



APPENDIX

H Ground Anchors & Soil Nails

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Case Study – Soldier Pile Wall with Ground Anchors (Tieback)	H-2
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Case Study- Soldier Pile Wall with Tieback Anchors

Contract No. 04-1S2724 04 - SM - Rte 84 - PM 10.2
Soldier Pile Wall with Tieback Anchors (7.7 km west of Rte 35).
Completed in June 2004. \$850,000.00.

Hwy 84 runs through the Santa Cruz Mountains in San Mateo County. The forested hills form a ridge that separates the Pacific Ocean from San Francisco Bay and from Santa Clara Valley. Hwy 84, along with Hwy 1, 9, 17, and 35, are continuously being improved because of unstable slopes and erosion.

Project 04-1S2724 specified a soldier pile wall with *tieback anchors*. The wall prevents further erosion of the slope adjacent to a creek. The design specified 44 soldier piles with timber lagging. Two rows of tieback anchors are connected to concrete walers. A concrete barrier slab and concrete barrier with chain link fence is on top of the wall.



Soldier Pile Wall with Tieback Anchors within two concrete walers. Date: June 2004.
Fiber rolls placed along slope for erosion control. Photo by D. Dait, P.E., Sr Br Engr

Figure H-1. Completed Soldier Pile Wall

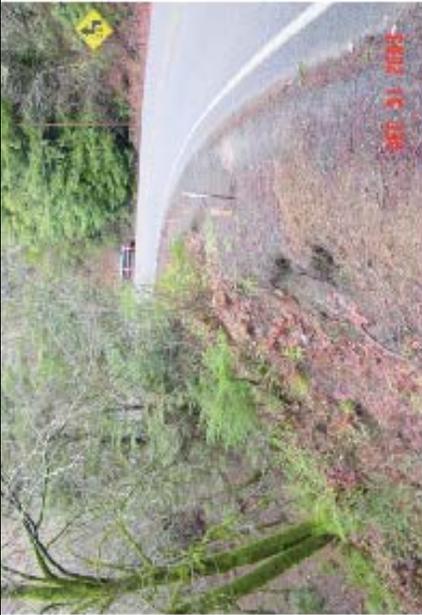
 <p style="color: red; font-size: small; text-align: right;">2003 11 20 03</p> <p>“Before”, Facing east. Survey stakes placed. Slope is eroding (on the left). 12/31/03</p>	 <p style="color: red; font-size: small; text-align: right;">2003 11 20 03</p> <p>“Before”, Facing west. Survey stakes placed. Slope is eroding. Existing drainage pipe and creek on right.</p>
 <p style="color: red; font-size: small; text-align: right;">2004 6 24</p> <p>“After”, Facing east. Type 7 chain link fence. Type 27 modified concrete barrier on top of barrier slab. 6/24/04</p>	 <p style="color: red; font-size: small; text-align: right;">2004 6 24</p> <p>“After”, Facing west. Wall is complete. Two rows of concrete walers (with tieback anchors). Creek on the right. 6/24/04</p>
<p>PROJ/RTE/PM: 04-SM-Rte 84-PM 10.2 Soldier Pile Wall with Tieback Anchors PROJECT NO. 04-1S2724 Photos by Dan Dait, P.E., Sr Br Engr</p>	
<p>Date: 2003/2004 Photo Page 1</p>	

Figure H-2. Soldier Pile Wall – Before and After.

Case Study - Soil Nail Wall

Contract No. 04-1123C4

04-SM - Rte 1- KP 61.2/62.2

Soil Nail Wall (South Rock Cut) near Devil's Slide.

Construction began in Spring 2005 and finished Spring 2006.

Description of Work:

The South Rock Cut Soil Nail Wall project, located in San Mateo County between the City of Pacifica and town of Montara, is part of the overall Devil's Slide Tunnel and Bridge work.

The large "rock-cut" at the Tunnel's south portal area is planned to align the highway and to provide adequate site distance. The face of the large rock-cut is designed to match the appearance of existing rock-cuts in the immediate view.

The South Rock Cut wall consists of a *soil nail wall*. The soil nail wall is composed of two walls separated by a 25m concrete barrier. Total length of walls is 281m (RW No. 2 is 190m long, RW No. 1 is 91m long). The soil nail assembly pay item equals 18, 860 meters.



Retaining Wall #2. Shotcrete sculpting at northern end of wall.

Photo by Ann Meyer, P.E., Structure Representative. Photo Date: Feb.24, 2006.

Figure H-3. Soil Nail Wall – Sculpted Facing.

 <p>Drilltech drilling top row of nails at Wall #2. Test nail installed between two nails. 8/09/05</p>	 <p>Drilltech shooting next section of initial shotcrete at Wall #1. 8/11/05</p>
 <p>Soil nail getting ready to be installed in a drilled hole. Grouting lower nail w/1" PVC grout tube. 8/04/05</p>	 <p>Drilltech crew installed 12" geocomposite drain strips between nail columns.</p>
<p>PROJ/RTE/PM: 04-SM-Rte1-KP 61.2/62/2 South Rock Cut Soil Nail Wall Date: 2005/2006 PROJECT NO. 04-1123C4 Photos by Ann Meyer, P.E., Structure Representative Photo Page 1</p>	

Figure H-4. Soil Nail Wall Construction 1.

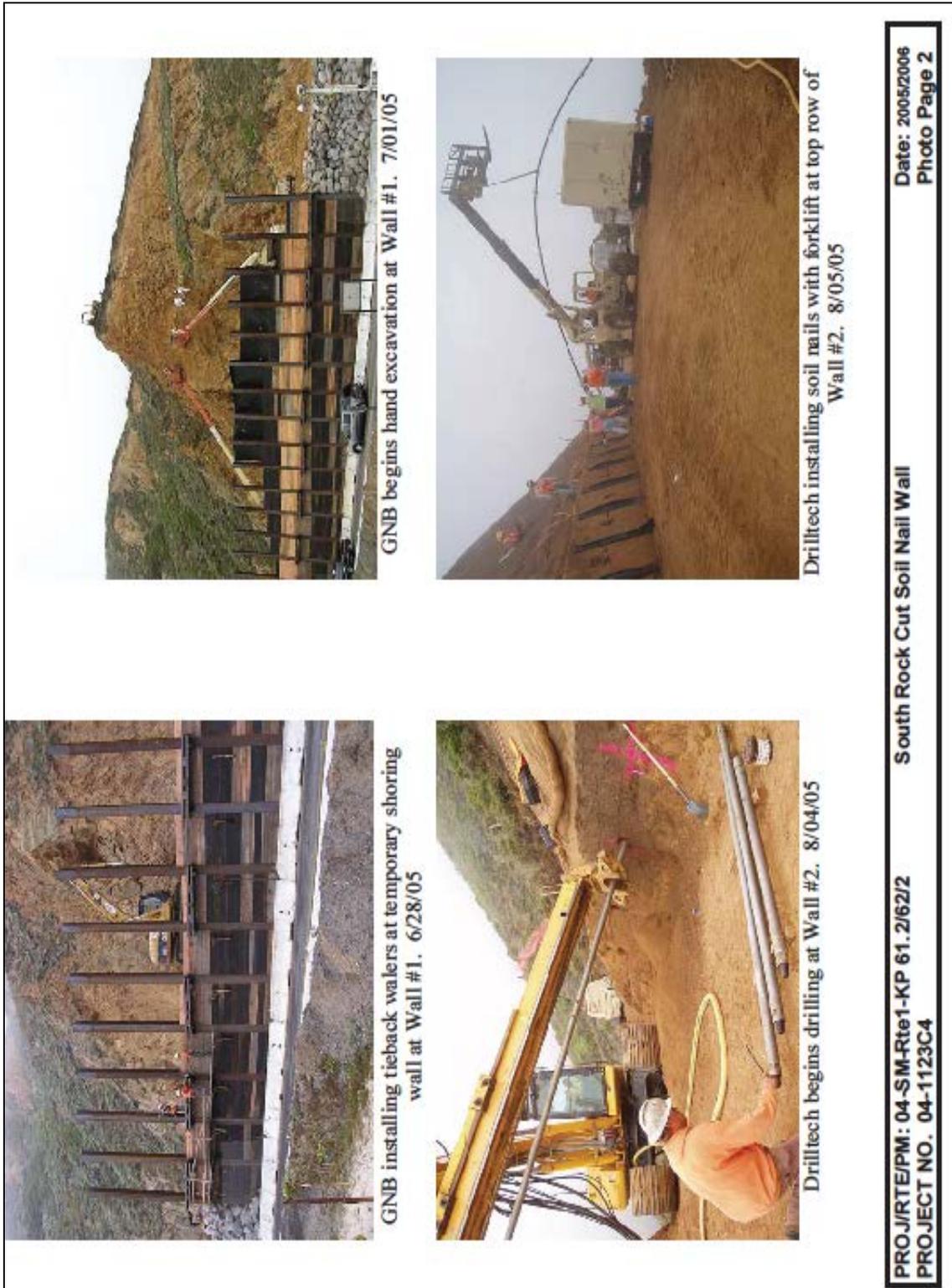


Figure H-5. Soil Nail Wall Construction 2.

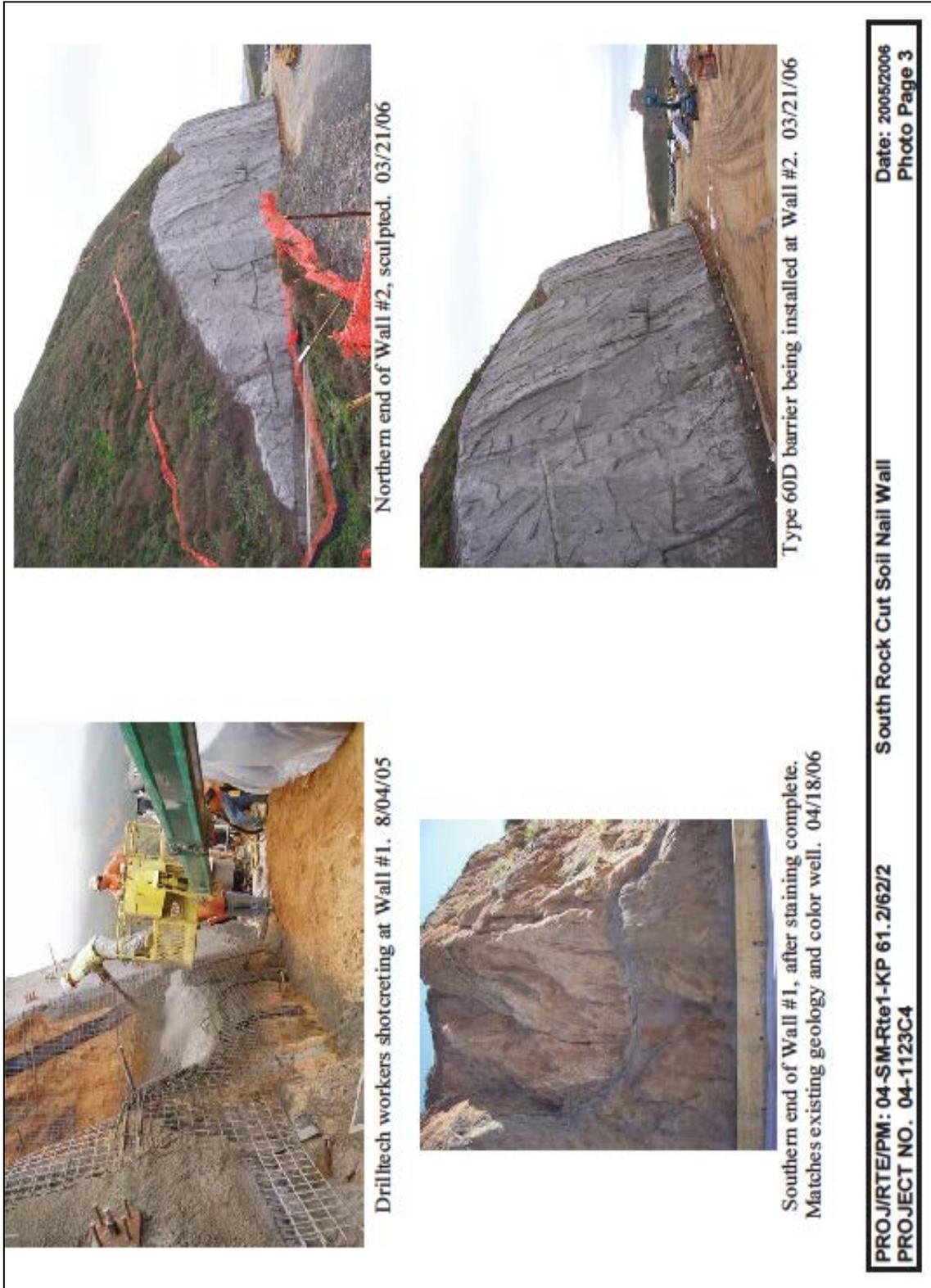


Figure H-6. Soil Nail Wall Construction 3.