Northwest Cascade Construction

# Case Study

## Soil Nail Wall

**Date:** March 2004 - August 2004
**Job Name:** Rock Island Slopes, Soil Nail Wall Installation
**Owner:** WSDOT
**Location:** Wenatchee, Washington
**General Contractor:** Scarcella Bros.

The Rock Island Slopes are located off of Highway 28, approximately 500 feet east of the Columbia River, between the towns of Wenatchee and Quincy, Washington. During the summer months, the use of this highway more than doubles as a result of people traveling to enjoy the many recreational activities Eastern Washington has to offer. Severe traffic jams and long delays are the norm along this stretch of highway during the summer months. As a remedy to the summer traffic, WSDOT developed a plan that would increase the number of lanes from 2 to 4. In order to complete the proposed lane expansion, the eastern slopes would need to be blasted and scaled back to create enough space for 2 additional lanes.

Part of the plan was to construct a soil nail/shotcrete wall, 274 EA soil nails and 8900 SF of shotcrete facing, approximately 400 feet above and 150 feet east of the existing highway. The new soil nail/shotcrete wall would prevent blasting operations from eliminating any portion of the slope beyond the new soil nail/shotcrete wall.

The soil nail/shotcrete installation offered many unique challenges for Northwest Cascade, Inc. (NWC) throughout the duration of the project. Daily access to the jobsite proved to be a challenge, which consisted of extremely steep terrain along an existing Cliffside.

Transporting materials from the staging area to the project site became increasingly difficult and dangerous as the project progressed. A helicopter was eventually used to transport all materials after a D-8 Bulldozer was no longer capable of reaching the jobsite.

The soil conditions were very inconsistent throughout the duration of the project, containing numerous cobbles and boulders while encountering major fractures at different drilled depths. The unpredictable soils forced crews to implement different drilling methods from nail to nail. The fractures encountered caused crews to pump excessive amounts of grout into each drilled hole.

Johnson & Western Gunite was subcontracted to assist with the shotcrete placement for the project. A method was created to allow crews to pump concrete 500 feet – 800 feet vertically, up the face of the cliff and with enough pressure to place shotcrete on the wall. The method used required rock scalers to manually attach 4” diameter steel pipe, in 10’ sections along the entire face of the cliff. The steel pipe allowed crews to pump the concrete at very high pressures that were required to perform such a dramatic vertical climb. This method was performed without error, even in the extreme summer temperatures of Eastern Washington.

The challenges of the project proved NWC handles adversity and implements ingenuity while performing in unpredictable environments.

**Northwest Cascade Inc.**
www.nwcascade.com
800/ 444 - 2371