

FOR CONTRACT NO.: 04-1A6824

# **INFORMATION HANDOUT**

## **MATERIALS INFORMATION**

**SOIL NAIL RECOMMENDATION FOR IMPACT RESISTANCE OF NEW BARRIER AND  
SLAB**

**ROUTE: 04-ALA-880-PM 28.2/29.9**

## Memorandum

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Be energy efficient!*

To: MR. BRIAN MORI  
Branch Chief  
Bridge Design Branch 8

Date: February 25, 2011

Attention: Nirav Shah

File: 04-ALA-880, PM 28.2/29.9  
04-1A6821  
0400020137  
Barrier Anchor by Soil Nails  
Recommendations

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Division of Engineering Services

Subject: Soil Nail Recommendations for Impact Resistance of New Barrier and Slab

Per your request, we have reviewed the replacement barrier design for the top of the existing retaining walls. There are two retaining walls which are adjacent to abutment 1 of the Fruitvale Avenue Overcrossing. The north and southbound retaining walls will have a new replacement barrier constructed on top of the wall. It is proposed to resist vehicle impact load on the new barrier by installing one row of soil nail embedded into the embankment and native soils below the embankment. The nails are anchored in a reinforced slab on which the barrier is mounted. The slab is approximately 20 inch thick and 4 ft wide.

The as-built plans for the Fruitvale Ave OC indicate the retaining walls are standard walls, and walls over 10 feet in height are supported by piles. We assume the backfill between the two walls is engineered fill. The as-built LOTBs indicate that the sub-surface material consist of gravelly material and soft to stiff clay.

Below is the design information for the soil nails. Please include a copy of the special provisions for the soil nail walls in the PS&E submittal. The section of the special provision related to the stability testing is not needed, and should be deleted.

The soil nail length required to meet the load requirement of 54 kips distributed over a 10 foot wall section is 25 feet. This is based on a soil nail design pull out load of 1.35 kips/ft, nail horizontal spacing of 5 ft center to center, and using a friction angle of 30 degrees and unit weight of 125 lbs/ft<sup>3</sup> for the embankment and native soil material. The design pull out load shall be included in the soil nail wall special provisions. The angle of the soil nail installation below the horizontal plane can vary between 10 to 20 degrees. We are recommending that temporary casing be used for the soil nails that will penetrate into the native material. For the northbound

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retaining wall, temporary casing will be required from Station 202+64.503 to Station 207+00.0. For the southbound retaining wall, temporary casing will be required from Station 206+60.675 to Station 207+50. The nails shall be sufficiently anchored into the reinforced slab. Per Structure Design request, the suggested detail was provided.

Groundwater may be present in the embankment and the underlying native soil especially during the rainy season. The contractor needs to be prepared to dewater the drilled holes, if required. We suggest that soil nails be installed during the dry season to minimize the impact of groundwater on the drilled holes and the soil nail installation.

If you have any questions, please contact David Nesbitt at (510) 622-0104 or Mahmood Momenzadeh at (510) 286-5732.

C: MMomenzadeh, TJPokrywka, Daily File, Route File

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