DEPARTMENT OF
Environmental Protection
STATE OF MAINE

Drinking Water Program
An Office of the Department of Health and Human Services

NEMO
Maine

Maine Coastal Program

National Partnership
PETE
for Environmental Technology Education
Community Colleges
Tribal Colleges
Government
Industry
Building a Global Workforce

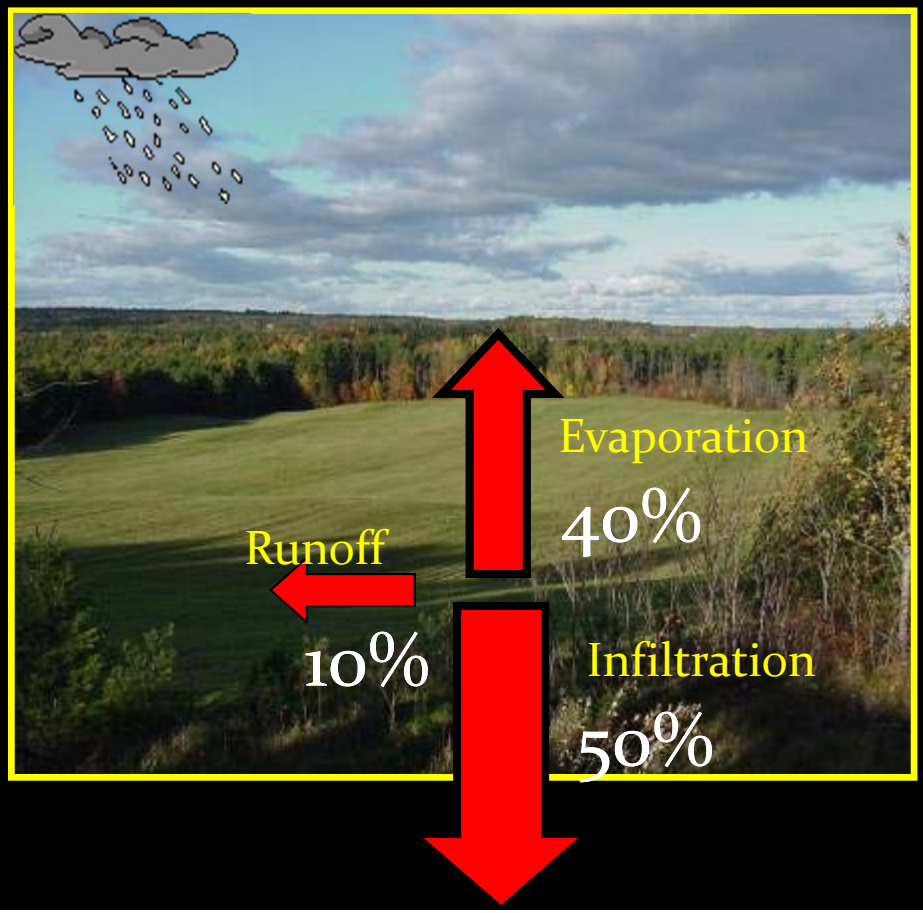
SPO Maine State Planning Office

LaMarr Clannon, Maine NEMO

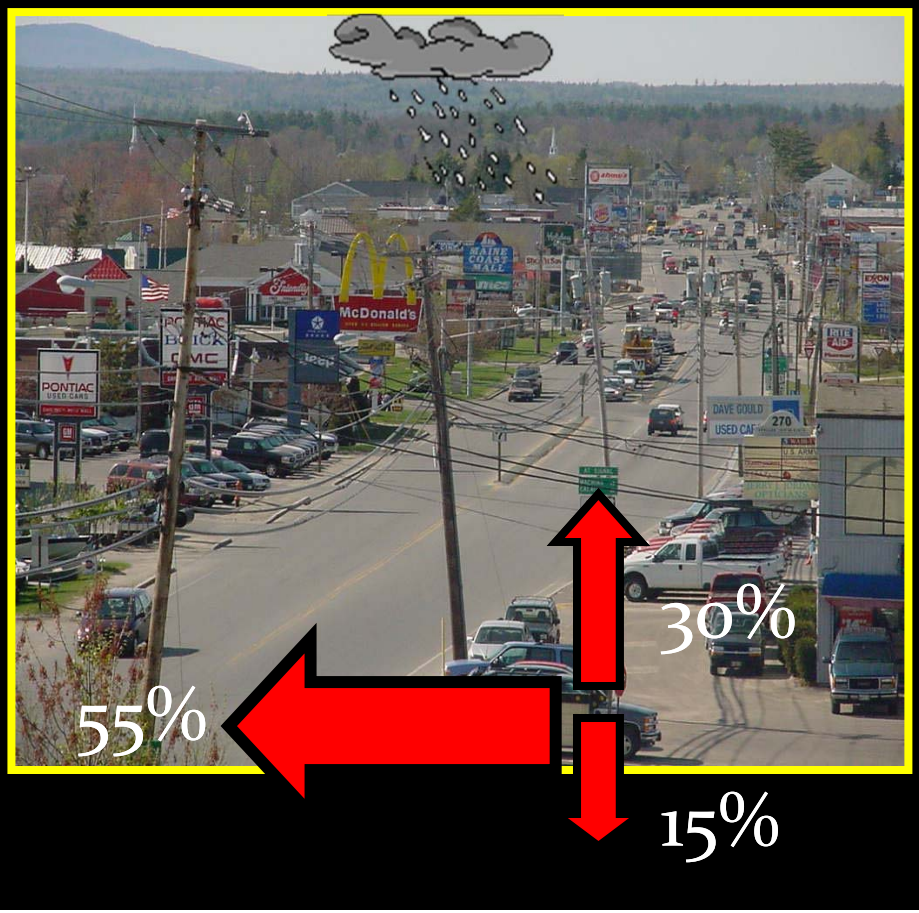
LID- It Works Better and Can Cost Less

Maine's Water Budget
Impacts of Development

Natural Cover



75-100% Impervious Surface

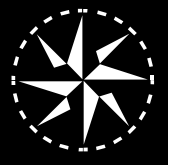


Development Impacts on Water Quality

Bacteria
Sediments
Temperature
Nutrients
Petroleum Derivatives
Pesticides and Herbicides
Heavy Metals

Increased quantity

Decreased quality



Safe Eating Guidelines

for fish from Maine lakes, ponds and rivers

- **Pregnant and nursing women**
- **Women who may get pregnant**
- **Children under age 8**
  SHOULD NOT EAT fresh water fish, EXCEPT 1 meal per *month* of brook trout or landlocked salmon.
- **All other adults, and children age 8 and older**
  CAN SAFELY EAT 2 meals per *month* of fresh water fish. For brook trout and landlocked salmon, 1 meal per *week* is safe.

The threat of impaired streams is motivating towns

York Ordinance language

- Low Impact Design. Each applicant is *required* to *submit a statement* to the Planning Board *documenting proposed* Low Impact Design (LID) *for the site,* which will help to reduce stormwater volumes and help to enhance stormwater quality.

Why do we want LID

- It's cool!
- Local research show it to be more effective than traditional treatment
- Lid can save developers money!
- Can be used on individual house lots

Traditional Development Pushes rain off the site

Traditional Development Pushes rain off the site

Traditional Development
Pushes rain off the site

LID

It's way cooler than traditional methods

Portland Oregon

Portland Oregon

Portland Oregon

Long Creek

Lisbon Rain Garden

Rockland WW Facility

Rockland Greenroof

UNH Stormwater Center

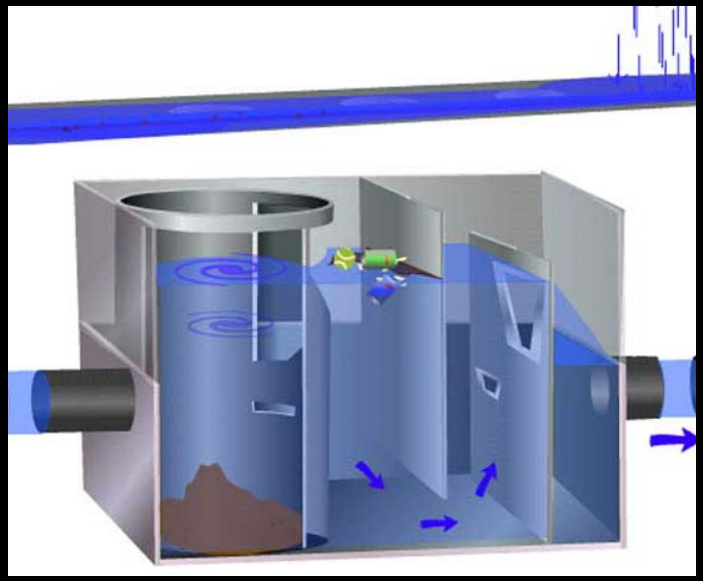
Since 2004

monitored the ability of 23 stormwater systems to treat pollution and reduce the volume of runoff

There is a concern that increased infiltration can cause harm to groundwater.

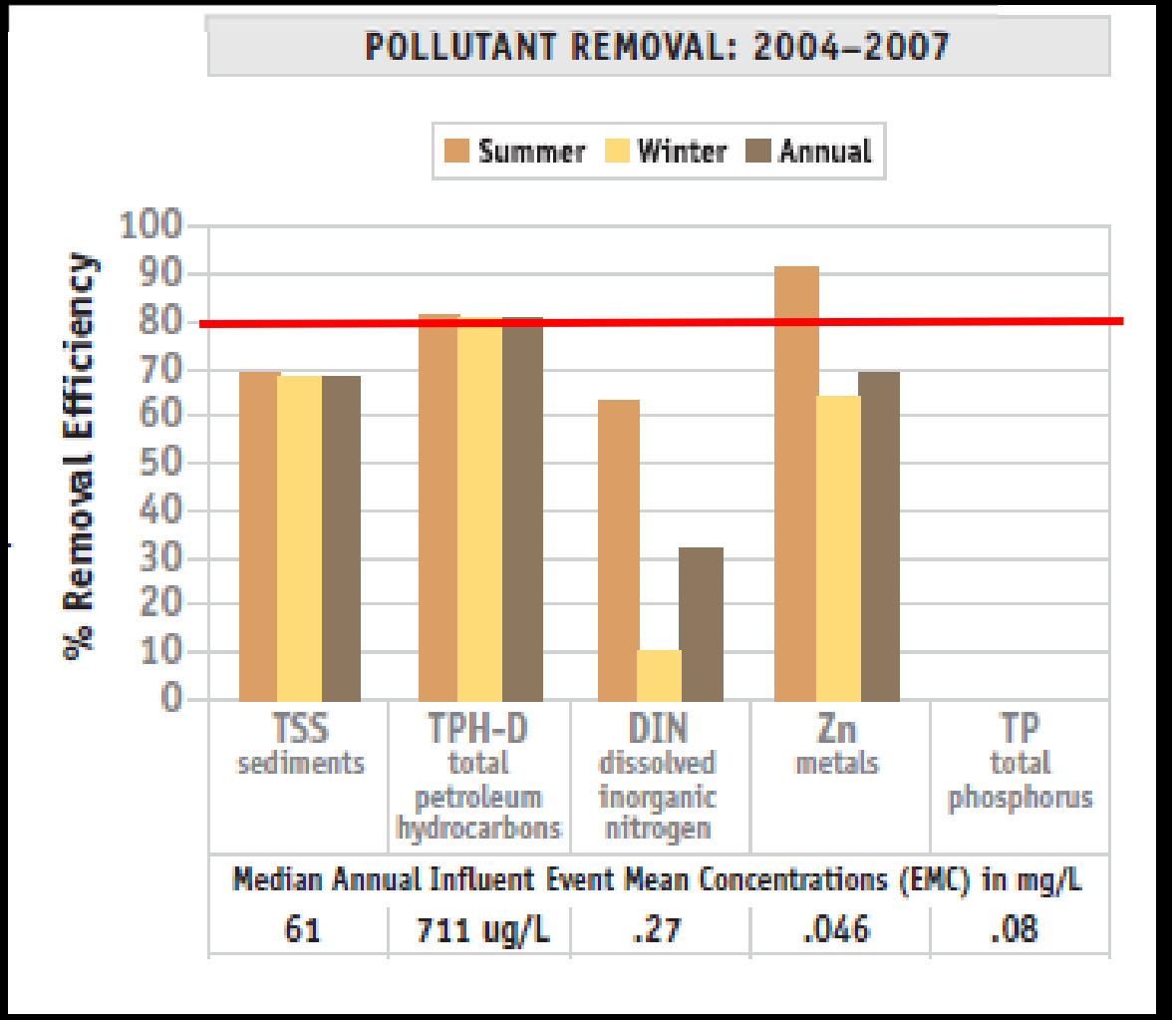
Conventional Treatment Devices
Retention Pond
Stone (rip-rap) Swale
Vegetated Swale
Berm Swale
Deep Sump Catch Basin

Manufactured Treatment Devices (MTDs)
ADS Infiltration Unit
StormTech
Aquafilter
Hydrodynamic Separators

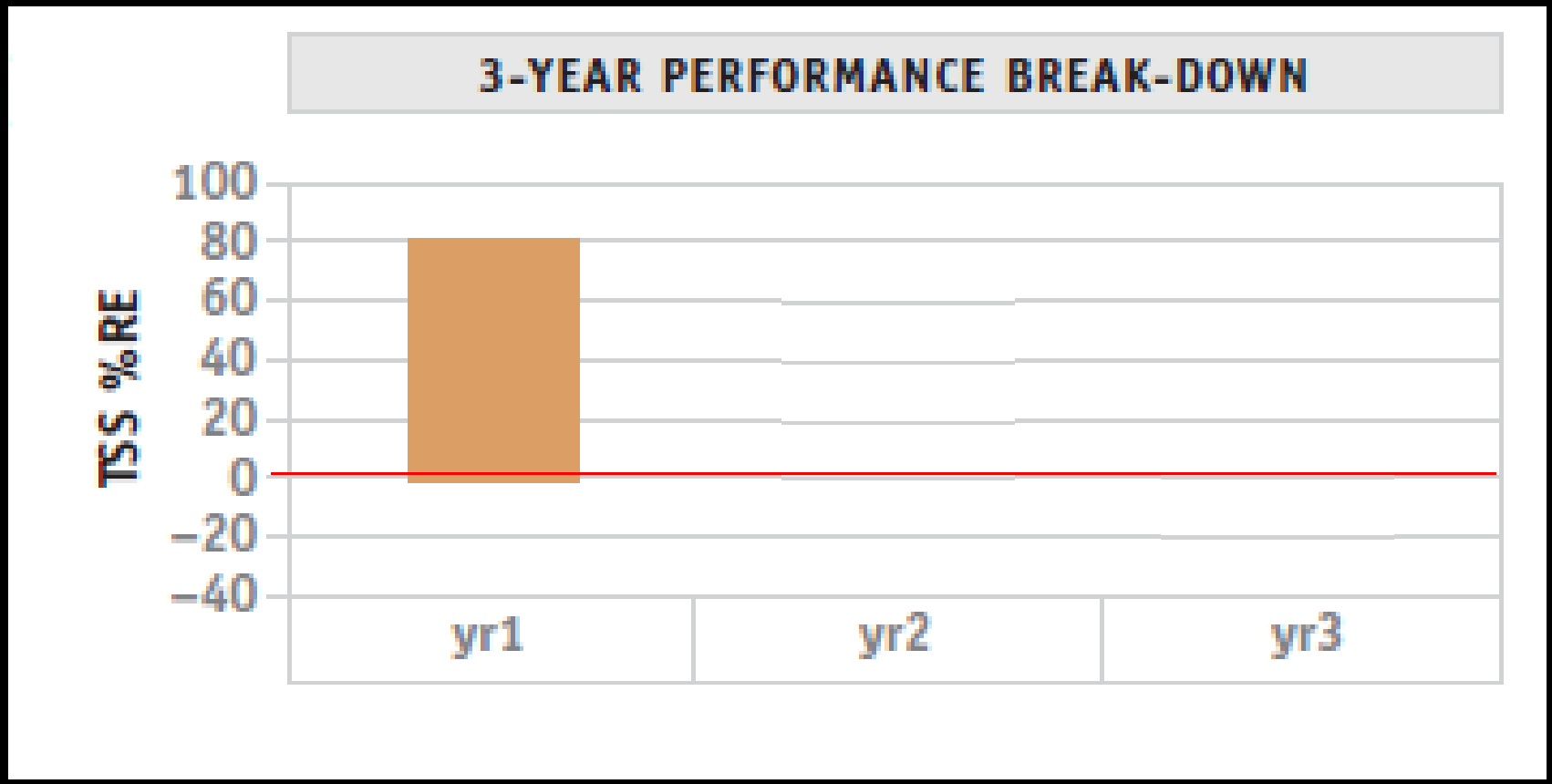


Low Impact Development (LID)
Surface Sand Filter
Bioretention
Bio I - 48" depth
Bio II - 30" depth
Gravel Wetland
Porous Asphalt
Pervious Concrete
Tree Filter

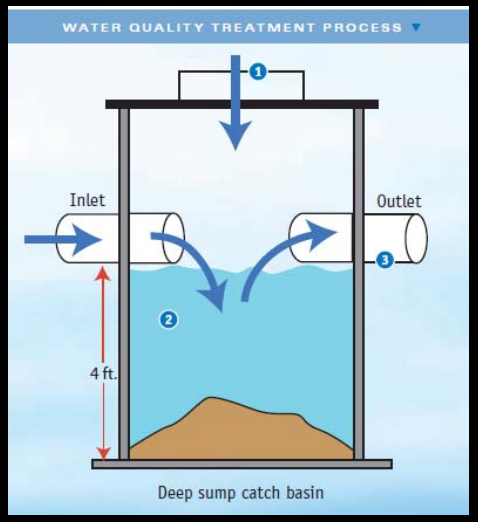
Retention Ponds $13,500/acre

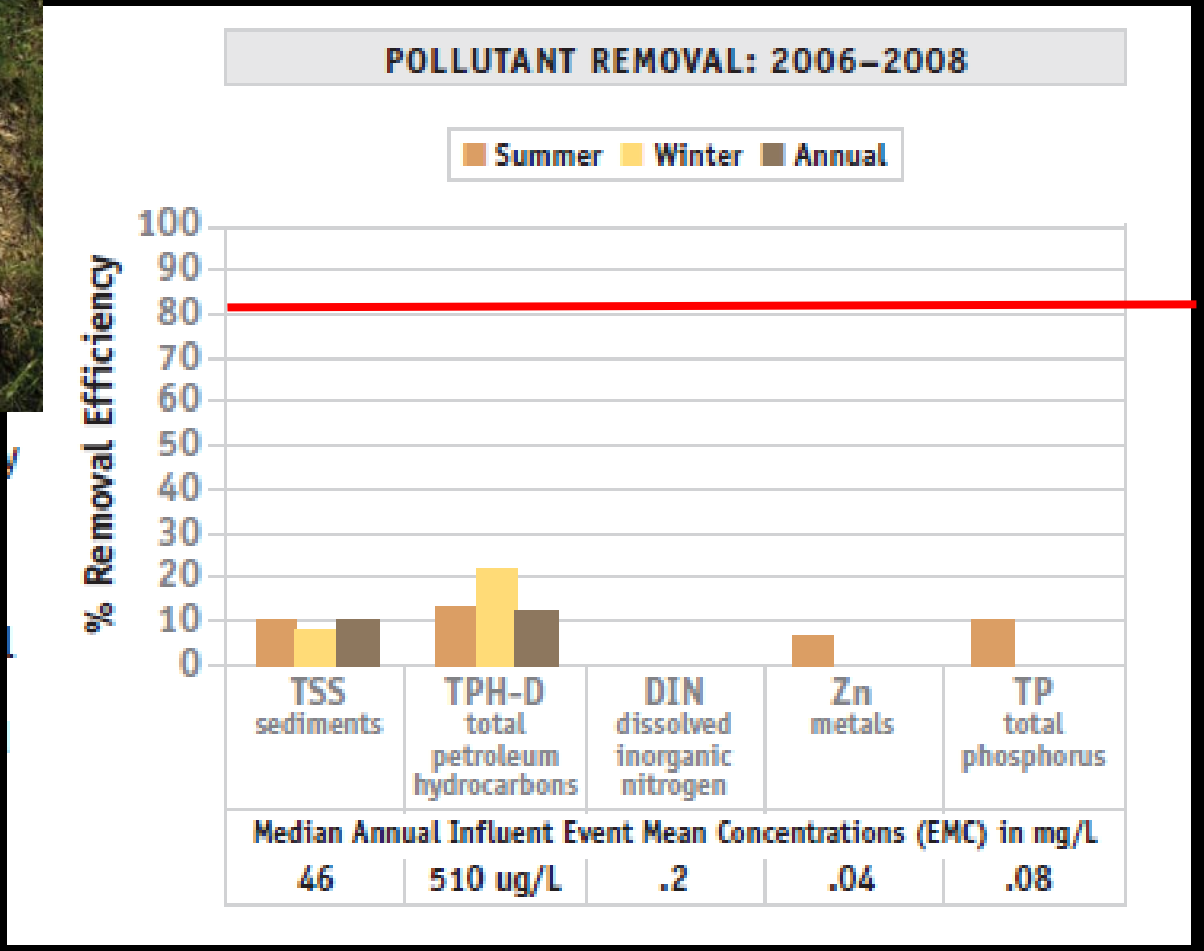


Retention Ponds



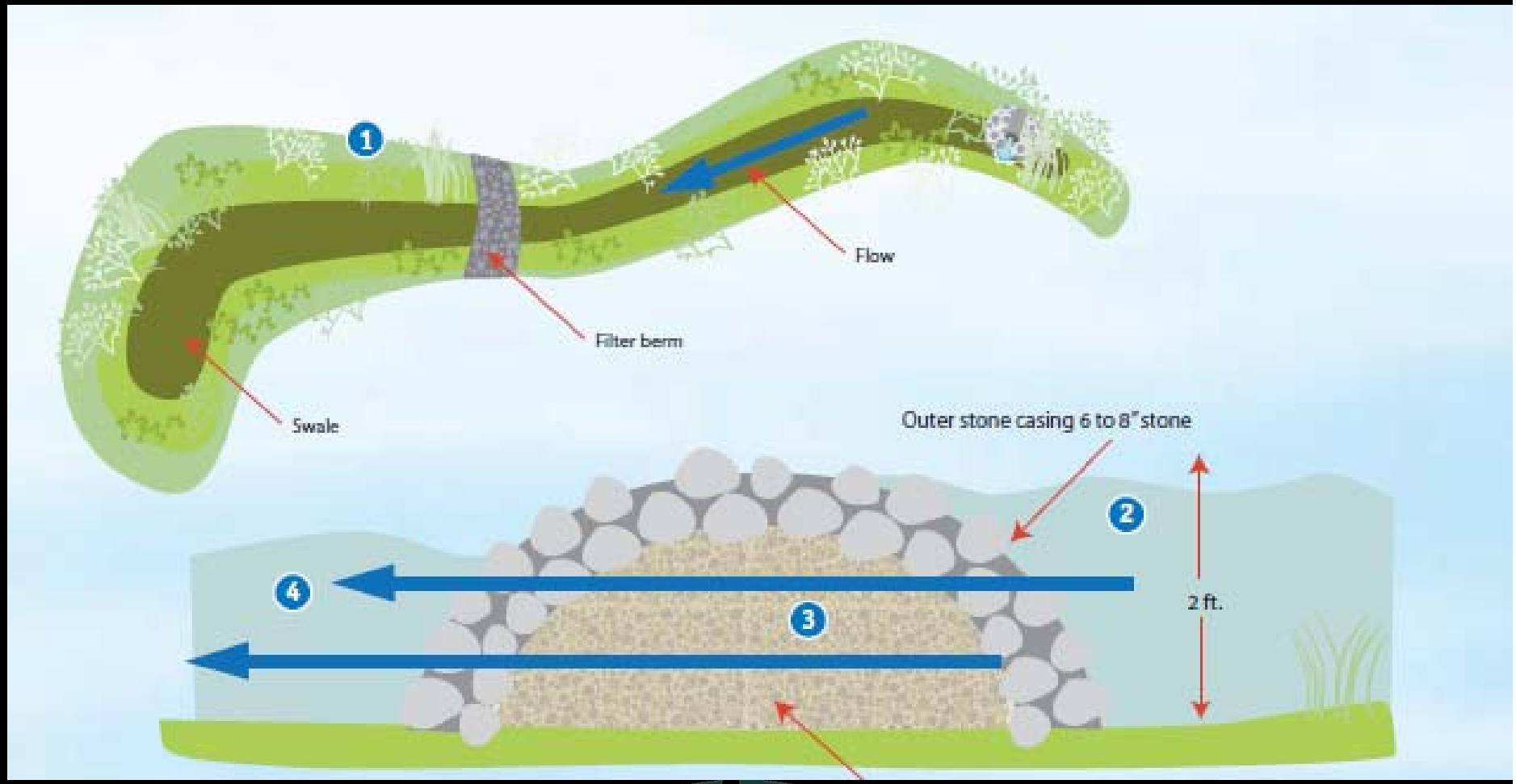
Deep Sump Catch Basins $1500 each





Filter Berm Swales $2,500

Filter Berm Swales



Filter Berm Swales $2,500

SPECIFICATIONS

Catchment Area:
1 acre

Water Quality Flow:
1 cfs

INSTALLATION COST

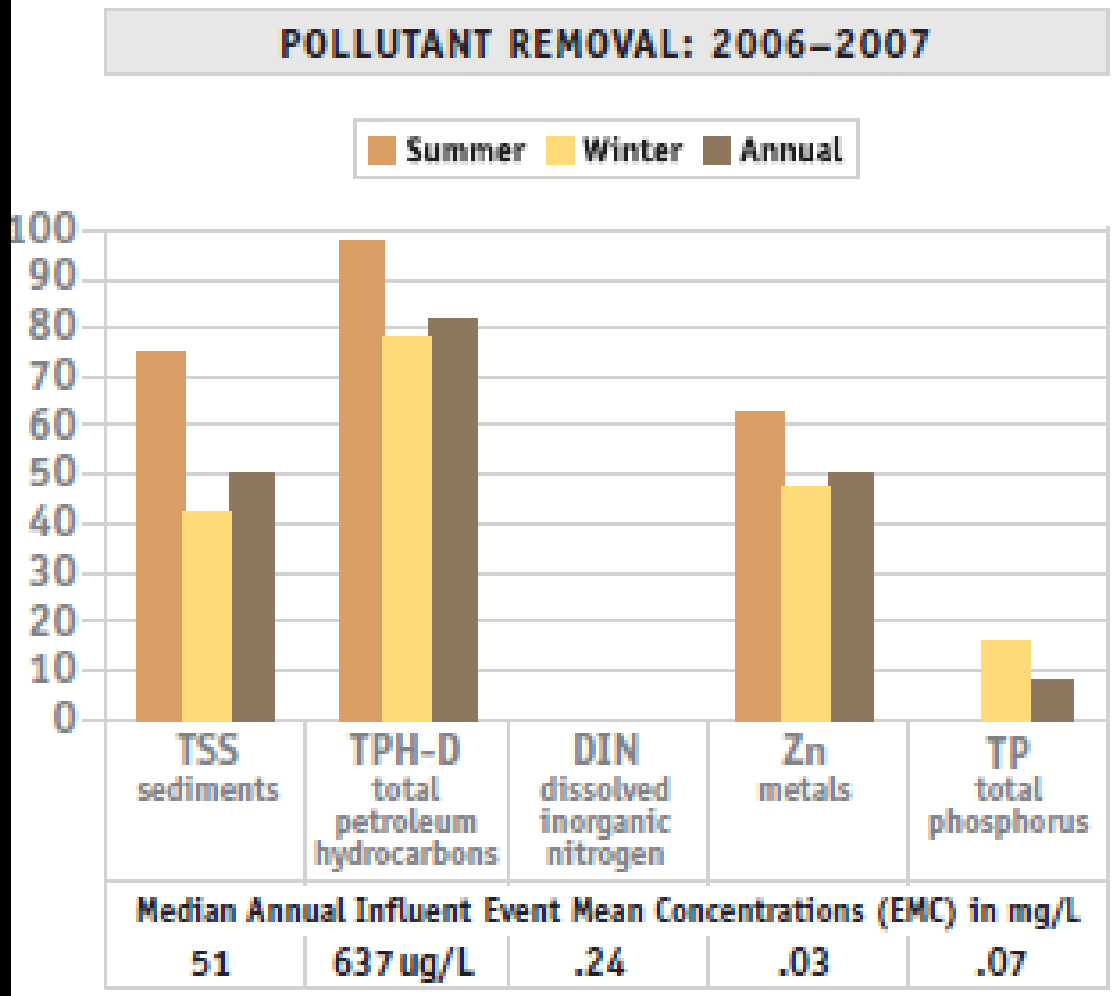
$2,500

MAINTENANCE

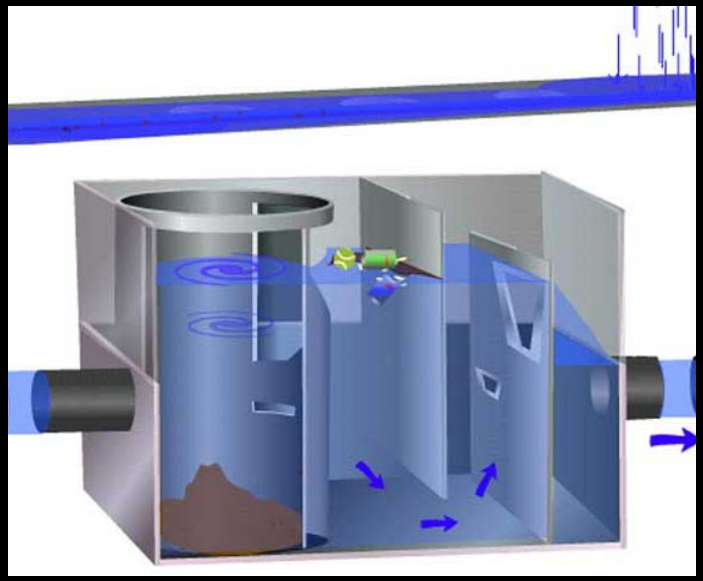
Maintenance Sensitivity: High

Inspections: High

Sediment Removal: Low

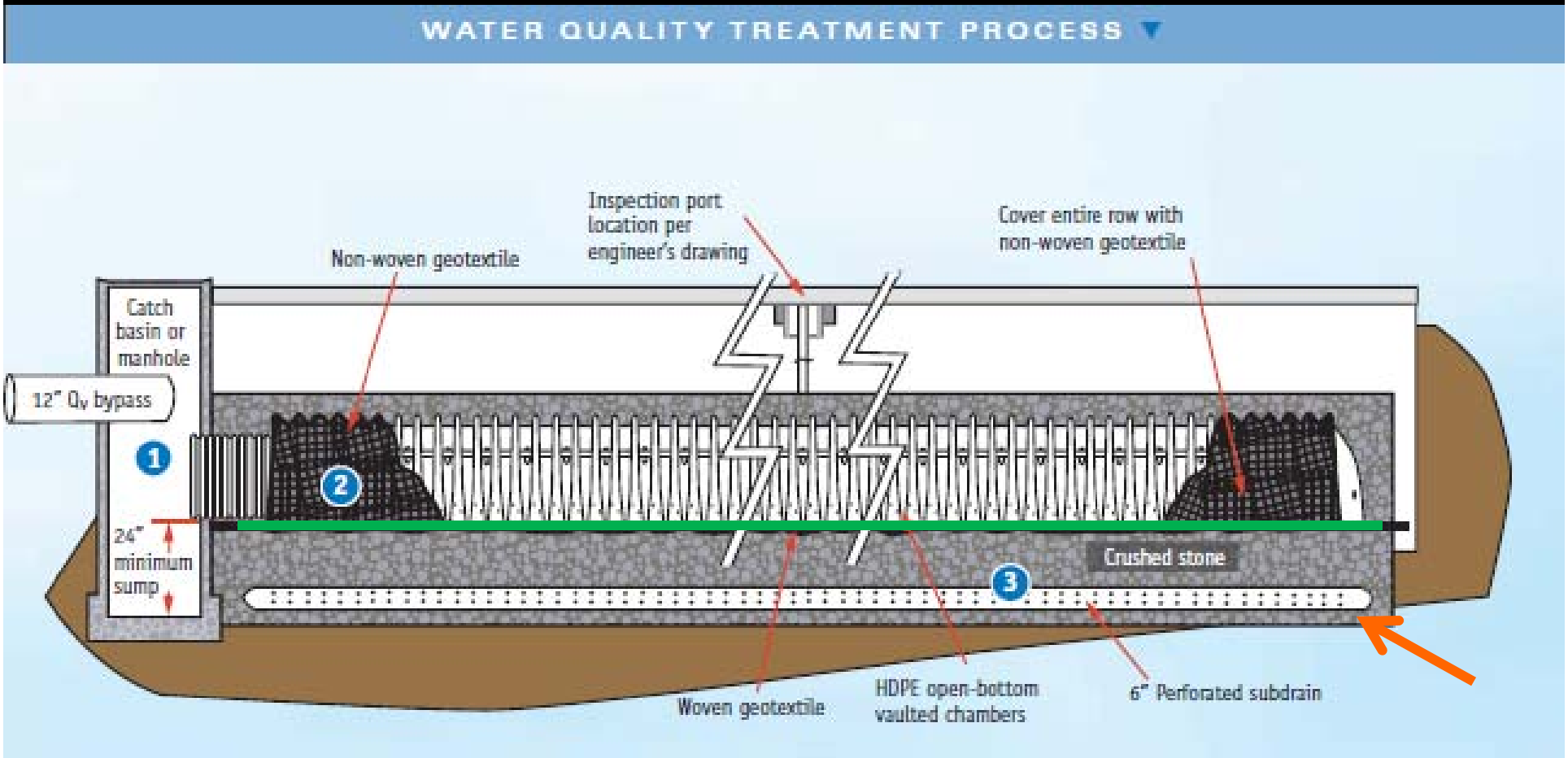


Treatment Unit Description	TSS Total Suspended Solids (% Removal)	TPH-D Total Petroleum Hydrocarbons in the Diesel Range (% Removal)	NO3-N (DIN) Dissolved Inorganic Nitrogen (% Removal)	TZn Total Zinc (% Removal)	TP Total Phosphorus (% Removal)
Manufactured Treatment Devices (MTDs)					
ADS Infiltration Unit	99	99	NT	99	81
StormTech	80	93	NT	56	49
Aquafilter	62	26	NT	52	59
Hydrodynamic Separators	27	1	NT	24	42



StormTech Isolator Row $34,000

StormTech Isolator Row



Organic Filter Cake

StormTech Isolator Row $34,000

SPECIFICATIONS

Catchment Area: 1 acre

Water Quality Flow: 1 cfs

Water Quality Volume: 3,300 cf

INSTALLATION COST

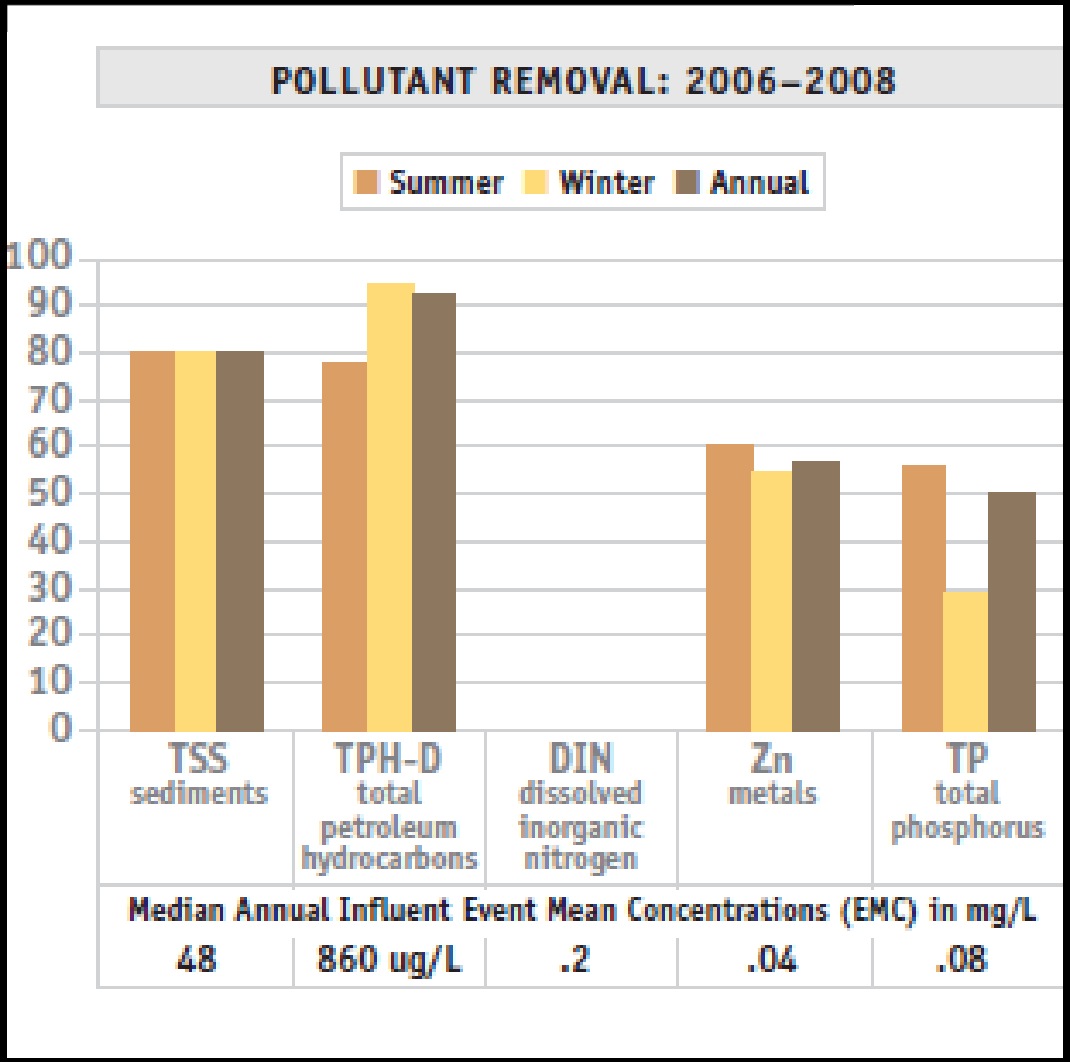
$34,000 per acre treated

MAINTENANCE

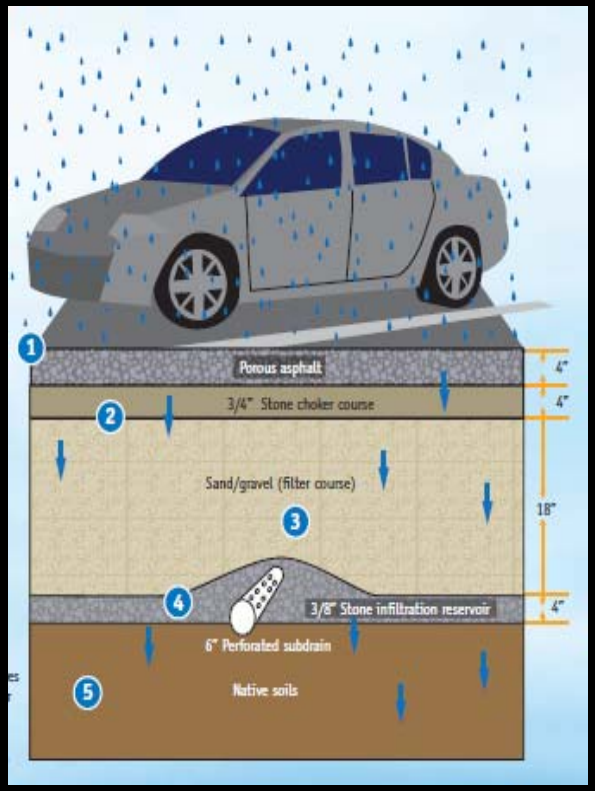
Maintenance Sensitivity: Low

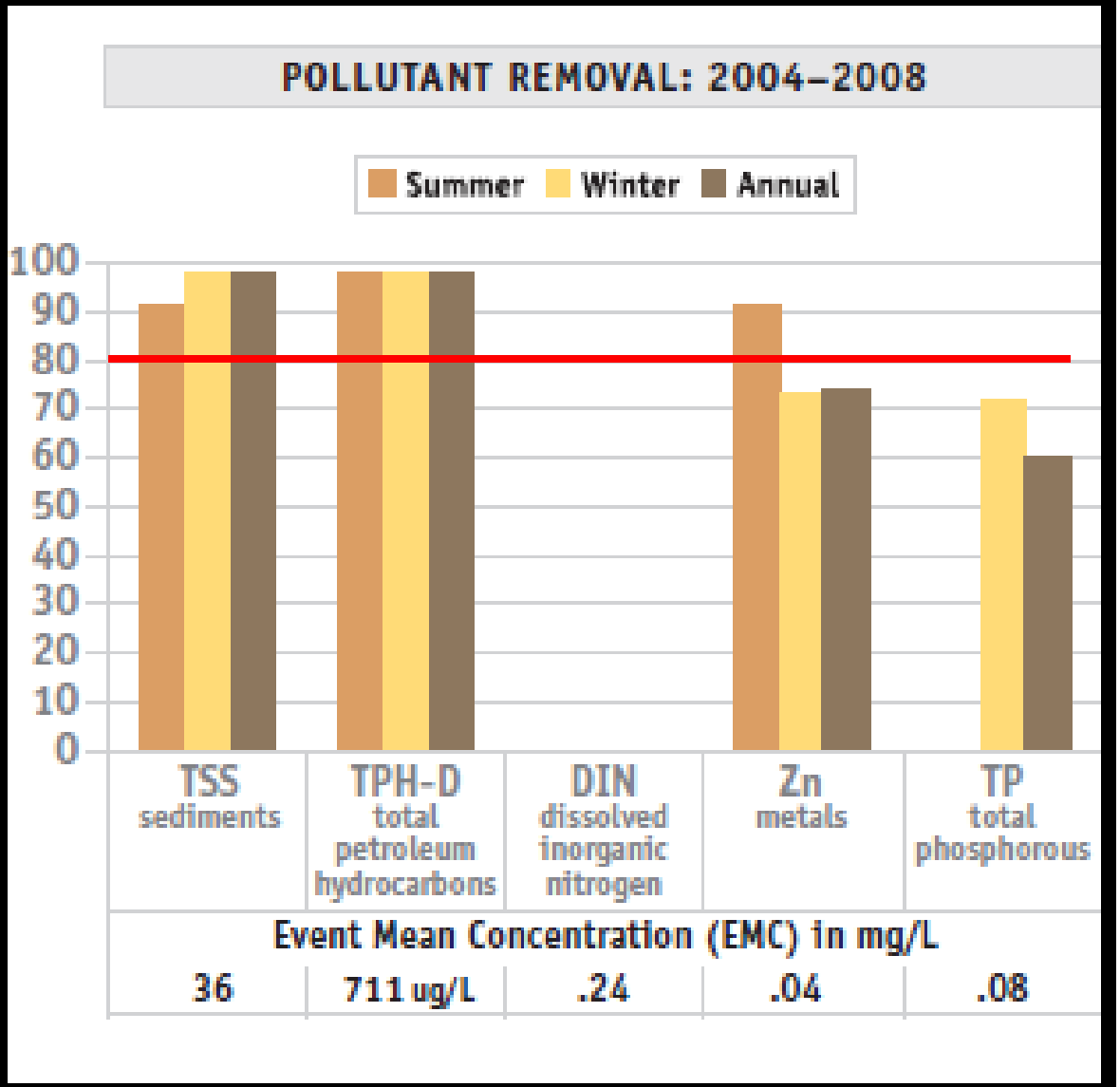
Inspections: High

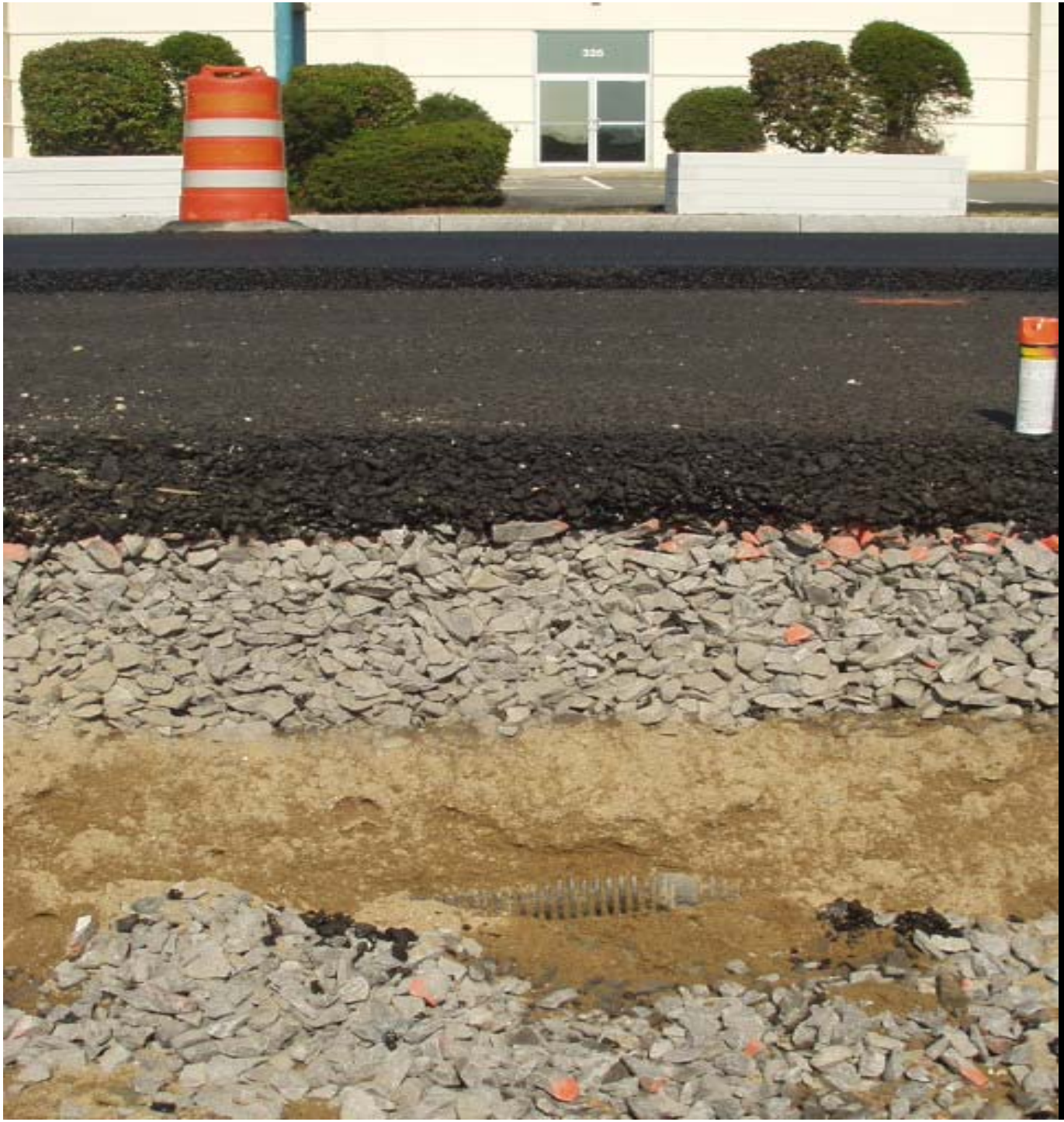
Sediment Removal: Moderate



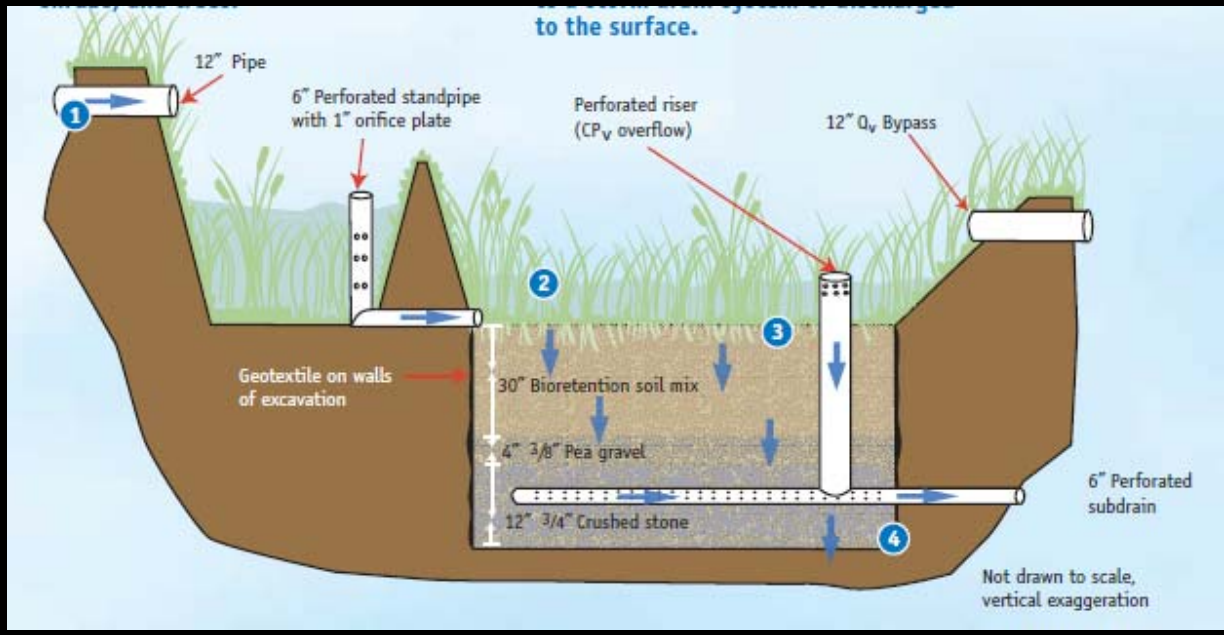
Porous Asphalt 2008 $2.80 sf ($2.25)



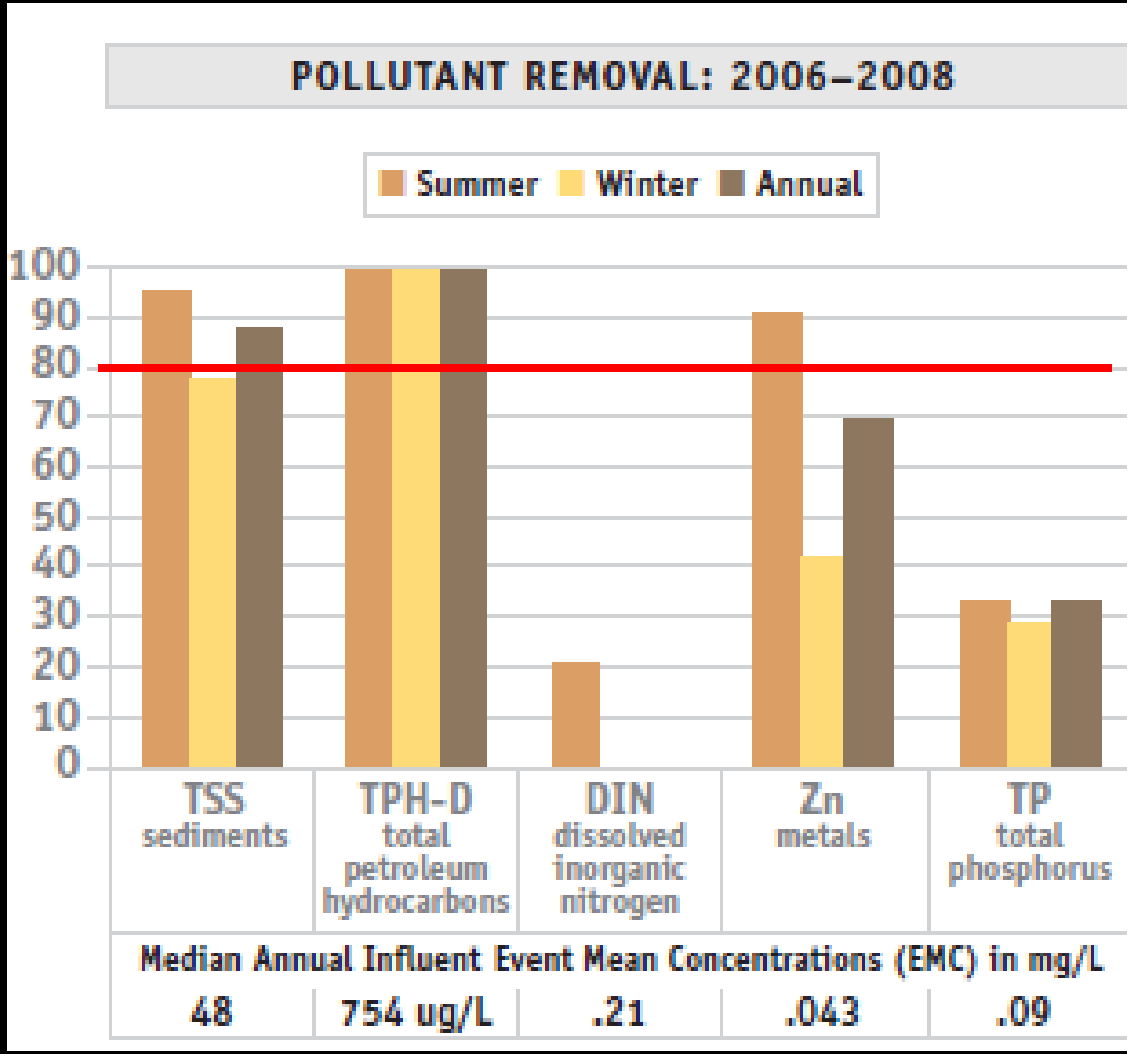



335

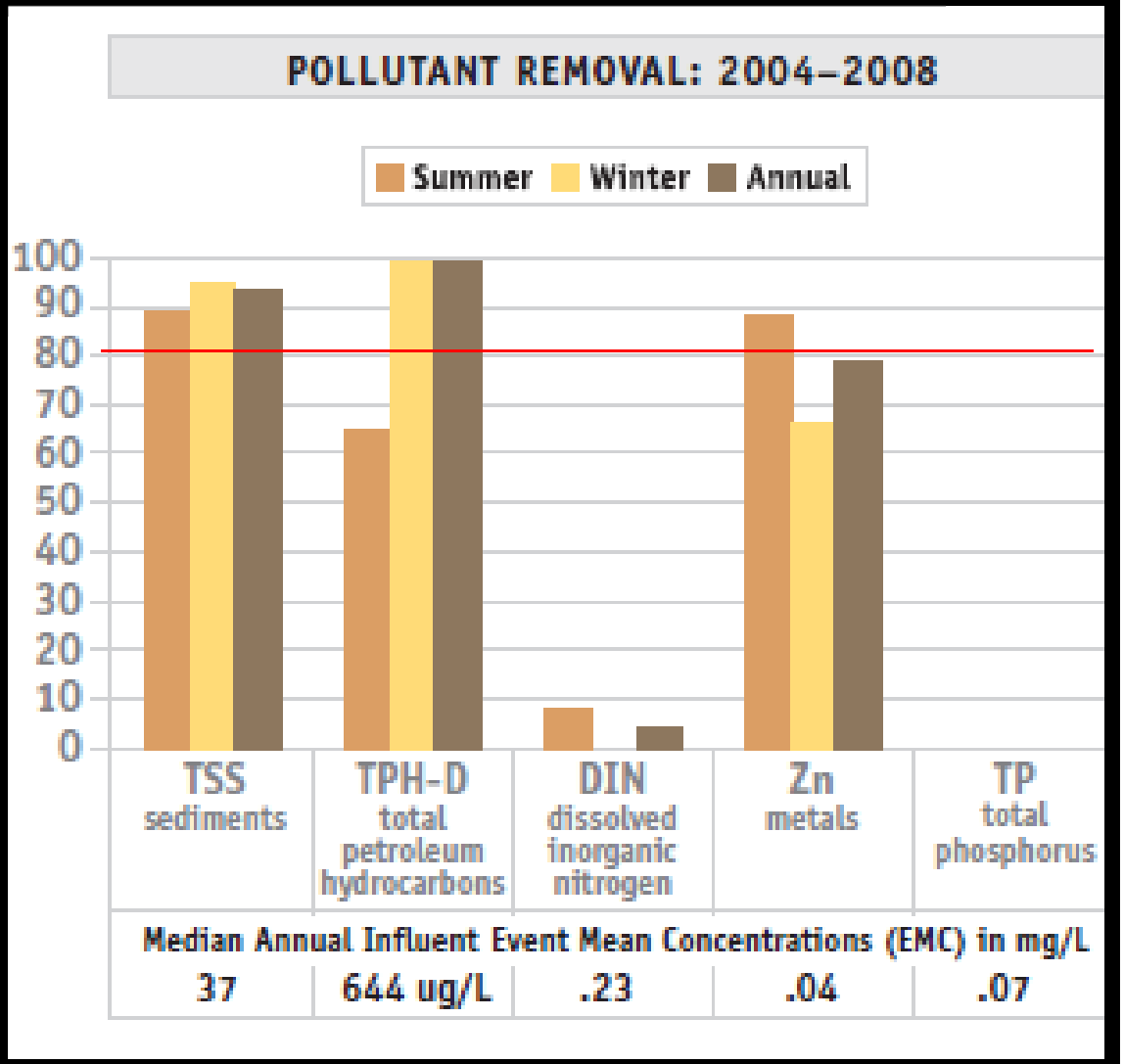
Bioretention Systems $18,000/acre



Bioretention Systems $18,000/acre

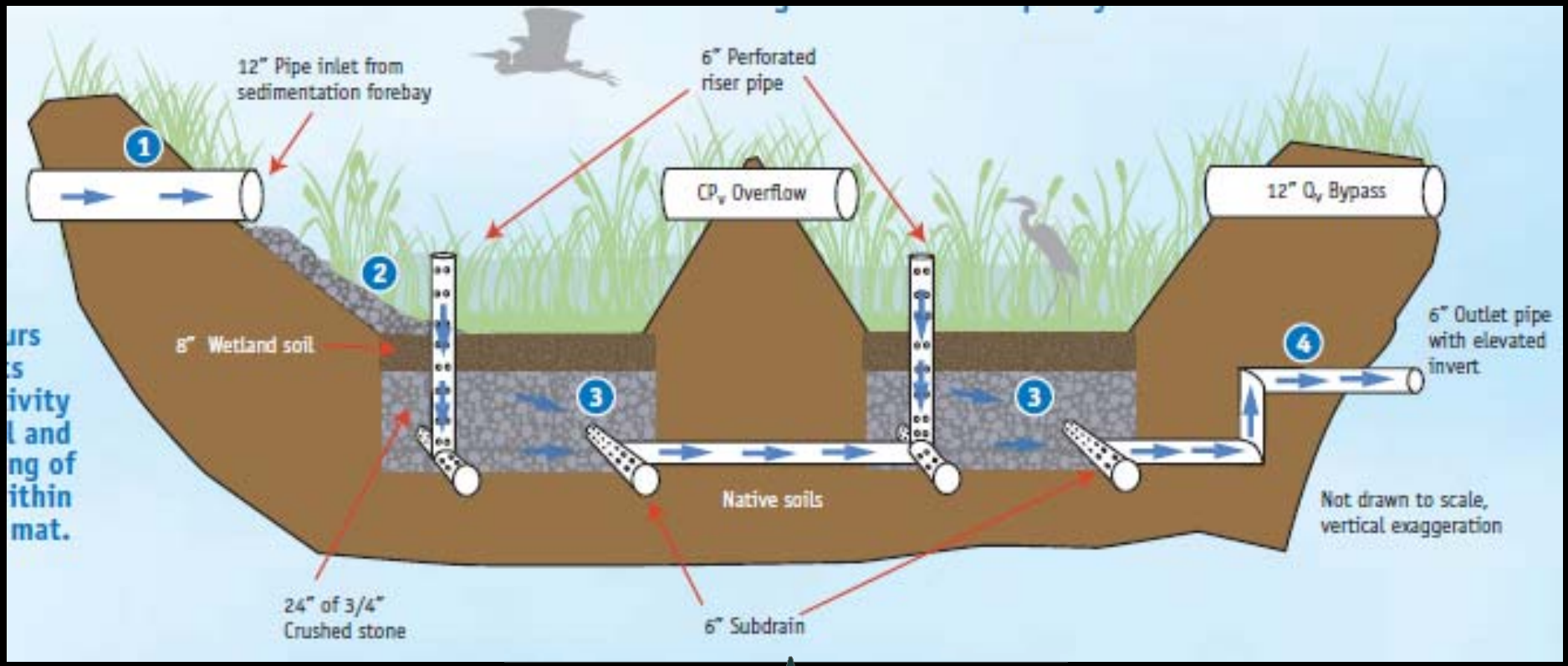


Tree Box Filter $3000 each (10/acre)

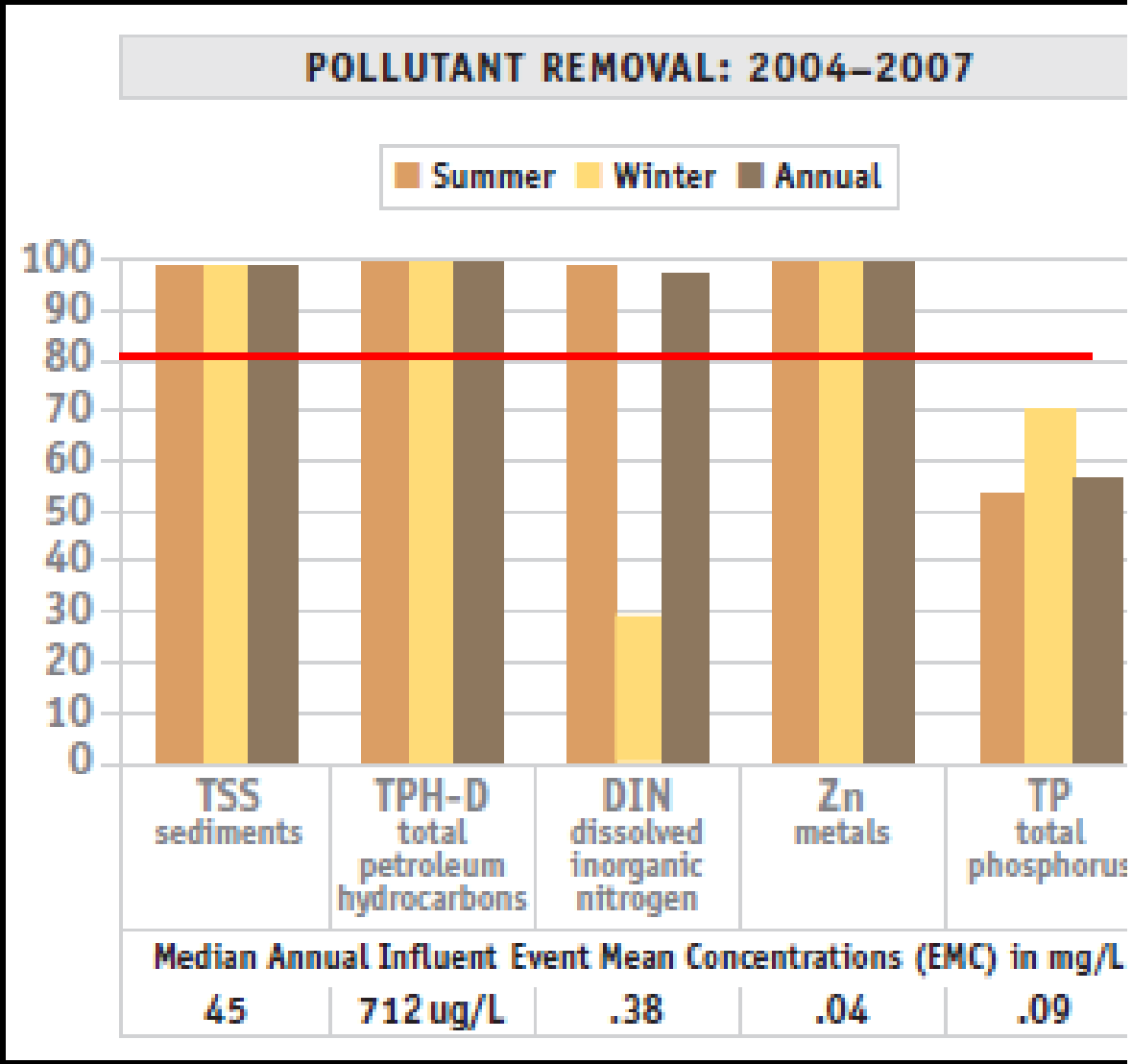


Subsurface Gravel Wetland $22,500/acre

Subsurface Gravel Wetland



Subsurface Gravel Wetland $22,500/acre



LID Weathers The Cold

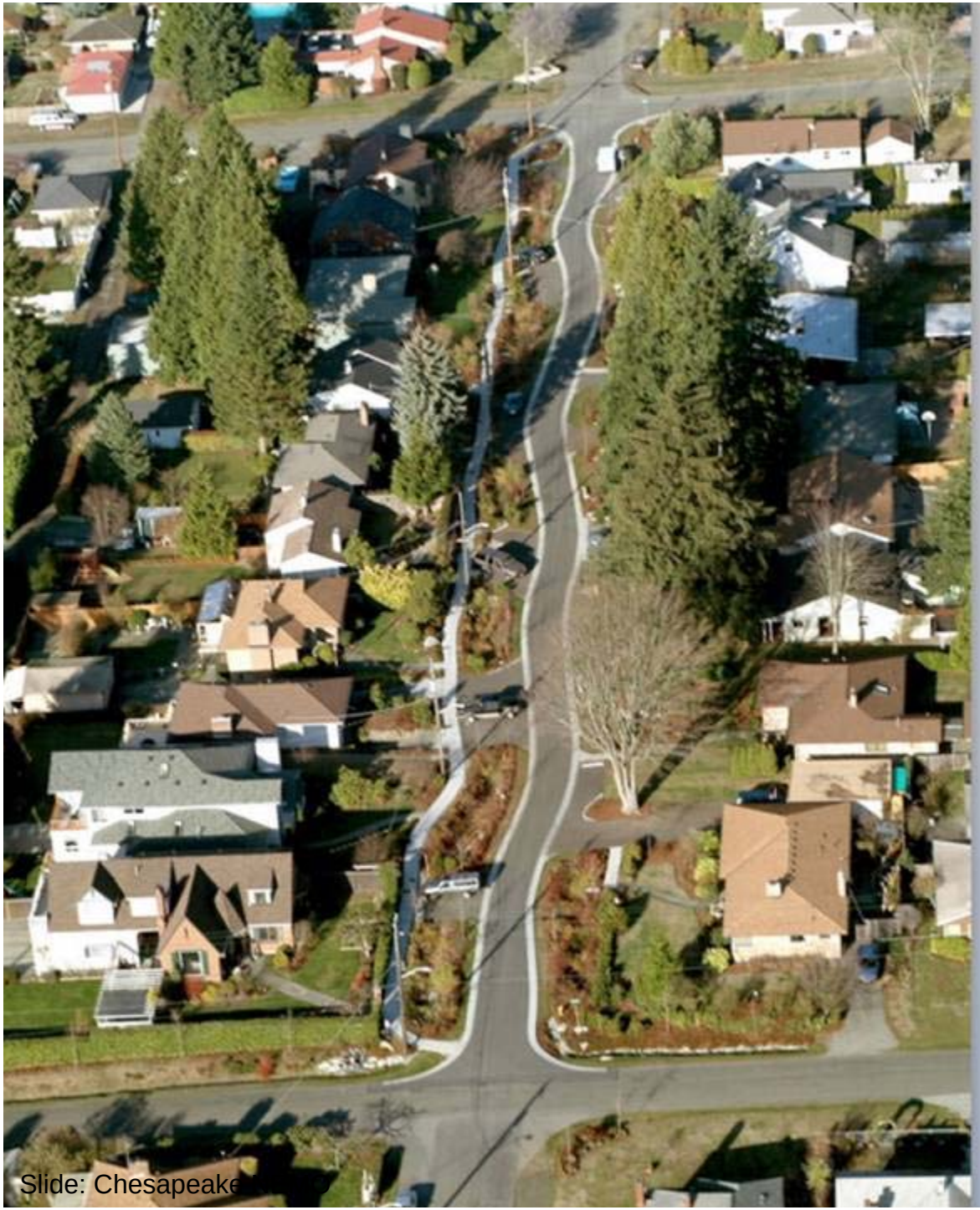
Low Impact Development function well in the harsh winters of cold climate regions.

Projects that use LID can be more effective in treating pollution and in some instances less expensive to install than those that rely on curbs, pipes, and ponds.

LID systems do require maintenance to function properly, but so do all of the commonly used systems that are believed to require little or no attention.

Saving $$ with LID

Slide: Pembroke Maryland , Chesapeake NEMO



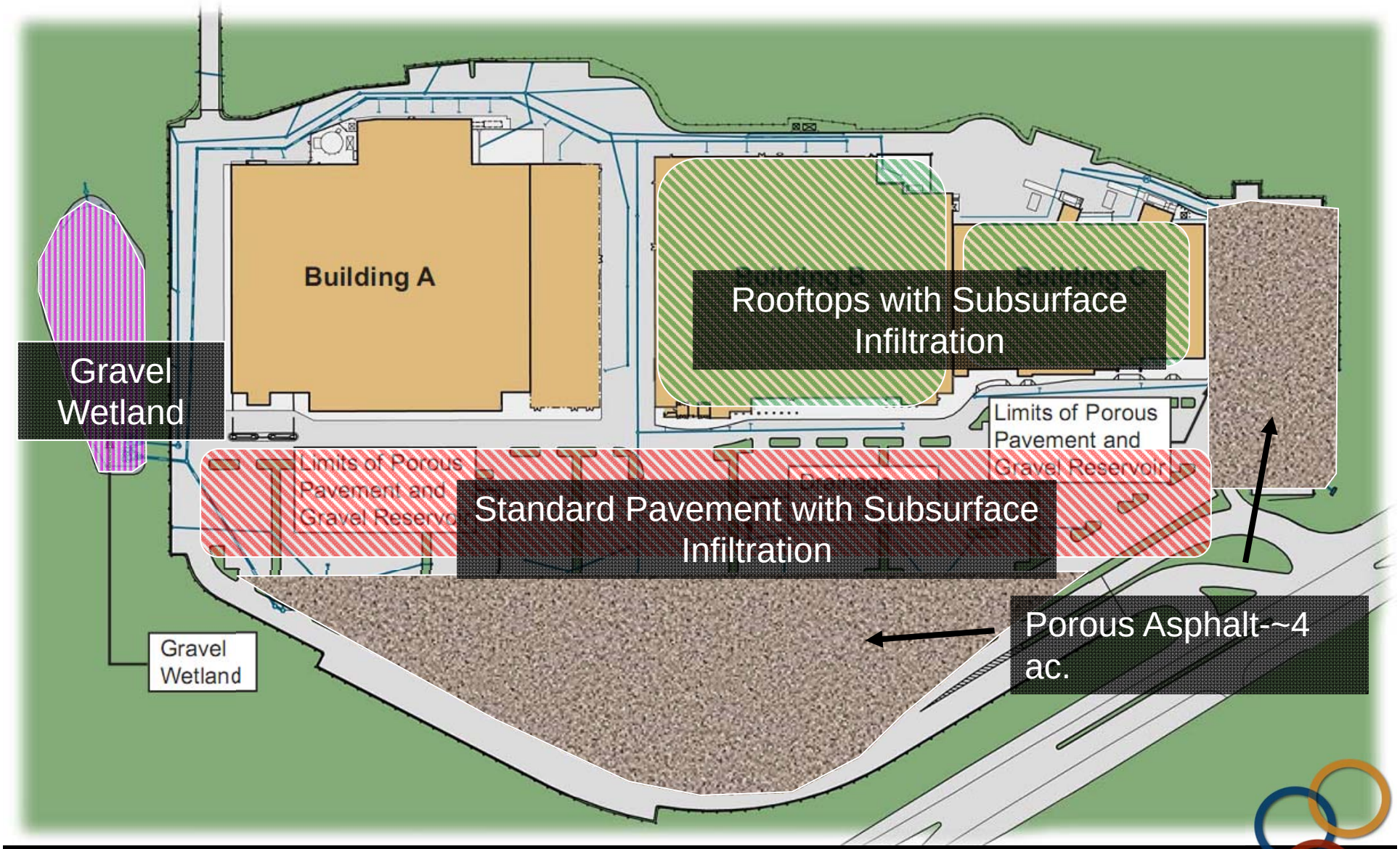
25% Savings

Slide: Chesapeake

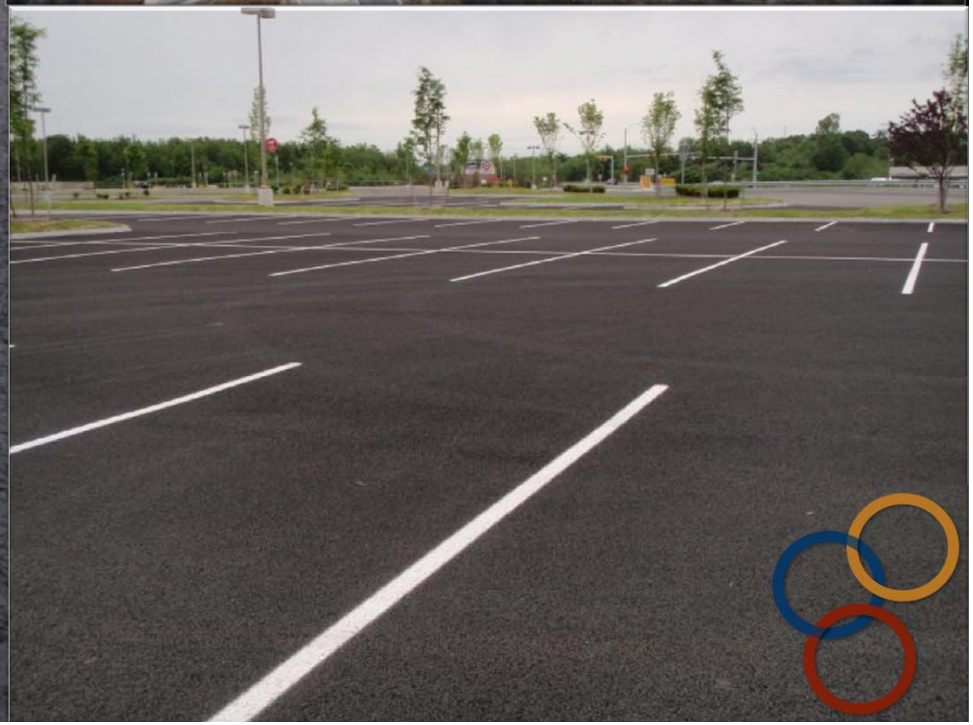
Boulder Hills, NH

Boulder Hills, NH

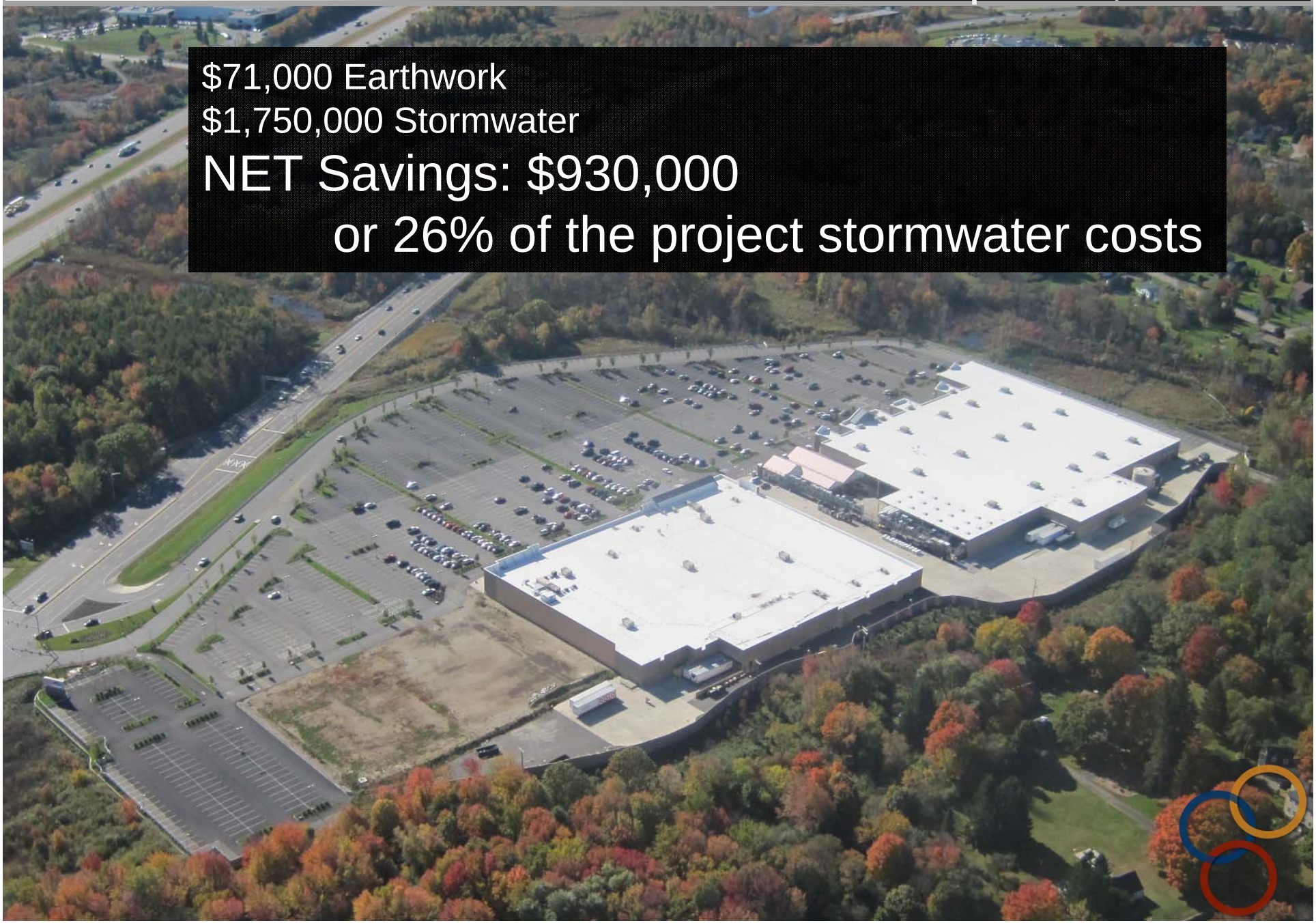
Greenland Meadows Commercial Development, NH



Greenland Meadows Commercial Development, NH



Greenland Meadows Commercial Development, NH



Portland, Oregon

Portland, Oregon

Estimated $144M for new pipes

Portland, Oregon

Portland, Oregon

Added 500 green streets, 4000 street trees

Chicago, Illinois

Chicago, Illinois

extensive flooding 1,900mi of alleys and 3,500 ac

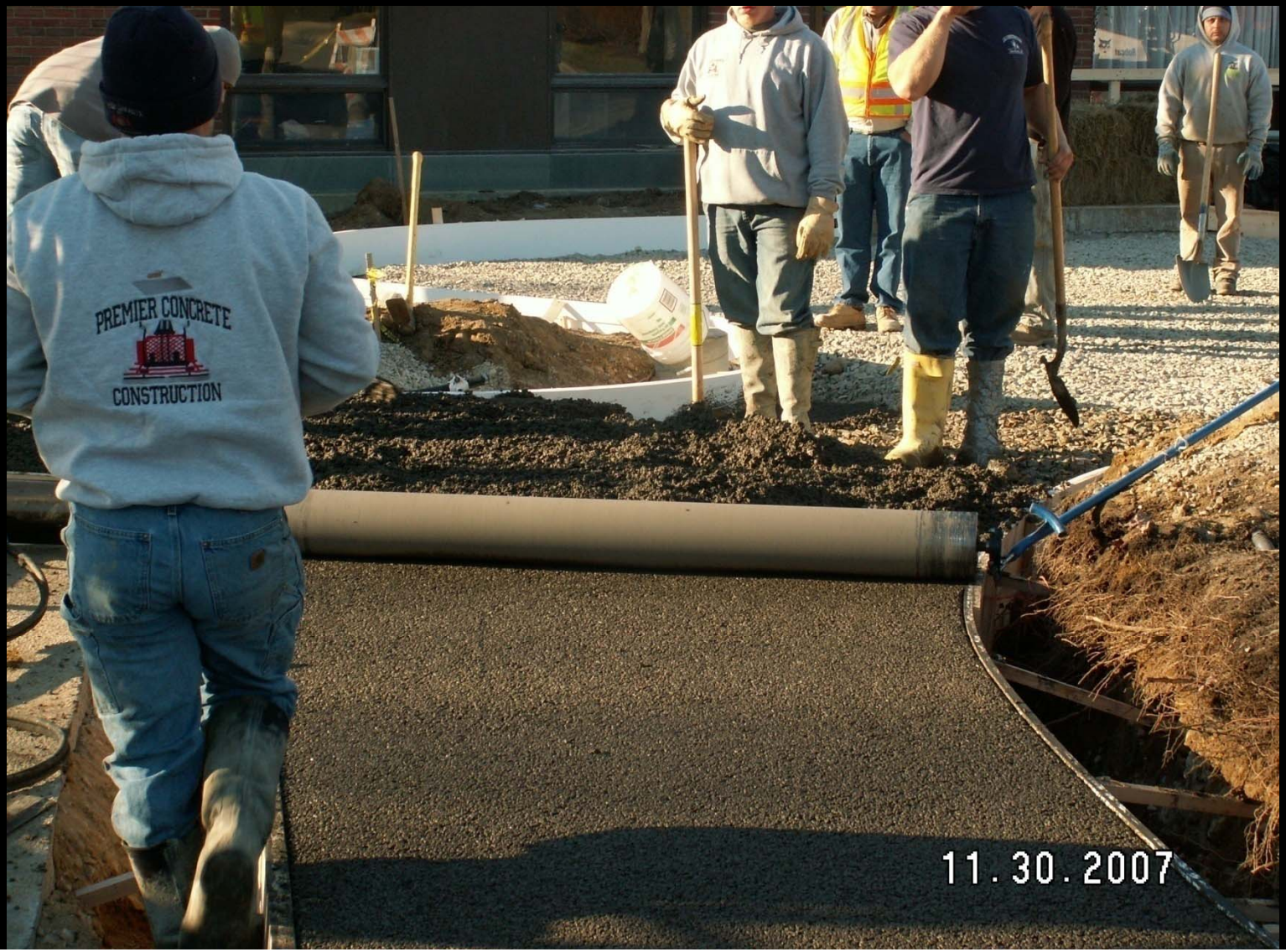
Chicago, Illinois

- Eliminated 70M gallons of stormwater in 2009

Most still didn't know how to use the tools

Back Cove Rain Garden

Porous concrete York Hospital



Northgate Plaza

Ocean Ave Elementary

Augusta Hannaford

Ellsworth Middle School

Rockland Green roof

Woodard and Curran

Maine Mall Porous Pavement

Portland Greenroofs

Long Creek Tree Box Filter

Kittery Commercial Raingarden

Kittery Downspout

Orono Raingarden

Portland Raingarden

Belgrade Pavers

Turf reinforcement

Belgrade Raingarden

Belgrade dripline infiltration

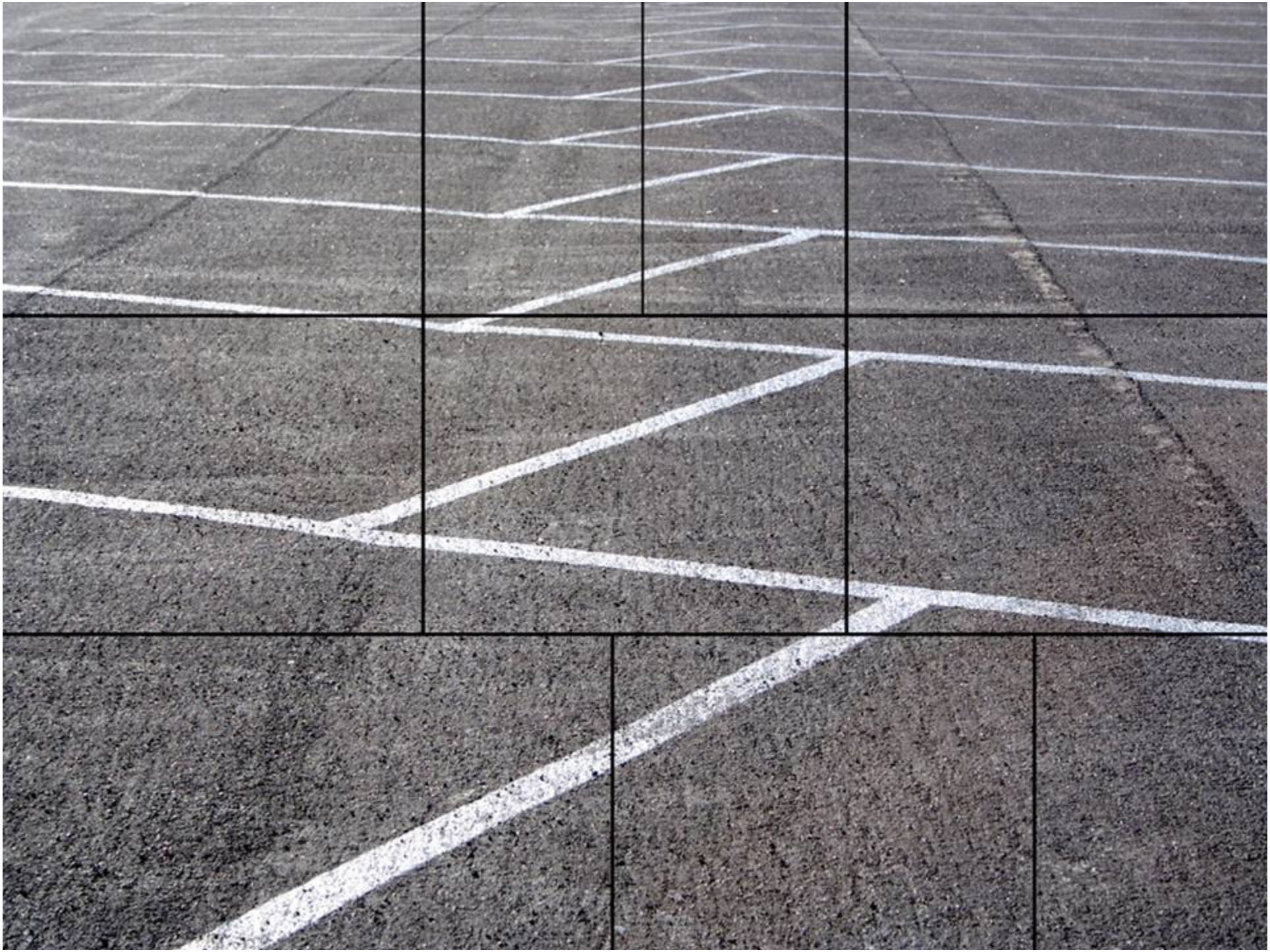
What can we make happen in small towns?

Gravel Grass

Parking stall paved with gravel grass - ready to be put to good use

Porous sidewalks require less winter maintenance

LID creates unique opportunities




CVS/pharmacy








CVS/pharmacy



PREMIER CONCRETE
CONSTRUCTION
11.30.2007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Carving Up the Landscape


This is why we do it