Green Infrastructure To Protect Water Quality

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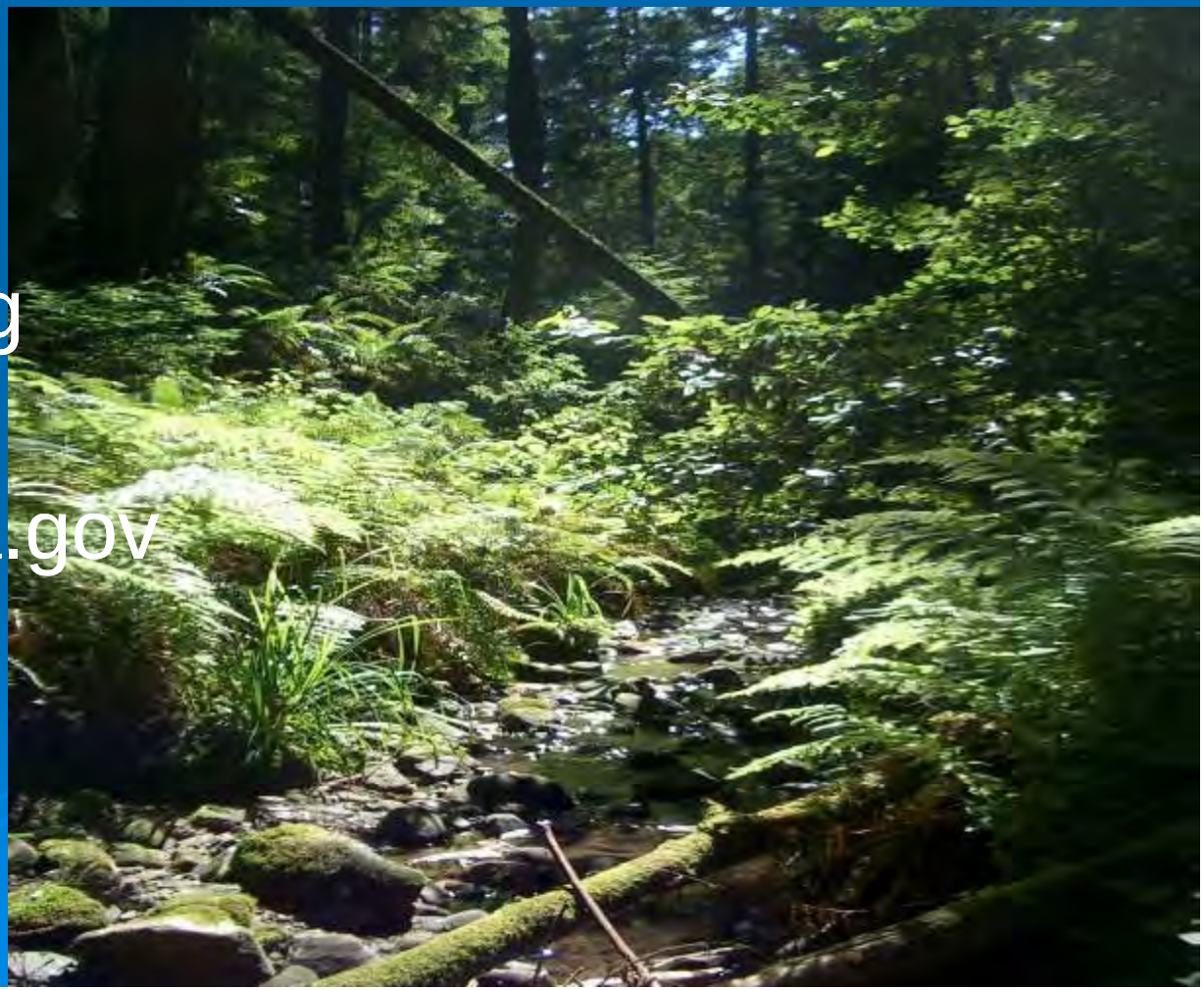
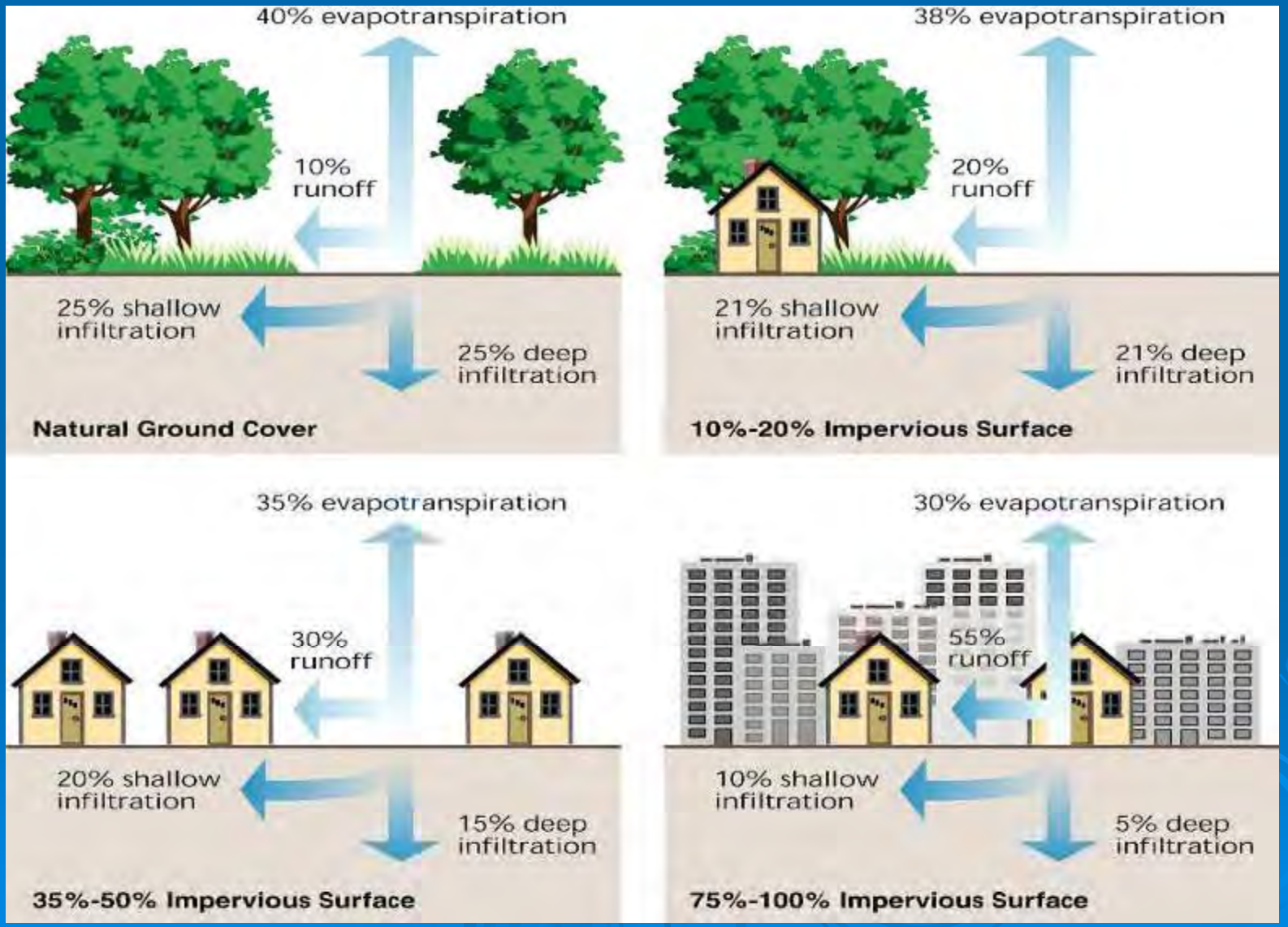


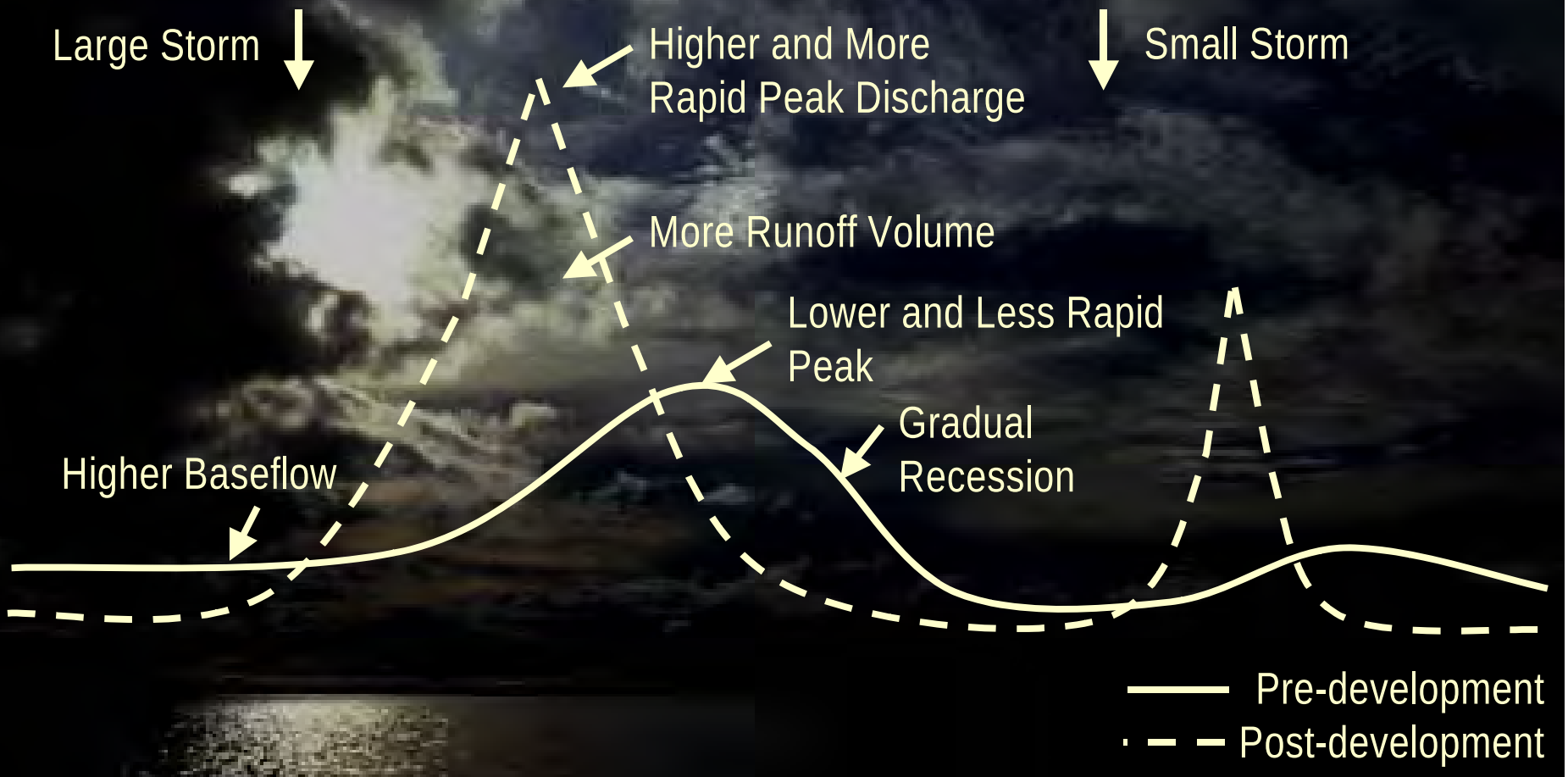
Impacts of Development on Water Resources

1) Increase Impervious Area
2) Increase Pollutant Runoff
3) Habitat/Resource Destruction

1) Increase in Impervious Area



Increase in Impervious Area: Stream Hydrograph

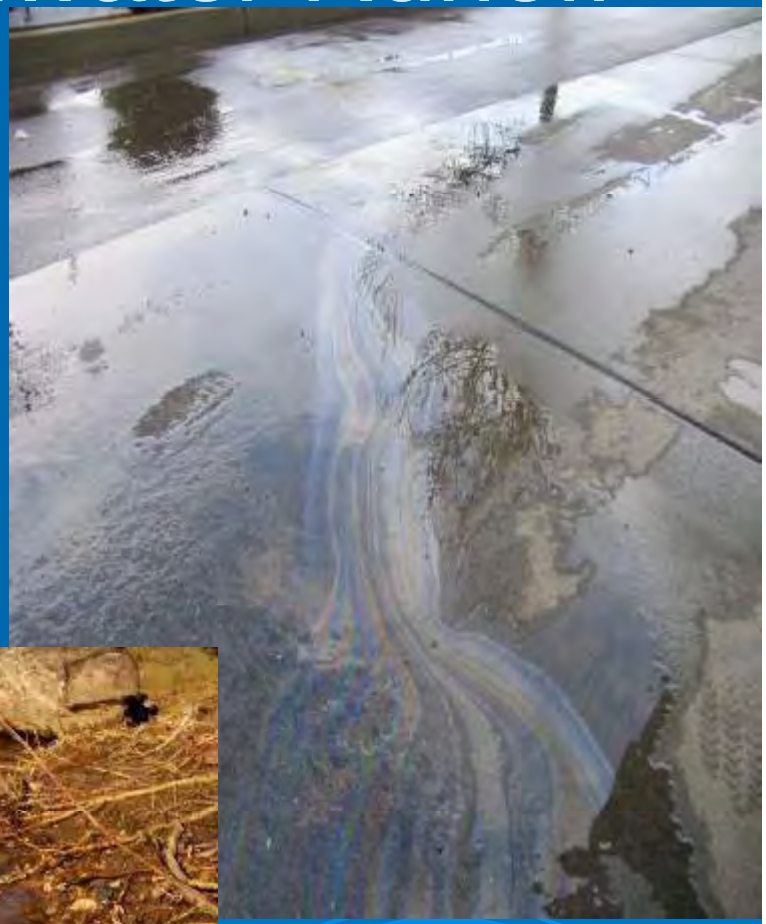


Increase in Impervious Area

- Erosion
- Loss of pool & riffles
- Loss of vegetation & riparian canopy
- Decrease in dry weather flow regime

2) Pollutants in Stormwater Runoff

- oil, grease
- heavy metals
- sediment, trash
- temperature
- pesticides, herbicides



Pollutants Generated from:

- Construction
- Parking lots
- Maintenance areas
- Material storage areas
- Restaurant washing
- Trash storage

3) Habitat/Resource Destruction

Low Impact Development (Green Infrastructure)

- New approach to stormwater management
- Cost-effective
- Sustainable
- Environmentally friendly

Green Infrastructure

- Utilize natural systems & engineered systems to:
  - mimic natural landscapes,
  - capture, cleanse and reduce stormwater runoff using plants, soils and microbes

- Maximize Stormwater
  - Infiltration
  - Evapotranspiration
  - Storage for re-use

Low Impact Development Concepts

- Preserve environmentally sensitive areas
- Reduce sources of pollution
- Minimize impervious areas
- Remove direct connections
- Utilize Natural systems

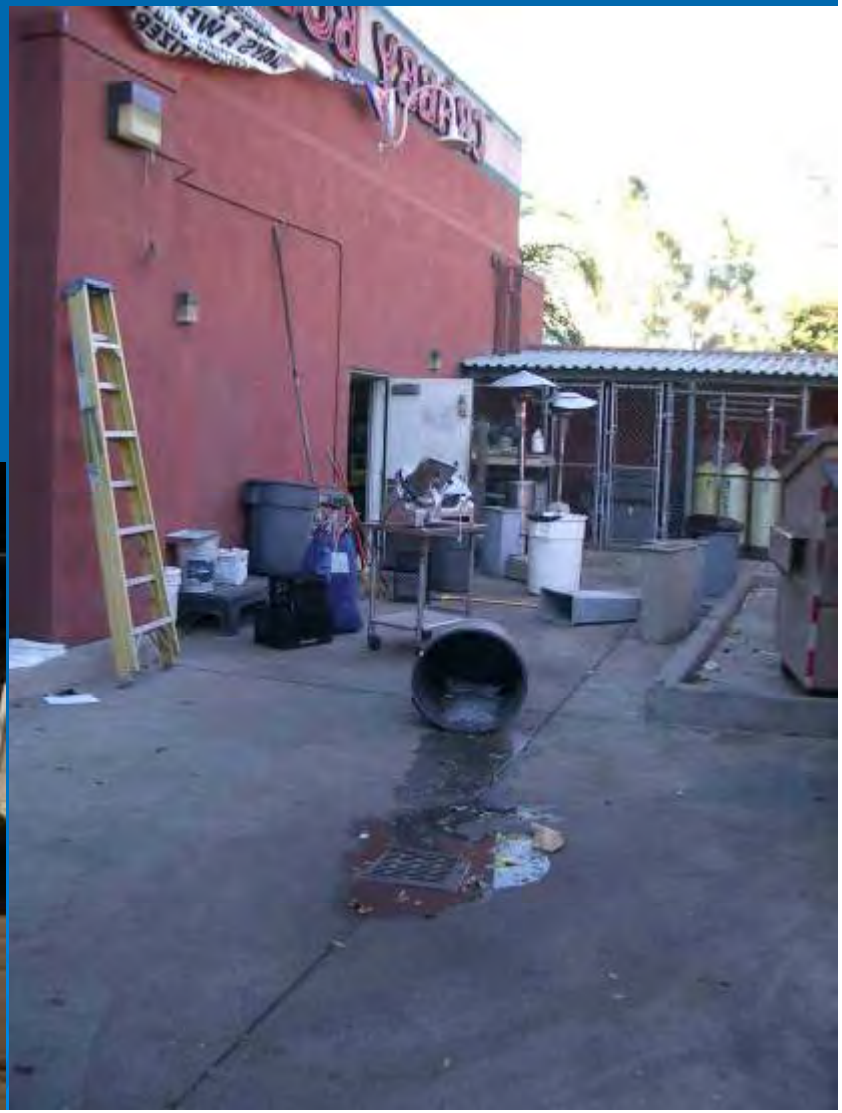
LID: Preserve environmentally sensitive areas

- Wetlands
- Stream Buffers
- Springs
- Habitat areas/native vegetation
- Maintain natural drainage paths
- Mature trees

LID: Reduce sources of pollution

Site design to contain or treat/recycle washwater

- Restaurant Areas –
- Vehicle washing area –



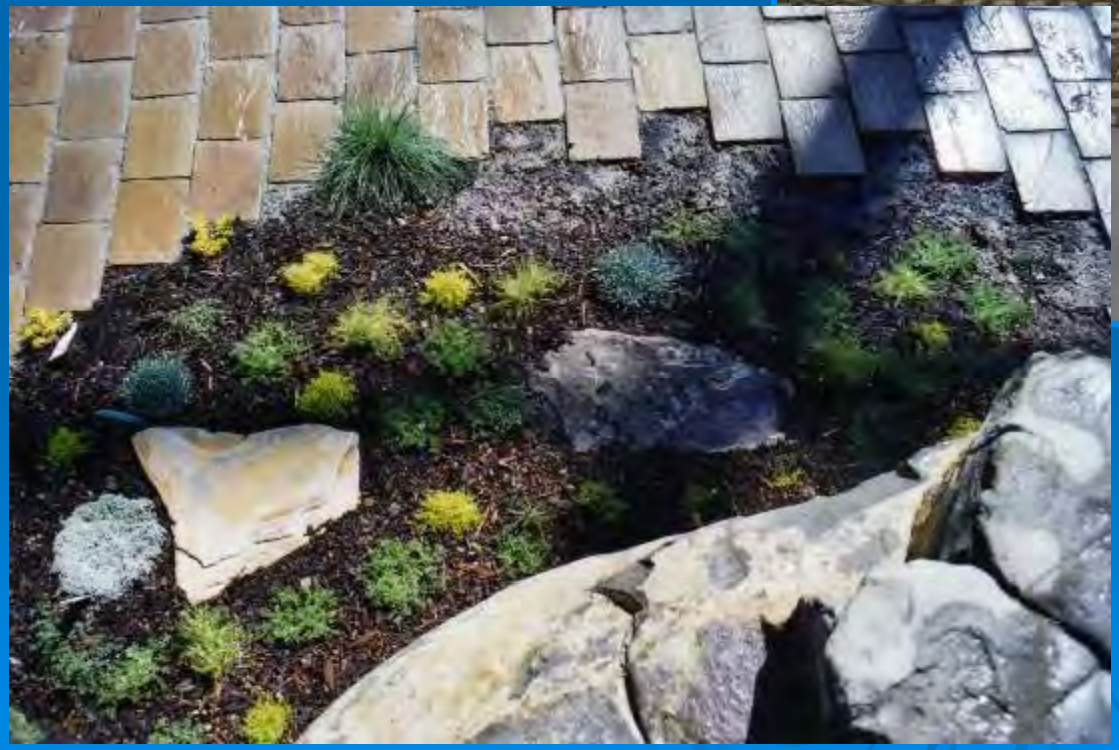
LID: Reduce sources of pollution

Site Design to prevent exposure (shed/cover) or contain and treat washwater

- Material Storage -
- Trash dumpsters -
- Fueling area -

LID: Minimize impervious areas

- Permeable and porous pavement



Porous pavement & raingarden

LID: Remove Direct Connections

Disconnect
Roof Drains

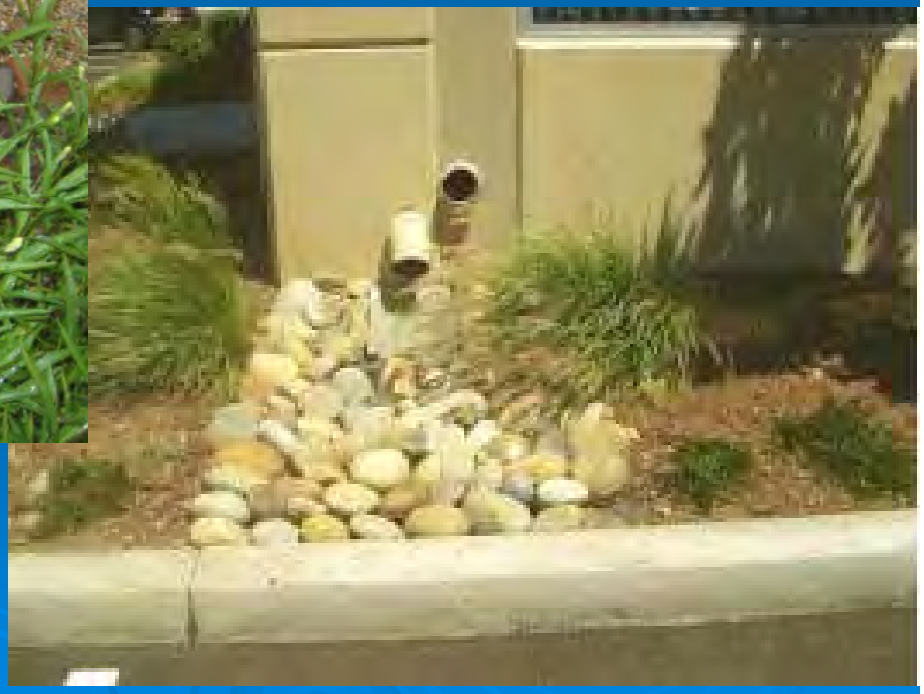


Photo from Alameda Countywide
Clean Water Program

LID: Parking Lots Infiltration, Retention

Parking lot treatment- vegetative buffer strip

LID: Parking Lots
Infiltration, Retention

Grassy Swale

CAHILL ASSOCIATES
Environmental Engineers,
Scientists, & Planners
www.thcahill.com

Green Parking Lot

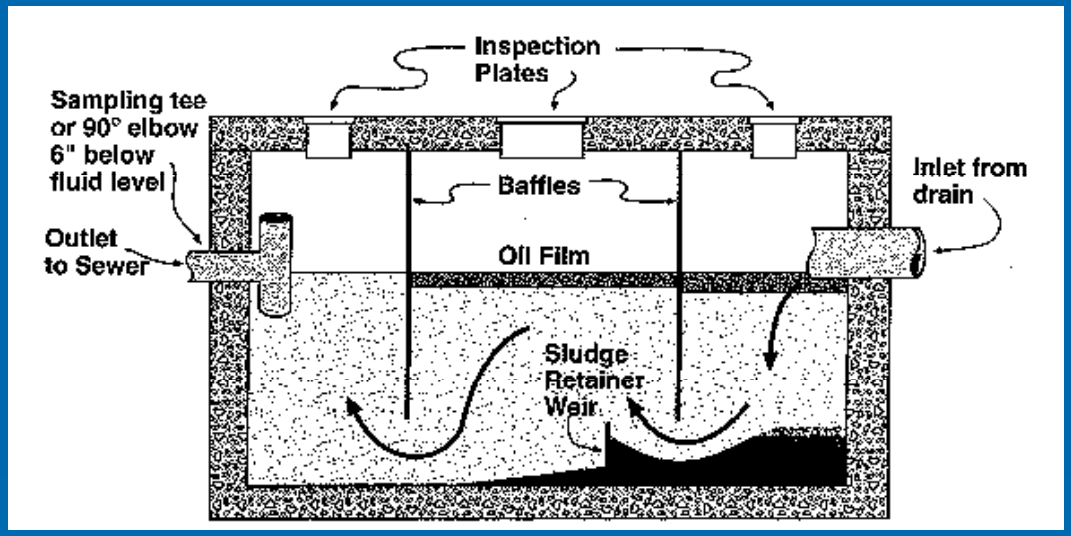
Photo from California Nevada Cement Association

LID: Bioretention, Raingardens

LID: Bioretention, Raingardens

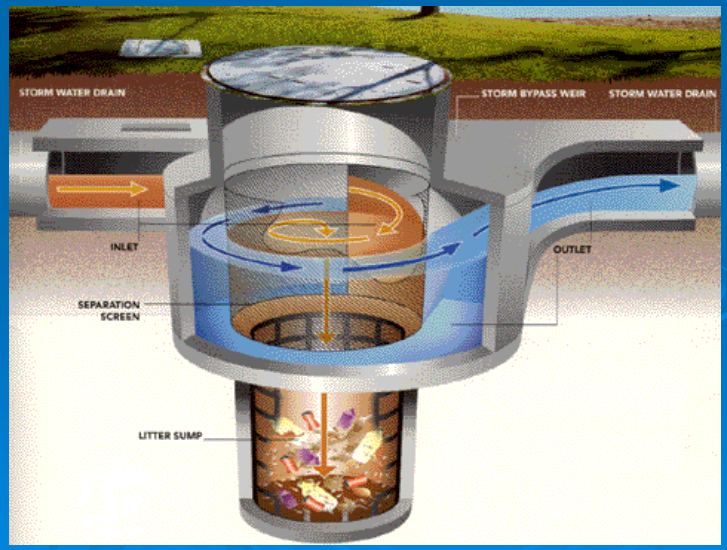
Small Scale Treatment Systems

- Oil/water Separators



- Media filters

Vortex Separators



Source: CDS Technologies

Multiple Benefits

- Reduce pollutants
- Maintain natural hydrograph
- Cost Effective
- Increase property values
- Climate change
- Maintain habitat

LID Resources

- www.epa.gov/NPDES/GreenInfrastructure
- California Stormwater Quality Association BMP Handbooks. www.CASQA.org
- www.lowimpactdevelopment.org
- "Start at the Source" - Bay Area Stormwater Management Agencies
- Alameda Countywide Clean Water Program Site Design Guidebook
  - www.BASMAA.org