

# Lessons Learned in the Repair of Failed Walls



August 2, 2012

Nate Beard

# Mechanically Stabilized Earth (MSE) Wall Failures





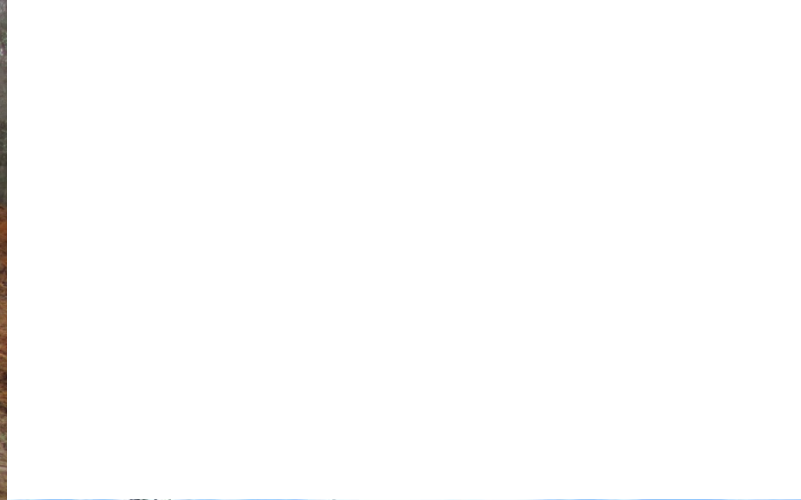
Crossgate Shopping Center  
Nashville, TN

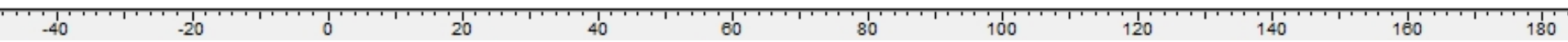
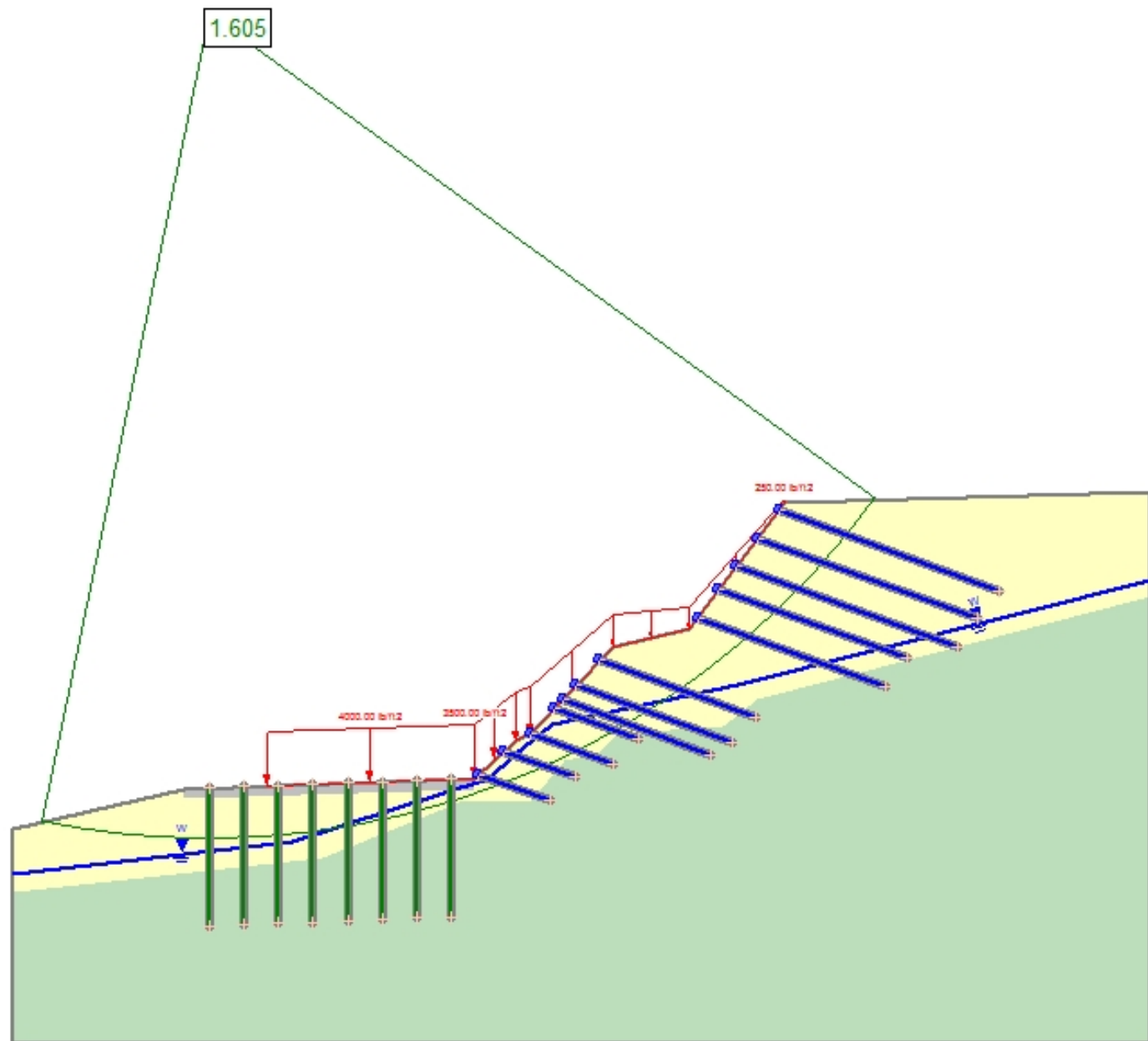
Competitively Bid Repair































Snowmass, CO







Deer Ridge Lane



Parking Lot 6, TOSV





US 421 in NC  
major artery  
Rapid drawdown during a heavy rainfall  
global failure

05/27/2009

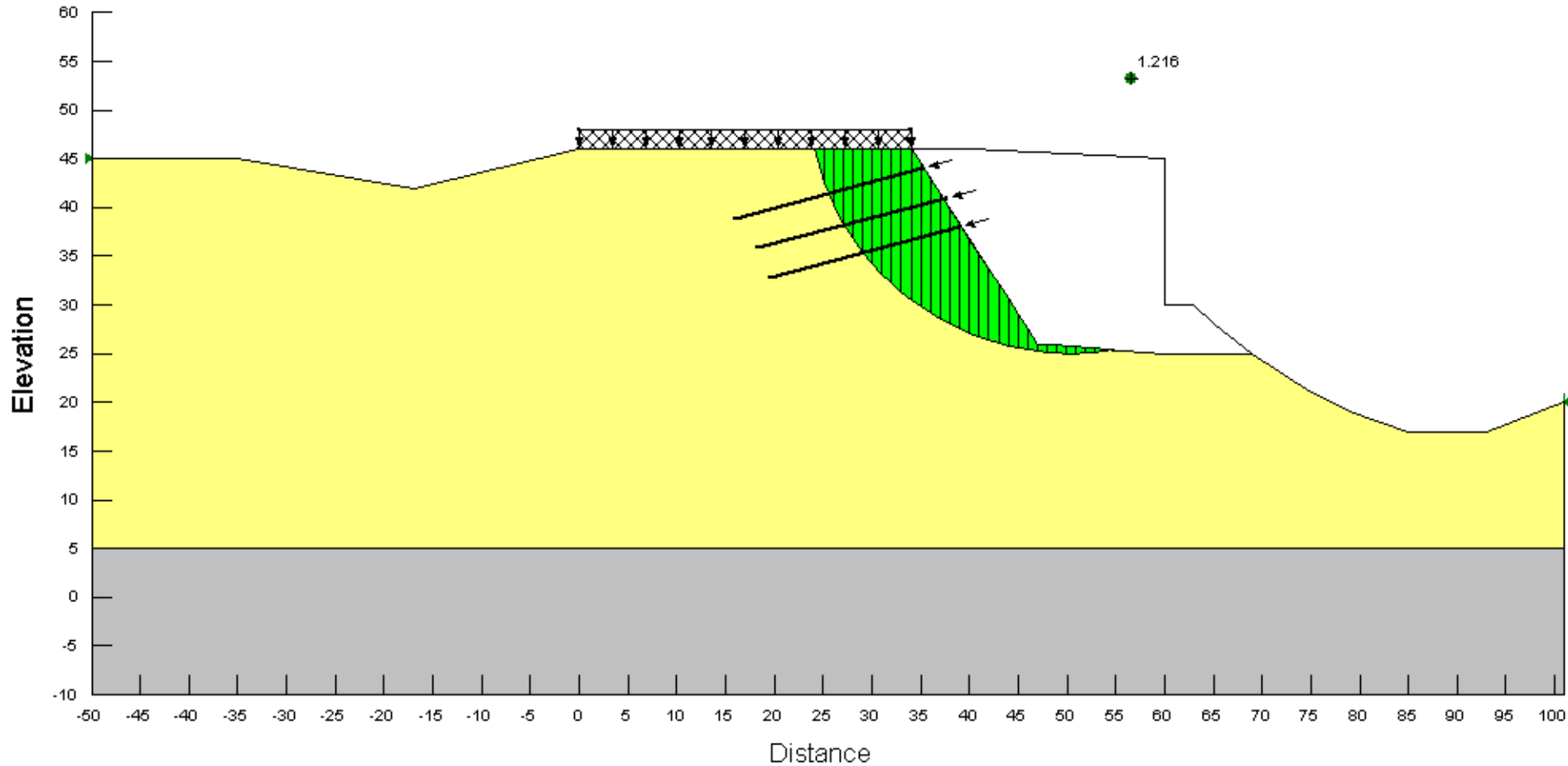


05/27/2009

SNLI Representatives were on site the following morning to assess the damage.



05/27/2009

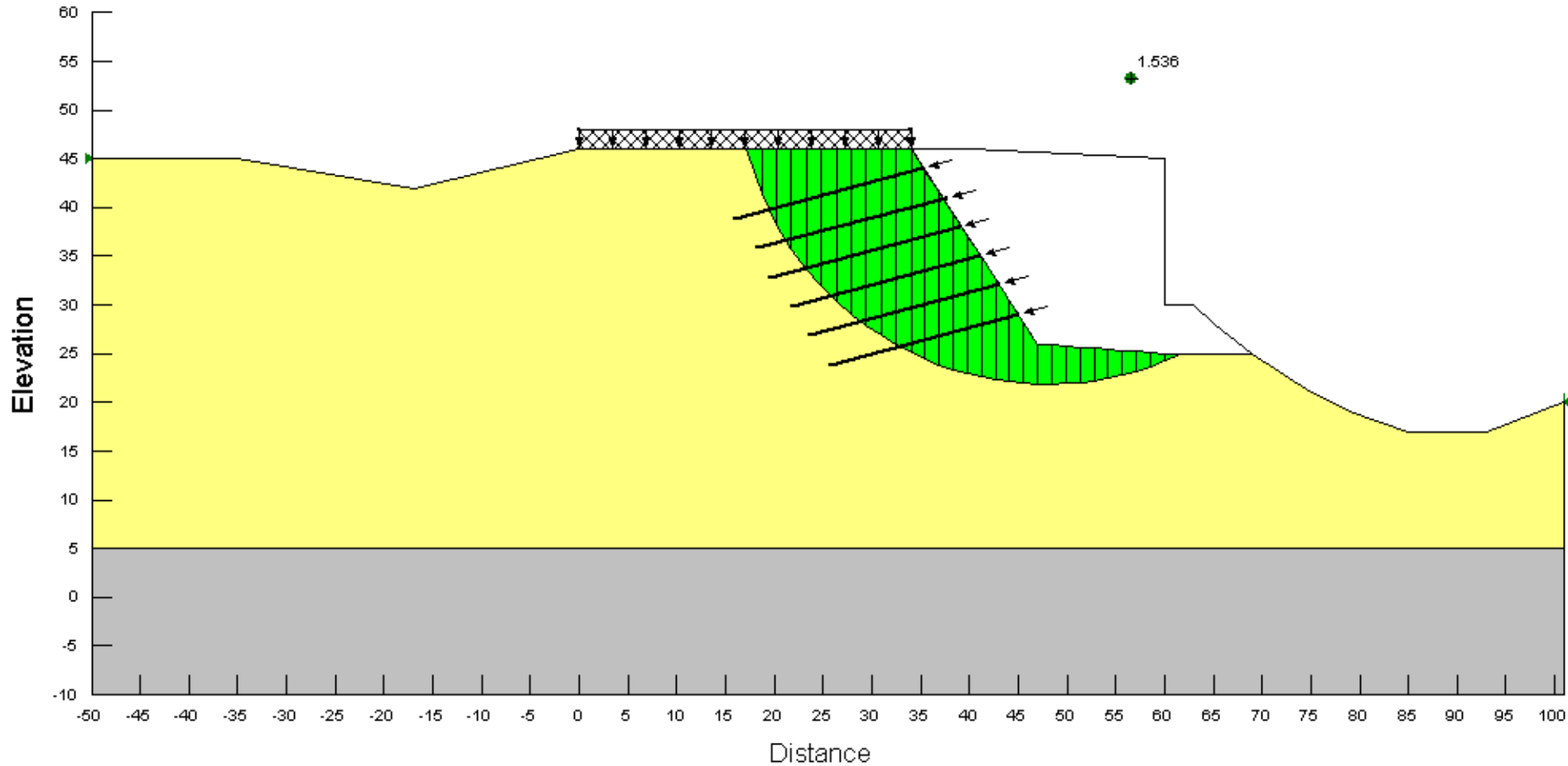


SNLI engineers used back-analysis methods to generate a repair scheme to allow equipment to enter the area. This design process took less than 6 hours. The target FOS was 1.2.

Crews and equipment were mobilized to the site at approximately 10 PM on the 28<sup>th</sup>. The crews worked through the night. By the end of the 29<sup>th</sup>, the roadway was reopened to partial traffic.

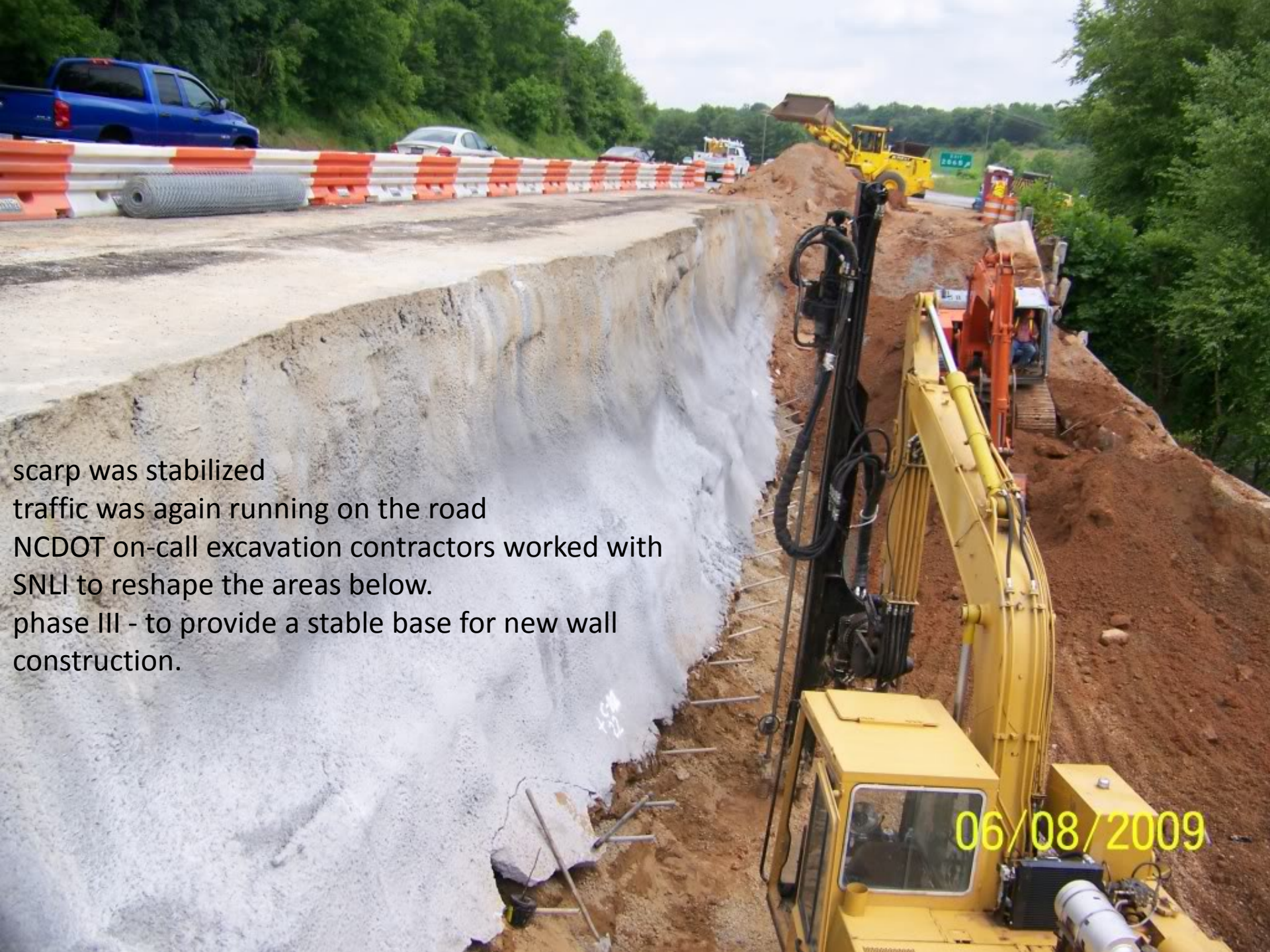


05/28/2009



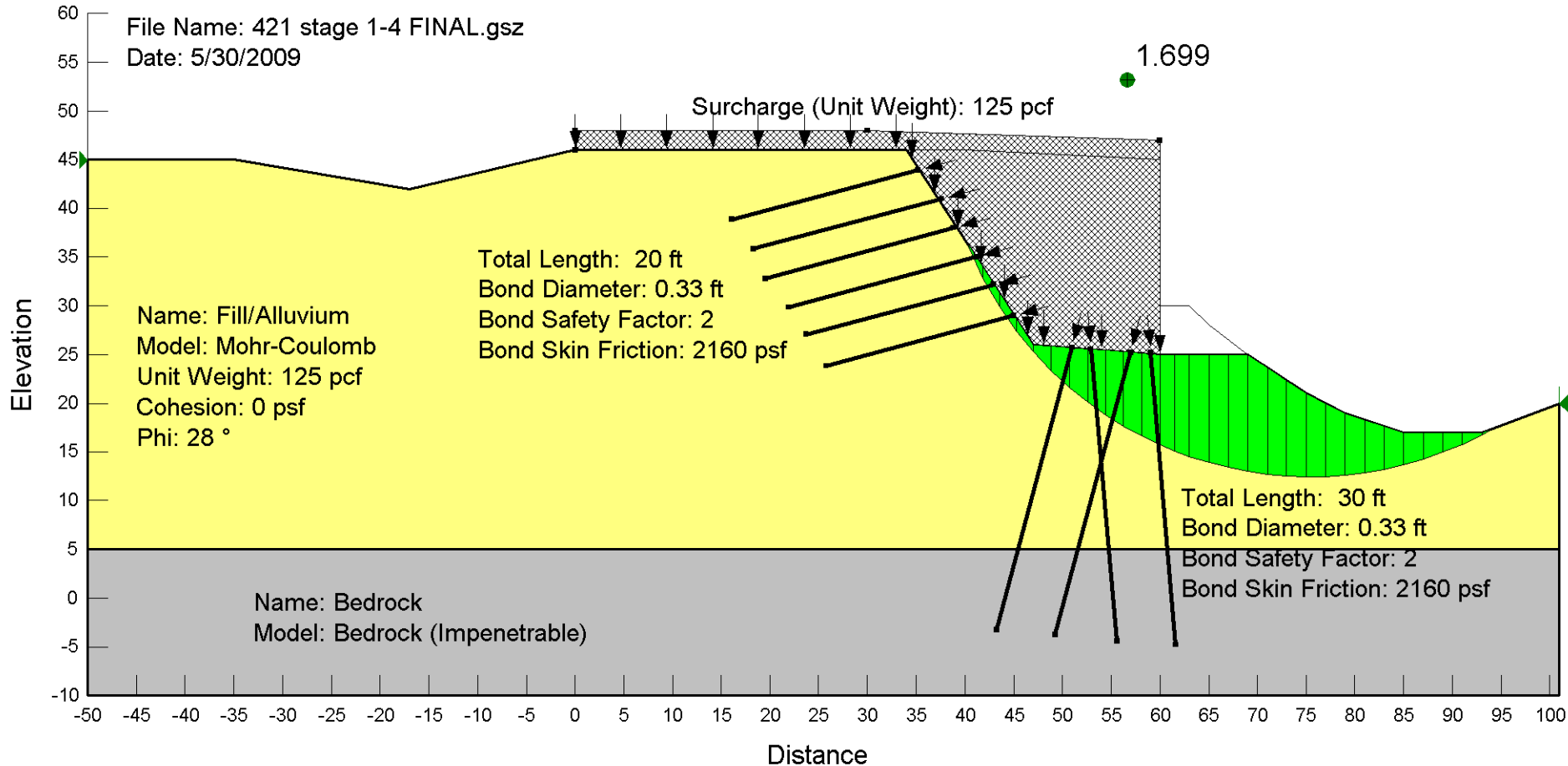
During phase II, SNLI staff engineers targeted getting the road back open to partial traffic. The target FOS was 1.5.





scarp was stabilized  
traffic was again running on the road  
NCDOT on-call excavation contractors worked with  
SNLI to reshape the areas below.  
phase III - to provide a stable base for new wall  
construction.

06/08/2009



During phase III, SNLI staff engineers designed a reticulated micropile foundation for a new retaining wall. Phase IV was the rebuild of the retaining wall on the reticulated micropile foundation. Target FOS was 1.5. At this point, SNLI engineers had better geotechnical data from the site

# Reticulated Micropile Array During Construction



07/02/2009



07/02/2009

# Rebuilding Retaining Wall



07/21/2009



07/21/2009

Retaining Wall Was then Shotcreted (Due to NCDOT Aesthetic Requirements)



07/24/2009

Project 4 months after completion



11/05/2009



# US 421 Project Highlights

- 24 hour response time for site visit.
- 36 hour mobilization, concurrent modeling.
- Roadway open in less than 4 days.
- Total project time: Less than 6 weeks

Shiloh Ridge  
Kennesaw, GA





Large Tension Crack  
60'L x 4'D



30" Grid Spacing  
3/4" Max Specified Particle Size

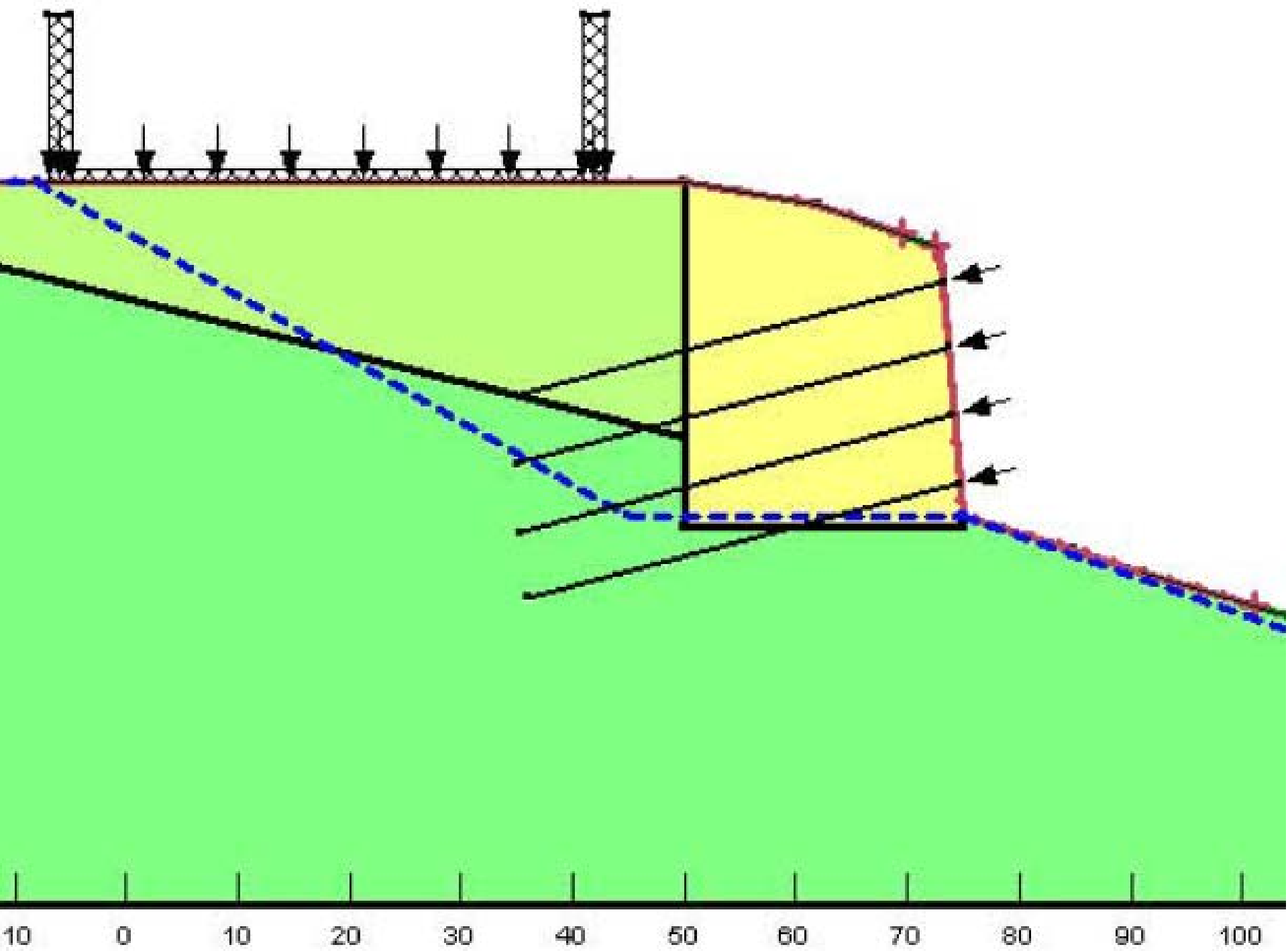


Non-Failed Sections



Water Flow  
Through Blocks

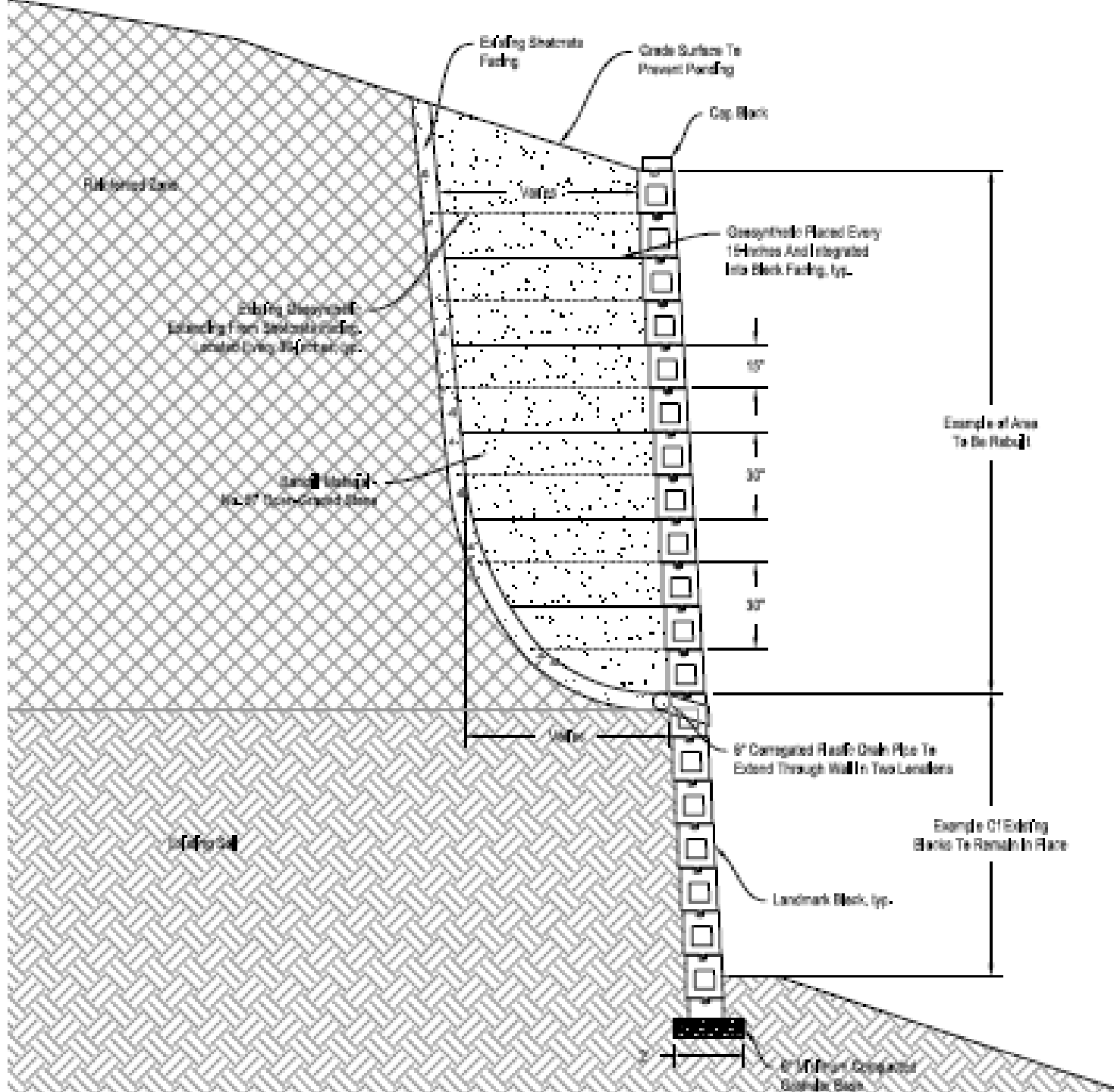






Slurry Consistency Soil Encountered  
21-feet from top of wall











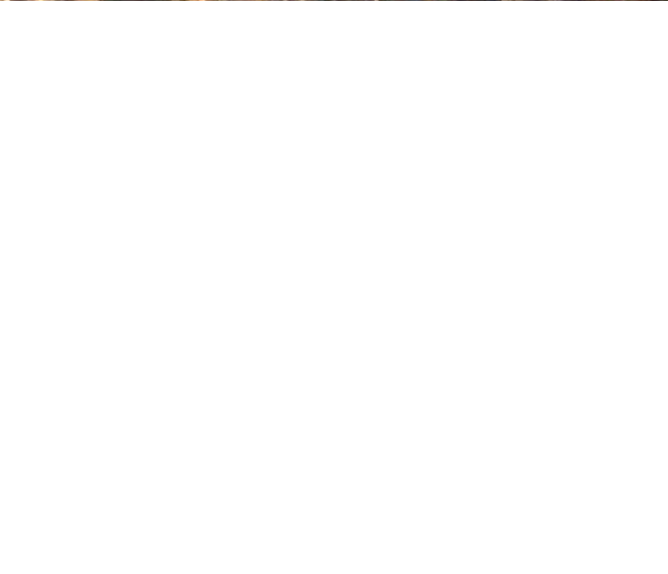
465858

GEHL

408050









Oregon - Jefferson Marion Bridge Repair  
No reinforcement in upper levels















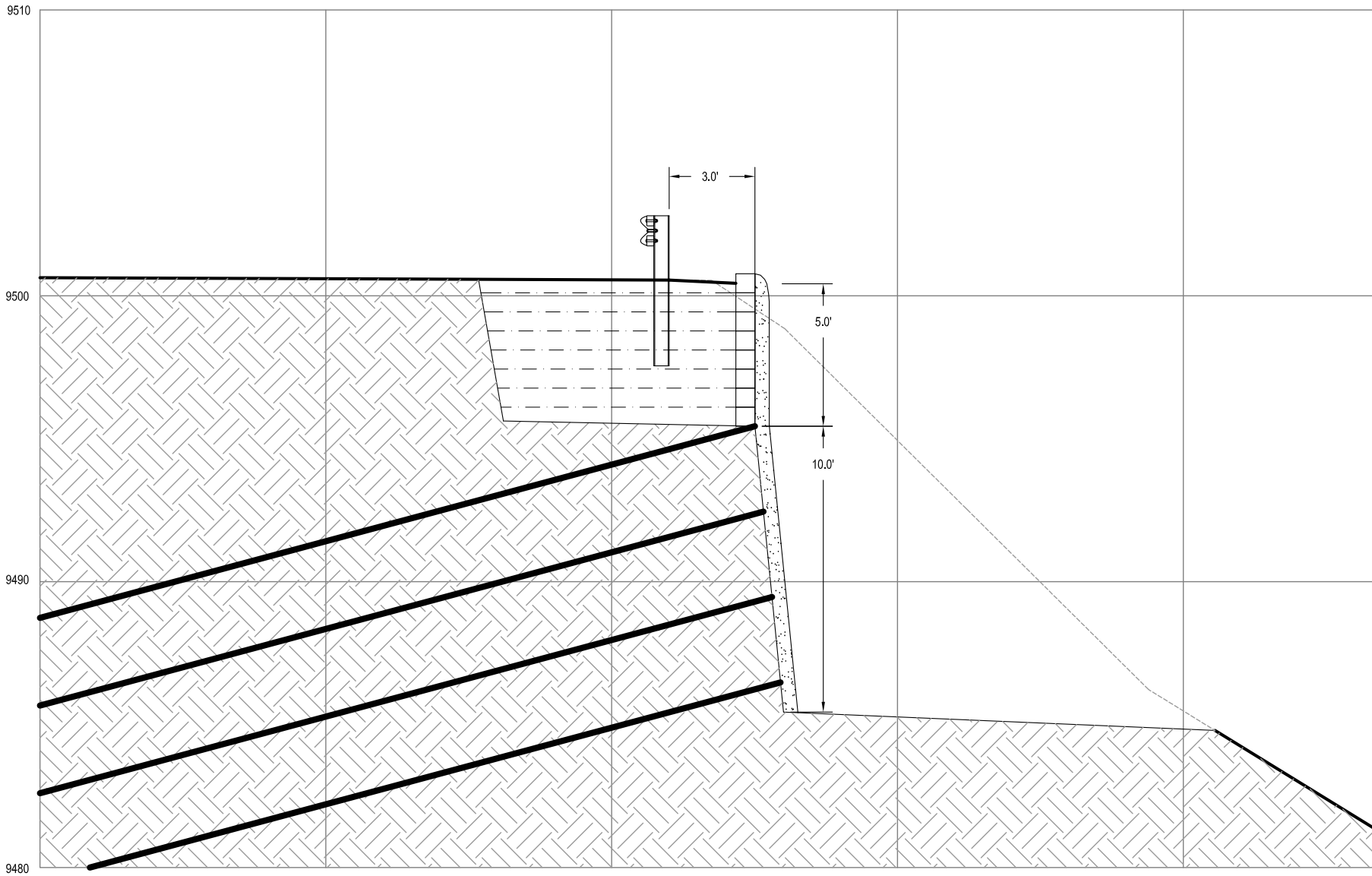
Kentucky  
Historic abutments







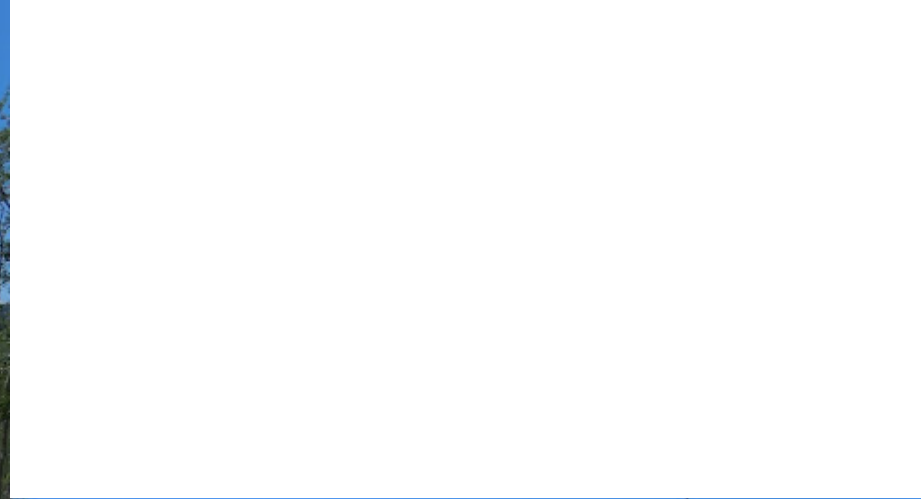




Sheet Revision	









# Railroad Rail Failures







04/22/2008



11/22/200



# Concrete Wall Failures





# Pile Wall Failures





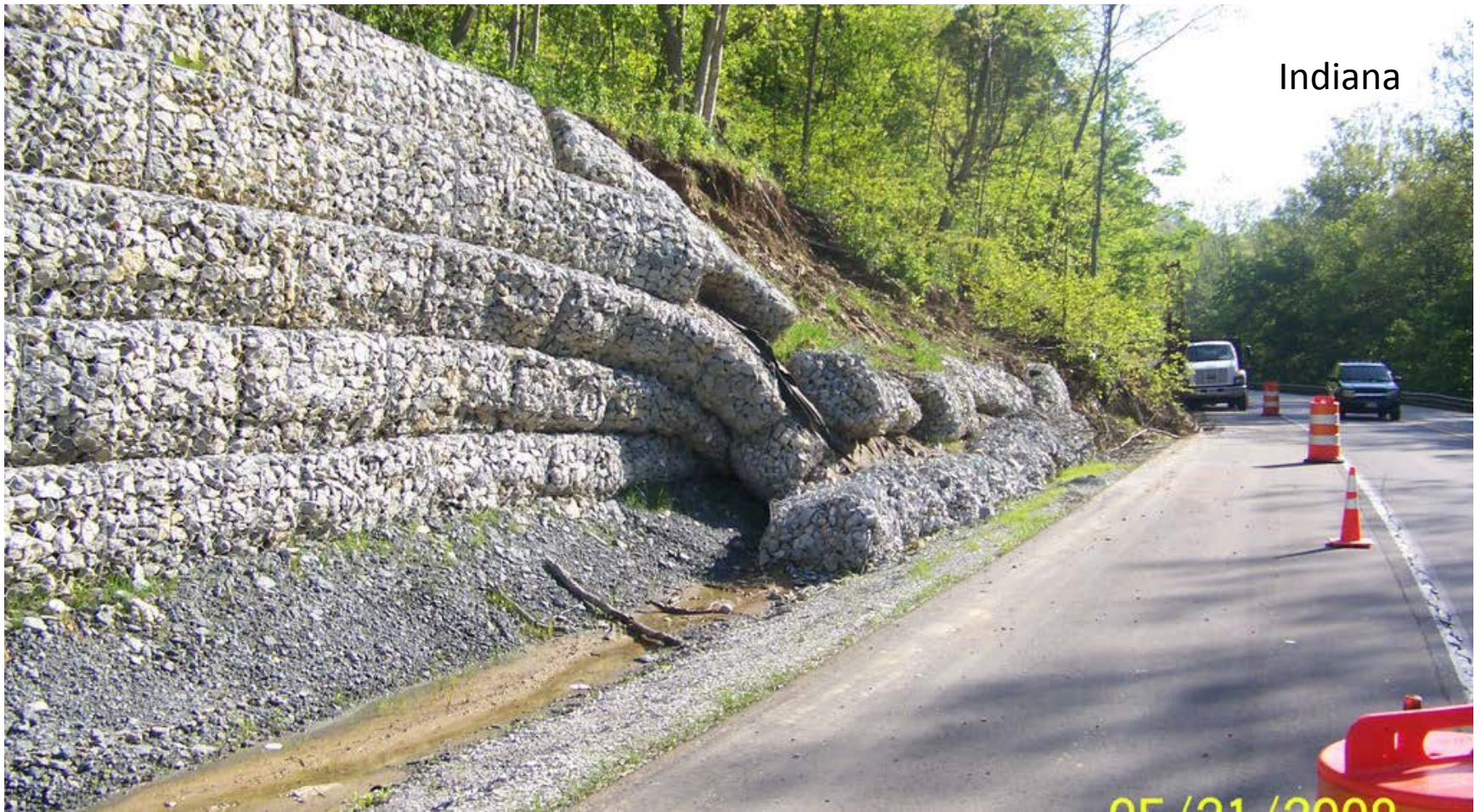








# Gabion Basket Wall Failures









West Virginia







# Rock Wall Repair

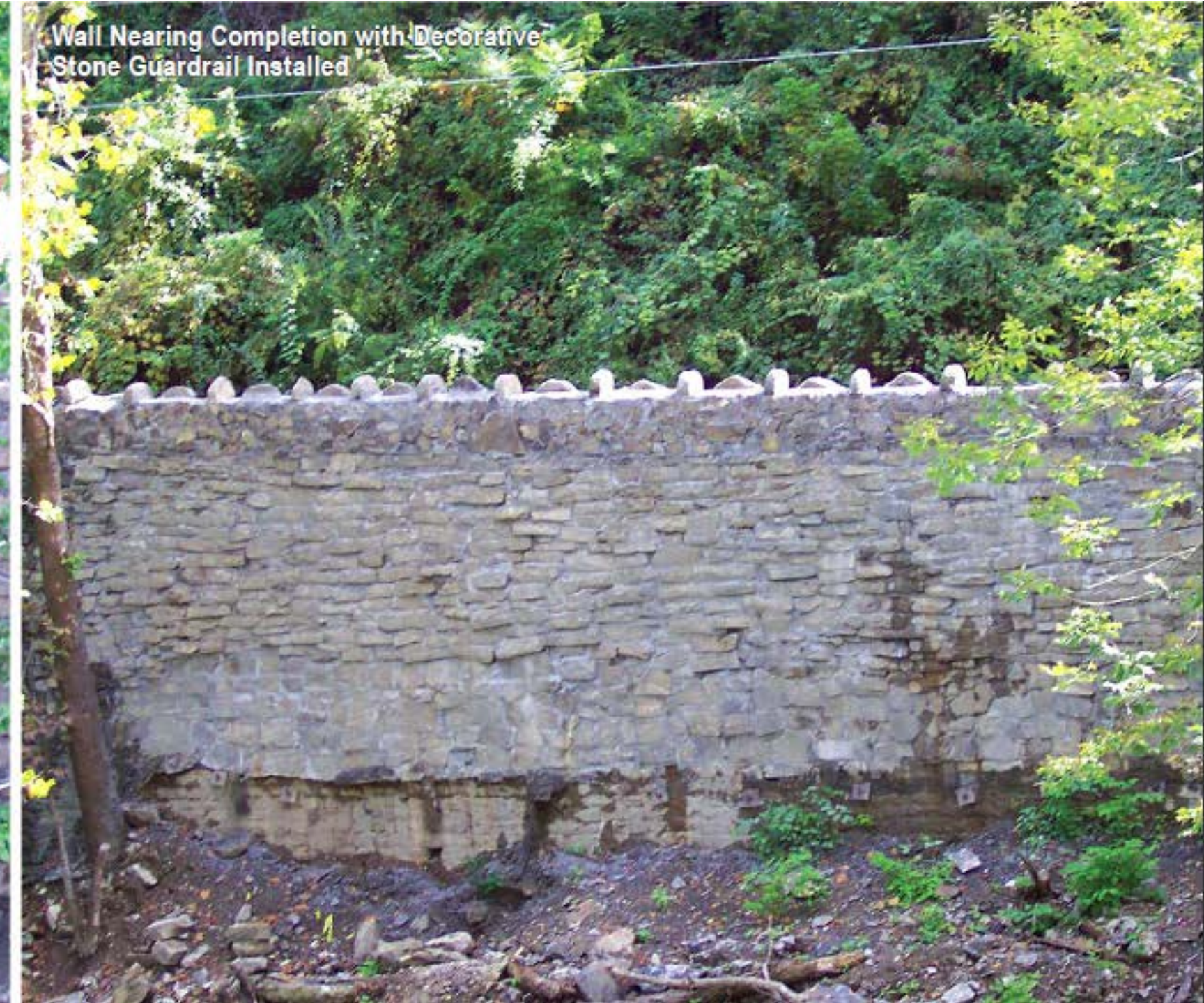


Appalachia, VA





Wall Nearing Completion with Decorative Stone Guardrail Installed



# Questions?

[www.soilnaillauncher.com](http://www.soilnaillauncher.com)