Is it really LID? A NEW look at planning and design elements

Making an Impact with Low Impact Development

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“Conventional” Planning and Design

- Style of suburban development that has evolved over the past 50 years;
- Generally involves larger lot development;
- Clearing and grading of significant portions of a site;
- Wider streets and larger cul-de-sacs;
- Enclosed drainage systems for stormwater conveyance; and
- Large “hole-in-the-ground” detention ponds (HIGS)
“Low-Impact” Planning and Design

“LowER Impact”
“Better Site Design”
“Smart Growth”

Incorporates non-structural and natural approaches to new and redevelopment projects to reduce impacts on watersheds by:

- conserving natural areas
- reducing impervious cover
- better integration of stormwater treatment
Better Site Design Planning Process:

1. **Avoid the Impacts** - Preserve Natural Features and use Conservation Design Techniques.

2. **Reduce the Impacts** - Reduce/Disconnect Impervious Cover.

3. **Manage the Impacts** - Utilize Natural Features and Natural Low-Impact techniques to manage stormwater.
9 houses
$ 40,400 to repave
$4,500/house
14 houses
$ 24,200 to repave
$1,700/house
Better Parking Lot Design
Low Impact Development Techniques / Integrated Management Practices

- Small-scale stormwater controls
- Distributed throughout site
- Maintain flow patterns, filter pollutants and re-create or maintain hydrology
LID Techniques

- Rain Barrels and Cisterns / Water Re-use
- Stormwater Planters
- Permeable Paving
- Open Channels
- Infiltration
- Bioretention
- Stormwater Wetlands
- Green Rooftop Systems
- Vegetative Buffers / Reforestation
Rain Barrels and Cisterns
Can this Old Dog Still Hunt?

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Typical Applications
Who are these guys?
Current gas price?

Open Vegetated Channels
Infiltration
Rain Gardens/Bioretenion
Application of Bioretention

- Can be applied to a **wide range of development**
- **Compatible with commercial landscaping needs**
- Utilizes existing **open space**
- Economical for **small sites** (1 acre or less)
- **Parking lot runoff** (perimeters, traffic islands, & swales)
- **Median strips**
- Residential “Rain Gardens”
- Reduce need for **storm drain pipe**
Bioretention Schematic

Vegetation on Surface

Planting Soil - Primarily Sand
Planting Soil and Mulch

- Loamy Sand to a sandy Loam
  - 80 % sand
  - < 20 % silt
  - < 5 % clay (some say less than 2% clay)
- Well aged graded compost (25% of soil mix)
- Well aged, aerated hard-wood mulch (aged 6 months, if possible)
Vegetation Management Important
LID Planning Principles

- Identify applicable local regulations
- Define development envelope and protected areas
- Reduce limits of clearing and grading
- Use drainage and hydrology as a design element (infiltration directed to best soils)
- Reduce and minimize total impervious area
- Minimize directly connected impervious area
- Modify/ increase drainage flow paths
- Compare pre- and post development hydrology (rate and volume)
LENGTH AND WIDTH OF BIORETENTION PER SITE PLAN

FRAME AND GRATE (H2O LOAD) SET ABOVE BIORETENTION BASIN BOTTOM AS SPECIFIED IN THE SCHEDULE (Dp)

MAX 9" PONDING (Dp)

LIMIT OF MulCH TO EDGE OF INLET Riser

BOTTOM AND TOP OF Riser SECTION TO BE SET IN FULL BED OF MORTAR

ADJUST FRAME AND GRATE WITH Riser SECTION

FURNISHED PLANTING SOIL (LOAMY SAND)

FILTER FABRIC (Mirafi FW300 or Approved Equiv.)

1-1/2" TO 3" WASHED CRUSHED STONE

12" OF 1-1/2" TO 3" WASHED CRUSHED STONE

APPROVED NATIVE SUBGRADE FREE OF ROOTS, LARGE ROCKS & DEBRIS

NOTES:
1. SEE TYPICAL RECHARGE BASIN (RB) DETAIL FOR BASIN SPECIFICATIONS AND BIORETENTION SCHEDULE FOR BIORETENTION FACILITY SPECIFICATIONS.
2. SEE PLANTING PLAN FOR PLANT SPECIFICATIONS.
3. FURNISHED PLANTING SOIL SHALL CONSIST OF A MAX. OF 10% CLAY, MAX. 20% SILT, & MIN. 70% SAND.

TYPICAL BIORETENTION WITH OVERFLOW RECHARGE BASIN

NOT TO SCALE
TYPICAL 2-LANE ROADWAY CROSS SECTION
STATION 0+00 TO 7+50

NOT TO SCALE

NOTES:
1. ROADWAY SECTION DEPICTS 2 SEPARATE DRAINAGE CONDITIONS (BERTED SECTION AND OPEN SECTION) SEE PLAN FOR LIMITS OF EACH.
2. GRAVEL BASE COURSE SHALL CONSIST OF INERT MATERIAL THAT IS HARD, DURABLE STONE AND COARSE SAND, FREE FROM LOAM AND CLAY. SANDY-LOAM AND/OR LOAMY-SAND SHALL BE EXCAVATED FROM ALL ROADWAY SUBGRADE IF FOUND AT THE TIME OF ROADWAY CONSTRUCTION.
3. HORIZONTAL UTILITY DISTANCES ARE SHOWN FOR MINIMUM SEPARATIONS, SEE SITE PLAN FOR ACTUAL LOCATIONS. SEE TYPICAL DETAILS FOR EACH SEPARATE MINIMUM UTILITY DEPTH.
4. SEE NOTE ABOVE FOR DRAINAGE SWALES.
TYPICAL SECTION THROUGH INFILTRATION BASIN

NOT TO SCALE

NOTES:
1. REMOVE ALL TOPSOIL AND A MINIMUM OF 3 FEET OF NATIVE MATERIAL SUBSOIL BENEATH ALL BERMS AND REPLACE WITH STRUCTURAL FILL COMPACTED TO 90% ASTM D-1557.

2. MAINTENANCE PATH SHALL BE LOAMED AND SEEDED AND HAVE AN 10-FOOT TOP WIDTH WITH A LAYOUT AS SHOWN IN THE PLAN.

3. THE EMERGENCY OVERFLOW SHALL BE INSTALLED IN ACCORDANCE WITH THE TYPICAL RIP RAP DRAINAGE DITCH DETAIL AT THE ELEVATION SHOWN IN THE GRADING PLAN.
NITREX module in a septic system
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