Mayor Kasim Reed

City of Atlanta
Green Infrastructure Initiative
Incorporating GI into Watershed Improvement Plans

SESWA 2016 Annual Conference

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Department of Watershed Management

10/25/2016

Agenda

- Background on the GI program
- Overview of Atlanta watersheds
- Adding GI to WIP Process

What is Green Infrastructure?

Gray vs. Green

Slow, Infiltrate, and Clean Stormwater

Reduce impervious surfaces

Promote infiltration

Types of Green Infrastructure

Natural Green Infrastructure

- Wetlands
- Floodplains
- Forests
- Stream Buffers

Engineered Green Infrastructure

- Bioswales
- Rain Gardens
- Permeable Pavements
- Green Roofs

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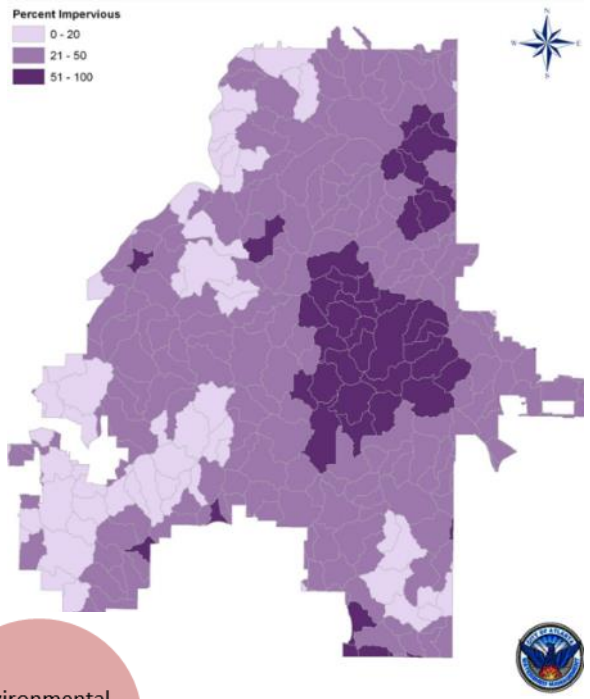
Why Green Infrastructure in Atlanta?

- **Environmental Protection**
  - *Improves water quality*
  - *Supports Mayor Reed's sustainability initiatives*
- **Compliance**
  - *NPDES permit – Removing Barriers*
  - *Prepares the City for potential changes in federal stormwater rules*
  - *CSO Permits*
- **Community**
  - *Addresses drainage issues in redeveloping historic neighborhoods*
  - *Maximizes infrastructure investments by further reducing combined sewer overflows and flooding*



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Pioneer Projects 1990s-2011

Green Roof - Atlanta City Hall

Cistern & Green Roof - Southface

Bioretention - Adair Park

Bioretention - 14th St DWM office

Bioswale - Fernbank Museum

Porous Concrete - Felder St

Pervious Pavers - English Park

Wet pond, wetlands bench, sewer capacity relief, urban reforestation - Historic Fourth Ward

Bioswale - Klaus Building - GT campus

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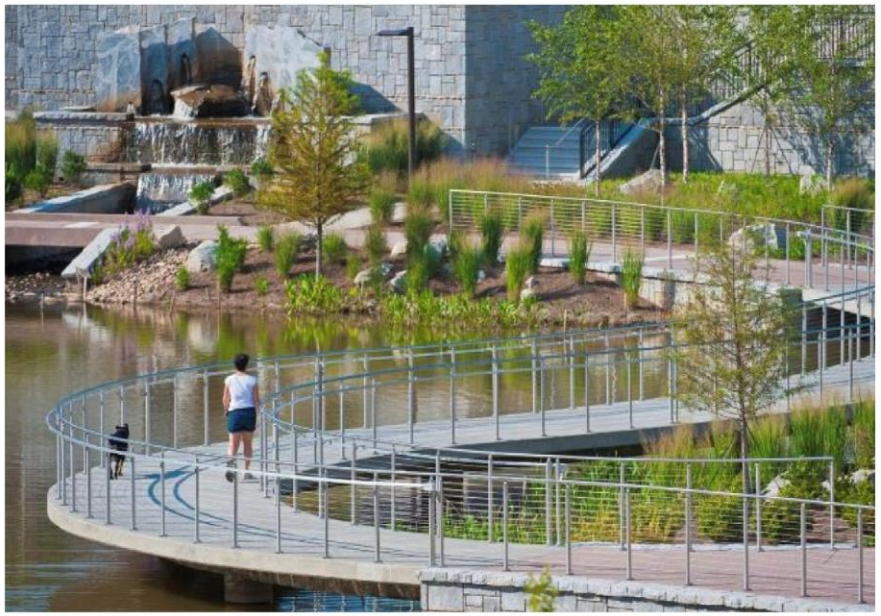
Focus and Commitment of Using GI

An Emerging GI Leader

- Post-development Stormwater Management Ordinance
- SE Atlanta GI Initiative
- Historic Fourth Ward Park
- Technical GI Training and Outreach Program
- Internal and External Partnerships

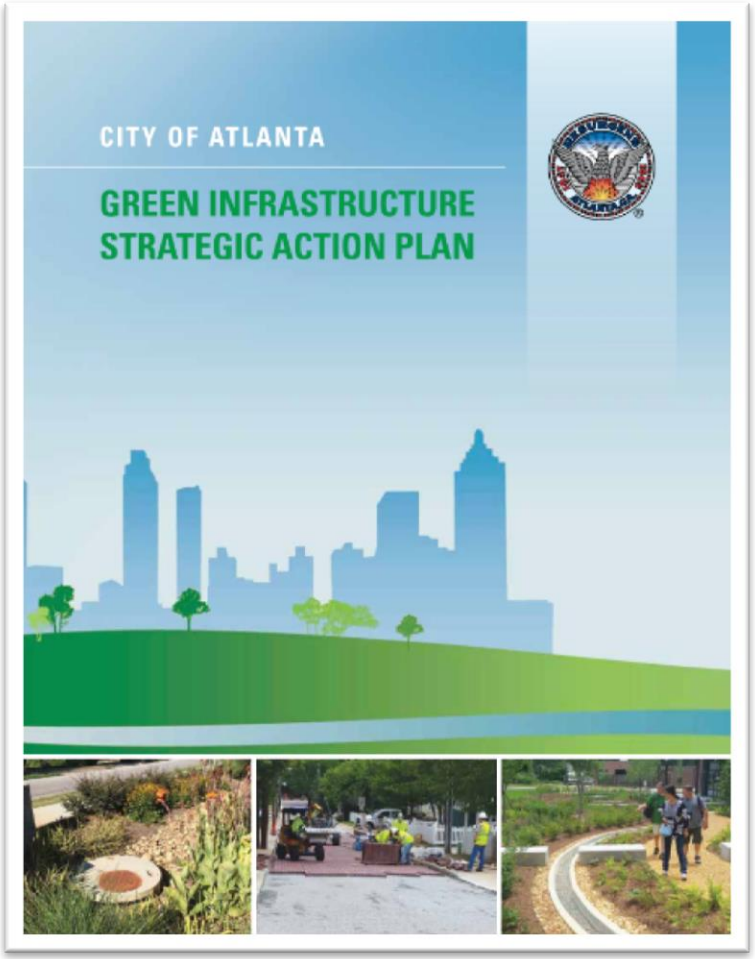


Ordinance recently awarded the Metropolitan North Georgia Water Planning District STREAM Award

GI Action Plan

Key actions:

- Project Implementation
- Policy, funding, and planning
- Partnering and outreach
- Data tracking and technical analysis



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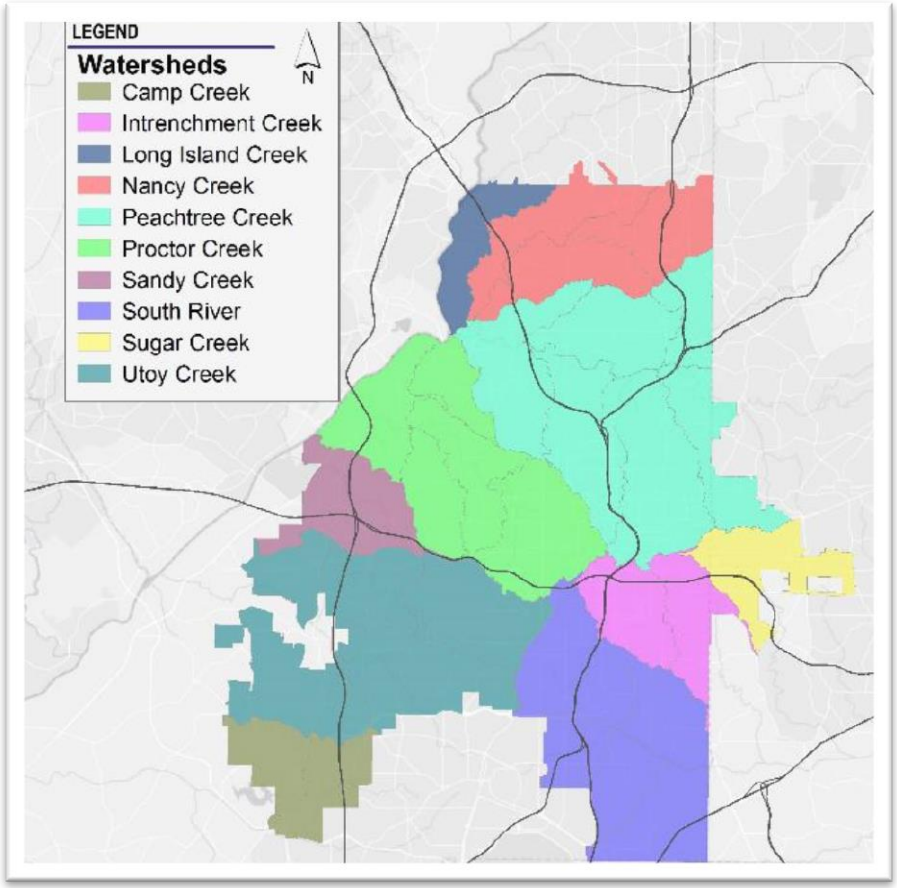
WIPs and the GI Action Plan

- The first component of the Action Plan is Project Implementation
- Prior to implementation Projects must first be identified
  - **WIPs provide the opportunity to review entire watersheds and site potential GI projects**

Atlanta Watersheds

- City Extents
  - 136 mi^2
- Watersheds
  - Divided into 10 primary watersheds
  - 7 watersheds flow west into the Chattahoochee and eventually to the Gulf of Mexico
  - 3 watersheds flow east into the South River and eventually the Atlantic Ocean
- WIPs completed for 3 watersheds and underway for the remainder of the watersheds



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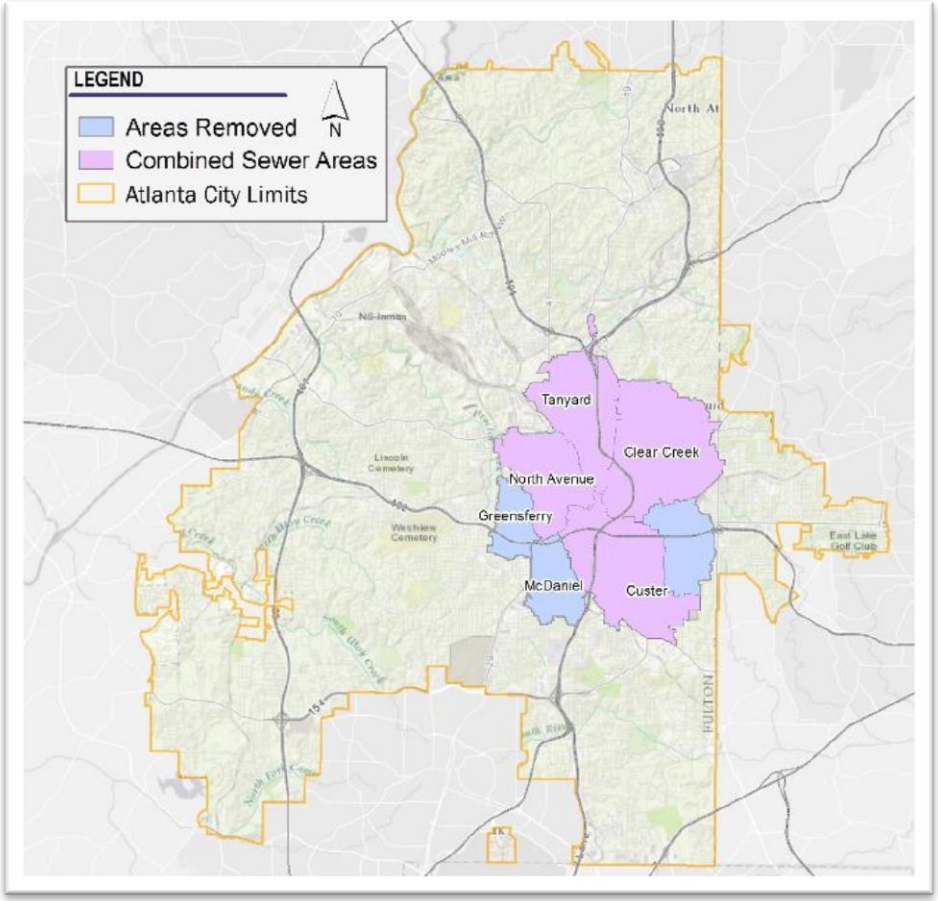
Combined Sewer Areas

- Combined sewer areas:
  - Originally 6 CSAs
  - 2 have been separated
  - A portion of one has been separated
- CSAs cover ~15 mi^2 or 11% of the city area.



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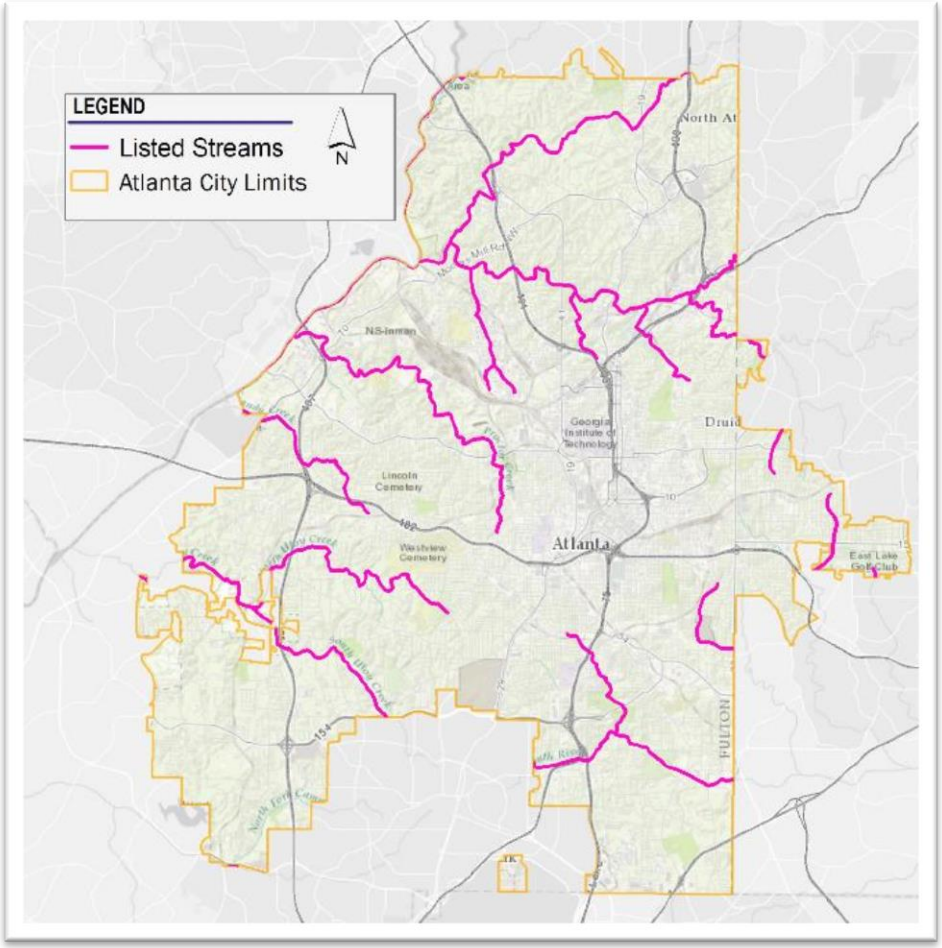
303d/305b Listed Streams

- 22 listed stream segments
- 71 miles of listed streams
- All listed for fecal coliform
- Several listed for Biota-M and Biota-F



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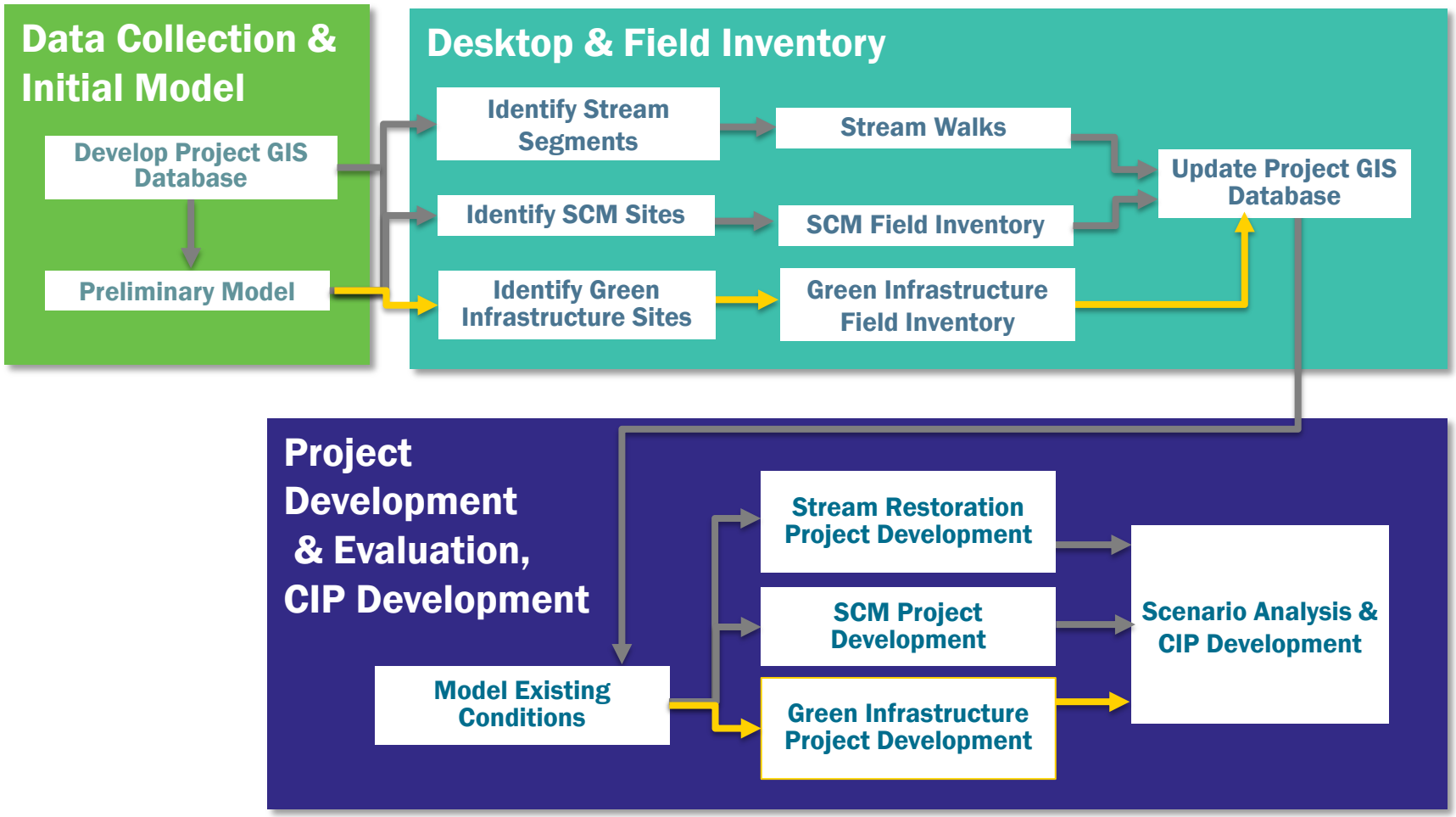
Watershed Improvement Plan

- A plan focused on improving water quality in a watershed. Plans generally include:
  - An assessment of the water quality in the study area
  - Development of actions to improve water quality:
    - Specific watershed improvement projects (stream restoration, stormwater ponds or green infrastructure)
    - Programmatic items (street sweeping, SSOs, utility crossings, etc.)
- Many communities need to develop watershed plans as a result of TMDLs, NPDES requirements or other water quality related objectives.

Overview of WIP Process

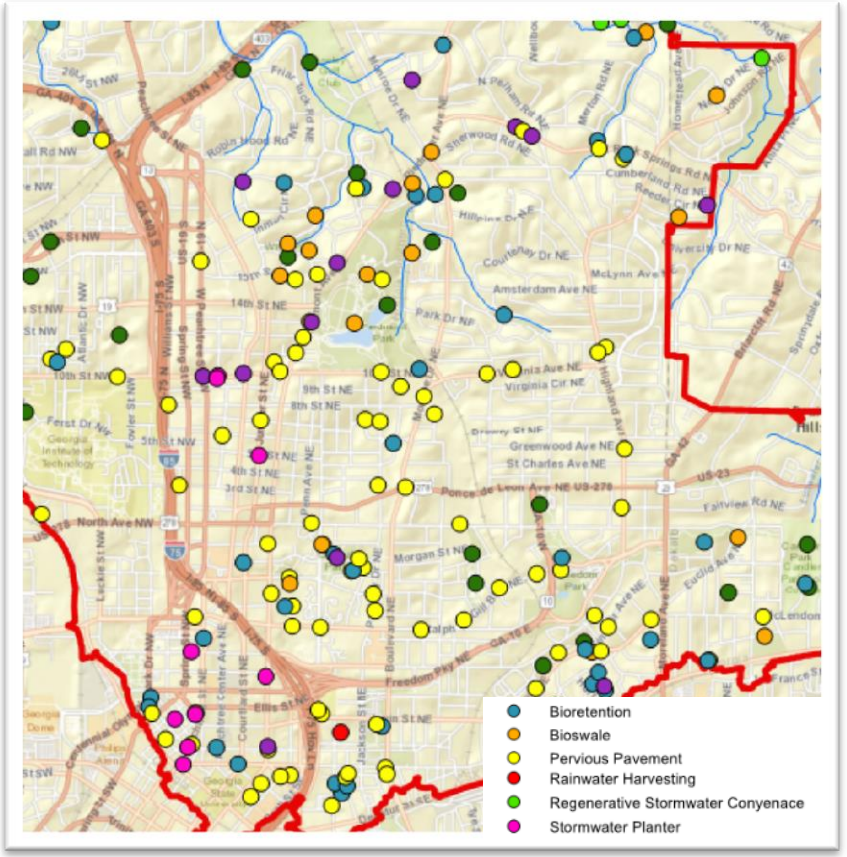
- Key WIP Components
  - Data Collection
  - Field Inventory
  - Project Development & Evaluation
  - Modeling
  - CIP Development
- Traditionally WIPs focused on stream restoration and larger stormwater structural controls

WIP Process


Data Collection & Initial Model
Develop Project GIS Database
Preliminary Model
Desktop & Field Inventory
Identify Stream Segments
Stream Walks
Identify SCM Sites
SCM Field Inventory
Identify Green Infrastructure Sites
Green Infrastructure Field Inventory
Update Project GIS Database
Project Development & Evaluation, CIP Development
Model Existing Conditions
Stream Restoration Project Development
SCM Project Development
Green Infrastructure Project Development
Scenario Analysis & CIP Development

Incorporating GI into WIPs

- Over the course of the past several years, the WIP Process in regard to GI siting and project development has been refined
- Initial WIP
  - Sited 9 GI projects (0.5 projects/mi^2)
  - Based primarily on previously identified projects and drainage complaints
- Most Recent WIP
  - Sited 252 GI Projects (8.1 projects/mi^2)
  - More comprehensive siting process
  - Also, more detailed conceptual project development



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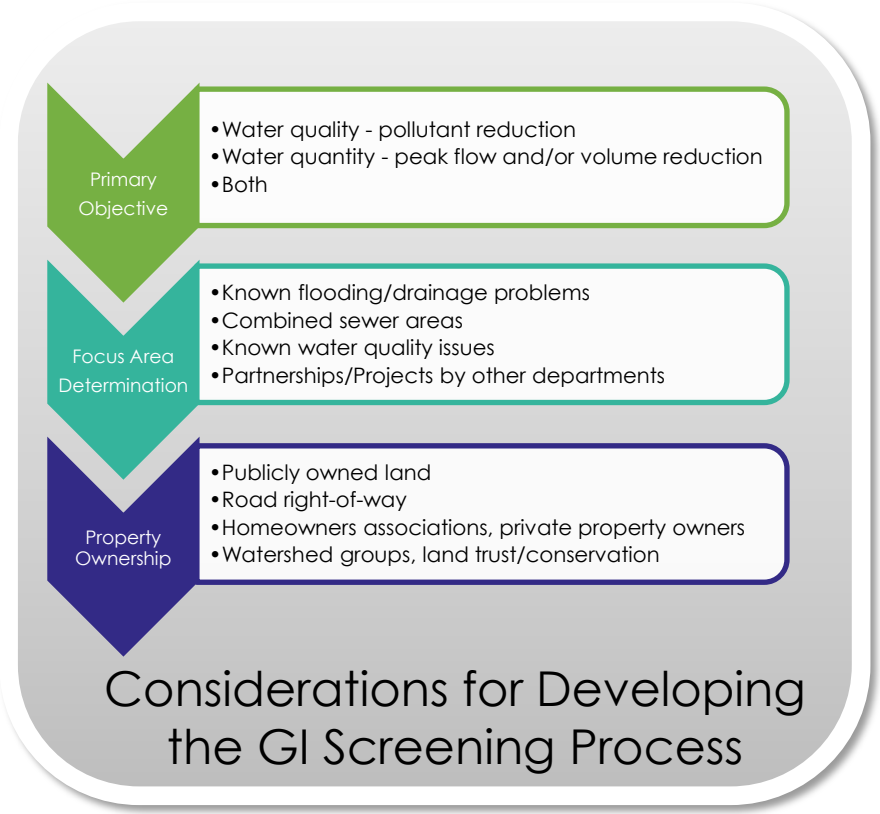
Determining Locations for Siting GI

- Due to small size, GI may be sited in numerous locations
- Worked to develop a process for determining siting locations
  - referred to as GI screening

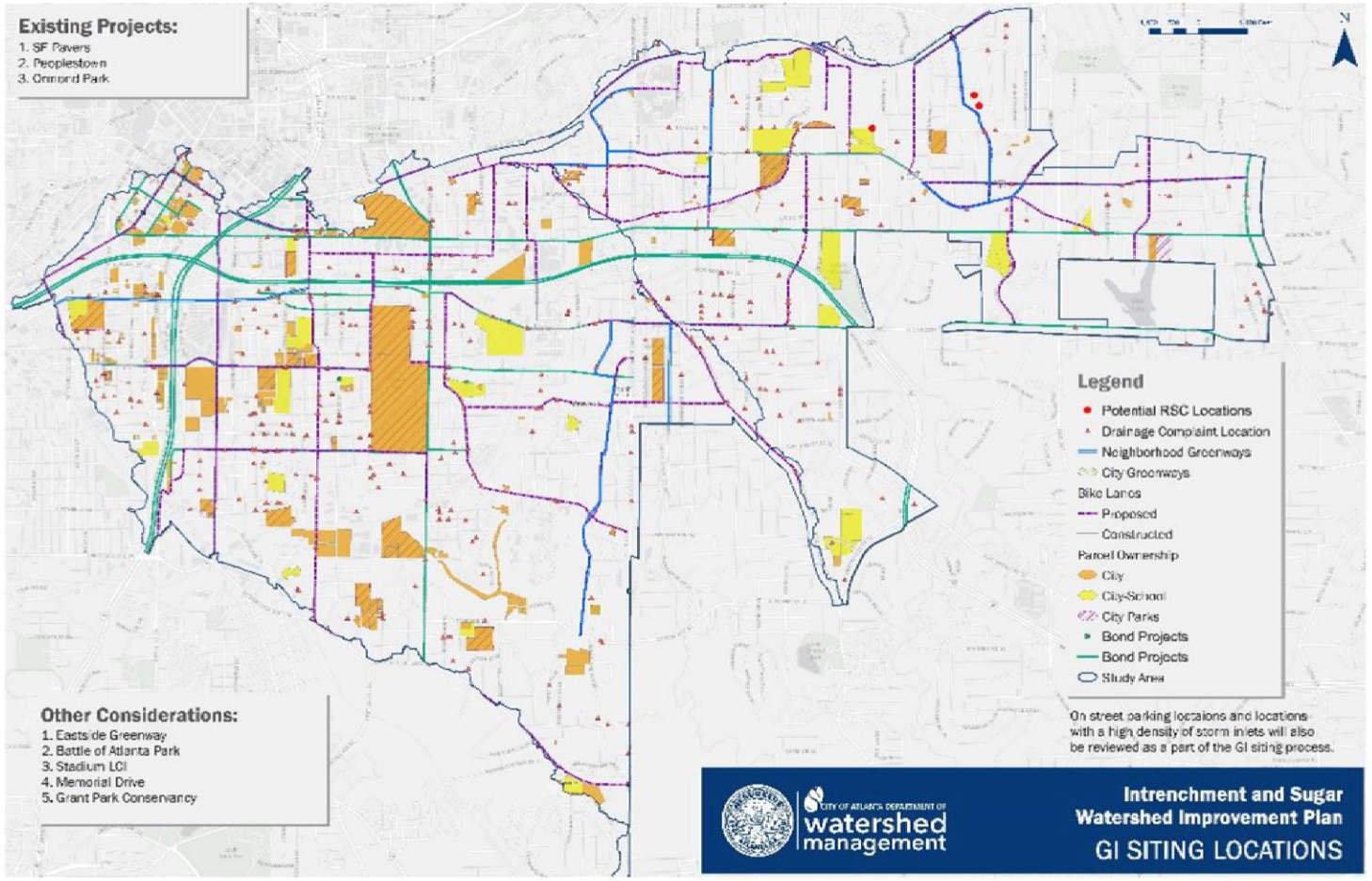


Considerations for Developing the GI Screening Process

GI Screening

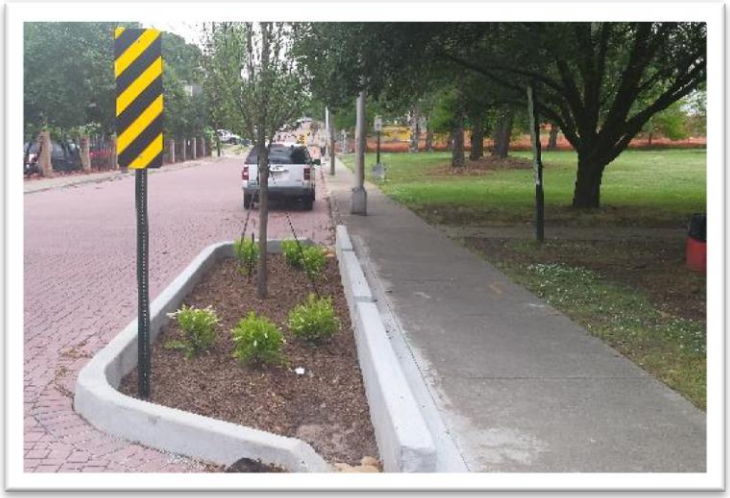
- City owned property (including Atlanta Public Schools)
- Proposed bike lanes based on the Connect Atlanta Plan
- Areas of on-street parking
- Areas with a high density of stormwater inlets
- Drainage complaint locations
- Bond project data (planned projects from other departments)
- Watershed specific partnerships, existing plans and studies

Example GI Screening Map



Siting Process

- Review all the locations developed as a part of the GI Screening
- Site Considerations:
  - Treat as much impervious or disturbed pervious area as possible
  - Work with existing drainage patterns/storm sewer
  - If possible, avoid utilities and trees
  - Look for site characteristics that lend themselves to being converted to GI measures

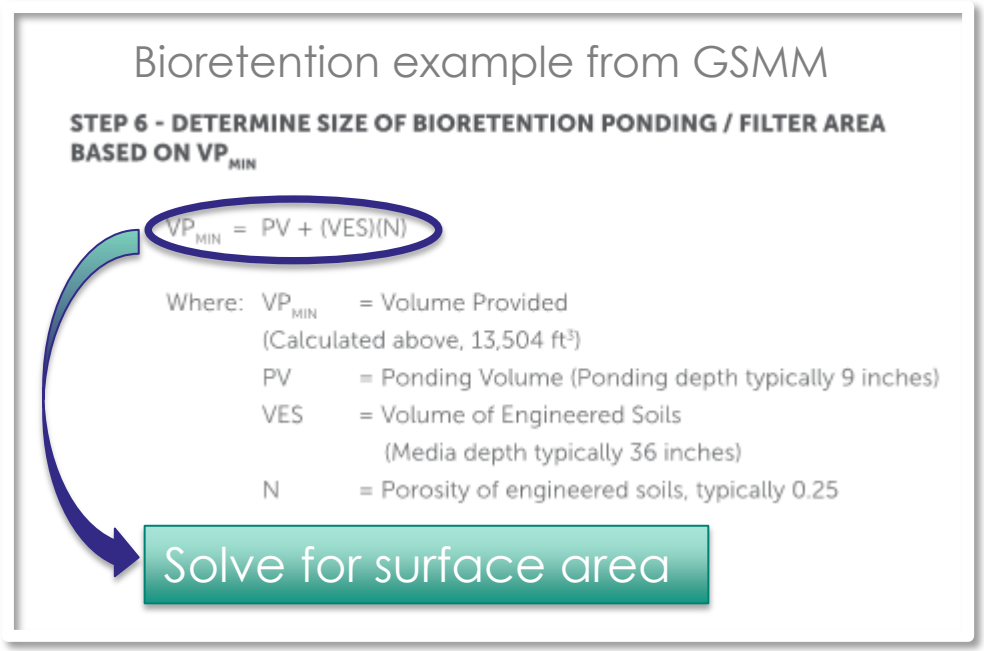


Types of GI Projects

- Focused on engineered GI:
  - Bioretention
  - Bioswale (enhanced swale)
  - Pervious pavement
  - Cisterns
  - Regenerative Stormwater Conveyance
  - Stormwater Planters

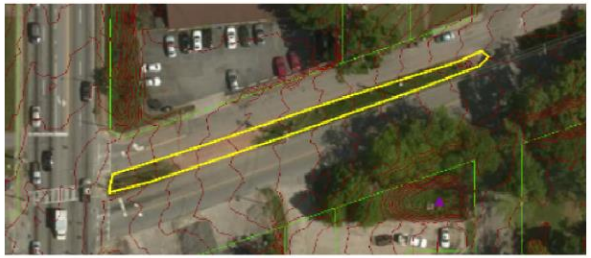
Desktop Project Development

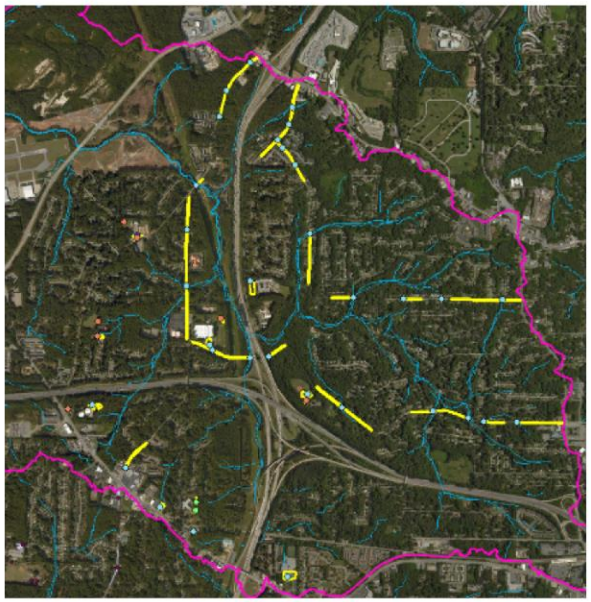
- Determine drainage area and runoff volume
- Select project type
  - Site characteristics
  - Pollutant removal
- Use guidance in the Georgia Stormwater Manual to back out the needed footprint for project
- Develop polygon footprint based on calculated size



Desktop Siting

- Size project to treat runoff volume if possible
  - Adjust ponding depth and/or media depth if needed
- Note site questions for field review
- Repeat process for entire study area





Field Review & Evaluation

- 2-person teams visit each project
- Collect standard information at each site
- Mobile data collection
  - i-Pad mini with Fulcrum app
- Field sheet for each project
  - Quick mark up of site conditions, flow paths
  - Footprint modifications

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Field Data Collection

- Project type
  - Determine if assigned project type is suitable for site
- Project Recommendation
  - Are site drainage patterns the same as shown in GIS?
  - Will runoff go to proposed project? What needs to be done to get water to the proposed project?
  - Can additional areas be added? Roof drains, etc.?
  - Any site characteristics that will affect the project or make it difficult to build?
- Desktop notes
  - Address questions from desktop notes
- Standard Photos
  - Downstream across site
  - Upstream across site
  - Upstream /Area draining to project
  - Downstream of proposed project

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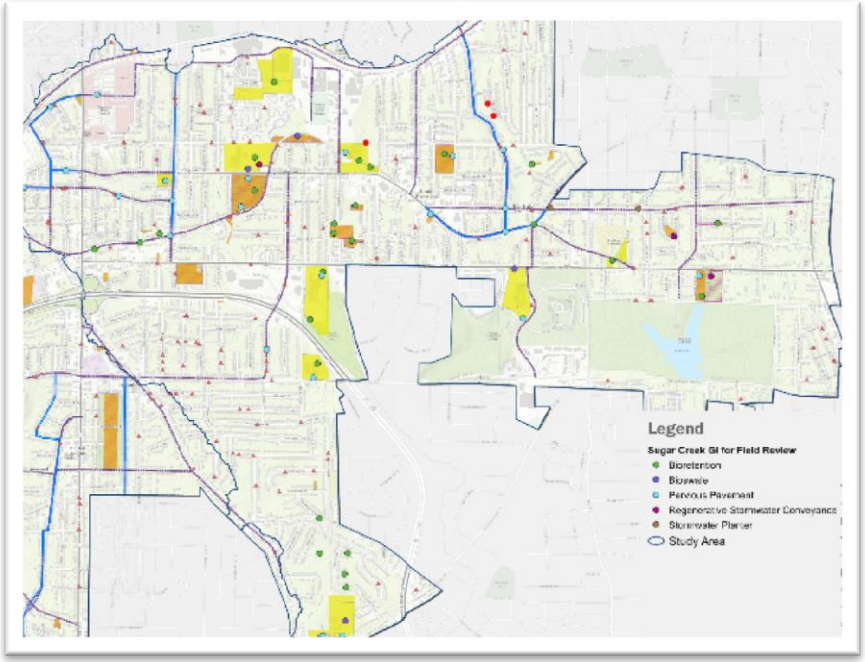
Project Refinement

- Refine project concept:
  - Remove unsuitable projects
  - Edit and modify other projects based on field evaluation
- Develop information needed to :
  - Calculate pollutant removal
  - Estimate Project Cost
  - Assign Project Score



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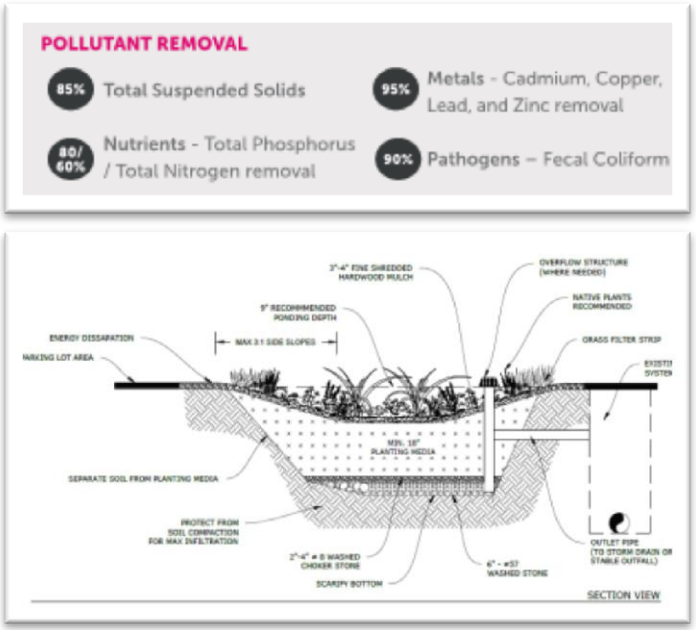
Project Pollutant Removal

- Assigned based on project type
- Prorated for projects that don't treat full volume
- Water Quality model used to determine average annual pollutant removal for each project
  - Fecal Coliform
  - TSS

Bioretention Example from GSMM



GI projects assigned Pollutant removal based on project type and storage volume

Planning Level Project Cost

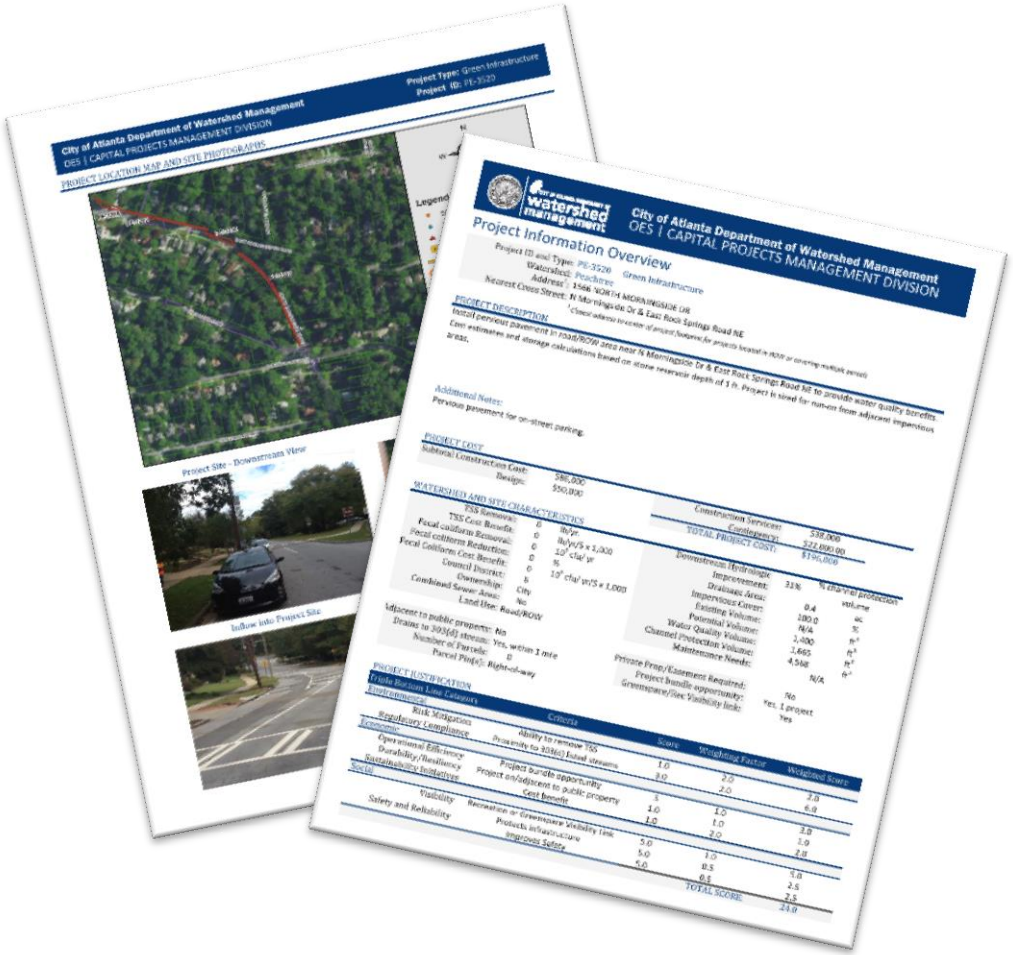
- Construction Cost based:
  - Type of project
  - Project size
- Percent of Construction Cost:
  - Erosion Control
  - Mobilization/Demobilization
  - Traffic Control
  - Design and Permitting
  - Contingency

Project Evaluation Score

	Score	Weight	Range
Environmental			
Pollutant Removal	1-5	2	2-10
Proximity to listed streams	1-5	2	2-10
Economic			
Bundle with other projects	1-5	1	1-5
Public land	1-5	1	1-5
Cost benefit	1-5	2	2-10
Social			
Greenspace link	1-5	1	1-5
Improves Safety	1-5	0.5	0.5-2.5
Protects existing infrastructure	1-5	0.5	0.5-2.5
Project Evaluation Score			10-50

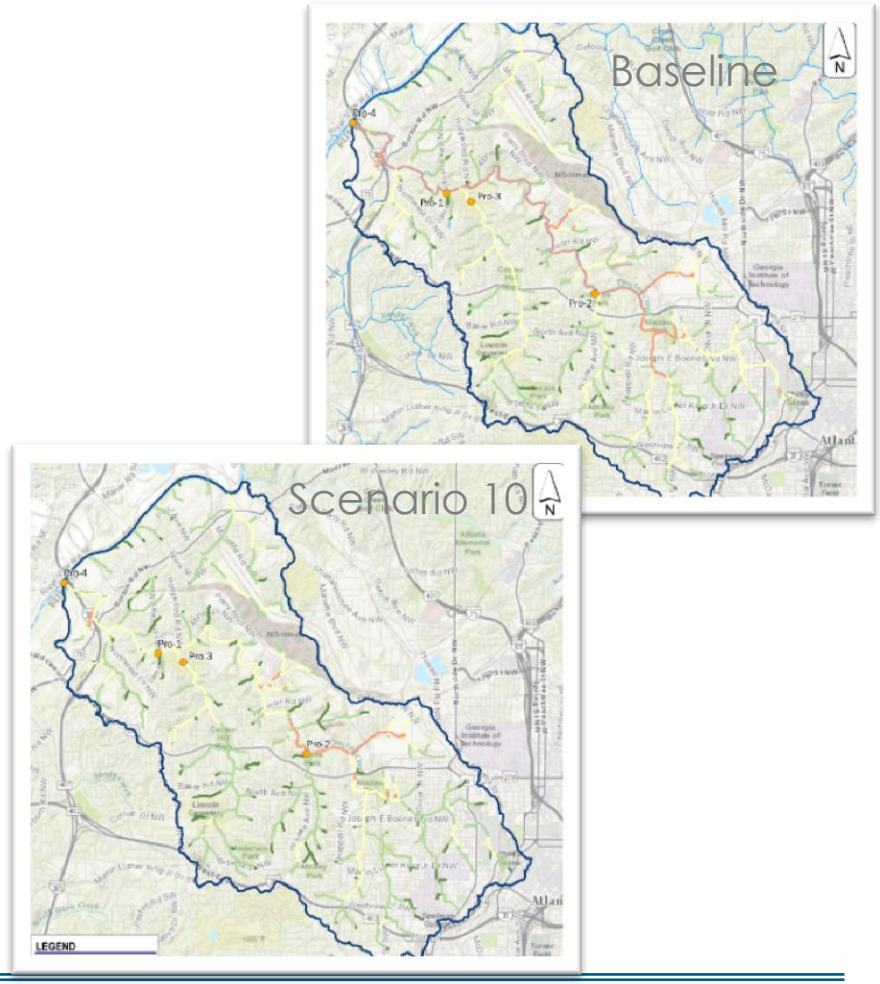
Finalize Project Concept

- 2-page summary sheets developed for each project
- Includes:
  - Project Description
  - Cost
  - Watershed and Site Characteristics
  - Project Benefits
  - Project Evaluation Score
  - Site Map and Photos



Examples of Modeling Scenarios

- Scenario 1 – Baseline Conditions
- Scenario 2 - Existing Conditions
- Scenario 3 –Retrofit/Redevelopment
- Scenario 4 – Green Infrastructure (GI)
- Scenario 5 – Street Sweeping
- Scenario 6 – SCM and Stream Restoration Projects
- Scenario 7 – Sanitary Sewer Overflow (SSO) Reduction
- Scenario 8 – Combined Sewer Overflow (CSO) Reduction
- Scenario 9 – Publicly Owned Land
- Scenario 10 – Combination of Publicly Owned Land and Highest Scoring Projects



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Benefits of GI in WIPs

- It's a logical addition - another tool in the tool box for WIP development
- Fits into the City's Goals of being a leader in GI
- Provides a comprehensive review of watersheds for potential GI locations
- Provides the City with a large list of potential projects that can be compared based on evaluation score, benefits and estimated project cost

Questions?

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