



Washington Street Flood Control & Stormwater Retrofits *Seaford, Delaware*



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About Seaford



History:

- Incorporated in 1865
- Originally a rural farming community
- Became the “Nylon Capital of the World” in 1942 when the Dupont Plant began producing nylon.

Location:

- Situated on the Nanticoke River, in the Chesapeake Bay Watershed
- In central Delmarva Peninsula
- Midway between the Atlantic Ocean and the Chesapeake Bay
- 80 miles southeast of Washington, DC
- Primarily rural area of “lower” Delaware, or the “Lower Shore”.

About Seaford



- **Approx. five square miles in size**
- **Population: 6928 (2010 census)**
- **Traditional downtown**
- **Median Family Income: \$36,688 (2010 census)**
- **Geography: Flat coastal plain - 6 to 30 feet above sea level**

Rainfall

Extreme Storms:

- **3 extreme storms in a 10 year period**
 - August 11, 2001 received 10-12 inches...100 yr storm
 - June 25, 2006 received 12-14 inches in 10 hours...100 yr storm
 - September 8, 2011 received 10-12 inches in 4.5 hours...500+ yr storm

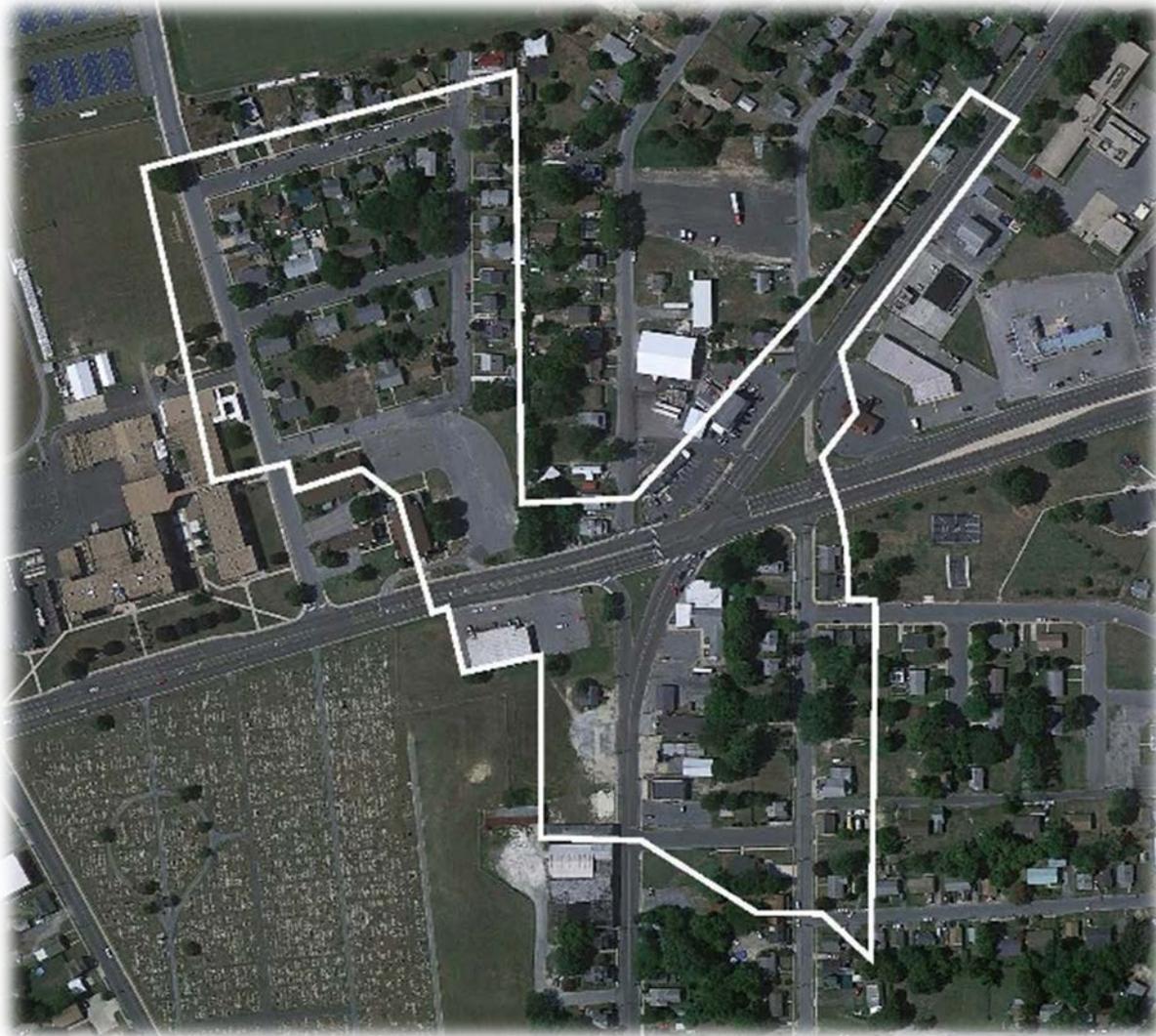


Flooding



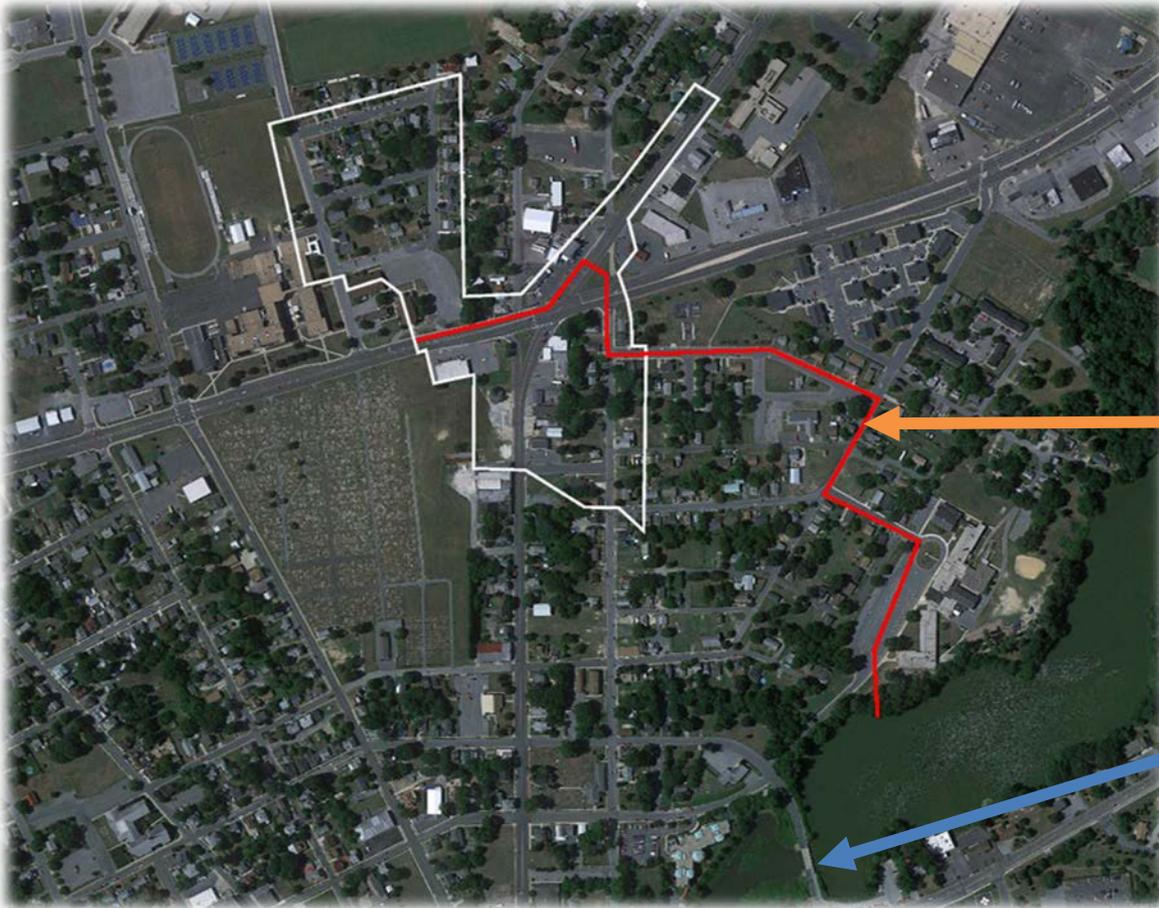
- Repeated flooding with property damage at Wil Mar Village – 20 homes with damage from floodwater...some basements collapsed
- Flooding in rectory basement in Catholic Church causing mold

Project Area



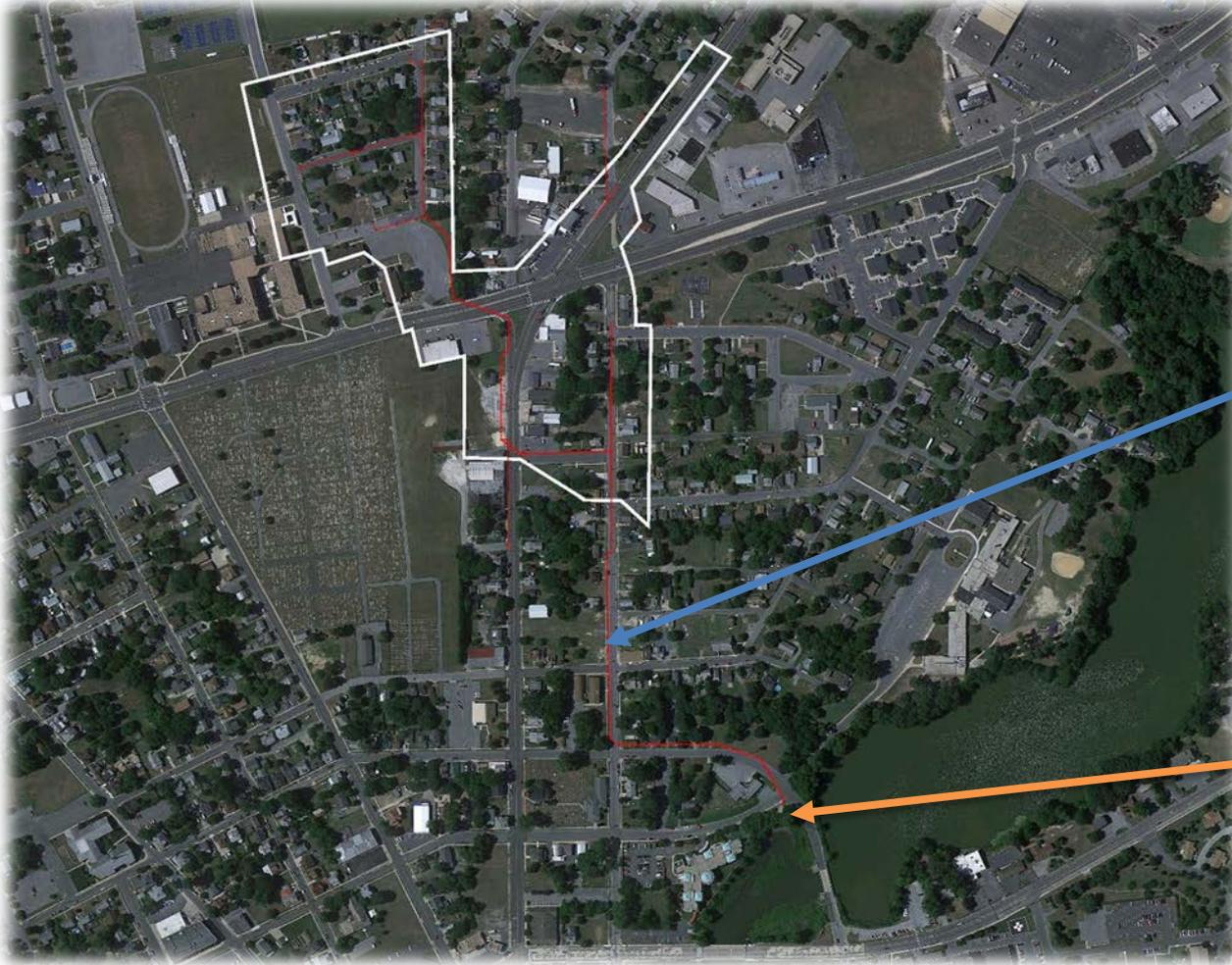
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Project Area



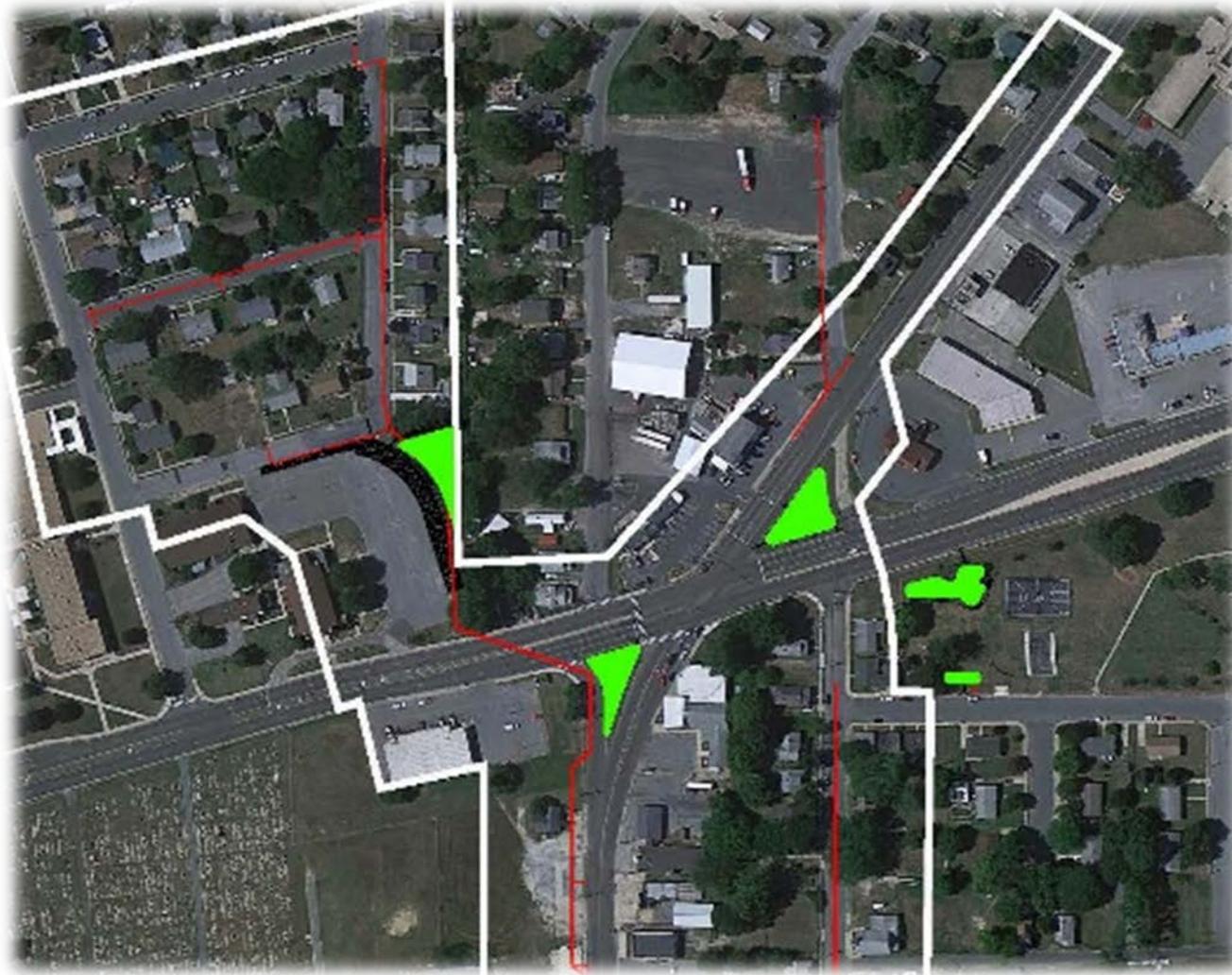
- 24 acre watershed
- Medium Density Residential, commercial, and institutional
- Drains through DeIDOT drainage system
- Discharges to Williams Pond upstream of dam
- Surcharged system

Recommended Solution



- Divert flow away from the DeIDOT drainage system
- Install 3000 lf of 48-inch diameter storm drain
- Storm drain sized to prevent flooding over curb for 100-year event
- Reroute to Nanticoke River downstream of dam

Green Technology Retrofits

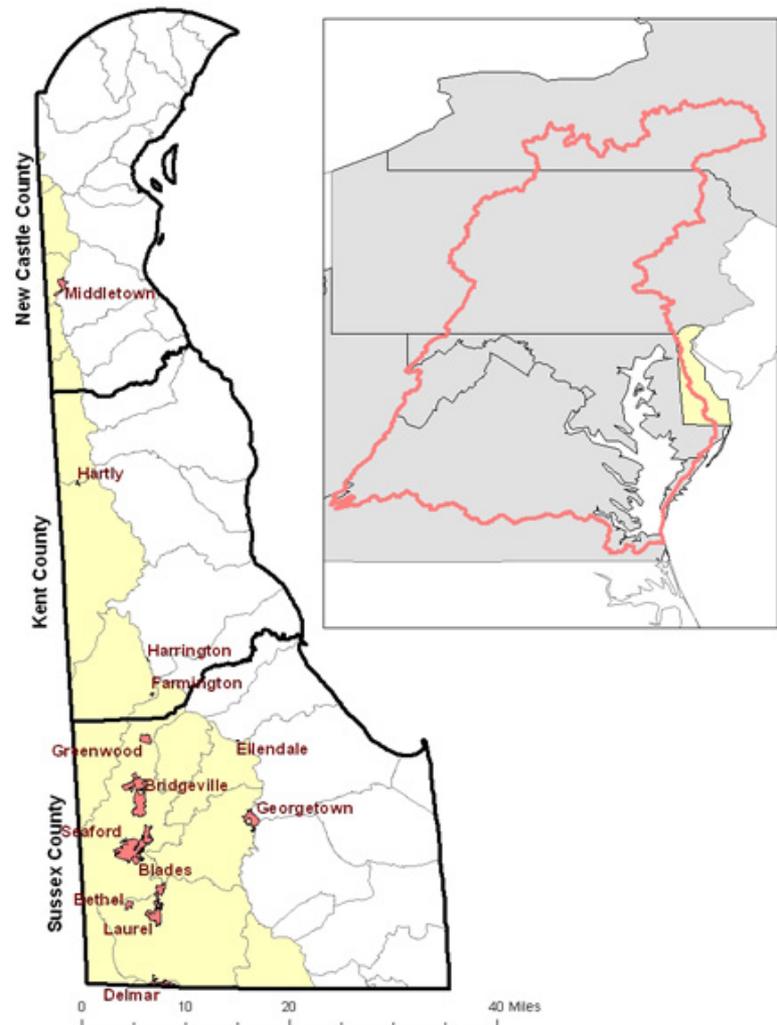


Opportunities:

- Green technology BMPs
- Reduce peak discharge to Nanticoke River
- Open other funding avenues
- Meet water quality goals
- Educational Opportunities

Water Quality Issues

Chesapeake Bay TMDL and WIP



Peak Discharge Reduction

- 48" outfall originally proposed
- Green BMPs allowed reduction to 36" outfall

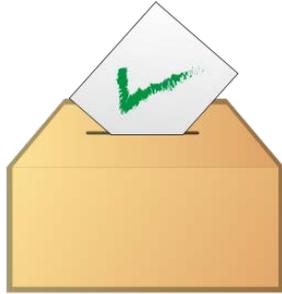


Funding



- **Project Funding**: The project was funded through the Delaware Clean Water State Revolving Fund under the Green Project reserve category. As a Green Project, it qualified for lower interest rates (2% interest, 20 year term, no closing costs)
- **Business Case**: The project's unique approach to municipal stormwater was the first of its kind within western Sussex County, by applying conventional "green" technologies in an urban environment. That served as the "business case" justification in support of the full eligibility of the project including stormwater conveyance pipes.

Funding



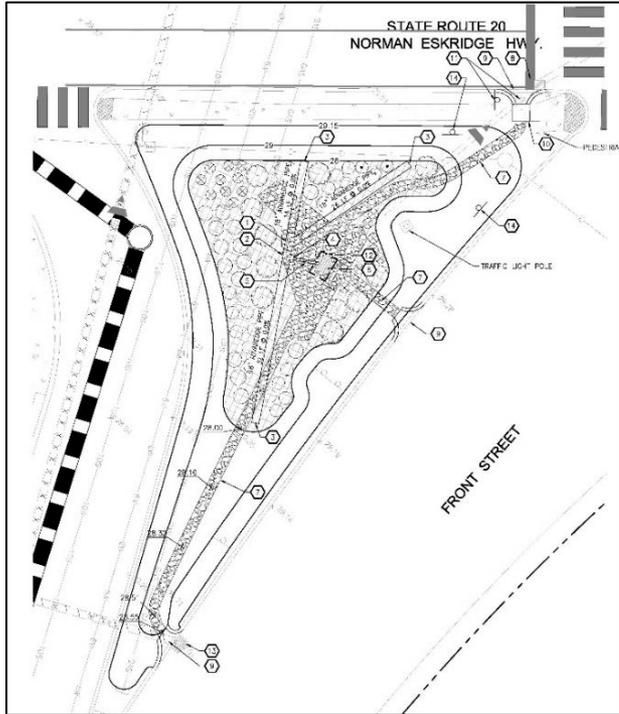
Referendum:

- City charter required public vote on issuance of General Obligation Bonds in amount of \$2.579 million.
- Passed 31:1, on 64 total votes



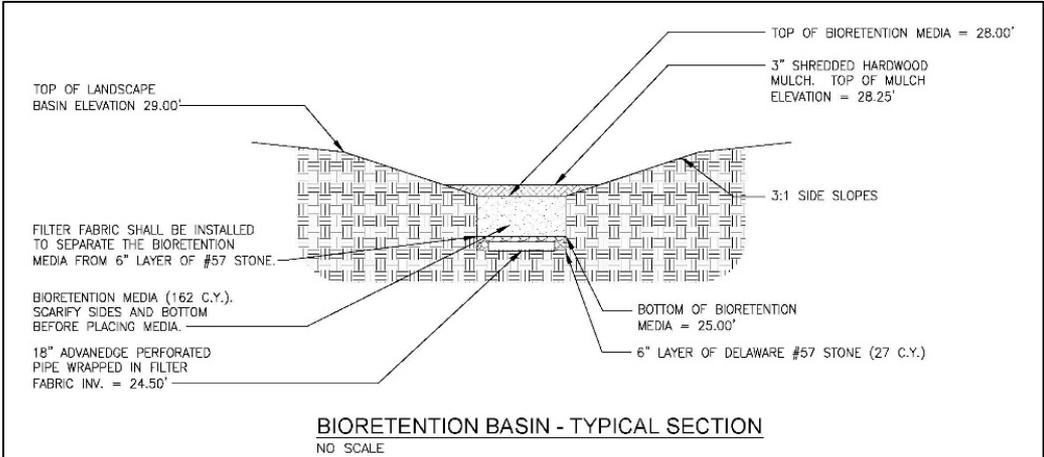
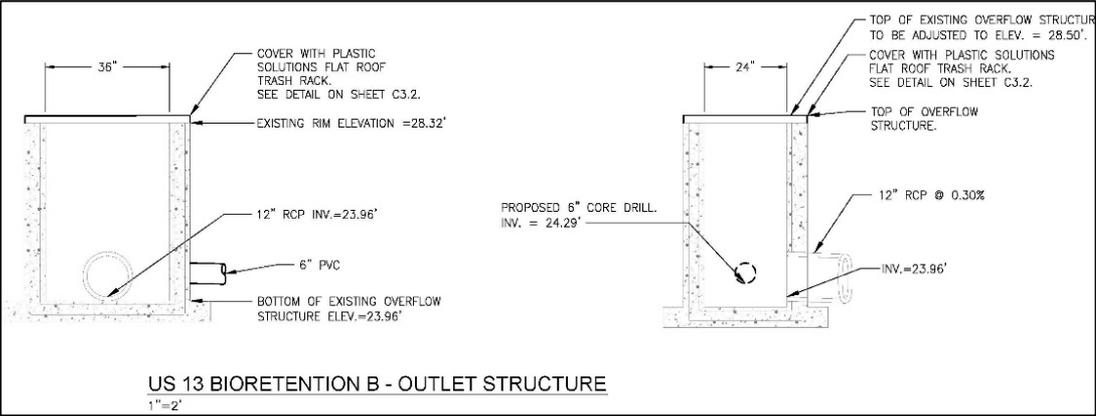
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Bioretention Design



- Conversion of traffic islands to bioretention
- Curb openings installed
- Existing yard drains converted to overflow structures

Bioretention Design



Before and After



Washington Street Flood Control & Stormwater Retrofits

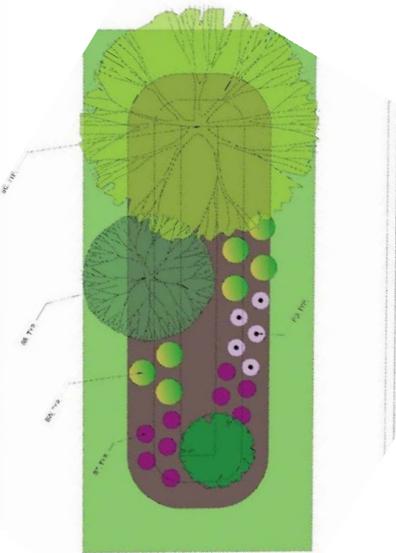
Bioretention Design



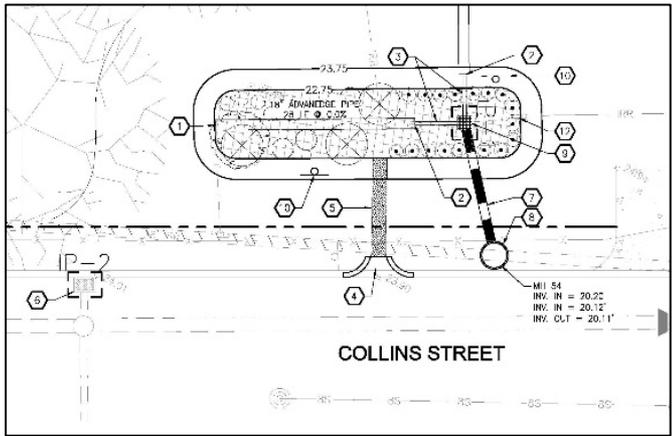
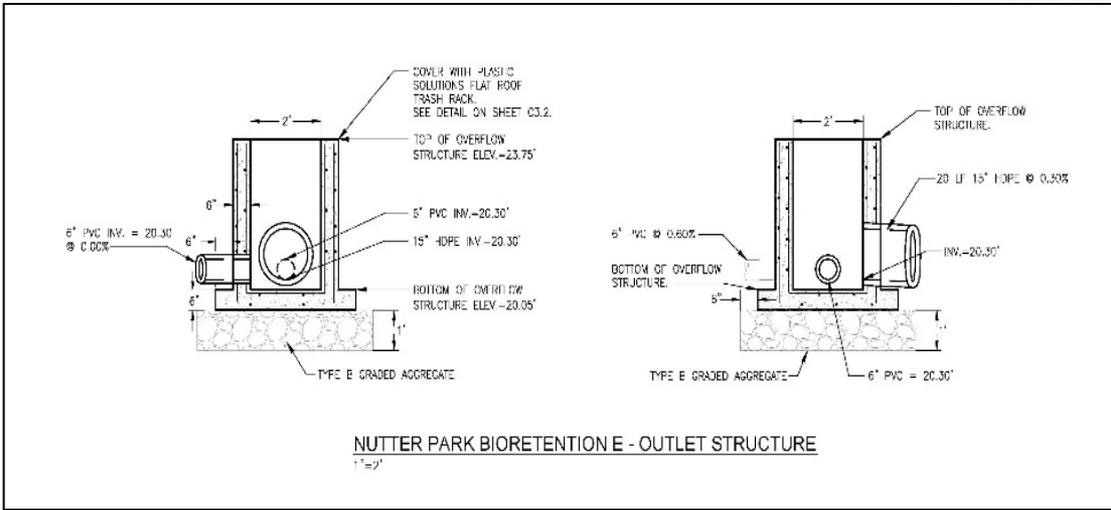
- 36" of Biomedia
 - 20% triple shredded hardwood mulch
 - 20% aged, certified compost
 - 60% concrete sand
- 3" hardwood mulch and decorative river rock



Bioretention Design



- Outfall structure rim set above grade to allow for ponding
- Underdrain Connected to outfall structure
- Outlet pipe tied into storm drain system



Landscape Design



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Wet Weather Performance - Bioretention



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Permeable Paver Design



Design Features

- Conversion of paved parking aisle to permeable pavers
- Stone Base
 - 2" thick # 8 Stone
 - 4" thick #57 Stone
 - 6" thick #2 Stone
- Non-Woven Filter Fabric – High Rate



Wet Weather Performance



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Tree Box Filter



Design Benefits

- Compact footprint
- High Pollutant Removal Rates
- First year Maintenance included
- Extended Maintenance services available



Educational Opportunities



Washington Street Flood Control & Stormwater Retrofits

City of Seaford Experience



- **Successful flood control project**
- **Introduced new green practices to the City**
- **Presented opportunity to showcase new technologies**
- **Fostered partnerships with DeIDOT, local residents, church and hospital**
- **Led the way to additional green infrastructure projects in Seaford**

Conclusions



- Protection of health, safety and welfare of local residents plagued by flooding
- Integration of green technology BMPs opened up alternative funding avenues and have assisted in meeting goals for Chesapeake Bay
- Demonstration retrofit of DeIDOT traffic islands to promote public awareness
- Success was a function of good design, good communication, a good contractor, proper inspection during construction





**Thank you for your
time this morning.**



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