Maintain after development, as nearly as possible, the predevelopment runoff characteristics of a site=handling stormwater by slowing it down, spreading it out and letting it soak into the ground
MAINTENANCE RESPONSIBILITY

• ESD facilities - Primarily property owner
  Residential and Commercial
  Schools and Parks
  Government
• ALL required to remain and be maintained
• Will be inspected by DEP
LID/ESD IN MONTGOMERY COUNTY

6,633 ESD/LID Practices = ~46% of Stormwater Practices

...and growing
# PERMITTED & VOLUNTARY LID/ESD IN MONTGOMERY COUNTY

<table>
<thead>
<tr>
<th>Practice Type</th>
<th>Permitted</th>
<th>RainScapes Projects</th>
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<tbody>
<tr>
<td>Dry Wells</td>
<td>3,530</td>
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<tr>
<td>Bioretention / BioSwale/Microbioretention/Rain Garden</td>
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<td>Dry swale &amp; Microinfiltration</td>
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<td>Porous Pavement</td>
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<td>Tree Box</td>
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<td>Greenroofs</td>
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<td>Rain Barrel/Cistern</td>
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<tr>
<td>Canopy Trees</td>
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<td>189 Tree Montgomery</td>
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<tr>
<td>Conservation Landscape</td>
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</table>
Maintenance of Vegetated Stormwater Practices

Vegetated Practices

- Rain Gardens
- Bio-Retention Facilities
- Tree Boxes
- Grass Swales
Rain Garden vs. Regular Garden

Holds Stormwater and slowly drains out within 24-72 hours
Non-structural practice
Bioretention Gardens
absorb rainwater and filter pollutants using soil, stone and plants.

Rain Gardens
absorb rainwater and filter pollutants using mulch, soil and plants.

Structural components
Larger drainage area

Non structural
Smaller drainage area
MICRO-BIoretention
Typical Cross Section

NOTE: IF SIDE SLOPES > 3:1, PROVIDE LOW MAINTENANCE GROUND COVER.

Water flowing off impervious surfaces (for example a roof or driveway) can be delivered to the rain garden through a swale lined with decorative rock or plants, through a pipe, or across a landscape area.

Selected native plants or hardy cultivars

Most pollutant tolerant plants

Existing ground

Rain Garden soil mix

Wet zone

Dry zone

Ponding depth (6" to 12" typical)

Mulch layer

Rain garden soil mix

Gradual side slopes

Overflow

Rain garden soil mix depth (12" to 24" typical)

Image courtesy of Washington State University Rain Garden Handbook
MAINTENANCE NEEDS

- Seasonal/Monthly Maintenance for bioretention

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<th>Maintenance Task</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
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<tr>
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See the Vegetated Facility Maintenance Guidance Documents for additional information.
REGULAR VISUAL INSPECTION

Water drains in 2-3 days

Inlet and Outlet clear of debris

Dead Plants

Erosion
GOOD BIORETENTION MAINTENANCE
MOSQUITO PREVENTION

• Keep inlets and outlets clear

• Correct grades and reset stones to prevent water ponding

• Facilities should drain within 24-72 hours

• Mosquito Dunks—biological mosquito control contains Bacillus thuringiensis (Bti) a natural mosquito larvicide (Bacterium), which kills mosquito larvae, but is harmless to birds, fish, wildlife, and pets, controls mosquito larvae for up to 30 days.
PREVENT DAMAGE –
DON’T PLOW SNOW OR PILE LEAVES
LEAF REMOVAL

- Check and remove trash, organic debris and sediment from facility
- Remove leaves from facility
SEDIMENT, DEBRIS REMOVAL

• Clear sediment and debris from inlets, and from approximately 5-10 feet upstream of inlet, within the inlet, and forebay.

• Remove sediment when voids between stones are approximately 50% filled.

• Must be removed from site and disposed of legally (i.e. trash or compost)
CLEANING VOIDS AND RESETTING COBBLE

Voids over 50% filled

Voids clean
Without frequent maintenance:

With frequent maintenance:
Sediment can move past forebay:
Sediment in snow piles
Trench Drains need cleaning, too!
PATCH EROSION

- Patch small areas of erosion from water flow or human activity with either topsoil or bioretention media (topsoil usually only on side slopes) you may need to add more stone if needed

- Reset cobble or riprap displaced by water or human activity.
SHEET FLOW

EROSION

Diffuse water flow

SEDIMENT
SAFETY/VISIBILITY

- Safety Vests
- Company Identification on trucks
- Road Signage/Cones
Permitted:
Biomedia mix vs topsoil

--**Biomedia**-is specified by design, always used on basin surface

--**Topsoil**-only used as specified, usually only on sideslopes

Voluntary (RainScapes)
Rain Gardens may be constructed using existing native soil and amended if passed the perk test. Test hole drains within 24-36 hours filled 2 times.
Mowing

Adjust mower blade height to avoid Scalping which leads to erosion
Mowing

Always avoid/remove grass clippings in bios—can clog surface or add excess nutrients
EDGING

Keeps mowers out and defines facility, mulch fresh edges for weed /grass encroachment and aesthetics. Do not create moats=sheet flow may need ground cover stabilization
Weeding and Edging

NO
HERBICIDE
WEEDING—DONE BY HAND

– Keeping up with it as it grows will reduce the overall effort required
– More dense planting will reduce problem
– Carefully select mulch source (no compost)

Mile-a-minute  Thistle  Prickly Lettuce  Plantain
MULCH TIMING MATTERS

April

May

Sligo Rec Center Rain Garden
MULCH

- Replenishment up to 3”
- Shredded hardwood mulch
- Raking – evenly disperse
  - Check after large storms
Planting plans can drive maintenance

PLANT GRADE   SPARSE PLANTINGS

Dogwood
Twig ?

DEER PRESSURE
GROUND COVER LAYER
Reduce maintenance costs!!

Less mulch

Less weeds
PLANTS - PRUNING

• Full prune/cut back plants and remove cut material from the cell between February 20 and April 1
• Grasses—Not below 6 inches
WHY NO FALL PRUNING?

- Plants slow erosive water flows
- Winter aesthetics
- Wildlife habitat, overwintering insects
PLANTS - WATERING

• Newly installed plants water until established

  • 6 weeks -3 x's a week for 2 weeks
    -2 x's a week for 2 weeks
    -1 x a week for 2 weeks

• After established, only water if drought stressed
PLANTS – CAN DIVIDE PERENNIALS
ALWAYS MAINTAIN GOOD PLANT
COVERAGE
PLANTS - REPLANTING

- Natives (dwarf cultivars?)
- Deer resistant
- Flood tolerant
- Drought tolerant
- Salt tolerant
Grass Swales

- Leave grass longer if turf
- Clear inlets regularly
- Remove leaves
- Be cautious mowing around cleanouts*
- Prune perennial grasses once a year
- Avoid scalping with mowers, and only mow when dry
TREE BOXES

• Weed and/or prune
• Clear inlets and flow paths
• Clear trash and sediment
• Remove old mulch
• Lift out entry stone
• Remulch with 3"
• Replace entry stone
Maintenance of Non-Vegetated Stormwater Practices

NON-PLANT BASED PRACTICES

PERMEABLE PAVEMENT  DRY WELLS  RAIN BARREL
Permeable Pavement Maintenance

- Blow off leaves and debris or vacuum
- Street sweepers/Regenerative Vacuum
- If clogged, may need power washing to loosen debris using a combination power washer and vacuum truck
POROUS PAVEMENT IN WINTER

- Use snow blowers and rubber tip shovels/plow blades
- Remove snow to 1 inch, insulation from air space of below grade stone layer keeps surface temperature high so snow melts and no ice forms
- De-icing chemicals should not be used, degrades concrete and adds chemicals to local aquifers
Dry Well/Micro-Infiltration Maintenance

Typically located 20 ft from house
DRYWELL MAINTENANCE—CAPS AND DOWNSPOUTS

- Keep pipes, gutters, downsputs cleaned
RAIN BARREL MAINTENANCE

• Drain and use water during dry spells so it’s empty by the next rain
• Clean screens, maintain level base
• Keep pipes, gutters, downspouts cleaned
• Disconnect in winter
• Replace if brittle
WATER QUALITY PROTECTION CHARGE (WQPC) CREDIT

Reduced Fee for maintained practices up to 80% for ESD/LID on Nonresidential, Multifamily and Single Family Residential

Creates More Contractor Opportunities for Maintenance
RainScapes Program
Contractor Trainings

Green Roof
- 523 gallons of water falls on each sq. ft of roof during a normal rainstorm of 1". A 1000 sq. ft conventional roof can shed 523 gallons when there is an inch of rain. Green roofs reduce and clean this stormwater runoff before it hits the ground.

Conservation Landscape
- Loosened and improved soil, planted with easy-to-maintain native plants that soak up the rain.

Dry Well
- Collects stormwater from rooftops or driveways and filters the rainwater through a small stone-filled pit, then into the underlying soils.

Canopy Trees
- Leaves intercept raindrops and retain them, thus reducing stormwater runoff.

Pavement Removal
- Allows more water to soak into the ground when you plant native plants.

Rain Gardens
- A spoon-like, concave area filled with a special soil mix that collects rainfall and allows it to filter into the ground.

Cistern
- Larger than a rain barrel, cisterns perform the same water harvesting benefits and are no more aesthetically intrusive than an air conditioner.

Rain Barrels
- Collects and stores rainwater from rooftops.

Permeable Surfaces
- Allow rainwater to rapidly infiltrate and enter the ground where it is naturally filtered.
Questions?

www.montgomerycountymd.gov/stormwater