



# Traversing Stormwater Treatment Technologies

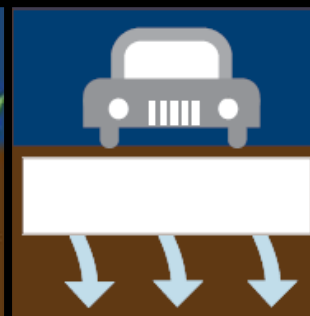
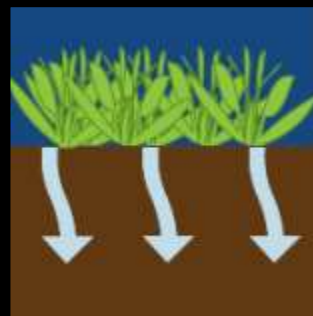
*Presented for:*



**COUNTY ENGINEERS  
ASSOCIATION OF OHIO**

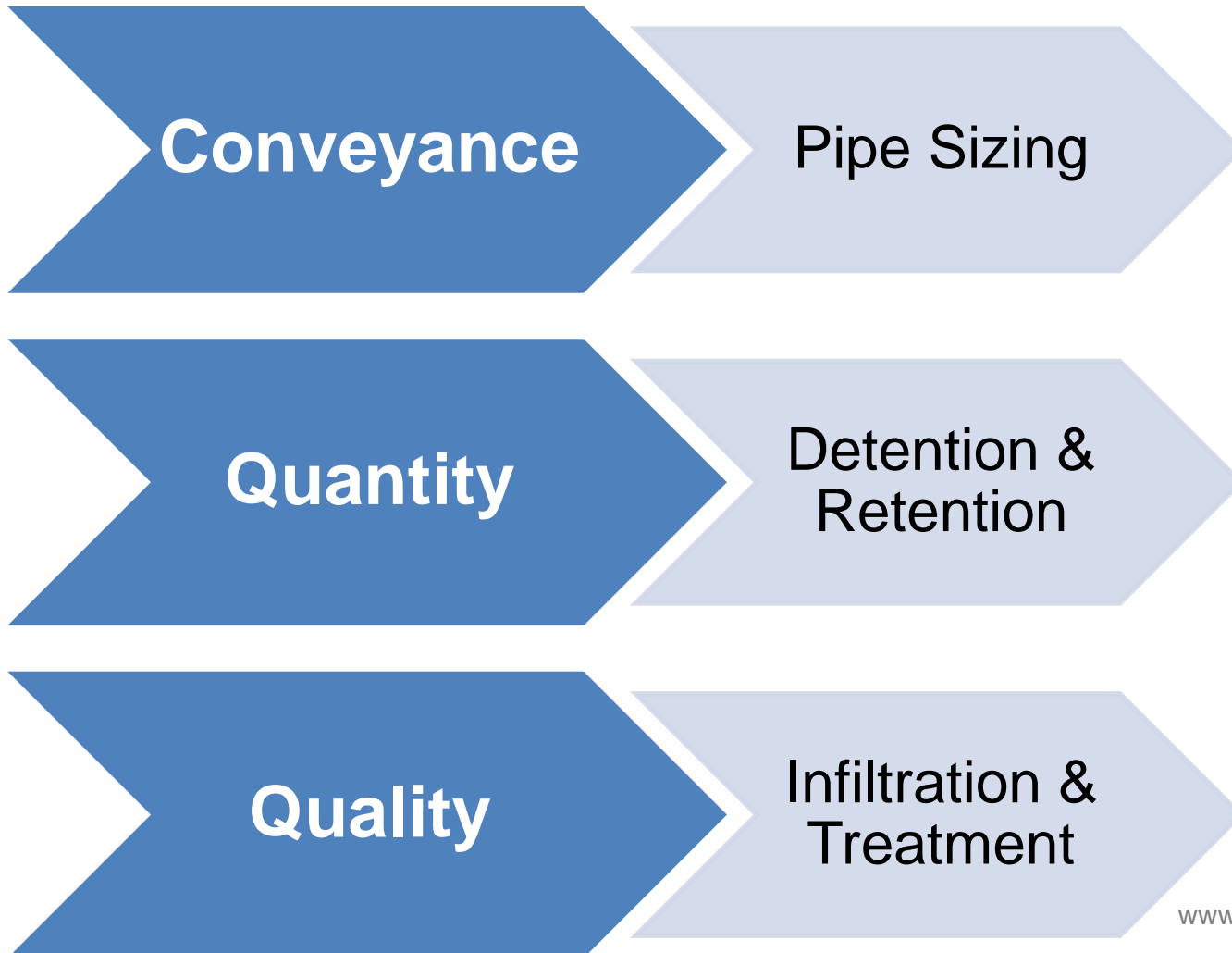
*"ALL TRAVEL STARTS AND ENDS ON A LOCAL ROAD"*

Samantha Brown,  
Regional Regulatory Manager



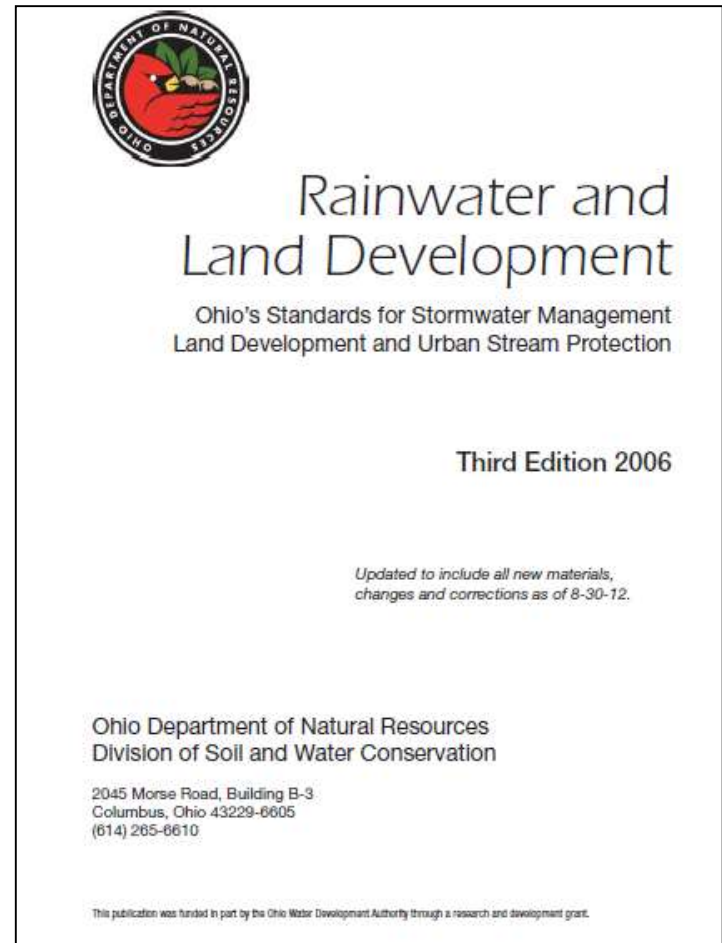
# Evolution of Stormwater Management

---



# Ohio Stormwater Regulations

- Water Quality Volume
  - 0.75 inches
  - Consistent across state
- Large Construction Activities
- Small Construction Activities
- Redevelopment Activities
  - Treat 20% of WQv
  - Reduce impervious by 20%



## Changes ahead...

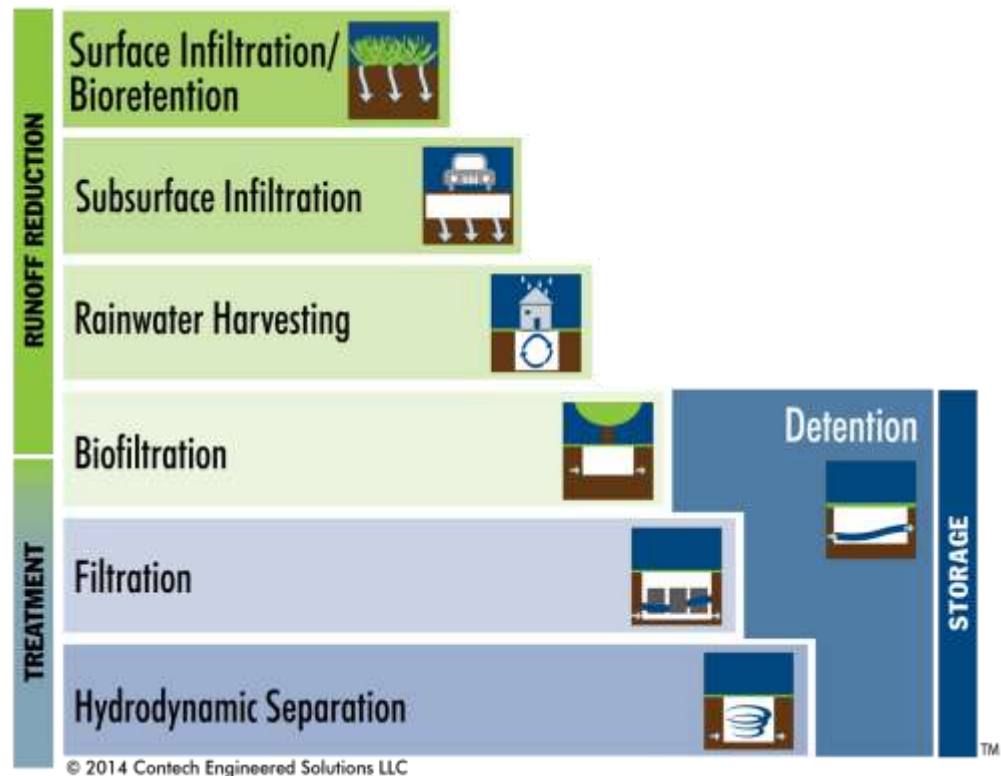
---

- Phase II Permit Renewal
  - 2018
  - Underground detention as Table II BMP
- ODOT Roadway Runoff Study
  - Particle size distribution analysis
  - Impact on future regulations?
- NJDEP Certification Process
  - New PSD for testing protocol
  - HDS: 50% removal
  - Filter: 80% removal



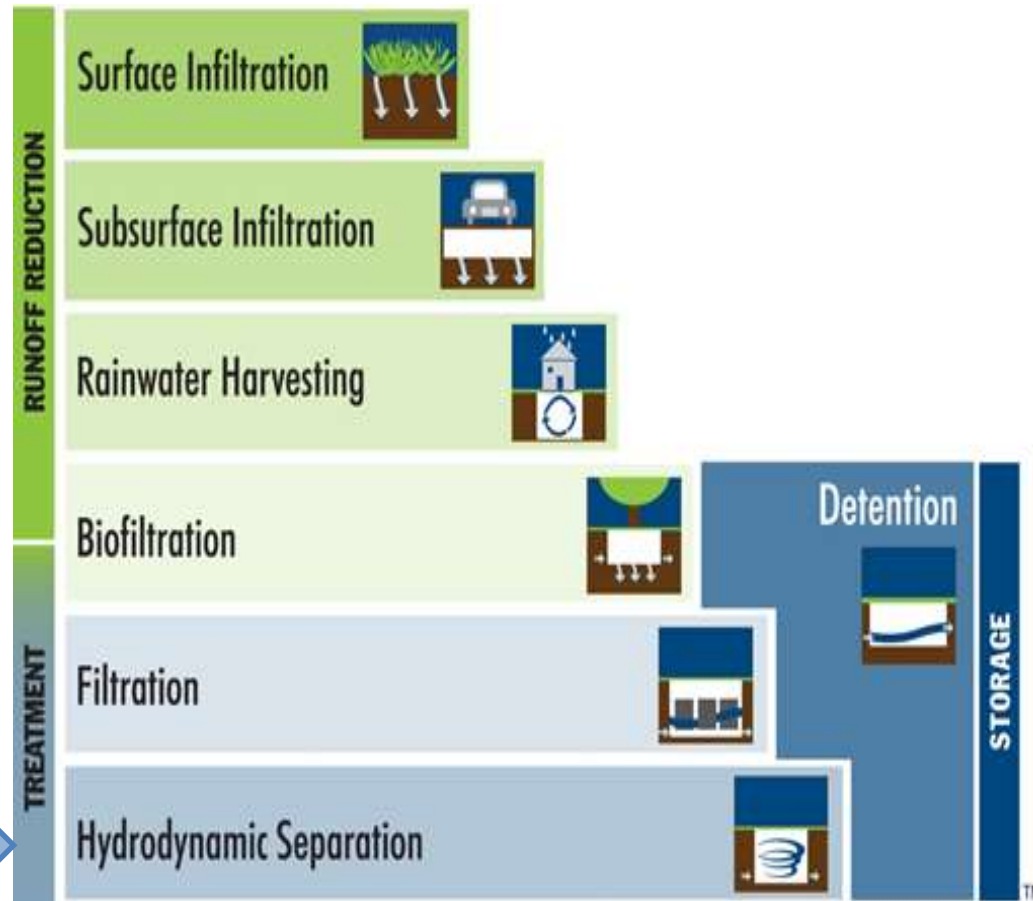
# LID Design Staircase

- Represents regulatory hierarchy and site design process
- Available surface area and soil conditions often drive solution choices
- Contech products offer space and cost efficient solutions at every step
- Contech design support provides the best options to fit your site conditions and local regulations

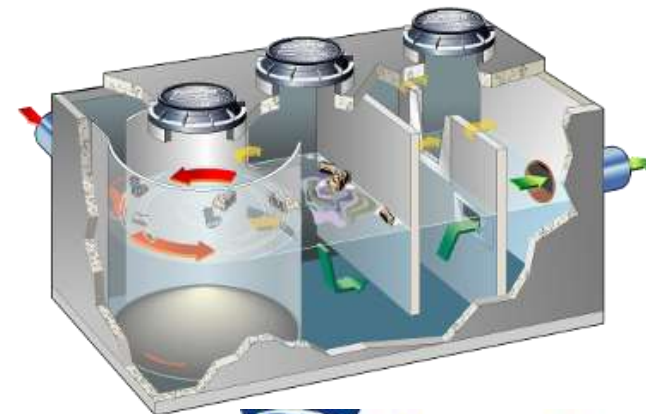
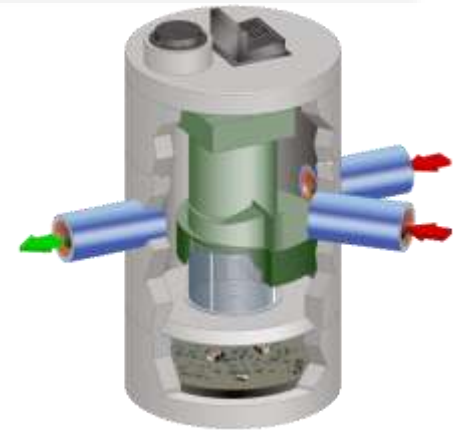




# LID Design Staircase



© 2012 Contech Engineered Solutions LLC



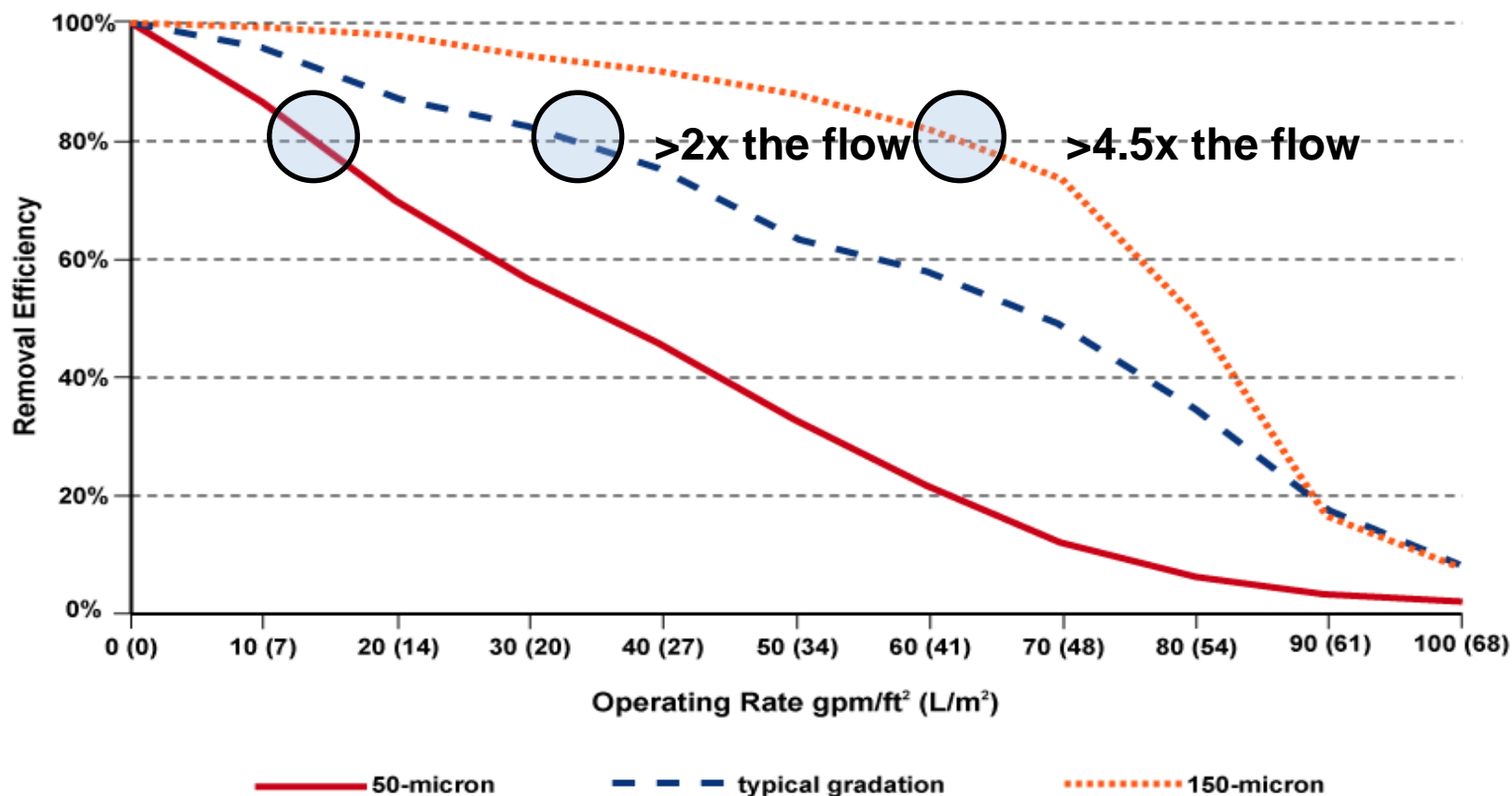
# Treatment Efficiency Evaluation

---

- Pollutant Concentration
  - High concentrations are easier to reduce
  - Typical SW TSS concentration is 50-300 mg/l
  - Testing should use similar concentrations
- Flow rate
  - Treatment efficiency increases as flowrate decreases
  - System should be tested across full range of design flows
- Particle size
  - Large particle sizes are easier to remove than small ones
  - An “apples to apples” product comparison must use the same Particle Size Distribution (PSD)

# The Influence of Particle Size

Vortechs<sup>®</sup> System Removal Efficiencies for Selected Particle Gradations





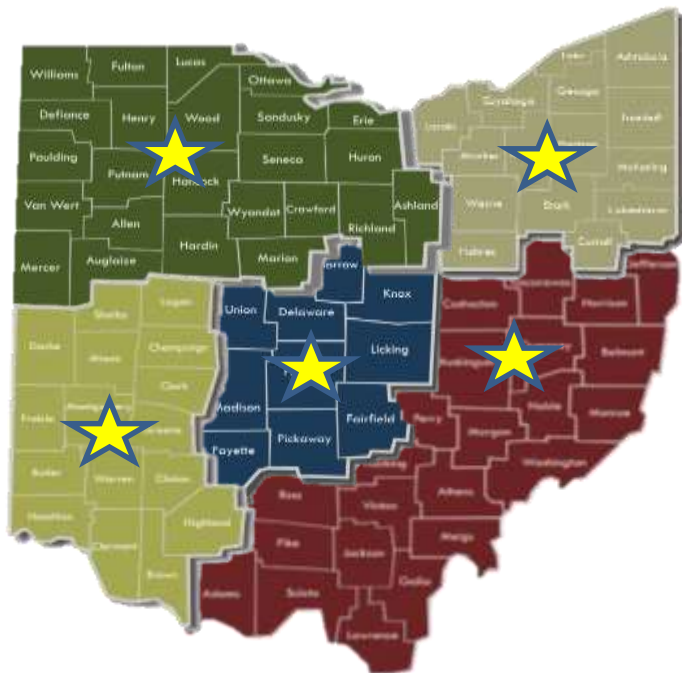
# ODOT Requirements

---

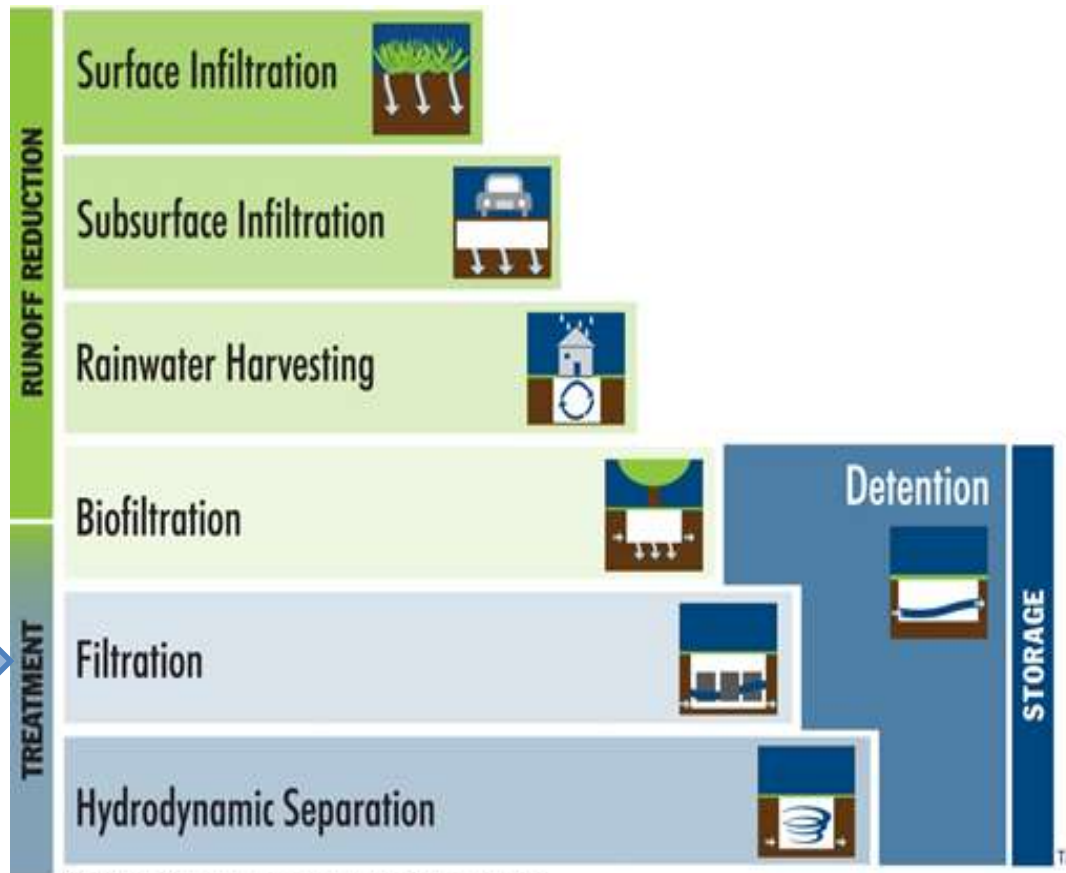
- SS - 995
  - Establishes performance requirements for approved BMPs to be utilized on roadway projects
- Performance Criteria
  - Offline configuration
  - **80% TSS capture of water quality flow (third party testing)**
    - Influent concentration of 450mg/L or less
    - OK110 or F110 particle distribution
  - Capture all floatable free oil

## HDS: Where is it?

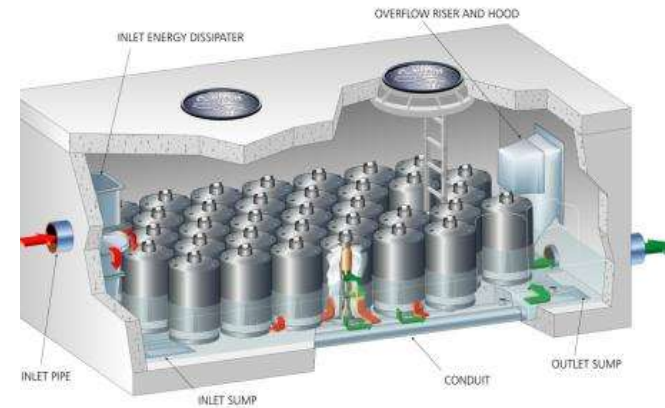
- Sites <5 acres
  - ODOT/Roadway Projects
  - Pretreatment
- Standalone Treatment BMP
    - New Development
    - Redevelopment
    - Retrofit
  - LID Pretreatment
    - Surface Infiltration
    - Subsurface Infiltration
    - Rainwater Harvesting



# LID Design Staircase



© 2012 Contech Engineered Solutions LLC



## Moving Beyond TSS

---

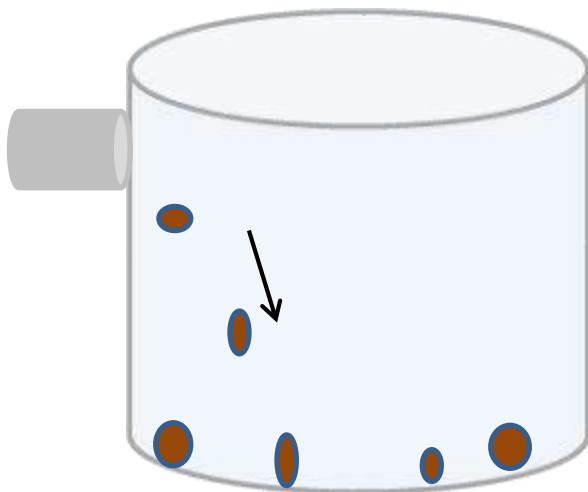
- TSS initially thought to be a good surrogate for all stormwater pollutants
- Good control of TSS translates to good control of other pollutants of concern
- We have since realized 80% TSS removal is not enough to address nutrients, metals etc. in impaired watersheds
- Solids removal does not address soluble (dissolved) pollutants

# Filtration Mechanisms

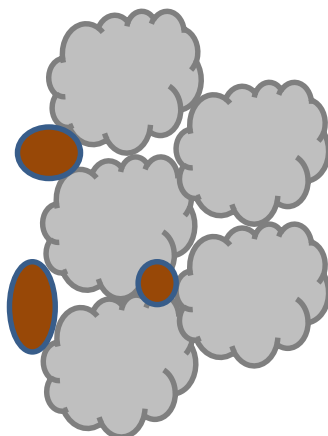
---

- Three primary mechanisms

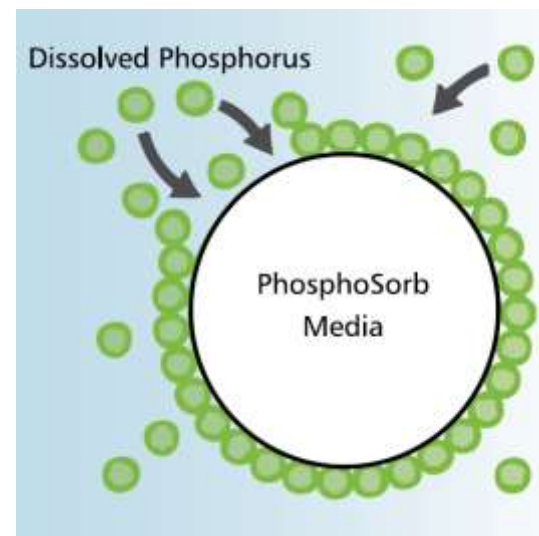
**Sedimentation**



**Physical Filtration**



**Reactive Filtration**



# Media vs. Membrane



**PhosphoSorb™**

**Perlite**

**CSF®  
Leaf Media**

**ZPG**

**Sediments**



**Phosphorous**



**Oil and Grease**



**Soluble Metals**



**Organics**



**Nutrients**





# Maintenance

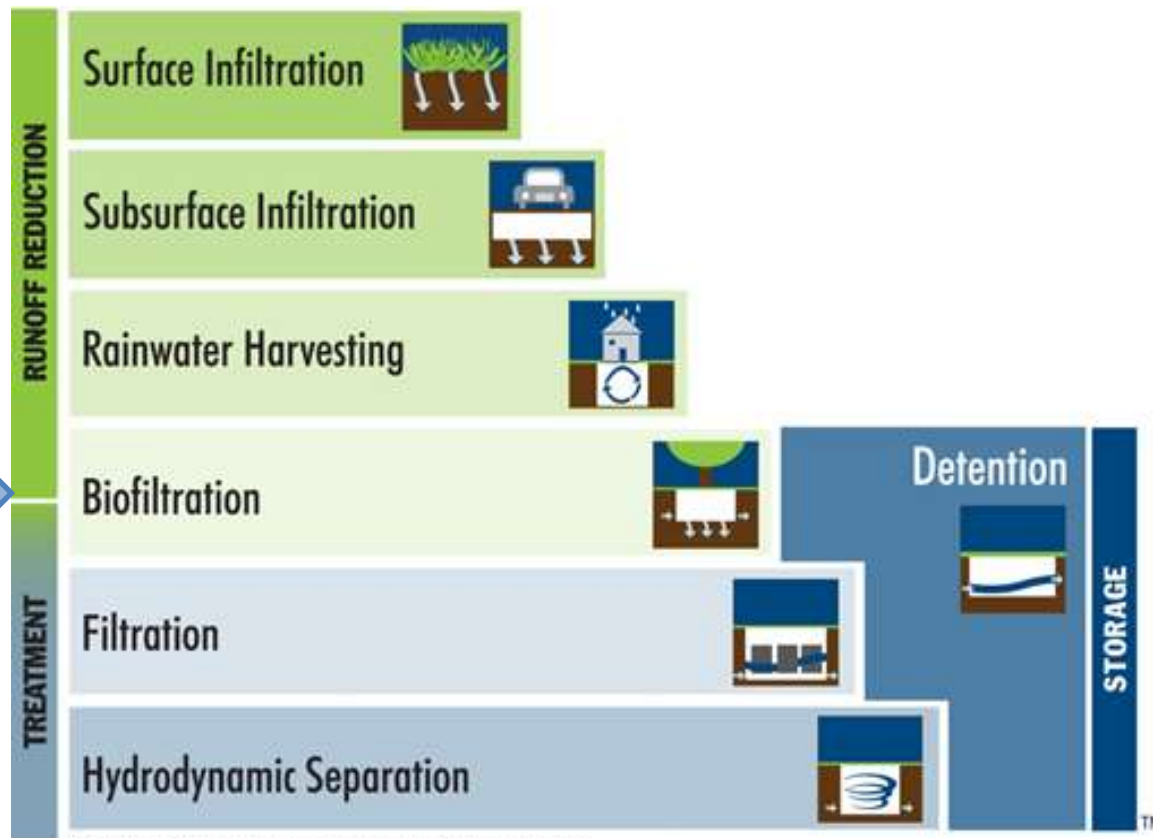


## Filtration: Where is it?

- Sites >5 acres
- Municipalities that reference NJDEP
- Standalone Treatment BMP
  - New Development
  - Redevelopment
- Pretreatment
  - Subsurface Infiltration
  - Rainwater Harvesting
- Polishing Treatment BMP
  - Downstream of Detention System



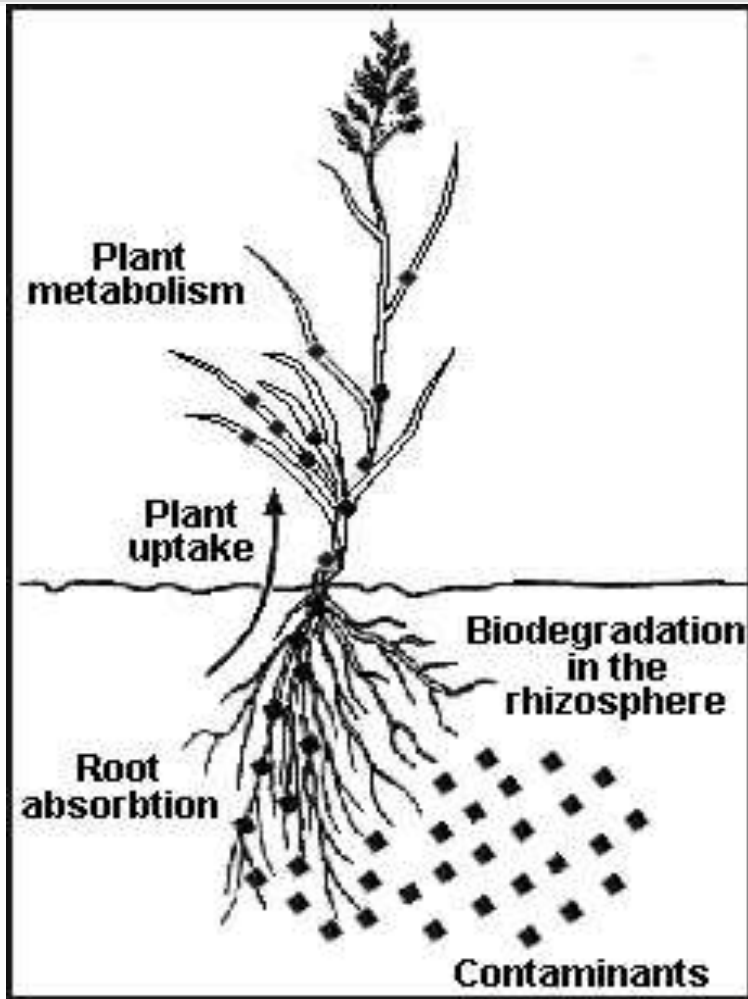
# LID Design Staircase



© 2012 Contech Engineered Solutions LLC



# Biofiltration Pollutant Removal Mechanisms



- Physical/Chemical Processes
  - Filtration
  - Adsorption/Absorption
  - Cation/Anion exchange
  - Metals complexing
- Biological Processes
  - Degradation/Decomposition
  - Plant/Bacteria uptake



# Biofiltration: New Technologies

- Filterra: High Flow Media
  - Same principles as traditional biofiltration
  - 100+ inches/hr flowrate
  - Reduced footprint – typically 1% of tributary drainage area
  - Quality control of media composition
  - NJDEP Approval



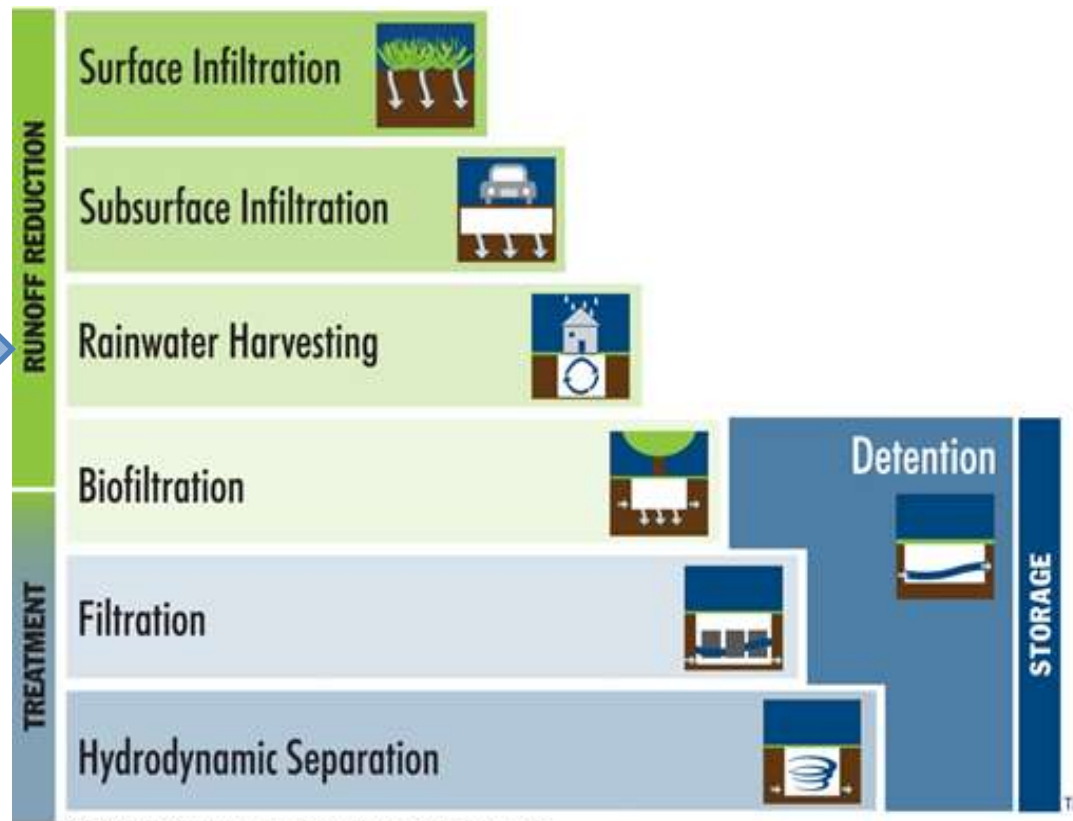
## Filtererra: Where is it?

- Sites >5 acres
- Municipalities that reference NJDEP





# LID Design Staircase



© 2012 Contech Engineered Solutions LLC

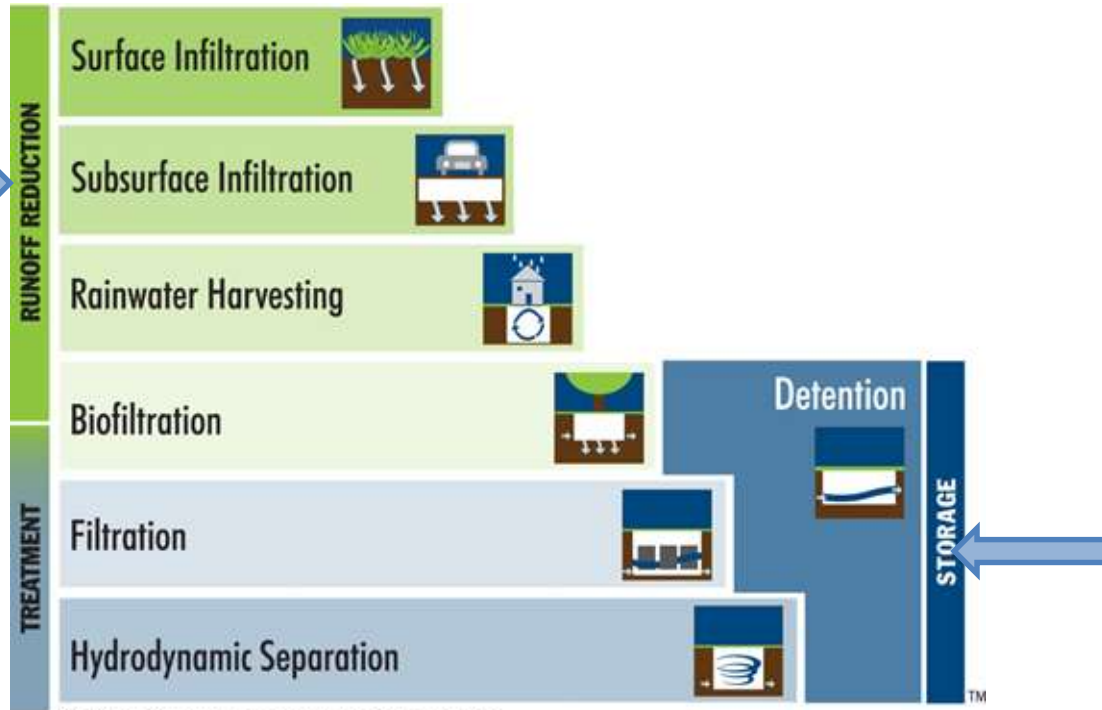


# Rainwater Harvesting

- For Runoff Reduction
  - Must find reuse applications during wet season
- Reuse Applications
  - Irrigation
  - Toilet flushing
  - Clothes/Vehicles/Equipment Washing
  - Process water & Cooling Tower Makeup water

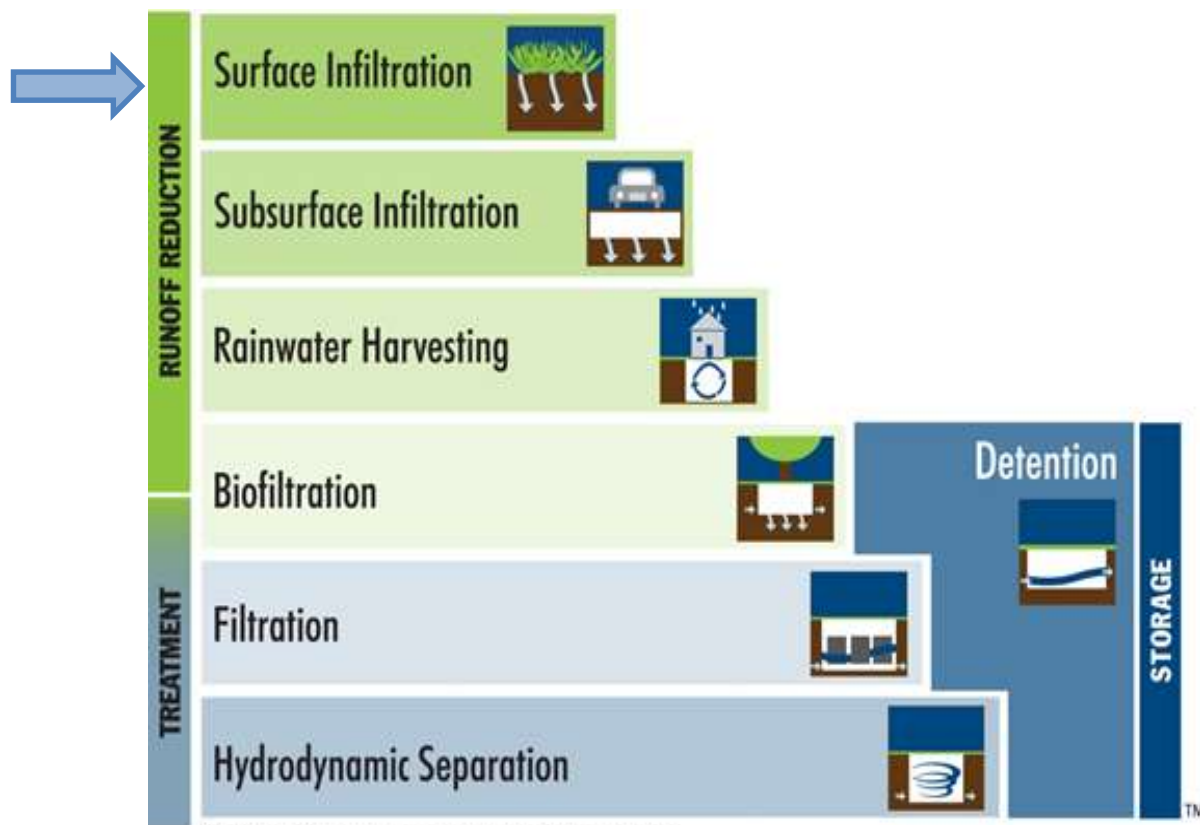


# LID Design Staircase





# LID Design Staircase



© 2012 Contech Engineered Solutions LLC



# Your Stormwater Support Team

---

Samantha Brown  
Regional Regulatory Manager  
[sbrown@conteches.com](mailto:sbrown@conteches.com)  
859-321-5825

Dana Hinaman  
Stormwater Consultant  
[dhinaman@conteches.com](mailto:dhinaman@conteches.com)  
513-314-4781

Joe Sommer, PE  
Account Manager  
[jsommer@conteches.com](mailto:jsommer@conteches.com)  
614-477-1171