Outline

A. Project Overview
B. Traditional MSE Wall Construction Sequence
C. Advantages of SMSE Walls
D. MSE Wall Design
E. MSE Wall Construction
F. Soil Nail Wall Design
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Project Overview – NC 194 From Avery County Line to SR 1112 in Valle Crucis
Conventional Mechanically Stabilized Earth

Facing

Granular fill
Reinforcement
Leveling Pad
Conventional MSE Wall Construction
TYPICAL SOIL NAIL WALL SECTION “CUT WALL”
COMPLEX MSE STRUCTURES – SHORED MSE WALL

Figure 6-1. Types of complex MSE structures.

CURRENT FHWA MANUAL
Basic Design of MSE Walls
MSE WALL DESIGN

External Stability

Internal Stability
Shored MSE Walls

Shored Mechanically Stabilized Earth (SMSE) Wall Systems Design Guidelines

Publication No. FHWA-CFL/TD-06-001  February 2006

Figure 5. Flow chart. Flow chart for assistance in SMSE wall selection.

Notes:
1. Verify suitable soil conditions.
2. Most economical alternative.
3. Consider use of partial height shoring wall to reduce required shoring area.
5.1 POTENTIAL FAILURE MODES

Stability analysis of an SMSE wall system must consider failure modes associated with conventional MSE walls and shoring walls, plus internal failure modes specific to the compound nature of the SMSE wall system. Figure 13 illustrates the various failure modes of the composite SMSE wall system.

Figure 13. Diagram. SMSE wall system failure modes.
TYPICAL SECTION NC-194

MSE WALL OFFSET
0.5H FROM SOIL
NAIL WALL

NO CONNECTIONS REQUIRED

UNIT OF REINFORCED ZONE
SEPARATE UNCLASSIFIED FILL FROM SOIL BACKFILL

EXISTING GRADE

LEVELED GRADE

SEPARATION FABRIC
(Used for concrete pavement)

SEAL LOCATIONS WHERE GUARDRAIL INTERSECTS

FULL LENGTH REINF. STRIP (TYP.)
(TOP TWO ROWS AND ABOVE TOP OF SOIL NAIL WALL)

REINF. STRIP LENGTH VARIES—
SEE WALL ELEVATIONS

REDUCED LENGTH REINF. STRIP (TYP.)
(BELOW TOP OF SOIL NAIL WALL)

SOIL NAIL WALL
(REFER TO CONTRACT DRAWINGS & SCHNABEL PLANS FOR SOIL NAIL DETAILS)

UNDER DRAIN SHOULD OUTLET 10 FT BEYOND END OF WALLS AND EVERY 100 FT (OR AS DIRECTED BY NCDOT)
LATERALLY THROUGH WALLS (AT LEVELING PAD STEP LOCATIONS) AND DOWNSPOUT THROUGH SLOPE.

TYPICAL SECTION C
N.T.S.

SCHNABEL FOUNDATION COMPANY
SHORED MSE WITH “SANDWICH REINFORCEMENTS”

- NOT USED ON NC-194

IF SPACE BETWEEN MSE AND SOIL NAIL WALL IS LESS THAN 0.5H +/-, IT MAY BE NECESSARY TO ATTACH SOIL REINF. TO SOIL NAIL HEADS TO PROVIDE REINFORCEMENT IN BOTH DIRECTIONS.
Widening Applications

VARIES

0.7H

VARIES
DESIGN PROCESS – SHORED MSE WALLS

• OBTAIN FIELD SURVEY FROM CONTRACTOR – DEVELOP CROSS SECTIONS
• DETERMINE PRELIMINARY MSE WALL STRIP LENGTHS
• PROVIDE PRELIMINARY LAYOUT AND CROSS SECTIONS TO SOIL NAIL WALL DESIGNER
• COORDINATE SUBMITTALS WITH CONTRACTOR (2 SEPARATE DESIGN PACKAGES)
• NCDOT REVIEWS SOIL NAIL WALL SUBMITTAL AND MSE WALL SUBMITTAL AND CHECKS GLOBAL STABILITY
CROSS SECTION DEVELOPMENT