US 76/SR 2 (Lookout Mountain Scenic Highway) Landslide Repair in Rabun County, GA

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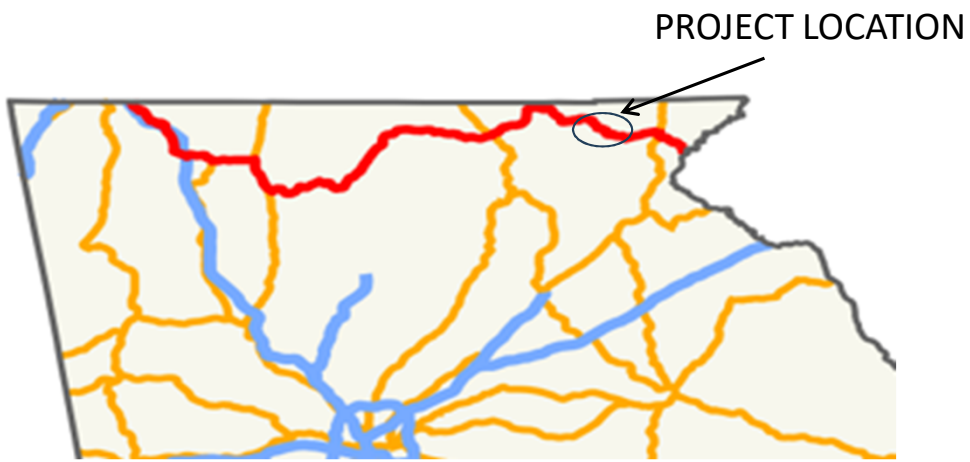
Outline

- Construction Problem
  - Project background
  - What happened
  - Challenges
- Design Solution
  - Tie-back wall
  - Geotechnical exploration
  - Stability analysis
- Lessons Learned
  - Takeaways
  - Cost

Project Location

- From the TN line (Ridges & Valley) through the Chattahoochee-Oconee National Forest to the SC line (Blue Ridge)
- High priority with low to medium AADT - 1,730/16 (2021), 2,750/14 (2022) & 2,810/14 (2023)



Project Background

- Roadway within project limits had a history of pavement distress repairs
- Significant pavement cracks, bulges & localized failures observed in May of 2019
- Landslide observed during field investigations
- Emergency project

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Aerial View of Landslides

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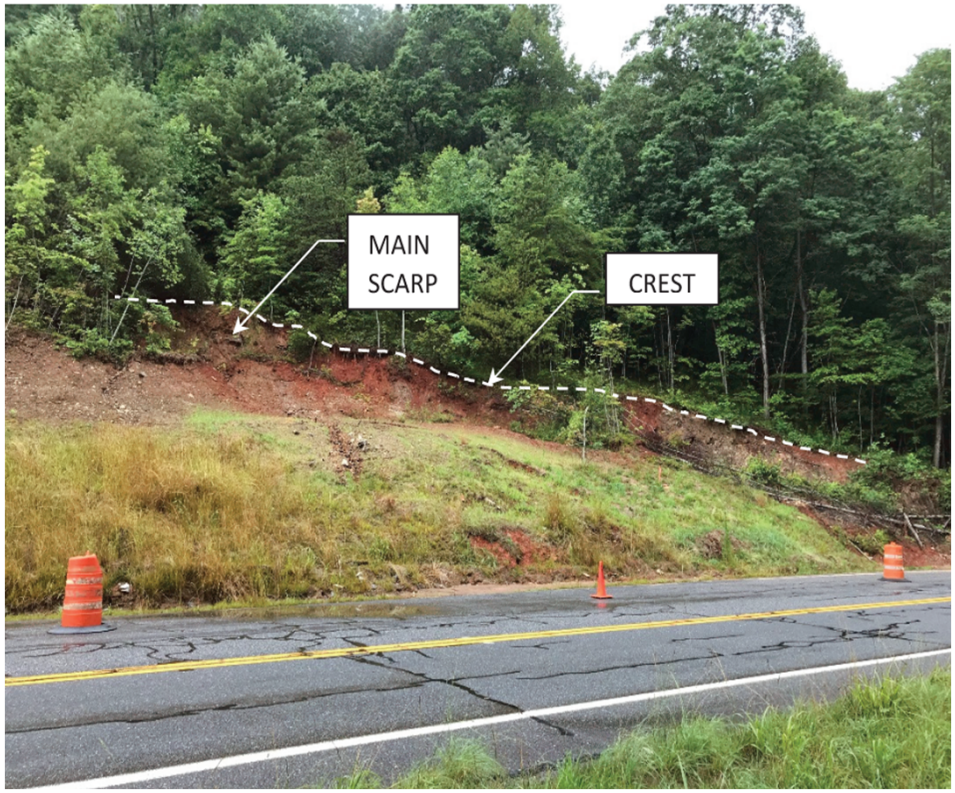
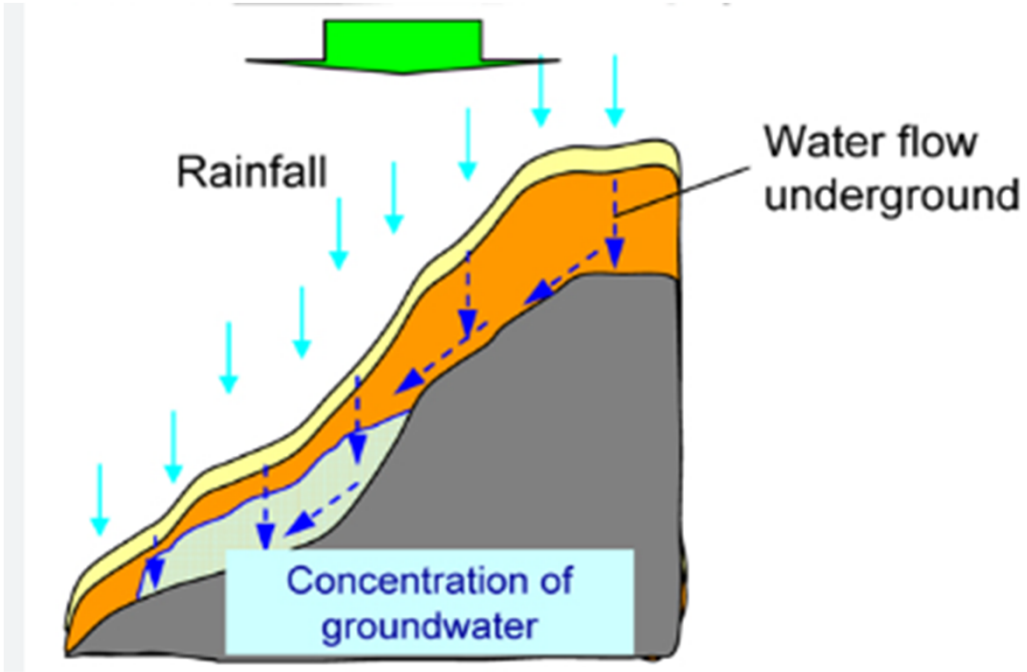
North Slide



South Slide

Landslide Cause

Caused by groundwater seepage



Initial Challenges

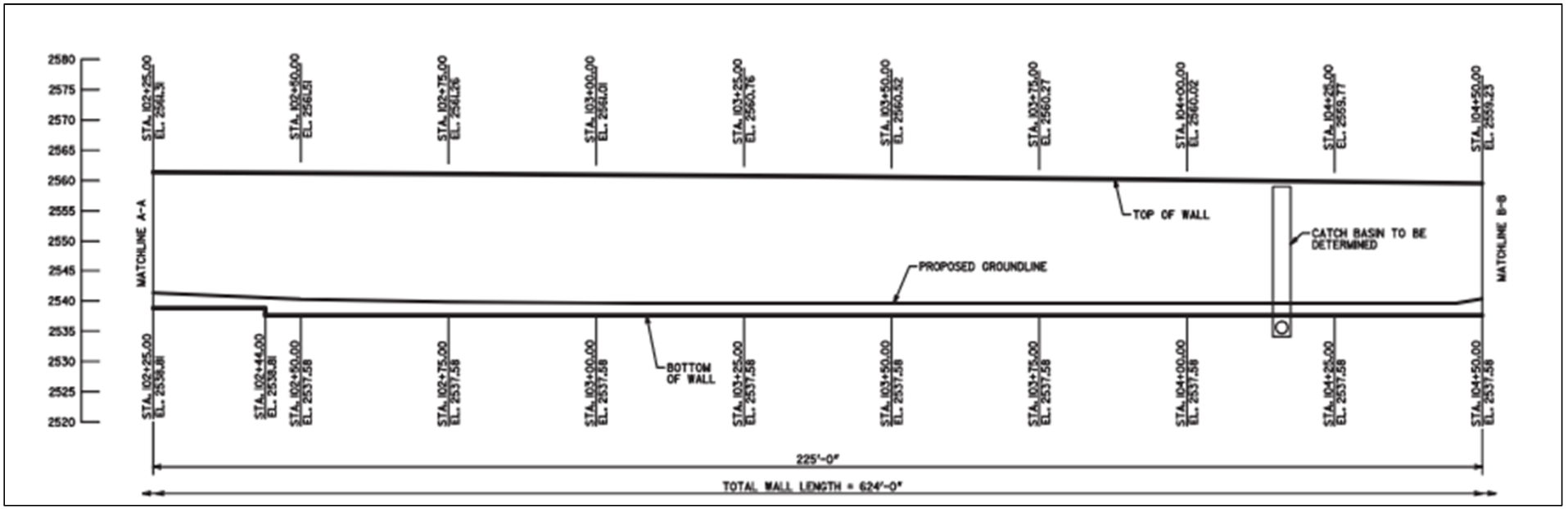
1. Coordination with US Forest Service
   - Chattahoochee-Oconee National Forest

2. Cold water trout streams down existing slope
   - Disturbance of approximately 2.18 acres

3. COVID-19
   - Social distancing and precautions

Design Solution

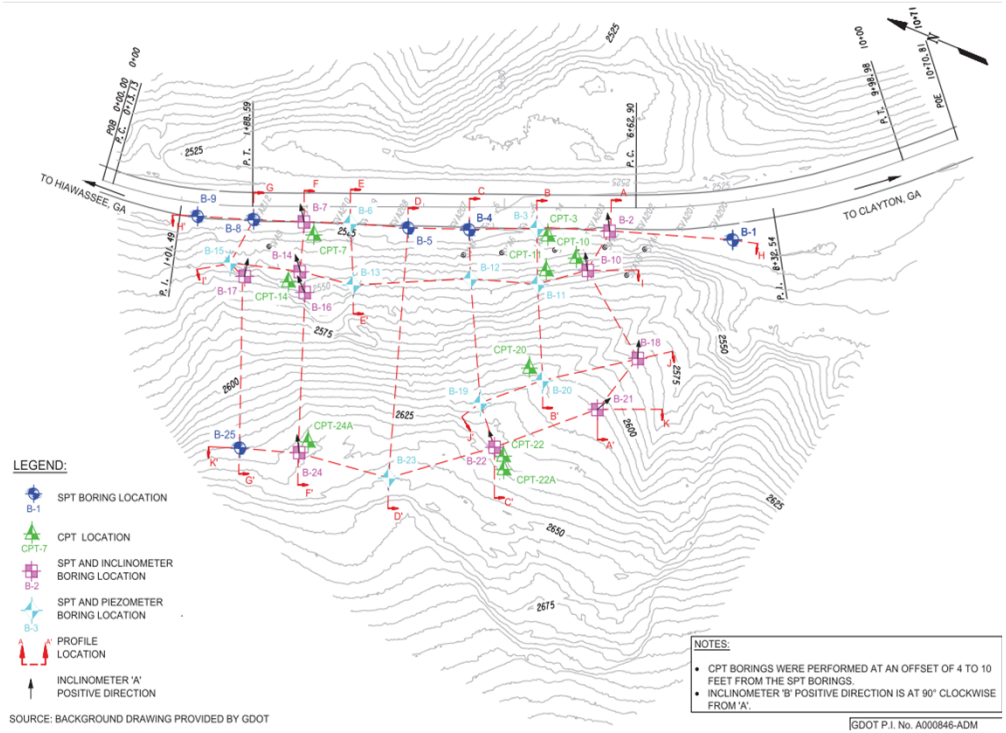
Tie-Back Wall



Geotechnical Exploration

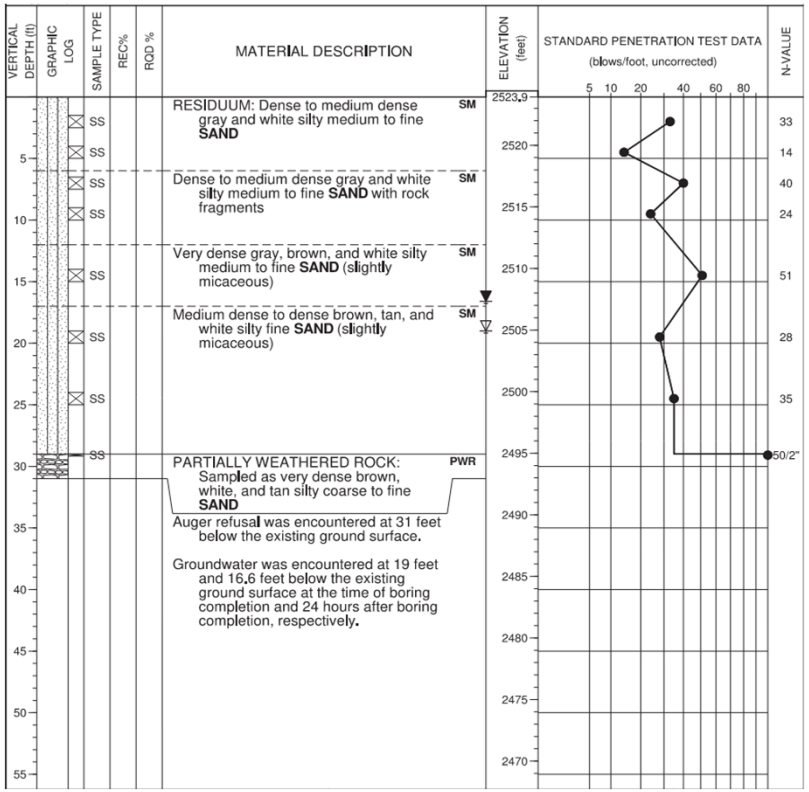
Subsurface & Wall Foundation Investigations

- SPT Borings
- CPT Borings
- Slope Inclinometers
- Piezometers



Subsurface Features

- Topsoil
- Fill soils, colluvial and residual soils
- Partially Weathered Rock (PWR)
- Bedrock



Tie-Back Wall Design

Excavation for wall installation

Soldier piles (14x89) – spaced 7 feet & embedded 3 to 16 feet into mostly PWR

Tie-back anchors embedded 10 to 12 feet into PWR & rock; bonded length → 40 to 90 feet

Horizontal drains – lower water table & porewater pressures

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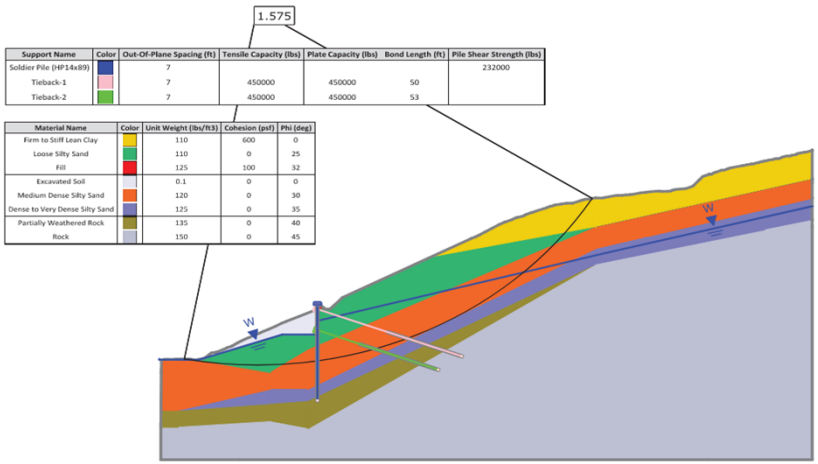
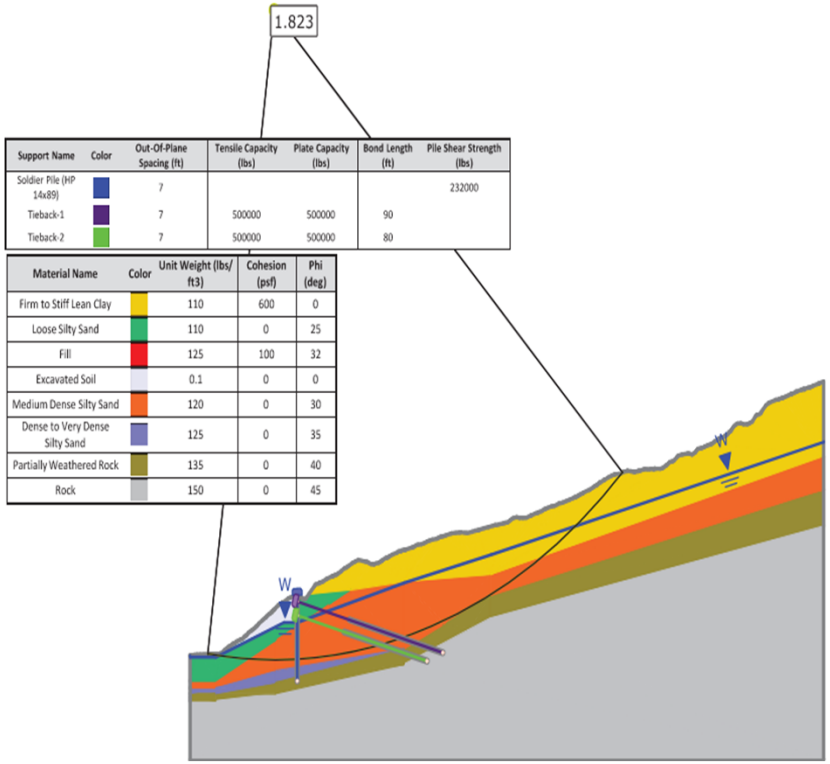
Tie-Back Wall Design Advantages

- Increased structural capacity
- Long-term durability
- Non-complex installation process
- Cost-effective

Tie-Back Wall Global Stability

- Global Stability Analysis showed Tie-Back Wall with anchors embedded in PWR/rock exceeded the desired Factor of Safety





Construction

- Roughly 2.5 years
  - Start – October of 2021
  - End – April 2024

- COST
  - Preliminary Engineering - $250,000 (~$325,000)
  - Construction - $10.6M (~$10.5M)
  - Total - $10.85M (~$10.84M)

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Final Wall Section

Lessons Learned

1. More communication between maintenance and design

2. Importance of an Asset Management Program

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Thank You