

**2015 MAFSM Conference
“Gray Within Green”
Stormwater Management Case Study
Washington County, MD**

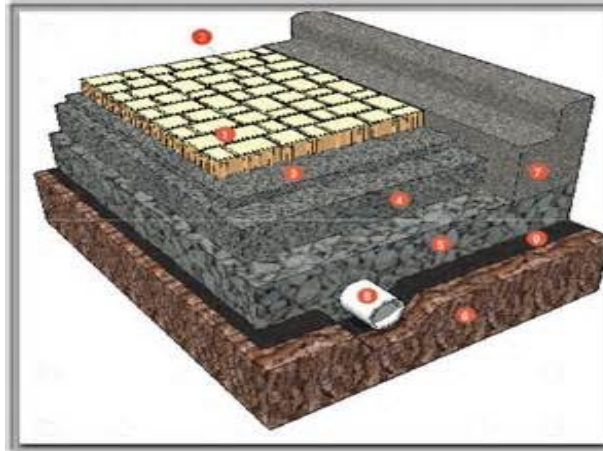
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Maryland & Delaware
2015



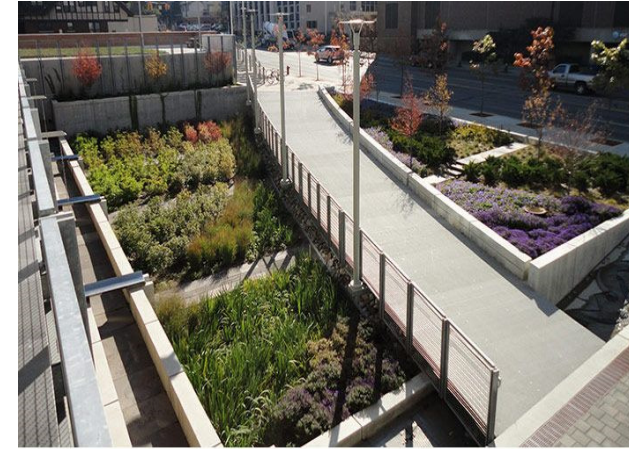
Natural Soil Bioretention



Permeable Pavement



Rain Garden



Green Roof



Planter Boxes



Rainwater Harvesting

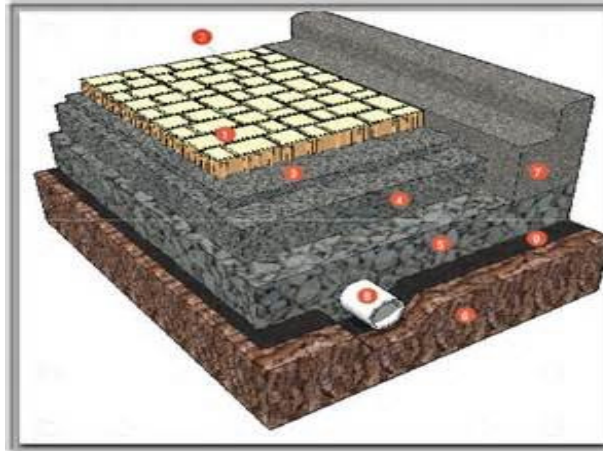


Reduce Stormwater Runoff & Offsite Discharge

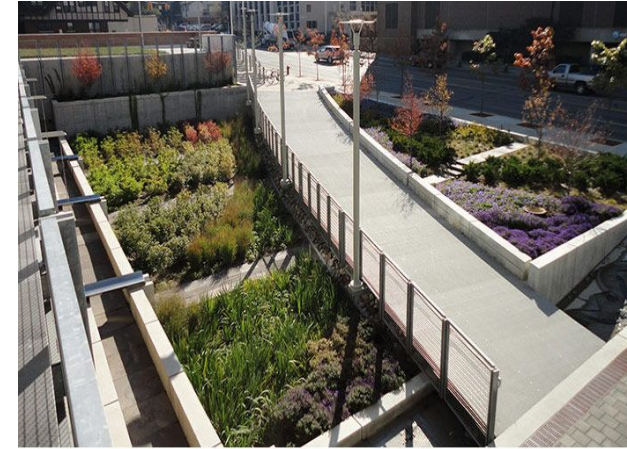
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Reduce Stormwater Runoff & Offsite Discharge

Existing Conditions Panoramic View

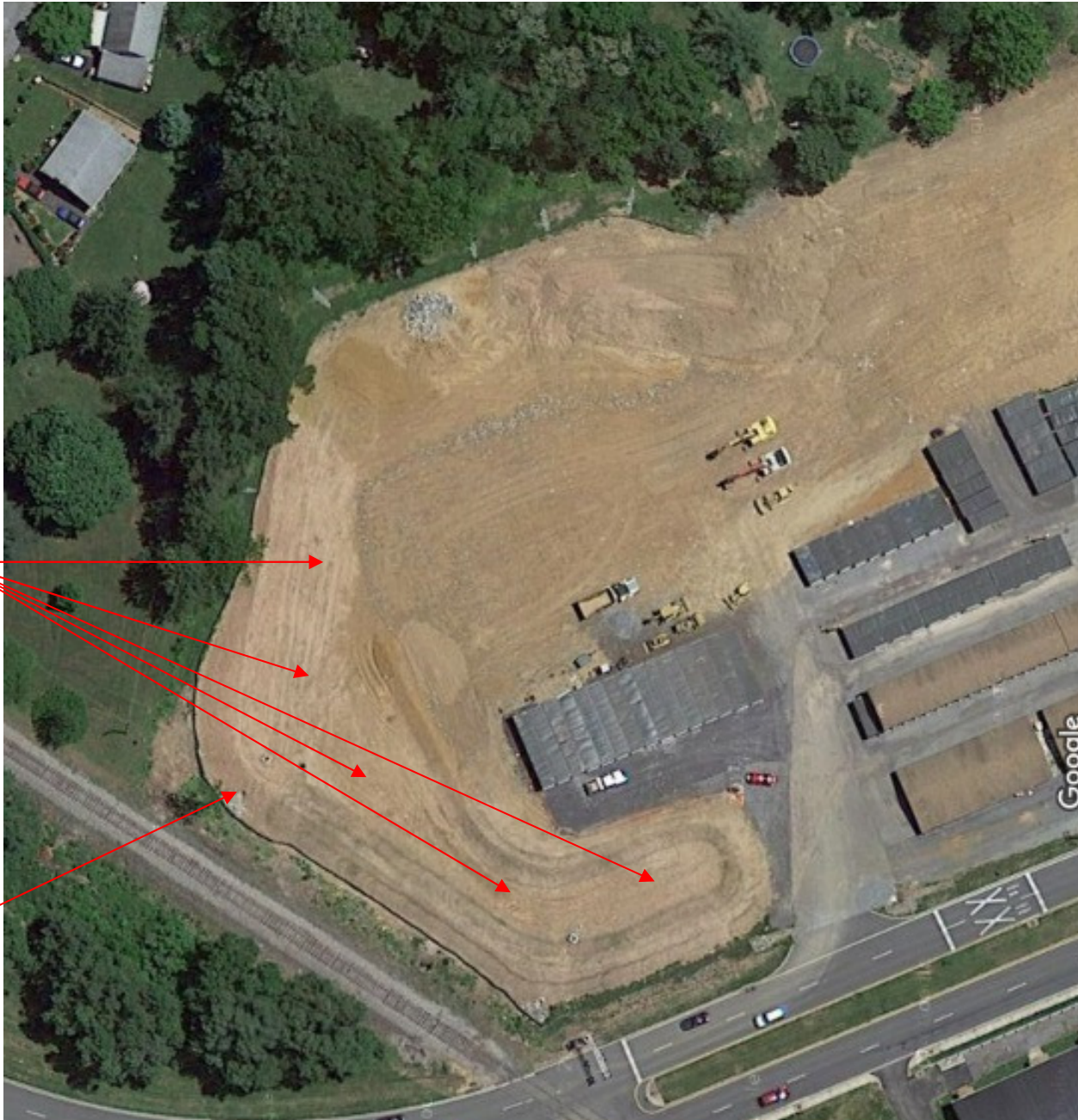


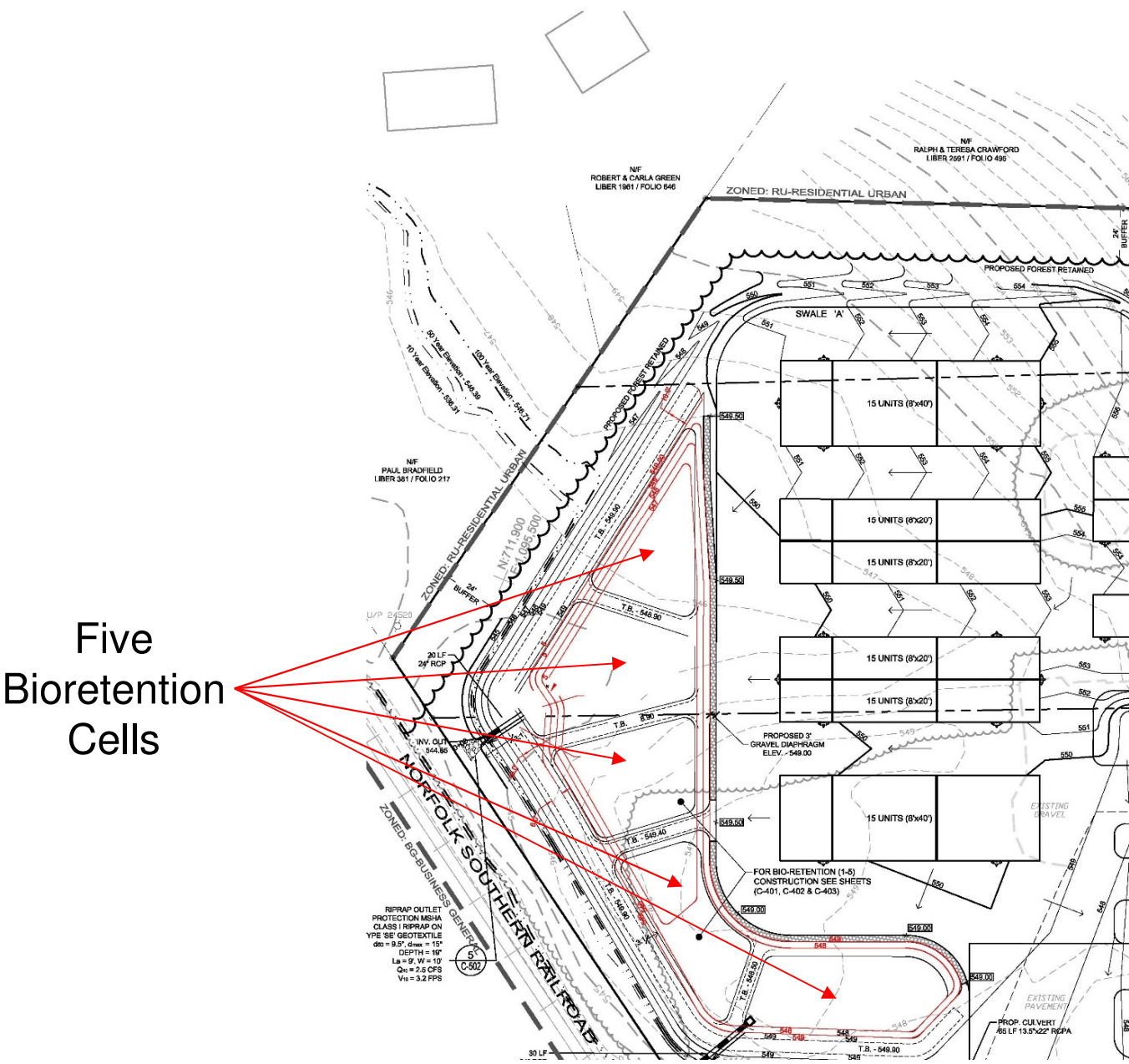
Location of
Proposed
Surface
ESD Facility

- Location: Hagerstown, MD
- Site Use: Mini Storage
- Subsurface Geology: Karst
- Storm Drain Outfall: Open End Section
- High Impervious Cover Site Layout

Five
Bioretention
Cells

Outfall
End Section





Five
Bioretention
Cells

Direct Sheet Flow to Five
Bioretention Cells
Separated by Berms

Impermeable Liner Under
Bioretention Cross Section
Due to Karst

Autumn Debris Removal
and Removal of Invasive
Plants

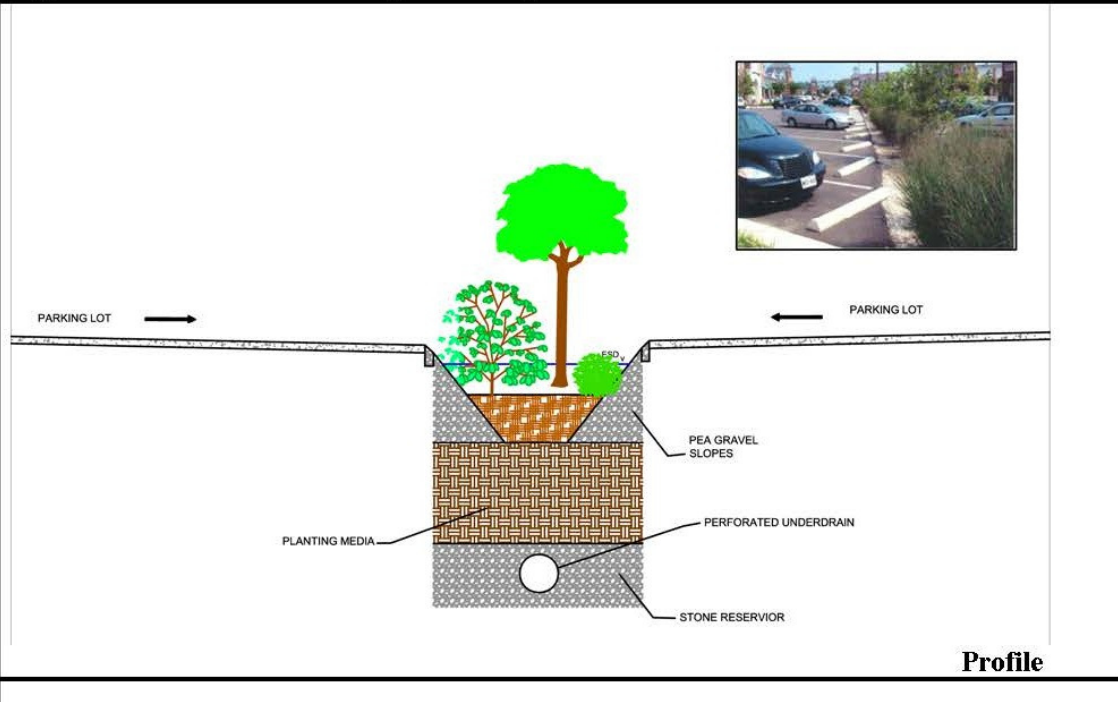
Spring Mulching

Soil Removal and
Replacement When
Dewatering Ceases



Chapter 5. Environmental Site Design.....Nonstructural and Micro-Scale Practices

Figure 5.16 Micro-Bioretention (Variation 3)



- Impermeable Liner
- Drain Rock Layer
- Perforated Underdrain Pipe (Each Cell) With Cleanouts
- 24"-48" Thick Soil Layer
- Selected Plantings
- 3" Mulch Layer
- Four Impervious Berms To Separate Five Bioretention Cells
- Riser Overflow Outlet (Each Cell)



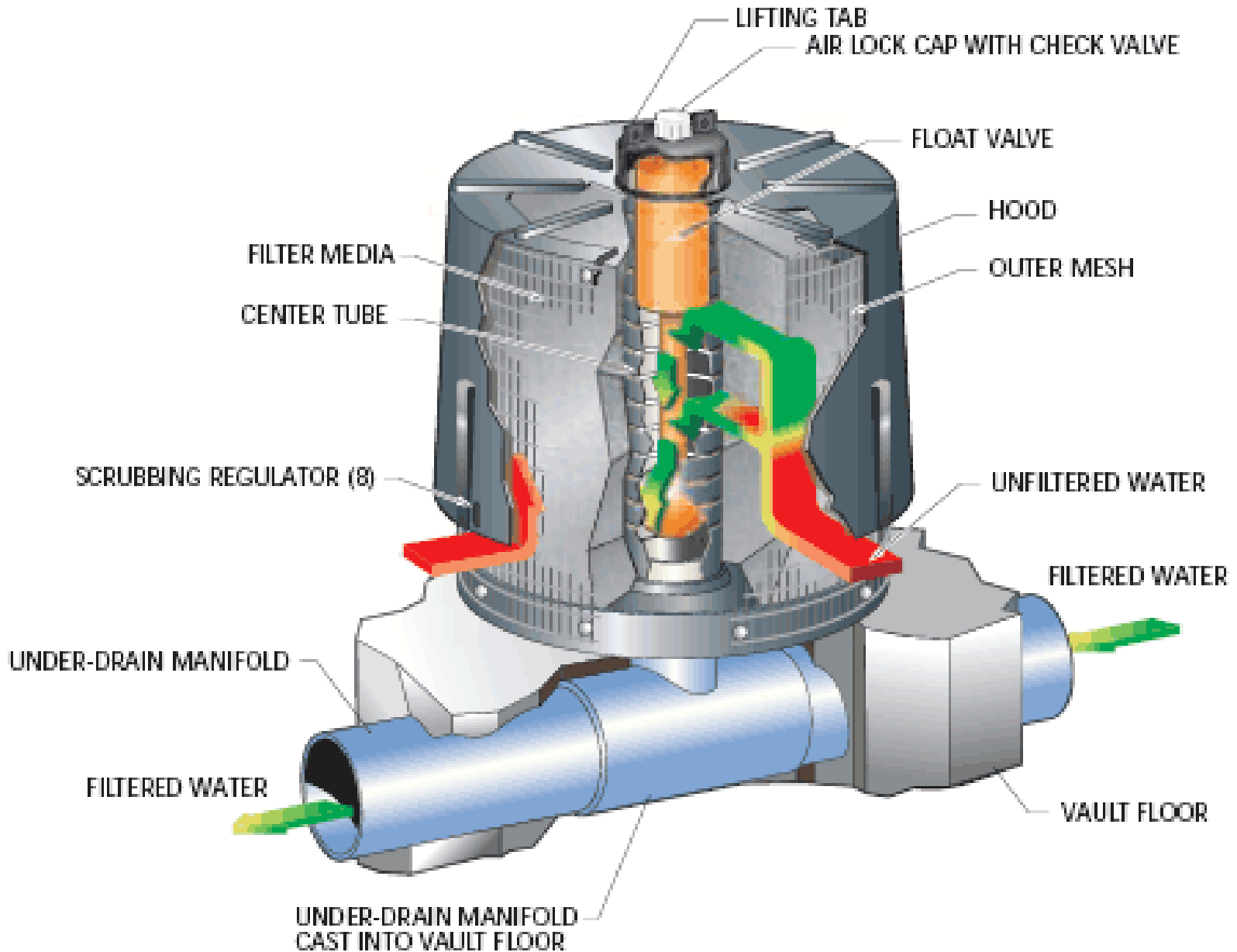
- ✓ Construction Cost (Given Total Yards of Material Required)
- ✓ Cost of Routine Biannual Maintenance
- ✓ Time Required for Routine Biannual Maintenance
- ✓ Plant Removal and Replacement (If Required)
- ✓ Soil Removal and Replacement (If Required)
- ✓ Invasive Plant Growth
- ~~✓ Space Required~~
- ~~✓ Appearance~~

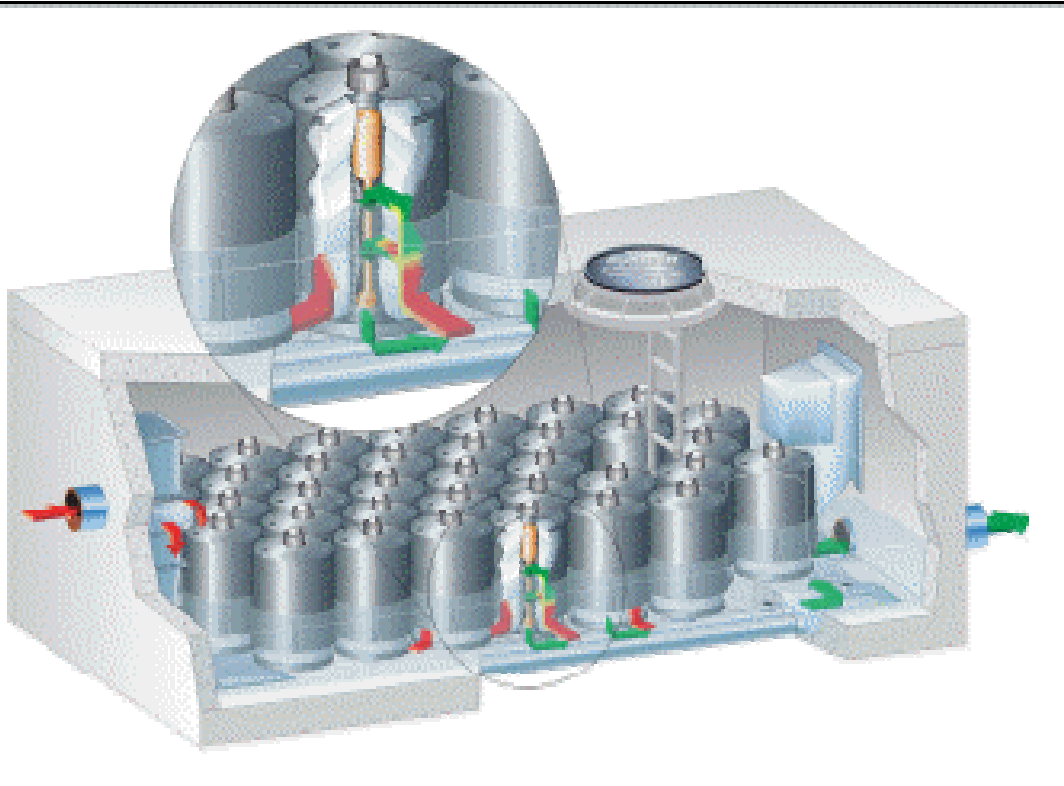


Owner Halts Construction to Investigate Alternatives to Bioretention

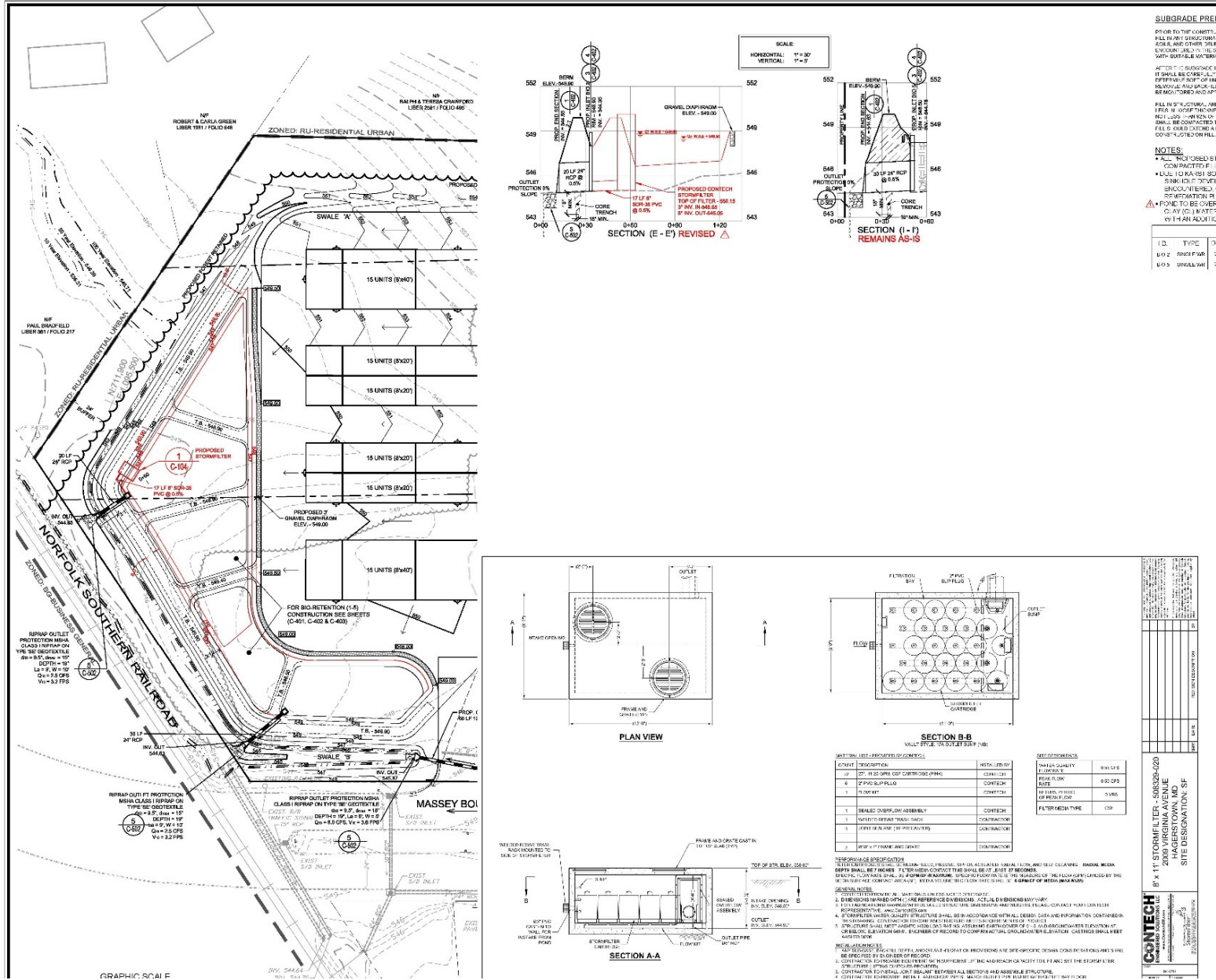


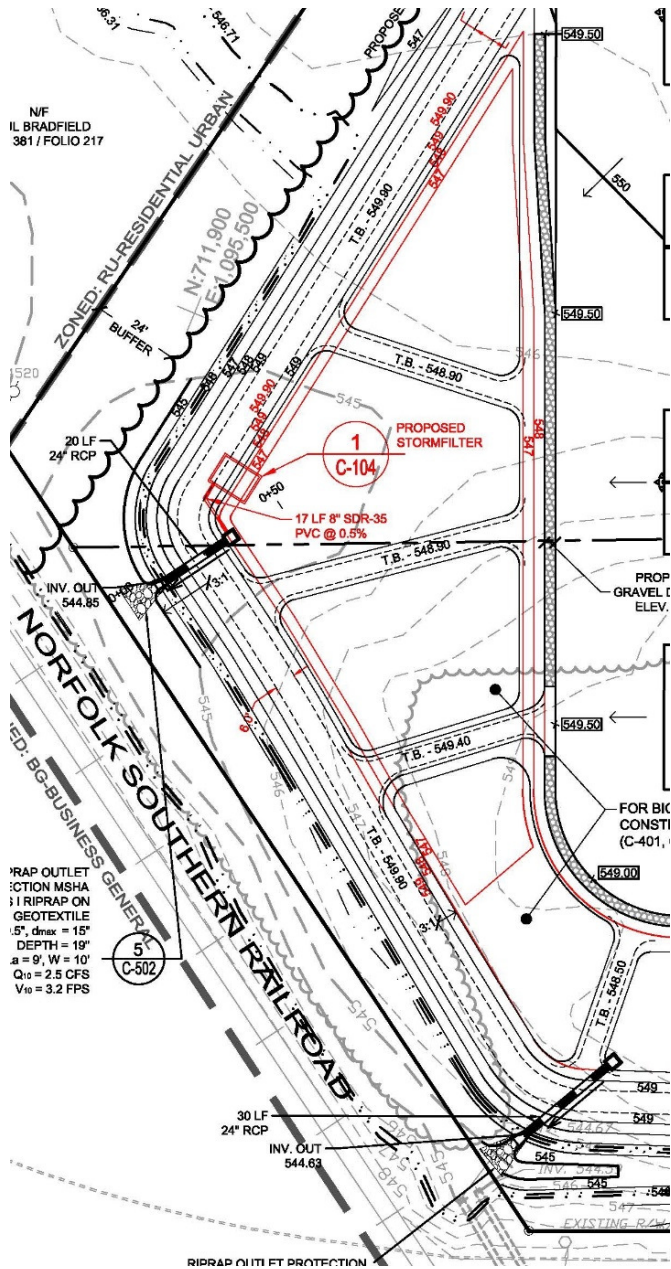
Granular Media Cartridge Filter





- Utilizes Pelletized Leaf Compost Media
- Operates Like a Sump Pump (Fill and Drain Cycle) But Passive
- Self Cleaning Functionality
- Full Drawdown of Water
- Approved by MDE for Stand Alone WQ Control
- Remove and Replace Filter Media Every 3-4 Years





- Precast 8' Wide x 11' Long StormFilter Placed Directly in Pond Berm
- 22 Cartridges – Sized for Entire ESD Volume
- Side Facing Pond Exposed on Slope
- 3" Diameter Flow Control Orifice Provided in Side of Structure to Allow Controlled Outflow
- Trashrack Mounted Over Control Orifice to Prevent Blocking
- Discharge from StormFilter Connects to Basin Riser Below Grade
- Bioretention Soil, Plants, and Mulch No Longer Required – Nor Are Berms
- Basin Planted with Grass – Standard Permanent Seed Mix
- Maintenance - Mow Grass Seasonally





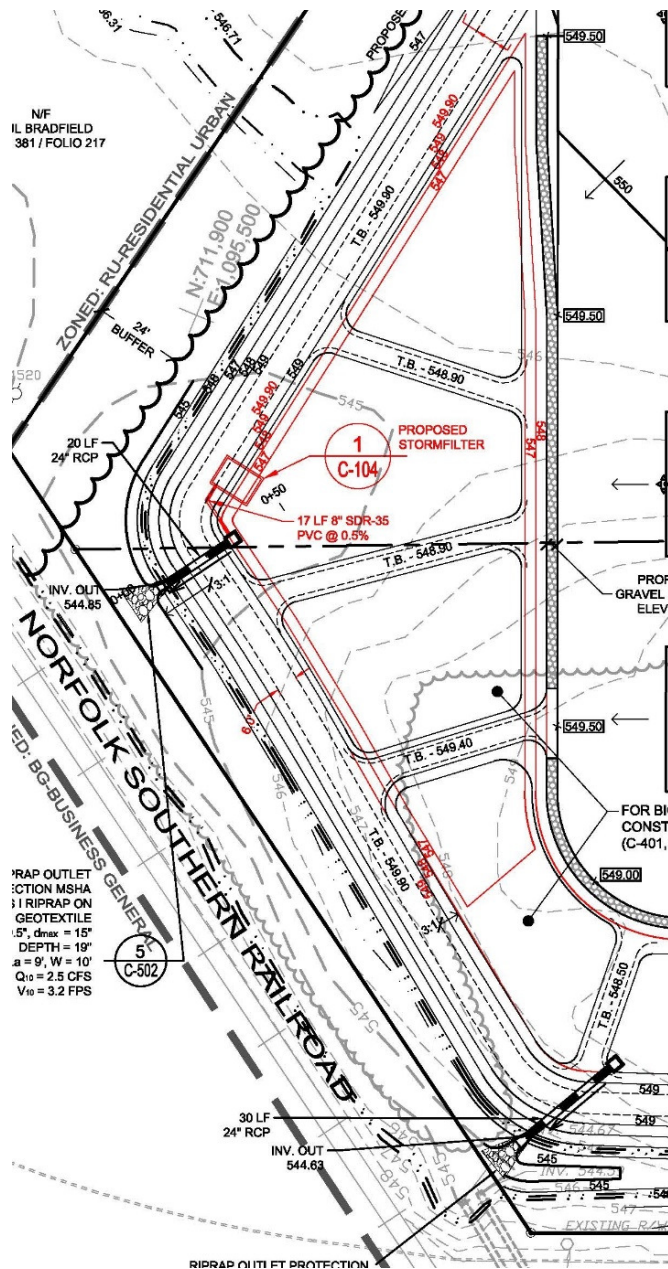












- Bioretention Replaced with Grass
- StormFilter Provides Treatment
- Berms Not Necessary
- Maintenance Requirements Satisfactory to Owner
- Will Likely Achieve Considerable Runoff Reduction (Evaporation and Evapotranspiration) Even Without any Infiltration
- Grass is Tough – Scour, Full Sun, Ponding - and Adapted to Maryland Climate – As Long as No Drought
- Grass Root System Very Resilient
- Invasive Species Not Critical Issue
- StormFilter Box Will Last 50+ Years
- What It Lacks in Good Looks It Makes Up in Function