PROJECT SPECIAL PROVISIONS

ROADWAY

CLEARING AND GRUBBING – METHOD III:

(4-6-06) SP2 R02

Perform clearing on this project to the limits established by Method "III" shown on Standard No. 200.03 of the *Roadway Standard Drawings*.

BURNING RESTRICTIONS:

(7-1-95) SP2 R05

Open burning is not permitted on any portion of the right-of-way limits established for this project. Do not burn the clearing, grubbing or demolition debris designated for disposal and generated from the project at locations within the project limits, off the project limits or at any waste or borrow sites in this county. Dispose of the clearing, grubbing and demolition debris by means other than burning, according to state or local rules and regulations.

SHALLOW UNDERCUT:

(2-19-02) (Rev 7-18-06) SP2 R35

Perform undercut excavation and place a combination of fabric for soil stabilization and Class IV Subgrade Stabilization at locations as directed. Work includes performing undercut excavation, disposing of unsuitable material, furnishing and placing fabric for soil stabilization; and furnishing, placing and compacting Class IV Subgrade Stabilization.

Materials

Item	Section
Fabric for Soil Stabilization	270
Class IV Subgrade Stabilization	1016-3, Class IV, or Material meeting gradation requirements of Table 520-1, Column C

Construction Methods

Perform undercut excavation in accordance with Section 225 and/or Section 226.

Place fabric for soil stabilization in accordance with Section 270.

Place Class IV Subgrade Stabilization by back dumping material on previously placed fabric.

Compact material to 95% of AASHTO T-99, Method "D" density or compact material to the highest density that can be reasonably obtained.

Measurement and Payment

Undercut Excavation will be measured and paid for in accordance with Section 225 and/or Section 226 of the *Standard Specifications*.

Fabric for Soil Stabilization will be measured and paid for in accordance with Article 270-4 of the *Standard Specifications*.

Class IV Subgrade Stabilization, as accepted in place, will be measured and paid for by the ton in accordance with Section 106-7 of the *Standard Specifications*.

Payment will be made under:

Pay Item	Pay Unit
Undercut Excavation	Cubic Yard
Fabric for Soil Stabilization	Square Yard
Class IV Subgrade Stabilization	Ton

SHOULDER AND FILL SLOPE MATERIAL:
(5-21-02) SP2 R50

Description

Perform the required shoulder and slope construction for this project in accordance with the applicable requirements of Section 560 and Section 235 of the *Standard Specifications* except as follows:

Construct the top 6 inches of shoulder and fill slopes with soils capable of supporting vegetation.

Provide soil with a P.I. greater than 6 and less than 25 and with a pH ranging from 5.5 to 6.8. Remove stones and other foreign material 2 inches or larger in diameter. All soil is subject to test and acceptance or rejection by the Engineer.

Obtain material from within the project limits or approved borrow source.

Compensation

When the Contractor elects to obtain material from an area located beneath a proposed fill sections which does not require excavation for any reason other than to generate acceptable shoulder and fill slope material, the work of performing the excavation will be considered incidental to the item of *Borrow Excavation* or *Shoulder Borrow*. If there is no pay item for *Borrow* or *Shoulder Excavation* in the contract, this work will be considered incidental to *Unclassified Excavation*. Stockpile the excavated material in a manner to facilitate measurement by the Engineer. Fill the void created by the excavation of the shoulder and fill slope material with suitable material. Payment for material used from the stockpile will be made at the contract unit price for *Borrow Excavation* or *Shoulder Borrow*. If there is no pay item for *Borrow Excavation* or *Shoulder Borrow*, then the material will be paid for at the contract unit price for

Unclassified Excavation. The material used to fill the void created by the excavation of the shoulder and fill slope material will be made at the contract unit price for *Unclassified Excavation*, *Borrow Excavation*, or *Shoulder Borrow*, depending on the source of the material.

Material generated from undercut excavation, unclassified excavation or clearing and grubbing operations that is placed directly on shoulders or slope areas, will not be measured separately for payment, as payment for the work requiring the excavation will be considered adequate compensation for depositing and grading the material on the shoulders or slopes.

When undercut excavation is performed at the direction of the Engineer and the material excavated is found to be suitable for use as shoulder and fill slope material, and there is no area on the project currently prepared to receive the material generated by the undercut operation, the Contractor may construct a stockpile for use as borrow at a later date. Payment for the material used from the stockpile will be made at the contract unit price for *Borrow Excavation* or *Shoulder Borrow*.

When shoulder material is obtained from borrow sources or from stockpiled material, payment for the work of shoulder construction will be made at the contract unit price per cubic yard for *Borrow Excavation* or *Shoulder Borrow* in accordance with the applicable provisions of Section 230 or Section 560 of the *Standard Specifications*.

PIPE ALTERNATES:
(7-18-06) SP3 R35

Description

The Contractor may substitute Aluminized Corrugated Steel Pipe, Type IR or HDPE Pipe, Type S or Type D up to 48 inches in diameter in lieu of concrete pipe in accordance with the following requirements.

Material

Item	Section
HDPE Pipe, Type S or D	1044-7
Aluminized Corrugated Steel Pipe, Type IR	1032-3(A)(7)

Aluminized Corrugated Steel Pipe will not be permitted in counties listed in Article 310-2 of the *Standard Specifications*.

Construction Methods

Aluminized Corrugated Steel Pipe Culverts and HDPE Pipe Culverts shall be installed in accordance with the requirements of Section 300 of the *Standard Specifications* for Method A, except that the minimum cover shall be at least 12 inches. Aluminized Corrugated Steel Pipe Culvert and HDPE Pipe Culvert will not be permitted for use under travelways, including curb and gutter.

Measurement and Payment

The quantity of ____ "*Aluminized Corrugated Steel Pipe Culvert* to be paid for will be the actual number of linear feet installed and accepted. Measurement will be in accordance with Section 310-6 of the *Standard Specifications*.

The quantity of _____ "*HDPE Pipe Culvert* to be paid for will be the actual number of linear feet installed and accepted. Measurement will be in accordance with Section 310-6 of the *Standard Specifications*.

Payment will be made under:

Pay Item	**Pay Unit**
___" Aluminized Corrugated Steel Pipe Culverts, ___" Thick	Linear Foot
___" HDPE Pipe Culverts	Linear Foot

TEMPORARY SHORING: **12-19-06**

DESCRIPTION

This special provision governs the design and construction of temporary shoring in accordance with the plans and Standard Shoring Details as directed by the Engineer. The Standard Shoring Details include the *Standard Temporary Shoring Detail and the Standard Temporary Mechanically Stabilized Earth (MSE) Wall Details*.

Furnish, install and remove piling, shoring and bracing at locations shown on the plans and other locations as directed by the Engineer. Temporary shoring may be required to maintain traffic and for other reasons as shown on the plans or as determined by the Engineer. Unless noted otherwise on the plans, shoring required to maintain traffic is defined as shoring necessary to provide lateral support to the side of an excavation or embankment parallel to an open travelway when a theoretical 2:1 (H:V) slope from the bottom of the excavation or embankment intersects the existing ground line closer than 5 ft from the edge of pavement of the open travelway. No value engineering proposals will be accepted based solely on revising or eliminating the shoring locations shown on the plans or the estimated quantities shown in the bid item sheets as a result of actual field measurements or site conditions. The Engineer will determine whether value engineering proposals involving temporary shoring are acceptable.

For the purposes of this provision, "standard shoring" refers to both the *standard temporary shoring* and the *standard temporary MSE walls*. Unless noted otherwise on the plans or as directed by the Engineer, use the standard shoring or design a temporary shoring system in accordance with the "Contractor Designed Shoring" section of this provision. When the plans or the Engineer prohibit one or both types of standard shoring, Contractor designed shoring may be required. When the plans require a temporary MSE wall, use one of the standard temporary MSE wall options or submit an alternative temporary MSE wall design. Provide all shoring submittals in accordance with this provision before beginning work.

This provision applies to non-anchored temporary shoring systems, standard shoring and temporary MSE walls. If the Contractor chooses to provide an anchored temporary shoring system or any other shoring system for which this provision does not apply, the Engineer will provide an applicable special provision. Trench boxes are not considered temporary shoring and this provision is not applicable to trench boxes. This provision is also not applicable to the installation of pipes, drop inlets and utilities unless noted otherwise on the plans.

MATERIALS

(A) Certifications, Storage and Handling

Provide Type 7 Contractor's Certifications for all shoring materials used with the exception of reinforcing fabrics and geogrids. Furnish Type 5 Certified Test Reports for all seam strengths and reinforcing fabric and geogrid properties.

Load, transport, unload and store shoring materials such that they are kept clean and free of damage. Identification, storage and handling of all geogrids and geotextile fabrics shall meet the requirements of ASTM D4873 and as directed by the Engineer. Geogrids and fabrics with defects, flaws, deterioration or damage will be rejected. Do not leave fabric or geogrid uncovered for more than 7 days.

(B) Shoring Backfill

Use shoring backfill for the construction of all temporary shoring systems including filling behind non-anchored shoring and in the reinforced zone for temporary MSE walls. Shoring backfill around culverts shall meet the requirements of Class II Type I, Class III, Class V or Class VI in accordance with the Standard Specifications. Shoring backfill for all other applications shall meet the requirements for around culverts or AASHTO M145 for soil classification A-2-4 with a maximum plasticity index (PI) of 6.

(C) Non-anchored Temporary Shoring

Steel shapes, plates and piles shall meet the requirements of ASTM A36. Sheet piling shall be hot rolled and meet the requirements of ASTM A328. Timber lagging shall have a minimum allowable bending stress of 1000 psi and meet the requirements of Article 1082-1 of the Standard Specifications. For standard temporary shoring, use pile sections and lengths and lagging sizes as shown on Standard Temporary Shoring Detail.

(D) Temporary MSE Walls

Welded wire reinforcement forms, facings, mesh and mats shall meet the requirements of AASHTO M55 or M221. Connector bars and wires for welded wire wall components and support struts shall meet the requirements of AASHTO M32. For standard temporary MSE walls, use wire gauges, strut sizes and welded wire components as shown on the Standard Temporary MSE Wall Details.

(1) Geotextile Fabrics

Geotextile fabrics shall consist of strong rot-proof synthetic fibers and be free of any treatment or coating that might significantly alter the physical properties before or after installation. Fabric fibers shall contain stabilizers and/or inhibitors to make the filaments resistant to deterioration resulting from ultraviolet or heat exposure. The fabric shall be a pervious sheet of synthetic fibers oriented into a stable network so that the fibers retain their relative position with respect to each other. Finish the edges of the fabrics to prevent the outer fibers from pulling away from the fabric. Bond or sew seams together with a fungus resistant material and do not use nylon thread.

(a) Reinforcing Fabric

For the purposes of this provision, the reinforcement direction (RD) is defined as the direction perpendicular to the wall face and the cross-reinforcement direction (CRD) is defined as the direction parallel to the wall face. Do not splice reinforcing fabric in the RD.

Use woven polyester or polypropylene fabric that meets the following properties:

Property	Test Method	Requirement
Wide Width Tensile Strength @ Ultimate (RD)	ASTM D4595	Varies – 200 lb/in min
Wide Width Tensile Strength @ Ultimate (CRD)	ASTM D4595	100 lb/in min
Trapezoidal Tear Strength	ASTM D4533	100 lb min
CBR Puncture Strength	ASTM D6241	600 lb min
UV Resistance after 500 hrs	ASTM D4355	70 %
Apparent Opening Size (AOS), US Sieve	ASTM D4751	20 min – 70 max
Permittivity	ASTM D4491	0.20 sec^{-1}

All values above represent minimum average roll values (any roll in a lot should meet or exceed the minimum values shown in this table).

For standard temporary MSE walls (temporary fabric wall) use reinforcing fabric wide width tensile strengths and lengths in the RD as shown on the Standard Temporary MSE Wall Details.

(b) Retention Fabric

Retain shoring backfill at the face of temporary MSE walls with retention fabric. Fabric shall meet the requirements of Class 3 and the UV resistance, AOS and permittivity for separation geotextile in accordance with AASHTO M288.

(2) SierraScape Temporary Wall

Geogrids shall be uniaxial (UX) geogrids composed of high-density polyethylene (HDPE) manufactured by Tensar Earth Technologies. Test geogrid properties with the following methods:

Property	Test Method
Tensile Strength	ASTM D6637
Junction Strength	GRI-GG2*
Flexural Rigidity	ASTM D1388
Deterioration	ASTM D4355

*As modified by AASHTO Standard Specifications for Highway Bridges, 2002 Interim, using a single rib having the greater of 3 junctions or 8 in and tested at a strain rate of 10 % per minute based on this gauge length.

Connection rods are required to transfer the load between the facings and geogrids. Use rods manufactured by Tensar Earth Technologies composed of HDPE with fiberglass inclusions or oriented polypropylene.

For standard temporary MSE walls (SierraScape temporary wall) use geogrid types and lengths and a connection rod size as shown on the Standard Temporary MSE Wall Details.

(3) Terratrel Temporary Wall

Reinforcing strips shall be ribbed steel strips manufactured by The Reinforced Earth Company meeting the requirements of ASTM A572, grade 65 ksi steel. Connector rods shall meet the requirements of AASHTO M31, grade 60 ksi steel and hair pin connectors shall meet the requirements of ASTM A1011, grade 50 ksi steel. Bolts, nuts and washers shall meet the requirements of AASHTO M164.

For standard temporary MSE walls (Terratrel temporary wall) use ribbed steel strip size and lengths, rod lengths and diameters, hairpin connectors, bolts, nuts and washers as shown on the Standard Temporary MSE Wall Details.

EMBEDMENT

For the purposes of this provision, "embedment" is defined as the depth of the shoring below the bottom of the excavation or finished or existing grade in front of the shoring. For cantilever shoring, embedment is the depth of the piling below the grade in front of the shoring. For a temporary MSE wall, embedment is the difference between the grade in front of the wall and the bottom of the reinforced zone.

CONCRETE BARRIER AND CLEAR DISTANCE

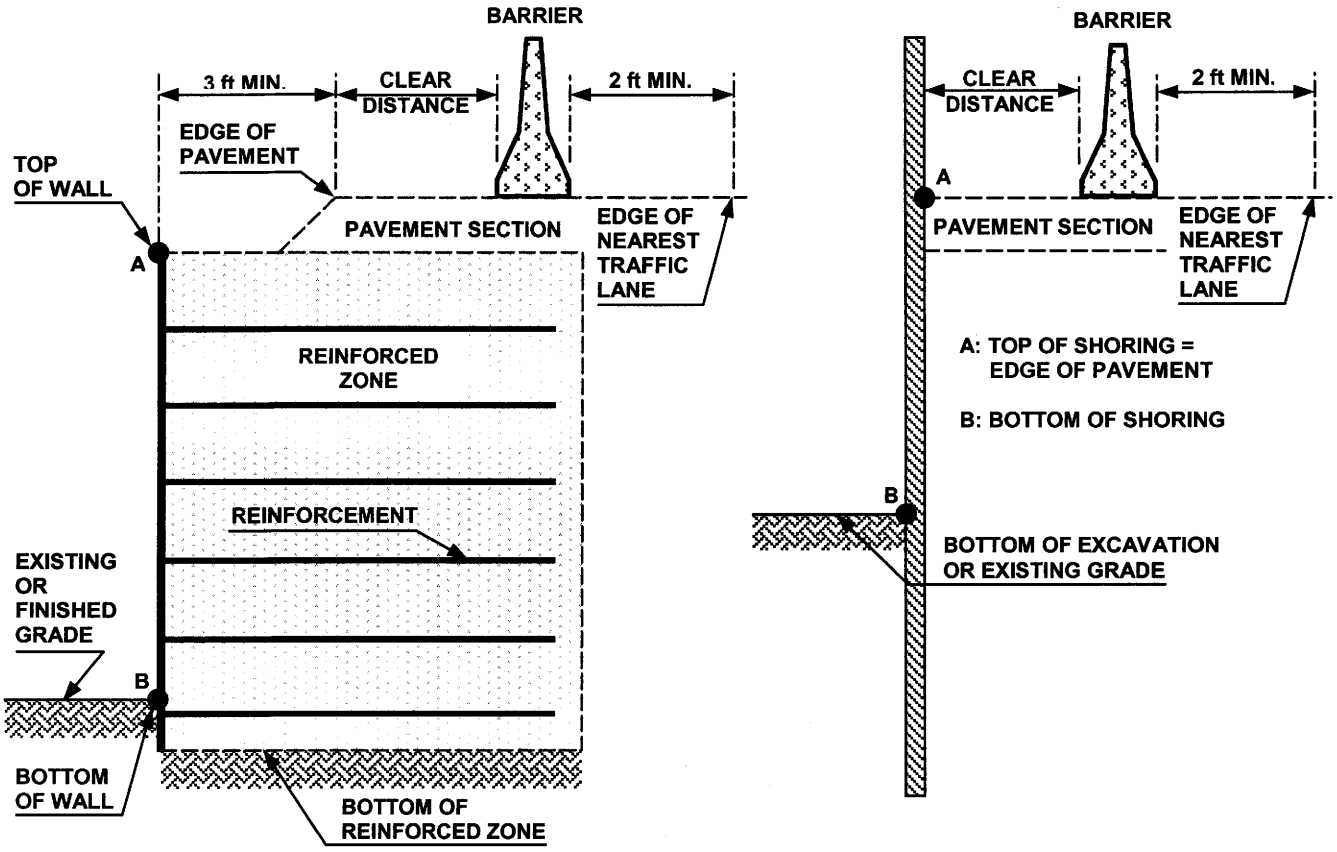
Provide portable concrete barriers to protect temporary shoring if shoring is located within the clear zone as defined in the latest edition of AASHTO Roadside Design Guide. Use NCDOT portable concrete barriers (PCBs) in accordance with Roadway Standard Drawing No. 1170.01 and Section 1170 of the Standard Specifications. Use Oregon Tall "F" Shape Concrete Barriers in accordance with the detail and provision located on the web at:

http://www.ncdot.org/doh/construction/wztc/DesRes/English/DesResEng.html

Unless noted otherwise on the plans, set portable concrete barriers with a minimum of 2 ft between the front face of the barrier and the edge of the nearest traffic lane. For portable concrete barriers above and behind temporary MSE walls, provide a minimum of 3 ft between the edge of pavement and the wall face. These distances are illustrated in the figures below. If these minimum required distances are not available, contact the Engineer.

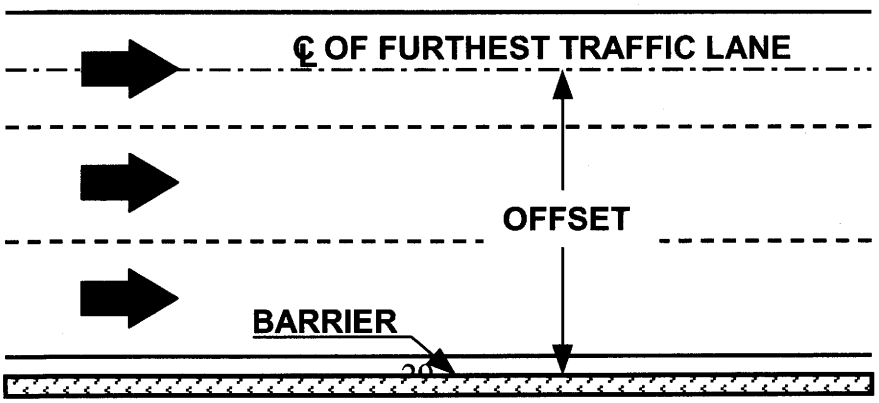
For traffic lanes and portable concrete barriers located above and behind temporary shoring, the following are defined as:

Clear Distance – Horizontal distance from the back face of the barrier to the edge of pavement as shown below for temporary MSE wall and non-anchored temporary shoring



NOTE: WALL OR SHORING HEIGHT

Offset **– Horizontal distance from the front face of the barrier to centerline of the furthest traffic lane as shown below for 3 traffic lanes**



Based on the clear distance, offset, design speed and pavement type, choose an unanchored PCB, anchored PCB or an Oregon barrier from the table below:

MINIMUM REQUIRED CLEAR DISTANCE, in

Barrier Type	Pavement Type	Offset ft	Design Speed, mph					
			<30	31-40	41-50	51-60	61-70	71-80
Unanchored PCB	Asphalt	< 8	**24**	**26**	**29**	**32**	**36**	**40**
		8-14	**26**	**28**	**31**	**35**	**38**	**42**
		14-20	**27**	**29**	**34**	**36**	**39**	**43**
		20-26	**28**	**31**	**35**	**38**	**40**	**44**
		26-32	**29**	**32**	**36**	**39**	**42**	**45**
		32-38	**30**	**34**	**38**	**41**	**43**	**46**
		38-44	**31**	**34**	**41**	**43**	**45**	**48**
		44-50	**31**	**35**	**41**	**43**	**46**	**49**
		50-56	**32**	**36**	**42**	**44**	**47**	**50**
		> 56	**32**	**36**	**42**	**45**	**47**	**51**
	Concrete	< 8	**17**	**18**	**21**	**22**	**25**	**26**
		8-14	**19**	**20**	**23**	**25**	**26**	**29**
		14-20	**22**	**22**	**24**	**26**	**28**	**31**
		20-26	**23**	**24**	**26**	**27**	**30**	**34**
		26-32	**24**	**25**	**27**	**28**	**32**	**35**
		32-38	**24**	**26**	**27**	**30**	**33**	**36**
		38-44	**25**	**26**	**28**	**30**	**34**	**37**
		44-50	**26**	**26**	**28**	**32**	**35**	**37**
		50-56	**26**	**26**	**28**	**32**	**35**	**38**
		> 56	**26**	**27**	**29**	**32**	**36**	**38**
Anchored PCB or Oregon Barrier	Asphalt	All Offsets	**24 for All Design Speeds**					
Anchored PCB or Oregon Barrier	Concrete (including bridge approach slabs)	All Offsets	**12 for All Design Speeds**					

Note: Table above is based on NCDOT Research Project No. 2005-010 with vehicle type used for NCHRP 350 crash tests. Barrier deflections and resulting minimum required clear distances might vary significantly for larger heavier vehicles and wet or dry pavement.

At the Contractor's option or if the minimum required clear distance is not available, set an unanchored PCB against the back of the shoring and design shoring for traffic impact in accordance with "Contractor Designed Shoring" section below or use the "surcharge case with traffic impact" for the standard temporary shoring. A portable concrete barrier option from the table above with the minimum required clear distance is required for barriers above and behind temporary MSE walls.

CONTRACTOR DESIGNED SHORING

Contractor designed shoring does not apply to temporary MSE walls designed by the Contractor. See "Standard Temporary MSE Walls" section of this provision for alternate temporary MSE walls in lieu of the standard temporary MSE wall options.

Before beginning design, survey the shoring location to determine existing elevations and actual design heights. Submit design calculations and drawings including typical sections for review and acceptance showing details of the proposed shoring design and construction sequence in accordance with Article 105-2 of the Standard Specifications. Have shoring designed, detailed and sealed by a Professional Engineer registered in the State of North Carolina. Submit 3 hard copies of design calculations and 10 hard copies of drawings and an electronic copy (pdf or jpeg format on CD or DVD) of both the calculations and drawings.

For the purposes of this provision, the following are defined as:
Top of Shoring – Point at which the grade intersects the back face of the shoring
Bottom of Shoring – Point at which the grade intersects the front face of the shoring
Shoring Height (h) – Difference between the top and bottom of shoring

Design temporary shoring for a 3-year design service life and in accordance with the latest edition of AASHTO Guide Design Specifications for Bridge Temporary Works. Design temporary shoring for a traffic surcharge equal to 240 psf. This surcharge is not applicable for construction traffic. If a construction surcharge will be present within a horizontal distance of the shoring equal to "h", design the shoring for the required construction surcharge. If the edge of pavement or a structure to be protected is within a horizontal distance of the shoring equal to "h", design shoring for a maximum of 3 in of deflection. Otherwise, design shoring for a maximum of 6 in of deflection.

Use 2 kips/ft applied at 1.5 ft above the ground line behind the shoring for traffic impact. When designing for traffic impact, extend the shoring at least 32 in above the top of shoring elevation and set the barrier against the back of the shoring. Otherwise, extend shoring at least 6 in above the top of shoring elevation.

STANDARD SHORING

The standard shoring is based on the following in-situ assumed soil parameters:

- Total Unit Weight = 120 pcf
- Friction Angle = 30 degrees
- Cohesion = 0 psf

Groundwater is assumed to be below bottom of shoring or bottom of reinforced zone for temporary MSE walls.

Do not use standard shoring when the groundwater elevation is above the bottom of shoring or bottom of reinforced zone for temporary MSE walls. Also, do not use the standard shoring when very loose or soft soil or muck is present within the embedment depth for the standard temporary shoring or below the bottom of reinforced zone for standard temporary MSE walls. If the assumed soil parameters are not applicable or the groundwater elevation is too high, Contractor designed shoring is required.

When the alignment of a standard temporary MSE wall results in an interior angle less than 90 degrees, submit an acute corner detail for the specific situation in accordance with the wall vendor recommendations. Also, submit a "Standard Temporary MSE Wall Selection Form" for each standard temporary MSE wall location and a "Standard Temporary Shoring Selection Form" for up to three standard temporary shoring locations. Submit all these items at least 14 days before beginning the associated construction.

The standard shoring selection forms are located on the web at:
http://www.doh.dot.state.nc.us/preconstruct/highway/geotech/formprovdet/

(A) Standard Temporary Shoring

The standard temporary shoring is based upon the following conditions:

- Maximum shoring height is 12 ft.
- Traffic surcharge is 240 psf maximum or backslope is 2:1 (H:V) or flatter.
- Bottom of excavation or existing grade in front of shoring is 6:1 (H:V) slope or flatter.
- H pile spacing is 6 ft.
- H pile embedment depths are for driven piles. H pile embedment depths for piles placed in drilled holes are 75% of the embedment depths shown for driven piles.
- Timber lagging is a minimum of 3 in thick.

If these conditions are not met, a Contractor designed shoring may be required.

Determine the shoring height, traffic impact, groundwater condition and slope or surcharge case for each standard temporary shoring location. Determine the minimum required extension, embedment and sheet pile section modulus or H pile section from the Standard Temporary Shoring Detail for each location. Provide sheet piling or H piles and timber lagging that meets the minimum requirements.

(B) Standard Temporary MSE Walls

The standard temporary MSE walls are based upon the following conditions:

- Maximum wall height is 28 ft.
- Traffic surcharge is 240 psf maximum or backslope is 2:1 (H:V) or flatter.
- Existing or finished grade in front of wall is 6:1 (H:V) slope or flatter.
- The grade of the top of wall is less than 4% for retained earth and Terratrel temporary walls.
- Design service life is 3 years.
- Material in reinforced zone is shoring backfill.
- Maximum applied bearing pressure is 1 tsf for wall heights up to 8 ft, 2 tsf for wall heights between 8 and 18 ft and 3 tsf for wall heights over 18 ft.

If these conditions are not met, a Contractor designed shoring may be required.

Five options are provided in the Standard Temporary MSE Wall Details. Each option with the reinforcement type, vendor and contact information are listed below:

Standard Temporary MSE Wall Option	Reinforcement Type	Vendor and Contact Information
Temporary Fabric Wall Hilfiker Temporary Wall	Polyester or Polypropylene Fabric Welded Wire Mat	N/A Hilfiker Retaining Walls 1902 Hilfiker Lane Eureka, CA 95503-5711 (707) 443-5093 www.hilfiker.com
SierraScape Temporary Wall	Geogrid	Tensar Earth Technologies, Inc. 5883 Glenridge Drive, Suite 200 Atlanta, GA 30328-5363 (404) 250-1290 www.tensarcorp.com
Retained Earth Temporary Wall	Welded Wire Mesh	The Reinforced Earth Company 8614 Westwood Center Drive, Suite 1100 Vienna, VA 22182-2233 (703) 749-4325 www.reinforcedearth.com
Terratrel Temporary Wall	Ribbed Steel Strips	The Reinforced Earth Company 8614 Westwood Center Drive, Suite 1100 Vienna, VA 22182-2233 (703) 749-4325 www.reinforcedearth.com

Step bottom of reinforced zone in increments equal to vertical reinforcement spacing for the wall option chosen. Determine the wall height and slope or surcharge case for each section of standard temporary MSE wall. With the exception of either the first or last section of wall, use horizontal section lengths in increments equal to the following for the wall option chosen.

Standard Temporary MSE Wall Option	Increment
Temporary Fabric Wall	9 ft min (varies)
Hilfiker Temporary Wall	10 ft min (varies)
SierraScape Temporary Wall	18 ft – 7 ¼ in
Retained Earth Temporary Wall	24 ft
Terratrel Temporary Wall	19 ft – 8 in

Determine the appropriate facings and/or forms and reinforcement length, spacing, strength, type, density and/or size from the Standard Temporary MSE Walls Details for each wall section. Provide facings, forms and reinforcement that meet the minimum requirements.

Do not use more than one temporary MSE wall option or type per wall location. An alternate temporary MSE wall type may be submitted for review and acceptance in lieu of the standard temporary MSE wall options above. When this occurs, submit design calculations and drawings for review and acceptance showing details of the proposed temporary MSE wall design and construction sequence in accordance with Article 105-2 of the Standard Specifications. Submit 3 hard copies of design calculations and 10 hard copies of drawings and an electronic copy (pdf or jpeg format on CD or DVD) of both the calculations and drawings.

Have the temporary MSE wall designed, detailed and sealed by a Professional Engineer registered in the State of North Carolina. Design the temporary MSE wall for a 3-year design service life in accordance with the latest edition of AASHTO Allowable Stress Design Standard Specifications for Highway Bridges. Use the in-situ assumed soil parameters from the "Standard Shoring" section of this provision for design.

CONSTRUCTION REQUIREMENTS

When using an anchored PCB, anchor the barrier in accordance with Roadway Standard Drawing 1170.01 and Section 1170 of the Standard Specifications. Control drainage during construction in the vicinity of temporary shoring. Collect and direct run off away from temporary MSE walls, shoring and shoring backfill.

(A) Non-anchored Temporary Shoring

Install and interlock sheet piling or install piles as shown on the approved plans or the Standard Temporary Shoring Detail with a tolerance of ½ inch per foot from vertical. Contact the Engineer if the design embedment is not achieved. If piles are placed in

drilled holes, perform pile excavation to the required elevations and backfill the excavations with concrete and lean sand grout.

Remove grout as necessary to install timber lagging. Install timber lagging with a minimum bearing distance of 3 in on each pile flange. Backfill voids behind lagging with shoring backfill.

Perform welding in accordance with the approved plans and Article 1072-20 of the Standard Specifications.

(1) Pile Excavation

Excavate a hole with a diameter that will result in at least 3 in of clearance around the entire pile. Use equipment of adequate capacity and capable of drilling through soil and non-soil including rock, boulders, debris, man-made objects and any other materials encountered. Blasting is not permitted to advance the excavation. Blasting for core removal is only permitted when approved by the Engineer. Dispose of drilling spoils in accordance with Section 802 of the Standard Specifications and as directed by the Engineer. Drilling spoils consist of all excavated material including water removed from the excavation either by pumping or drilling tools.

If unstable, caving or sloughing soils are encountered, stabilize the excavation with steel casing. Steel casing may be either the sectional type or one continuous corrugated or non-corrugated piece. Steel casings should consist of clean watertight steel of ample strength to withstand handling and driving stresses and the pressures imposed by concrete, earth or backfill. Use steel casings with an outside diameter equal to the hole size and a minimum wall thickness of ¼ in.

Before placing concrete, check the water inflow rate in the excavation after any pumps have been removed. If the inflow rate is less than 6 in per half hour, remove any water and free fall the concrete into the excavation. Ensure that concrete flows completely around the pile. If the water inflow rate is greater than 6 in per half hour, propose a concrete placement procedure to the Engineer. The Engineer must approve the concrete placement procedure before placing concrete.

Center the pile in the excavation and fill the excavation with Class A concrete in accordance with Section 1000 of the Standard Specifications except as modified herein. Provide concrete with a slump of 6 to 8 in. Use an approved high-range water reducer to achieve this slump. Place concrete in a continuous manner to the bottom of the excavation. Fill the remainder of the excavation with a lean sand grout to the ground surface and remove all casings.

(B) Temporary MSE Walls 36

The Engineer may require a wall preconstruction meeting to discuss the construction and inspection of the temporary MSE walls. If required, conduct the meeting with the Site Superintendent, the Resident or Bridge Maintenance Engineer and/or his or her representatives, the Bridge Construction Engineer and the Geotechnical Operations Engineer before beginning wall construction.

Perform all necessary clearing and grubbing in accordance with Section 200 of the Standard Specifications. Excavate as necessary for standard temporary MSE walls in accordance with the following for the wall option chosen:

- minimum embedment of 18 in unless wall bears on rock, concrete or pavement as determined by the Engineer
- vertical steps in increments equal to the vertical reinforcement spacing
- with the exception of either the first or last section of wall, horizontal section lengths in increments equal to those shown in the "Standard Shoring" section of this provision

Notify the Engineer when foundation excavation is complete. Do not place shoring backfill or the first reinforcement layer until obtaining approval of the excavation depth and checking foundation material for in-situ assumed soil parameters.

If applicable, install foundations located within the reinforced zone before beginning wall construction unless directed otherwise by the Engineer.

For standard temporary MSE walls, erect and maintain facings and forms as shown on the Standard Temporary MSE Wall Details. Stagger vertical joints of facings and forms to create a running bond when possible unless shown otherwise on the details.

Place facings and forms as near to vertical as possible with no negative batter. Construct temporary MSE walls with a vertical and horizontal tolerance of 3 in when measured with a 10 ft straight edge and an overall vertical plumbness (batter) and horizontal alignment of less than 6 in.

For standard temporary MSE walls, place reinforcement at the locations and elevations shown on the Standard Temporary MSE Wall Details. Repair or replace any damaged reinforcement to the satisfaction of the Engineer. Contact the Engineer when existing or future structures such as pavements, pipes, inlets or utilities will interfere with the reinforcement. To avoid structures, deflect, skew and modify reinforcement as directed by the Engineer. Place reinforcement in slight tension free of folds, wrinkles or creases.

Do not splice reinforcement in the reinforcement direction (RD), i.e., parallel to the wall face. Seams are allowed in the cross-reinforcement direction (CRD). Bond or sew adjacent reinforcing fabric together or overlap fabric a minimum of 18 in with seams orientated perpendicular to the wall face.

Place shoring backfill in the reinforced zone in 8 to 10 in thick lifts and compact in accordance with Subarticle 235-4(C) of the Standard Specifications. Use only hand operated compaction equipment within 3 ft of the wall face. Do not damage reinforcement when placing and compacting shoring backfill. End dumping directly on the reinforcement is not permitted. Do not operate heavy equipment on the reinforcement until it is covered with at least 10 in of shoring backfill. Do not use sheepsfoot, grid rollers or other types of equipment with feet.

Cover reinforcing and retention fabric with at least 3 in of shoring backfill. For standard temporary MSE walls, place top reinforcement layer between 4 and 24 in below top of wall depending on wall option as shown on the Standard Temporary MSE Wall Details.

Bench temporary MSE walls into the sides of excavations where applicable and as directed by the Engineer. If the top of wall is within 5 ft of finished grade, remove top form or facing and incorporate the top reinforcement layer into the fill when placing fill in front of the wall. Temporary MSE walls remain in place permanently unless directed otherwise by the Engineer.

MEASUREMENT AND PAYMENT

Temporary Shoring will be measured and paid for as the number of square feet of exposed face area at locations shown on the plans or required by the Engineer. For temporary MSE walls, the wall height will be measured as the difference between the top and bottom of wall and does not include the embedded portions of the wall or any pavement thickness above the wall. For all other temporary shoring systems, the shoring height will be measured as the difference between the top and bottom of shoring as defined in "Contractor Designed Shoring" section of this provision. No payment will be made for any extension of shoring above the top of shoring or any embedment below the bottom of shoring. No payment will be made for temporary shoring not shown on the plans or required by the Engineer including shoring for OSHA reasons or the Contractor's convenience. Such price and payment will be full compensation for furnishing all labor, tools, equipment, materials and all incidentals necessary to design and install the temporary shoring and complete the work as described in this provision.

Measurement and payment for portable concrete barriers will be in accordance with Section 1170 of the Standard Specifications with the following exception. No additional payment will be made for Oregon barriers or anchored PCBs above and behind temporary shoring. Additional costs for Oregon barriers or anchored PCBs will be considered incidental to *temporary shoring.*

Payment will be made under:

Pay Item	**Pay Unit**
Temporary Shoring	Square Feet

PVC PIPE: **10-19-04**

Furnish and install PVC pipe in accordance with the Specifications, plans or as otherwise directed by the Engineer.

PVC pipe shall conform to the requirements of Section 1044-5 of the *Standard Specifications* and shall be installed in accordance with Section 300 of the *Standard Specifications.*

Method of Measurement:

PVC pipe will be measured in accordance with Section 310-6 of the *Standard Specifications.*

Basis of Payment:

The quantity of PVC pipe, measured as provided for above, will be paid for at the contract unit price per linear foot for ____" PVC Pipe.

Payment will be made under:

10" PVC Pipe.....Linear Foot

SPI

ASPHALT PAVEMENTS - SUPERPAVE:
(7-18-06) (Rev 9-19-06) SP6 R01

Revise the *2006 Standard Specifications* as follows:

Page 6-2, Article 600-9 Measurement and Payment

Delete the second paragraph.

Page 6-12, 609-5(C)2(c) add after (AASHTO T 209):

or ASTM D 2041

Page 6-13, last line on page & Page 6-14, Subarticle 609-5(C)(2)(e), delete and substitute the following:

(e) Retained Tensile Strength (TSR) - (AASHTO T 283 Modified), add subarticle (1) Option 1 before the first paragraph.

(1) Option 1

Add subarticle (2) Option 2 and the following sentence as the first sentence of the second paragraph:

(2) Option 2

Mix sampled from truck at plant with one set of specimens prepared by the Contractor and then tested jointly by QA and QC at a mutually agreed upon lab site within the first 7 calendar days after beginning production of each new mix design.

Page 6-28, 610-3(A) Mix Design-General, third sentence of the fourth paragraph:

Substitute 20% for 15%

First, second and third sentences of the fifth paragraph:

Substitute 20% for 15%

Page 6-44, 610-8, third full paragraph, replace the first sentence with the following:

Use the 30 foot minimum length mobile grade reference system or the non-contacting laser or sonar type ski *with at least four referencing stations mounted on the paver at a minimum length of 24 feet* to control the longitudinal profile when placing the initial lanes and all adjacent lanes of all layers, including resurfacing and asphalt in-lays, unless otherwise specified or approved.

Page 6-54, Article 620-4, add the following pay item:

Pay Item	**Pay Unit**
Asphalt Binder for Plant Mix, Grade PG 70-28	Ton

Page 6-69, Table 660-1 **Material Application Rates and Temperatures**, add the following:

Type of Coat	**Grade of Asphalt**	**Asphalt Rate gal/yd^2**	**Application Temperature °F**	**Aggregate Size**	**Aggregate Rate lb./sq. yd. Total**
Sand Seal	CRS-2 or CRS-2P	0.22-0.30	150-175	Blotting Sand	12-15

Page 6-75, 660-9(B), add the following as sub-item (5)

(5) Sand Seal

Place the fully required amount of asphalt material in one application and immediately cover with the seal coat aggregate. Uniformly spread the fully required amount of aggregate in one application and correct all non-uniform areas prior to rolling.

Immediately after the aggregate has been uniformly spread, perform rolling.

When directed, broom excess aggregate material from the surface of the seal coat.

When the sand seal is to be constructed for temporary sealing purposes only and will not be used by traffic, other grades of asphalt material meeting the requirements of Articles 1020-6

and 1020-7 may be used in lieu of the grade of asphalt required by Table 660-1 when approved.

Page 10-41, Table 1012-1, add the following:

Mix Type	Course Aggregate Angularity [b] ASTM D5821	Fine Aggregate Angularity % Minimum AASHTO T304 Method A	Sand Equivalent % Minimum AASHTO T176	Flat & Elongated 5:1 Ratio % Maximum ASTM D4791 Section 8.4
S 9.5 D	100/100	45	50	10

Page 10-45, Replace Table 1012-2 with the following:

TABLE 1012-2
NEW SOURCE RAP GRADATION and BINDER TOLERANCES
(Apply Tolerances to Mix Design Data)

Mix Type	**0-20% RAP**			**21-25% RAP**			**26%+ RAP**		
Sieve (mm)	**Base**	**Inter.**	**Surf.**	**Base**	**Inter.**	**Surf.**	**Base**	**Inter.**	**Surf.**
P_b, %		± 0.7%			± 0.4%			± 0.3%	
1 1/2" (37.5)	±10	-	-	±7	-	-	±5	-	-
3/4" (19.0)	±10	±10	-	±7	±7	-	±5	±5	-
1/2" (12.5)	-	±10	±6	-	±7	±3	-	±5	±2
3/8" (9.5)	-	-	±8	-	-	±5	-	-	±4
No. 4 (4.75)	±10	-	±10	±7	-	±7	±5	-	±5
No. 8 (2.36)	±8	±8	±8	±5	±5	±5	±4	±4	±4
No.16 (1.18)	±8	±8	±8	±5	±5	±5	±4	±4	±4
No. 30 (0.600)	±8	±8	±8	±5	±5	±5	±4	±4	±4
No. 50 (0.300)	-	-	±8	-	-	±5	-	-	±4
No. 200 (0.075)	±4	±4	±4	±2	±2	±2	±1.5	±1.5	±1.5

ASPHALT BINDER CONTENT OF ASPHALT PLANT MIXES:

(11-21-00) SP6 R15

The approximate asphalt binder content of the asphalt concrete plant mixtures used on this project will be as follows:

Asphalt Concrete Base Course	Type B 25.0__	4.3%
Asphalt Concrete Intermediate Course	Type I 19.0__	4.7%
Asphalt Concrete Surface Course	Type S 4.75A	7.0%
Asphalt Concrete Surface Course	Type SF 9.5A	6.5%
Asphalt Concrete Surface Course	Type S 9.5__	6.0%
Asphalt Concrete Surface Course	Type S 12.5__	5.5%

The actual asphalt binder content will be established during construction by the Engineer within the limits established in the *Standard Specifications.*

PRICE ADJUSTMENT - ASPHALT BINDER FOR PLANT MIX:

(11-21-00) SP6 R25

Price adjustments for asphalt binder for plant mix will be made in accordance with Section 620 of the *Standard Specifications.*

The base price index for asphalt binder for plant mix is $315.36 per ton.

This base price index represents an average of F.O.B. selling prices of asphalt binder at supplier's terminals on December 1, 2006.

PREFORMED SCOUR HOLE WITH LEVEL SPREADER APRON:

(10-15-02) (Rev 7-18-06) SP8 R105

Description

Construct and maintain preformed scour holes with spreader aprons at the locations shown on the plans and in accordance with the details in the plans. Work includes excavation, shaping and maintaining the hole and apron, furnishing and placing filter fabric, rip rap (class as specified in the plans) and permanent soil reinforcement matting.

Materials

Item	Section
Plain rip rap	1042
Filter Fabric	1056

The permanent soil reinforcement matting shall be permanent erosion control reinforcement mat and shall be constructed of 100% coconut fiber stitch bonded between a heavy duty UV stabilized cuspated (crimped) netting overlaid with a heavy duty UV stabilized top net. The three nettings shall be stitched together on 1.5 inch centers UV stabilized polyester thread to

form a permanent three dimensional structure. The mat shall have the following physical properties:

Property	*Test Method*	*Value Unit*
Ground Cover	Image Analysis	93 %
Thickness	ASTM D1777	0.63 in
Mass Per Unit Area	ASTM D3776	0.92 lb/sy
Tensile Strength	ASTM D5035	480 lb/ft
Elongation	ASTM D5035	49 %
Tensile Strength	ASTM D5035	960 lb/ft
Elongation	ASTM D5035	31 %
Tensile Strength	ASTM D1682	177 lbs
Elongation	ASTM D1682	22 %
Resiliency	ASTM D1777	>80 %
UV Stability *	ASTM D4355	151 lbs
Color(Permanent Net)		UV Black
Porosity (Permanent Net)	Calculated	>95 %
Minimum Filament Diameter (permanent net)	Measured	0.03 in

*ASTM D1682 Tensile Strength and % strength retention of material after 1000 hours of exposure in a Xenon-arc weatherometer.

A certification (Type 1, 2, or 3) from the manufacturer showing:
(A) the chemical and physical properties of the mat used, and
(B) conformance of the mat with this specification will be required.

Soil Preparation

All areas to be protected with the mat shall be brought to final grade and seeded in accordance with Section 1660. The surface of the soil shall be smooth, firm, stable and free of rocks, clods, roots or other obstructions that would prevent the mat from lying in direct contact with the soil surface. Areas where the mat is to be placed will not need to be mulched.

Measurement and Payment

Preformed Scour Holes with Level Spreader Aprons will be measured and paid for shall be the actual number that has been incorporated into the completed and accepted work. Such price and payment will be full compensation for all work covered by this provision.

Payment will be made under:

Pay Item	**Pay Unit**
Preformed Scour Hole with Level Spreader Aprons	Each

STREET SIGNS AND MARKERS AND ROUTE MARKERS:
(7-1-95) SP9 R01

Move any existing street signs, markers, and route markers out of the construction limits of the project and install the street signs and markers and route markers so that they will be visible to the traveling public if there is sufficient right of way for these signs and markers outside of the construction limits.

Near the completion of the project and when so directed by the Engineer, move the signs and markers and install them in their proper location in regard to the finished pavement of the project.

Stockpile any signs or markers that cannot be relocated due to lack of right of way, or any signs and markers that will no longer be applicable after the construction of the project, at locations directed by the Engineer for removal by others.

The Contractor will be responsible to the owners for any damage to any street signs and markers or route markers during the above described operations.

No direct payment will be made for relocating, reinstalling, and/or stockpiling the street signs and markers and route markers as such work will be considered incidental to other work being paid for by the various items in the contract.

STEEL U-CHANNEL POSTS:
(7-18-06) SP9 R02

Amend the *2006 Standard Specifications* as follows:

Page 9-15 Subarticle 903-3(D) first paragraph, last sentence, delete the last sentence and add the following:

Use posts of sufficient length to permit the appropriate sign mounting height. Spliced posts are not permitted on new construction.

AGGREGATE PRODUCTION:
(11-20-01) SP10 R05

Provide aggregate from a producer who uses the current Aggregate Quality Control/Quality Assurance Program that is in effect at the time of shipment.

No price adjustment is allowed to contractors or producers who use the program. Participation in the program does not relieve the producer of the responsibility of complying with all requirements of the *Standard Specifications*. Copies of this procedure are available upon request from the Materials and Test Unit.

CONCRETE BRICK AND BLOCK PRODUCTION:

(11-20-01) SP10 R10

Provide concrete brick and block from a producer who uses the current Solid Concrete Masonry Brick/Unit Quality Control/Quality Assurance Program that is in effect on the date that material is received on the project.

No price adjustment is allowed to contractors or producers who use the program. Participation in the program does not relieve the producer of the responsibility of complying with all requirements of the *Standard Specifications*. Copies of this procedure are available upon request from the Materials and Test Unit.

GLASS BEADS:

(7-18-06) SP10 R35

Revise the *Standard Specifications* as follows:

Page 10-223, 1087-4(C) Gradation & Roundness

Replace the second sentence of the first paragraph with the following:

All Drop-On and Intermixed Glass Beads shall be tested in accordance with ASTM D1155.

Delete the last paragraph.

ENGINEERING FABRICS TABLE 1056-1:

(7-18-06) SP10 R40

Revise the *Standard Specifications* as follows:

Page 10-100, Table 1056-1, replace the values for Trapezoidal Tear Strength with the following:

Physical Property	ASTM Test Method	Type 1	Type 2	Type 3		Type 4
				Class A	Class B	
Typical Applications		Shoulder Drain	Under Riprap	Temporary Silt Fence		Soil Stabilization
Trapezoidal Tear Strength	D4533	*45* lb	*75* lb	--	--	*75* lb

CHANGEABLE MESSAGE SIGNS

(11-21-06) SP11 R 11

Revise the *2006 Standard Specifications* as follows:

Page 11-9, Article 1120-3, Replace the 3rd sentence with the following:

Sign operator will adjust flash rate so that no more than two messages will be displayed and be legible to a driver when approaching the sign at the posted speed.

PAVEMENT MARKING LINES MEASUREMENT AND PAYMENT:
(11-21-06) SP 12 R01

Revise the *2006 Standard Specifications* as follows:

Page 12-14, Subarticle 1205-10, delete the first sentence of the first paragraph and replace with the following:

Pavement Marking Lines will be measured and paid for as the actual number of linear feet of pavement marking lines per application that has been satisfactorily placed and accepted by the Engineer.