Comprehensive Legacy Sediment Removal and Multi-Benefit Outcomes

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Agenda

01 Historical Impacts

02 Watkins Mill Road Extension

03 Questions

Historical Impacts

Post-Settlement Land Clearing (>300 Years Ago)

Widespread tree clearing to provide fuel and building materials

Land was converted for agricultural purposes

Source: John W. Eckfeldt, M.D. (1917)

Historical Impacts

Modern Impacts (Last 100 Years)

- Floodplain Encroachments
- Channelization
- Roadway Crossings
- Stream and Wetland Ditching
- Land Use Changes

Degraded Condition

Restored Condition

Case Study

Watkins Mill Road Extension

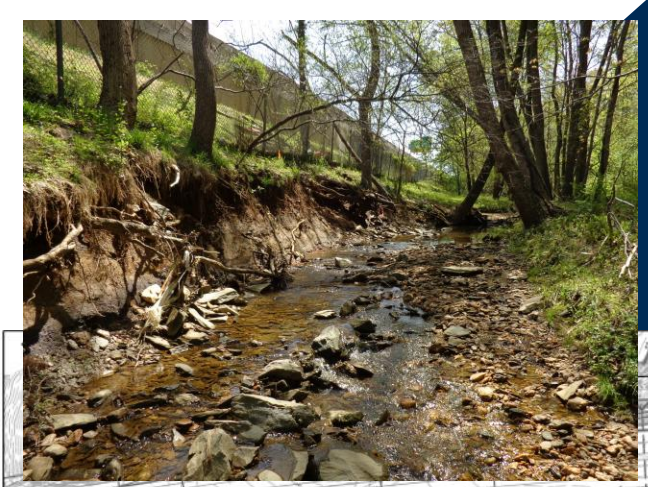
Project Purpose and Need

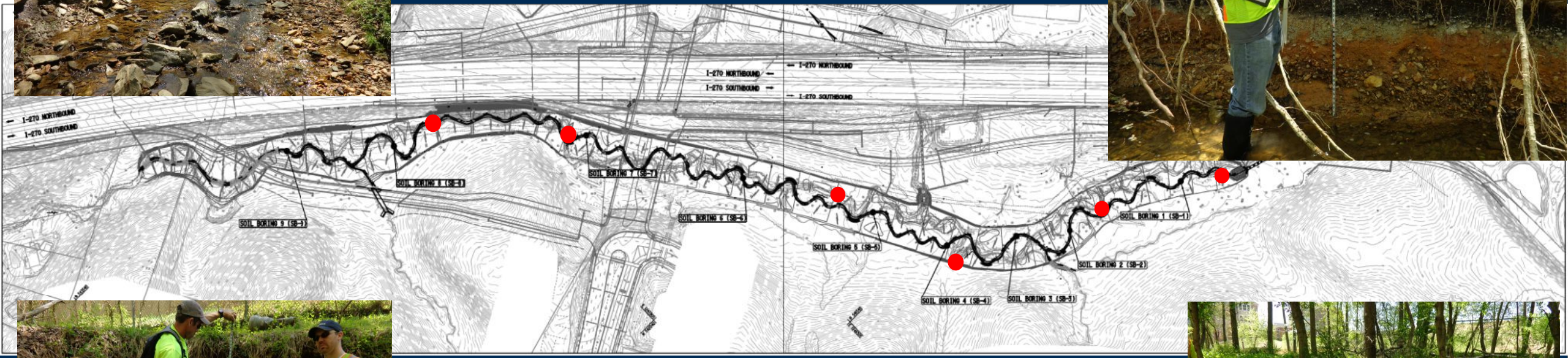
Watkins Mill Road Extension

- Project design included connectivity of the Watkins Mill Road crossing, including four new ramps (NB/SB) and new traffic signals at Watkins Mill Road Interchange.
- JMT was contracted to develop an on-site Permittee-Responsible Mitigation (PRM) for aquatic resource impacts through the implementation of a comprehensive stream and floodplain restoration design approach.
  - Project would provide both stream and wetland mitigation
  - Project provided 10-year stormwater management

Legacy Sediment and Understanding

PREVALENCE OF A BURIED HYDRIC SOIL LAYER





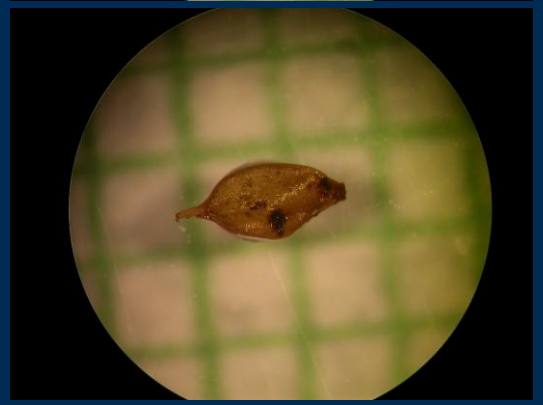
SEDIMENT AND PALEO-ENVIRONMENTAL INVESTIGATION

- Radiocarbon dating at base of hydric soil layer was +/- 7856 yr Before Present (BP)
- Radiocarbon at layer just below upper part of hydric soil was +/- 908 years BP
- Fine-grained sediments above

PALEO-ENVIRONMENT

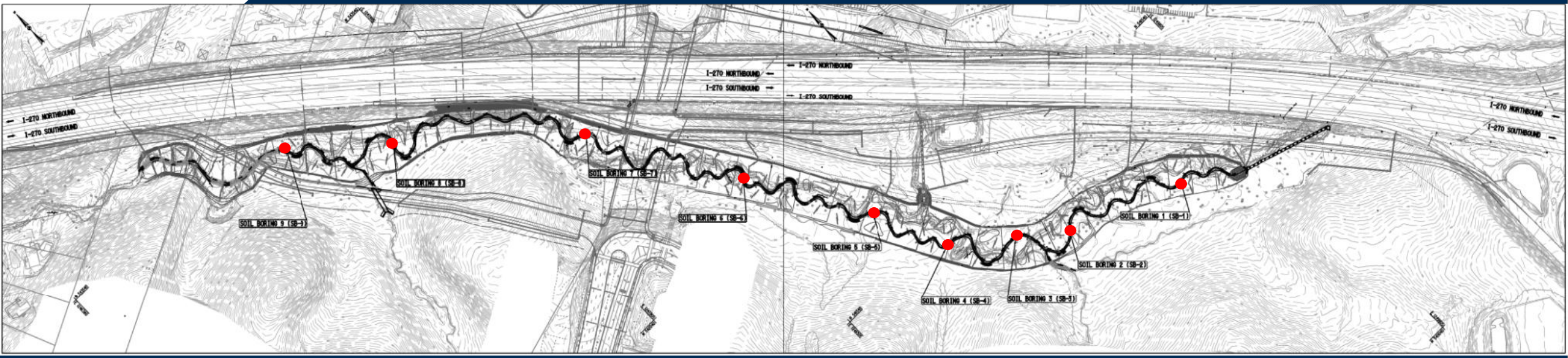
- Pleistocene (>11,500 years old) quartz-rich angular to sub-angular rubble at base (below water) of hydric soil.
- Hydric soil is overlain by fine-grained legacy sediments and more recent historic sediments.
- Seeds are consistent with species found in a marsh-like environment that is seasonally or permanently inundated.

- Seed of *Alysma subcordatum* (water plantain), OBL



- Seed of *Carex scoparia* (broom sedge), FACW

Buried Gravel Investigation



- Buried Gravel Investigation to confirms the presence of in-situ native basal gravels along the proposed streambed profile at nine locations within the valley bottom.
- Native quartz gravels were identified in each of the soil borings within 0.1-0.4 feet of proposed streambed profile.
- Auger refusal occurred within 0.1-0.4 feet of proposed streambed.
- Buried Gravel Investigation helped confirm the presence of native gravels along the designed proposed design approach

Stream and Floodplain Restoration as Stormwater BMP

Stormwater Management

Volume Reduction

Infiltrate and Evapotranspirate Increased Runoff Volume

Peak Rate

Maintain or Reduce Flow Rates to Pre-Construction Conditions

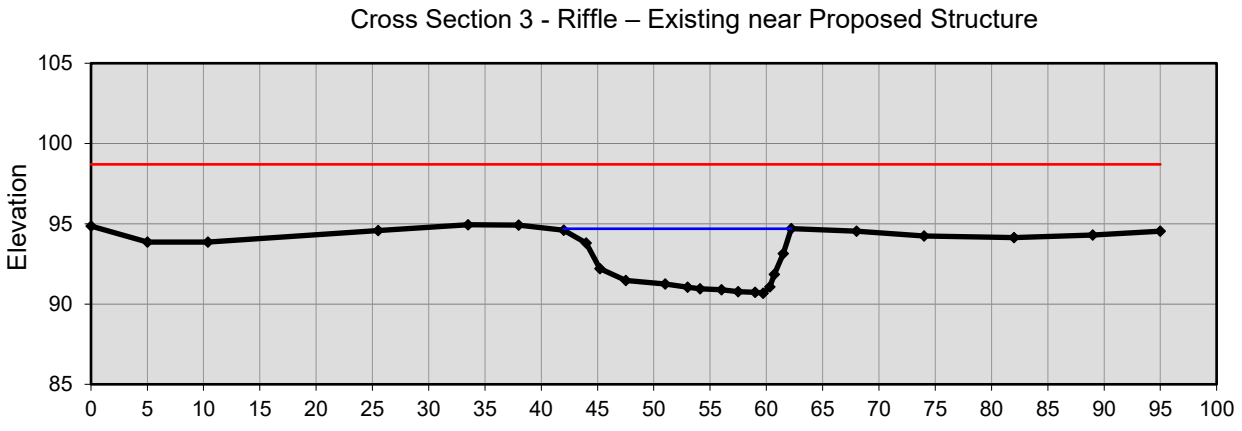
Water Quality

Reduce Pollutant Load Concentrations

Volume Control / Reduction

Infiltration and Evapotranspiration

Increased Wetted Area During 2-yr (even for the 1-year) Storm Event



Existing Conditions

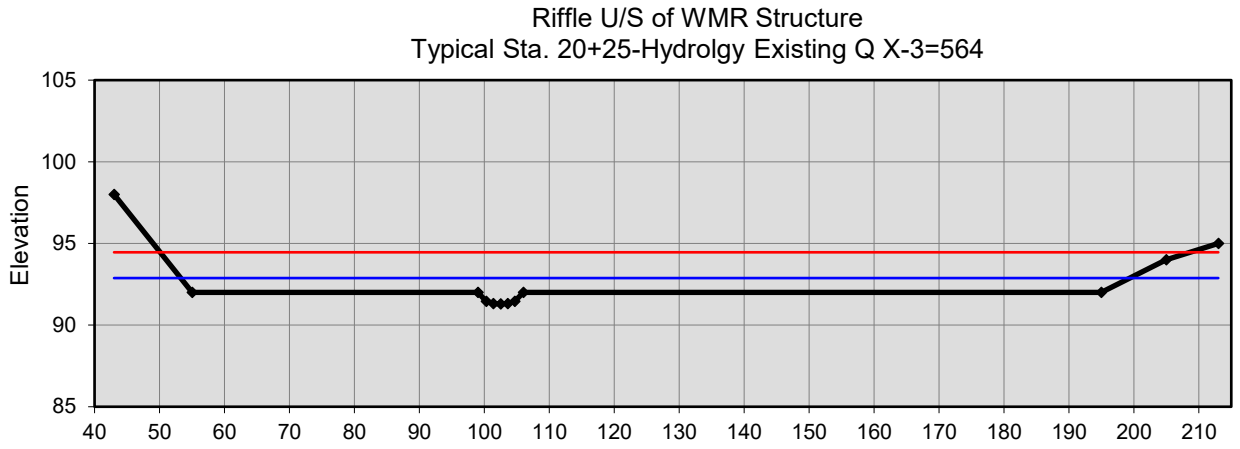
Discharge 564 cfs

Flow Area = 59.9 SF

Velocity = 9.4 FT/S

Wetted Perimeter = 23.6 FT

Flow Depth = 4.0 FT



Proposed Conditions

Discharge 564 cfs

Flow Area = 129.4 SF

Velocity = 4.4 FT/S

Wetted Perimeter = 165.1 FT

Flow Depth = 1.6 FT

Peak Rate Control

~116% increase in Flow Area

~113% reduction in Velocity

>700% increase in Wetted Perimeter

~60% reduction in flow depth

Transportation Project

- MDSHA I-270 Watkins Mill Road Extension in Montgomery County, MD
- Major Interchange Project to Relieve Traffic on One of Most Traveled Roads in County
- On-site Permittee-Responsible Mitigation (PRM)
- Stream and Floodplain Restoration to Achieve Peak Rate Control Requirement

Case Study: Watkins Mill Road Extension

Water Quality

- Sediment and Pollutant Loading Reductions
- Soil Sampling
- BANCS Analysis
- Removal of Legacy Sediments

Stacked Benefits

Questions:

Contact us:

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