

Stormwater Management Inventory and Watershed Improvement Plan

Community Meeting

January 17, 2017



The City of
ANNAPOLIS
Maryland

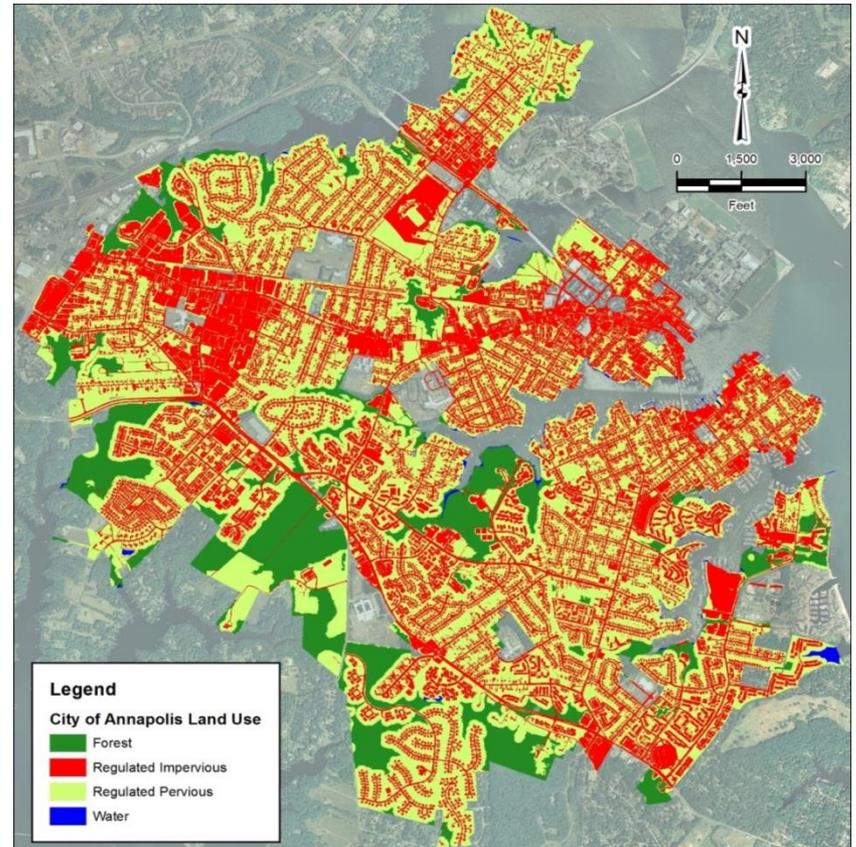
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Presentation Overview

- Regulatory Background
- Stormwater Management Inventory and Watershed Improvement Plan
- Needs Analysis and Funding Mechanism Assessment for Stormwater Programs

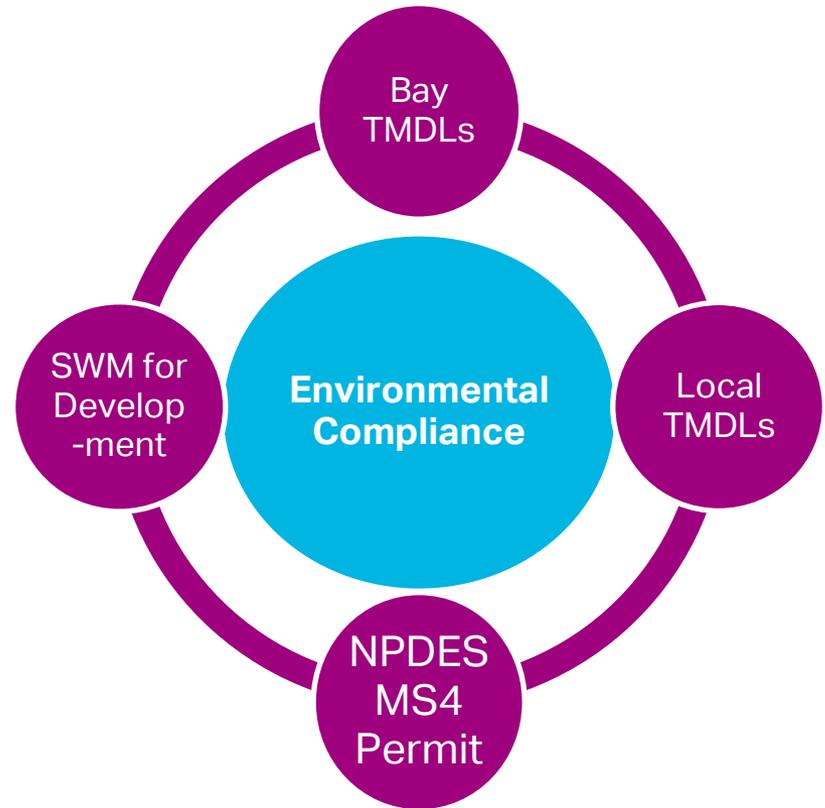
City of Annapolis

- 12 sub-watersheds
- 15 miles of natural streams
- 38.5 percent impervious
 - Residential neighborhoods
 - Commercial and industrial areas
 - Institutional properties
 - State and County roads



Regulatory Drivers

- Upcoming National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit
- Chesapeake Bay Total Maximum Daily Loads (TMDLs)
- Local TMDLs
- Stormwater Management for New and Re-development



The above programs are required by the EPA Clean Water Act - non compliance may result in large fines

NPDES MS4 Permit Requirements

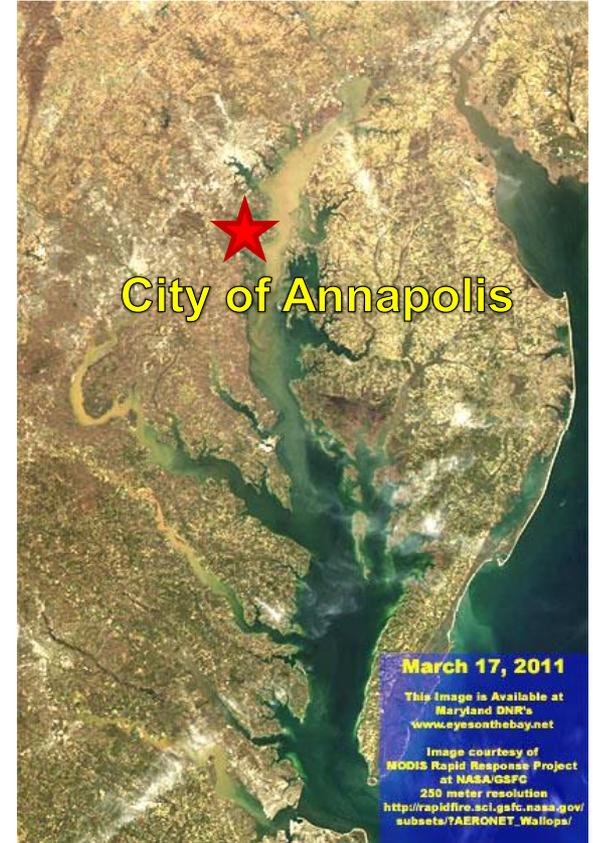
- Annapolis is designated as a Phase II community
- Current permit expired April 14, 2008
- Tentative Permit Published by MDE on December 22, 2016
- New Requirements
 - Chesapeake Bay Restoration and Meeting Total Maximum Daily Loads



NPDES MS4 Six Minimum Control Measures

Chesapeake Bay TMDLs

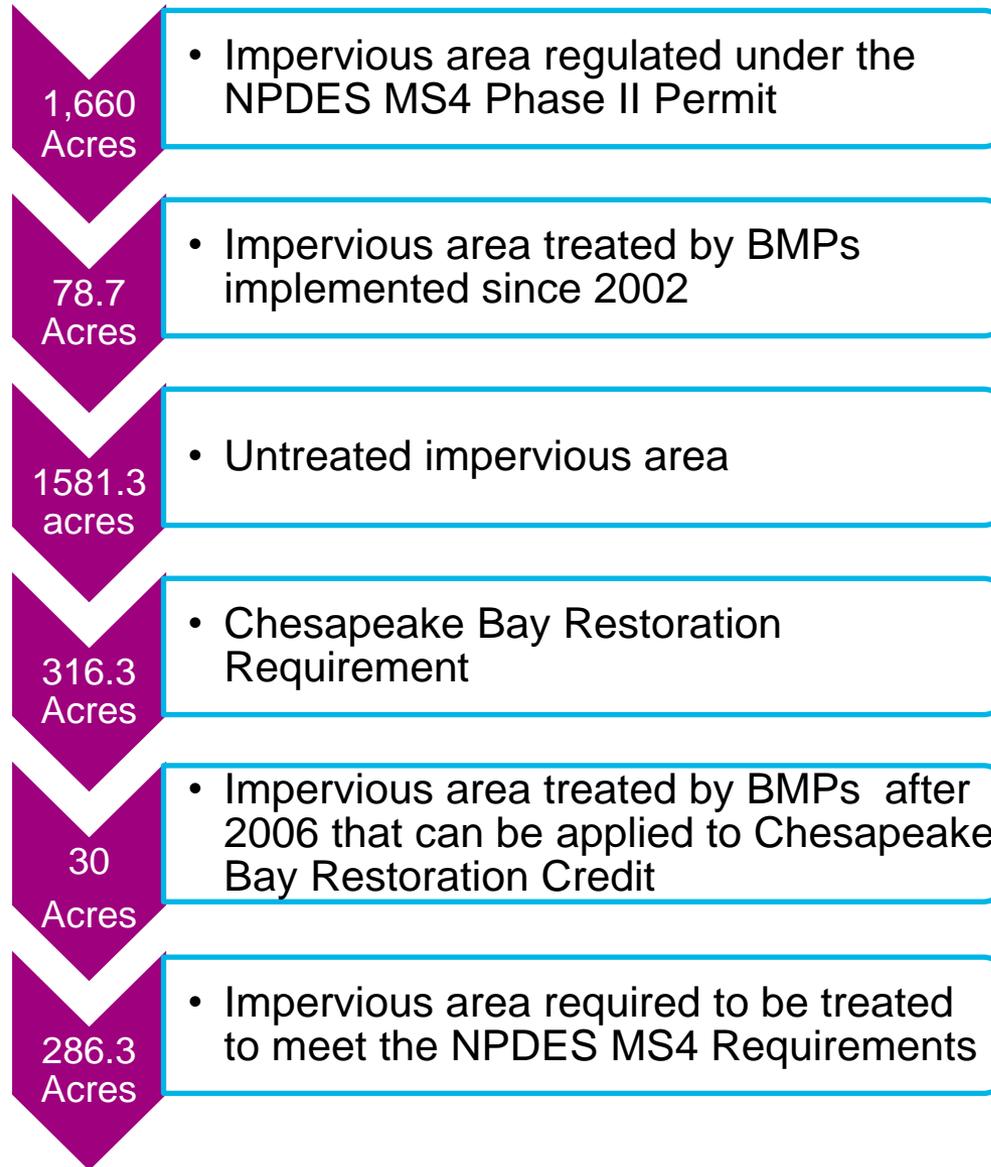
- TMDL established by EPA in 2010; requires significant reductions by 2025:
 - 25% less nitrogen (TN)
 - 24% less phosphorus (TP)
 - 20% less sediment (TSS)
- Target reductions for 2017
 - 60% of 2025 target reductions to be achieved



City of Annapolis Baseline Loads (2010)

Area (acres)	Total Nitrogen (lbs/year)	Total Phosphorus (lbs/year)
4,533	43,390	5,440

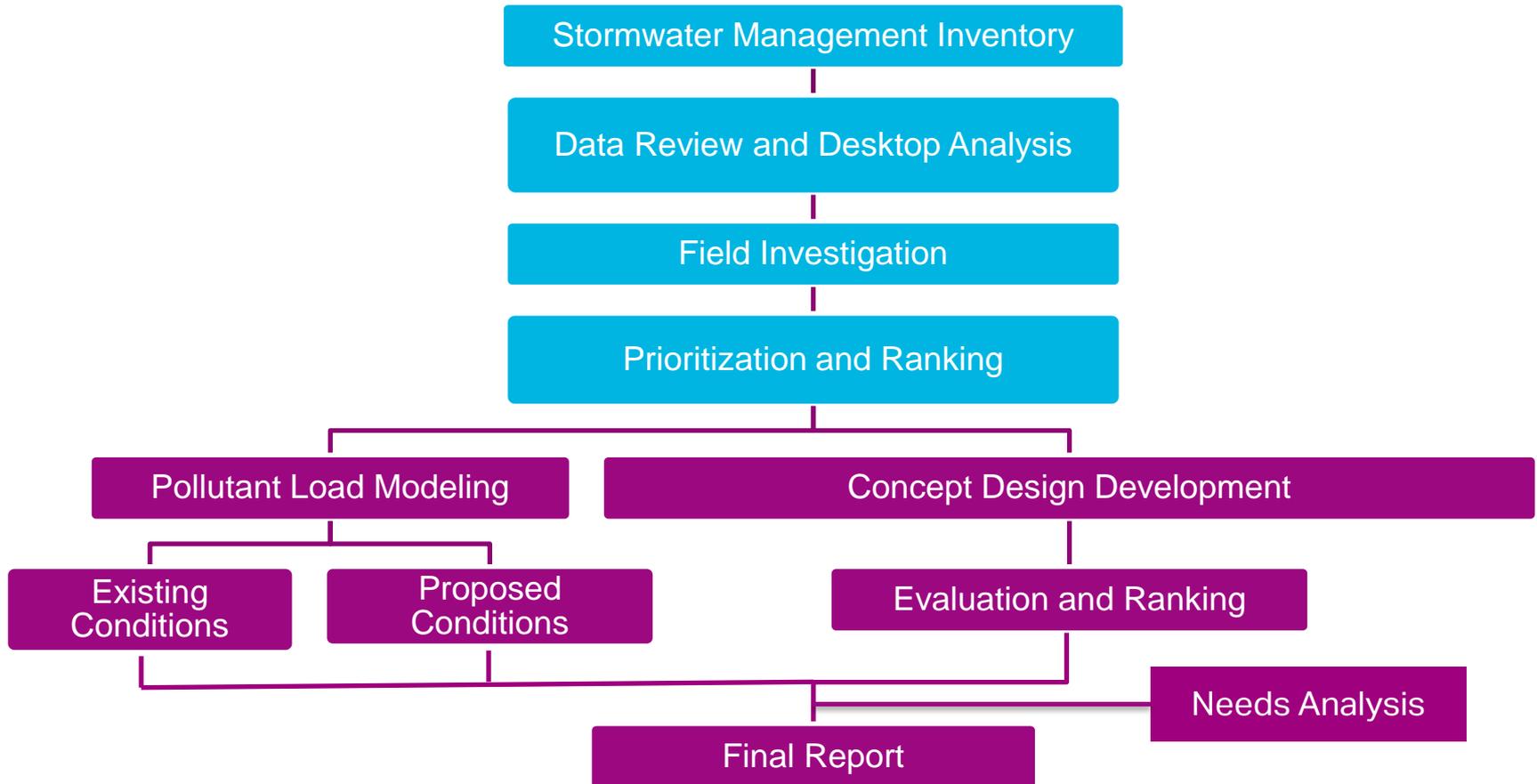
Chesapeake Bay Restoration Requirements



Local Partners Provide Significant Contributions

- Annapolis Watershed Network
- Back Creek Conservancy
- Severn River Association
- South River Federation
- Spa Creek Conservancy
- St. Luke Episcopal Church

Stormwater Management Inventory and Watershed Improvement Plan



Stormwater Management Inventory

Inventory existing Best Management Practices (BMPs)



Arc GIS database



Microsoft Excel



PDF

Data Collected

- Stormwater management facility type
- Location
- Approval date
- Built date
- Drainage area treated
- Impervious area treated
- Land use
- Hydrologic factors (ex. curve number, design rainfall event, water quality volume)

Summary of Inventory

Total Number Design Plan Sets Scanned	351
Total Number of Pages Scanned	1,725
Total Number of BMPs Identified	741

Data Review, Desktop Analysis and Field Investigation

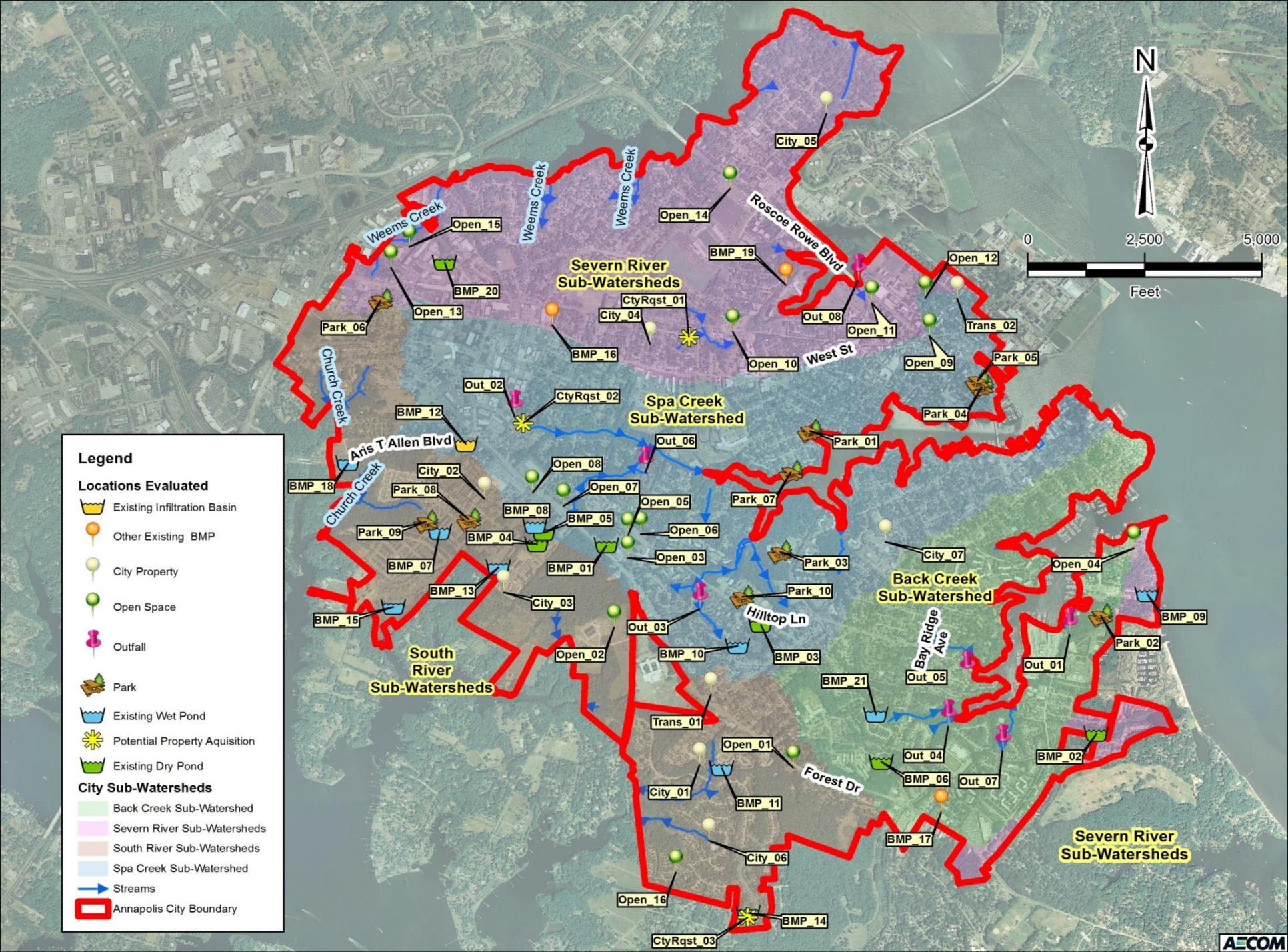
- 65 sites identified from desktop analysis
 - 20 existing BMPs with retrofit potential
 - 45 new stormwater management options
 - City properties
 - Parks
 - Streams
 - Open areas
 - Right of Way
 - City-recommended areas
- Stormwater opportunities identified
 - Dry/wet pond retrofits
 - New stormwater management facilities
 - Environmental Site Design (ESD)
- Alternative urban BMPs



Existing wet pond near the intersection of Coybay Drive and Annapolitan Lane (BMP_07)



Existing grass swale west of the intersection of Spa Road and Silopanna Road (Out_06)



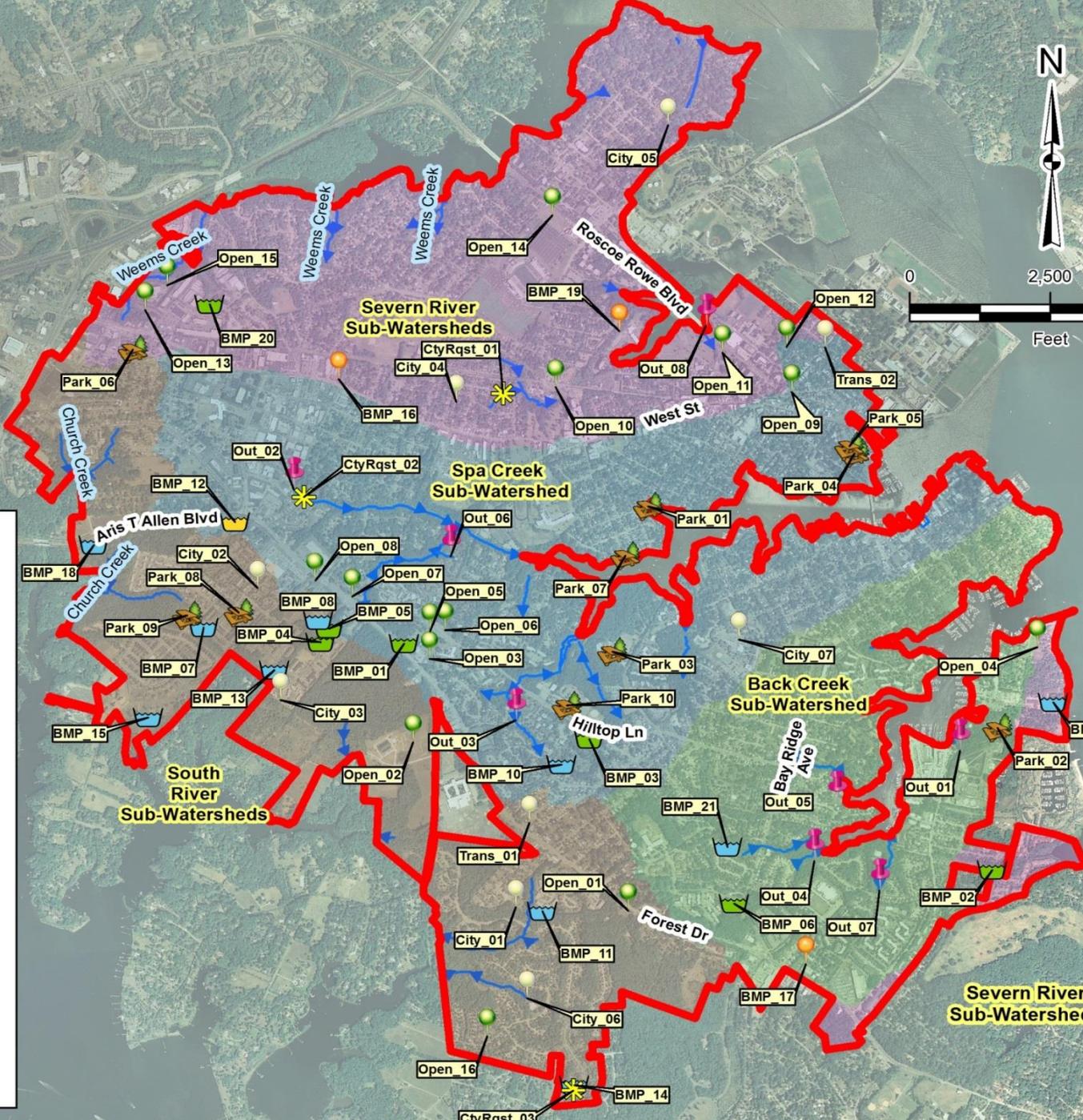
Legend

Locations Evaluated

- Existing Infiltration Basin
- Other Existing BMP
- City Property
- Open Space
- Outfall
- Park
- Existing Wet Pond
- Potential Property Aquisition
- Existing Dry Pond

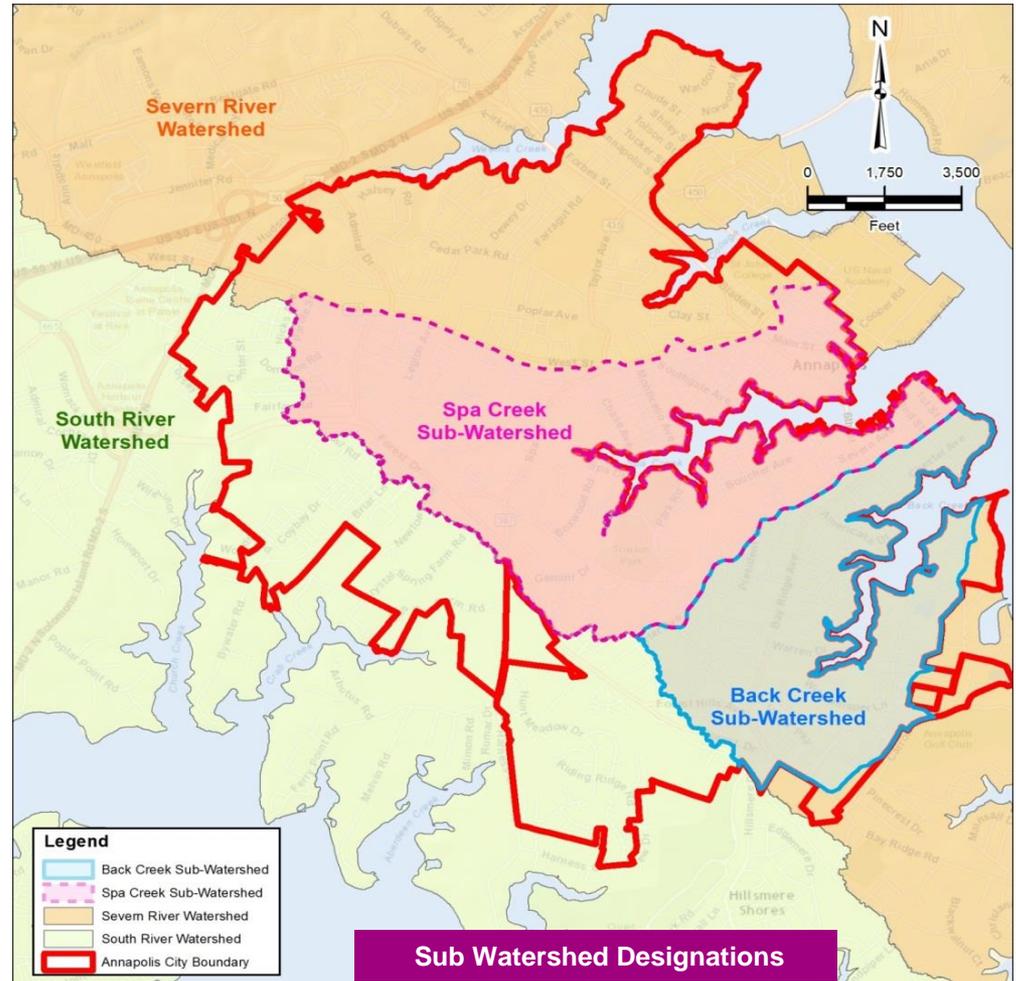
City Sub-Watersheds

- Back Creek Sub-Watershed
- Severn River Sub-Watersheds
- South River Sub-Watersheds
- Spa Creek Sub-Watershed
- Streams
- Annapolis City Boundary



Site Prioritization

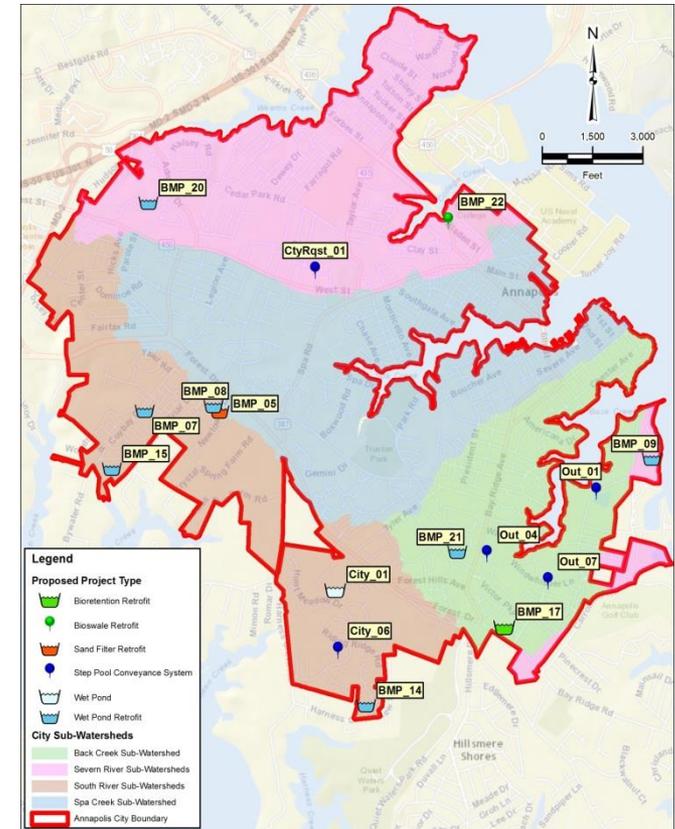
- Impervious drainage area
- Site ownership
- Site access
- Utility conflicts
- Environmental impacts of proposed solutions
- Regulatory approval
- Flooding concerns
- Anticipated project cost
- Public visibility
- Maintenance burden



Development of Concept Designs

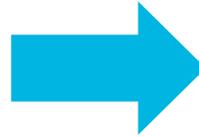
16 Project Selected by the City for Development of Concept Designs

- Back Creek
 - BMP_05 - Dry Pond Retrofit to Sand Filter
 - BMP_17 - Bioretention Retrofit
 - BMP_21 - Wet Pond Retrofit
- South River Sub-watersheds
 - Out_01 - Step Pool Conveyance System
 - Out_04 - Step Pool Conveyance System
 - Out_07 - Step Pool Conveyance System
- Severn River Sub-watersheds
 - BMP_07 - Wet Pond Retrofit
 - BMP_08 - Wet Pond Retrofit
 - BMP_14 - Wet Pond Retrofit
 - BMP_15 - Wet Pond Retrofit
 - City_01 - Wet Pond
 - City_06 - Step Pool Conveyance System
- Spa Creek Sub-watersheds
 - BMP_09 - Wet Pond Retrofit
 - BMP_20 - Wet Pond Retrofit
 - BMP_22 - Grass Swale to Bio Swale Retrofit
 - CityRqst_01 - Step Pool Conveyance System

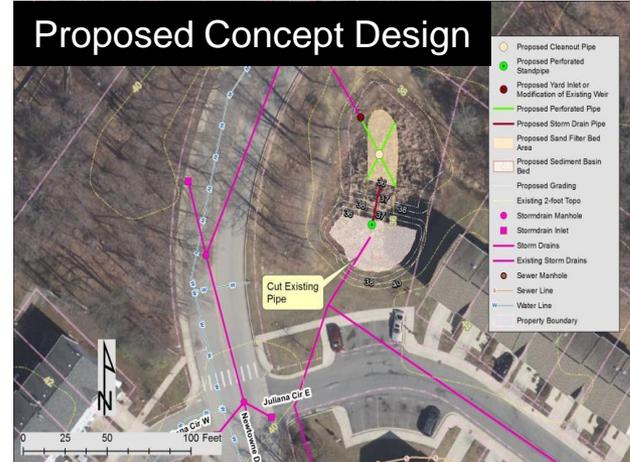


Example Projects

Existing Pond

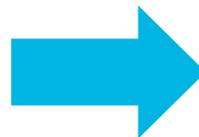


Proposed Concept Design



BMP_05 - Existing pond near the intersection of Juliana Court East and Newtowne Drive

Existing Outfall



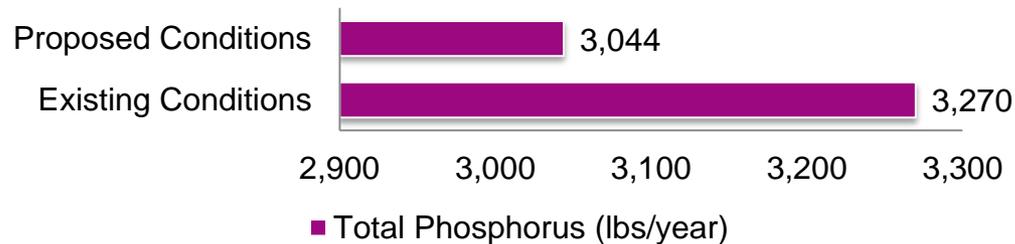
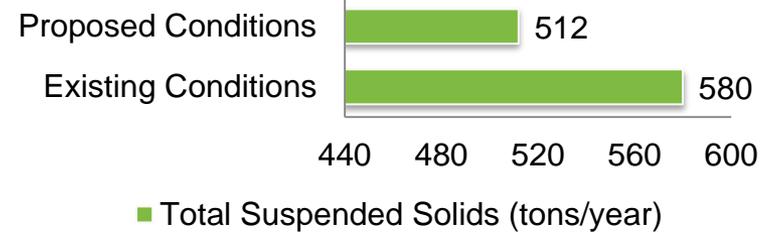
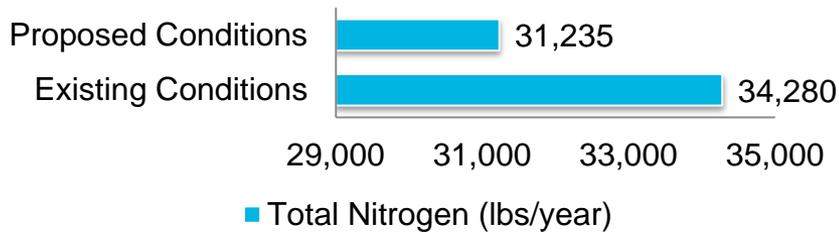
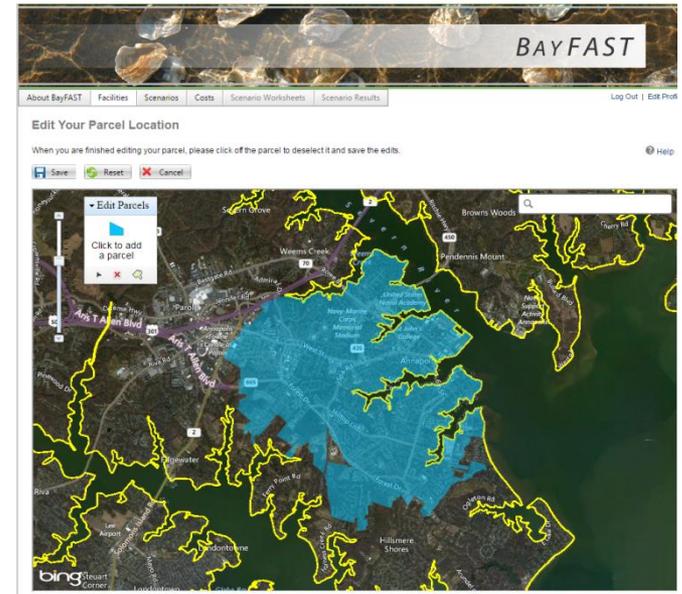
Proposed Concept Design



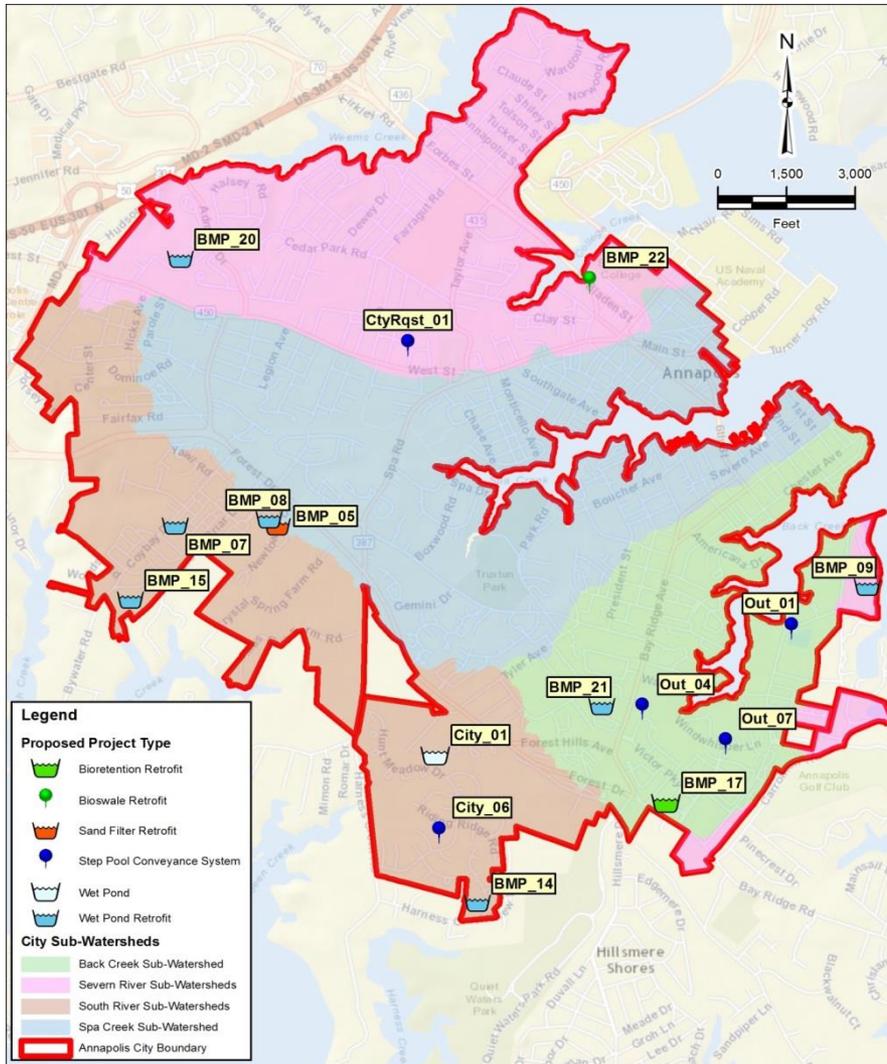
City_06 - Existing outfall Northwest of the Hunt Meadow Drive Pool Parking Lot

Pollutant Load Modeling

Bay Facility Assessment Scenario Tool (BayFAST)



Proposed Restoration Projects



- 16 high priority projects selected by City for concept development
- Alternative Urban BMPs
 - Street sweeping
 - Urban tree planting
 - Catch basin cleaning
 - Shoreline management
 - Conversion of impervious area to pervious area
 - Pet waste management

Chesapeake Bay TMDL – Cost of Compliance

- Funding needed to comply with the Upcoming NPDES MS4 Phase II and Chesapeake Bay TMDL requirements
 - Total design and construction costs needed to implement proposed BMP projects through 2025 - **\$9.3 Million**
 - Annual costs for maintenance of existing and proposed BMPs - **\$312,500**
- Current CIP budget through 2022 - **\$1.8 Million**

City of Annapolis – Current Stormwater Fee

- Stormwater fee is collected quarterly
 - Residential: \$10.40
 - Commercial: ranges from \$39-\$130
- Annual revenue generated by the stormwater fee - **\$875,000**
- Distribution of collected funds
 - Salaries of personnel under stormwater management program
 - Operations costs of the program
 - Principal and interest payment of General Obligation bonds issued for CIP projects

Needs Analysis

- Identified expenditure to be incurred by the City through the Chesapeake Bay TMDL time line (i.e. 2025)
- Key items considered
 - Cost of implementation of restoration BMPs
 - Annual maintenance cost for existing and future BMPs
 - Personnel cost



Projected Annual Costs

- Cost of implementing the proposed projects
- Cost of maintaining existing and proposed BMPs
- CIP costs
- Salaries and benefits of personnel
- Operation costs
- Pollution prevention training

Year	Projected Annual Cost
2017	\$2.9 Million
2018	\$2.3 Million
2019	\$2.6 Million
2020	\$2.3 Million
2021	\$2.3 Million
2022	\$2.3 Million
2023	\$2.3 Million
2024	\$2.3 Million
2025	\$2.3 Million

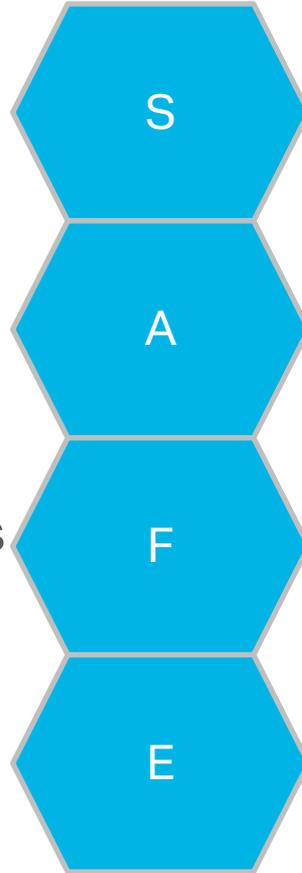
Options for Funding, Financing and Partnership

- Funding
 - Re-evaluation of current stormwater fee
 - Establishment of a stormwater utility
 - Capital recovery fee/development impact fee
 - Grants and technical assistance
- Financing
 - Debt financing
 - Loans
- Partnerships
 - Public-private partnerships
 - Cost sharing



Stormwater Fee

- Stable – Funding does not fluctuate year-to-year based on prior years' occurrences
- Adequate – Determined by actual expenditures plus projected future needs
- Flexible – Rates can be adjusted as conditions warrant
- Equitable – Cost is borne by the user based on demand placed on the drainage system

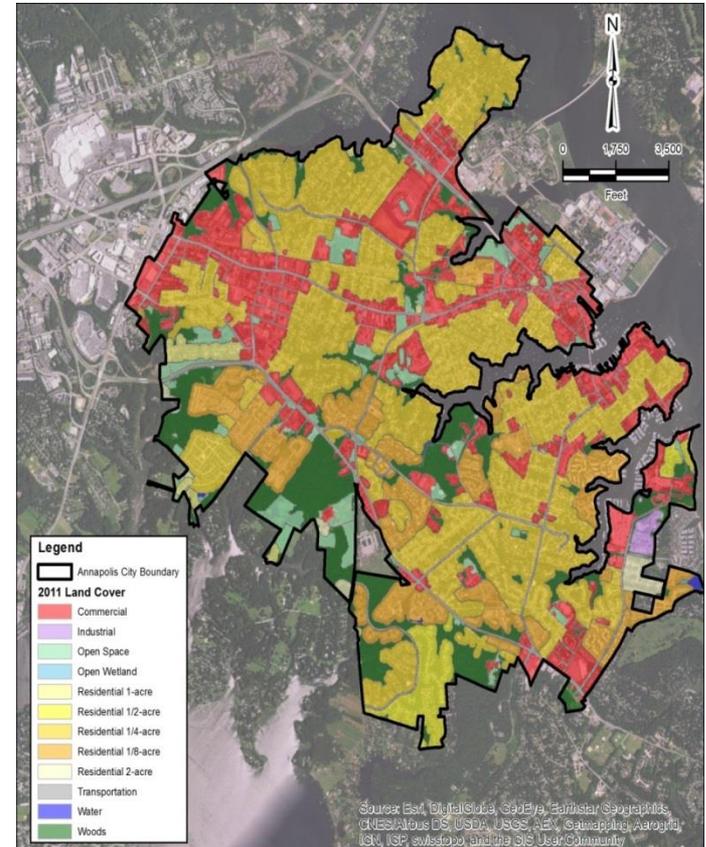


Next Steps for Required Program Funding

- Finalize financing approach
- If enhancing the City's stormwater fee, select fee structure and method for refining
 - Flat, variable, or tiered fee structure
 - Categorize like properties together, often by zoning district or land use
 - Equivalent Residential Unit (ERU)
 - Intensity Development (ID)
 - Equivalent Hydraulic Area (EHA)
- An ERU approach using tiers is common and recommended

Stormwater Utility Option

- Other Considerations for establishing a SW Utility
 - Credit policy
 - Inclusion of tax – exempt properties
 - Rebate programs for disadvantaged
 - Community buy-in through outreach



Stormwater Management Inventory and Watershed Improvement Plan – Summary

- Watershed Improvement Plan
 - Robust SWM database
 - 16 proposed projects to comply with Ches Bay TMDL
 - Flexibility to change projects
 - Implementation costs estimated
- Compliance with the Chesapeake Bay TMDL and NPDES MS4 Phase II Permit
 - Compliance is mandated by the EPA Clean Water Act
 - Compliance requires significant funds





Questions?

Study is available at: <http://www.annapolis.gov/government/city-departments/mayors-office/office-of-environmental-policy>