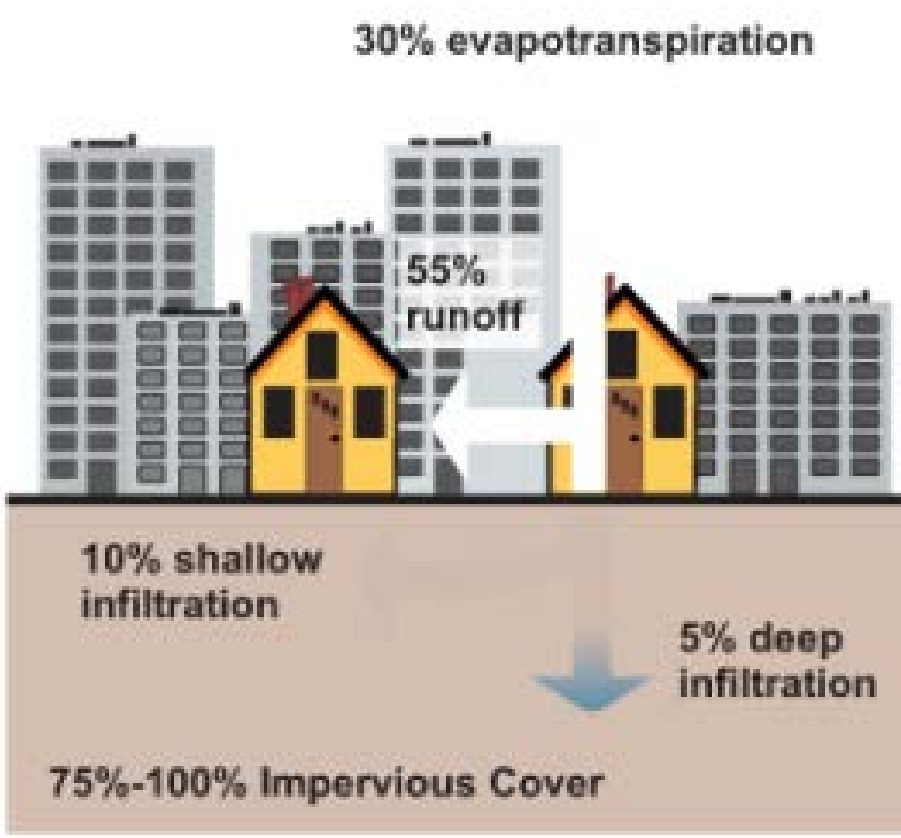
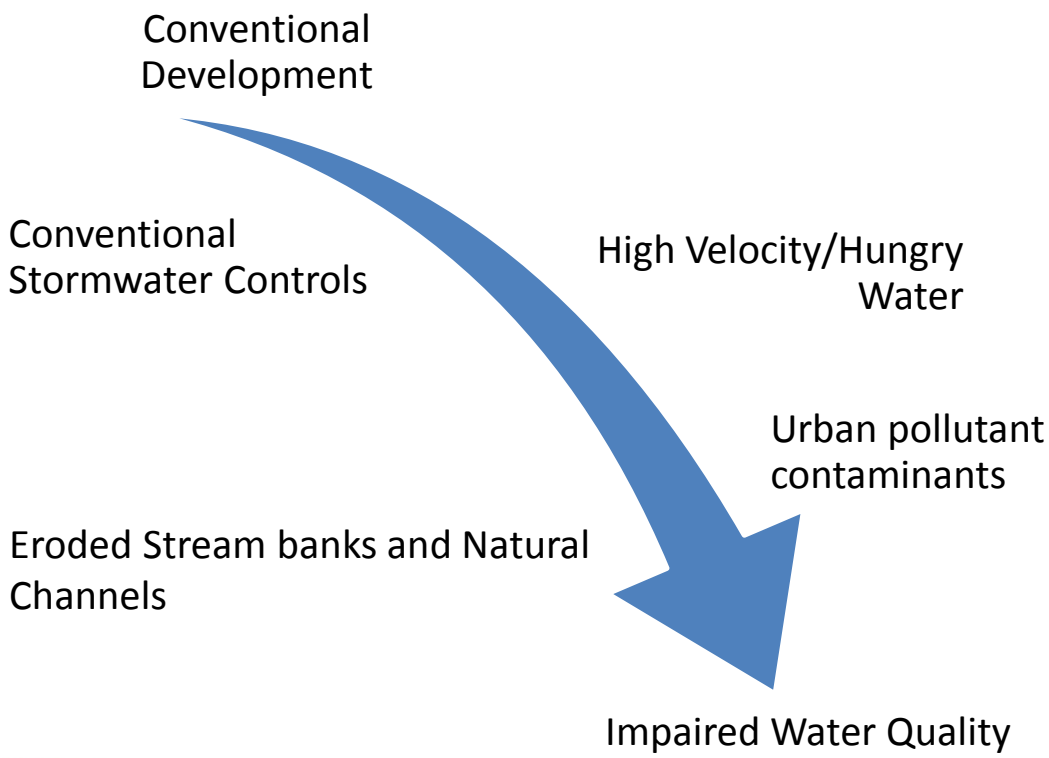
Urbanization and Runoff





Source: U.S. Environmental Protection Agency, *Protecting Water Quality from Urban Runoff*, p. 1.

Conventional Practices



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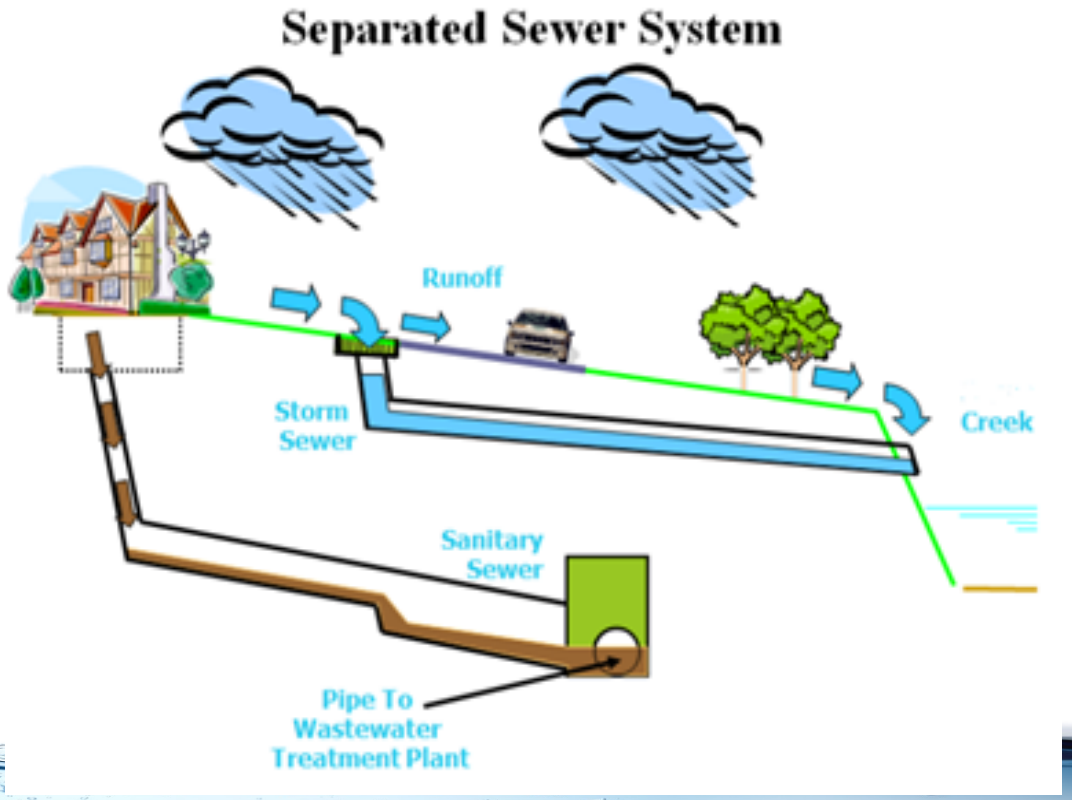
What is a Municipal Separate Storm Sewer System (MS4)?

An MS4 is a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels or storm drains) designed or used for collecting or conveying stormwater that is owned/ operated by a public body (e.g. USA, state, city, town, county, university, etc.) that is not a combined sewer system and is not a part of a Publicly Owned Treatment Works (POTW) system.



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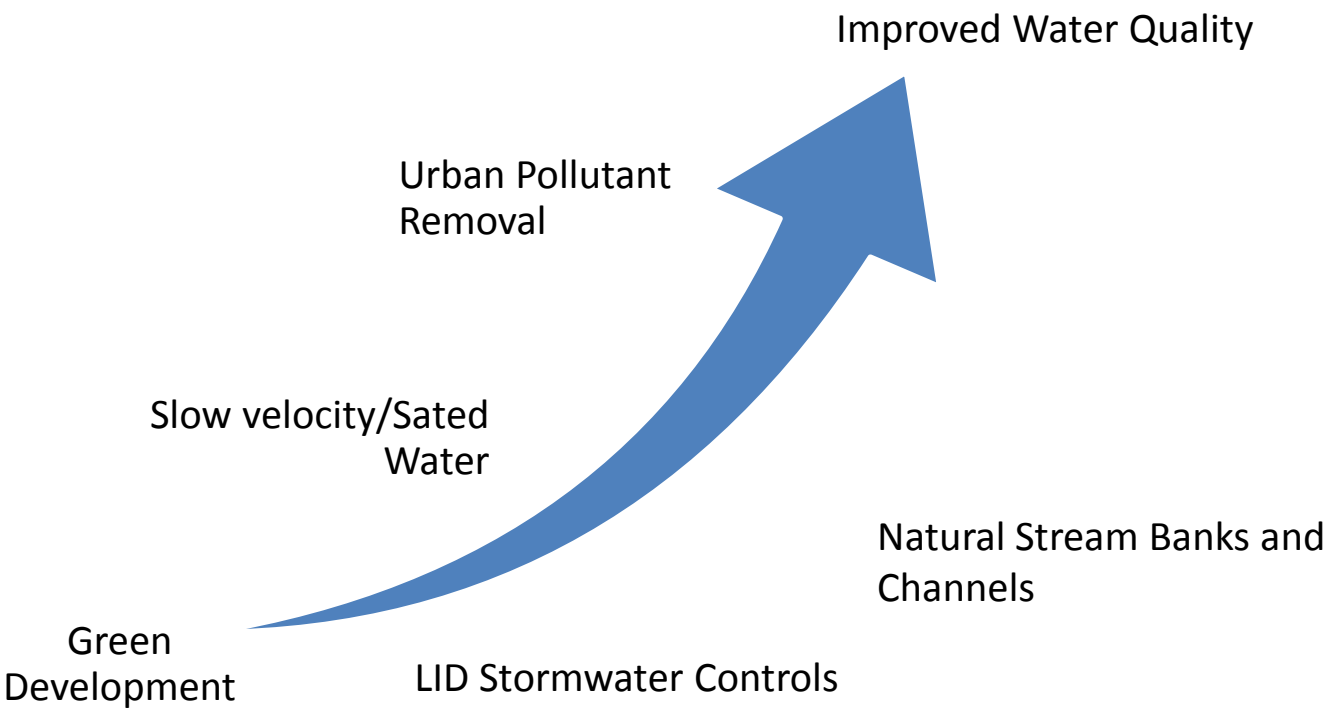
LID/Green Infrastructure

LID is an acronym for low impact development, an approach to land development and redevelopment that works with nature to manage stormwater as close to its source as possible. LID employs principles such as preserving and recreating natural landscape features, minimizing effective imperviousness to create functional and appealing site drainage that treats stormwater as a resource rather than a waste product.

Green Practices



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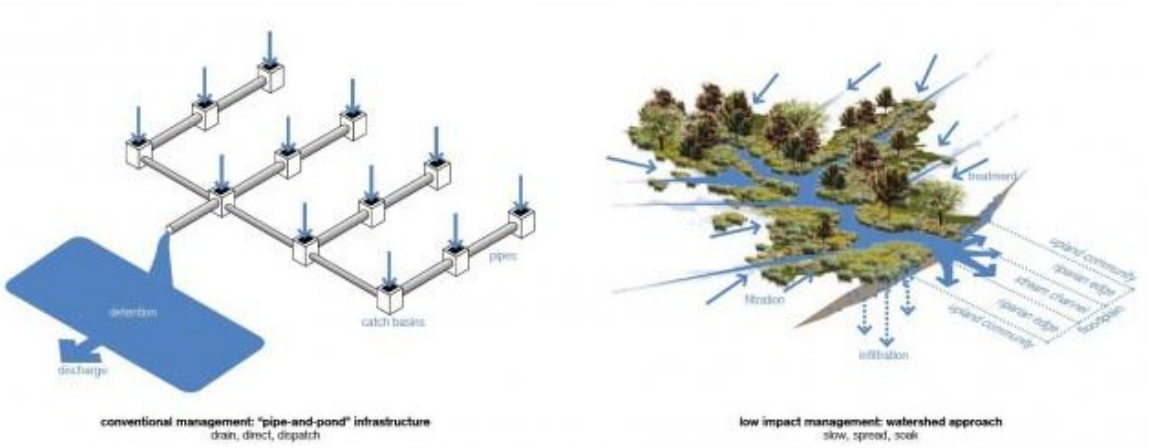
Benefits of Green Practices

- Improved water quality
  - Pollutant removal
  - Decreased cost for water treatment
- Decreased costly flooding events
  - Holistic use imperative
  - Decrease in volume and speed of runoff

Benefits of Green Practices

- Restored aquatic habitat
  - Decrease in scouring and erosion of banks and channels
- Improved groundwater recharge
  - More rainfall retained and infiltrated on site
- Enhanced neighborhood aesthetics
  - Decrease in use of ugly materials
  - Beautiful, sustainable and wildlife friendly

Green vs. Gray Infrastructure



conventional management: "pipe-and-pond" infrastructure
drain, direct, dispatch

low impact management: watershed approach
slow, spread, soak

Traditional Street in OK

Green Street in Washington, DC

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How Is LID/GI Implemented?

Non-structural controls

- Don't involve physical construction
- Are planning and management-related

Structural controls

- Involve physical construction

Non-Structural Controls

- Direct growth
- Protect sensitive areas
- Maintain and/or increase open spaces
- Provide buffers along waterbodies
- Minimize impervious surfaces
- Encourage infill
- Educate builders/developers/city employees/public on green infrastructure

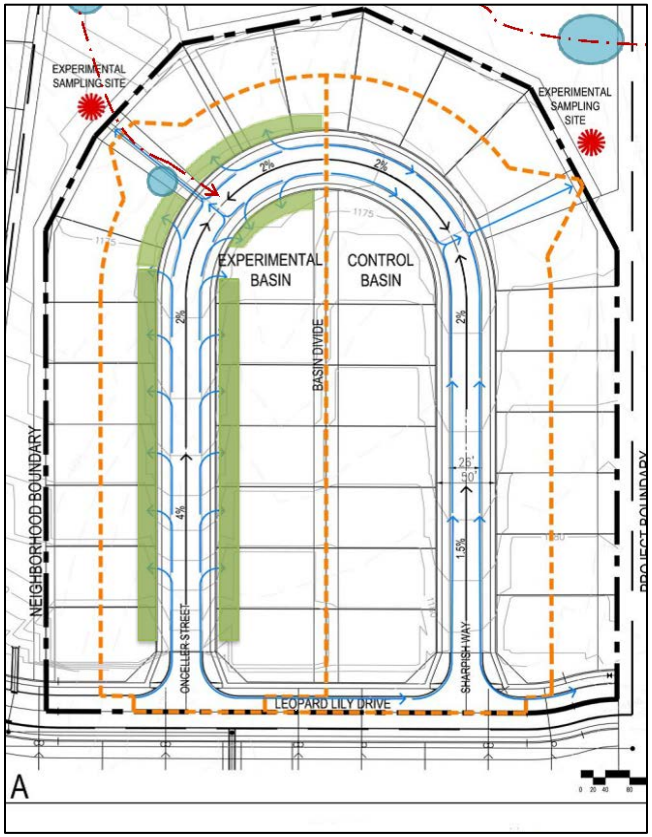
Structural Controls

- Retention/Detention Systems
- Water Harvesting Techniques
- Rain Gardens/Bioretention
- Green Roofs
- Green Parking
- Permeable/Pervious/Porous Materials
- Sand/Organic Filters
- Stream/River Restoration

Development Design

http://www.illinoisfloods.org/documents/2011_Cost_of_Green_Workshop/2011-10-22-IAFSM_Green_vs_Gray.pdf

Development Design



Incentivization

- Incentives
  - PACE-Tulsa
    - Voluntary
    - Provides incentive for LID implementation through recognition
    - Sites can be added to green tour
  - Living Green LID program-BA
    - Voluntary
    - Provides incentive for LID implementation through recognition
    - Can achieve Bronze, Silver, Gold, or Platinum LID Certification Level based on types of LID implemented

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Retention/Detention Systems

- Mitigate increased runoff
- Can also reduce pollutants
  - Wet ponds
  - Dry ponds
  - Underground detention
  - Stormwater wetlands

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Rain Barrels and Cisterns

- Reduce runoff by disconnecting downspouts from storm sewer system
- Allow for reuse
- Complicated by water rights laws in Western states

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Rain Harvesting Workshop

Lean how to build your own rain barrel or cistern for outdoor use

SAVE THE RAIN FOR ANOTHER DAY

July 12, 2014

8am – 10am

Great Plains Coliseum
920 SW Sheridan Rd.
Lawton, OK 73501

55 gallon barrel—$15
250 gallon cistern—$40

Limit 1 barrel or cistern per participant.
Cash or check only

The City of Lawton Stormwater Division is hosting a rain harvesting workshop July 12th during the Tomato Festival. Rain barrels and cisterns provide a cost effective alternative to using tap water for watering yards and reduce stormwater runoff. All participants that purchase a barrel or cistern will receive step-by-step instructions on how to build and install a rain harvesting system. Participants may purchase a 55 gallon barrel or a 250 gallon tank. Supplies are limited and will be distributed on a first come first served basis.

For more information call (580) 581-3478 or e-mail cywilliams@cityoflawton.ok.us.
Visit www.cityoflawton.ok.us to learn more about these and future workshops.

CITY OF LAWTON STORMWATER DIVISION
212 SW 9TH STREET
LAWTON, OK 73501

Rain Gardens/Bioretention

- Provide on-site treatment by filtering out pollutants
- Mitigate increased runoff
- Can be designed for infiltration or discharge via underdrain
- Suitable for small drainage area
- Can use drought-tolerant plant species

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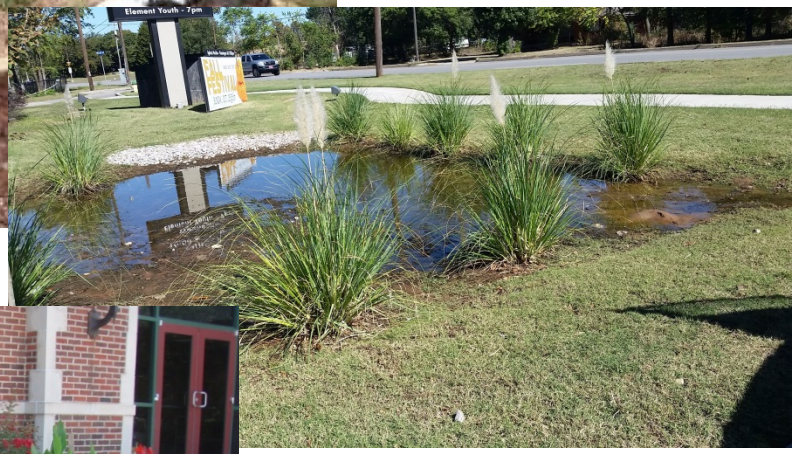
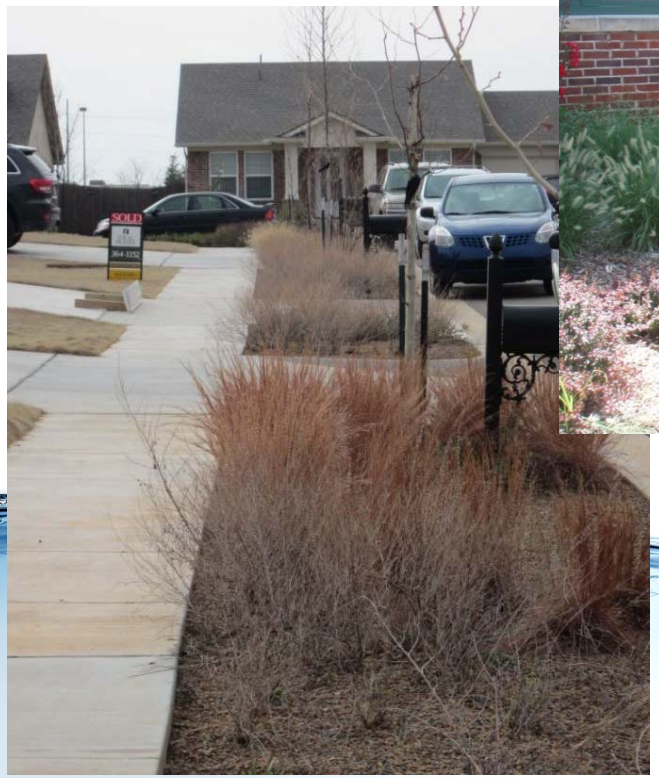
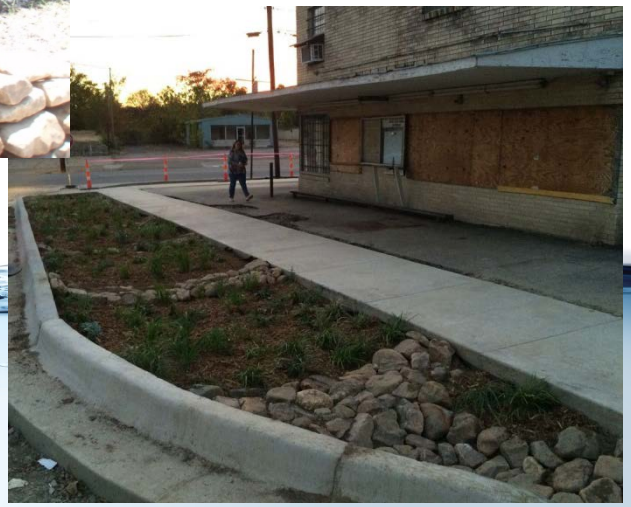

Element Youth - 7pm


SOLD



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Green Roofs

- Reduce peak flow discharge
- Reduce urban heat island effect
- Use drought-tolerant plant species
- Can be used to support habitat
- Difficult to retrofit structures

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Green Parking

- Reduce parking lot contribution to stormwater runoff by reducing impervious surfaces and increasing infiltration
- Combination of porous paving, reduced lot/space size, and bioretention

http://www.streamteamok.net/Doc_link/Green%20Parking%20Lot%20Guide%20(final).PDF

Permeable/Pervious/Porous Materials

- Includes grassed or grassless pavers, concrete, and asphalt
- Allow water to drain through to a storage/infiltration layer
- Used for parking lots, sidewalks, and residential streets

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10/05/2012


10/05/2012


01.22.2013

Sand and Organic Filters

- Direct stormwater through sand bed
- Remove floatables and pollutants
- Primarily used for water quality improvement
- Requires regular maintenance and filter media replacement

Sand filter under construction

http://www.dcr.virginia.gov/stormwater_management/documents/Chapter_3-12.pdf

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Stream Restoration

- Restoration of stream to a more natural state
- Reduction of non-point source pollution using buffer filtration
- Restoration of fish and wildlife habitat

http://www.watershedconservation.org/proj_brentwood.html

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WQD Stormwater Contacts

- Permitting
  - Michael Jordan - (405) 702-8208
  - Karen Milford (South) - (405) 702-8191
  - Ismat Esrar (North) - (405) 702-8193
- Compliance/Enforcement
  - Wayne T. Craney - (405) 702-8139
  - Michele Loudenback (East) - (405) 702-8116
  - Michelle Chao (West) - (405) 702-8112

Questions, Comments, Discussion

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