





Coping with Change: Strategies for GIS-based MS4 Permit Management

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Agenda

- Project Background
- Why GIS MS4 Management
- Project Goals
- Methods
- Conclusions / Next Steps

What is an MS4?

- **M**unicipal **S**eparate **S**torm **S**ewer **S**ystem
- System that is:
 - Owned by a public entity discharging to waters of the U.S.;
 - Designed / used to collect or convey stormwater
 - Not a combined sewer; and
 - Not part of a Publicly Owned Treatment Works (sewage treatment plant).

What is a TMDL?

- **T**otal **M**aximum **D**aily **L**oad
- Calculated maximum pollutant load a waterbody can receive and still safely meet water quality standards
- 1 water body can have multiple TMDLs
- Large concern on east coast is Chesapeake Bay TMDL

Why MS4 Management?

- Cumbersome data tracking and storage
 - Infrastructure
 - Inspections
- TMDL requirements for Chesapeake Bay
- Annual reporting requirements
- Why GIS?
 - Allows data to have a spatial component
 - Multiple queries at different geographic extents on same data

Current Research

Many Commercial, off the shelf solutions available

- Customized to MS4 (Predominately Phase 2)
- General Asset Management Software

Why aren't cities using these?

- Not customizable enough for individual needs
- Inputs are required from too many departments
- Duplicated entry into many systems
- High cost of implementation

Application Goals

- Implement database schema to house Bay TMDL and MS4 related data utilizing Arlington's MS4 Permit issues in June 2013 as a Template
- Design a front-end system for data entry
 - Limit tabular data viewing
 - Limit use of standard GIS tools
 - Utilize simple forms and tools
- Customizable “on-the-fly”
- Export reports / data in standardized formats (NEIEN)
- Web-based services to reduce data entry duplication

Study Area

- Norfolk, VA
- Phase I MS4
- Approx. 33,000 ac
- MS4 Area = 23,000 ac (70% of land area)
- 42% of land area is impervious
- Scheduled to receive updated MS4 Permit




Exclusion Type

-  Revised MS4 Permit Area  Excluded Land

Methods: Design data schema

- Utilized MS4 permit issued to Arlington, VA as template
- Identified over 52 tables and hundreds of attributes
- Created data schema for use in GIS software
- Split into sections corresponding with MS4 Permit headings


COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

Permit No.: VAS00079
Effective Date: June 25, 2013
Expiration Date: June 25, 2018

AUTHORIZATION TO DISCHARGE UNDER THE VIRGINIA STORMWATER MANAGEMENT PROGRAM AND THE VIRGINIA STORMWATER MANAGEMENT ACT

Pursuant to the Clean Water Act as amended and the Virginia Stormwater Management Act and regulations adopted pursuant thereto, the following permit is authorized to discharge in accordance with the effluent limitations, monitoring requirements, and other conditions set forth in this permit.

Permittee: Arlington County
Facility Name: Arlington County Municipal Separate Storm Sewer System
County Location: Arlington County is 38 square miles in area and is bounded by the Potomac River to the North and East, the City of Alexandria to the South, and Fairfax County to the West and South.


The owner is authorized to discharge from municipal owned storm sewer outlets in the surface waters in the following watersheds:

Watersheds: Stormwater from Arlington County discharges into four (4) major hydrologic units: PL23 (Potomac River-Matias Run-South Run), PL24 (Potomac River-Front Run), PL25 (Potomac River-Fourmile Run), PL26 (Cottrell Run).

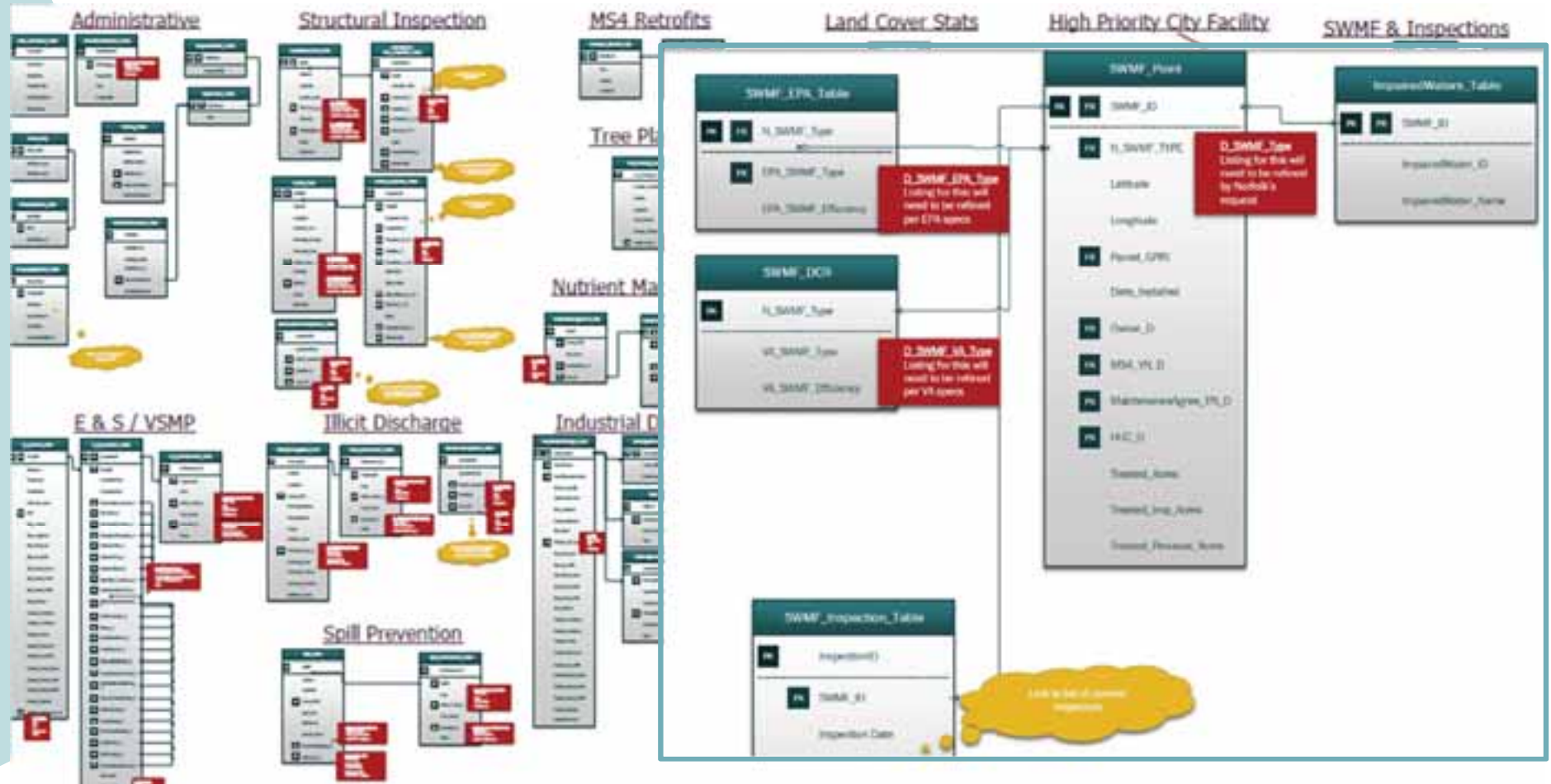
There are 11 major watersheds: Oak Branch, Oxenlow Run, Potomac River (A), Windy Run, Spout Run, Coburn Village-Rocky Run, Potomac River (B), Four Mile Run contains the following major streams: Lower Long Branch, Cedar's Branch, Labadie Run, and Upper Long Branch, Little Front Run, Front Run, and Roanoke Run.

Flow Basin: Potomac
Subbasin: 5, 7, 8
Channel: R, S
Special Standards: 5

The authorized discharge shall be in accordance with this cover page, Part I - Authorization, Effluent Limitations and Monitoring Requirements and Part 2 - Conditions Applicable To All VSMW Permits, as set forth herein.


Director, Department of Conservation and Recreation
June 26, 2013
Date

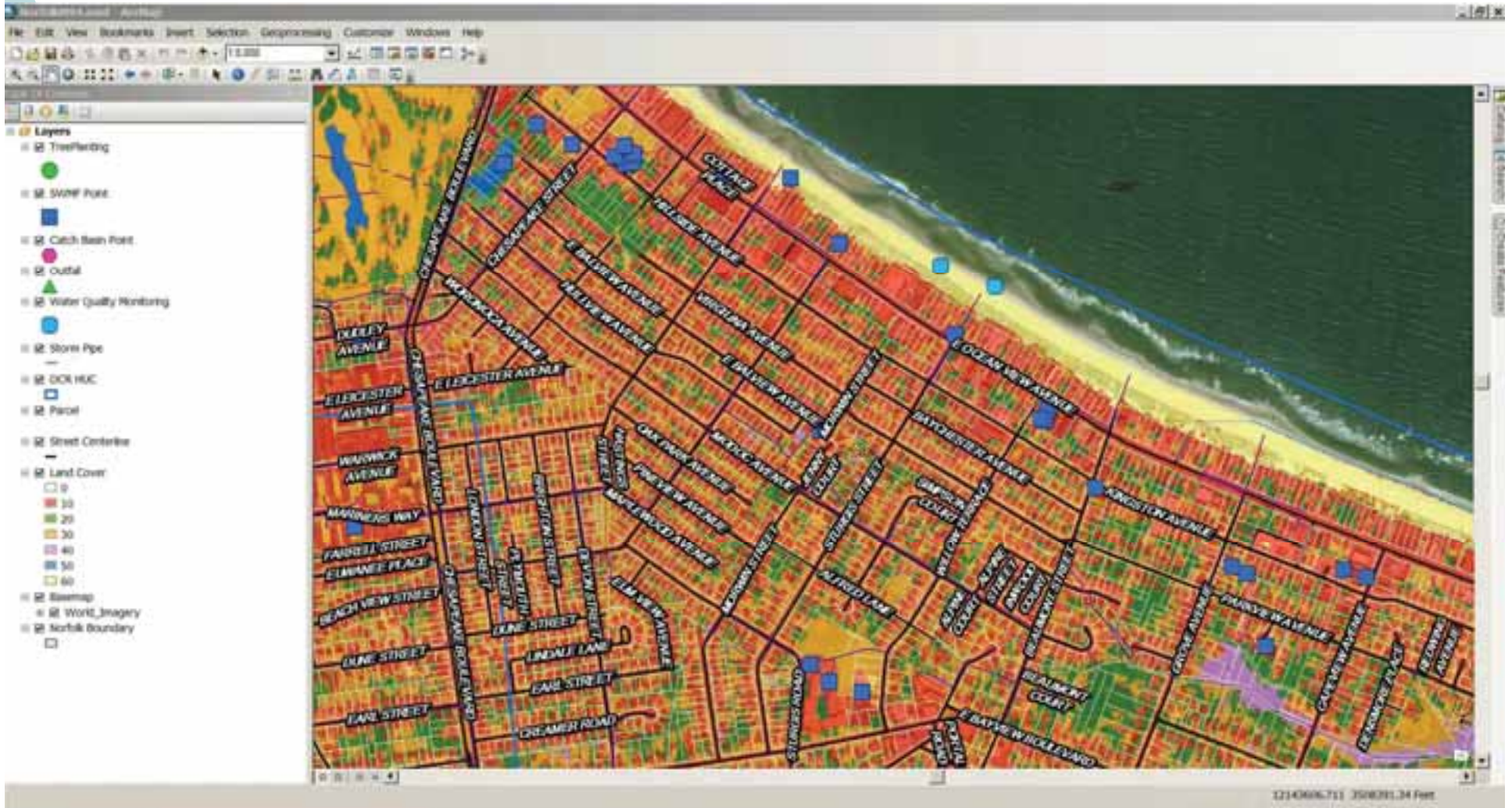
Draft data schema



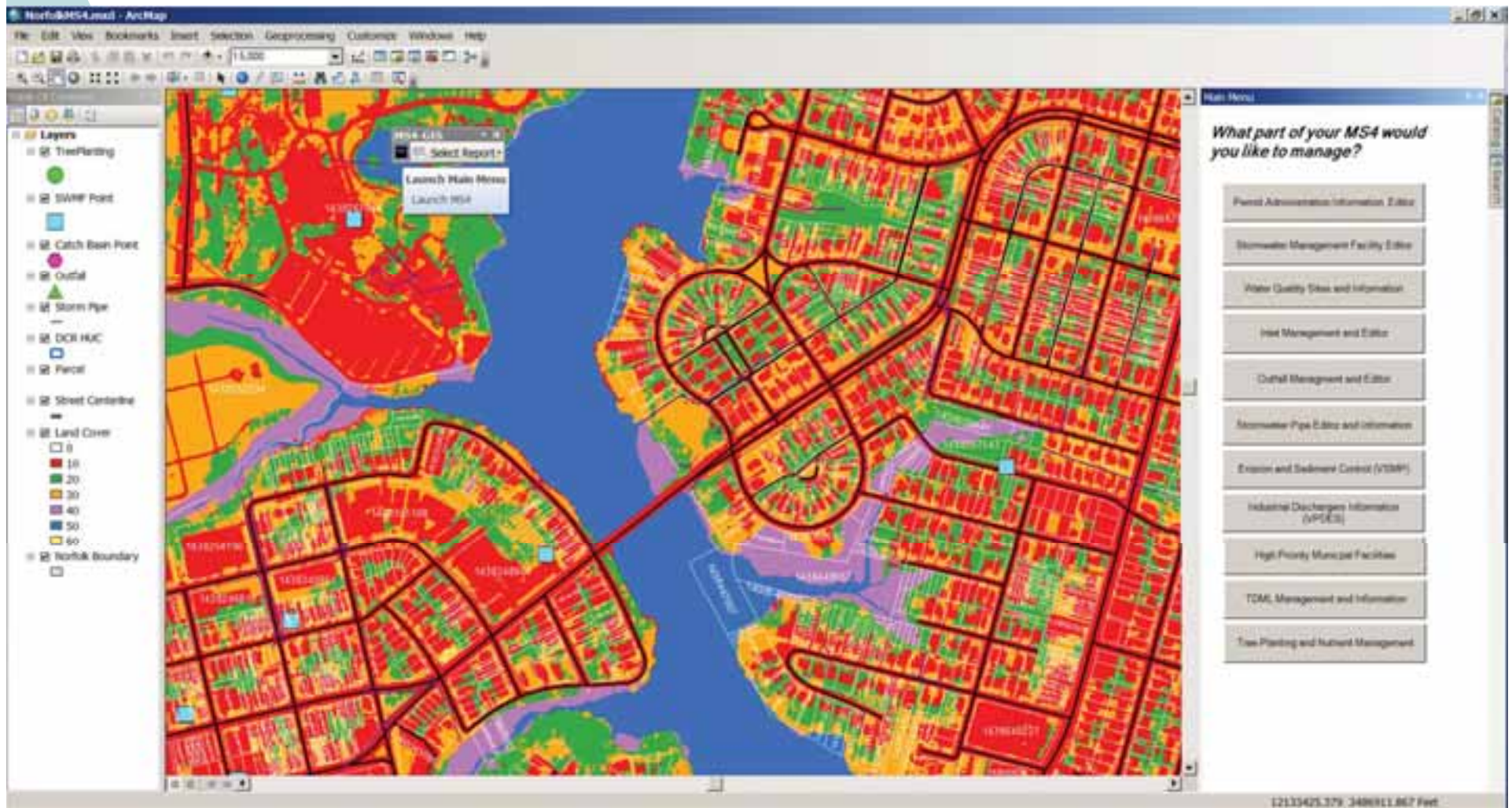
Methods: Design Application

- ArcGIS Desktop Add-in designed in Visual Studio 2010
- Windows Forms for data Entry
- ArcGIS Server versioned feature services
- Users are able to:
 - edit information,
 - create reports, and
 - modify the database with little to no ArcGIS experience
- Add-in is compatible with ArcGIS 10.1 and higher

Application Video Demo:



Highlights



Conclusions / Lessons Learned

- Early stakeholder involvement is key
- No “*one-size fits all*” solution to Phase I MS4 permit data management
 - Standardized software
 - Flexibility in implementation
- Simpler solutions are better, but more time consuming to create upfront

Next Steps

- Continue to refine data model to meet Norfolk's needs
- Finalize application
 - Help documentation
 - Fix any remaining issues
- Create web application with similar functionality
 - Field use for real-time editing of inspections and other data
 - Eliminate data entry duplication
 - Additional accessibility



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Questions?

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