


# TEMPORARY SHORING



Policy and Procedures

# Policy

  
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

MICHAEL F. HASLEY  
GOVERNOR

LYNDO TIPPETT  
SECRETARY

October 6, 2006

MEMORANDUM TO: Highway Design Branch Unit Heads

FROM: Art McMillan, P.E.  
State Highway Design Engineer

SUBJECT: Temporary Shoring

The purpose of this memorandum is to assign and clarify the responsibilities and roles related to temporary shoring. The Geotechnical Engineering Unit has completed new standard special provision, notes and details for temporary shoring. These items are attached for your reference and will be provided for each project by the Geotechnical Engineering Unit as necessary. These guidelines address three types of shoring and do not address temporary shoring for railroads. Structure Design will continue the responsibility for railroad shoring at structures.

The provision defines temporary shoring as required to maintain traffic and for other reasons as shown on the plans or determined by the engineer. Examples of other reasons might include shoring to protect wetlands, structures or pavements (with no traffic) for undercut or to remove existing structures. As has always been the case, the temporary shoring provision does not apply to nor does the Department pay for shoring for OSHA reasons or Contractor convenience.

Each type of temporary shoring with a procedure is listed below. The Unit primarily responsible for identifying and coordinating the shoring is also listed below; however, all Units should be involved in the identification of the temporary shoring.

**Roadway Shoring for Maintenance of Traffic (common):**  
*Responsible Unit: Work Zone Traffic Control Unit*

1. One month before Final Design Field Inspection (FDFI), Traffic Control may schedule a meeting to discuss the temporary shoring with Roadway, Geotechnical, Division and Hydraulics (if there are drainage issues). If a meeting is not necessary, Traffic Control will request temporary shoring recommendations from the Geotechnical Engineering Unit.
2. Traffic Control will determine the shoring limits (begin and end stations) and offsets between reference line and shoring face (minimum or maximum depending on situation) and provide this information to the Geotechnical Engineering Unit.

MAILING ADDRESS: 1027 P.O. BOX 6204  
N.C. DEPARTMENT OF TRANSPORTATION  
1100 EAST 7TH STREET  
Raleigh, NC 27611-0624

1027 P.O. BOX 6204  
1100 EAST 7TH STREET  
RALEIGH, NC 27611

1027 P.O. BOX 6204  
1100 EAST 7TH STREET  
RALEIGH, NC 27611

Click on letter to obtain copy.

# Procedures

- ① Determine the need for possible shoring.
- ② Set up a meeting if deemed necessary with applicable parties.
- ③ Show and call out location(s) on your Traffic Control Plans.
- ④ Request an investigation and determination from Geo-Tech at the location(s) indicated on your plans.
- ⑤ Place the result of the Geo-Tech investigation on your plans.
- ⑥ Add PCB at Temporary Shoring Locations detail to plans.
- ⑦ Include a quantity for PCB including crash cushions in the final project estimate. (Advise Roadway Design of any temporary pavement needs associated with the PCB placement).
- ⑧ Include Temporary Shoring and Temporary Pavement total quantities on the Final Submittal letter.

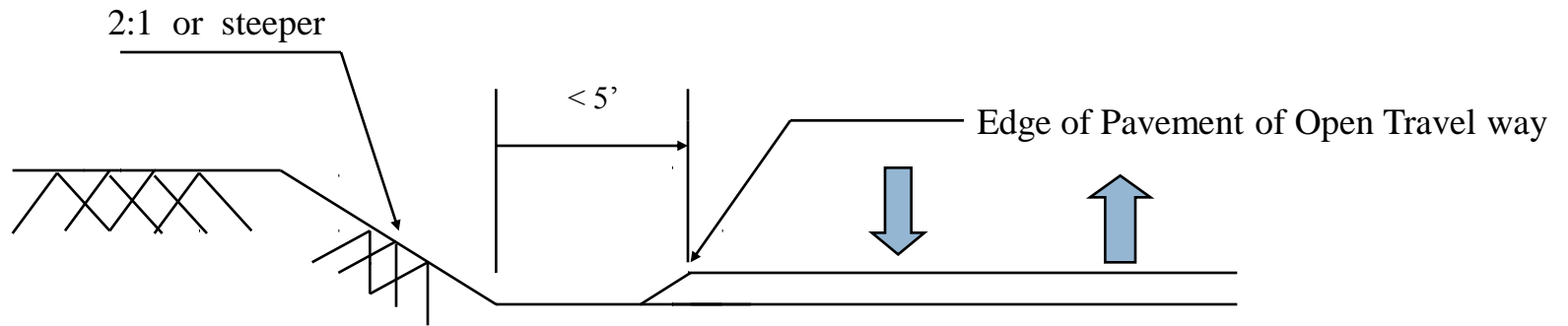
# 1 Determine the need for possible shoring:

## ❑ Roadway Shoring for MOT -

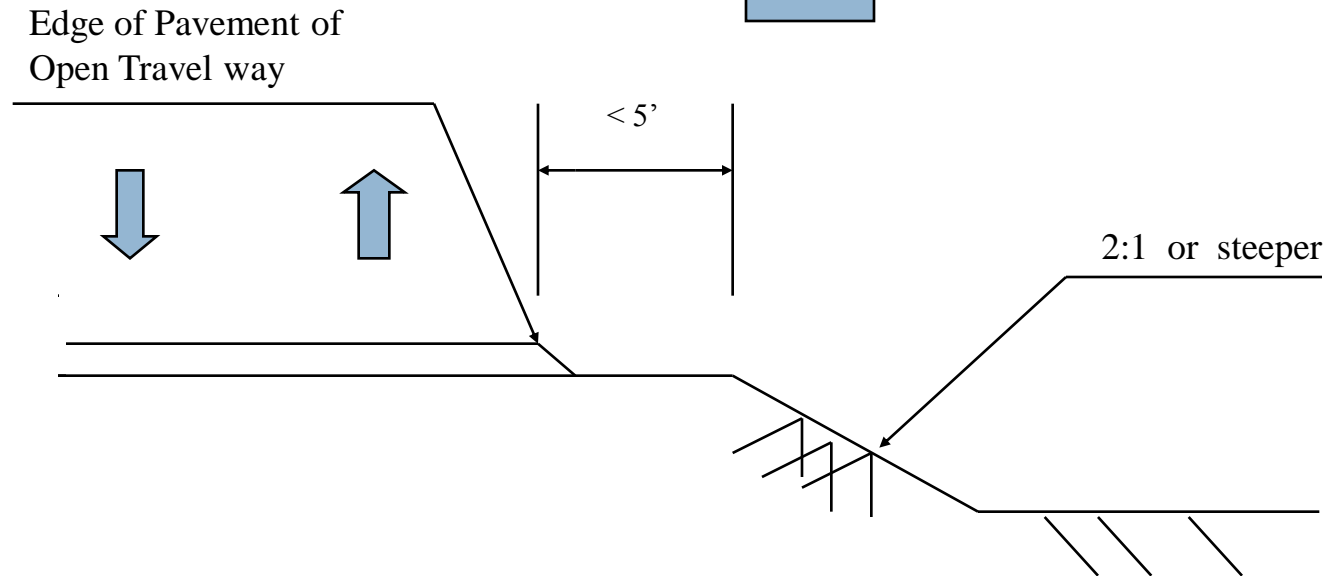
Shoring required to maintain traffic is defined as shoring necessary to provide lateral support to the side of an excavation or embankment parallel to an open travelway when a theoretical 2:1 (H:V) slope from the bottom of the excavation or embankment intersects the existing ground line closer than 5 ft (1.5m) from the edge of pavement of the open travelway.

- ❑ Geo-Tech will ascertain average heights for your calculations.

# Example:



OR



# 1 Determine the need for possible shoring:

- ❑ Structure Shoring for MOT -  
During construction of a culvert or bridge.
- ❑ Both WZTC and Structure Design will coordinate and ascertain the limits and heights.

## 2 Setup a Meeting:

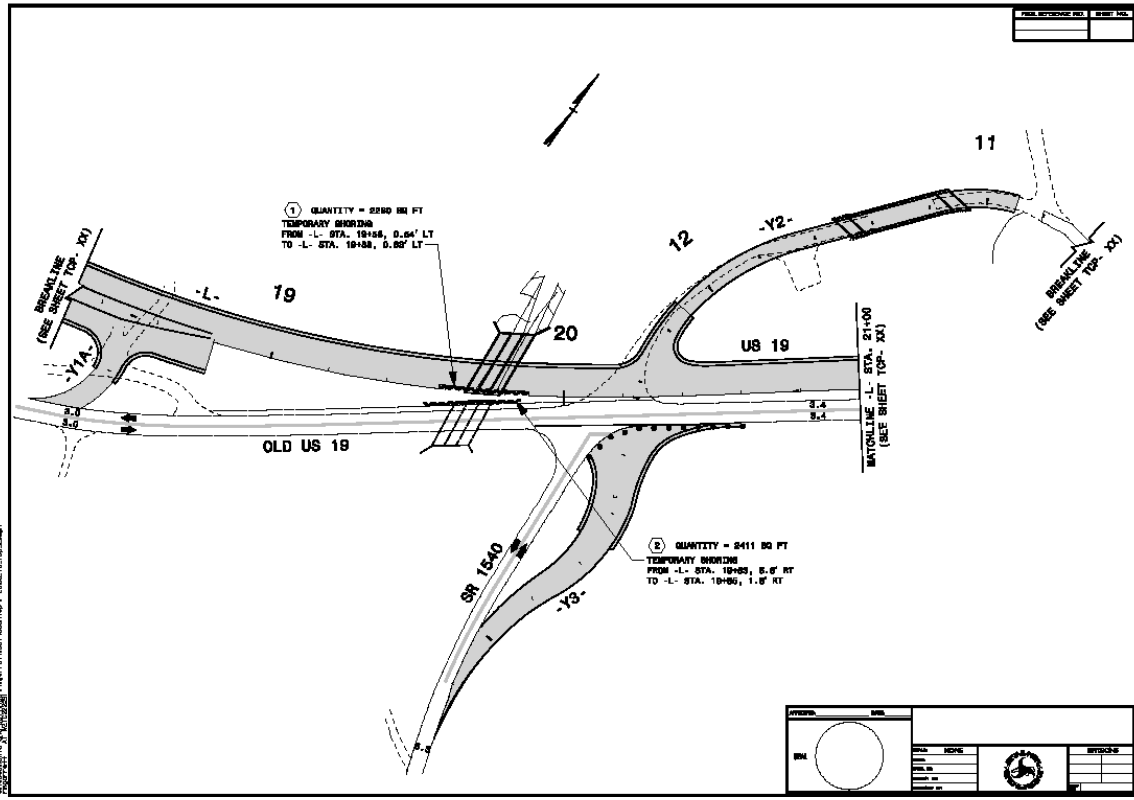
- ❑ If deemed necessary establish a meeting to discuss the need for shoring and the locations for same.
- ❑ Invite personnel from:
  - Roadway Design
  - Structure Design
  - Geo-tech
  - Hydraulics
  - Division as applicable.

# Procedures

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- ① Determine the need for possible shoring.
- ② Set up a meeting if deemed necessary with applicable parties.
- ③ Show and call out location(s) on your Traffic Control Plans.

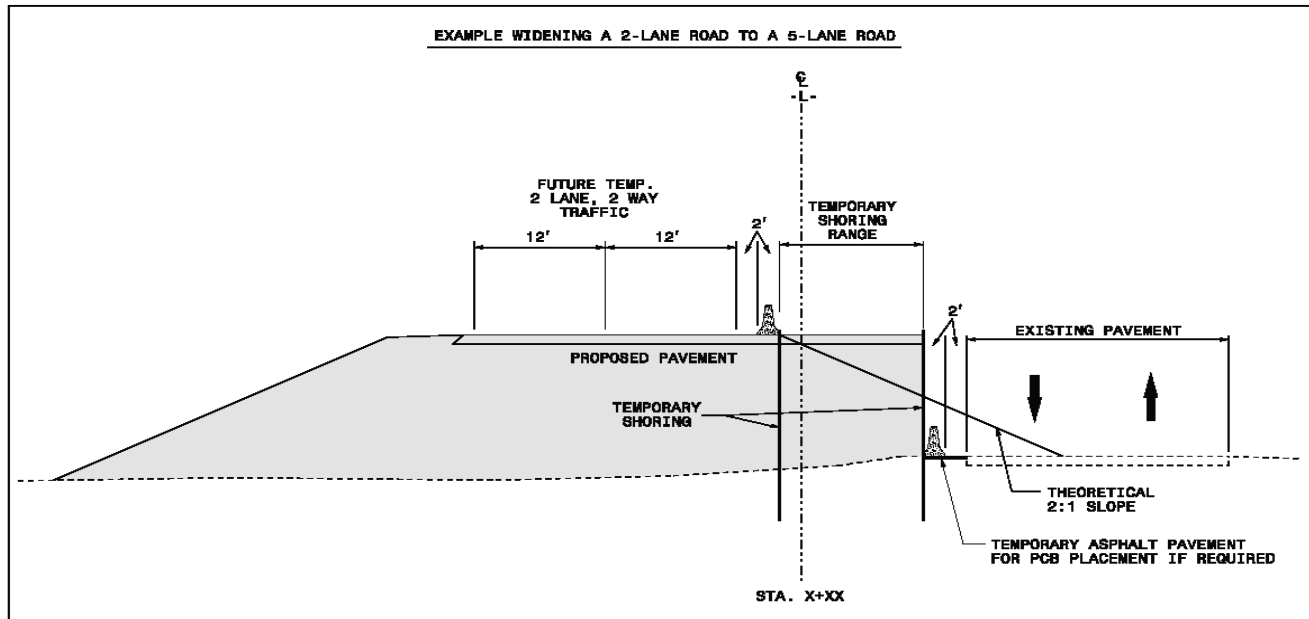
# 3 Example Plan View:



Click on image to obtain an [example](#) copy

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# Example Section:




Click on image to obtain an [example](#) copy

# Procedures

- ① Determine the need for possible shoring.
- ② Set up a meeting if deemed necessary with applicable parties.
- ③ Show and call out location(s) on Traffic Control Plans.
- ④ Request an investigation and determination from Geo-Tech at the location(s) indicated on your plans.

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# Request investigation from Geo-Tech :



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY  
GOVERNOR

LYNDO TIPPETT  
SECRETARY

November 1, 2006

T. I. P. NO.: \_\_\_\_\_  
 WBS Number: \_\_\_\_\_  
 F. A. Project: \_\_\_\_\_  
 County: \_\_\_\_\_  
 Description: \_\_\_\_\_

**MEMORANDUM**

TO: Njoroge W. Wainaina , P.E., State Geotechnical Engineer

FROM: \_\_\_\_\_, Traffic Control Project Design Engineer

SUBJECT: Request for Temporary Shoring Recommendations

The Work Zone Traffic Control Unit has determined a need for temporary shoring for the maintenance of traffic during construction of the following project design elements: *Roadway and/or Structure*. A Temporary Shoring Meeting was held on \_\_\_\_\_. The locations and offsets for the temporary shoring are shown below.

Location/ Shoring type	From station	To station	Offset range	Est. average shoring height	Max. shoring height
#1 roadway	-L- Sta. 10+00+/-	-L- Sta. 12+00+/-	2' left of -L- to 10' right of -L-	To be determined by Geotech	To be determined by Geotech
#2 structure	-L- Sta. 11+50+/-	-L- Sta. 11+85+/-	7' left of -L-	8'	11'

Please provide the Work Zone Traffic Control Unit with a temporary shoring special provision, estimated average shoring height, and the appropriate notes and soil parameters to be included in the Traffic Control Plans. Please provide Roadway Design with any shoring details to be included in the 2-series sheets.

If you have any questions or need more information, please contact \_\_\_\_\_ or myself at (919) 250-4159.

**MAILING ADDRESS:**  
 WORK ZONE TRAFFIC CONTROL UNIT  
 1350 MAIL SERVICE CENTER  
 RALEIGH, NORTH CAROLINA 27699-1380

TELEPHONE: 919-250-4159  
 FAX: 919-250-5948  
 WEBSITE: [WWW.DOT.IGOT.STATE.NC.US](http://WWW.DOT.IGOT.STATE.NC.US)

**LOCATION:**  
 CENTURY CENTER COMPLEX BUILDING B  
 1029 BRUNNEN DRIVE  
 RALEIGH, NORTH CAROLINA 27610

Attention WZTCU personnel:  
Letter can be found in the form letter database.


Click on the letter to obtain an example copy

# Procedures

- ① Determine the need for possible shoring.
- ② Set up a meeting if deemed necessary with applicable parties.
- ③ Show and call out location(s) on Traffic Control Plans.
- ④ Request investigation and determination from Geo-Tech at the location(s) indicated.
- ⑤ Place the result of the Geo-Tech investigation on your plans.

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# Example Letter and Notes from Geo-Tech:



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY  
GOVERNOR

LYNDO TIPPETT  
SECRETARY

October 5, 2006

MEMORANDUM TO: \_\_\_\_\_ P.E.  
Responsible Unit Head Title

ATTENTION: \_\_\_\_\_ P.E.  
Responsible Unit Project Engineer Title

FROM: Njoroge W. Wainaina, P.E.  
State Geotechnical Engineer

STATE PROJECT: WBS El. # (TIP #)  
FEDERAL PROJECT: N/A  
COUNTY:

DESCRIPTION:

SUBJECT: Temporary Shoring Recommendations

The Geotechnical Engineering Unit has received the following proposed temporary shoring locations.

Shoring ID No.	Begin Sta. & Ref. Line	Offset (L/R)	End Sta. & Ref. Line	Offset (L/R)	Shoring Type
No. 1					Roadway and/or Structure
No. 2					Roadway and/or Structure

*(List all temporary shoring and 1.5:1 slope locations in table.)*

The Geotechnical Engineering Unit recommends placing the following notes on the Traffic Control, Roadway or Structure Plans for the referenced project. The Geotechnical Engineering Unit also recommends the use of a temporary 1.5:1 (H:V) slope in lieu of temporary shoring for shoring ID nos. \_\_\_\_\_ . *(optional)*

MAILING ADDRESS:  
NC DEPARTMENT OF TRANSPORTATION  
GEOTECHNICAL ENGINEERING UNIT  
1589 MAIL SERVICE CENTER  
RALEIGH NC 27699-1589

TELEPHONE: 919-250-4088  
FAX: 919-250-4237  
Website: www.ncdot.org/geo

LOCATION:  
CENTURY CENTER COMPLEX  
ENTRANCE B-2  
1020 BIRCH ROUSE DRIVE  
RALEIGH NC 27610

Click on letter to obtain an [example](#) copy.


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## *Where on the plans?:*

- ❑ Individual Quantities are called out on the plan views at each related shoring location.
- ❑ All specific notes and soil parameters are to be placed on each individual sheet depicting the shoring **or** on a separate sheet entitled **Temporary Shoring Notes**.
- ❑ Refer to the temporary shoring locations in your phasing.

**IMPORTANT !!**  
**“See Next Sheets”**

# Temporary Shoring Notes Sheet:




FORM NUMBER	REV
E-251A	TOP-20

**TEMPORARY SHORING NOTES**

**TEMPORARY SHORING NO. ① (SEE SHEET TCP-12)**  
 FOR TEMPORARY SHORING, SEE TEMPORARY SHORING SPECIAL PROVISION.  
 USE A TEMPORARY MSE WALL FROM STATION 19+58+/- -L-, 0.64 m LEFT, TO STATION 19+68+/- -L-, 0.64 m LEFT. SEE TEMPORARY SHORING SPECIAL PROVISION AND STANDARD TEMPORARY MSE WALL DETAILS.  
 NO SUBSURFACE INFORMATION IS AVAILABLE IN THE VICINITY OF THE TEMPORARY SHORING. THE INFORMATION PROVIDED FOR DESIGN WAS ASSUMED AND MAY NOT BE APPLICABLE TO THE ACTUAL SITE CONDITIONS ENCOUNTERED DURING CONSTRUCTION. SEE SUBSURFACE INVENTORY REPORTS FOR ANY ADDITIONAL INFORMATION.  
 DRIVEN PILING FOR TEMPORARY SHORING FROM STATION 19+68+/- -L-, 0.64 m LEFT, TO STATION 19+68+/- -L-, 0.64 m LEFT MAY NOT PENETRATE BELOW ELEVATION 600 m DUE TO THE PRESENCE OF AN OBSTRUCTION. VERY DENSE OR HARD SOIL, WEATHERED OR HARD ROCK. SEE SUBSURFACE INFORMATION FOR ADDITIONAL DETAILS.  
 FOR CONTRACTOR DESIGNED SHORING, SURVEY THE SHORING LOCATION TO DETERMINE EXISTING ELEVATIONS AND ACTUAL DESIGN HEIGHTS BEFORE BEGINNING DESIGN.  
 WHEN USING CONTRACTOR DESIGNED SHORING, USE THE FOLLOWING SOIL PARAMETERS:  
 UNIT WEIGHT OF SOIL ABOVE WATER TABLE,  $\gamma = 120$  PCF  
 UNIT WEIGHT OF SOIL BELOW WATER TABLE,  $\gamma = 80$  PCF  
 FRICTION ANGLE,  $\phi = 30$  DEGREES  
 COHESION,  $c = 0$  PSF  
 FOR PORTABLE CONCRETE BARRIERS ABOVE AND BEHIND TEMPORARY SHORING, USE AN HCOOT PORTABLE CONCRETE BARRIER (UNANCHORED OR ANCHORED) OR AN OREGON TALL F-SHAPE CONCRETE BARRIER IN ACCORDANCE WITH THE TRAFFIC CONTROL PLANS.

**TEMPORARY SHORING NO. ② (SEE SHEET TCP-12)**  
 FOR TEMPORARY SHORING, SEE TEMPORARY SHORING SPECIAL PROVISION.  
 DO NOT USE STANDARD SHORING FROM STATION 19+58+/- -L-, 0.6 m RIGHT, TO STATION 19+58+/- -L-, 1.0 m RIGHT. CONTRACTOR DESIGNED SHORING IS REQUIRED. SEE TEMPORARY SHORING SPECIAL PROVISION.  
 IT MAY BE PREFERRED OR NECESSARY TO ANCHOR THE TEMPORARY SHORING FROM 19+58+/- -L-, 0.6 m RIGHT, TO STATION 19+68+/- -L-, 1.0 m RIGHT. THE TEMPORARY SHORING SPECIAL PROVISION DOES NOT APPLY TO ANCHORED TEMPORARY SHORING. IF ANCHORED TEMPORARY SHORING IS PROVIDED, THE ENGINEER WILL PROVIDE AN APPLICABLE SPECIAL PROVISION.  
 NO SUBSURFACE INFORMATION IS AVAILABLE IN THE VICINITY OF THE TEMPORARY SHORING. THE INFORMATION PROVIDED FOR DESIGN WAS ASSUMED AND MAY NOT BE APPLICABLE TO THE ACTUAL SITE CONDITIONS ENCOUNTERED DURING CONSTRUCTION. SEE SUBSURFACE INVENTORY REPORTS FOR ANY ADDITIONAL INFORMATION.  
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**TEMPORARY SHORING NO. ③ (SEE SHEET TCP-15)**  
 FOR TEMPORARY SHORING, SEE TEMPORARY SHORING SPECIAL PROVISION.  
 USE A TEMPORARY MSE WALL FROM STATION 21+24+/- -L-, 0.64 m LEFT, TO STATION 21+51+/- -L-, 0.64 m LEFT. SEE TEMPORARY SHORING SPECIAL PROVISION AND STANDARD TEMPORARY MSE WALL DETAILS.  
 NO SUBSURFACE INFORMATION IS AVAILABLE IN THE VICINITY OF THE TEMPORARY SHORING. THE INFORMATION PROVIDED FOR DESIGN WAS ASSUMED AND MAY NOT BE APPLICABLE TO THE ACTUAL SITE CONDITIONS ENCOUNTERED DURING CONSTRUCTION. SEE SUBSURFACE INVENTORY REPORTS FOR ANY ADDITIONAL INFORMATION.  
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	<b>TEMPORARY SHORING NOTES</b>																
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NO.	REV.	DATE	BY														
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Click on image to obtain an [example](#) copy

## 5 *Temporary Shoring Notes Sheet:*

- ❑ The Geotechnical Unit is **solely responsible** for sealing the TCP sheets that have temporary shoring notes and parameters **only**.  
(See Previous Sheet)
- ❑ During plan development, the WZTCU Designer should send the Full Sized original sheet(s) to the Geotechnical Design Engineer to be sealed and sent back to us to include in the Traffic Control Plans.

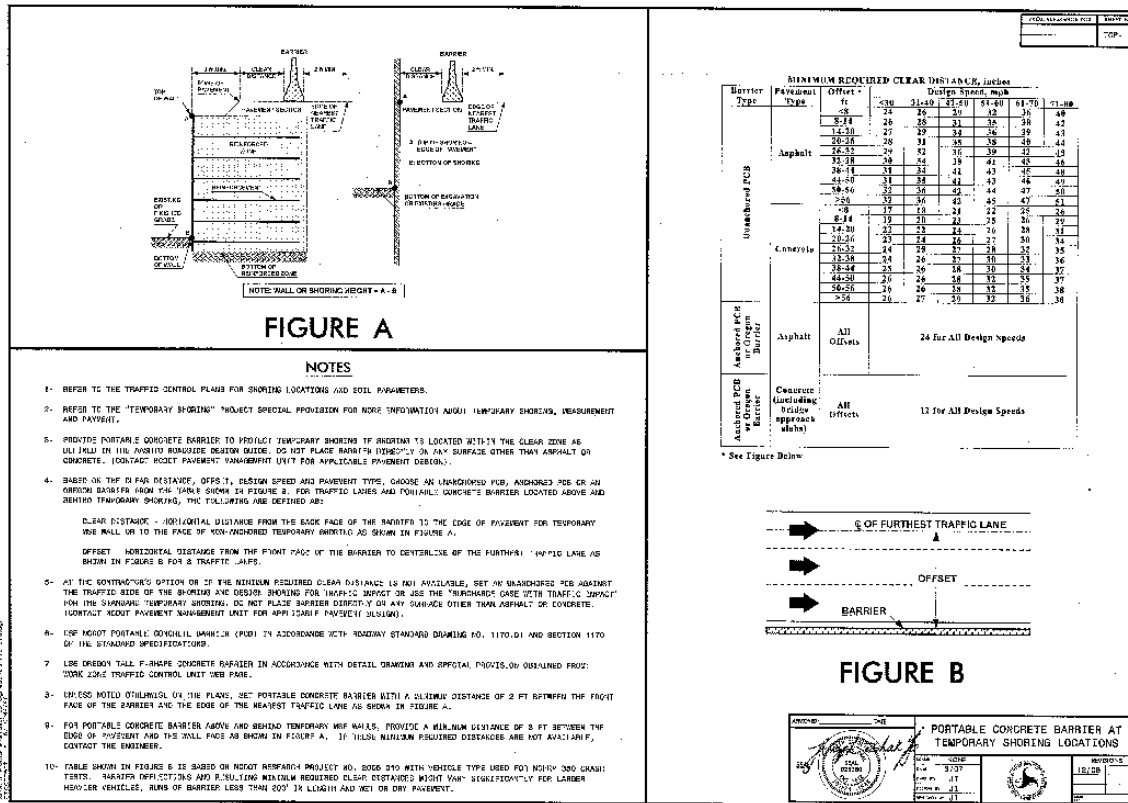
## 5 *Where on the plans?:*

- ❑ For TC plan sheets that depict the temporary shoring locations together with the notes and soil parameters provided by Geo-tech, include the following note:  
  
“The temporary shoring notes shown on this sheet were provided through a sealed document from the Geotechnical Engineering Unit. The document was submitted to the WZTCU on (date) and sealed by a Professional Engineer, (name), license # (xxxxxx)”.

# Procedures

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- 5 Place the result of Geo-Tech investigation on your plans.
- 6 Add PCB at Temporary Shoring Locations detail to plans.  
(See next sheet)**

# PCB at Temporary Shoring Locations Detail:



Click on image to obtain copy

# Procedures


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- 7 Include a quantity for PCB including crash cushions in the final project estimate. (Advise Roadway Design of any temporary pavement needs associated with the PCB placement).
- 8 Include Temporary Shoring and Temporary Pavement total quantities on the Final Submittal letter. (See the next slide for an example copy).

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# Final Submittal Example Letter:

  
STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY  
GOVERNOR

LYNDO TIPPETT  
SECRETARY

October 31, 2006

T. I. P. NO.: B-2804  
WBS Number:  
F. A. Project: MA-BRZ-1164(2)  
County: AVERY  
Description: BRIDGE 72 OVER NORTH TOE RIVER ON SR 1164

**MEMORANDUM**

**TO:** Jay A. Bennett, P.E., State Roadway Design Engineer  
(Attention: Gary R. Lovering, P.E., Roadway Project Engineer)

**FROM:** Ishak Unassigned, Traffic Control Project Design Engineer

**SUBJECT:** Traffic Control Plan Submittal

The Work Zone Traffic Control Unit has completed the Traffic Control Plans (TCP) for the above project. The following items are enclosed in this submittal to the Roadway Design Unit.

- Traffic Control Plans and Traffic Control Estimate
- Force Account Estimate for Signing and Pavement Markings
- Project Special Provisions as listed below:
  - Police
  - Polyurea
  - Shoring

There are no traffic control intermediate contract time special provisions for this project. The following Roadway pay items that are being used as part of the TCP are:

- Temporary Shoring - 1000 sq. ft.
- Temporary Pavement
- Temporary Guardrail

If additional information is required, please advise.

/

**Attachments**

**cc:** Michael A. Pettyjohn, P.E., Division Engineer, Att.,  
(Attention: G. T. Beaver, P.E., Division Construction Engineer)  
J. D. Ledbetter, P.E., Division Traffic Engineer  
Jimmy Hamrick, P.E., Regional Traffic Engineer, Att.  
Richard E. Mullinax, P.E., Signals & Geometrics Engineer, Att.  
FHWA, Att.  
Project File

**MAILING ADDRESS:** WORK ZONE TRAFFIC CONTROL UNIT  
1520 MIAMI SERVICE CENTER  
RALEIGH, NORTH CAROLINA 27699-1500

**TELEPHONE:** 919-250-4159  
**FAX:** 919-250-5848  
**WEBSITE:** WWW.MCDOT.ORG/WZTC

**LOCATION:** CENTURY CENTER COMPLEX BUILDING B  
1020 BIRCH ROSE DRIVE  
RALEIGH, NORTH CAROLINA 27610

Attention WZTCU personnel:  
Letter can be found in the form  
letter database.

Click on letter to obtain an example copy.