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
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
Why Restore Meadow Creek?
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

Old unstable channel

Restored Channel
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
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