Targeted Stream Restoration

2018 Annual KAMM Conference
September 19, 2018
Agenda

• What Is “Targeted” Stream Restoration?
• Natural Channel Design
• Case Studies
• Project Delivery Methods
• Q&A
What is “Targeted” Stream Restoration?

• Streams are dynamic, subject to horizontal and vertical adjustments

• Rate of adjustment can accelerate when disturbed (floodplain loss, hydrologic changes, channel straightening, etc.)

• Asset Protection: utilities, transportation, buildings, recreational amenities (paths, shelters, etc.)
Streams Are Dynamic!
Natural Channel Design

• Initial Stream Assessment
• Grade Control Improvements (riffles/ pools, cross-vanes, J-hooks, etc.)
• Reconfigured Channel Sections (re-established floodplains, reduced bank slopes, bankfull benches)
• Permanent and Temporary Stabilization (toe rock, vegetation, erosion control blanket)
Case Study: Dry Fork Creek

- **Project Owner:** Great Parks of Hamilton County
- **Site Conditions:**
  - Alluvial soils (sand / gravel)
  - 77 mi² watershed
- **Principal Design Elements**
  - 3,300 cys of excavation
  - 1,600 cubic yards of toe rock
  - J-Hook structures (5 total)
  - Constructed Riffles
  - Native plantings (seeding, shrubs, trees, live stakes)
- **Total Restoration Length (3 areas):** 1,400-ft
- **Construction Cost:** $597,800
Site A
Substantial Completion
October 2014
Site A
Post-Construction
September 2015
Site A
Post-Construction
August 2016
Site A
Post-Construction
June 2018
Case Study: West Creek

- Project Owner: Northeast Ohio Regional Sewer District
- Site Conditions:
  - Urbanized Watershed, 9.2 mi²
  - Adjacent Landfill
  - Historic Stream Impacts
- Project Goals
  - Asset Protection
  - Protect / Improve Water Resources
  - Address Flood / Erosion Concerns
  - Enhance Water Quality and Aquatic Habitat
- Total Restoration Length 6,500-ft
West Creek Improvement Options

- Reestablish Floodplain
- Channel Improvements
  - Riffles / Pools
  - Bank Stabilization
  - Headcut Stabilization
  - Grading
  - Rock Toe
- Outfall Stabilization
- Utility Protection
- Flume Restoration
West Creek Flume – Existing Conditions
West Creek Flume - Restoration

Design Considerations

• Eliminate Fish Passage Barrier
• Lower Stream Energy (gradient, floodplain)
• Maintain Conveyance Capacity
• Plan for Public Outreach
Case Study: Beechers Brook

- **Project Owner:** Northeast Ohio Regional Sewer District
- **Site Conditions:**
  - Urbanized Watershed, 1.6 mi²
  - Adjacent Residential neighborhood
- **Project Goals**
  - Protect / Improve Water Resources
  - Address Flood / Erosion Concerns
  - Enhance Water Quality and Aquatic Habitat
  - Asset Protection
- **Total Restoration Length** 800-ft
Beechers Brook – Existing Conditions
Beechers Brook

- Raised Grade
- Reestablish Floodplain
- Channel Improvements
  - Riffles / Pools
  - Bank Stabilization
  - Headcut Stabilization
  - Grading
  - Rock Toe
- Outfall Stabilization
Case Study: Pepper Creek

• Project Owner: Northeast Ohio Regional Sewer District
• Site Conditions:
  o Urbanized Watershed, 1.36 mi²
  o Existing homes adjacent to stream
  o Entrenched stream
• Project Goals
  o Protect / Improve Water Resources
  o Address Flood / Erosion Concerns
  o Enhance Water Quality and Aquatic Habitat
  o Asset Protection
• Total Restoration Length 900-ft
Pepper Creek—Existing Conditions
Pepper Creek

- Raised grade
- Reestablish Floodplain
- Channel Improvements
  - Riffles / Pools
  - Bank Stabilization
  - Grading
  - Rock Toe
Project Delivery Methods

• Design-Bid-Build (Dry Fork Creek, West Creek)
  o Pro’s: Established Practices for Public Agencies, Strict Adherence to Design Plans, More Design Control, Complex projects
  o Con’s: Contractor Qualifications, Change Orders, Less Flexibility During Construction

• Design-Build (Beechers Brook, Pepper Creek)
  o Pro’s: Contractor Input, Cost-Effective, Flexibility During Construction, Improved Contractor Qualifications, Schedule
  o Con’s: Less Traditional Contracting for Some Owners, Less Design Input
Q&A
For More Information

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