Storm Water Management Planning to Achieve Load Reductions at Naval Facilities in the Chesapeake Bay Watershed

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NAVFAC
Naval Facilities Engineering Command

Presentation Outline

- Background
  - Executive Order 13508
  - Chesapeake Bay TMDL
- Site Assessment Project Approach
  - Standardized approach
  - Project prioritization approach
- Case Study: Cheatham Annex/Yorktown Fuels

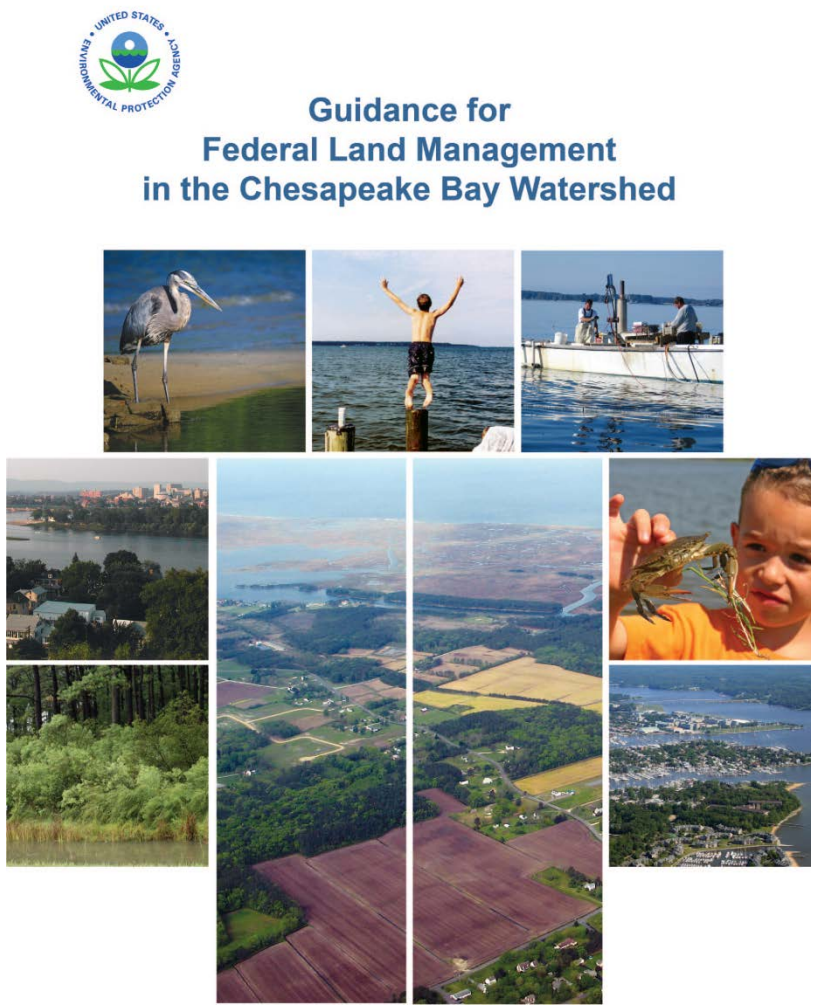
Executive Order (EO) 13508: Chesapeake Bay Protection and Restoration

- Signed by Obama May 12, 2009
- Prioritized effort to clean Chesapeake Bay
- Federal government identified as one of the largest land owners in the watershed
  - Expected to lead by example in Bay cleanup efforts

EO 13508 Guidance Documents

- *Section 202c, DoD Lead - Stormwater Management at Federal Facilities and on Federal Lands*
  November 23, 2009

- *Section 502, EPA Lead - Guidance Document for Federal Land Management*
  May 12, 2010



Chesapeake Bay TMDL

- Bay TMDL requires reductions in nitrogen, phosphorous, and sediment loadings
- All jurisdictions require some level of urban storm water retrofits as well as other practices to reduce nutrient and sediment loading
- VA Phase I WIP - Urban Sector Requires Level L2 – Practices on 22.5% of impervious urban lands, 10% of pervious urban lands)
- VA Phase I WIP requires Level L3 Practices for federal facilities (2*L2) but WIP model run does not reflect

Site Assessment Pilot Projects

- Identify stormwater improvement options
- Establish standard prioritization criteria
- Prioritize sites
  - nutrient reduction benefit
  - feasibility
  - site constraints
  - cost/benefit ratio
- Conceptual designs and cost estimates for top ranked projects
- Establish framework for similar investigations at other Federal facilities throughout bay region

Site Assessment Pilot Projects

- Prioritization Criteria
  - Benefits, 50 points
  - Environmental impacts, 50 points
  - Constraints, 30 points
  - Relative BMP cost, 20 points

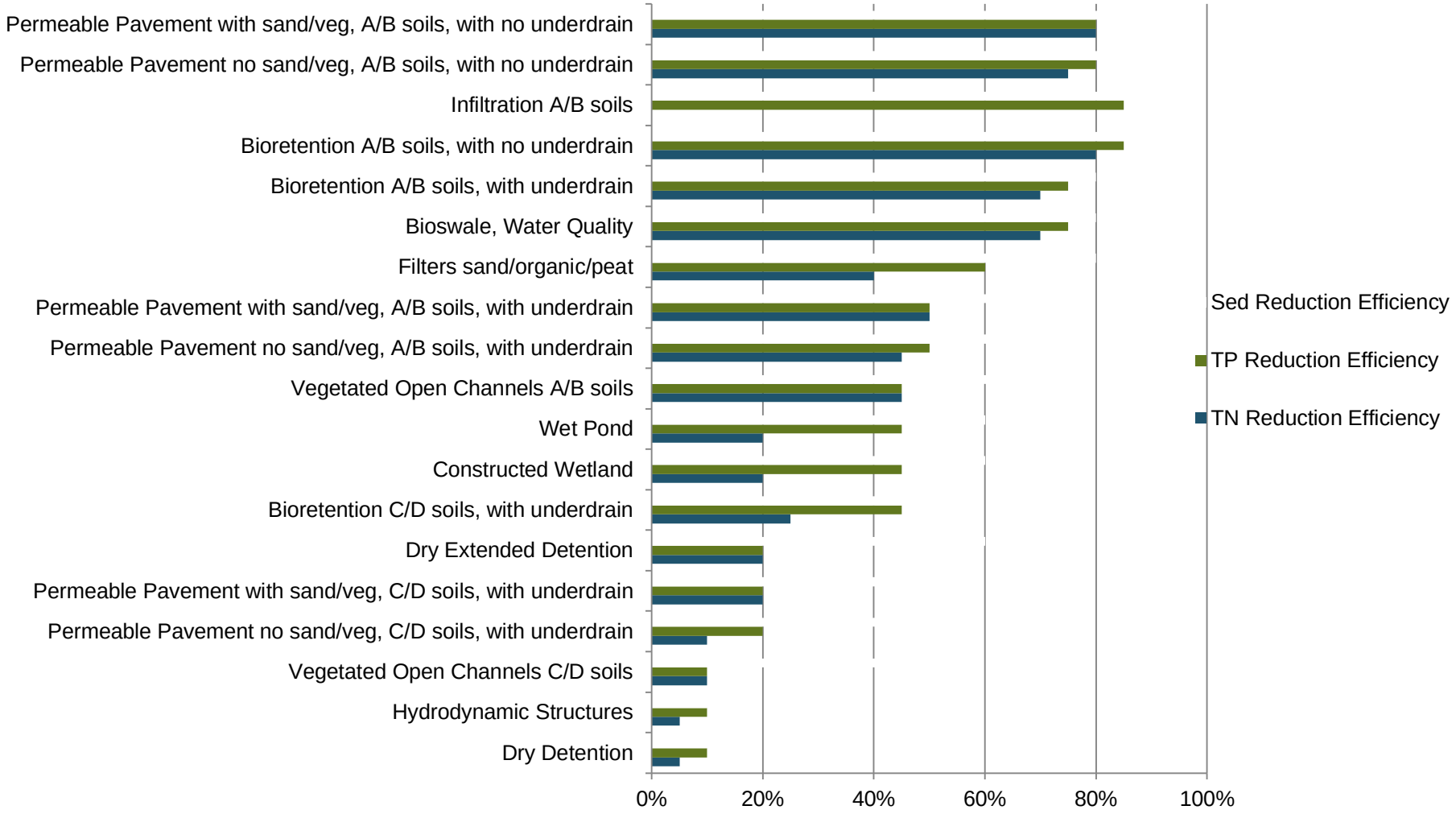
Site Assessment Pilot Projects

- Environmental impacts (50 Points)
  - Contributing impervious drainage area (25)
  - Stormwater benefits, existing landscape (10)
  - Land use (10)
  - Sensitivity of receiving water (5)

Site Assessment Pilot Projects

- Environmental benefits (50 Points)
  - Nutrient, sediment removal potential (40)
  - Native vegetation establishment (5)
  - Tree/vegetation loss minimization (5)

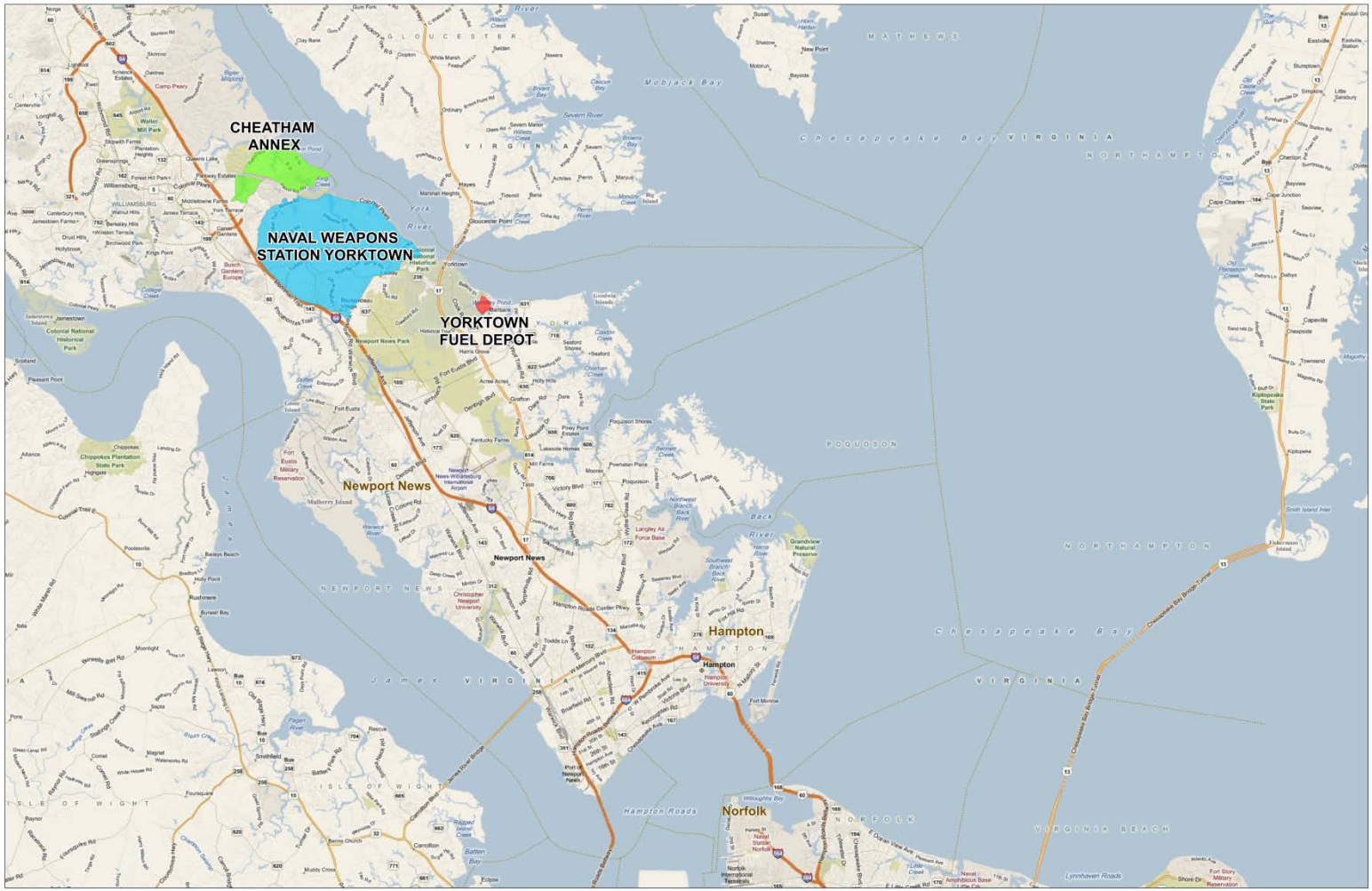
Site Assessment Pilot Projects



Site Assessment Pilot Projects

- Constraints (30 Points)
  - Space constraints (10)
  - Utility conflicts, site access (10)
  - Engineering design issues (10)
- Relative Cost (20 Points)
  - Relative cost per impervious area treated (10)
  - Relative maintenance cost burden (10)

Case Study:
Cheatham Annex/Yorktown Fuels



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Case Study: Cheatham Annex/Yorktown Fuels

- Site Description
  - Cheatham Annex: 1,570 acres
  - Yorktown Fuels: 110 acres
- Cheatham Annex
  - less than 50% developed
  - primarily warehouse storage and forest
- Yorktown Fuels
  - maintained as turf grass
  - forest on perimeter
  - less than 15% impervious

Case Study:
Cheatham Annex/Yorktown Fuels

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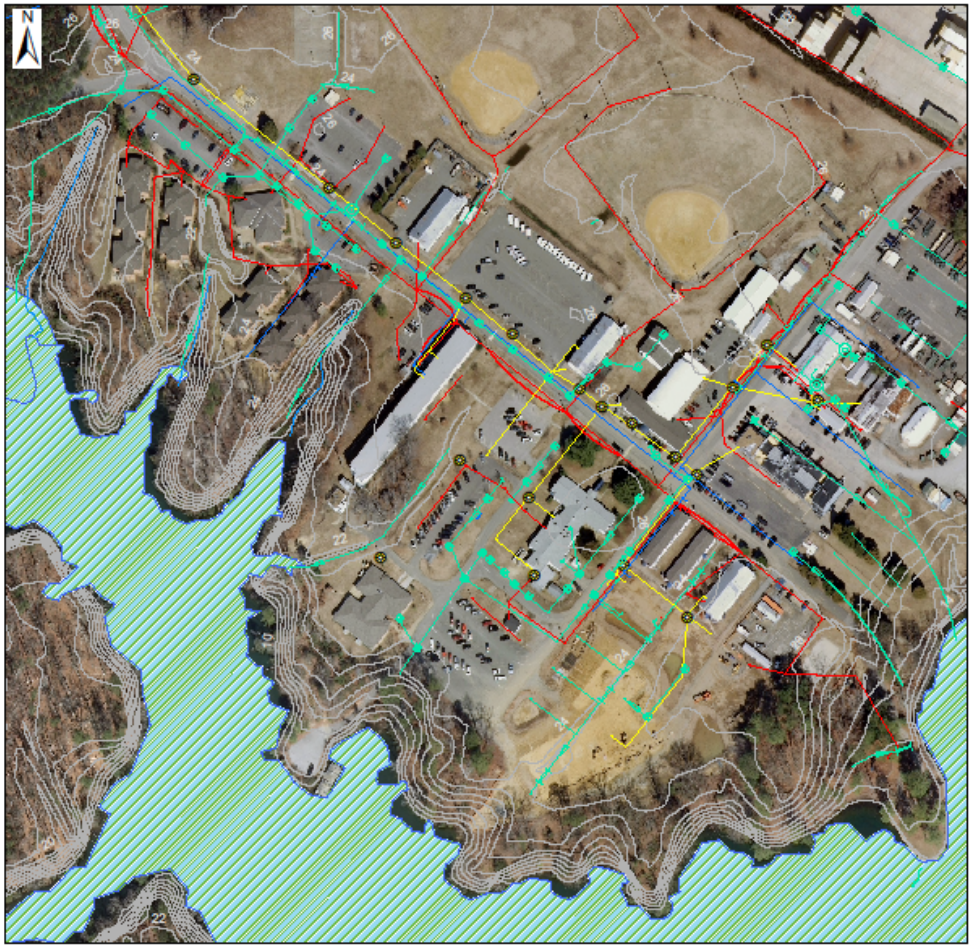
Case Study: Cheatham Annex/Yorktown Fuels

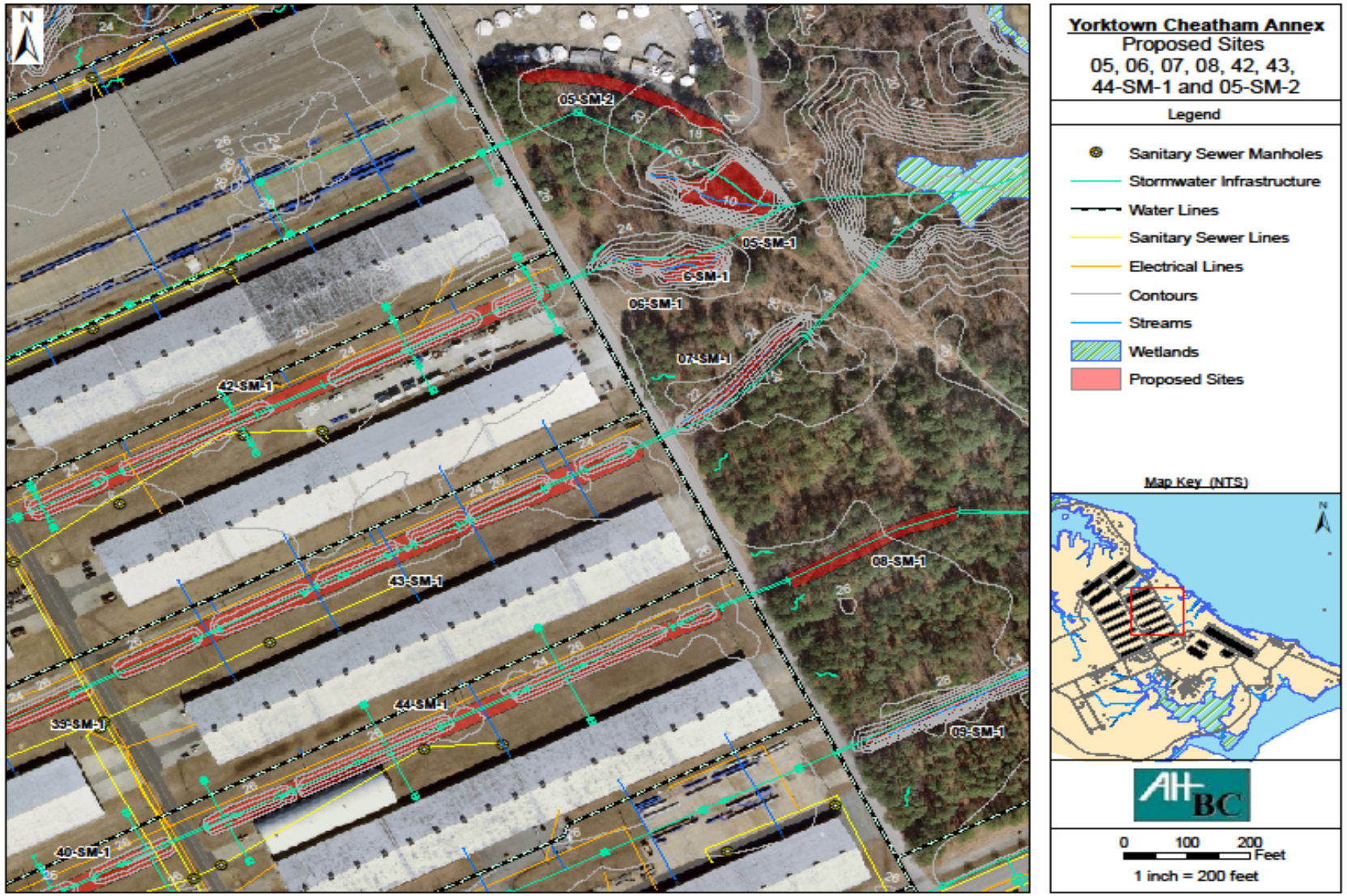
- Preliminary site assessments
  - Storm system maps
  - Facility plans
  - Outfall reports
  - GIS data layers (i.e. cultural resources)
- Stormwater management
- Erosion control
- Infrastructure repair



Case Study: Cheatham Annex/Yorktown Fuels

- Alternative Analysis
  - Location
  - Drainage area
  - Land use type
  - Potential improvement measures for the site
  - Sketch of site and potential BMPs
  - Utilities
  - Observed problems

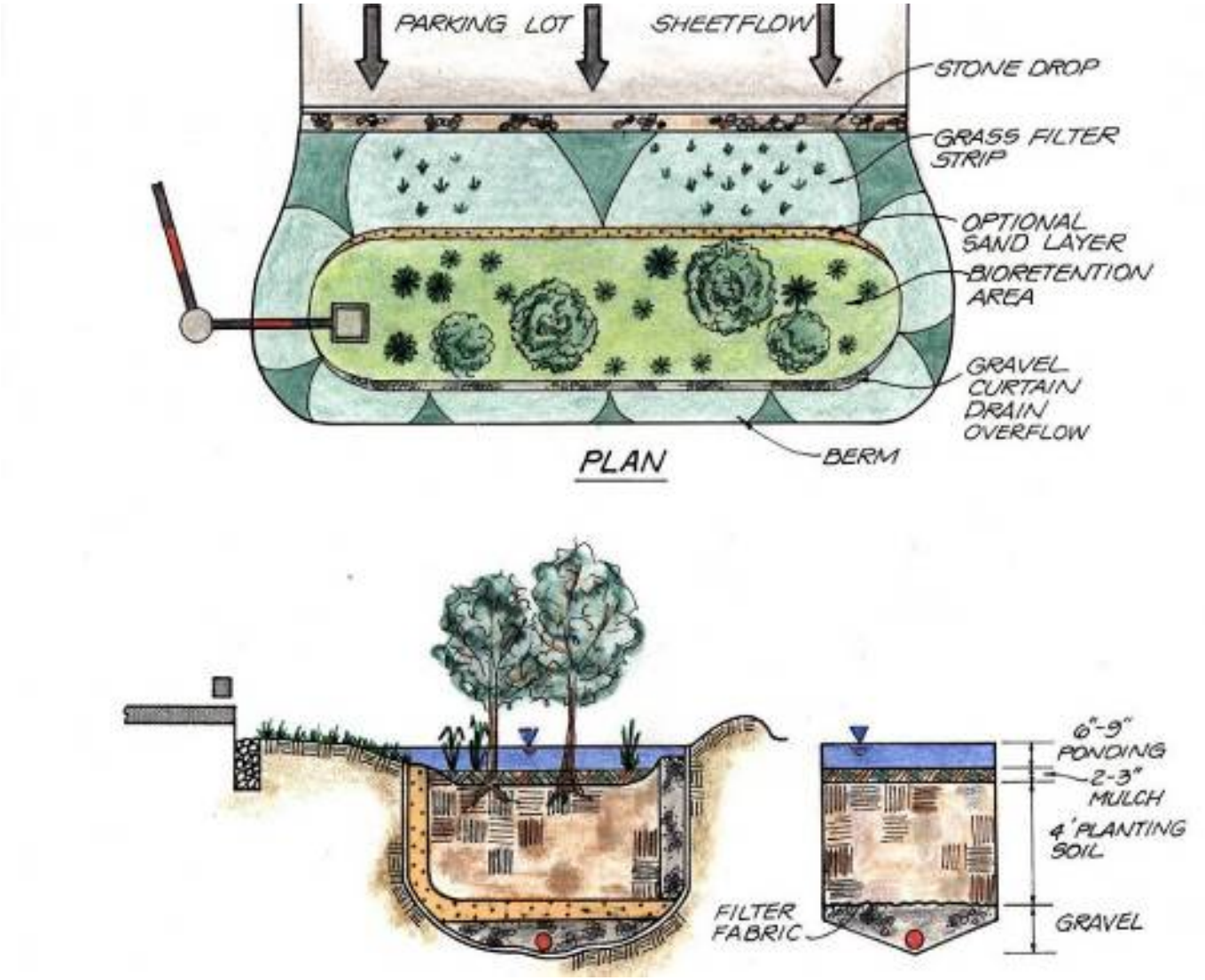
Case Study:
Cheatham Annex/Yorktown Fuels



Cheatham Annex/Yorktown Fuels Stormwater Management Options

Bioswales and
Bioretention Options

Case Study:
Cheatham Annex/Yorktown Fuels



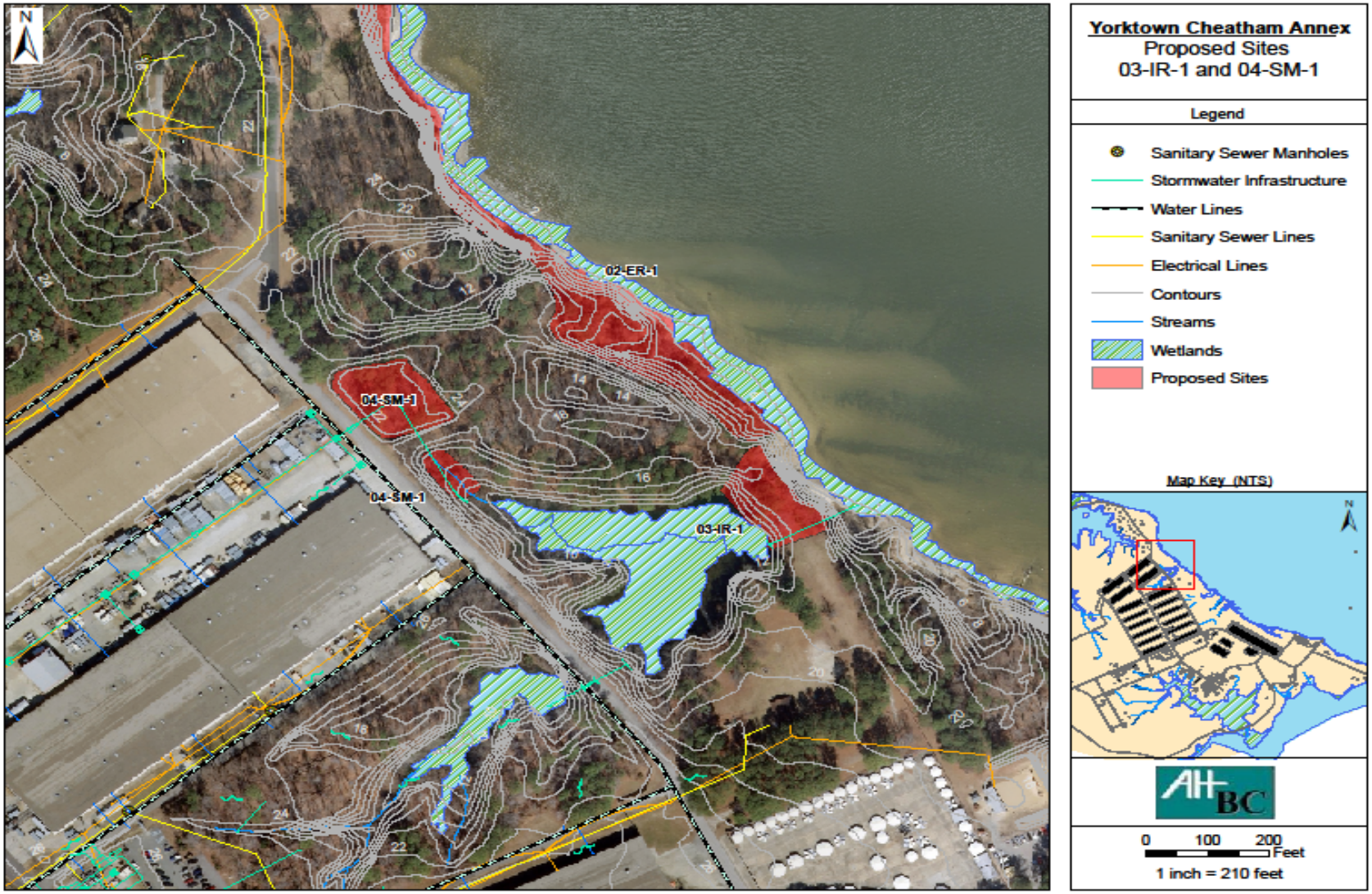
Proposed Bioswale Improvement

Proposed Bioswale

Proposed Bioswale

Proposed Bioswale

Case Study:
Cheatham Annex/Yorktown Fuels



Design of Natural Stream Restoration and Erosion Control BMPs

Stream Restoration
and Erosion Control Options

Stream Restoration/Bank Stabilization

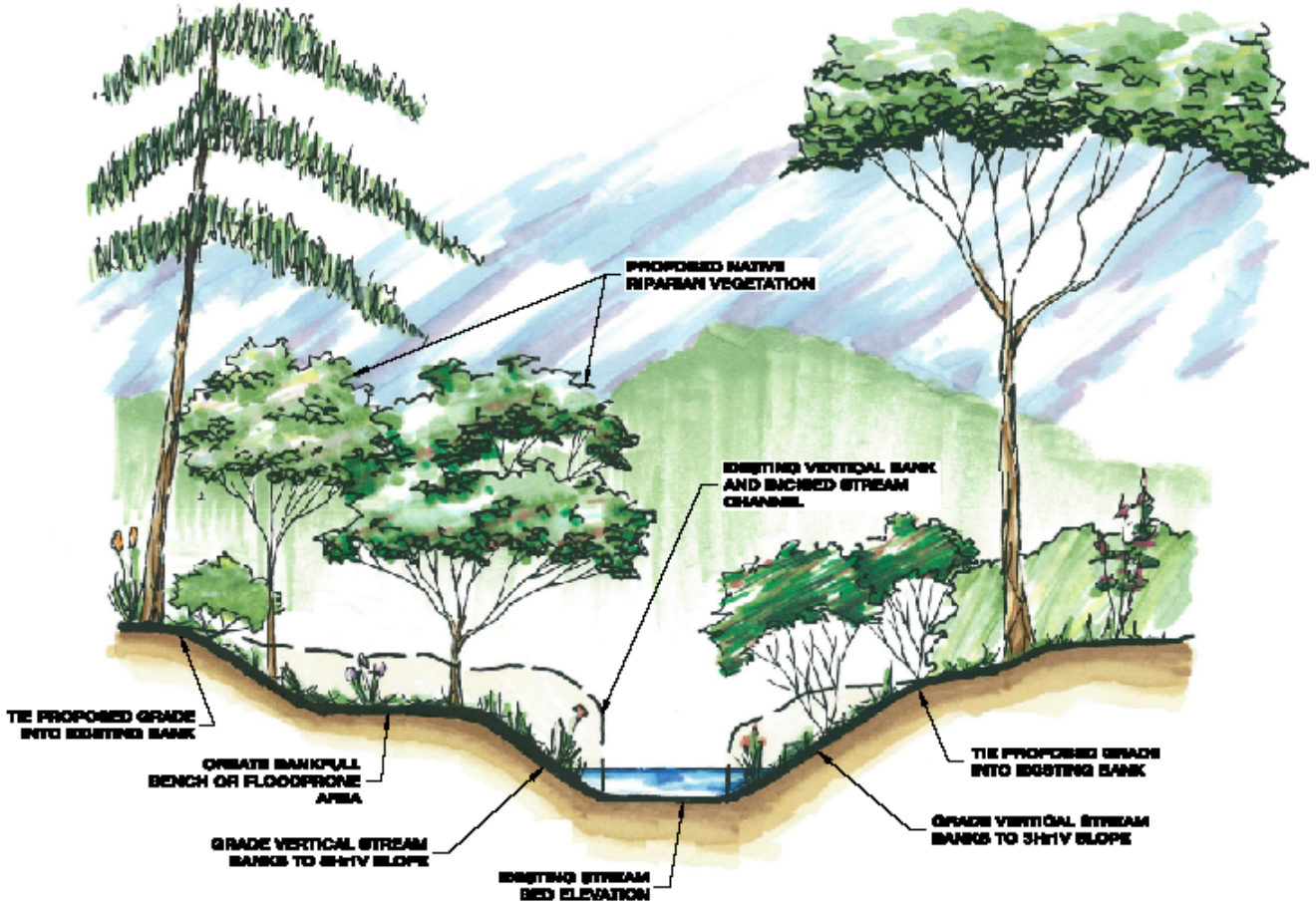


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FIGURE 4-4
STREAM ENHANCEMENT (PRIORITY 2 &3)
TYPICAL CROSS-SECTION

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Erosion Impacting Storm Drainage

Erosion within Drainage System

Lake and Channel Stabilization

Lake and Channel Stabilization

Case Study:
Cheatham Annex/Yorktown Fuels

- Alternative Prioritization Criteria
  - Fatal Flaws
    - Cultural Resource
    - Permit Requirements
    - Utility Conflicts
  - Flood Mitigation
  - Health/Safety

Non-Structural Alternative

- Material storage
- Nutrient management
- Forest management

Non-Structural Alternatives

- Demolition/Redevelopment
- Turf Management: Nutrient/Pest Management Plan
- Forest Land Management Plan
- Street Sweeping
- Catch Basin/Culvert Cleanout

Summary

- Benefits of Program
  - Uniform approach for multiple federal facility evaluations
  - Identify stormwater improvement alternatives
  - Prioritize alternatives
    - Environmental benefits
    - Environmental impacts
    - Constraints
    - Relative cost/benefit
  - Potential for trading within watershed

Questions and Answers

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