North Carolina
Low Impact Development Summit

March 25, 2014

"Costs / Jobs / Economic Development"

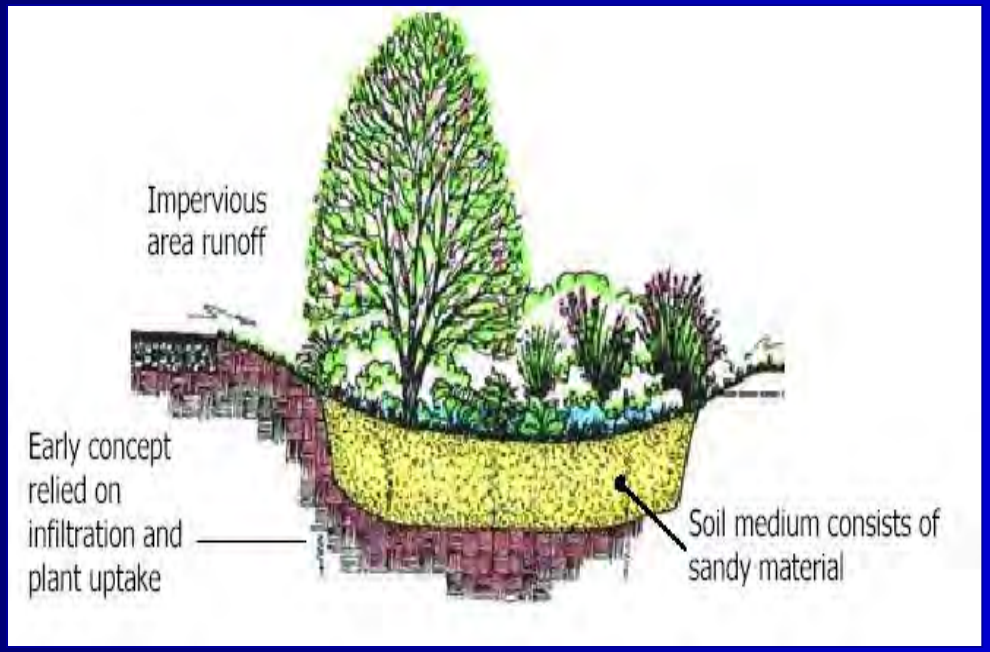
Multi-functional site design, green space, streetscapes and architecture for detention, retention, filtration and reuse of urban runoff to address flooding, water quality and restoration of vital ecosystem services necessary to protect the integrity of receiving waters.

Larry Coffman, Deputy Director
Prince George's County, Department Environmental Resources
lscoffman@co.pg.md.us
301-883-5965

Background

1992 Bioretention Guidelines

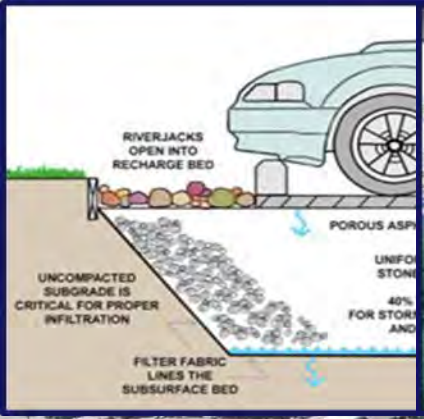
1999 County LID Guidelines



1992 - 2013

LID Fundamentals

- Philosophy
  - Replicate Natural Water Balance & Sequestration Processes
- Principles
  - Decentralized / Integrated / Multi-functional
  - Multi-beneficial /Cumulative Impacts
- Same Engineering Principles at Smaller Scale
  - Retain / Detain / Filter / Infiltrate / Treat / Prevent / Use
- New Development Process
  - Conserve / Minimize / Timing / Integrate Practices / Prevent
- Urban Retrofit
  - Driver for Next Generation LID and New Business Model


RIVERJACKS
OPEN INTO
RECHARGE BED
UNCOMPACTED
SUBGRADE IS
CRITICAL FOR PROPER
INFILTRATION
FILTER FABRIC
LINES THE
SUBSURFACE BED

MAY 29 2001

Multi Family Residential LID Techniques Tools

Site Planning Techniques

Conservation

Minimize clearing

Minimize grading

Save sandy soils

Save Drainage Patterns

LID practices

Reforestation

Disconnect Impervious Surfaces

Limit use of concrete conveyances

Vegetative swales

Rain gardens

Porous surfaces

Reduce impervious surfaces

Rain Water Harvesting

Infiltration

Detention Devices

Vegetative Buffers

Big Box Commercial LID Techniques Tools

Site Planning Techniques

Conservation

Minimize clearing

Minimize grading

Save sandy soils

Save Drainage Patterns

LID Practices

Porous pavers

Tree box filters

Green roofs

Bioswales

Disconnect impervious surfaces

Vegetative swales

Rain gardens / bioretention

Porous surfaces

Reduce impervious surfaces

Rain Water Harvesting

Infiltration devices

Detention Devices

Vegetative Buffers

High Density Mix Use LID Techniques Tools

Site Planning Techniques

Conservation

Minimize clearing

Minimize grading

Save sandy soils

Save Drainage Patterns

LID practices

Reforestation

Disconnect Impervious Surfaces

Limit use of concrete conveyances

Vegetative swales

Rain gardens

Porous surfaces

Reduce impervious surface s

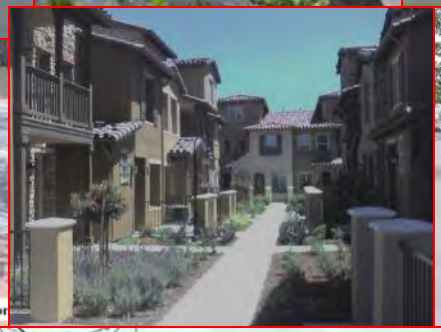
Rain Water Harvesting

Infiltration

Detention Devices

Vegetative Buffers

1100 block of bus mall, downtown Por



Buckman Terrace Apartments (303 NE 16th Ave.)

Queenston Manor Apartments

- Typical detention storage
- 7 residential buildings
- 7.4 acres

Queenston Manor Apartments

- LID design spreads drainage throughout site as an amenity
- Redesign yielded 2 additional buildings
- 48 more apartment units

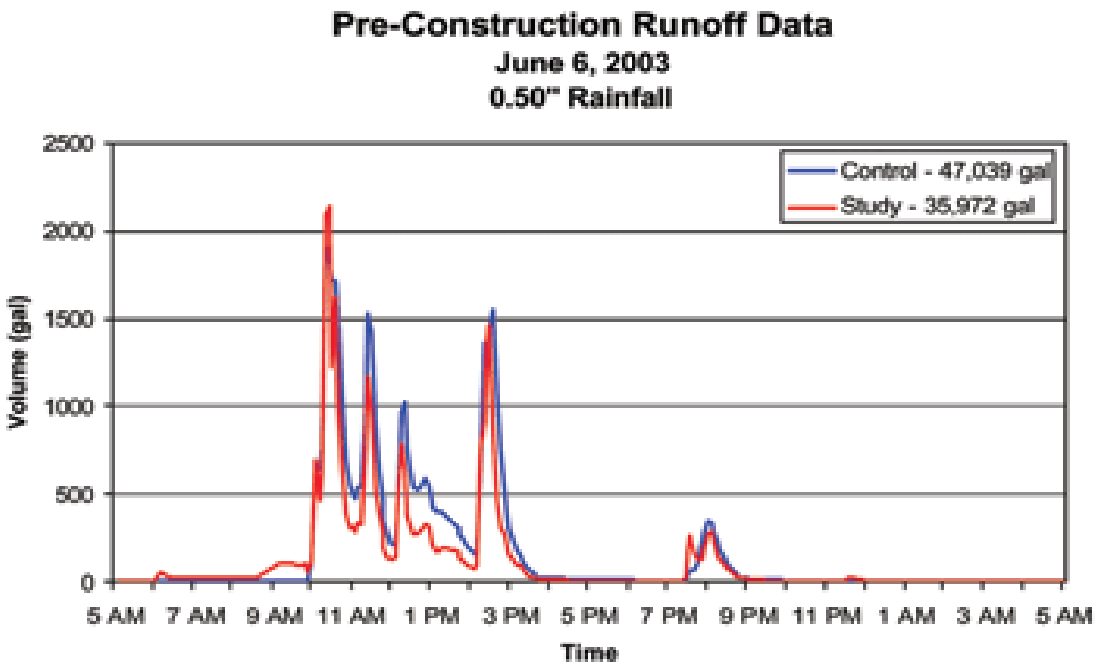
Queenston Manor Apartments

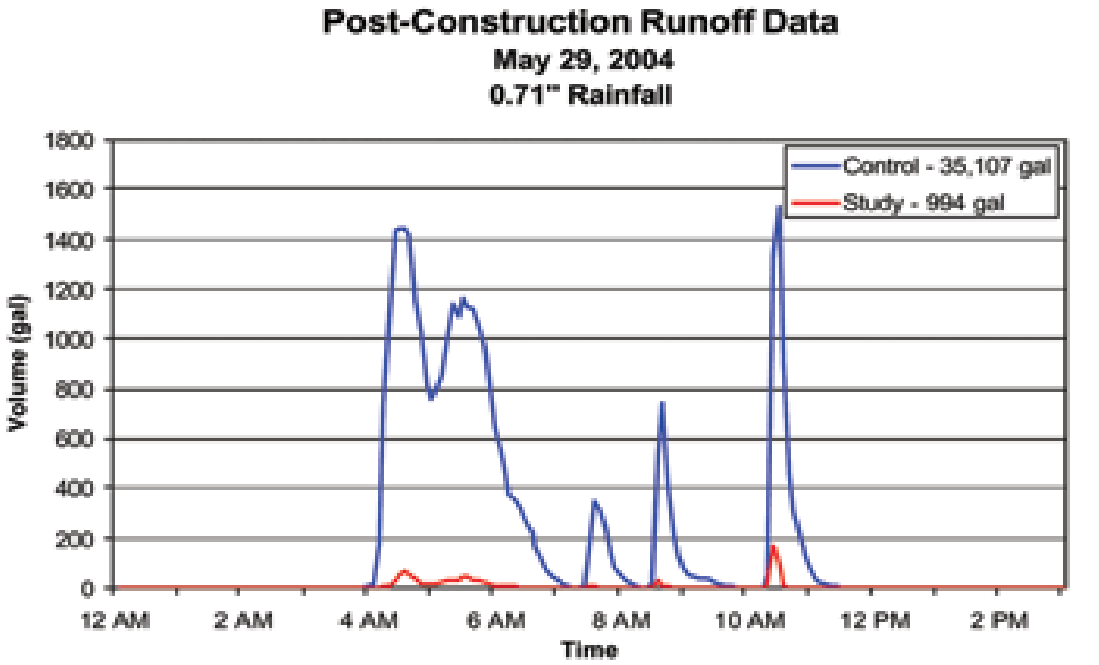
- Raingardens
- Underground storage
- Pervious pavement (parking)
- Vegetated swales
- Planter boxes

Burnsville, MN Rainwater Gardens

- Urban Retrofit
- 90% Runoff Reduction
- 85% Participation

For more information, contact Barr Engineering Company, 4700 W. 77th St., Suite 200, Minneapolis, MN 55435, (952)832-2600 or (800)632-BARR or Fax (952)832-2601.





Buckman Heights courtyard with infiltration garden

Buckman Heights Apartments – Infiltration garden

Buckman Heights courtyard infiltration basin (430 NE 16th Ave.)

Rain Gardens

Care2
Link

High Density

Tree Box Filters

Porous Pavers

Bioretention

Porous Asphalt

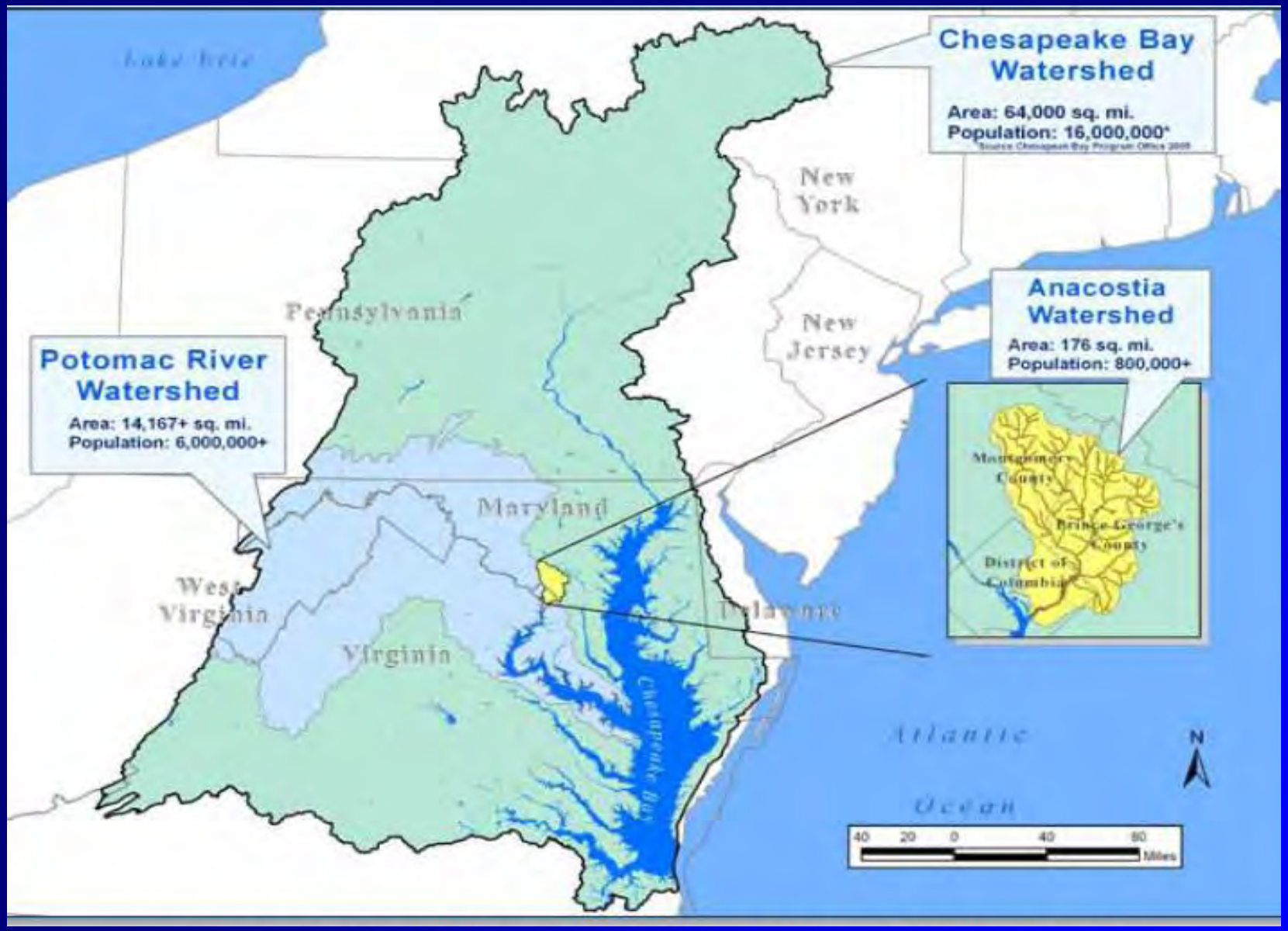
Infiltration

LID Practices (No Limit!)

"Creative Techniques to Treat, Use, Store, Retain, Detain and Recharge"

- Bioretention / Rain Gardens
- Strategic Grading
- Site Finger Printing
- Resource Conservation
- Flatter Wider Swales
- Flatter Slopes
- Porous Surfaces
- Tree / Shrub Depression
- Turf Depression
- Landscape Island Storage
- Rooftop Detention /Retention
- Roof Leader Disconnection
- Parking Lot / Street Storage
- Smaller Culverts, Pipes & Inlets
- Amended soils
- Alternative materials
- Tree Box Filters
- Alternative Impervious Surfaces
- Reduce Impervious Surface
- Surface Roughness Technology
- Rain Barrels / Cisterns / Water Use
- Catch Basins / Seepage Pits
- Sidewalk Storage
- Vegetative Swales, Buffers & Strips
- Infiltration Swales & Trenches
- Eliminate Curb and Gutter
- Shoulder Vegetation
- Maximize Sheet flow
- Maintain Drainage Patterns
- Green Roofs
- Reforestation
- Pollution Prevention……..

Chesapeake Bay TMDL



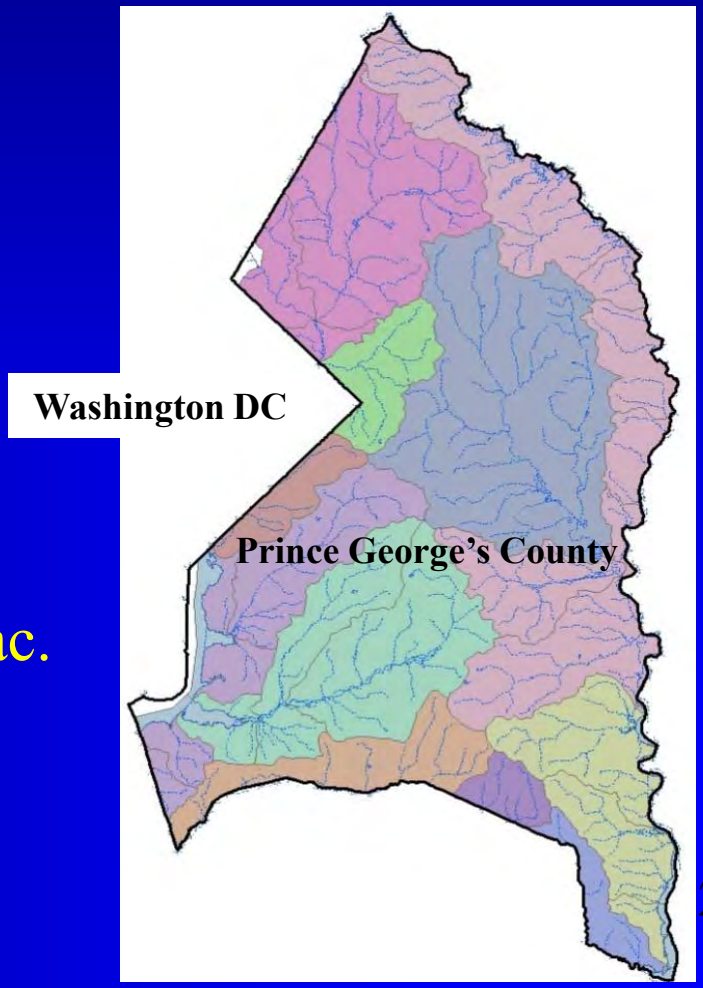
THE WIP II

WATERSHED IMPLEMENTATION PLAN II

Population 881,138
482.69 Square Miles

Bay TMDL Goals

- 2025 Load Reductions
  - TN 178,421 lbs. /yr.
  - TP 32,249 lbs./yr.
- 2019 Retrofit Target 8,000 ac.
- 2025 Retrofit Total Goal 15,469 ac.
- Estimated Total Cost $1.2 Billion



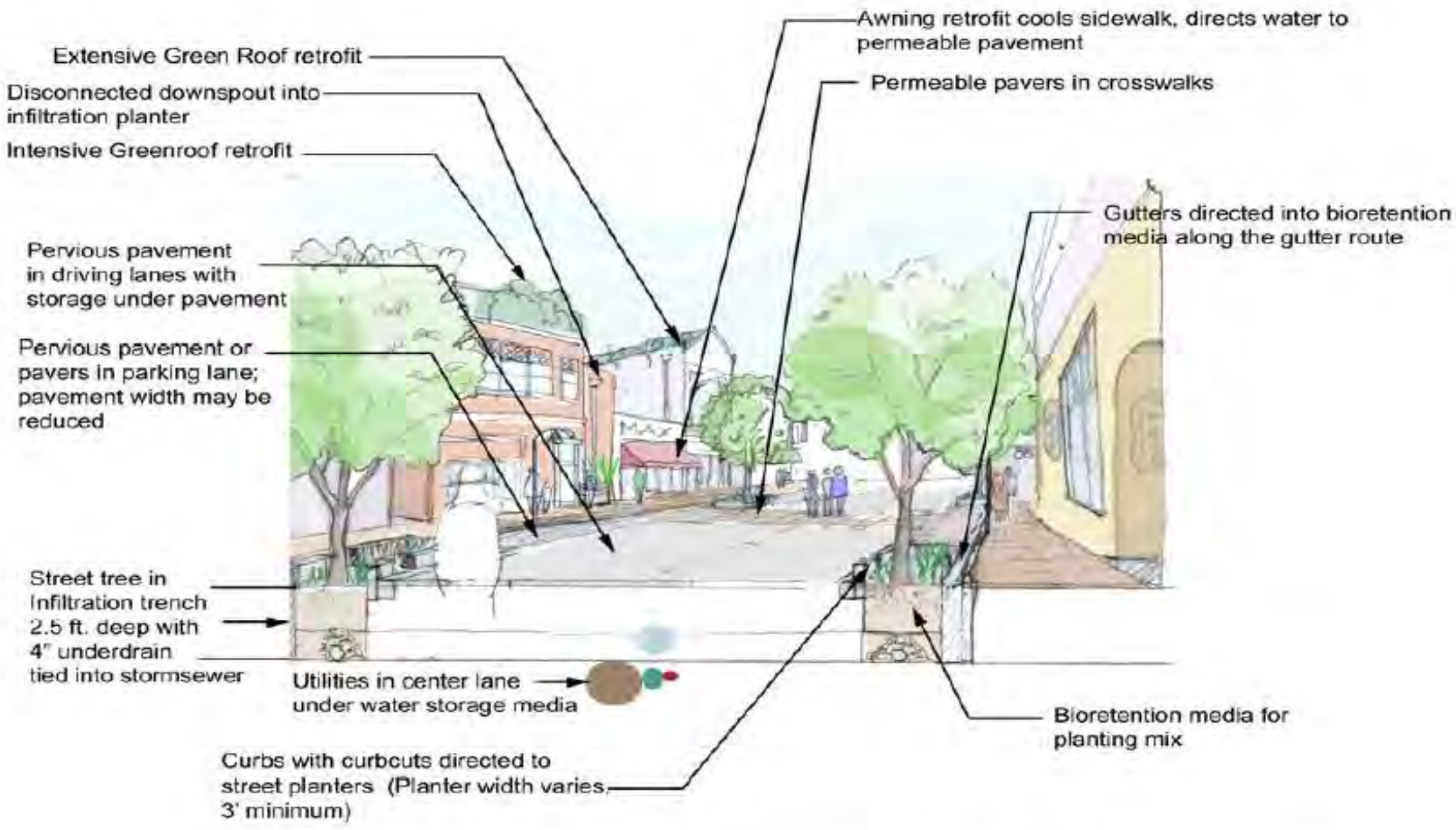
RETROFIT TECHNIQUES

GREEN STREET RETROFITS / REVITILATION

Rain Garden – Municipal Applications

Rain Garden – with Street Treatment Prefabrication will speed up installation

Creating a New Green Infrastructure



Decentralized Stormwater Controls in Urban Retrofit Streetscape

STORMWATER RETROFIT ECONOMIC OPPORTUNITIES

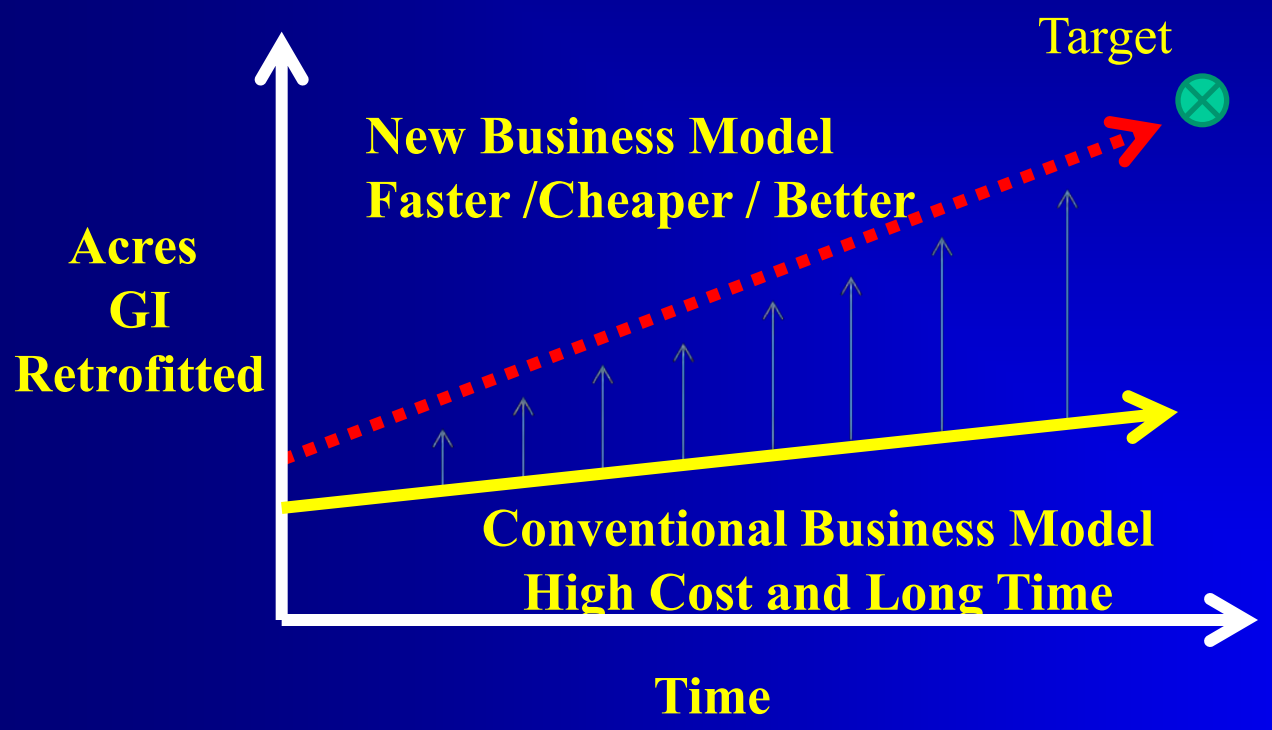
NEW INDUSTRY TECHNOLOGIES AND OPPORTUNITIES

$1.2 Billion for Local Business

- Long-Term Program
- Create Sustainable New Local Businesses
- Create approximately 5,000 new jobs
  - Engineering, Landscape Architects, Construction services, suppliers, equipment operators, etc.
- Build and maintain 50,000 stormwater devices

BAY TMDL TIME & COSTS REQUIRES INNOVATION

MUST HAVE A DIFFERENT BUSINESS MODEL



Financing
Technology
Planning
Procurement
Design
Permitting
Reviews
Construction
Management
Inspection
Enforcement
Tracking
Staffing

INNOVATION "PUBLIC PRIVATE PARTNERSHIP"

PRIVATE SECTOR MARKET FORCES

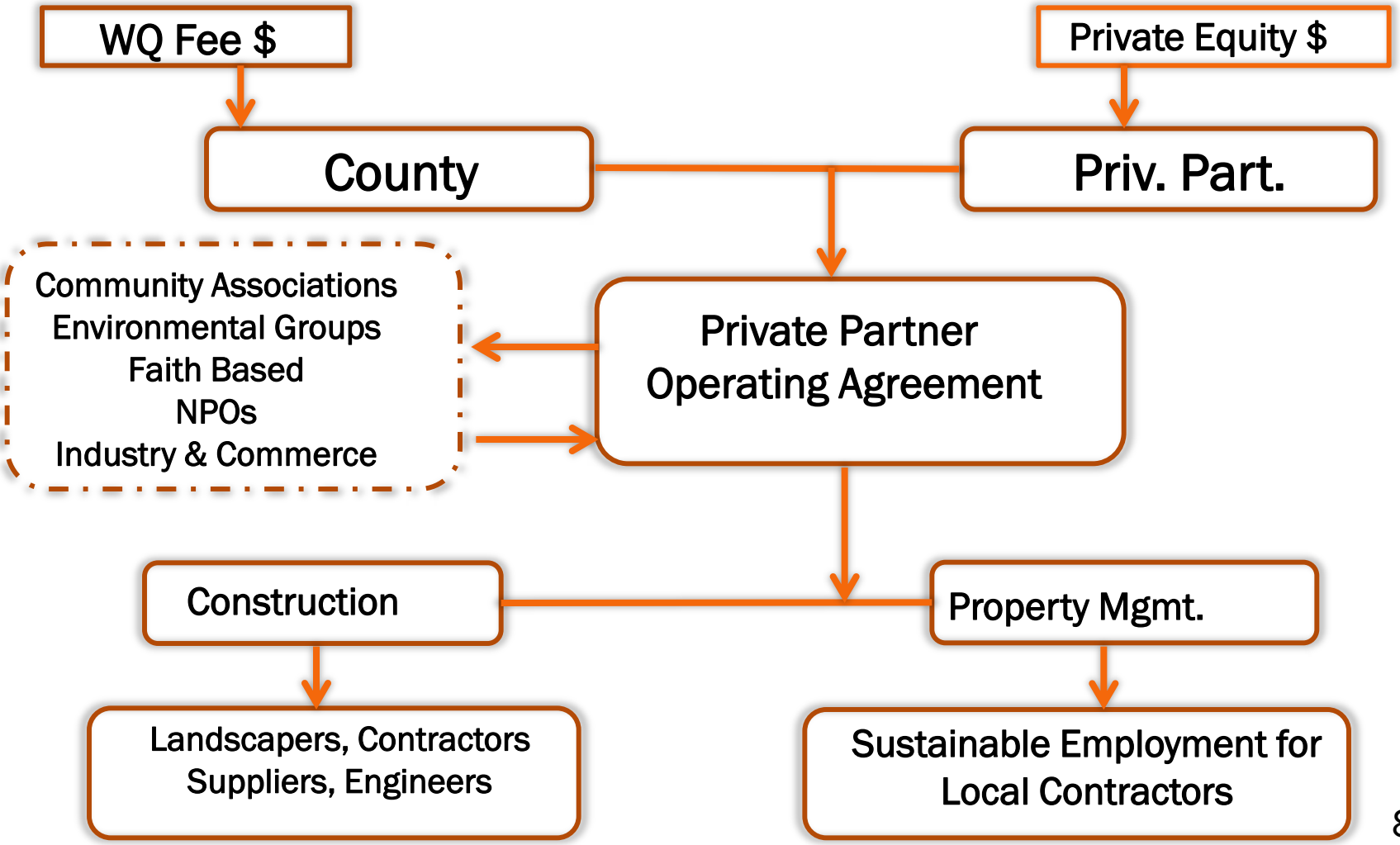
- Value Engineering
- Standardization
- Economy of Scale
- Efficiencies
- Added Values
- Process
- Materials
- Certifications
- New Technologies

- ***Estimated Savings By Streamlining Government Processes 40%.***

- ***Estimated Savings Through Private Processes 20%***

PUBLIC PRIVATE PARTNERSHIP MODEL URBAN RETROFIT

FINANCING / ECONOMY OF SCALE / EFFICIENCIES



BUSINESS CAPACITY DEVELOPMENT & JOBS

BUSINESS DEVELOPMENT RESERVE PROGRAM (BDRP)

- Economic Development Goals
  - Jobs First Legislation
    - Local, Local Small, Veterans, Disadvantaged & MBE Businesses
    - Work Force Development
      - Community
      - Reentry program
      - Green jobs training
    - Business Capacity Development
    - Community Wealth

STORMWATER RETROFIT ECONOMY

NEW INDUSTRY TECHNOLOGIES AND OPPORTUNITIES

- Innovative Technology and Services
  - Incentives
    - Financial Support
    - Sales
    - Verification
    - Technology Enterprise Zone

P3 IMPORTANT CONSIDERATIONS
STORMWATER PROGRAM

COMPLEX WITH UNLIMITED VARIATIONS

- Legal Issues (Equity Partnerships LLC) (Simple Contract)
- Select the Right "Partner"
- Request for Proposals
- Understand Objectives
- Performance Incentives
- Governance
- ***Innovation***
- Financing (unlimited options)

LID = Innovation!

- Integrated
- Multifunctional
- Advanced Designs
- Multiple Applications
- Economics
- Common Sense