Restoration and Floodplain Reconnection on Georges Creek

Civil & Environmental Consultants, Inc.

Allegany County Department of Economic & Community Development

NGE

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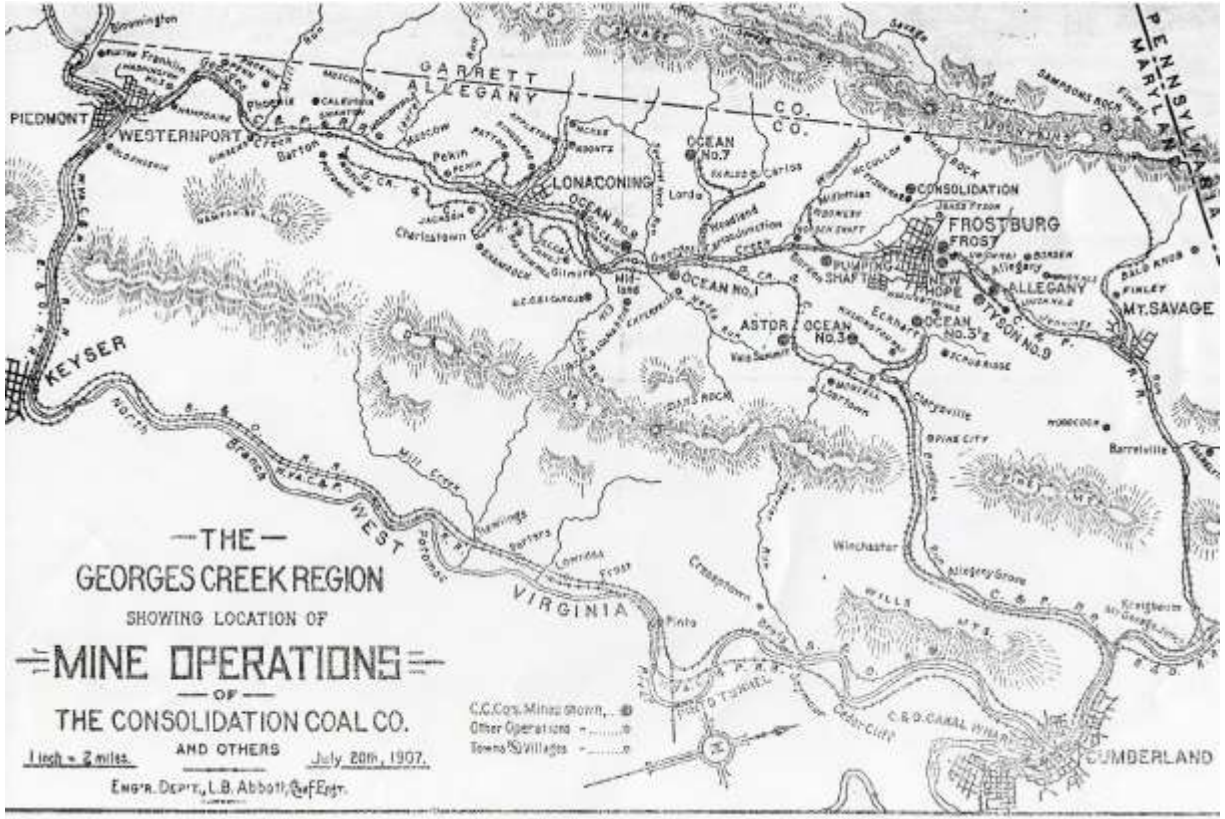
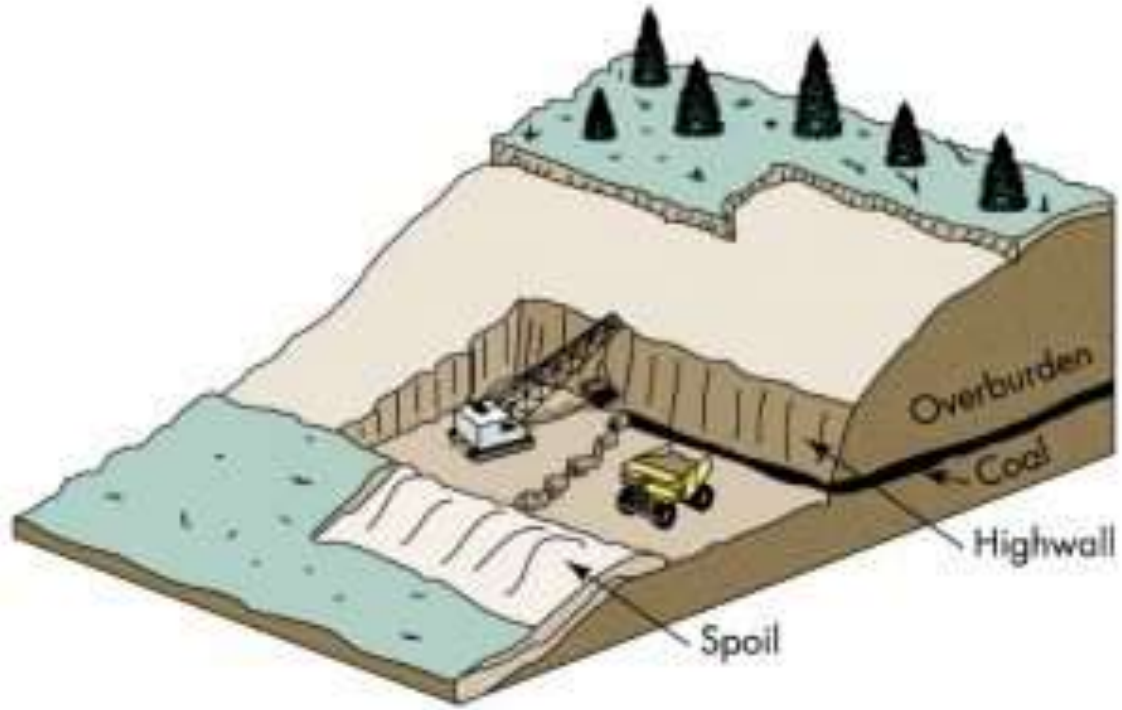
Site Location and History

- Allegany County, Maryland
- Georges Creek Coal and Iron Company- 1837
- Mining Peaked in the early 1900s
- Employed 5,000 people in watershed in 1910
- Employment dropped to 500 by 1950
- The abandoned mines left destabilized streams and chronic erosion and sediment problems



Project Goals

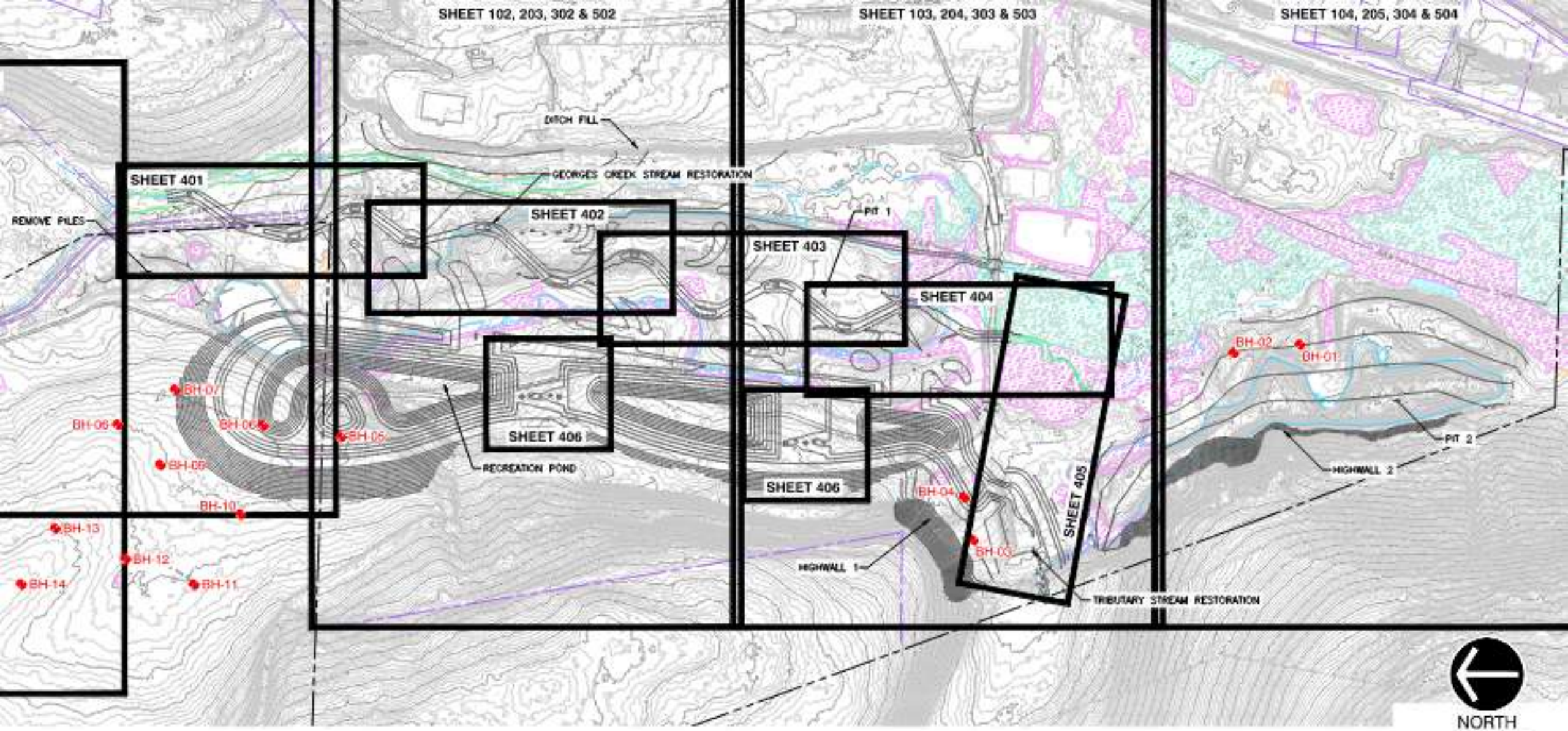
- Funded by Maryland Abandoned Mine Lands Section and Chesapeake and Atlantic Coastal Bay Trust.
- Goals:
- Fill and seal two abandoned surface mine pits
- Reclaim two highwalls
- Relocate and Restore 3,500 feet of stream
- Improve wetland and floodplain connectivity
- Improve existing stream crossing
- Create a public use recreation pond



Scope of Services

- Geotechnical Investigation
- Hydrogeology and Water Quality Analysis
- Geomorphic Survey
- Stream and Wetland Delineations
- Survey
- Permitting
- Grading Plan and Specs
- Stream Restoration Design Plans and Specs

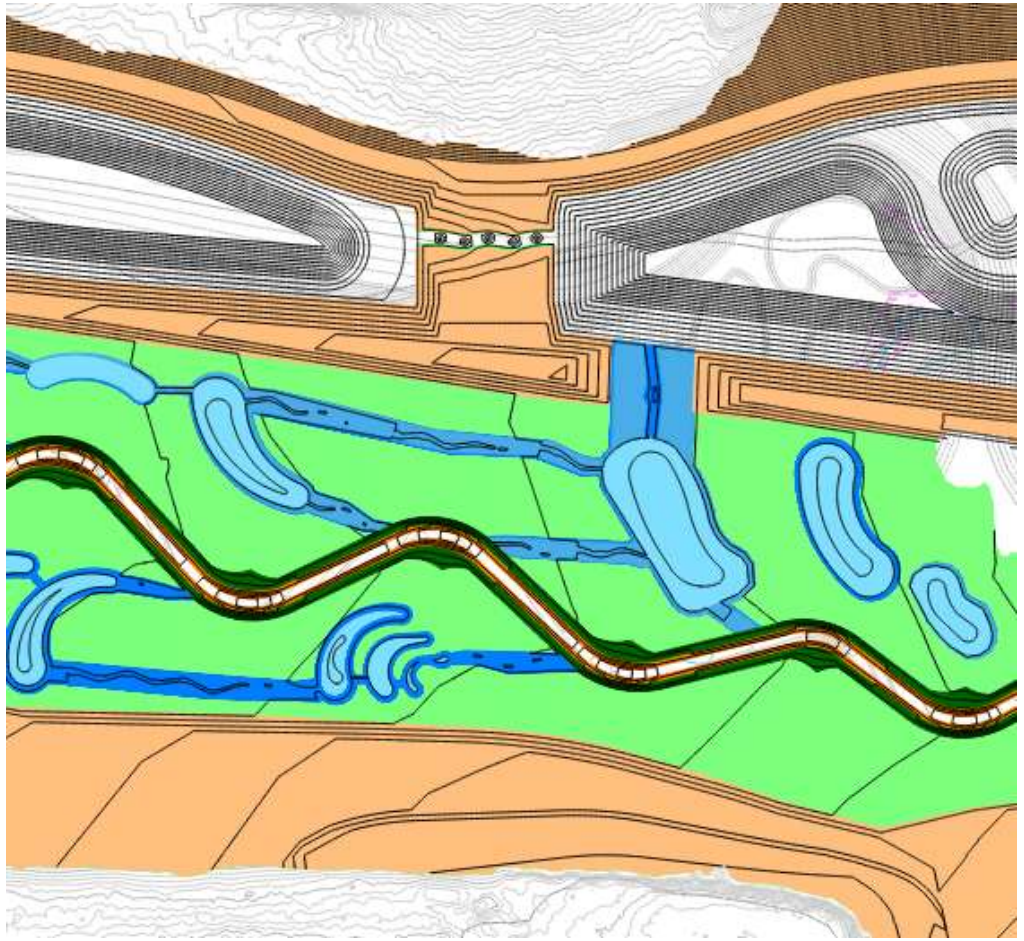
SITE AERIAL OVERVIEW WITH DESIGN CONTOURS



PROJECT OVERVIEW AND SHEET LAYOUT

Selected Highlights

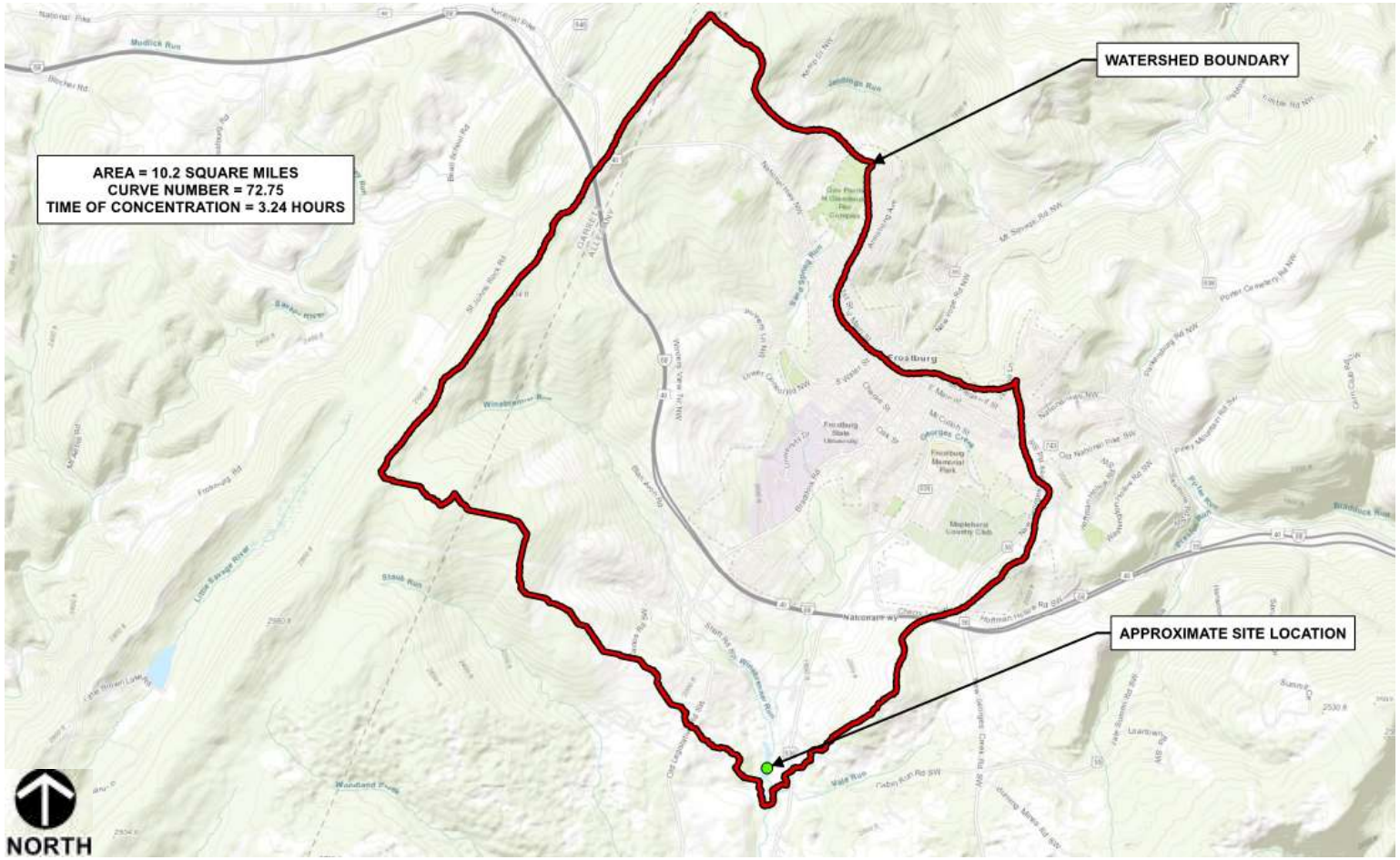
- Floodplain Reconnection
  - Integration of anastomosing channels and wetland complexes
- Application of 2D modeling
  - Proof of Concept / Concept evaluation



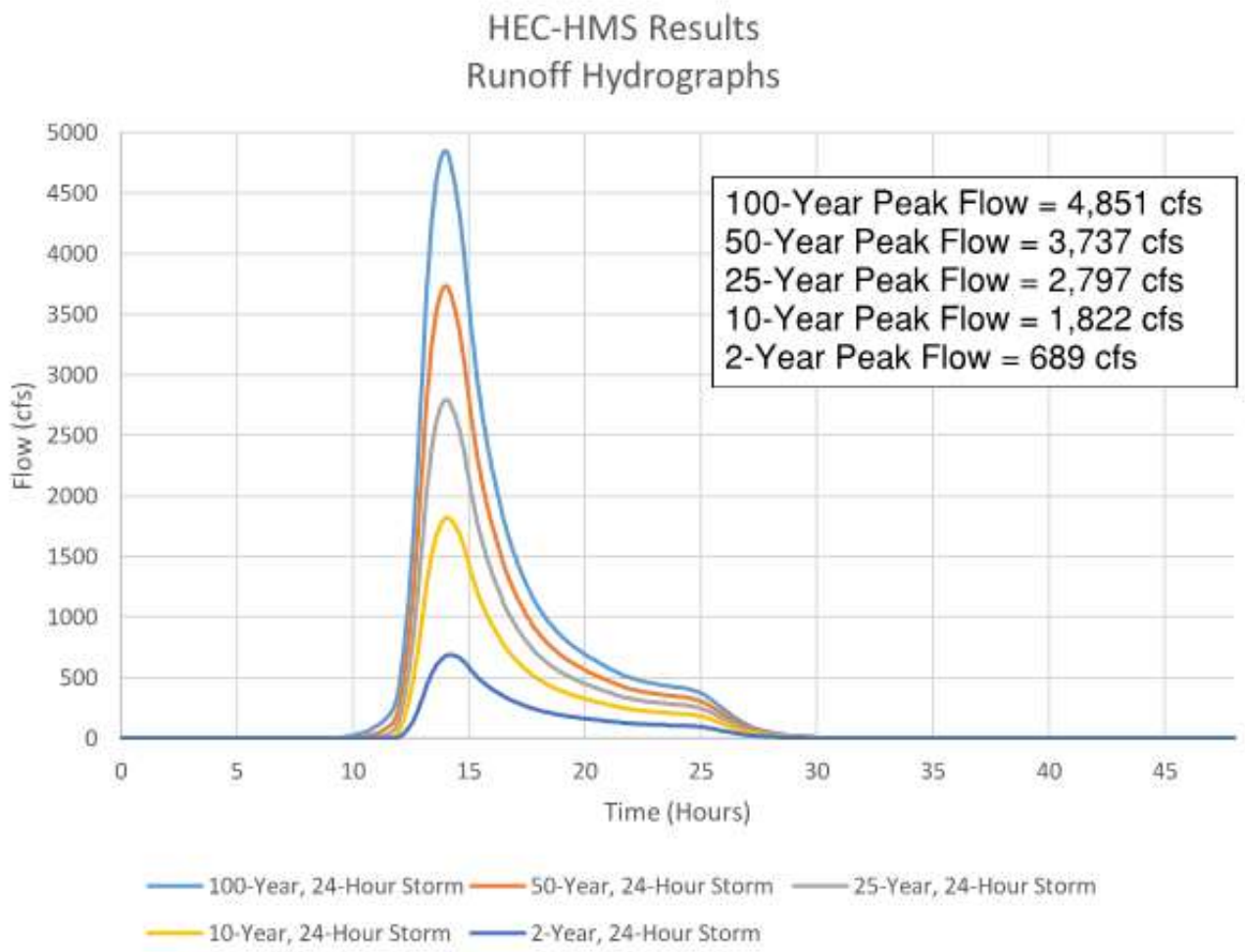
Floodplain Reconnection / 2D Modeling

Hydrologic Analysis

- USACE HEC-HMS
  - Simulate the precipitation-runoff process
- Watershed Characteristics
  - Drainage Area = 10.2 mi^2
  - Composite Curve Number = 73
  - Time of Concentration = 3.24 hrs
  - Rainfall depth



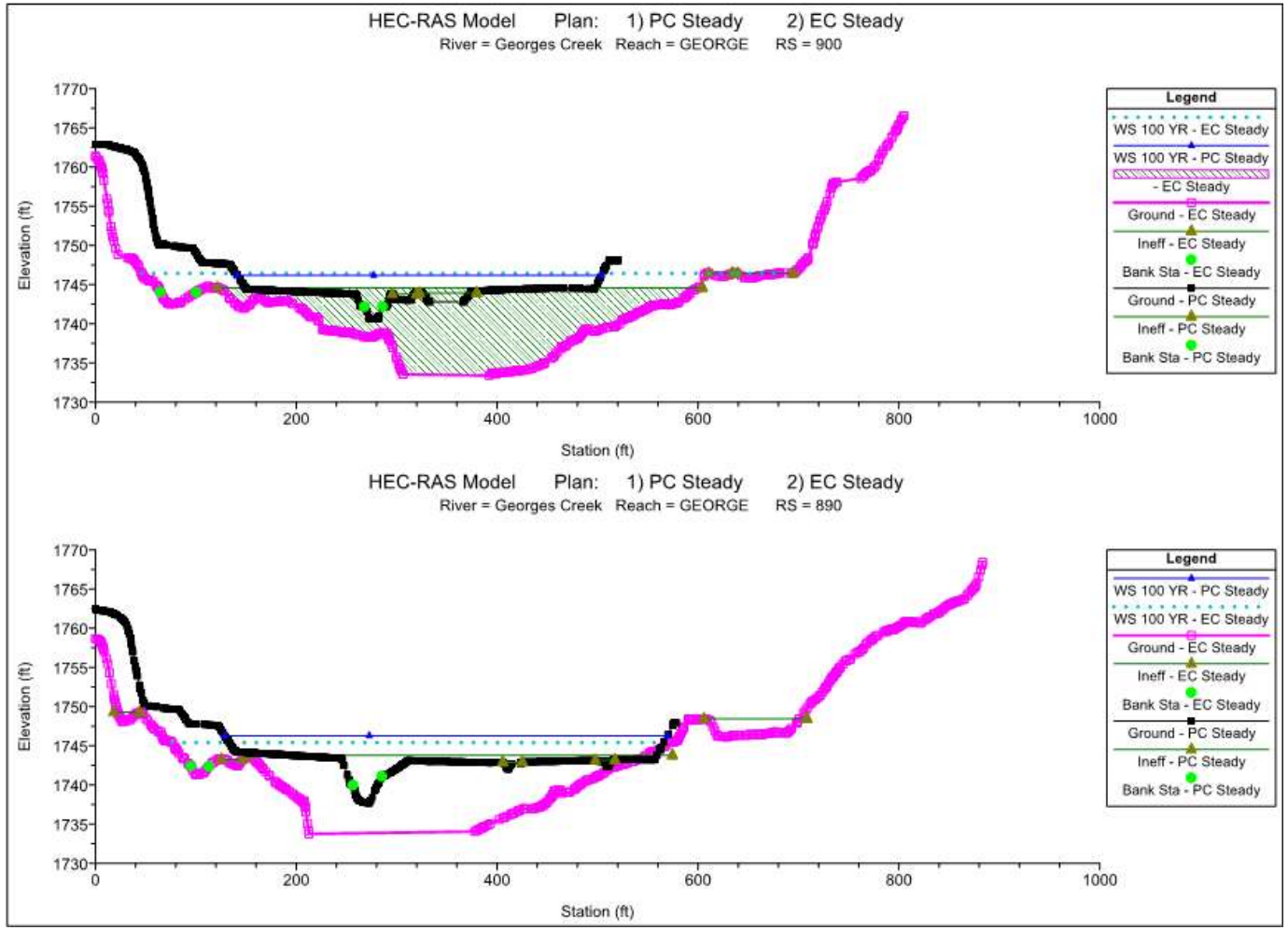
Floodplain Reconnection / 2D Modeling



Floodplain Reconnection / 2D Modeling

Hydraulic Analysis

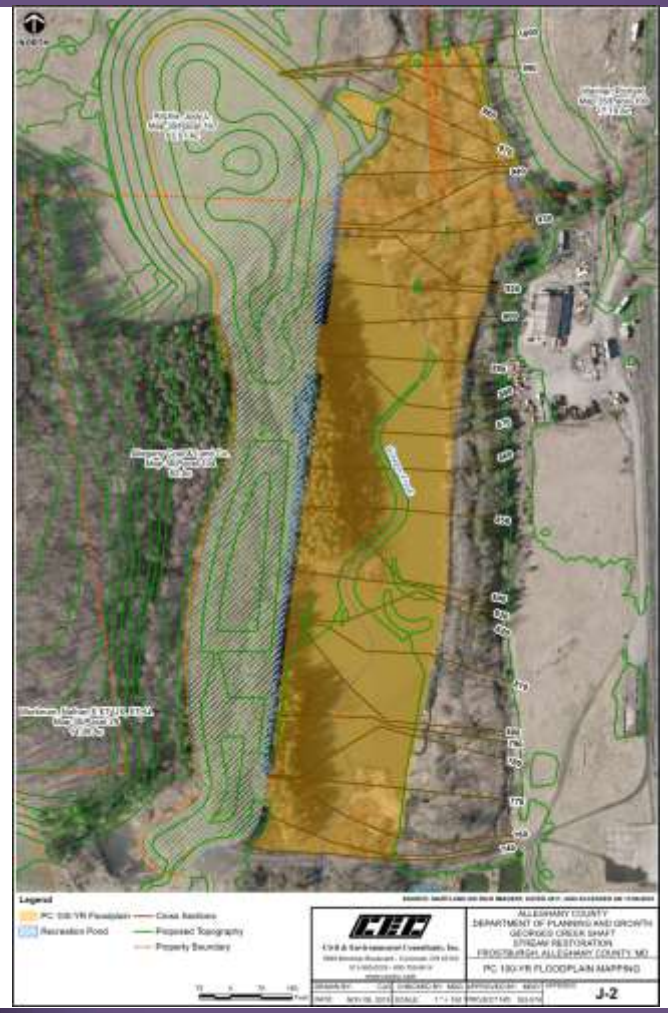
- USACE HEC-RAS
  - Simulate the precipitation-runoff process
- Storm Events
  - 2-, 10-, 25-, 50-, and 100-Year
- Geometry
  - LiDAR - FEMA Region 3 FY12 for Allegany County, Maryland
  - Supplemental topographic information obtained in 2018



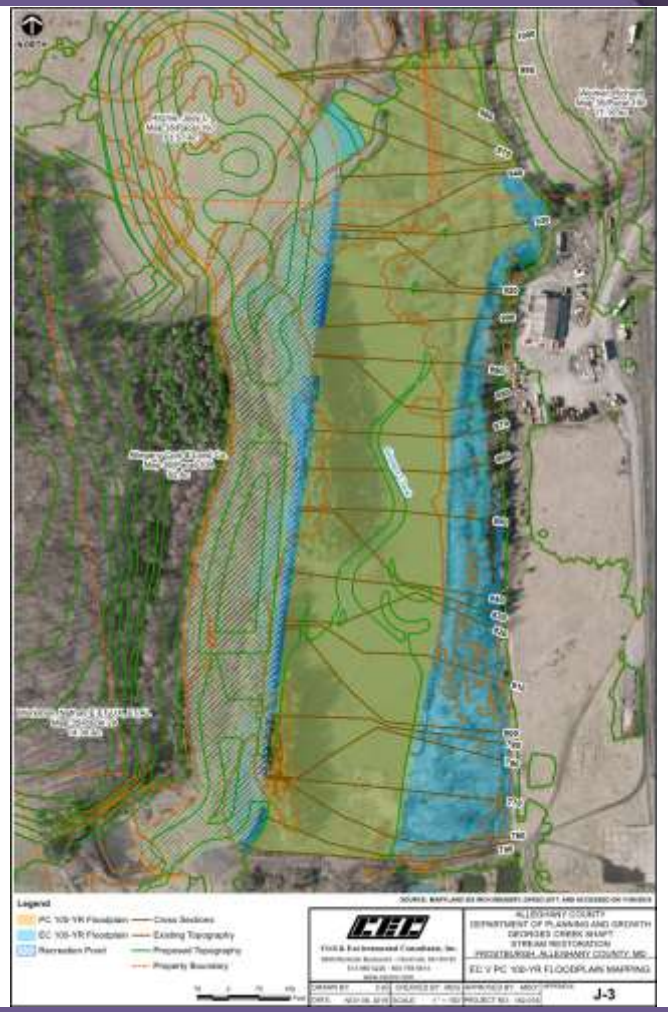
Floodplain Reconnection / 2D Modeling

← Existing Conditions

Proposed Conditions →

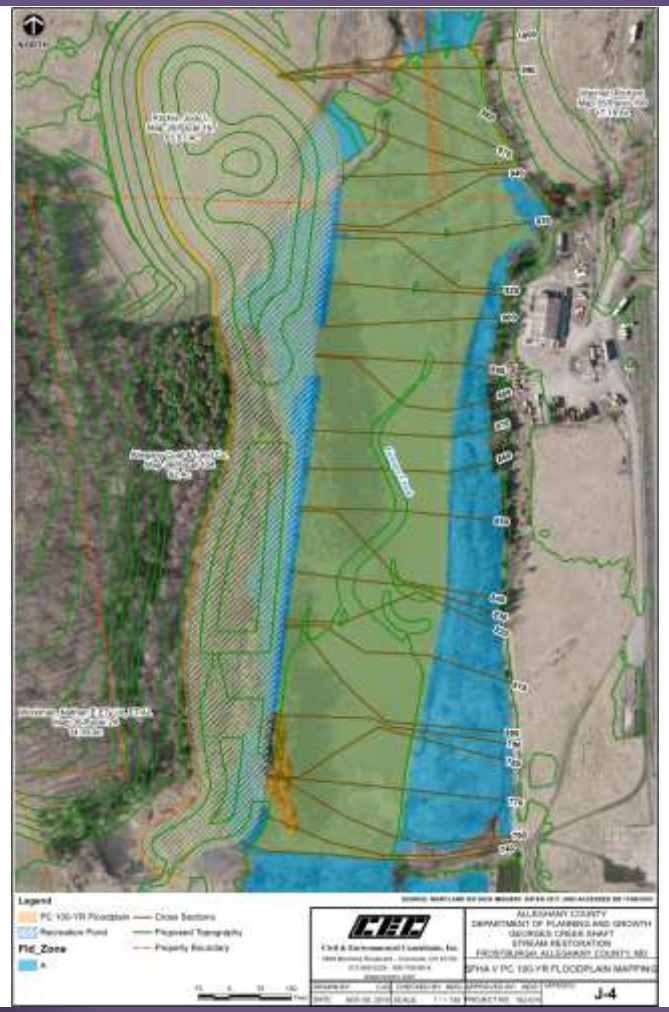


Floodplain Reconnection / 2D Modeling



← EC vs PC Comparison

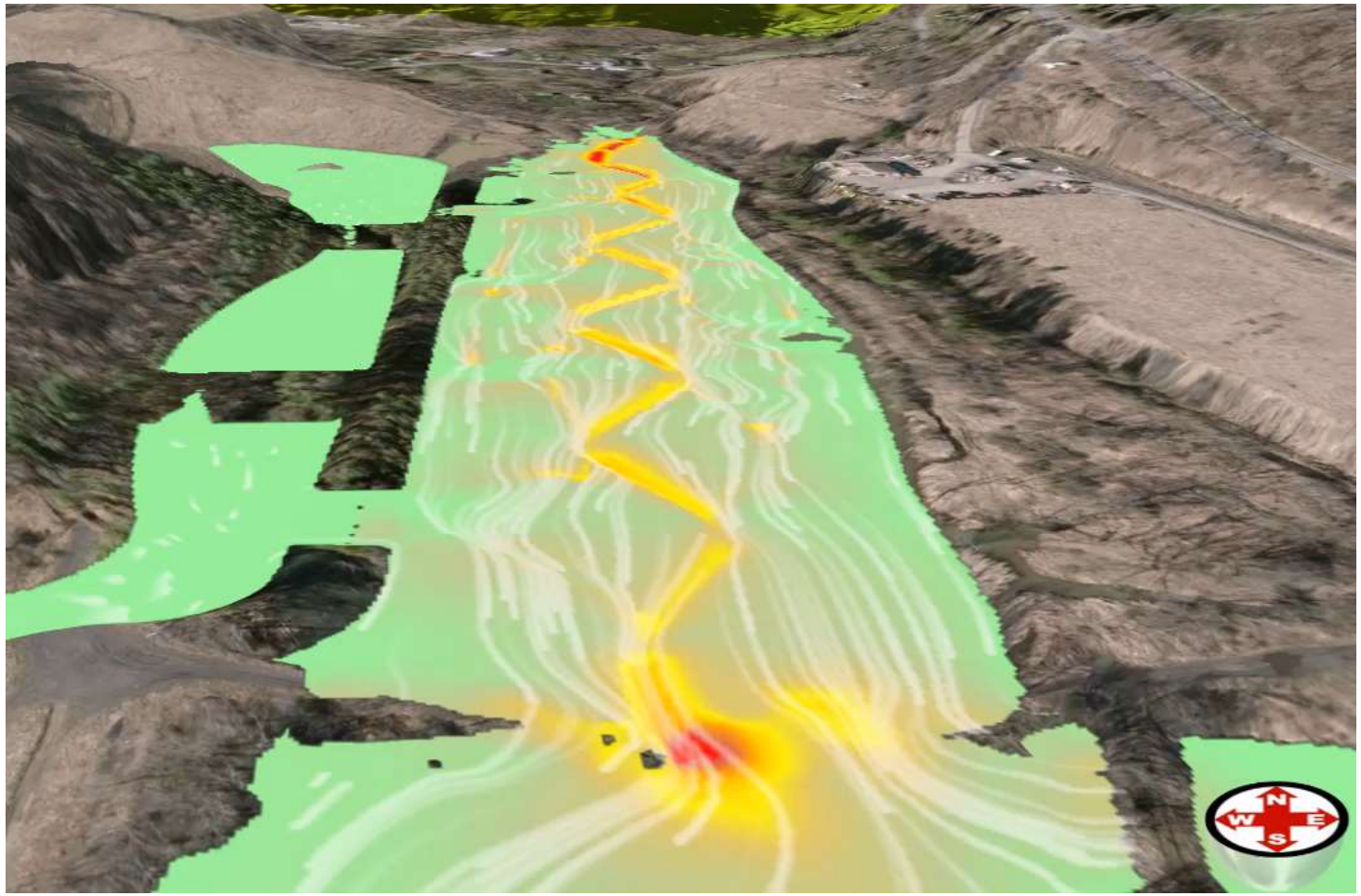
PC vs SFHA Comparison →



Modeled Shear Stress for 2-Year Flood

PC 2yr Shear Stress (lb/ft²)

- > 2
- 1.75 - 2
- 1.5 - 1.75
- 1.25 - 1.5
- 1 - 1.25
- 0.75 - 1
- 0.5 - 0.75
- 0.25 - 0.5
- < 0.25



Floodplain Reconnection / 2D Modeling

- Potential modeling pitfalls
  - Model is not Purpose-Driven
  - Scale and Resolution
  - Relative vs Absolute Results
  - Understand the limits and assumptions
    - Steady, Gradually Varied flow?
    - Full momentum or Dynamic Wave – eddy formation
    - Slope
    - Courant Condition

Summary

- Overbank flooding design recurrence interval ~1.0 years
  - 1.78 in rainfall in 24 hours
- Encourage the recruitment of wetlands and anastomosed (braided) streams across the floodplain
- Proposed bankfull channel contains the required shear stress and stream power to competently balance the bedload, suspended loads, and wash loads to maintain a functional stream and riparian corridor
- Ponds have been designed to the west of the Georges Creek alignment to provide recreational fishing opportunity for the community.
  - Recharged by overbank flows coming out of Georges Creek and unnamed tributary

Questions?

CONNECT WITH US!

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