BIOLOŠKE VODOGRADNJE

P6

EKOLOŠKO UREĐENJE I OBNOVA VODOTOKA

Primjeri eko-obnove vodotoka

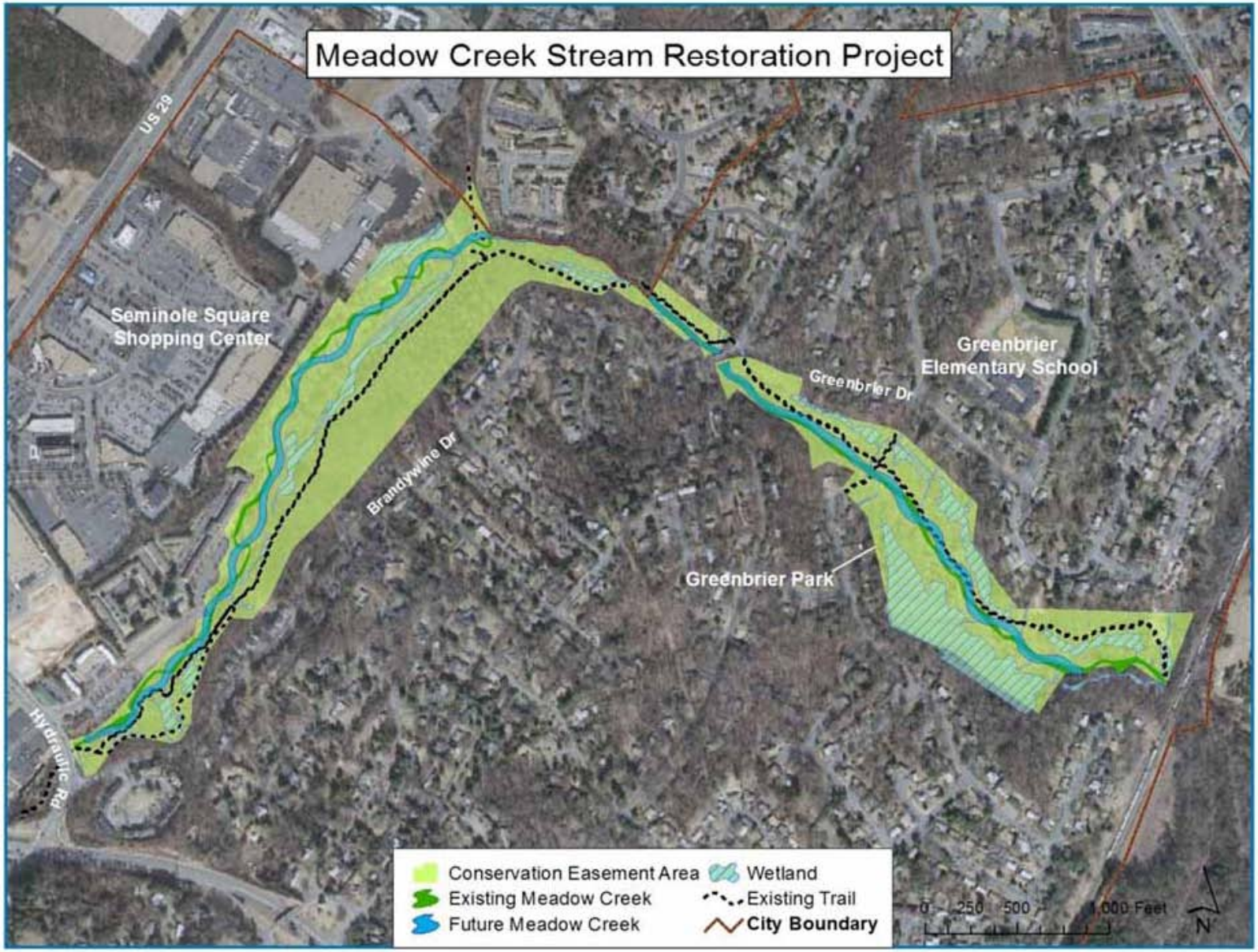
Meadow Creek

Stream Restoration Project

Outline

- Project Overview
- Project Goals
- Approach and Design
- What to Expect During Construction
- Questions
- Displays

Project Overview


Meadow Creek Stream Restoration Project
US 29
Seminole Square
Shopping Center
Brandywine Dr
Greenbrier Dr
Greenbrier
Elementary School
Greenbrier Park
Hydraulic Rd
Conservation Easement Area
Existing Meadow Creek
Future Meadow Creek
Wetland
Existing Trail
City Boundary
0 250 500 1,000 Feet
N

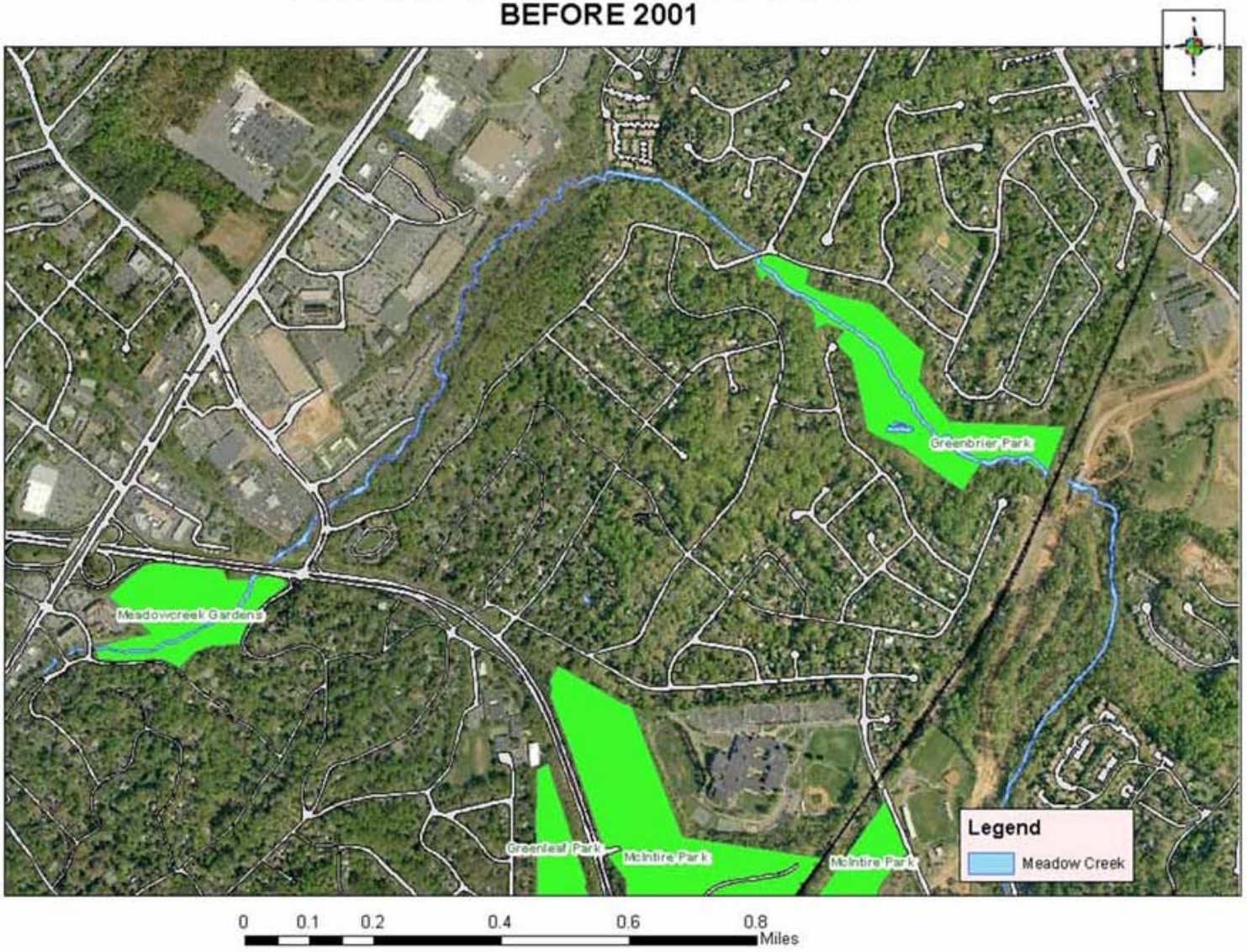
Project Elements

- Stream Channel
  - Improve stream habitat
  - Improve water quality
  - Restore stability
- Stream Buffer
  - Improve forest habitat
  - Invasive species management
  - Native plantings
  - Enhance floodplain storage
- Expansion and protection of park land
- Enhance recreation and education
- Protection of infrastructure

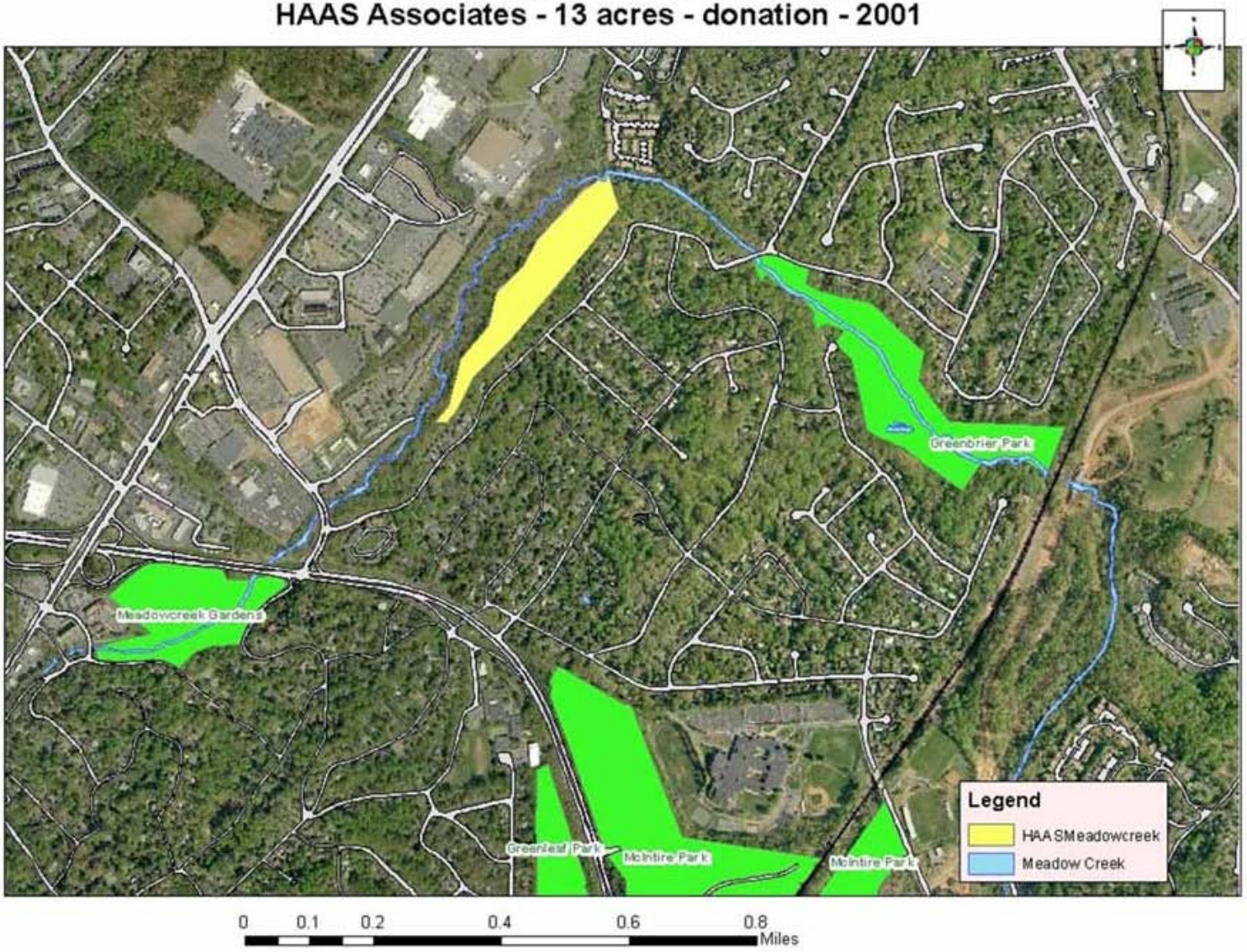
Expansion and Protection of Parkland

- 40 acres of new parkland
- Permanent conservation easements
  - Designed to ensure property remains forested and natural
  - Recreational uses permitted
  - New pervious trails permitted
  - No subdivision, buildings, commercial or agricultural use
  - No destruction of vegetation (e.g., mowing/clearing), with limited exceptions
- Permanent trail system

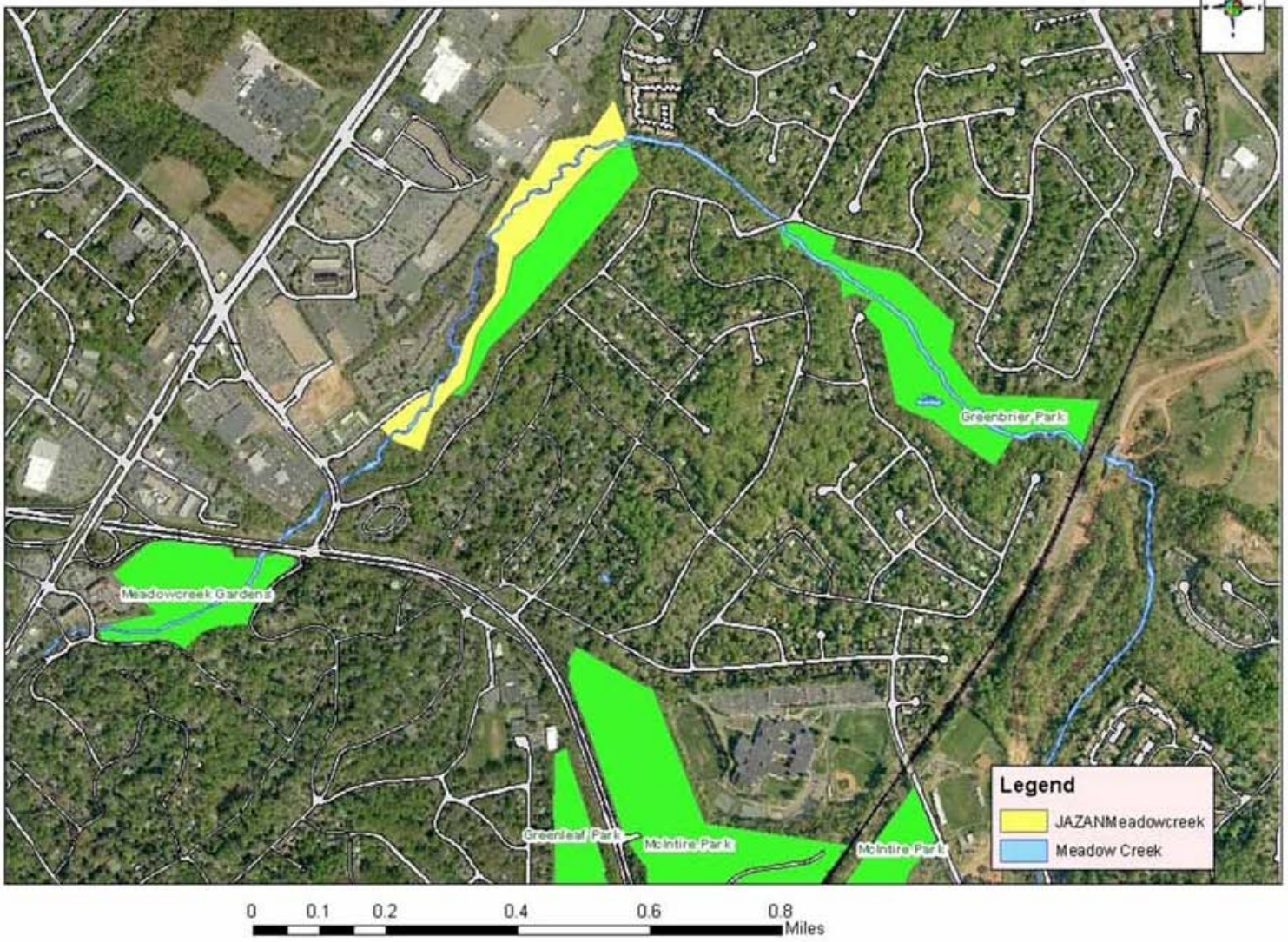
Parkland Acquisitions - Meadowcreek West
BEFORE 2001



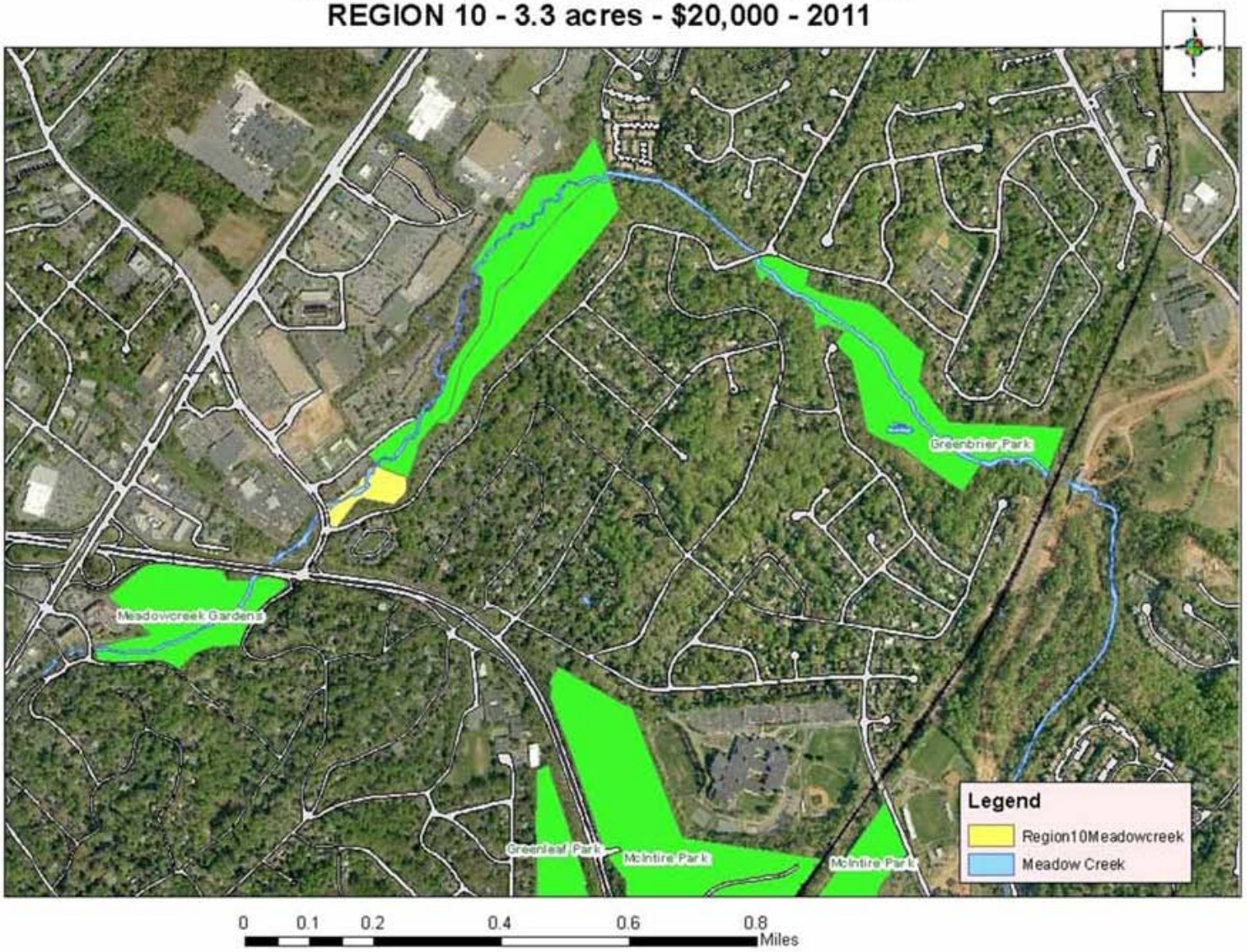
Parkland Acquisitions - Meadowcreek West
HAAS Associates - 13 acres - donation - 2001



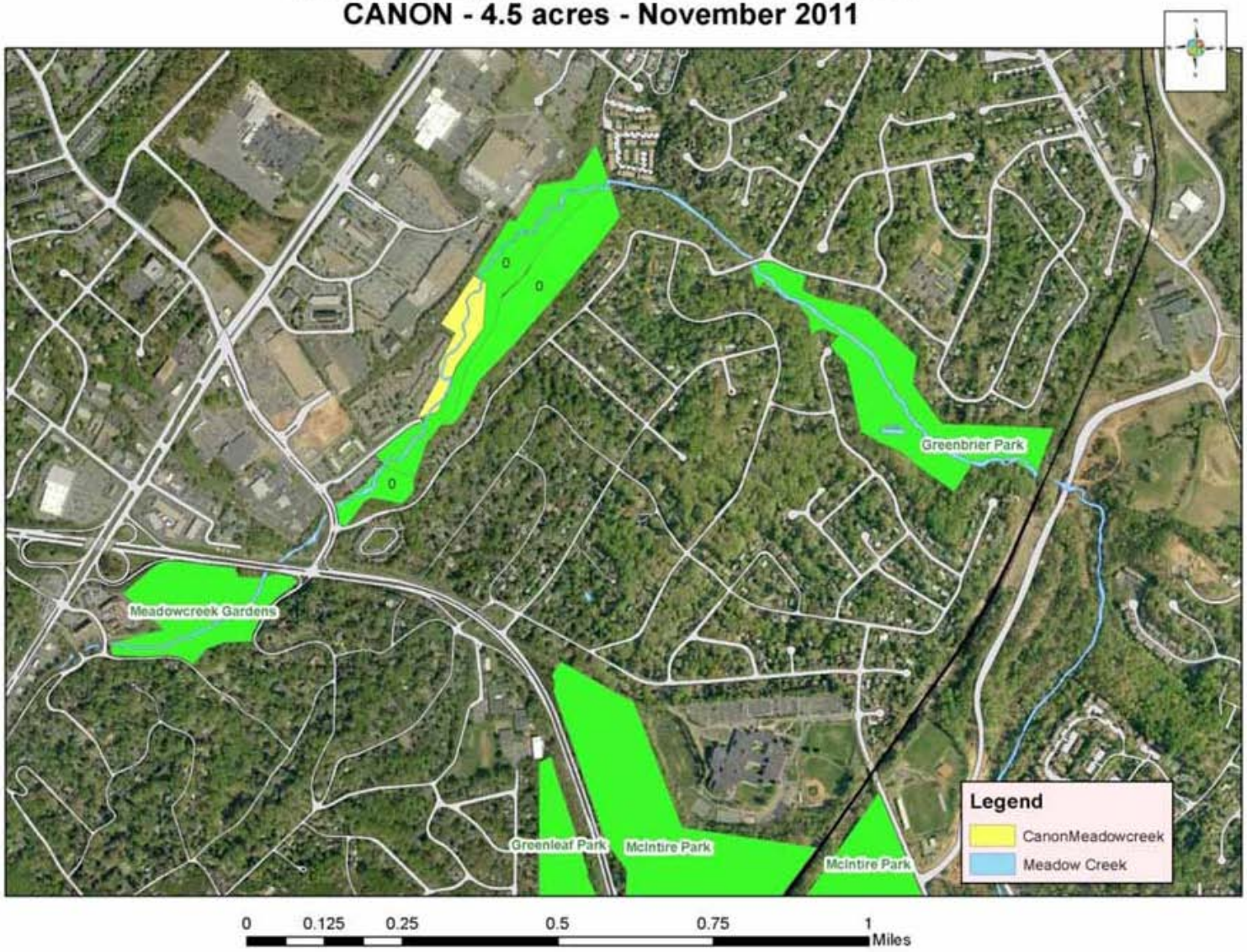
Parkland Acquisitions - Meadowcreek West
JAZAN - 18 acres - donation - 2009



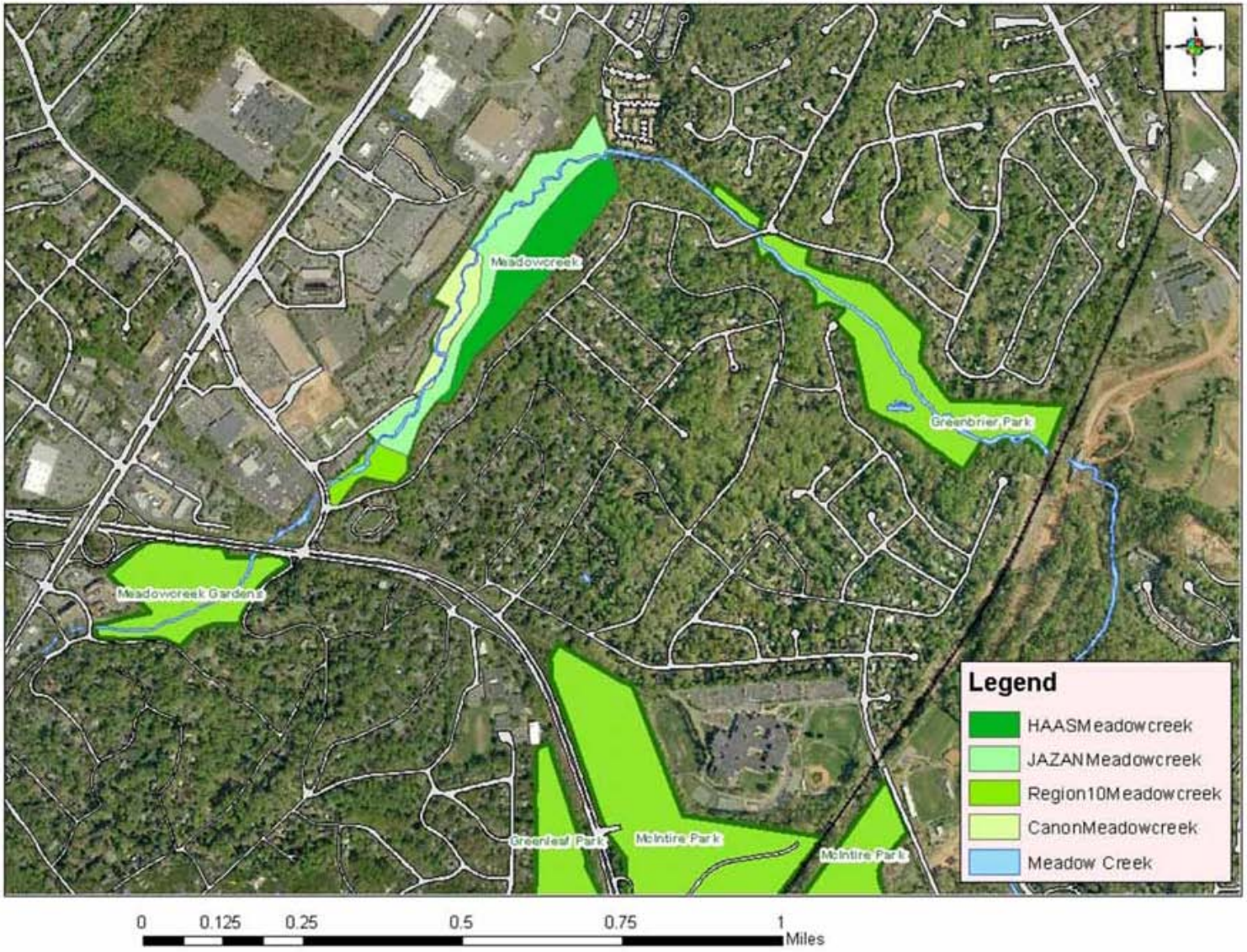
Parkland Acquisitions - Meadowcreek West
REGION 10 - 3.3 acres - $20,000 - 2011



Parkland Acquisitions - Meadowcreek West
CANON - 4.5 acres - November 2011



Parkland Acquisitions - Meadowcreek West



Azalea Park

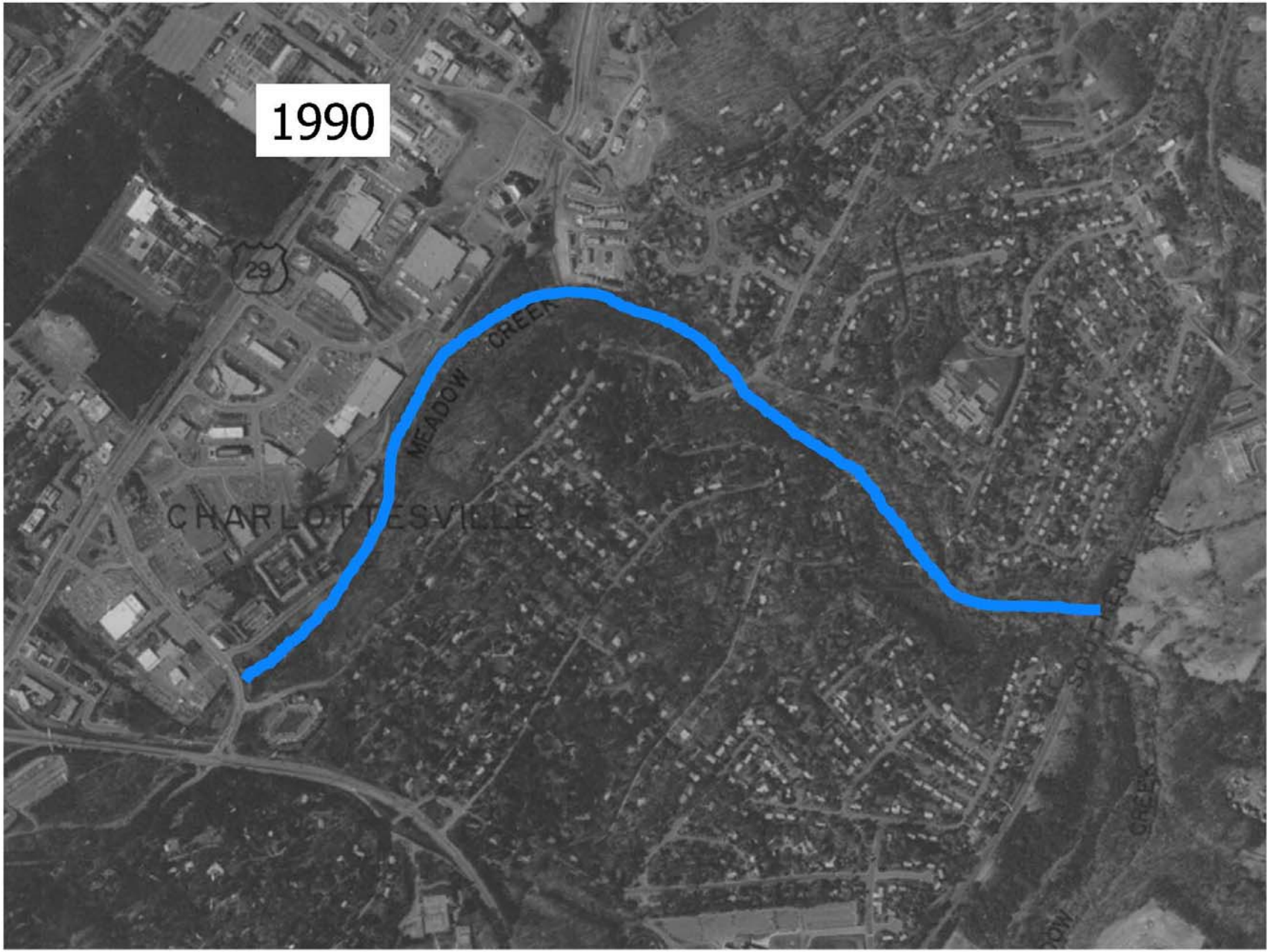
Before

During

Why Restore Meadow Creek?


1957


1974


1990
29
MEADOW CREEK
CHARLOTTESVILLE


2002

Project Goals

- Decrease sedimentation
- Improve stability
- Improve in-stream habitat

Project Goals

- Enhance/establish native forest

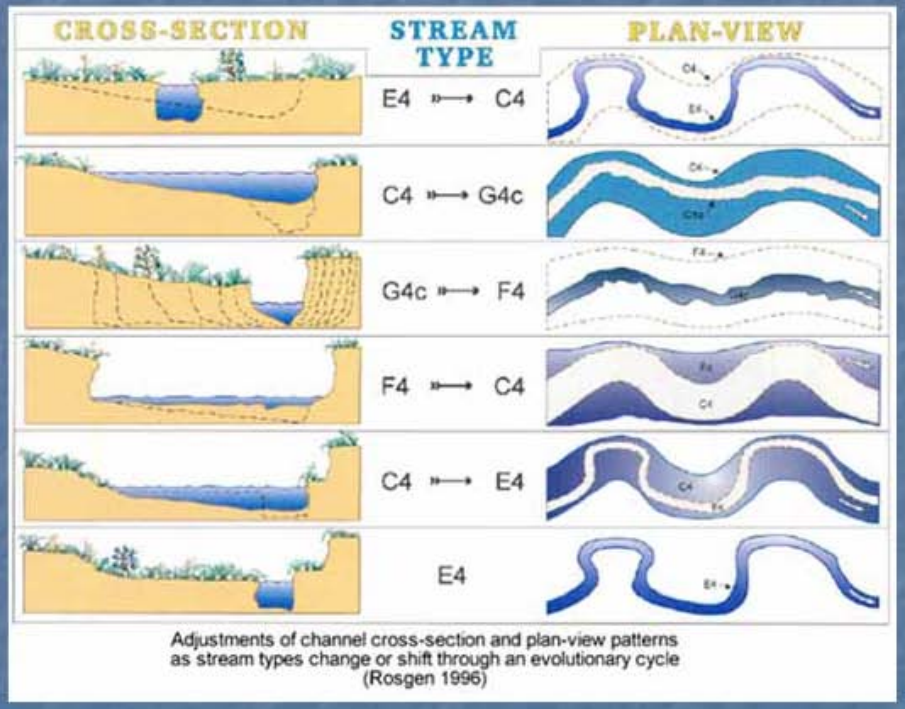
- Protect infrastructure

Project Goals

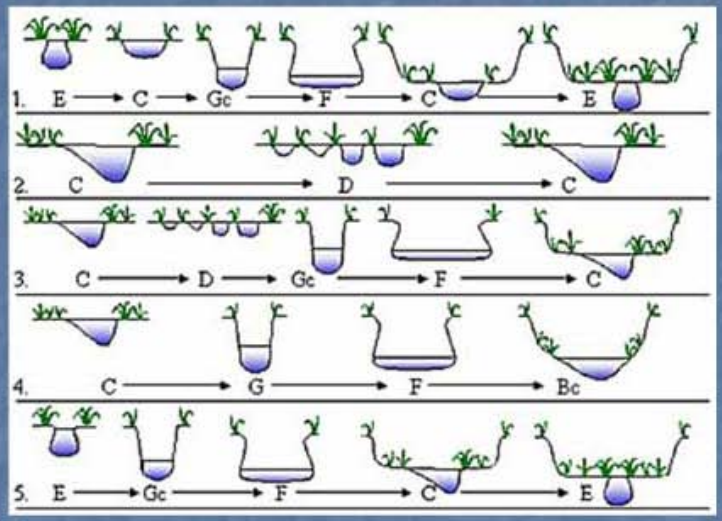
- Demonstration project
- Engage students and volunteers
- Research opportunities
- Enhance recreational opportunities

Approach and Design

Natural Channel Design



Adjustments of channel cross-section and plan-view patterns as stream types change or shift through an evolutionary cycle (Rosgen 1996)



Un-Natural Channel Design

Use of Innovative Practices to Achieve Multiple Goals

- Restore and/or stabilize impacted streams through the design of a stable channel utilizing fluvial geomorphological principles…including:
  - Reference reach data
  - Understanding of the sediment transport regime
  - Incorporation of in-stream structures where applicable
  - Riparian buffer establishment
- GOAL=Long-term stability and a natural functioning stream and buffer that has improved aquatic habitat
  - No maintenance required
  - Able to transport the water and sediment supplied by the watershed
  - Provide a sink for contaminants such as nutrients and sediment
  - Work with site constraints

Natural Channel Design Process

- Assessment
  - Survey existing channel
  - Tree inventory
  - Wetland delineation
  - Utility location
- Design
  - Identify and survey reference sections and profile
  - Design calculations
  - Create proposed plan view, profile and cross sections
  - Model floodplain – water surface elevations (existing & proposed)
- Plan Set
  - Create plans for City and permitting agencies
    - Erosion and Sediment Control Plan
    - Proposed Plan, Profile, Sections
    - Planting Plan/Invasive Species Management Plan

Meadow Creek Design Elements

- Restored natural riffle-pool sequence
- Reconnection to floodplain
- Channel relocation
- In-stream structures
- Management of invasive species
- Planting native vegetation

Restore Natural Riffle-pool Sequence

Reconnection to Floodplain

Before

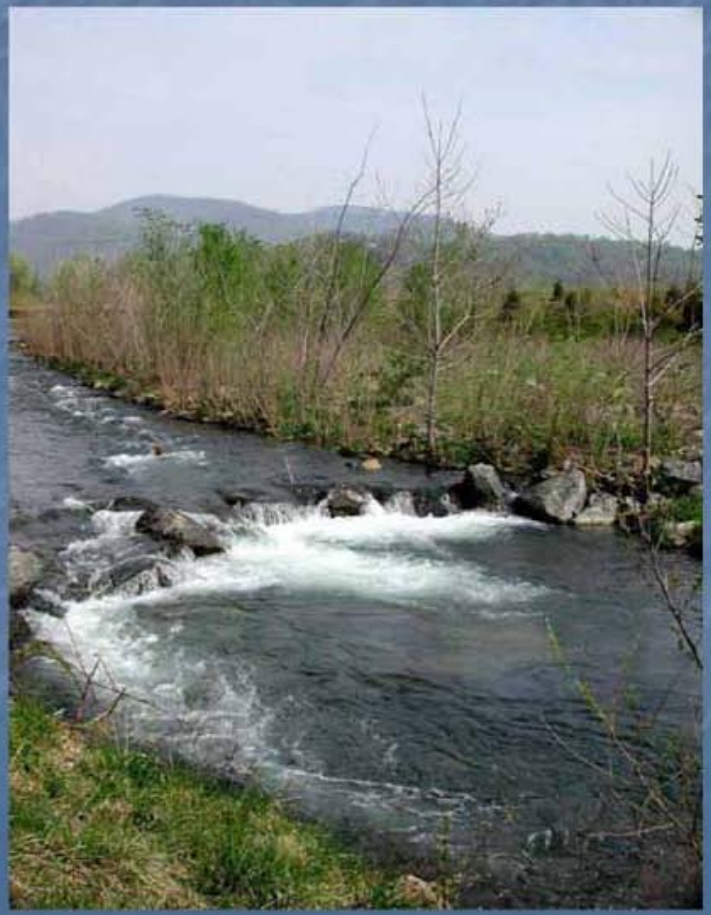
During

After

Channel Relocation

In-Stream Structures

Vanes



In-Stream Structures

Stacked Stone Walls and Bank Toe Protection

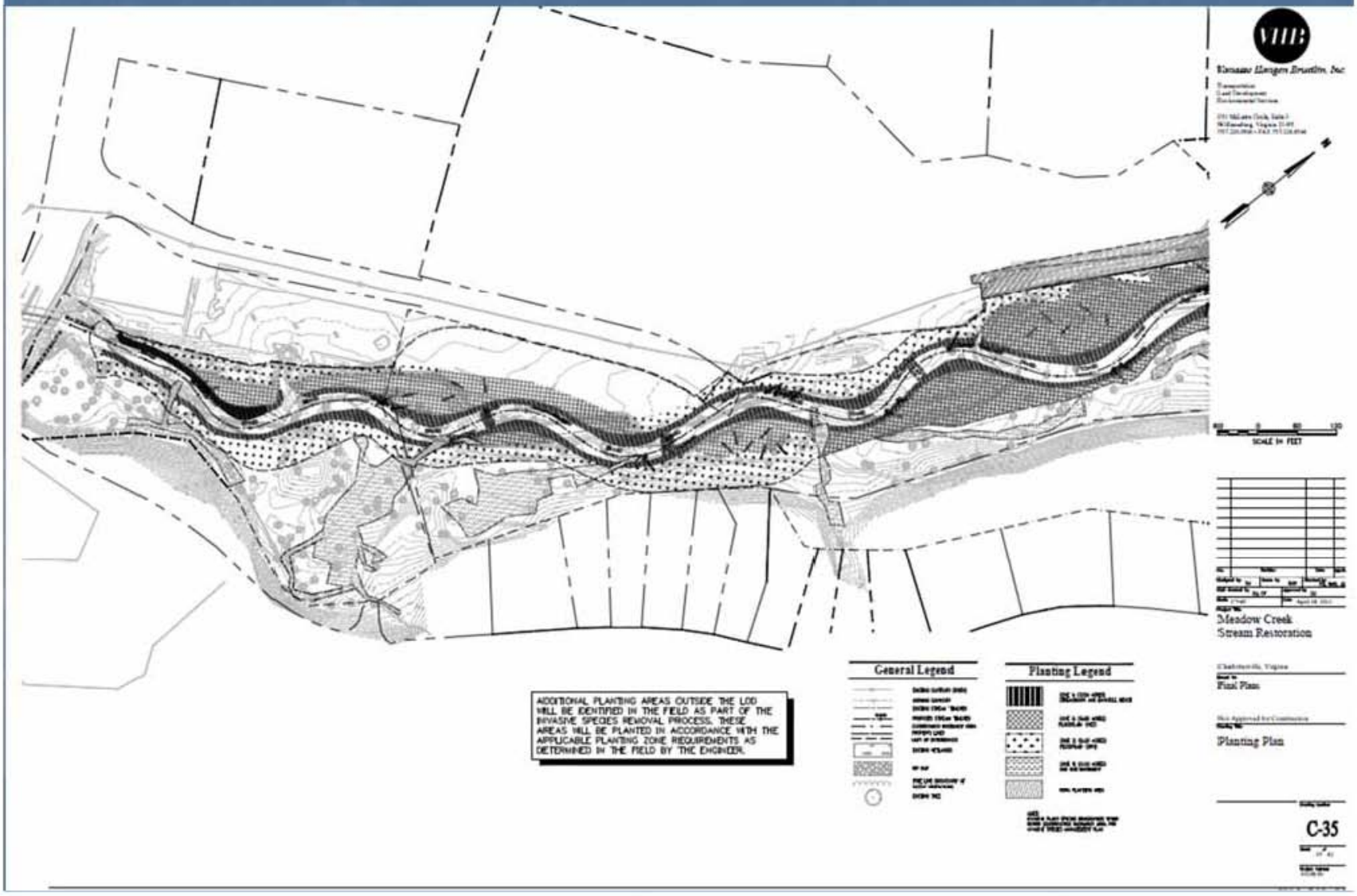
In-Stream Structures

Boulder/cobble Grade Control

In-Stream Structures

Rootwads

Planting Plan



Construction Schedule and Sequencing

- Two primary reaches
  - Hydraulic-Brandywine
  - Greenbrier Park
- Access at 5 locations
- General sequence
  - Mark LOD
  - Install accesses, staging and E&S control
  - Mow work area; selective invasives spraying; stake out construction

Construction Schedule and Sequencing (continued)

- Clearing and Grading for channel/floodplain construction
  - 300-500 lf segments
  - Work conducted "in the dry"
  - Install instream structures
  - Stabilize grading with matting, seed
- Begin Plant Installation - October 15, 2012
- Repeat for Greenbrier Park

Project Schedule/Phasing

Spring 2012	Begin Construction
Winter 2012/13	Planting (in first dormant season following construction)
2013 – 2023	Long term success monitoring

What to Expect During Construction

What to Expect During Construction

- Equipment and materials
- Erosion and sediment control
- Noise and work hours
- Temporary trail and park closures
- Children and school access
- Safety and traffic management
- Access and staging

Equipment and Materials

- Four wheel drive tractor/mower
- Excavators, dozers, off road haul trucks
- High capacity pumps, piping
- Material delivery via road trucks:
  - Rock
  - Gravel/cobble materials
  - Plant materials

Equipment and Materials

Erosion and Sediment Control

Temporary Trail/Park Closures

- Upper reach will remain open during construction (Hydraulic Road to Brandywine Drive)
- Temporary closures in Greenbrier Park as construction progresses
- Greenbrier Park bridge

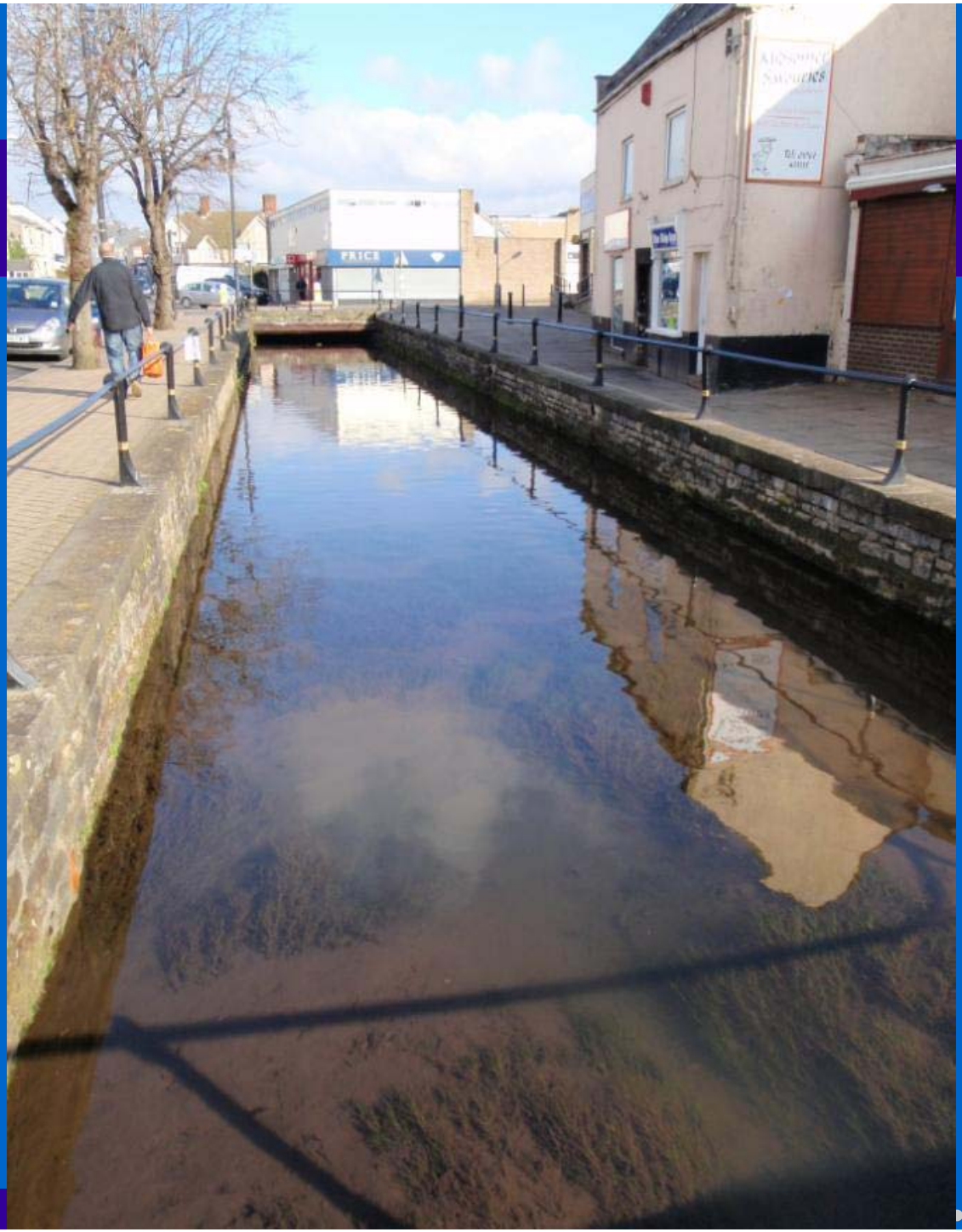
Safety and Traffic Management

- Safety signage
  - Sidewalk Closed
  - Truck Crossings
  - Stop signs
- Safety fencing on access and staging areas
- Side walk and curb removal/protection at key points

Access Points and Staging

- Five access points and staging areas:
  1. Michie Drive
  2. Pepsi Place
  3. Brandywine Drive (upper)
  4. Brandywine Drive (lower)
  5. Kerry Lane Greenbrier Park Access
- Open full duration of construction
  - Varying activity levels: equipment; materials

For more information and updates during construction, visit the project webpage: www.charlottesville.org/meadowcreek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