

District Department of  
Transportation  
Washington, D.C.

## DC Green Streets in the Anacostia

Meredith Upchurch  
District Department of Transportation  
Stormwater Management Branch  
[meredith.upchurch@dc.gov](mailto:meredith.upchurch@dc.gov)  
202-671-4663

Anacostia Watershed Management Committee  
February 18, 2010

d.

District Department of Transportation



# DDOT Green Street Implementation

- Guiding Plans
  - Anacostia Waterfront Transportation Architecture Design Guidelines
    - Includes 17 Low Impact Development options
    - Improved Tree Space Design & Construction Techniques
  - Great Streets Framework Plan
  - Stormwater Management Regulations
    - Treat first ½ inch stormwater runoff from roads
  - Anacostia Environmental Standards & Future SW Regulations
- Green Street Goals
  - Incorporate Low Impact Development, Reduce Paving in Tree Spaces, and use Innovative Tree Space Design Techniques
  - Treat & Capture ½ inch runoff in LID
  - Attempt to Capture 1 inch runoff in LID where space available

# DDOT Projects in the Anacostia Watershed

- **Great Streets**
  - H Street NE/Benning Road NE
  - Nannie Helen Burroughs Avenue NE
  - Pennsylvania Avenue, SE
  - Minnesota Avenue NE/SE
  - Martin Luther King Jr. Avenue/South Capitol
- **Anacostia Waterfront Initiative**
  - 11<sup>th</sup> St Bridge
  - South Capitol Street



# Nannie Helen Burroughs Avenue NE Great Street

## LID Toolbox



### Bioswale

- Linear bioretention feature, may mimic natural stream channel form
- Reduces runoff volume as water is conveyed
- Removes stormwater pollutants: organics, sediment, metals
- Provides habitat and green space

**Possible locations:**

- Near Eastern Ave, DC Welcome Sign
- Between 45<sup>th</sup> and 49<sup>th</sup> streets.



### Bioretention Cell

- Small-scale shallow vegetated depression
- Reduces runoff volume
- Removes stormwater pollutants: organics, sediment, metals
- Provides habitat and green space

**Possible locations:**

**Rain Gardens**

- 50th to 51st Street, north sidewalk bulge area
- 50th to 51st Street, south sidewalk bulge area

**Planters**

- 48th Street, north & south bus stop bump outs
- 51st to Division, north side (6) & south side (3) sidewalk

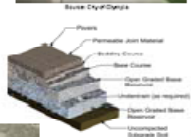


### Permeable Pavement

- Reduces runoff volume
- Removes pollutants: sediment, oils and grease, metals
- Reduces urban heat island
- Aesthetic value: many color and pattern options
- ADA compliant pavement

**Possible locations:**

- North side of 46<sup>th</sup> to 48<sup>th</sup>
- Between 51<sup>st</sup> and Division Ave.

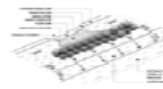


### Vegetated Filter Strip

- Includes soil amendments and sustainable landscaping
- Reduces runoff volume
- Provides habitat and green space

**Possible locations:**

- 40th Street, Slope on the north side of NHB
- 50th to 51st Street, Median
- 51st Street to Division, Median
- Division to 55th Street, Median



### Street Trees

- Reduces runoff volume
- Reduces urban heat island
- Improves air quality
- Reduces noise and wind effects
- Provides shade

**Healthy tree pilot locations:**

- (structural soil under permeable pavement)
- 51<sup>st</sup> St. to Division Ave.
- North side of 40th to 48th



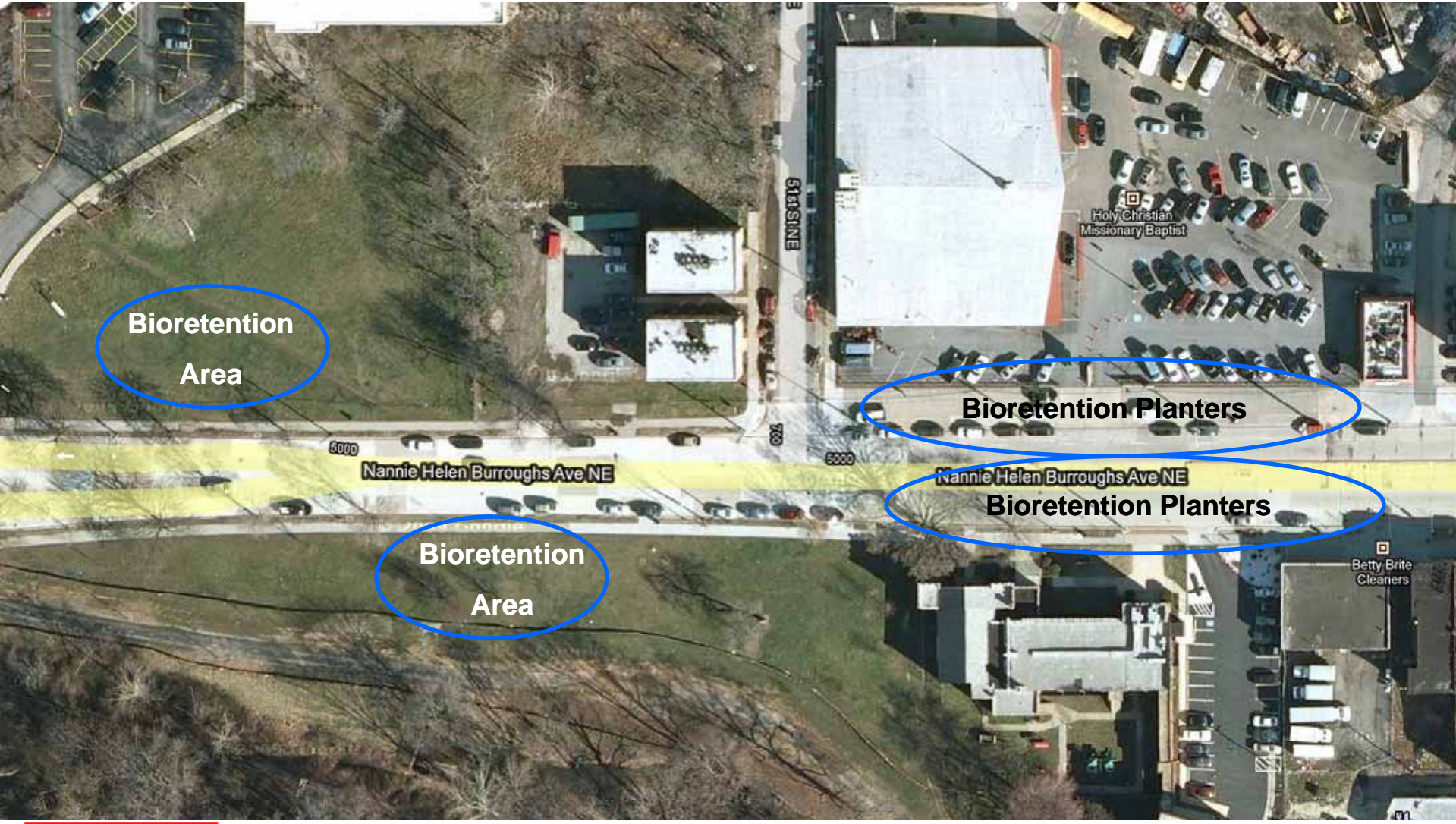
# Nannie Helen Burroughs Ave NE Great Street

- Roadway project: 1.5 miles
- Drainage area: 8.44 acres
- Design Challenges
  - Very limited ROW; very narrow strip of land between curb and residential property lines
  - Mature trees, driveways
- Stormwater Treatment & Storage
  - LID Captures & Treats 2.13 acres
    - 2 bioretention cells, 1 bioswale, 12 stormwater planters, & permeable concrete sidewalk
  - 39 Water Quality Catch Basins treat 6.97 acres

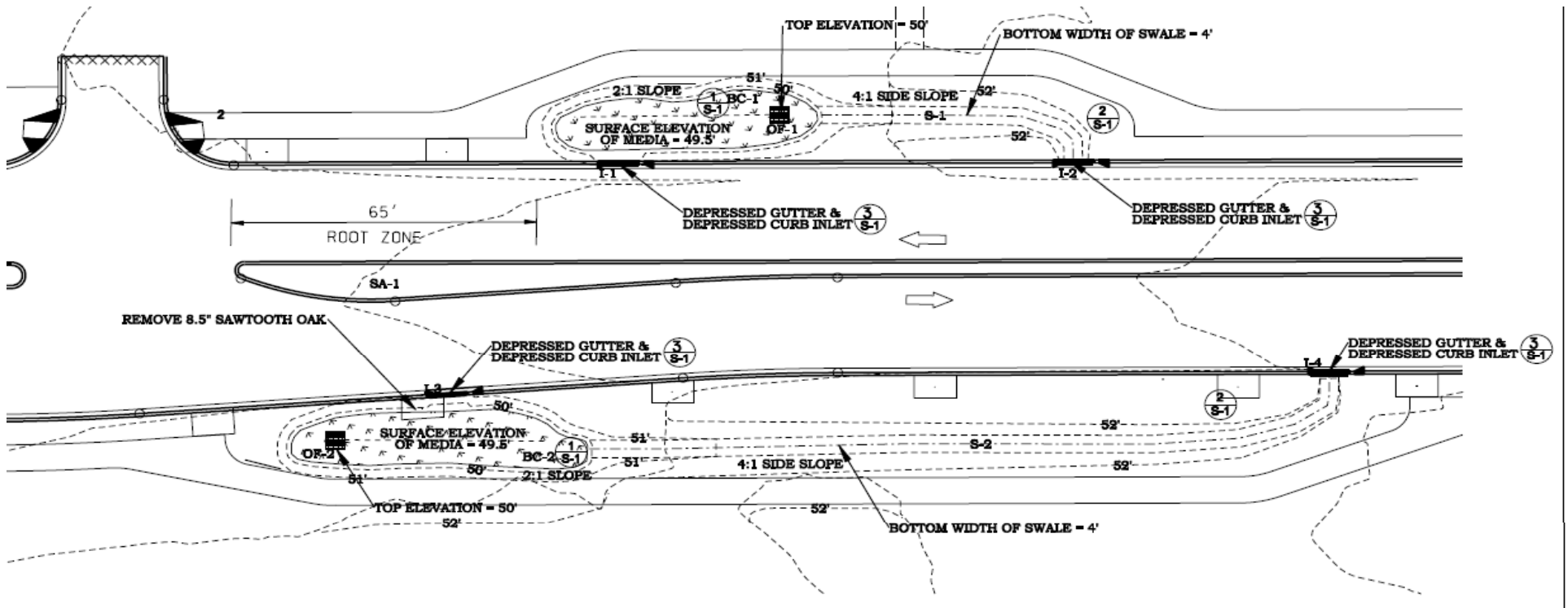
# Nannie Helen Burroughs Avenue NE Great Street

- SWMM Modeling shows LID reduces runoff by 12%
  - Fully captures & treats the 1 inch rain event and the 1yr-24 hr (2.7") rain event.
- Cost Estimate for SWM
  - Water Quality Catch Basins (39) \$767,500 (~20K/unit)
  - Filter Catch Basins (3) \$46,000
  - LID \$438,000
- Construction on road project will start this year, but section with LID delayed until 2012

# Nannie Helen Burroughs LID Implementation



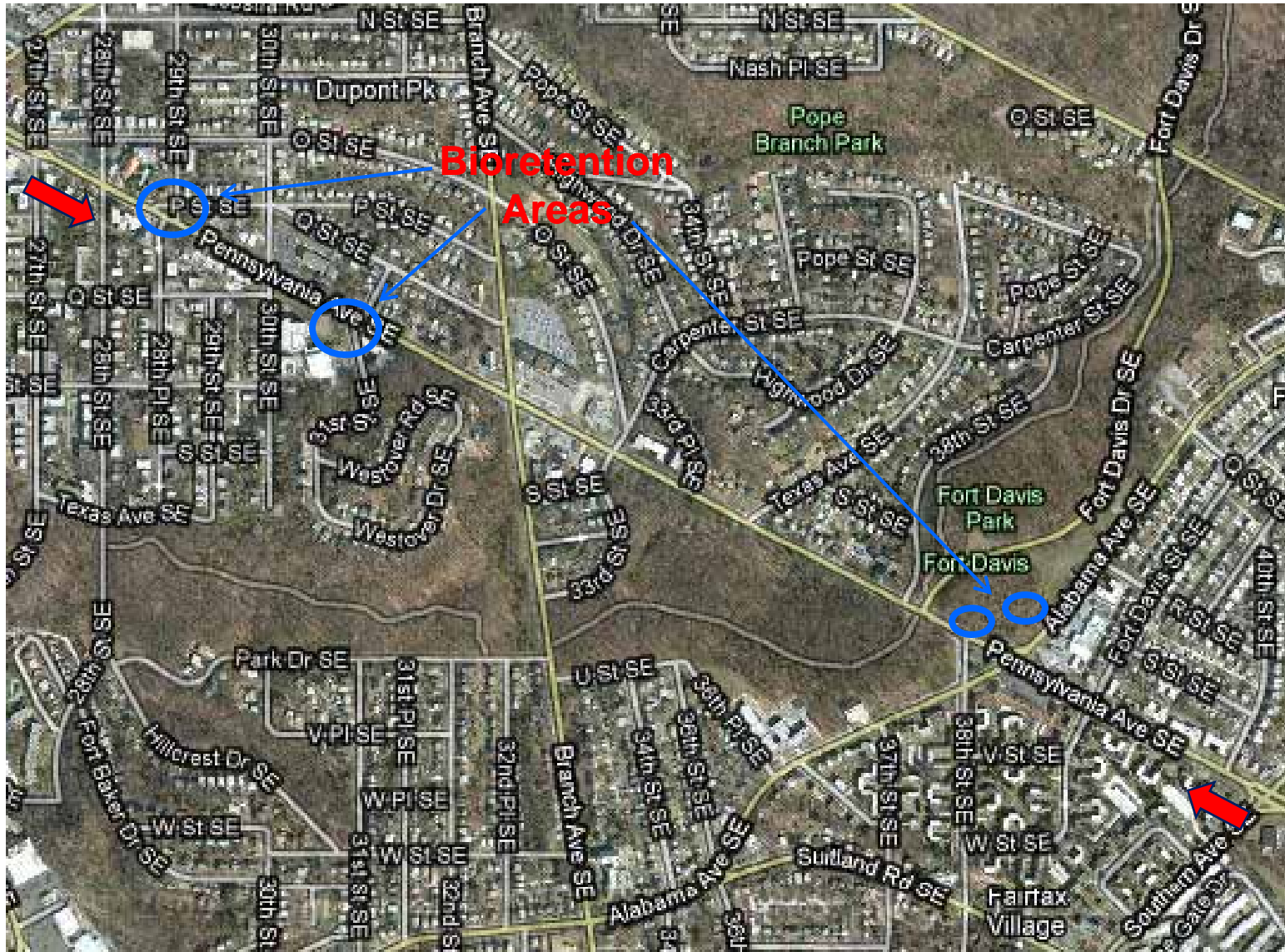
# NHB Ave Bioretention Cells



3  
S-1 PLAN VIEW OF BIORETENTION CELLS AND GRASSED SWALES 51+00 TO 53+50  
 1" = 20'



# Pennsylvania Avenue SE Great Street



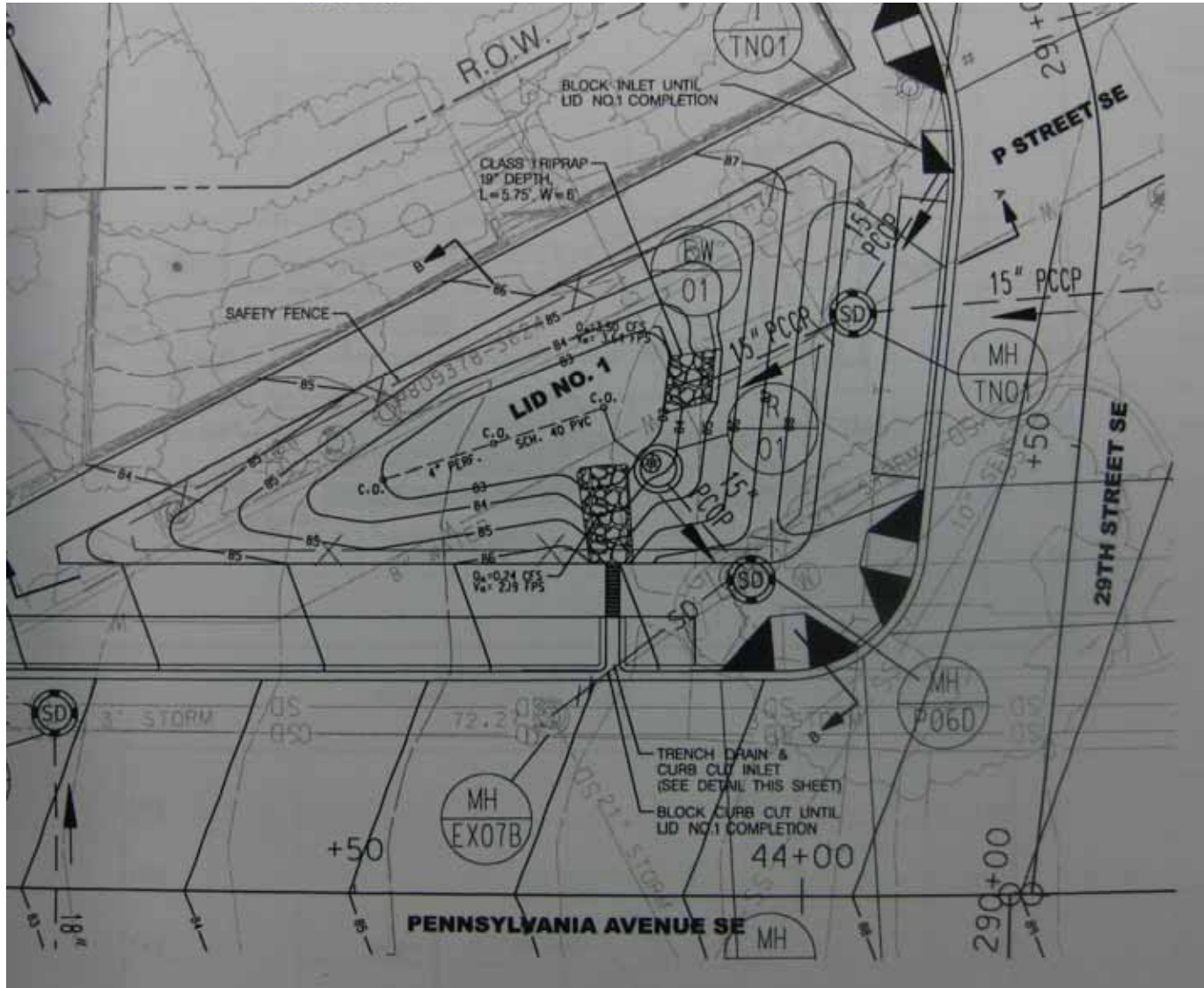
Project  
Length:  
1.4 miles

Drainage  
Area:  
~ 8.5 Acres

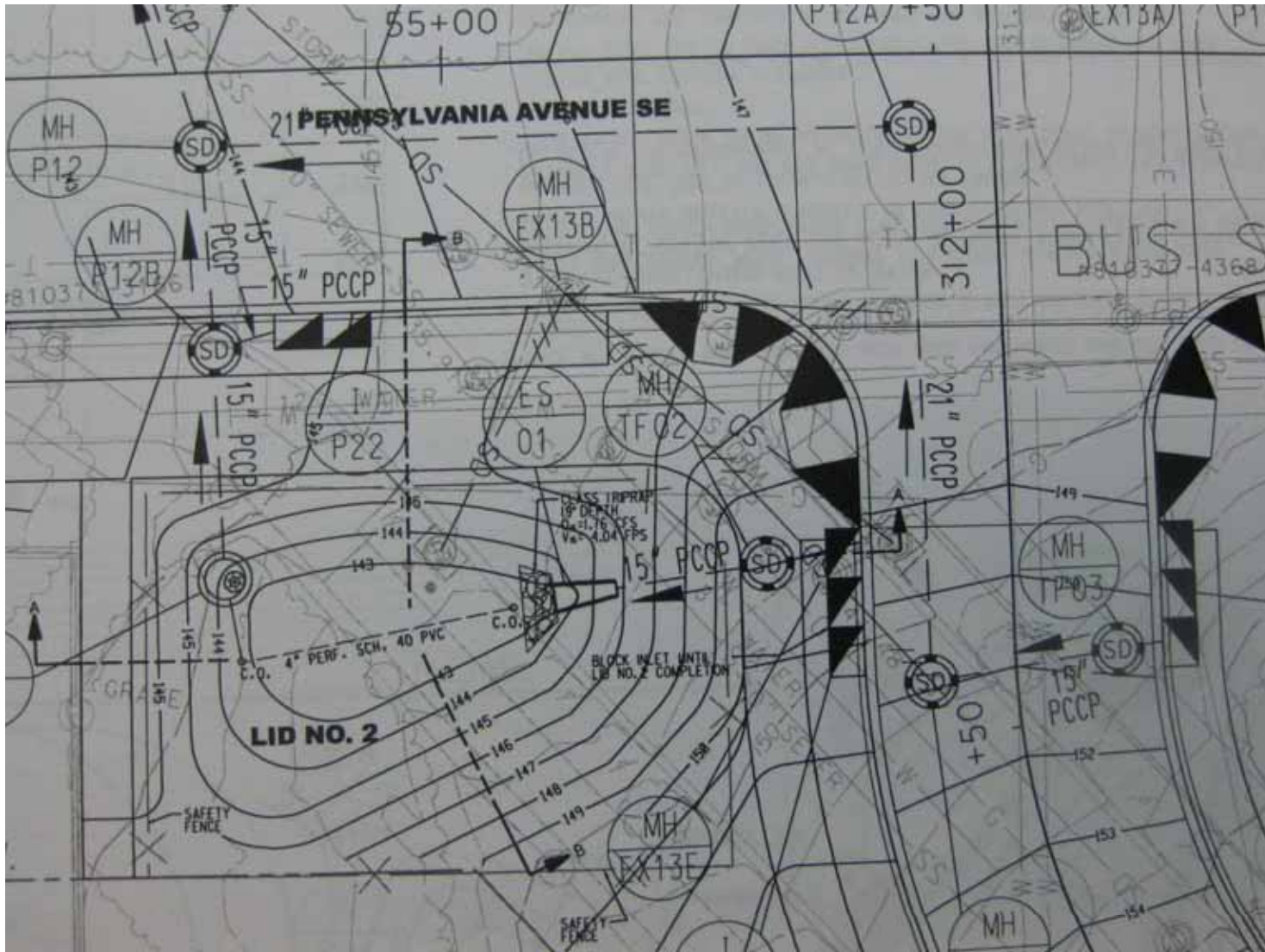
# Pennsylvania Avenue SE Great Street

- Design Opportunities
  - Wide ROW & Adjacent parkland
- Design Challenges
  - Hilly terrain, adjacent NPS parkland
  - Mature trees, adjacent properties, driveways
- Stormwater Treatment & Storage
  - LID Captures & Treats 1.96 acres
    - 4 bioretention cells (at least ½ inch treatment & storage)
  - 126 Water Quality Catch Basins
- Construction started December 2009

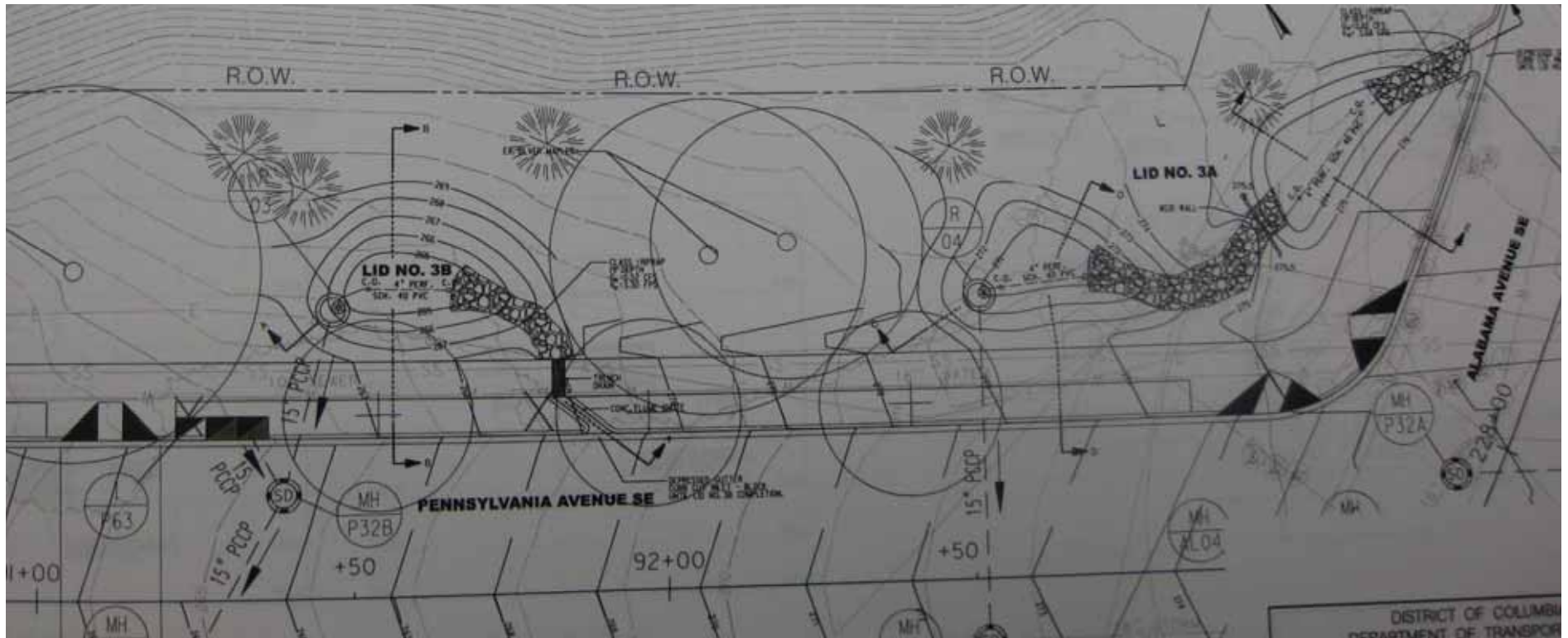
# Pennsylvania Avenue SE Bioretention #1



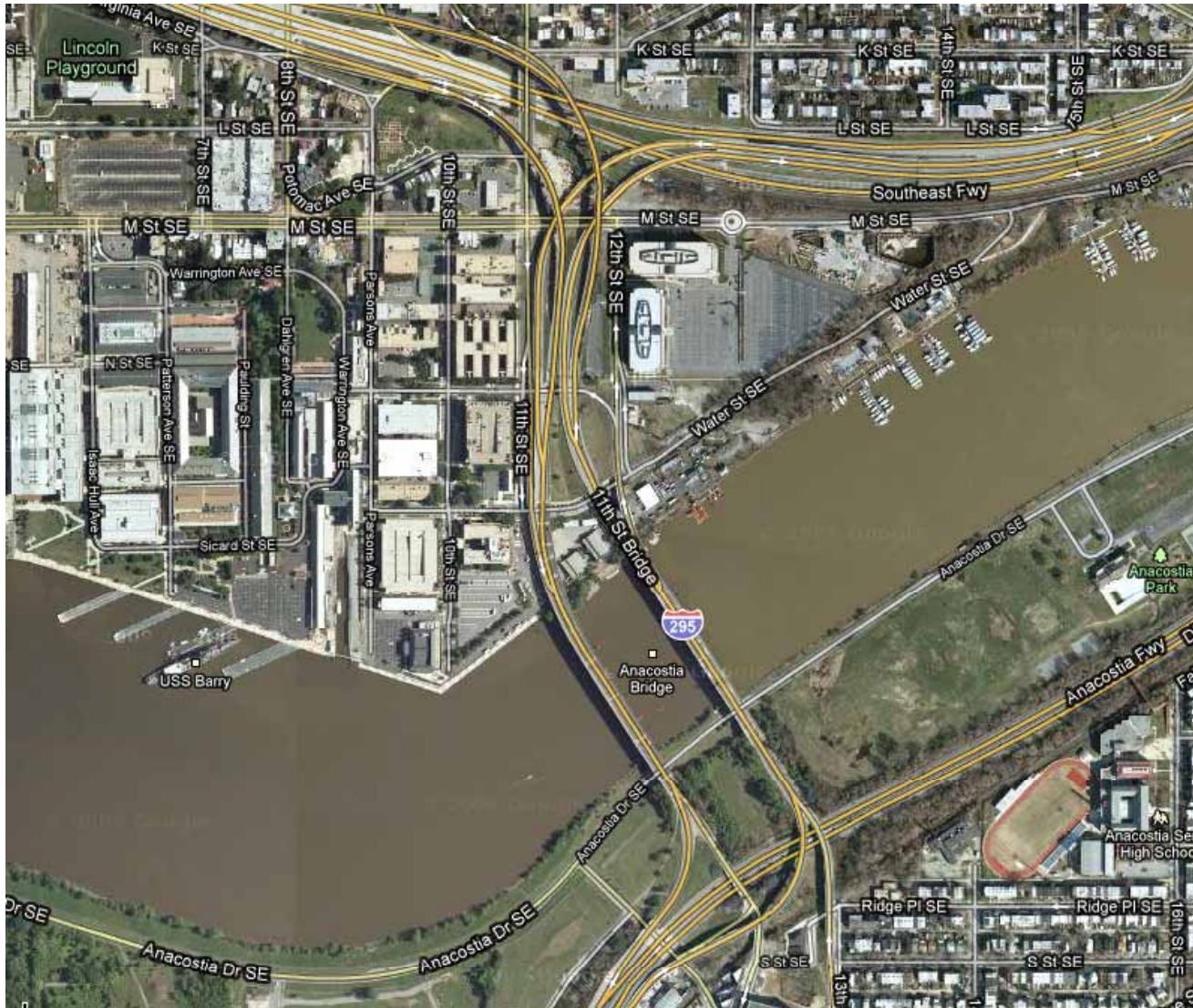
# Pennsylvania Avenue SE Bioretention #2



# Pennsylvania Avenue SE Bioretention #3 & 4



# 11<sup>th</sup> Street Bridge Project



Bridge &  
roadway  
project: ~ 1 mile

Impervious  
Area Drainage:  
47.43 acres

# 11<sup>th</sup> Street Bridge Project

- Design Challenges
  - Elevated roadway; high groundwater table; contaminated areas
- Stormwater Treatment & Storage
  - 8 Bioretention Areas capture & treat 9.05 acres
  - 2 Wet Ponds capture & treat 13.59 acres
  - 17 Grass Channels slow & treat 7.91 acres
  - ~ 90 Water Quality Catch Basins treat 16.88 acres
- Design – Build Project has started