# Low Impact Development

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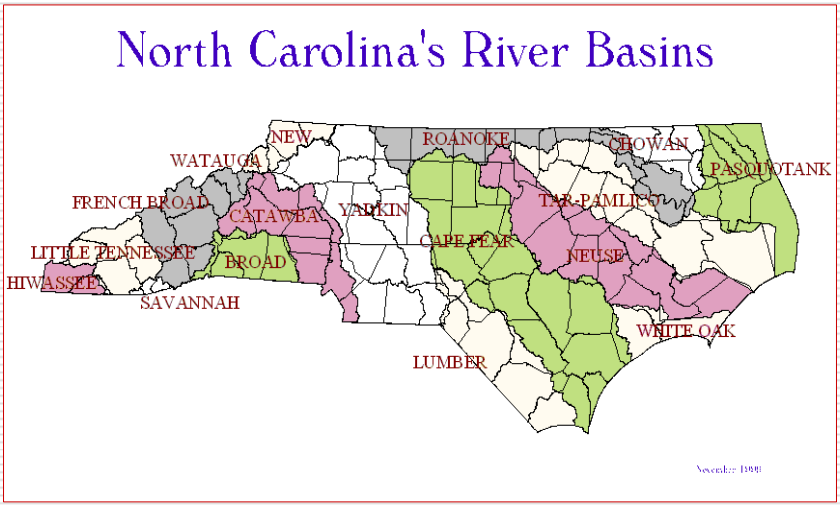
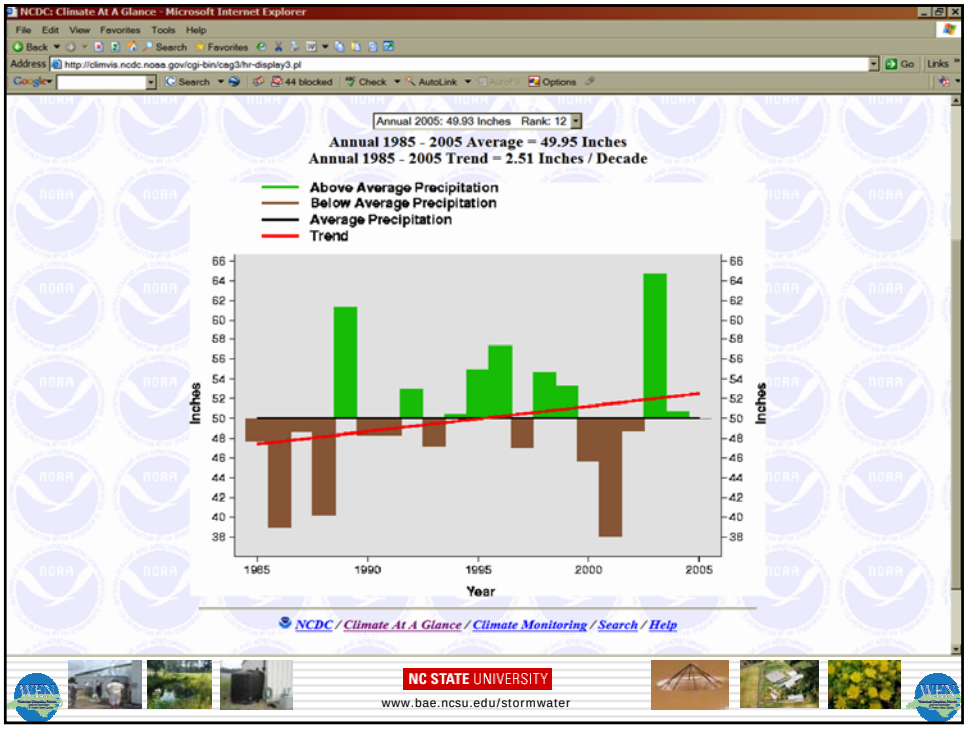
# 17 Major River Basins






# Conventional Development

Conventional land development involves removal of all vegetation, compacting the soil and putting in large areas of hard (impervious) surfaces like roads, parking lots and roofs. The compacted soil and impervious surfaces prevent stormwater from soaking into the ground (called infiltration). This results in a tremendous increase in surface runoff.

By traveling much faster, stormwater runoff overwhelms streams causing flooding, damaging public and private property and destroying habitat for fish and wildlife.

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## Conventional Development

Further, conventional practice collects and conveys stormwater runoff through storm drains and pipes to a centralized, manmade stormwater facility to manage stormwater flow and remove pollutants. This requires a lot of pipes and sometimes large, costly, stormwater best management practices.


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## Low Impact Development

Design, construct, & maintain each development site to protect, or restore, the natural hydrology (the scientific study of the properties, distribution, and effects of water on the earth's surface) of the site so that the overall integrity of the watershed is protected. This is done by creating a "hydrologically" functional landscape.


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# Low Impact Development (Benefits)

-Protection of Water Quality

-Reduction of Impervious Surfaces

-Increased Open Space

-Protection of Trees

-Reduced Land Disturbance

-Decrease in Infrastructure Costs

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# Low Impact Development (Technologies)

| LID PRACTICE / DEVICE | Peak Flow Control | Volume Reduction | Water Quality Improvement | Water Conservation |
|---|---|---|---|---|
| Bio-retention Cell | • | • | • | |
| Cistern | • | • | ~~> • <~~ | • |
| Curbless Parking Lot Islands | • | • | • | |
| Downspout Disconnection | • | • | • | |
| Grassed Swale | • | • | • | |
| Green Roof | • | | • | |
| Infiltration Trench | • | • | • | |
| Narrow Road Design | • | • | • | |
| Permeable Pavers/Pavement | • | • | • | |
| Rain Barrel | • | • | | • |
| Rain Garden | • | • | • | |
| Sand Filter | • | | • | |
| Tree Box Filter | • | | • | |
| Tree Planting | • | • | | |

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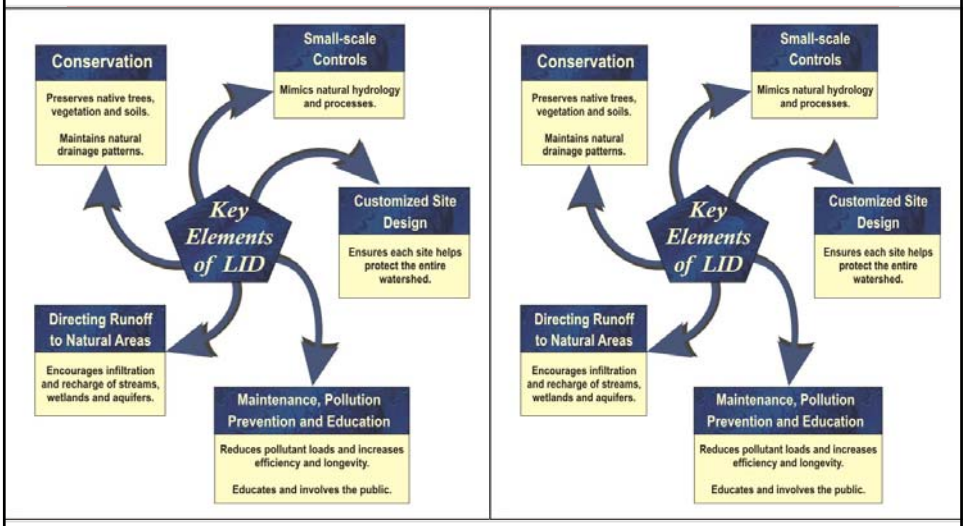
# Low Impact Development

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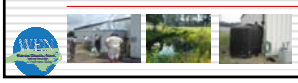
# Low Impact Development

**Conventional Development**

**LID Subdivision**



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## Small-scale Controls: Bioretention

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## Small-scale Controls: Permeable Pavement

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## Small-scale Controls: Disconnected Downspouts and/or Cisterns

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## Small-scale Controls: Green Roofs

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# Small-scale Controls: Level Spreader

-Diffuse Flow

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# Conservation: Landscape Vegetation

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# Directing Runoff: Encourage Infiltration

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# Small-scale Controls


LID (Commercial)


LID (Commercial)
Greenroof
Bioretention
Cistern
Permeable
Pavement

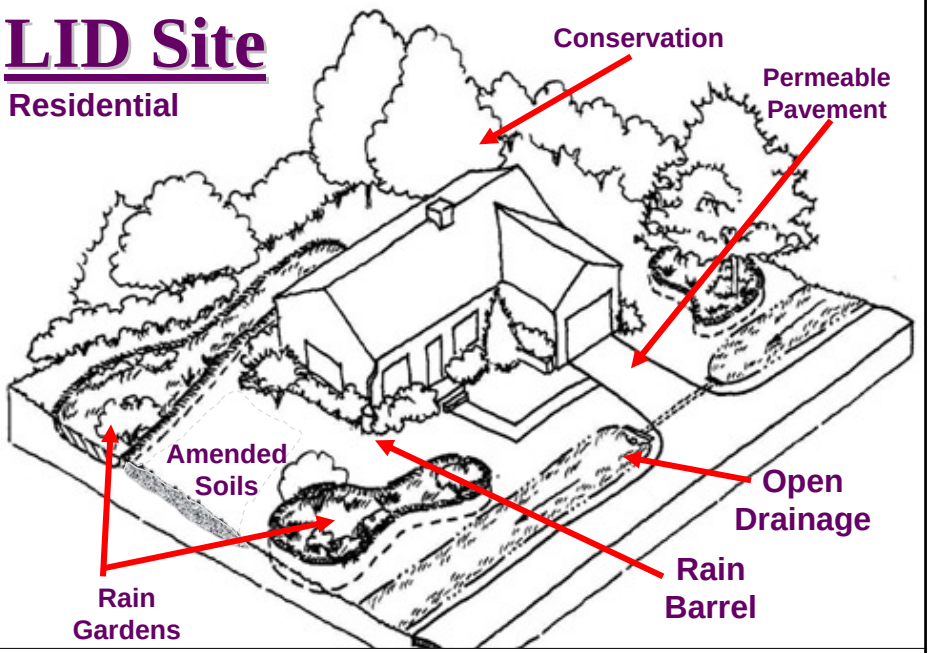
# LID Site

Residential

Create a Hydrologically Functional Lot

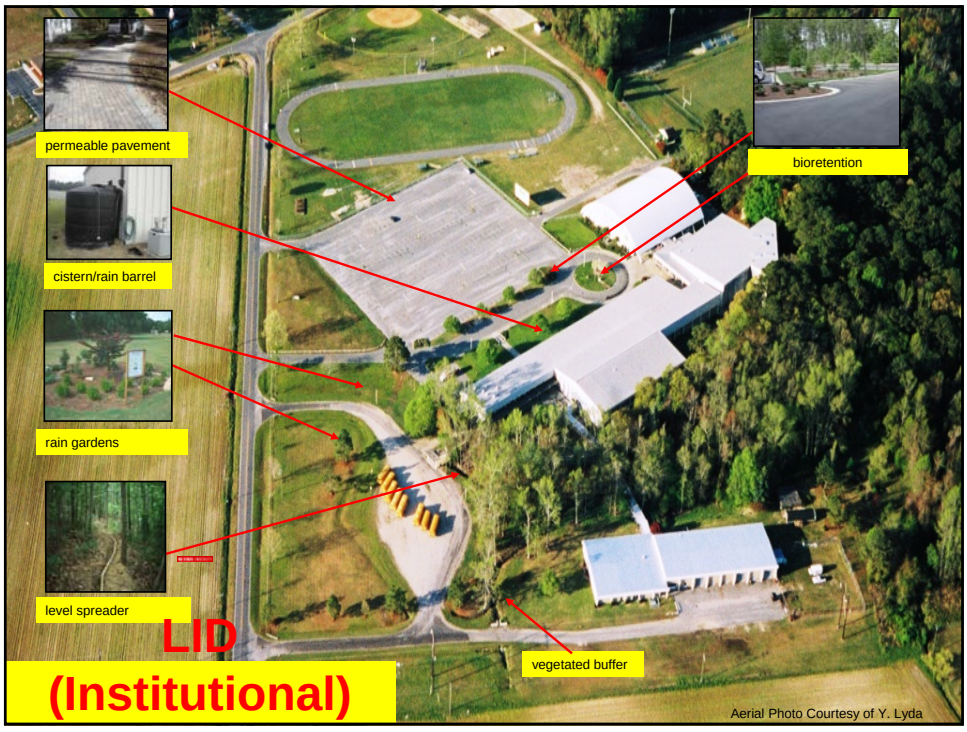
# LID Site

Residential




Create a Hydrologically Functional Lot


(Institutional)
Aerial Photo Courtesy of Y. Lyda


permeable pavement
bioretention
cistern/rain barrel
rain gardens
level spreader
LID
vegetated buffer
(Institutional)
Aerial Photo Courtesy of Y. Lyda

## Challenges to LID

-*Local Ordinances & Site Plan Review Process (often antiquated)

**The developer may request a variance, but often, these can be time-consuming.*

-Local Opposition from Governing Body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## City of XXXXX-Article II: "Streets Generally"

Any area to be paved, stabilized, or otherwise made impervious to storm water which shall exceed 2500 square feet shall be so graded that stormwater is collected at a low point at least 10 feet behind the property line and conducted through underground pipes of sufficient size to the nearest storm drain, provided the nearest storm drain is within one block or 500 feet of the above-mentioned point…it will be permissible to drain the low spot by installing pipes through the curb and discharge into the gutter.


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## City of XXXX-Subdivision Ordinance, Sidewalks, Walkways, and Bikeways.

Sidewalks shall be required to be constructed in the following circumstances:

(1) On a minimum of one side of the right-of-way of all thoroughfares such as freeways, expressways, arterials, or collector streets which are adjacent to property to be developed;

(2) On each side of the right-of-way…if the subdivider intends to construct any portion of the thoroughfare as access to his development;