NOTICE TO PROPOSERS

September 15, 2015

NOTICE TO PROPOSERS - Enclosed is Addendum #2 to the Request for Proposals (RFP) package for the I-77 Widening and Rehabilitation from MM 15 to 27, a Design Build Project. The information provided in this notice and the addendum shall be made part of the contract documents.

The yellow highlights identify the changes from the Industry Review RFP to the Final RFP. The green highlights identify the changes associated with Addendum #1. The turquoise highlights identify the changes associated with Addendum #2.

This addendum is being issued in order to provide clarification and additional information for the project and includes the following documents:

- NOTICE TO PROPOSERS
- NOTICE OF RECEIPT
- Pages to be inserted into Request for Proposals
- Additional information provided in Attachment B

NOTICE OF RECEIPT
ADDENDUM #2

The information in this addendum shall be made part of the contract documents. PROPOSERS are instructed to incorporate the information into the previously provided RFP documents.

PROPOSERS are required to sign this document and enclose it with their Technical Proposal and/or Statement of Intent. Signed receipt of this document by The South Carolina Department of Transportation serves as confirmation that the PROPOSER has received and incorporated Addendum #1 into the contract documents.

Confirmation Statement:

I, the PROPOSER confirm that I have received this addendum package and have incorporated the information provided in the addendum into the contract documents.

_____ _____

PROPOSER's Signature Date

_____

Printed Name

For:_____

Design Build Team Name

The following pages should be inserted into previously provided copies of the RFP and the old page of the same number removed and disregarded. A summary of the pages included follows:

Exhibit 3– Scope of Work
- Pages 1 through 3

Exhibit 4 – Project Design Criteria
- Page 3

Exhibit 4a – Roadway Design Criteria
- Pages 1 through 8

Exhibit 4b – Structures Design Criteria
- Pages 4, 6

Exhibit 4c – Pavement Design Criteria
- Pages 1 through 5

Exhibit 4d – Traffic Design Criteria - Part 2 – Traffic Control
- Pages 1 through 26

Exhibit 4d – Traffic Design Criteria - Part 3 – Traffic Signals
- Page 1

Exhibit 4f – Geotechnical Design Criteria
- Pages 1 through 7

Exhibit 4g – Environmental Design Criteria
- Divider page & Pages 1 through 3

Exhibit 5 – Special Provisions
- Pages 2, 64, 65, 121 through 126

The following items are included in Attachment B via the website:

Environmental

3. Approved_JD.pdf

Pavement

5. Ramp_Limits.zip

Roadway

10. Safety_Clearing.pdf

Railroad

3. NS_2.zip

Utilities

2. SCDOT_SUE_Info.pdf
3. SCDOT_SUE_map.zip

1. Project Summary

This Project consists of widening northbound and southbound I-77 in Richland County with one (1) additional lane in each direction beginning between SC 12 (Percival Road) and I-20 and terminating near the S-52 (Killian Road) interchange. The project also includes interstate rehabilitation along southbound I-77 from Percival Road to S-59 (Blythewood Road) and interstate rehabilitation along northbound I-77 from Percival Road to Killian Road. The pavement for the Project consists of both concrete and asphalt. The CONTRACTOR shall complete the work in accordance with the Agreement and all subsequent exhibits. ~~At the specified locations referenced to the existing I-77 plans provided in **Attachment B**, the Project includes, but is not limited to, the following general items that are further detailed in subsequent exhibits:~~ The following is a list of major construction items involved in the Project. This list is not intended to comprise all components of the Project nor is it intended to be a complete description of the criteria for each item required. For a full understanding of the scope of the Project and the criteria of the construction items needed for this Project, please review Exhibit 4.

I-77 Mainline Southbound from Station 1160+00 (approx. MM 14.9) to 1170+00 (approx. MM 15):

- extend/install new guardrail at locations that do not meet current standards
- Pave under guardrail adjacent to paved shoulders

I-77 Mainline Northbound & Southbound from Station 1170+00 (approx. MM 15.0) to 1302+50 (approx. MM 17.5):

- Remove existing paved shoulders in median and add one (1) travel lane with paved shoulder toward the median in each direction
- Mill existing lanes and overlay with HMA and OGFC
- Overlay existing ramps with HMA
- Adjust existing ramp tapers, gores, and storage lanes
- Adjust ~~and/~~or improve shoulders, side slopes, ditch banks and paved ditches and rehabilitate or reconstruct paved ditches within present right-of-way to ensure positive drainage
- Replace damaged and/or substandard guardrail and extend/install new guardrail and concrete bridge pier protection at locations that do not meet current standards
- Pave under all guardrail including mainline, ramps, auxiliary lanes, collector/distributer roads, and local roads within present I-77 right-of-way ~~adjacent to paved shoulders~~
- Install new median cable barrier
- Widen and repair existing I-77 mainline bridges
- Install milled-in rumble strips
- Install new and/or upgrade signing and pavement markings
- Repair, ~~and/or~~ replace, or increase capacity of stormwater drainage systems ~~appurtenances~~

- Provide or improve clear zone, sight distance, and roadside safety ~~Clearing and improving I-77 clear zone~~
- Re-install signal loop detectors that are damaged by construction ~~along ramps~~
- Retain the existing vegetated buffer along the west side of southbound I-77 from approximate STA 1178+00 to 1183+00
- Cross Slope Verification/Correction

I-77 Mainline Northbound & Southbound from Station 1302+50 (approx. MM 17.5) to 1510+00 (approx. MM 21.5):

- Remove existing paved shoulders in median and add one (1) travel lane with paved shoulder towards the median in each direction
- Patch existing concrete lanes and/or paved shoulders in various locations
- Overlay existing concrete pavement with HMA and OGFC
- Overlay existing ramps with HMA
- Cross Slope Verification/Correction
- Adjust existing ramp tapers, gores, and storage lanes
- Adjust ~~and/~~or improve shoulders, side slopes, ditch banks and paved ditches and rehabilitate or reconstruct paved ditches within present right-of-way to ensure positive drainage
- Replace damaged and/or substandard guardrail and extend/install new guardrail and concrete bridge pier protection at locations that do not meet current standards ~~Install new guardrail~~
- Pave under all guardrail including mainline, ramps, auxiliary lanes, collector/distributer roads, and local roads within present I-77 right-of-way ~~adjacent to paved shoulders~~
- Install new median cable barrier
- Widen and repair existing I-77 mainline bridges
- Repair ~~and/or replace~~ control of access fencing
- Install new and/or reset existing signing and install new pavement markings
- Repair~~, and/or~~ replace, or increase capacity of stormwater drainage systems ~~appurtenances~~
- Provide or improve clear zone, sight distance, and roadside safety ~~Clearing and improving I-77 clear zone~~
- Re-install signal loop detectors that are damaged by construction ~~along ramps~~
- Install milled-in rumble strips

I-77 Mainline Southbound from Station 1510+00 (approx. MM 21.5) to 1801+15 (approx. MM 27.0):

- Patch existing concrete lanes and/or shoulders in various locations
- Overlay existing lanes with HMA and OGFC

- Overlay existing ramps with HMA
- Cross Slope Verification/Correction
- Adjust ~~and/~~or improve shoulders~~,~~ and side slopes~~, ditch banks and paved ditches and rehabilitate or reconstruct paved ditches~~
- Replace damaged and/or substandard guardrail and extend/install new guardrail and concrete bridge pier protection at locations that do not meet current standards ~~Install new guardrail~~
- Pave under all guardrail including mainline, ramps, auxiliary lanes, collector/distributer roads, and local roads within present I-77 right-of-way ~~adjacent to paved shoulders~~
- ~~Install new median cable barrier~~
- Repair existing I-77 mainline bridge deck
- Repair ~~and/or replace~~ control of access fencing
- Install new pavement markings
- ~~Where the work requires existing pipes to be extended, repair and/or replace storm drainage appurtenances~~
- Provide or improve clear zone, sight distance, and roadside safety ~~Clearing and improving I-77 clear zone~~
- Re-install signal loop detectors that are damaged by construction ~~along ramps~~
- Install milled-in rumble strips

The Project includes widening and rehabilitation of the following ten (10) bridges and approach/transitional slabs:

- I-77 Northbound and Southbound Overpasses over I-20 & I-20 Ramp (two (2) bridges)
- I-77 Northbound and Southbound Overpasses over I-77 Ramp E (File 40.835.6 in existing plans) (two (2) bridges)
- I-77 Northbound and Southbound Overpasses over Windsor Lake Boulevard (S-1196) (two (2) bridges)
- I-77 Northbound and Southbound Bridges over Windsor Lake (two (2) bridges) and replacement of one (1) approach slab
- I-77 Northbound and Southbound Overpasses over Little Jackson Creek/Edgewater Drive (S-1722) (two (2) bridges) and replacement of all transitional slabs

The Project includes repair/rehabilitation of the following bridge deck and replacement of transitional slabs:

- I-77 Southbound Overpass over US 21 (one (1) bridge)

- SCDOT Preconstruction Advisory Memorandums, effective as of the Final RFP release date
- SCDOT Bridge Design Manual, 2006
- SCDOT Bridge Design Memoranda, effective between July 1, 2006 and the Final RFP release date
- 2012 AASHTO LRFD Bridge Design Specifications, Sixth Edition (with 2013 Interim Revisions)
- SCDOT Geotechnical Design Manual, 2010 Edition (Version 1.1)
- SCDOT Seismic Design Specifications for Highway Bridges, 2008 (Version 2.0)
- SCDOT Bridge Drawings and Details, effective as of the Final RFP release date
- AASHTO/AWS D1.5M/D1.5:2010 Bridge Welding Code, with 2011 interims
- SCDOT Pavement Design Guidelines, July 2008 Edition
- SCDOT Requirements for Hydraulic Design Studies, May 2009
- SCDOT Stormwater Quality Design Manual, effective as of the Final RFP release date;
- AASHTO "Highway Drainage Guidelines", 2007
- AASHTO "Drainage Manual", 2014 first edition
- FEMA Regulations, 44CFR Chapter 1
- The State Stormwater and Sediment and Erosion Control Regulations administered by DHEC, 26 S.C. Code Ann. Regs. 72-405 (Supp. 1995) et seq.
- South Carolina State Water Law
- SCDHEC NPDES MS4 Permit # SCS040001
- SCDHEC NPDES Construction Permit # SCR160000
- FHWA Publication No. FHWA NHI-05-039 Micropile Design and Construction, December 2005

1.0 GENERAL

The Contractor shall prepare the roadway geometric design for the project using the design standards and criteria that are most appropriate based on design speed, functional classification, design traffic volumes, right-of-way, and aesthetics. The design elements shall include, but not be limited to, the horizontal and vertical alignments, lane widths, shoulder widths, median widths, sight distance, clear zone, cross slopes, and side slopes. ~~The geometric design developed by the Contractor shall be an engineering solution that is not merely an adherence to the minimum SCDOT and/or AASHTO standards.~~

2.0 CRITERIA

2.1 Design Speed & Functional Classification

Interstate 77 shall be designed as a principal arterial freeway with rolling terrain classification. A WB-62 design vehicle shall be utilized for all geometric design.

Interstate 77

Begin (Station 1160+00 ~~1170+00~~) to Station ~~1188+64~~ ~~1240+00~~ 1255+00	60 mph (Meet or Exceed)
Station ~~1188+64~~1240+00 ~~1255+00~~ to End (Station 1801+15)	70 mph (Meet or Exceed)

Interchange Ramps

I-77 SB to I-20 WB ramp	30 mph (Meet or Exceed)
All other ramps	45 mph (Meet or Exceed)
US 1 SB to I-77 SB loop ramp	20 mph (Meet or Exceed)
All other loop ramps	25 mph (Meet or Exceed)

2.2 Pavement, Shoulder & Median Width

Pavement, shoulder, and median widths shall be developed in compliance with SCDOT Highway Design Manual Chapters 9, 13, 16, and 19.

Add 3.5 ft. to shoulder width when guardrail is required. Pave entire shoulder width when adjacent to guardrail/concrete barrier.

I-77 Mainline Northbound & Southbound from Station 1170+00 (approx. MM 15.0) to 1510+00 (approx. MM 21.5):

- Through Lanes — 12 ft.
- Shoulder (outside) — 10 ft. paved/12 ft. total width
- Shoulder (inside) — 10 ft. paved/12 ft. total width

I-77 Mainline Southbound from Station 1286+55 to Station 1299+00, retain the

existing paved shoulder width, concrete curb & gutter, retaining wall, and closed drainage system.

I-77 Mainline Southbound from Station 1510+00 (approx. MM 21.5) to 1801+15 (approx. MM 27.0):

- Through Lanes 12 ft.
- Shoulder (outside) 10 ft. paved/12 ft. total width
- Shoulder (inside)
  - Wilson Blvd. to Blythewood Rd: 4 ft. paved/10 ft. total width (approx. MM 24.15 to MM 27.0)
  - Killian Rd to Wilson Blvd: 10 ft. paved/12 ft. total width (approx. MM 21.5 to MM 24.15)

2.3 Horizontal Curves

Horizontal curves and superelevation shall be developed in compliance with SCDOT Highway Design Manual Chapter 11 and the SCDOT Standard Drawing No. 150-205-00.

2.4 Vertical Curves, Grades, and Clearances

Vertical curves, grades, and clearances shall be developed in compliance with SCDOT Highway Design Manual Chapters 12, 16, and 19 through 22. Grade adjusted K values shall be considered where the grades are 3 percent or greater.

Spline grade shall not be used.

2.5 Side Slopes

Side slopes shall be developed in compliance with SCDOT Highway Design Manual Chapters 13, 14, 16, and 19.

2.6 Cross Slopes

Cross slopes shall be developed in compliance with SCDOT Highway Design Manual Chapters 11, 13, 16, and 19.

- Shoulder (paved) 2’ or less Match travelway pavement slope
- Shoulder (paved) greater than 2’ 24:1
- Shoulder (unpaved) 12:1

Paved shoulder on high side of superelevation will continue the travelway cross slope.

Paved shoulder on low side of superelevation will maintain a 24:1 slope until the

superelevation slope exceeds a 24:1 slope. The shoulder then will be sloped at the superelevation rate.

2.7 Clear Zones

~~A crash analysis has been performed for this section of I-77. The clear zone for I-77 mainline shall be 46' for the entire length of project.~~

Mainline Interstate, Collector / Distributor Road, and Ramps

The SCDOT HDM (2003 with updates) Chapter 14 and the *Roadside Design Guide* (AASHTO) edition 2006 with Chapter 6 Update, 3rd Edition shall be used based on traffic volumes, design speed, and slopes. Clear Zones provided in Figure 14.3A in the SCDOT HDM (2003 with updates) shall not be limited to 30 feet as indicated as a possibility in the footnote for this figure. When a range of values is shown; the higher value shall be selected. Also, SCDOT does not typically use a 3H:1V fill slope. See the Roadside Design Guide (AASHTO) edition 2006 with Chapter 6 Update, 3rd Edition for clear zone calculations where a 3H:1V fill slope is used. Use 3H:1V fill slope only where fill heights are required to match existing conditions and clear zone can be obtained within the Project limits.

For those areas where no guardrail currently exists, the Contractor shall design fill and cut slopes to obtain clear zones and to avoid the need for protection. In areas where new right-of-way, wetland impacts, or impacts to frontage roads or immovable obstructions would be a result of achieving the clear zone requirement, substandard areas may be protected.

Where existing fill and cut slopes are presently protected by guardrail, the Contractor shall replace damaged and/or substandard guardrail and extend/install new guardrail at locations that do not meet current standard. Also, Contractor shall clear and grind in accordance with ED~~M~~ 29.

Extend Clear Zone and ED 29 clearing limits on all I-77 ramps to the crossing route. Apply Clear Zone and ED 29 clearing limits to all I-77/I-20/Alpine Rd interchange ramps including along I-20 between Alpine Road and Windsor Lake Blvd.

Any Other Roads

The SCDOT HDM (2003 with updates) Chapter 14 and the *Roadside Design Guide* (AASHTO) edition 2006 with Chapter 6 Update, 3rd Edition shall be used based on traffic volumes, design speed, and slopes.

Clear zone for any facilities using curbs on this project shall comply with SCDOT HDM (2003 with updates) Chapter 14.

2.7.1 Safety Clearing

Clear and grind all trees and shrubs down and ground to a depth of 6" (0.5 feet) below grade or remove including stumps. Remove all debris (trash, limbs, dead

logs, etc.). Once clearing and grinding operations are complete, the area shall be properly graded and seeded in accordance with Section 810 of SCDOT Standard Specifications (2007) and any applicable Supplemental Specifications.

Where existing fill slopes are protected by guardrail, clear and grind in accordance with EDM 29.

Safety Clearing shall apply to the following areas:

I-77 at I-20 Interchange

- The area between NB I-77 Mainline, Ramp from Alpine Rd to NB I-77, Ramp from Alpine Rd to SB I-77
- The area between SB I-77 Mainline, Ramp from SB I-77 to WB I-20, Ramp from NB I-77 to WB I-20
- The area between Ramp from WB I-20 to SB I-77 and SB I-77 Loop to EB I-20
- The area between EB I-20 CD, Ramp from NB I-77 to WB I-20, Ramp from NB I-77 to EB I-20
- The area between WB I-20 Mainline, Ramp from WB I-20 to I-77, Ramp from Alpine Rd to WB I-20
- The area between Ramp from WB I-20 to I-77, Ramp from Alpine Rd to WB I-20, Ramp from Alpine Rd to I-77

The Contractor's attention is called to Attachment B which includes a sketch of the above clearing limits that is provided for information only.

I-77 at SC 277 Interchange

- The area between the NB SC-277 ramp and I-77
- The area between the SB SC-277 ramp and I-77
- ~~The area bordered by I-77 and the two forks of the WB I-20/Alpine Rd on ramp~~

Other Interchange Areas

- The area between NB I-77 and the on ramp from US-1
- The area between SB I-77 and the on ramp from US-21 NB

~~Clear and grind all trees and shrubs 6" below grade or remove within the 46' clear zone with the following exceptions:~~

- ~~Where backslopes are steeper than 3:1, clear and grind a distance of 10' beyond the ditch line.~~
- ~~Where backslopes are equal to or flatter than 3:1, clear and grind to the 46' zone.~~
- ~~Where existing fill slopes are protected by guardrail, clear and grind in~~

~~accordance with EDM 29.~~

- ~~In areas where new right-of-way or wetland impacts would be a result of achieving the clear zone requirement, substandard areas may be corrected or protected. If the shoulder can be graded to acceptable slopes without impacting wetlands, right-of-way, or immovable obstructions, then existing guardrail shall be removed and the shoulder graded to meet design standards.~~

~~All trees within the 46' zone shall be cut down and ground to a depth of 6" (0.5 feet) below grade or removed (including stumps). Remove all debris (trash, limbs, dead logs, etc.) within the 46' zone. Once clearing and grinding operations are complete, this area shall be properly graded and seeded in accordance with Section 810 of SCDOT Standard Specifications (2007) and any applicable Supplemental Specifications.~~

~~Clear zone for all other areas shall be developed in compliance with SCDOT Highway Design Manual Chapter 14 and the AASHTO Roadside Design Guide, with 2006 Chapter 6 update, 3rd Edition.~~

2.8 Sight Distance

Sight distance shall be developed in compliance with SCDOT Highway Design Manual Chapter 10.

~~The upper range value established in the current edition of AASHTO's "A Policy on Geometric Design of Highways and Streets," 2001, for the appropriate design speed shall be used.~~

2.9 Ramps

Ramps shall be developed in compliance with SCDOT Highway Design Manual Chapter 16.

Ramps shall be analyzed and corrected if there are deficiencies in acceleration and deceleration lane lengths.

~~Widen and reconstruct, where applicable, portion of the outside shoulder to provide a continuous auxiliary lane from Percival Road to I-20 along I-77 NB.~~

From Percival Road to I-20 along I-77 NB, widen and reconstruct as necessary to provide a continuous auxiliary lane between the two ramps.

From I-20 to Percival Road along I-77 SB, widen and reconstruct as necessary to provide a continuous auxiliary lane between the two ramps.

Provide a two lane bifurcated exit from I-77 NB to I-20 as indicated in the "I-77 Signing Plan" provided in Attachment B.

Eliminate the existing condition (middle lane shared merge) on I-77 NB at SC 277. Provide a two lane parallel entrance ramp for SC 277 plus three thru lanes on I-77 NB. ~~Properly~~ Drop the outside acceleration lane from SC 277 before the SC 555 entrance ramp. Continue four lanes northbound to Killian Road. The fourth lane may be dropped at Killian Road.

Reconstruct and widen, where applicable, portion of the existing ramp to provide a continuous two lanes entrance ramp from Killian Road to I-77 SB. Once two lanes are developed parallel to I-77 SB, the outside lane shall be dropped. Four SB lanes shall continue to SC 277, at which time the lanes shall be bifurcated in accordance with the signing plan provided.

The existing I-77 southbound to I-20 westbound ramp divergence angle may be retained.

I-77 Mainline Southbound from approx. Station 1284+00 to approx. Station 1299+00, retain the existing acceleration length of the parallel-lane entrance ramp.

2.10 Roadside Barriers

Roadside barriers shall be developed in compliance with SCDOT Highway Design Manual Chapter 14. The following items shall be included in the work:

Guardrail: The Contractor shall be responsible for determining the existing guardrail or end treatments that do not meet current design standards. All existing ~~mainline~~ guardrail~~, ramp guardrail,~~ and end treatments within the project limits that is damaged or does not meet current design standards shall be replaced, reset or reused as a part of the project. All new, reset or reused guardrail and end treatments must be listed on the Qualified Products Policies & Listings. New guardrail shall be added where necessary in order to meet current design standards. Pavement under guardrail ~~adjacent to paved shoulders shall be provided~~ within the project limits utilizing HMA Surface Type B at a rate of ~~200~~ 300 psy. Paving under guardrail shall be provided in accordance with the ~~guardrail posts in mow strips~~ guidance found in the ~~2011 AASHTO Roadside Design Guide.~~ Exhibit 5, Special Provisions, Section 403.

Additional length guardrail posts with compressed guardrail shoulder break shall be used only where right of way or environmental impacts dictate that standard guardrail shoulder break cannot be built.

Thrie-beam guardrail with critical offset posts shall not be use at the bridge piers.

Cable Median Barrier: The Contractor shall provide a single run of cable median barrier in all medians less than or equal to 72 feet and greater than or equal to 36 feet. Cable median barrier shall be in installed in accordance with SCDOT standard drawings and specifications. All existing mainline cable median barrier within the project limits that is damaged or does not meet current design standards shall be replaced as a part of the project. This work shall include all necessary median

grading, drainage adjustments, and any other work necessary to meet current design standards.

Reset or reused cable median barrier must meet current design standards and subject to RCE approval.

The Contractor shall not use Double Run Cable Median Barrier. ~~Concrete median barrier shall be used in the areas where median slopes cannot accommodate for a single run of cable barrier. Pave entire area between travelway and concrete median barrier.~~

Concrete Median Barrier: The Contractor shall provide concrete median barrier in all medians less than or equal to 36 feet in the widened section only. When concrete median barrier is constructed, the inside shoulder shall be paved to barrier. All new concrete median barriers shall be painted in accordance to SCDOT Standard Specifications. All new concrete median barriers on I-77 shall be single slope shaped.

NBL & SBL Overpasses over I-20 & I-20 Ramp: Remove and dispose of existing concrete median barrier and glare shield barrier extension on I-20 as necessary to construct the new substructures for the widened bridges. After substructure construction has been completed, replace the removed barrier and extension with new concrete median barrier (match existing) and glare shield barrier extension constructed in accordance with SCDOT Standard Drawings 805-806-00 and 805-895-00.

2.11 Right-Of-Way and Control Of Access

If right-of-way is required, it shall be the Contractor's responsibility to secure right-of-way in accordance with Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646), as amended and revise environmental document, if needed.

Maintain fully controlled access along interstate, all interchanges, and ramp intersections. SCDOT and FHWA guidelines for Control of Access at interstate interchanges shall be followed.

3.0 DELIVERABLES

All submittals to SCDOT shall be subjected to a thorough QC review by the Contractor prior to submittal. All RFC Plans submittals shall be signed and sealed by the Engineer of Record who shall be licensed and registered as a Professional Engineer in the State of South Carolina.

3.1 Preliminary Plans

The Contractor shall submit to the SCDOT:

- Four (4) half-size sets of preliminary plans shall include, at a minimum: title sheet, roadway typical section, roadway plan and profile, cross sections, clearing limits on plan view and cross sections, drainage features, proposed right-of-way, and preliminary geotechnical reports.
- Contractor shall provide one electronic copy of the plans and reports.
- Contractor shall also provide any design calculations requested in writing by SCDOT.
- If the Contractor does not anticipate the need for Right-of-Way Plans, the conceptual work zone traffic control plans shall be submitted with the Preliminary Plans.

3.2 Right-of-Way Plans

The Contractor shall submit to the SCDOT:

- Four (4) half-size sets of right-of-way plans are not a required submittal. However, if right-of-way is required and the Contractor wishes to pursue right-of-way acquisition prior to Final Plan submittal, Contractor has the option to submit right-of-way plans.
- Right-of-Way plans shall include, at a minimum: right-of-way data, roadway typical section, roadway plan and profile, cross sections, drainage features, conceptual work zone traffic control plans, existing right-of-way, and proposed new right-of-way requirements.
- If the Contractor elects to submit right-of-way plans, one electronic copy is also required.

3.3 Final Plans

The Contractor shall submit to the SCDOT:

- Four (4) half-size sets of final plans shall include, at a minimum: title sheet, roadway typical section, roadway plan and profile, cross sections, drainage design, sediment and erosion control design, existing right-of-way, proposed right-of-way, proposed barrier locations, and final geotechnical and hydraulic reports. The following traffic elements shall also be included: work zone traffic control plans, signing plans, and pavement markings plans.
- Contractor shall provide one electronic copy of the plans and calculations.
- Contractor shall also provide any design calculations requested in writing by SCDOT.

3.4 Release for Construction (RFC) Plans

For roadway plans, Contractor shall provide two full size sets, four half size sets, and one electronic copy of RFC Plans to SCDOT. RFC Plans shall be inserted into plan folders as detailed in the SCDOT plan and preparation guide.

for Test Level 5, as specified in Section 13 of the AASHTO LRFD Bridge Design Specifications. It is acceptable to use a bridge rail design that is similar to a crash tested design based on an analytic comparison using the methodology outlined in Section 13 of the AASHTO LRFD Bridge Specifications. The width of the barrier at the base shall be a minimum of 18 inches, the traffic face shall be vertical and the height shall transition at a 10:1 maximum rate to 32 inches at ends where thrie beam guardrail is attached. At ends where thrie beam is required, the barrier shall be detailed using the standard thrie beam attachment details (the End Wall segment that is 4 feet in length and 32-inch high) shown on Bridge Drawings and Details Drawing 702-30b.

2.1.11 Transition Curbs

For the interstate mainline bridges, construct a transition curb at the ends of barrier parapets that will be retained and that meet both of the following conditions:

- Thrie beam guardrail is attached to the end of the barrier; and
- There is not an existing curb or drainage feature located at the end of the barrier.

For transition curb details and requirements, see SCDOT Standard Drawing No. 403-205-02.

2.1.12 Barrier End Treatment

At the north end of the SBL Overpass over US 21, new reinforced concrete barrier transitions shall be constructed at the ends of the existing barrier parapets and metal railing. The new barriers shall have a height of 40 inches at the end adjacent to the existing rail and the height shall transition at a 10:1 maximum rate to 32 inches at the ends where thrie beam guardrail is attached. At these ends, the barrier shall be detailed using the standard thrie beam attachment details (the End Wall segment that is 4 feet in length and 32-inch high) shown on Bridge Drawings and Details Drawing 702-30b. The barrier transition shall be supported by a moment slab or the transitional slab may be widened as necessary to support the barrier transition. Any existing drainage features that are impacted by the new barrier transitions shall be reconstructed.

2.1.13 Concrete Barrier for Pier Protection

Concrete barrier for pier ~~Pier~~ protection shall be provided for ~~Bent 3 of the Underpass under EBL of SC 277.~~ new and existing bents located within a distance of 30 feet to the edge of a through lane of I-77 ~~roadway~~. Concrete barrier for pier ~~Pier~~ protection shall consist of either a structurally independent, crashworthy ground mounted 54-inch high barrier, located within 10 feet from the column or a 42-inch high barrier

existing slab (30 feet plus/minus), shall be 12 inches thick, and shall be constructed at grade. Fill under the new slab shall be thoroughly compacted in accordance with Section 208 of the Standard Specifications. Where required by staged construction, transverse reinforcing steel shall be lap spliced (Class B minimum) or mechanically connected.

A transverse Grooved Surface Finish shall be applied to all widened approach slabs and to all new approach and transitional slabs in accordance with Subsection 702.4.16 of the Standard Specifications for Highway Construction.

2.1.15 Deck Drainage

The bridge deck drainage shall be designed to ensure that minimum requirements of the SCDOT Bridge Design Manual are met and that erosion of the end fill slopes is prevented due to excessive run off at the bridge ends. For decks where the existing drainage will remain in place, the Contractor shall make modifications if capacity needs to be increased to handle the additional runoff from the widened decks. Because there are low points on the Bridges over Windsor Lake and the Overpasses over Little Jackson Creek/Edgewater Drive, a 50-year Design Flood Frequency shall be used in the deck drainage design for those bridges.

Bridge deck drainage systems of existing overpass bridges shall be modified if necessary to prevent free-falling discharge from spilling onto the new inside shoulder and new inside lane or onto concrete barrier walls. Modifications of existing bridge drainage systems shall comply with the requirements of Chapter 18 of the SCDOT Bridge Design Manual.

2.1.16 Pile Sizes and Types

Minimum pile sizes and acceptable pile types are listed below. No other pile types will be permitted.

PILE TYPE	MINIMUM SIZE
Steel H-Piles	HP12x53
Steel Pipe Piles	12” Diam. (min. wall thickness equal to ½”)
Solid Prestressed Concrete Piles	18” Square
Prestressed Concrete Pile Points	W8x58
*Micropiles	7” Casing OD

*Micropiles are allowed only at locations specified in Exhibit 4f.

2.1.17 Steel Pipe Pile Connection Details

The pile connection detail described in Item 2 of Section 19.2.6.3 of the SCDOT Bridge Design Manual shall not be used for this project. Steel pipe piles shall be terminated at the bottom of the end bent cap or footing

1.0 GENERAL

The pavement shown in the Typical Section included in the SCDOT Conceptual Plans provided in Attachment B is for information only. The design for pavement shall conform to the criteria listed in Section 2.0.

Milled-in rumble strips shall be used on all mainline shoulders, both inside and outside, in accordance with SCDOT Standard Drawings and specifications for the entire project.

Transition areas not requiring pavement reconstruction or rehabilitation but requiring revised pavement markings shall be milled 2-inches and resurfaced utilizing 200 lbs/sy hot mix asphalt HMA Surface Type B and 110 lbs/sy Open Graded Friction Course (OGFC). These areas include, but are not limited to, existing I-20 pavement sections.

Include 2000 SY of ~~10"~~ 9" full depth concrete patching and 1000 SY of full depth asphalt patching in accordance with the Special Provision in Exhibit 5.

Cross-slope verification in accordance with Exhibit 5 – Special Provisions is required.

2.0 CRITERIA

2.1 Mainline Pavement New Lane

Construct a composite pavement for the mainline travel lane. Construct a plain jointed portland cement concrete (PCC) pavement overlaid with a HMA pavement having the following characteristics:

2.1.1 HMA Overlay

Place two (2) 200 psy lifts of Surface Type B with PG76-22 and one (1) 110 psy lift of OGFC. Extend OGFC four (4) feet beyond pavement edge line.

2.1.2 PCC Pavement

Thickness:	10"
Transverse Joint Spacing:	15'
Transverse Load Transfer:	1.5" dowels, 18" long, spaced 12" c-c, mainline only
Surface Texture:	Mainline – Heavy Broom
Joint Sealant:	~~NA (Saw cut joints only)~~ Hot Poured, 3/8 inch wide longitudinal and transverse
Nominal Compressive Strength:	5500 psi
Base:	6" GABC overlaid with 200 lbs Surface C

PCC pavement elevation shall match existing concrete pavement. When

placing PCC pavement ~~adjacent to existing asphalt section (approximate mile marker 15 to 17.5)~~ saw cut existing pavement structure at the joint to create a clean vertical surface throughout the depth of PCC pavement and base. The new mainline PCC shall meet the requirements of SC-M-502 Section 5.1.6 Profilograph Measurement prior to placement of overlay. Final Rideability will be measured after overlay and be in accordance with SC-M-403.

For all new PCC pavements construct an expansion joint of a design acceptable to the Department when abutting bridges or other structures. At bridge ends and other rigid obstructions, provide three (3) expansion joints one (1) inch in width located at the obstruction and 75 feet and 150 feet away from the obstruction. Obtain approval of expansion joint assembly and detail from the RCE prior to construction.

In Section 5.6.1 of SC-M-501(0308), the compressive strength of 4000 psi is removed and replaced with 5500 psi.

Section 6.3.3.1 of SC-M-501(0308) is removed and replaced with the following:

6.3.3.1 Furnish a suitable concrete compression testing machine meeting the requirements of ASTM C39. Have the machine professionally calibrated after installation in the field laboratory and prior to commencement of work. Maintain proper calibration of the equipment for the duration of the project.

Section 7.4.2 and 7.4.3 of SC-M-501(0308) shall be adjusted for compressive strength of 5500 psi such that the same percentages are applied.

No ATC's will be considered for the above defined pavement types of PCC overlaid with HMA.

2.2 New and Existing Shoulders (Station 1302+50 to 1801+15)

The shoulders shall be surfaced with HMA pavement having a minimum thickness equal to the mainline overlay. ~~Existing shoulders have a Structural Number equal to 3.30~~. Attachment B provides a limited number of asphalt thickness cores and Falling Weight Deflectometer testing of the existing shoulders. This information should be used at the design build teams risk. Plans from previous projects indicate the existing shoulder sections vary. For new shoulders the base materials can be selected from the following list by the design build team. New and existing shoulders shall not have a structural number less than 5.36 calculated in accordance with SCDOT Pavement Design Guide. Allowable base materials include: Cement Stabilized Aggregate Base (CSAB),

Graded Aggregate Base, Asphalt Aggregate Base, Cement Modified Subbase (CMS), PCC pavement, Roller Compacted Concrete. Submit all pavement design calculations for review on or before the Formal ATC submittal due date. ~~Submittal schedule for pavement design on shoulders shall follow the ATC milestones.~~

If PCC pavement is selected, tie to new PCC mainline with #5 tie bar, 30" long, 30" c-c. For PCC and Roller Compacted Concrete, match adjacent concrete pavement thickness. Do not tie to continually reinforced concrete pavement section. ~~Nominal compressive strength of concrete shall not exceed mainline mixture design.~~

2.3 Existing PCC Pavement

Milling of the existing PCC pavement is not allowed other than for transverse tie-ins. Perform full-depth patching as required in the Exhibit 5 Special Provisions. Tack at a rate of 0.08 to 0.10 gal/yd^2. Correct the cross slope with Asphalt Surface Type E with PG76-22 for correction up to 1.5 inches and Asphalt Surface Type B (with PG76-22) for greater correction. Overlay with 200 psy Surface Type B (with PG-76-22), 200 psy Surface Type B (with PG-76-22) and 110 psy OGFC matching new mainline composite pavement.

To meet the existing pavement grade, perform two variable milling operations up to 2.5 inches in depth to smoothly tie in the ~~intermediate course for the first operation and the surface and OGFC courses in the second~~ asphalt pavement. This variable milling shall extend a minimum of 75 feet for each lift to ensure smooth transitions.

2.4 Existing HMA Pavement (Station 1170+00 to 1302+50)

Mill 2 inches. Overlay with 200 psy Surface Type B (with PG-76-22) and 110 psy OGFC.

2.5 Ramp Pavement

Existing concrete ramps are to be full depth patched and overlaid with HMA matching mainline without OGFC. Carry the OGFC along the ramp to the gore, then variably mill 0 to 1 inch over a minimum of 75 feet and terminate the OGFC in a neat, smooth transverse joint. ~~The overlay shall extend from the mainline to the edge of travel way of the existing crossing route.~~ To meet the existing pavement grade, perform two variable milling operations up to 2.5 inches in depth to smoothly tie in the asphalt pavement. This variable milling shall extend a minimum of 75 feet for each lift to ensure smooth transitions. The final 75 feet of transition will only have one lift of asphalt. In this final transition, the asphalt

overlay shall be sawed and sealed at the existing concrete joint locations.

Existing asphalt ramps are to be milled 2 inches and replaced with 200 lbs Surface Type B (with PG 76-22). One exception to this is Killian Road on and off ramps South Bound which will be milled 4 inches or to the underlying PCC pavement and replaced with two lifts of 200 lbs Surface Type B (PG 76-22). ~~The overlay shall extend from the mainline to the edge of travel way of the existing crossing route.~~ Concrete patching may be necessary to rehabilitate the underlying concrete pavement in this location prior to overlay.

Existing six-inch curbs/gutters may be filled a maximum of two (2) inches when overlaying with new asphalt, leaving a minimum of four (4) inches of the face of the vertical curb exposed.

2.5.1 Auxiliary Lanes – Percival to I-20

The pavement design for the new outside auxiliary lanes along I-77 ~~northbound~~ that connects Percival Road ~~onramp~~ and I-20 ~~off~~ ramps will ~~match the new mainline pavement identified in Section 2.1.~~ be as follows:

Remove the existing shoulder and widen for new lane with one of the following options.

Option 1: 110 psy OGFC, 200 psy Surface B (with PG 76-22), 325 psy Intermediate B Special, 1350 psy Base A

Option 2: 110 psy OGFC, 200 psy Surface B (with PG 76-22), 300 Intermediate A, 850 Base A, 10 inches GABC.

Option 3: 110 psy OGFC, 200 psy Surface B (with PG 76-22), 350 psy Intermediate B Special, 10 inches CSAB, 6 inches CMS.

Option 4: 110 psy OGFC, 200 psy Surface B (with PG 76-22), 200 psy Intermediate B, 450 psy Base A, 10 inches CSAB.

Option 5: 110 psy OGFC, 200 psy Surface B (with PG76-22), 200 psy Surface B (with PG76-22), 10 inches PCC (pavement attributes from section 2.1.2), 6" GABC overlaid with 200 lbs Surface C. Note, any approved ATC for Base under PCC pavement from section 2.1.2 may also apply for Option 5.

2.5.2 Ramp Rehabilitation Limits

The rehabilitation shall extend from the mainline to the edge of travel way of the existing crossing route with the following exceptions:

- I-77 / I-20 Interchange north of I-20 – from mainline I-77 to gores
- I-77 / I-20 Interchange south of I-20 – from mainline I-77 to joint at gore of collector/distributer road or to approach slab of I-20 flyover bridge
- I-77 / SC 277 Interchange – from mainline I-77 to SC 277 bridge transitional slabs

The Contractor's attention is called to Attachment B which includes a sketch of the above limits that is provided for information only.

2.6 Temporary Pavement

Design of temporary pavement, including using the existing shoulder to carry the mainline traffic, is at the discretion of the Contractor. However, temporary pavement must provide a satisfactory rideability to the public prior to opening to traffic and during construction. Satisfactory rideability is defined as any 0.1 mile segment having roughness not to exceed 170 inches per mile when tested in accordance with SC-T-125. In addition to rideability, rutting shall not exceed ¼" when the wheel paths are measured with a 4' straightedge.

Should potholes appear in the temporary pavement the Contractor shall take action within one calendar day to temporarily fill the pothole for safety. Once per week all temporarily filled pot holes shall be full depth patched varying in depth as necessary but shall be no less than 4 inches.

If temporary pavement is to be incorporated in the final pavement structure, it must minimally meet the structural requirements given in Section 2.2 of this Exhibit. Additionally, the pavement must be free of cracks and distortion prior to overlay. If the pavement has visible wear or deterioration, then take remedial action to improve or repair the pavement to the Department's satisfaction prior to overlaying.

1.0 GENERAL

The Contractor shall execute the item of Traffic Control as required by the Standard Specifications, the Standard Drawings For Road Construction, the Special Provisions, all Supplemental Specifications, the SCDOT Procedures and Guidelines for Work Zone Traffic Control Design, the MUTCD, the Plans, and the Engineer. This is an amendment to the Standard Specifications to require the following:

2.0 CRITERIA

2.1 GENERAL REGULATIONS

These special provisions shall have priority to the plans and comply with the requirements of the MUTCD and the standard specifications. Revisions to the traffic control plan through modifications of the special provisions and the plans shall require approval by the Department. Final acceptance of any revisions to the traffic control plan shall be pending upon review by the member of the Design-Build team representing the Director of Traffic Engineering through the Design-Review Process.

In accordance with the document, *Rule on Work Zone Safety and Mobility: Implementation, Maintenance, and Safety Guidelines*, this project has been classified as "SIGNIFICANT" and all components of the Transportation Management Plan prepared by the CONRACTOR are required and shall be implemented.

Install and utilize changeable message signs in all lane closures installed on high volume high-speed multilane roadways. Use of changeable message signs in lane closures installed on low volume low speed multilane roadways is optional unless otherwise directed by the plans and the Engineer. Install and use a changeable message sign within a lane closure set-up as directed by the *Standard Drawings For Road Construction*. When a lane closures is not present for any time to exceed 24 hours, remove the changeable message sign from the roadway. Place the sign in a predetermined area on the project site, as approved by the Engineer, where the sign is not visible to passing motorists. Utilize preprogrammed messages in accordance with the *Standard Drawings For Road Construction* when using the changeable message sign as part of the traffic control set-up for lane closures. Only those messages pertinent to the requirements of the traffic control situation and the traffic conditions are permitted for display on a changeable message sign at all times. At no time will the messages displayed on a changeable message sign duplicate the legends on the permanent construction signs.

During operation of changeable message signs, place the changeable message sign on the shoulder of the roadway no closer than 6 feet between the sign and the near edge of the adjacent travel lane. When the sign location is within 30' of the

near edge of a travel lane open to traffic, supplement the sign location with no less than 5 portable plastic drums placed between the sign and the adjacent travel lane for delineation of the sign location. Install and maintain the drums no closer than 3 feet from the near edge of the adjacent travel lane. This requirement for delineation of the sign location shall apply during all times the sign location is within 30' of the near edge of a travel lane open to traffic, including times of operation and non-operation. Oversized cones are prohibited as a substitute for the portable plastic drums during this application.

All signs mounted on portable sign supports shall have a minimum mounting height of 5' from the bottom of the sign to the ground. All signs mounted on ground mounted u-channel posts or square steel tube posts shall have a minimum mounting height of 7' from the bottom of the sign to the grade elevation of the near edge of the adjacent travel lane or sidewalk when a sidewalk is present.

Temporary "Exit" signs (M1025-00) shall be located within each temporary gore during lane closures on multilane roadways. Mount these signs a minimum of 7' from the pavement surface to the bottom of the sign in accordance with the requirements of the MUTCD.

When mounting signs on ground mounted u-section or square steel tube posts, utilize either a sign support / ground support post combination with an approved breakaway assembly or a single direct driven post for each individual sign support of a sign assembly installation. Do not combine a sign support / ground support post combination and a direct driven post on the same sign assembly installation that contains two or more sign supports. Regarding sign support / ground support post combination installations, ensure that post lengths, stub heights and breakaway assemblies comply with the manufacturer's requirements and specifications. Use approved breakaway assemblies found on the *Approved Products List For Traffic Control Devices in Work Zones*.

When covering signs with opaque materials, the Department prohibits attaching a covering material to the face of the sign with tape or a similar product or any method that will leave a residue on the retroreflective sheeting. Residue from tape or similar products, as well as many methods utilized to remove such residue, damages the effective reflectivity of the sign. Therefore, contact of tape or a similar product with the retroreflective sheeting will require replacement of the sign. Cost for replacement of a sign damaged by improper covering methods will be considered incidental to providing and maintaining the sign; no additional payment will be made.

Overlays are prohibited on all rigid construction signs. The legends and borders on all rigid construction signs shall be either reversed screened or direct applied.

Signs not illustrated on the typical traffic control standard drawings designated for permanent construction signs shall be considered temporary and shall be included in the lump sum price bid item for "Traffic Control" unless otherwise specified.

Install "Grooved Pavement" signs (W8-15-48) supplemented with the "Motorcycle" plaque (W8-15P-30) in advance of milled or surface planed pavement surfaces. On primary routes, install these signs no further than 500 feet in advance of the beginning of the pavement condition. On interstate routes, install these signs no less than 500 feet in advance of the beginning of the pavement condition. Install two sign assemblies at each sign location, one on each side of the roadway, on multilane roadways when the pavement condition is present. Install these signs immediately upon creation of this pavement condition and maintain these signs until this pavement condition is eliminated.

Install "Steel Plate Ahead" signs (W8-24-48) in advance of an area of roadway where temporary steel plates are present. Install these signs no further than 300 feet in advance of locations where steel plates are present. On multilane roadways, comply with the same guidelines as applied to all other advance warning signs and install two sign assemblies at each sign location, one on each side of the roadway, when roadway conditions warrant. Install these signs immediately upon installation of a temporary steel plate and maintain the signs until the temporary steel plates are removed.

Install and maintain any necessary detour signing as specified by the typical traffic control standard drawings designated for detour signing, Part VI of the MUTCD, these Special Provisions, and the Engineer. The lump sum price bid item for "Traffic Control" includes payment for installation and maintenance of the detour signing.

The Contractor shall maintain the travel patterns as directed by the traffic control plans and shall execute construction schedules expeditiously. The Contractor shall provide the Resident Engineer with no less than a two-week prior notification of changes in traffic patterns.

During nighttime flagging operations, flaggers shall wear a safety vest and safety pants that comply with the requirements of ANSI / ISEA 107 standard performance for Class 3 risk exposure, latest revision, and a fluorescent hard hat. The safety vest and the safety pants shall be retroreflectorized and the color of the background material of the safety vest and safety pants shall be fluorescent orange-red or fluorescent yellow-green.

During nighttime flagging operations, the contractor shall illuminate each flagger station with any combination of portable lights, standard electric lights, existing street lights, etc., that will provide a minimum illumination level of 108 Lx or 10 fc.

During nighttime flagging operations, supplement the array of advance warning signs with a changeable message sign for each approach. These changeable message signs are not required during daytime flagging operations. Install the changeable message signs 500' in advance of the advance warning sign arrays. Messages should be "Flagger Ahead" and "Prepare To Stop".

During surface planing and milling operations, grade elevation differences greater than 1 inch in areas with pavements composed of hot mixed asphalt (HMA) base courses, intermediate courses or surface courses and Portland cement concrete are PROHIBITED unless otherwise directed by the Department. However, during surface planing and milling operations for removal of Open-Graded Friction courses ONLY, a grade elevation difference of 1½ inches between adjacent travel lanes opened to traffic may exist unless otherwise directed by the Department. During the paving operations, the length of roadway with an acceptable grade elevation difference less than or equal to 2" shall be restricted to 4 miles.

During the milling and surface planing operations, the length of roadway with an acceptable grade elevation difference less than or equal to 1" shall be restricted to 4 miles.

During construction on the ramps, the contractor shall conduct flagging operations. The flagging operations shall either stop traffic or direct the traffic around the work area. Installation and operation of these flagging operations shall be according to these special provisions and the MUTCD.

Supplement and delineate the shoulder edges of travel lanes through work zones with traffic control devices to provide motorists with a clear and positive travel path. Utilize portable plastic drums unless otherwise directed by the Department. Vertical panels may be used where specified by the plans and directed by the RCE. The installation of traffic control devices are required in all areas where those areas immediately adjacent to a travel lane open to traffic have been altered in any manner by work activities, including but not limited to activities such as grading, milling, etc. Install the traffic control devices immediately upon initiating any alterations to the areas immediately adjacent to or within 15 feet of the near edge line of the adjacent travel lane. When sufficient space is available, place the traffic control devices no closer than 3 feet from the near edge of the traffic control device to the near edge line on the adjacent travel lane. When sufficient space is unavailable, place the traffic control device at the maximum distance from the near edge of the adjacent travel lane available.

2.2 LANE CLOSURE RESTRICTIONS

The lane closure restrictions stated below are project specific, for all other restrictions, see supplemental specification, "Restrictions", dated ~~January 3, 2013.~~ September 1, 2015

On primary and secondary routes, the Department prohibits lane closures during any time of the day that traffic volumes exceed 800 vehicles per hour per direction. The Department reserves the right to suspend a lane closure if any resulting traffic backups are deemed excessive by the Engineer. Maintain all lane closure restrictions as directed by the plans, these special provisions, and the Engineer.

On Interstate 77, the Department prohibits lane closures ~~on northbound I-77~~ as described in the following three tables. ~~Monday through Friday from 6:00 am to 9:00 pm, Saturday from 7:00 am to 9:00 pm, and Sunday from 9:00 am to 9:00 pm. The Department prohibits lane closures on southbound I-77 Monday through Wednesday from 6:00 am to 8:00 pm, Thursday from 6:00 am to 9:00 pm, Friday from 6:00 am to 9:00 pm, Saturday from 7:00 am to 8:00 pm, and Sunday from 8:00 am to 8:00 pm.~~

~~HOURLY LANE CLOSURE PROHIBITIONS (NORTHBOUND I-77)~~	~~HOURLY LANE CLOSURE PROHIBITIONS (SOUTHBOUND I-77)~~
~~MON-FRI: 6A-9P~~	~~MON-WED: 6A-8P~~
~~SAT: 7A-9P~~	~~THU-FRI: 6A-9P~~
~~SUN: 9A-9P~~	~~SAT: 7A-8P~~
	~~SUN: 8A-8P~~

I-77 LANE CLOSURE PROHIBITIONS (6-LANE SECTION FROM I-20 SOUTHERLY)			
NB I-77 (Single Closure)	SB I-77 (Single Closure)	NB I-77 (Dual Closure)	SB I-77 (Dual Closure)
MON-THU: 4P-6P	MON-THU: 7A-8A 4P-6P	MON-THU: 6A-8P	MON: 6A-7P
			TUE-THU: 6A-8P
FRI: 3P-6P	FRI: 7A-8A 1P-6P	FRI: 6A-9P	FRI: 6A-9P
SAT: ---------	SAT: 10A-2P	SAT: 7A-8P	SAT: 7A-8P
SUN: ---------	SUN: ---------	SUN: 10A-8P	SUN: 9A-8P

I-77 LANE CLOSURE PROHIBITIONS (4-LANE SECTION FROM I-20 TO SC 277)			
NB I-77 (Single Closure)	SB I-77 (Single Closure)	NB I-77 (Dual Closure)	SB I-77 (Dual Closure)
MON-THU: 7A-8P	MON-WED: 6A-7P	NA	NA
	THU: 6A-8P		
FRI: 7A-9P	FRI: 6A-8P		
SAT: 8A-8P	SAT: 8A-7P		
SUN: 10A-8P	SUN: 9A-8P		

I-77 LANE CLOSURE PROHIBITIONS (6-LANE SECTION FROM SC 277 NORTHERLY)			
NB I-77 (Single Closure)	SB I-77 (Single Closure)	NB I-77 (Dual Closure)	SB I-77 (Dual Closure)
MON-WED: 4P-6P	MON-THU: 7A-9A	MON-WED: 7A-8P	MON-TUE: 6A-7P
THU: 3P-6P		THU: 7A-9P	WED-THU: 6A-8P
FRI: 2P-6P	FRI: 7A-9A 2P-6P	FRI: 7A-9P	FRI: 6A-9P
SAT: 1P-5P	SAT: 10A-2P	SAT: 8A-9P	SAT: 8A-9P
SUN: 2P-4P	SUN: ---------	SUN: 9A-9P	SUN: 9A-9P

On Interstate 20, the Department prohibits lane closures ~~on eastbound I-20~~ as described in the following table. ~~Monday through Tuesday from 7:00 am to 7:00 pm, Wednesday through Friday from 7:00 am to 8:00 pm, Saturday from 8:00 am to 8:00 pm, and Sunday from 10:00 am to 8:00 pm. The Department prohibits lane closures on westbound I-20 Monday through Thursday from 7:00 am to 7:00 pm, Friday from 7:00 am to 8:00 pm, Saturday from 9:00 am to 7:00 pm, and Sunday from 10:00 am to 8:00 pm.~~

~~HOURLY LANE CLOSURE PROHIBITIONS (EASTBOUND I-20)~~	~~HOURLY LANE CLOSURE PROHIBITIONS (WESTBOUND I-20)~~
~~MON-TUE: 7A-7P~~	~~MON-THU: 7A-7P~~
~~WED-FRI: 7A-8P~~	~~FRI: 7A-8P~~
~~SAT: 8A-8P~~	~~SAT: 9A-7P~~
~~SUN: 10A-8P~~	~~SUN: 10A-8P~~

I-20 LANE CLOSURE PROHIBITIONS (6-LANE SECTION FROM MP 68-84)			
EB I-20 (Single Closure)	WB I-20 (Single Closure)	EB I-20 (Dual Closure)	WB I-20 (Dual Closure)
MON-TUE: 7A-7P	MON-THU: 7A-7P	MON-TUE: 6A-10P	MON-WED: 6A-10P
WED-THU: 7A-8P		WED-THU: 6A-11P	THU: 6A-11P
FRI: 7A-8P	FRI: 7A-8P	FRI: 6A-12A (Mid-Night)	FRI: 6A-12A (Mid-Night)
SAT: 8A-8P	SAT: 9A-7P	SAT: 7A-11P	SAT: 7A-11P
SUN: 10A-8P	SUN: 10A-8P	SUN: 8A-10P	SUN: 8A-10P

On SC 277, the Department prohibits lane closures on Monday through Friday from 7:00 am to 9:00 am and 4:00 pm to 6:00 pm.

All other routes with lane closure prohibitions for this project are listed on the SCDOT website under Doing Business with SCDOT in the Publications and Manuals section for Traffic Engineering.

These restrictions also apply to all road closures and pacing operations. The Department reserves the right to suspend a lane closure if any resulting traffic backups are deemed excessive by the Engineer. Maintain all lane closure restrictions as directed by the plans, these special provisions, and the Engineer.

Installation and maintenance of a lane closure is PROHIBITED when the Contractor is not actively engaged in work activities specific to the location of the lane closure unless otherwise specified and approved by the Engineer. The length of the lane closure shall not exceed the length of roadway anticipated to be subjected to the proposed work activities within the work shift time frame or the maximum lane closure length specified unless otherwise approved by the Engineer. Also, the maximum lane closure length specified does not warrant installation of the specified lane closure length when the length of the lane closure necessary for conducting the work activity is less. The length and duration of each lane closure, within the specified parameters, shall require approval by the Engineer prior to installation. The length and duration of each lane closure may be reduced by the Engineer if the work zone impacts generated by a lane closure are deemed excessive or unnecessary.

On multilane primary and secondary routes, a reduced regulatory speed limit of 35 MPH shall be in effect during lane closures. Erect temporary regulatory "Speed Limit" signs (R2-1-48-35) and "Speed Reduction 35 MPH" signs (W3-5-48-35) on temporary supports according to the typical traffic control standard drawings. Cover the existing regulatory speed limit signs when reduced speed limits are in place. Immediately remove or cover the "Speed Limit" signs (R2-1-

48-35) and the "Speed Reduction 35 MPH" signs (W3-5-48-35) upon the removal of the lane closures.

On interstate routes, a reduced regulatory speed limit of 45 MPH shall be in effect during lane closures. Erect temporary regulatory "Speed Limit" signs (R2-1-48-45) and "Speed Reduction 45 MPH" signs (W3-5-48-45) on temporary supports according to the typical traffic control standard drawings. Cover the existing regulatory speed limit signs when reduced speed limits are in place. Immediately remove or cover the "Speed Limit" signs (R2-1-48-45) and the "Speed Reduction 45 MPH" signs (W3-5-48-45) upon the removal of the lane closures.

On interstate routes, the presence of temporary signs, portable sign supports, traffic control devices, trailer mounted equipment, truck mounted equipment, vehicles and vehicles with trailers relative to the installation or removal of a closure and personnel are prohibited within 30 foot clear zone during the prohibitive hours for lane closures specified by these special provisions.

Truck mounted changeable message signs shall be required during all interstate lane closures. The Contractor shall provide, install, and maintain these signs in accordance with all requirements of the Standard Specifications for Highway Construction (latest edition) and the typical traffic control standard drawings designated for interstate lane closures.

The truck mounted changeable message signs are in addition to the requirements for trailer mounted changeable message signs. Truck mounted changeable message signs and trailer mounted changeable message signs are not interchangeable.

The Contractor shall discontinue and remove a lane closure when the work activities requiring the presence of the lane closure are completed or are discontinued or disrupted for any period of time to exceed 60 minutes unless the presence of unacceptable grade elevation differences greater than 1" in milled areas or greater than 2" in all other areas are present unless otherwise directed by the Engineer.

2.3 SHOULDER CLOSURE RESTRICTIONS:

On primary and secondary routes, the Department prohibits the Contractor from conducting work within 15' of the near edge of the adjacent travel lane on an outside shoulder or a median area under a shoulder closure during any time of the day that traffic volumes exceed 800 vehicles per hour per direction. The hourly restrictions for lane closures shall also apply to work activities conducted under a shoulder closure within 15' of the near edge of an adjacent travel lane or a median area. The Department reserves the right to suspend work conducted under a shoulder closure if any traffic backups develop and are deemed excessive by the

Engineer. Maintain all shoulder closure restrictions as directed by the plans, these special provisions, and the Engineer.

On primary and secondary roadways, the Department prohibits the Contractor from conducting work within 1' or less of the near edge of an adjacent travel lane under a shoulder closure. All work that may require the presence of personnel, tools, equipment, materials, vehicles, etc., within 1' of the near edge of an adjacent travel lane shall be conducted under a lane closure.

On Interstate 77, the Department prohibits the Contractor from conducting work within 15' of the near edge of the adjacent travel lane on the outside shoulders or the median areas during the times listed in section 2.2 Lane Closure Restrictions~~of northbound I-77 Monday through Friday from 6:00 am to 9:00 pm, on Saturdays from 7:00 am to 9:00 pm, and on Sundays from 9:00 am to 9:00 pm. The Department prohibits the Contractor from conducting work within 15' of the near edge of the adjacent travel lane on the outside shoulders or the median areas of southbound I-77 Monday through Wednesday from 6:00 am to 8:00 pm, on Thursdays from 6:00 am to 9:00 pm, on Fridays from 6:00 am to 9:00 pm, on Saturdays from 7:00 am to 8:00 pm, and on Sundays from 8:00 am to 8:00 pm~~. The hourly restrictions for lane closures shall also apply to work activities conducted under a shoulder closure within 15' of the near edge of an adjacent travel lane or a median area. The Department reserves the right to suspend work conducted under a shoulder closure if any traffic backups develop and are deemed excessive by the Engineer. Maintain all shoulder closure restrictions as directed by the plans, these special provisions, and the Engineer.

On interstate highways, the Department prohibits the Contractor from conducting work within the limits of a paved shoulder or within 10' of the near edge of an adjacent travel lane under a shoulder closure. All work that may require the presence of personnel, tools, equipment, materials, vehicles, etc., within the limits of a paved shoulder or within 10' of the near edge of an adjacent travel lane shall be conducted under a lane closure.

The Contractor shall install all shoulder closures as directed by the typical traffic control standard drawings designated for shoulder closures, and the Engineer. Substitution of the portable plastic drums with oversized cones during nighttime shoulder closures is PROHIBITED.

2.4 MOBILE OPERATIONS

A mobile operation moves continuously at all times at speeds of 3 mph or greater without any stops. The minimal traffic flow impacts generated by these operations involve brief traffic flow speed reductions and travel path diversions. Conduct work operations that cannot be performed at speeds of 3 mph or greater under standard stationary lane closures.

The distance intervals between the vehicles, as indicated in the *Standard Drawings For Road Construction*, may require adjustments to compensate for sight distance obstructions created by hills and curves and any other conditions that may obstruct the sight distance between the vehicles. However, adjustments to the distance intervals between the vehicles should be maintained within the range of variable distance intervals indicated in the standard drawings unless otherwise directed by the Engineer.

Maintain two-way radio communication between all vehicles in the vehicle train operating in a mobile operation.

Supplement the work vehicles and the shadow vehicles with amber colored flashing dome lights. The vehicles may also be supplemented with advance warning arrow panels and truck mounted attenuators as directed in the *Standard Drawings For Road Construction* and the Standard Specifications.

The Contractor shall install, operate and maintain all advance warning arrow panels, truck mounted attenuators and truck mounted changeable message signs as required by these special provisions, the manufacturer's specifications, the *Standard Drawings For Road Construction*, the Standard Specifications, the plans and the Engineer.

2.5 TYPICAL TRAFFIC CONTROL STANDARD DRAWINGS:

The typical traffic control standard drawings of the "Standard Drawings For Road Construction", although compliant with the MUTCD, shall take precedence over the MUTCD. The typical traffic control standard drawings of the "Standard Drawings For Road Construction" shall apply to all projects let to contract.

Install the permanent construction signs as shown on the typical traffic control standard drawings designated for permanent construction signing.

2.6 ADDENDUMS

(Addendums to the "2007 Standard Specifications for Highway Construction")

2.6.1 <u>Construction</u> (Sub-section 601.4) –

<u>Sub-section 601.4.2 Construction Vehicles (paragraph 2) -</u>

When working within the rights-of-way of access-controlled roadways such as Interstate highways, the Contractor's vehicles may only change direction of travel at interchanges. These vehicles are prohibited from crossing the roadway from right side to the median or vice versa. Use a flagger to control the Contractor's vehicles when these vehicles attempt to enter the roadway from a closed lane or the median area. Ensure the

flagger does not stop roadway traffic, cause roadway traffic to change lanes, or affect roadway traffic in any manner. The Contractor's vehicles may not disrupt the normal flow of roadway traffic or enter the travel lane of the roadway until a sufficient gap is present.

The Contractor shall have flaggers available to control all construction vehicles entering or crossing the travel lanes of secondary and primary routes. The RCE shall determine the necessity of these flaggers for control of these construction vehicles. The RCE shall consider sight distance, vertical and horizontal curves of the roadway, prevailing speeds of roadway traffic, frequency of construction vehicles entering or crossing the roadway and other site conditions that may impact the safety of the workers and motorists when determining the necessity of these flaggers. Ensure these flaggers do not stop roadway traffic, cause roadway traffic to change lanes or affect roadway traffic in any manner. The Contractor's vehicles may not disrupt the normal flow of roadway traffic or enter the travel lane of the roadway until a sufficient gap is present.

When working within the rights-of-way of access-controlled roadways with posted regulatory speed limits of 55 MPH or greater and average daily traffic volumes {ADT} of 10,000 vehicles per day or greater, i.e. Interstate highways, all construction and work vehicles possessing any one or more of the vehicular characteristics listed below are only permitted to enter and exit a right or left shoulder work area during the presence of active lane closures unless otherwise directed by the RCE. These vehicles are not permitted to enter or exit these work areas without the presence of active lane closures unless otherwise directed by the RCE. Shoulder closures are unacceptable and insufficient methods for control of traffic at ingress / egress areas for these vehicles. The restrictive vehicular characteristics include the following:

- Over six (6) tires
- Tandem rear axles
- A base curb weight greater than 8000 lbs.
- A gross vehicular weight greater than 12000 lbs. unless performing duties as a shadow vehicle while supporting a truck mounted attenuator
- A trailer in tow except under the following conditions:
    - Trailers transporting traffic control devices (including but not limited to standard and 42" oversized traffic cones, portable plastic drums, signs, portable sign supports, u-channel and square steel tube sign posts) relative to the installation of lane closures, shoulder closures or other traffic control operations approved by the RCE

- Trailer mounted traffic control devices (including but not limited to advance warning arrow panels, changeable message signs, temporary traffic signals, highway advisory radios, work zone intelligent transportation systems and trailer towed truck mounted attenuators)

2.6.2 Construction (Sub-section 601.4) –

Sub-section 601.4.2 Construction Vehicles -

Auxiliary Warning Lights for Vehicles and Equipment -

Supplement all construction and/or construction-related vehicles and equipment that operate in a stationary or mobile work zone within or adjacent to a roadway within the highway rights-of-way with AMBER or YELLOW colored high intensity rotating or strobe type flashing auxiliary warning light devices. Utilize, install, operate and maintain a single or multiple lighting devices as necessary to provide visibility to approaching motorists.

All auxiliary warning light models shall meet *Society of Automotive Engineers* (SAE) Class I standards and SAE Standard J575 relative to *Tests for Motor Vehicle Lighting Devices and Components* and these specifications.

The amber/yellow color of the dome/lens of an auxiliary warning light device shall meet SAE Standard J578 for amber/yellow color specifications.

Auxiliary warning lights with parabolic reflectors that rotate shall rotate around a halogen lamp at a rate to produce approximately 175 flashes per minute. The parabolic reflector shall produce a minimum 80,000 candle power and a minimum 54,000 candela through an SAE Standard J846 approved amber dome.

Equip strobe type flashing auxiliary warning light devices with photosensitive circuit controls to adjust the lighting intensity in response to changes in ambient light conditions such as from day to night. These lights shall have a double-flash capability rated at approximately 80 double flashes per minute and produce a minimum 24 joules of flash energy at the highest power level setting.

Acceptable auxiliary warning light models shall provide sufficient light output to be clearly recognizable at a minimum distance of 1750 feet.

Mount all auxiliary warning light devices intended to function as the auxiliary warning light system or as an element thereof on vehicles and equipment at locations no less than 3 feet above the ground and in conspicuous locations to provide visibility to approaching motorists.

Auxiliary warning light devices and/or models that mount in the locations of the standard vehicle lighting system are unacceptable as the specified auxiliary warning light system due to restrictive simultaneous visibility capabilities from multiple sight angles. However, auxiliary warning light devices that mount in the standard vehicle lighting system locations are acceptable as supplements to the specified lighting devices mounted in locations that do meet the minimum height requirements and provide simultaneous visibility capabilities from multiple sight angles.

Standard vehicle hazard warning lights are only permitted as supplements to the specified auxiliary warning light devices.

2.6.3 <u>Category I Traffic Control Devices</u> (Section 603) –

<u>Sub-section 603.2.2 Oversized Traffic Cones (paragraph 6)</u> -

Reflectorize each oversized traffic cone with 4 retroreflective bands: 2 orange and 2 white retroreflective bands. Alternate the orange and white retroreflective bands, with the top band always being orange. Make each retroreflective band not less than 6 inches wide. Utilize Type III – Microprismatic retroreflective sheeting for retroreflectorization on all projects let to contract after May 1, 2010 unless otherwise specified. Separate each retroreflective band with not more than a 2-inch non-reflectorized area. Do not splice the retroreflective sheeting to create the 6-inch retroreflective bands. Apply the retroreflective sheeting directly to the cone surface. Do not apply the retroreflective sheeting over a pre-existing layer of retroreflective sheeting.

<u>Sub-section 603.2.3 Portable Plastic Drums (paragraph 3)</u> -

Reflectorize each drum with Type III – Microprismatic retroreflective sheeting: 2 orange and 2 white retroreflective bands, 6 inches wide on all projects let to contract after May 1, 2010 unless otherwise specified. Alternate the orange and white retroreflective bands with the top band always being orange. Ensure that any non-reflectorized area between the orange and white retroreflective bands does not exceed 2 inches. Do not splice the retroreflective sheeting to create the 6-inch retroreflective bands. Apply the retroreflective sheeting directly to the drum surface. Do not apply the retroreflective sheeting over a pre-existing layer of retroreflective sheeting.

2.6.4 Category II Traffic Control Devices (Section 604) –

Sub-section 604.2.1 Type I and Type II Barricades (paragraph 3) -

Reflectorize these barricades with Type VIII or IX Prismatic retroreflective sheeting on all projects let to contract after May 1, 2012 unless otherwise specified. Ensure that the retroreflective sheeting has alternate orange and white stripes sloping downward at a 45-degree angle in the direction of passing traffic. The stripes shall be 6 inches wide.

Sub-section 604.2.2 Type III Barricades (paragraph 3) -

Reflectorize these barricades with Type VIII or IX Prismatic retroreflective sheeting on all projects let to contract after May 1, 2012 unless otherwise specified. Ensure that the retroreflective sheeting has alternate orange and white stripes sloping downward at a 45-degree angle. Apply the sloping orange and white stripes in accordance with the requirements of the Plans, SCDOT Standard Drawings and the MUTCD. The stripes shall be 6 inches wide.

2.6.5 Temporary Concrete Barrier (Sub-section 605.2.3.2) –

Sub-section 605.2.3.2 Temporary Concrete Barrier (paragraph 6) -

Previously used temporary concrete barrier walls are subject to inspection and approval by the RCE before use. Ensure that previously used temporary concrete barrier walls are in good condition. Defects to a temporary concrete barrier wall that may disqualify a section of wall for use include gouges, cracks, chipped, or spalled areas. A defect that exposes reinforcing steel warrants immediate disqualification. A disqualification grade type defect shall consist of measurements in excess of 1 inch, entirely or partially within the boundaries of the end connection areas and the drainage slot areas as illustrated in the "Standard Drawings for Road Construction", and/or in excess of 4 inches for all areas beyond the end connection areas. To warrant disqualification, these measurements shall exceed the specified dimensions in all three directions, width, height, and depth. A defect that exceeds the specified dimensions in only one or two of the three directions does not warrant disqualification.

Temporary concrete barrier walls with defects less than 6 inches in all three directions, width, height, and depth that do not expose reinforcing steel may be repaired in accordance with the following requirements. Repair is prohibited on temporary concrete barrier walls with defects 6 inches or greater in all three directions, width, height, and depth.

For repair of temporary concrete barrier walls with defects less than 6 inches in all three directions, width, height, and depth that do not expose reinforcing steel, repair the defect with a premanufactured patching material specifically fabricated for patching structural concrete. The strength of the patch must meet or exceed the design strength of the class 3000 concrete of the temporary concrete barrier wall. Perform the repair procedures in accordance with all requirements and instructions from the manufacturer of the patch material. Use a bonding compound between the patch material and the concrete unless specifically stated by the manufacturer that a bonding compound is not required. If the manufacturer states that application of a bonding compound is optional, SCDOT requires application of a bonding compound compatible with the patch material. If cracking occurs within the patched area, remove the patch material completely and repeat the repair process. The contractor shall submit documentation stating all repairs have been conducted in accordance with these requirements prior to installing any temporary concrete barrier walls with repairs. Utilization of temporary concrete barrier walls with repairs shall require approval by the RCE prior to installation.

The Contractor shall submit certification documents for the patch material utilized for repairs to the Engineer prior to placing temporary concrete barrier walls that have been repaired on the project site.

****** (Effective on all projects let to contract after January 1, 2017) ******

The following subsection is included for information only.

Sub-section 605.2.3.2 Temporary Concrete Barrier (paragraph 5) -

In regard to projects let to contract after January 1, 2017, ALL *NCHRP Report 350* compliant temporary concrete barrier walls placed on a project site SHALL comply with the requirements for the recessed approval stamp as directed by the *SCDOT Standard Drawings*. Those *NCHRP Report 350* compliant temporary concrete barrier walls with the original recessed approval stamp that reads "SCDOT 350" will continue to be acceptable on projects let to contract after January 1, 2017. However, those temporary concrete barriers with the “SCDOT 350” identification plate attached to the side of the barrier walls with mechanical anchors previously grandfathered will no longer be acceptable on projects let to contract after January 1, 2017.

The following subsection is included for information only.

(A) Construction Signs (Sub-section 605.4.1.1) –

***** *(Effective on all projects let to contract after January 1, 2016)* *****

On all projects relative to **interstate highways** let to contract after January 1, 2016, all signs attached to portable sign supports on and/or adjacent to **interstate highways** shall be rigid. Fabricate each of these rigid signs from an approved aluminum laminate composite rigid sign substrate approved by the Department. Utilization of signs fabricated from roll-up fabric substrates attached to portable sign supports installed on and/or adjacent to **interstate highways** will no longer be acceptable on projects let to contract after January 1, 2016.

ONLY those portable sign supports specified and approved for support of rigid signs fabricated from approved aluminum laminated composite rigid sign substrates and included on the *Approved Products List for Traffic Control Devices in Work Zones*, latest edition, are acceptable. To facilitate location of acceptable portable sign supports, the listing of portable sign supports is now separated into two (2) sections; "Portable Sign Supports for Use with Roll-Up Signs ONLY" and "Portable Sign Supports for Use with Roll-Up Sign Substrates and Rigid Sign Substrates".

The trade names of the approved aluminum laminate composite rigid sign substrates are "Acopan", "Alpolic", "Dibond" and "Reynolite". These rigid sign substrates are restricted to thicknesses no greater than 2 millimeters.

Rigid signs fabricated from standard aluminum sign blanks or any other rigid material other than Acopan, Alpolic, Dibond or Reynolite are PROHIBITED for attachment to portable sign supports. However, rigid signs fabricated from standard 0.080 and 0.100 inches thick aluminum sign blanks will continue to be acceptable for mounting on ground mounted sign supports.

Signs fabricated from roll-up fabric substrates approved by the Department will continue to be acceptable for use on and/or adjacent to secondary and primary roadways unless otherwise directed by the Department.

The minimum mounting height of signs mounted on these portable sign supports shall continue to be 5 feet from the ground to the bottom edge of the sign except where a minimum 7 foot mounting height is required in accordance with the standard specifications, the standard drawings, these special provisions and the MUTCD, latest edition.

2.6.6 Truck-Mounted Attenuator (Sub-section 605.4.2.2) –

Sub-section 605.2.2.2.3.3 Color (paragraph 1) -

Use industrial grade enamel paint for cover of the metal aspects of the unit. Provide and attach supplemental striping to the rear face of the unit with a minimum Type III high intensity retroreflective sheeting unless otherwise directed by the Department. Utilize an alternating 4 to 8 inch black and 4 to 8 inch yellow 45-degree striping pattern that forms an inverted "V" at the center of the unit that slopes down and to the sides of the unit in both directions from the center.

2.6.7 Truck-Mounted Attenuator (Sub-section 605.4.2.2) –

Sub-section 605.4.2.2 Truck-Mounted Attenuators (paragraph 6) -

A direct truck mounted truck mounted attenuator is mounted and attached to brackets or similar devices connected to the frame of a truck with a minimum gross vehicular weight (GVW) of 15,000 pounds (actual weight) unless otherwise directed. A trailer towed truck mounted attenuator is towed from behind and attached via a standard pintle hook / hitch to the frame of a truck with a minimum gross vehicular weight (GVW) of 10,000 pounds (actual weight) unless otherwise directed.

Each truck utilized with a truck mounted attenuator shall comply with the manufacturer's requirements to ensure proper operation of the attenuator. The minimum gross vehicular weight (GVW) (actual weight) for each truck shall comply with these specifications unless otherwise directed within the "Remarks" column of the *Approved Products List For Traffic Control Devices in Work Zones* in regard to specific requirements for the device in question.

If the addition of supplemental weight to the vehicle as ballast is necessary, contain the material within a structure constructed of steel. Construct this steel structure to have a minimum of four sides and a bottom to contain the ballast material in its entirety. A top is optional. Bolt this structure to the frame of the truck. Utilize a sufficient number of fasteners for attachment of the steel structure to the frame of the truck to ensure the structure will not part from the frame of the truck during an impact upon the attached truck mounted attenuator. Utilize either dry loose sand or steel reinforced concrete for ballast material within the steel structure to achieve the necessary weight. The ballast material shall remain contained within the confines of the steel structure in its entirety and shall not protrude from the steel structure in any manner.

2.6.8 Trailer-Mounted Changeable Message Signs (Sub-section 606.3.2) -

Sub-section 606.3.2.7 Controller (paragraphs 1-4) -

The controller shall be an electronic unit housed in a weatherproof, rust resistant box with a keyed lock and a light for night operation. Provide the unit with a jack that allows direct communications between the on-board controller and a compatible personal computer. The unit shall have a LCD display screen that allows the operator to review messages prior to displaying the message on the sign.

The controller shall have the capability to store 199 factory preprogrammed messages and up to 199 additional messages created by the user in a manner that does not require a battery to recall the messages. Also, the controller shall allow the operator the capability to program the system to display multiple messages in sequence.

Provide the controller with a selector switch to allow the operator to control the brightness or intensity level of the light source of the sign panel. The selector switch shall include "bright," "dim" and "automatic" modes; inclusion of additional modes is permissible. When the selector switch is in the "automatic" mode, a photosensitive circuit shall control the brightness or intensity level of the light source in response to changes in ambient light such as from day to night and other various sources of ambient light.

Equip each sign with remote communications capabilities, such as utilization of cellular telephone or internet browser technology, to allow the operator to revise or modify the message selection from the office or other remote location. Also, provide protection to prohibit unauthorized access to the controller, (i.e. password protection).

Sub-section 606.5 Measurement (paragraph 2) -

Trailer-mounted changeable message signs are included in the lump sum item for Traffic Control in accordance with **Subsections 107.12** and **601.5** of the "2007 Standard Specifications for Highway Construction". No separate measurement will be made for trailer-mounted changeable message signs unless the contract includes a specific pay item for trailer-mounted changeable message signs.

The Contractor shall provide, install, operate, and maintain the trailer-mounted changeable message sign per traffic control set-up as directed by the Plans, the "Standard Drawings for Road Construction", these Special Provisions, the Specifications, and the Engineer.

Sub-section 606.6 Payment (paragraph 2) -

In addition to **Subsections 107.12** and **601.6**, the payment for Traffic Control is full compensation for providing, installing, removing, relocating, operating, and maintaining trailer-mounted advance warning arrow panels and trailer-mounted changeable message signs as specified or directed and includes providing the units' primary power source; repairing or replacing damaged or malfunctioning units within the specified time; providing traffic control necessary for installing, operating, and maintaining the units; and all other materials, labor, hardware, equipment, tools, supplies, transportation, incidentals, and any miscellaneous items necessary to fulfill the requirements of the pay item in accordance with the Plans, the Specifications, and other items of the Contract.

Sub-section 606.6 Payment (paragraph 3) -

Disregard this paragraph unless the Contract includes a specific pay item for trailer-mounted changeable message signs.

2.6.9 Temporary Pavement Markings (Sub-section 609.4.1) –

Sub-section 609.4.1.1.1 Application Requirements General (in addition to paragraph 3) -

On two-lane two-way roadways, apply and place temporary or permanent pavement markings, as specified hereupon, prior to the end of each day's work or shift or reopening a closed travel lane to traffic. These pavement markings shall include 4-inch wide solid lines on edge lines and solid center lines and 4-inch wide by 10 feet long broken lines with a 30-foot gap for broken center lines and lane lines unless otherwise specified. The center line pavement markings shall be either double yellow solid lines,

yellow broken lines or an appropriate combination of a yellow solid line and yellow broken lines for passing / no passing zones. Placement of a singular yellow solid line for a center line pavement marking is unacceptable. The edge line pavement markings shall be a white solid line.

On multilane primary and secondary roadways, apply and place temporary or permanent pavement markings, as specified hereupon, to the travel lanes prior to reopening a closed travel lane to traffic. These pavement markings shall include 4-inch wide solid lines, utilized for edge lines and solid center lines, and 4-inch wide by 10 feet long broken lines with a 30-foot gap, utilized for lane lines and turn lanes, unless otherwise specified. The center line pavement markings shall be either double yellow solid lines or an appropriate combination of a yellow solid line and 4-inch wide by 10 feet long yellow broken lines for two-way left turn median areas. The right edge line pavement markings shall be a white solid line and the left edge line shall be a yellow solid line except in areas where the travel lanes separate to create a gore type situation and then the color schemes shall comply with SCDOT application practices for gore areas. The lane lines between travel lanes and turn lanes shall be 4-inch wide by 10 feet long white broken lines with a 30-foot gap.

However, on two-lane two-way and multilane primary and secondary roadways, application of a 4-inch wide solid line utilized for an edge line adjacent to an earth shoulder, white or yellow, may be delayed up to 72 hours after eradication of the original line when the length of eradicated line at a single location is no longer than 250 feet. In the event of multiple locations along the same line, each location must be separated from the adjacent location by no less than 250 feet with a cumulative total distance of eradicated line of no more than 1300 feet within any continuous 1 (one) mile length of roadway measured from a selected location. If the length of eradicated line exceeds 250 feet at any single location, the distance interval between multiple adjacent locations is less than 250 feet or a cumulative total distance of multiple locations of eradicated line exceeds 1300 feet within any continuous 1 (one) mile length of roadway measured from a selected location, replace the eradicated line(s) prior to reopening the adjacent travel lane to traffic.

On interstate roadways, apply and place temporary or permanent pavement markings, as specified hereupon, to the travel lanes prior to reopening a closed travel lane to traffic. These pavement markings shall include 6-inch wide solid lines, utilized for edge lines, and 6-inch wide by 10 feet long white broken lines with a 30-foot gap, utilized for lane lines between travel lanes and auxiliary lanes, unless otherwise specified. The right edge line pavement markings shall be a white solid line and the left edge line shall be a yellow solid line except in areas where the travel lanes

separate to create a gore type situation and then the color schemes shall comply with SCDOT application practices for gore areas.

On all roadways, apply and place white stop bars and white triangle yield bars in all locations where previous stop bars and triangle yield bars have been eradicated by the work. Apply and place white stop bars and white triangle yield bars at intersections controlled by stop and yield signs within 72 hours of the eradication of the original pavement marking. Apply and place white stop bars at signalized intersections controlled by traffic control signals and at railroad crossings prior to reopening a closed travel lane to traffic.

Within the limits of existing turn lanes on all roadways, apply and place white arrows in all locations where previous arrows have been eradicated by the work unless otherwise directed by the RCE. Apply and place white arrows within 72 hours of the eradication of the original pavement markings. However, in regard to newly constructed turn lanes, apply and place white arrows the within turn lanes as directed by the RCE.

Within the limits of existing lane-drop sites on all roadways, apply and place white arrows in all locations where previous arrows have been eradicated by the work prior to the end of each day's work or shift or reopening the closed travel lane to traffic. In regard to newly constructed lane-drop sites, apply and place white arrows within the travel lane to be terminated prior to opening the travel lane to traffic and as directed by the RCE.

(B) Temporary Pavement Markings (Sub-section 609.4.1) –

Sub-section 609.4.1.1.1 Application Requirements General (Revision to paragraph 8) -

On two-lane, two-way roadways, passing zones may be eliminated within the work zone through application of 4-inch double yellow centerline pavement markings if determined feasible and directed to do so by the Plans and/or the RCE. Apply no passing zone markings as specified by the Plans, the Specifications, the *MUTCD* and the RCE.

2.6.10 Flagging Operations (Sub-section 610.4.1) –

Sub-section 610.4.1.1 Flagging Operations (paragraph 1) -

Use a flagging operation to control the flow of traffic when two opposing directions of traffic must share a common travel lane. A flagging operation may be necessary during a lane closure on a two-lane two-way roadway, an intermittent ramp closure or an intermittent encroachment of equipment onto a portion of the roadway. Utilize flagging operations to direct traffic around work activities and maintain continuous traffic flow at reduced speeds when determined to be appropriate by the RCE. As stated above, flagging operations shall direct traffic around the work activities and maintain continuous traffic flow; therefore, stopped traffic shall not be required to stop for time durations greater than those listed below unless otherwise directed by the RCE. Begin measurement of the time interval immediately upon the moment the Flagger rotates the Stop/Slow paddle to display the "Stop" condition to the approaching motorists.

LENGTH OF CLOSURE	MAXIMUM TIME DURATION FOR STOPPED TRAFFIC
1 MILE or LESS	5 Minutes
1 to 2 MILES	7 ½ Minutes

If the work activities require traffic to be stopped for periods greater than 5 to 7 ½ minutes as stated above, consider alternate work methods, conducting work activities during times of lowest traffic volumes such as during the hours of darkness or complete road closure with detour installation.

2.6.11 <u>Paving and Resurfacing</u> (Sub-section 611.4.1) –

<u>Sub-section 611.4.1.2 Requirements (paragraph 8)</u> -

Whenever travel lanes with acceptable grade elevation differences are open to traffic, provide "Uneven Lanes" signs (W8-11-48) or "Uneven Pavement" signs (W8-11A-48). Reflectorize these signs with a fluorescent orange colored prismatic retroreflective sheeting unless otherwise specified. Install these signs adjacent to roadways with uneven pavement surfaces between travel lanes or between travel lanes and the adjacent paved shoulders. Install these signs at intervals no greater than 2600 feet.

2.7 STAGING

2.7.1 Traffic Control Restrictions (Project Specific Widening and Rehabilitation)

Maintain the existing number of I-77 mainline lanes of traffic in each direction during the times of the lane closure restrictions (3 lanes from I-20 southerly and SC 277 northerly, 2 lanes from I-20 to SC 277). Maintain the existing number of travel lanes for all on-ramps and off-ramps during the times of the lane closure restrictions unless otherwise approved by the Department. Ramp traffic must be maintained at all times, no detours allowed. All I-20, US 1, SC 277, and Killian Road ramps must maintain free-flow operation (no yield control) unless otherwise approved by the Department. Reference section 2.7.2 for the US 21 Bridge Rehabilitation including exceptions to the lane and ramp closure restrictions listed above.

Once the northbound I-77 at SC 277 merge is converted to a parallel type acceleration lane, it SHALL NOT return to the existing condition (middle lane shared merge) in future staging.

During the widening of the I-77 mainline bridges over I-20, 3-lanes shall be maintained on I-20 in each direction during the times of the lane closure restrictions. Consider widening the median along I-20 asymmetrically for the work area; widen as much as possible on eastbound I-20 to limit the impacts associated with the Alpine Road entrance ramp in the westbound direction. If the Alpine Road entrance ramp is reduced, it shall maintain a minimum 300’ acceleration lane and 200’ taper onto westbound I-20 unless otherwise directed by the Department.

The Contractor shall have no more than 72 hours to begin elimination of any grade elevation differences between or adjacent to the travel lanes of I-77. The 72 hour time period shall begin upon creation of the grade elevation difference. This restriction shall apply to all acceptable grade elevation differences less than or equal to 1” in milled areas or less than or equal to 2” in paved areas.

During surface planing and milling operations, the length of roadway with a milled surface open to traffic is restricted to 4 miles. This restriction does not apply to concrete diamond grinding operations.

During surface planing and milling operations, the length of roadway with an acceptable grade elevation difference less than or equal to 1” adjacent to a single travel lane or between multiple travel lanes open to traffic is restricted to a maximum distance of 4 miles.

During asphalt paving operations, the length of roadway with an acceptable grade elevation difference less than or equal to 2" adjacent to a single travel lane or between multiple travel lanes open to traffic is restricted to a maximum distance of 4 miles.

The Contractor may conduct various work activities in the same direction at various locations concurrently if approved by the Department. Various work activities in the same direction requiring simultaneous closures in the same travel lane or shoulder shall be separated by no less than 2 miles from the end of the first closure that a motorist will encounter to the beginning of the taper of the second closure. Also, various work activities in the same direction requiring simultaneous right and left lane closures or shoulder closures shall be separated by no less than 4 miles from the end of the first closure that a motorist will encounter to the beginning of the taper of the second closure.

2.7.2 Traffic Control Restrictions (Project Specific US 21 Bridge Rehabilitation) -

Maintain 2-lanes of mainline I-77 traffic in each direction at all times during the US 21 bridge rehabilitation. If both lanes of southbound I-77 are diverted from the southbound bridge to the I-77 northbound bridge, then all traffic staging related to the bridge rehab will be limited to a maximum of 15 calendar days. If one lane of southbound I-77 mainline traffic is maintained on the southbound bridge and one lane is diverted to the I-77 northbound bridge, then all traffic staging related to the bridge rehab will be limited to a maximum of 30 calendar days. The Contractor is advised that this Staging Restriction will be strictly enforced. Should any staging related to the bridge rehabilitation remain in place or not be completely removed by the time listed above, a penalty will be assessed at the rate of **$5,000.00 (Five Thousand Dollars)** for each 24 hour interval exceeded.

The existing posted speed limit prior to construction shall be used to design the crossovers for all temporary detour shifts and staging.

Loop ramps at the US 21 interchange must remain a free-flow movement into an acceleration lane onto the interstate. If the loop ramp acceleration lane is removed or reduced to a distance less than 400’ and 200’ taper, the loop ramp shall be closed. Traffic must be detoured from the loop to a newly constructed 12’ wide left turn lane with 300 feet of storage in the median of US 21 and a connection made to the appropriate ramp. All new construction for the detour must meet current SCDOT design standards unless otherwise directed by the Department. ~~A temporary signal is expected at the new left turn lane on US 21 as a result of the southbound loop ramp detour. All SCDOT signal design standards and guidelines~~

~~shall be followed for the temporary signal. The only exemption to these standards and guidelines shall be the use of wooden poles and video vehicle detection. The elements associated with the detour must be removed at the conclusion of the detour and traffic shifted back to the existing loop.~~

2.7.2.1 Temporary Signal

A temporary signal is expected at the new left turn lane on US 21 as a result of the southbound loop ramp detour. The signal shall be fully actuated and provide a phase for both the left turn onto the ramp and the left turn from the off-ramp. The right turn onto the on ramp shall be converted to a YIELD condition.

All SCDOT signal design standards and guidelines shall be followed for the temporary signal. The only exemption to these standards and guidelines shall be the use of wooden poles and video vehicle detection.

The elements associated with the detour must be removed at the conclusion of the detour and traffic shifted back to the existing loop. Raised concrete islands shall be constructed to prevent traffic from making this turn after removal.

3.0 DELIVERABLES

3.1 Traffic Management Plan

The Contractor shall submit a Traffic Management Plan in accordance with the document, *Rule on Work Zone Safety and Mobility: Implementation, Maintenance, and Safety Guidelines.* All components of the Transportation Management Plan prepared by the CONRACTOR are required and shall be submitted for review by the Department ~~before approval~~ and shall be approved before any construction activities can begin.

3.2 Conceptual Work Zone Traffic Control Plans

The Contractor shall submit Conceptual Work Zone Traffic Control Plans in the Right-of-Way Plans. The plans shall include, but not be limited to, the following:

- Staging Narrative
- Concept Staging Plans
  - Widening/Rehabilitation Typical Sections for each Stage of Construction and any critical points
  - Show areas where additional Right-of-Way is warranted for the purposes of Staging

- Show the Separation of Adjacent Travel Lanes / Traffic Splits as described in the SCDOT Procedures and Guidelines for Work Zone Traffic Control Design
- Show areas where the travel lane leaves the existing roadway bed or direction on new alignment (transition area) and returns (termination area)

3.3 Work Zone Traffic Control Plans

The Contractor shall submit Conceptual Work Zone Traffic Control Plans in the Right-of-Way Plans Submittal and Work Zone Traffic Control Plans (including Temporary Signal Plans) in the Final Plans Submittal. The plans shall be in accordance with the SCDOT Procedures and Guidelines for Work Zone Traffic Control Design and all other applicable design references listed in Exhibit 4.

1.0 GENERAL

The Contractor shall repair and maintain all signal related equipment during the construction of this project. During the ramp rehabilitation it is anticipated that there will be impacts associated to the detection at the traffic signals listed below. The project should include any temporary detection measures (such as video detection cameras) that would be required if damage to the existing inductive loops occurs during this project. In addition, once the rehabilitation is completed, the damaged inductive loops should be replaced in accordance with the latest SCDOT design standards for stop bar loops. The project shall include permanent video detection for each signal approach at each intersection listed below in addition to the inductive loops.

In addition to maintaining the detection, any work at the ramps that impact the traffic signal, such as damage to fiber interconnect or any other signal appurtenances, shall be immediately repaired/replaced to SCDOT standards. Coordination with the District 1 Signal Staff should occur to ensure the work will avoid damaging traffic signal utilities as much as is feasible.

The intersections involved are shown in the list below. **Maintain detection at ALL times.**

- I-77 SB @ US 1 (Two Notch)
- I-77 NB @ US 1 (Two Notch)
- I-77 SB @ SC 555 (Farrow Rd)
- I-77 NB @ SC 555 (Farrow Rd)
- I-77 NB @ S-52 (Killian Rd)
- I-77 SB @ S-52 (Killian Rd)

2.0 CRITERIA

All criteria listed in Exhibit 5 and all other applicable design references in Exhibit 4 shall be incorporated into the signal design, maintenance, and construction.

3.0 DELIVERABLES

3.1 As-Built Signal Plans

Provide As-Built “red-lined” signal plans to the District Signal Shop after the signal work is completed.

1.0 GENERAL

The following items, at a minimum, shall be included in the geotechnical design for this project:

- Design foundations for the proposed 10 bridge structure widenings. All subsurface exploration, geotechnical design, and construction for the Project shall be carried out in accordance with the design criteria below.
- Evaluate new pavement subgrades within the proposed widening sections of the I-77 mainline and any other proposed new pavements on the project.
- As necessary, provide pile (including micropile) and drilled shaft dynamic and/or static load testing as outlined in the design criteria and in accordance with the project specifications and Special Provisions. The results shall be used to determine capacities of the associated foundation system.

2.0 CRITERIA

The Geotechnical Base Line Report prepared by S&ME dated May 19, 2015, has been provided in Attachment B for geotechnical information. In addition, soil test boring log input files have been provided electronically in gINT format.

All geotechnical testing shall comply with the requirements of the SCDOT Geotechnical Design Manual (GDM). Geotechnical design shall comply with the requirements stated below and the Special Provisions listed in Exhibit 5. Geotechnical information provided in the Appendix of the Geotechnical Base Line Report (field and lab data) as part of this RFP is intended for use in the design of this project. The Contractor shall verify that geotechnical information provided in **ATTACHMENT B** meets the requirements for a geotechnical investigation for this specific project as contained in the GDM. If the requirements of the GDM are not met, then the Contractor shall provide additional geotechnical investigation to meet the geotechnical requirements for this specific project.

2.1 Bridge

The 10 bridge structures proposed for widening on this project are to be designed in accordance with the AASHTO Standard Specifications for Highway Bridges, 17th Edition. Design criteria for minimum Factors of Safety have been modified and are provided in the following table. Geotechnical design criteria for bridge foundations are shown below.

The Contractor shall be responsible for the load testing of all foundations used on this project. All testing reports whether for ~~driven~~ piles or drilled shafts shall bear the legible seal, signature, and date of the testing firm's engineer registered as a Professional Engineer in the State of South Carolina. The Contractor's designer shall review and approve, in writing, all load test reports prior to submitting the reports to SCDOT for review and acceptance or comment. Comments made by SCDOT shall be reviewed and rectified by the Contractor's designer prior to the results of the load testing being used in design.

Bridge Foundations

DEEP FOUNDATIONS	Static Minimum Factor of Safety
Driven Piles with Wave Equation	3.00
Driven Piles with Dynamic Testing (PDA)	2.50
Driven Piles with Static Load Test	2.00
Drilled Shafts (Static Analysis)	3.00
Drilled Shafts with Static Load Test	2.00
Micropiles with Static Load Test	2.50

2.1.1 Pile Dynamic Load Testing with Pile Driving Analyzer

If driven piles are used and a Factor of Safety of 2.5 is used for design, Pile Driving Analyzer (PDA) testing in the form of a pile index program shall be performed. In addition to the PDA testing, CAPWAP (Case Pile Wave Analysis Program) analysis shall also be performed. If prestressed concrete piles are used, regardless of the Factor of Safety used for design, PDA testing shall be performed for verification of pile driving induced stresses in the pile during installation. For PDA testing, the Contractor shall select a testing firm from those firms currently approved to provide foundation testing services on SCDOT's Foundation Testing On-Call Contract. The Contractor shall provide a Pile Installation Plan (PIP) that shall include the pile index testing program. The pile index testing program shall at a minimum include the Bent and Pile number of each pile to be tested as well as the number of index piles to be tested. The number of index piles shall conform to the SCDOT GDM.

2.1.2 Shaft Load Testing

If drilled shafts are used and a Factor of Safety of 2.0 is used for design, a non-production drilled shaft shall be tested prior to the construction of any production drilled shafts. The number of load tests shall conform to the requirements of the latest version of the GDM. Any drilled shaft testing shall consist of either a static load test (bi-directional Osterberg Cell), a rapid load test (Statnamic), or a high-strain load test (Apple). The Contractor shall provide a Drilled Foundation Installation Plan (DFIP) that shall also include which load test procedure will be used (i.e. static, rapid, or high strain). The test shaft shall have a minimum diameter of 48 inches. The test shaft shall be located at least 25 feet from any existing bridge foundation and shall be positioned such that construction and testing operations do not adversely affect the existing bridges. In addition, the test shaft shall be located a minimum of 25 feet and a maximum of 50 feet from any future bridge drilled shaft foundation location. The location

shall avoid conflicts with any construction staging, necessary work trestle, and/or utilities.

2.1.3 Micropiles

Design and construction of micropiles shall comply with Publication No. FHWA NHI-05-039 Micropile Design and Construction (December 2005). The micropile contractor shall meet the recommended minimum qualifications as stated in Section 9.2 Contractor Qualification of Publication No. FHWA NHI-05-039.

Micropiles will only be allowed at the following locations:

- I-77 Northbound and Southbound Overpasses over I-20 & I-20 Ramp – Interior bents only
- I-77 Northbound and Southbound Overpasses over I-77 Ramp E – Interior bents only
- I-77 Northbound and Southbound Overpasses over Windsor Lake Boulevard – Interior bents only
- I-77 Northbound and Southbound Overpasses over Little Jackson Creek/Edgewater Drive (S-1722) – Interior bents 11 and 12 only

The Contractor shall submit a Special Provision for micropile construction that must be approved prior to final design and construction of the micropiles. The Special Provision shall include at a minimum, the specifications incorporated into Appendix C of Publicaton No. FHWA NHI-05-039.

Load testing shall be required for micropiles. Verification and proof load testing shall consist of static load testing as described in Sections 7.2 through 7.6 of Publicaton No. FHWA NHI-05-039, except as amended below. Load testing shall consist of a minimum of 1 verification test on a non-production pile at each I-77 mainline crossing location where micropiles are proposed. The verification test load shall be 2.5 times the design axial load. In addition, load testing shall consist of proof testing at 1.6 times the design axial load. Proof testing, which may be conducted on production piles, shall be conducted at a minimum frequency of 1 test per pile footing, but not less than 5 percent of the total production piles. Dynamic load testing of micropiles shall not be an allowable load test procedure for this Project.

Micropile center-to-center pile spacing shall not be less than 30.0 inches or 3.0 pile diameters, whichever is greater. Micropiles shall be adequately anchored to the pile cap. Anchoring devices shall be provided to develop all uplift forces but not less than 10 percent of the maximum axial pile capacity. The distance from the side of any pile to the nearest edge of the pile cap shall not be less than 9.0 inches. Permanent casing is required

and the tops of steel casings shall project at least 12.0 inches into the pile cap after all damaged material has been removed.

2.2 Roadway

Any new structures required for the Project shall be designed in accordance with the SCDOT Geotechnical Design Manual, 2010 Edition. Geotechnical evaluation of existing embankments will not be required. Geotechnical evaluation of new embankments less than 3 feet in height will not be required for slope stability. Geotechnical evaluation of new embankments ~~greater than~~ 3 feet and greater in height will be required for slope stability for the strength and service limit states only and must be evaluated in accordance with the SCDOT GDM. All new embankments must be evaluated for settlement for the service limit state only.

The Contractor shall provide a geotechnical exploration for I-77 mainline pavements including soil test borings at 500 foot intervals as recommended by the SCDOT Pavement Design Guidelines, July 2008 to verify pavement subgrades within the proposed widening sections of the Project.

Miscellaneous overhead structure foundations such as lighting and signage shall be designed in accordance with AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, effective as of the Final RFP release date.

2.3 Seismic

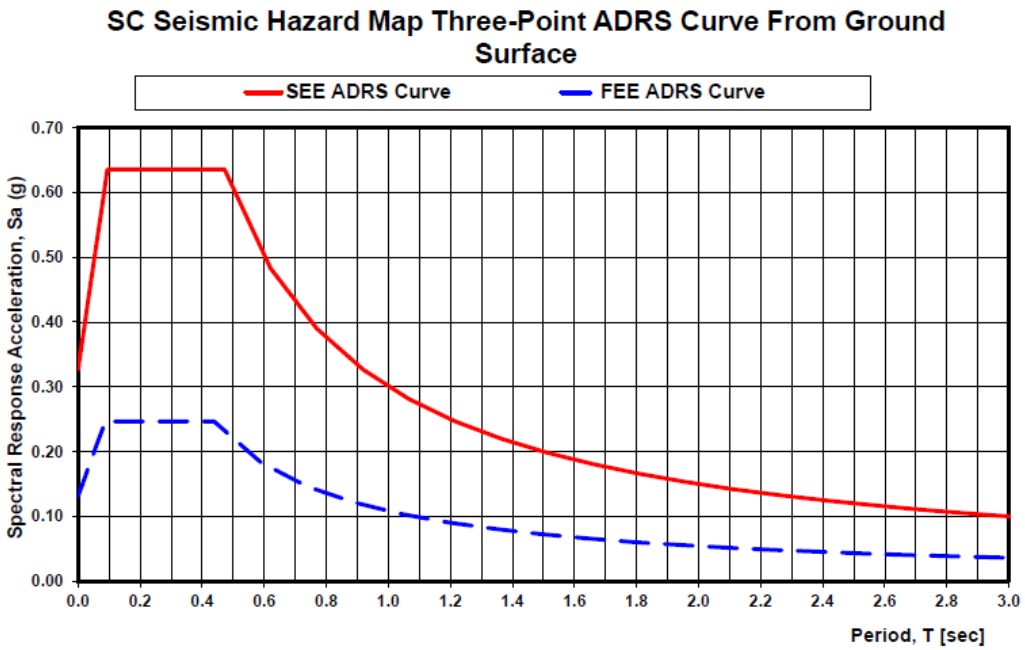
Geotechnical seismic design of the 10 bridge structure widenings and new or existing embankments will not be required. However, seismic design of any new structures will be required in accordance with the SCDOT Geotechnical Design Manual and SCDOT Seismic Design Specifications for Highway Bridges.

Three-Point Acceleration Design Response Spectrum (ADRS) curves have been generated for each bridge structure. For simplicity, single ADRS curves have been developed for the entire project and are supplied in this criteria for the SEE and FEE design events. The ADRS curves are provided below and shall be used in the design of all structures on this project.

A summary table of the applicable seismic coefficients is outlined below.

Design EQ	PGA	S_{DS}	S_{D1}
FEE	0.13	0.25	0.11
SEE	0.33	0.64	0.30

Based on shear wave velocity measurements at the site, the final seismic Site Class has been determined to be “C” for all bridge structures to be widened under this scope of work.



	FEE ADRS Curve Three-Point Method			SEE ADRS Curve Three-Point Method	
	T	S_a		T	Sa
	0.00	0.13		0.00	0.33
	0.01	0.15		0.02	0.38
	0.03	0.17		0.03	0.43
	0.04	0.19		0.05	0.48
	0.06	0.21		0.06	0.53
	0.07	0.23		0.08	0.58
To	0.09	0.25	To	0.09	0.64
	0.12	0.25		0.13	0.64
	0.15	0.25		0.16	0.64
	0.18	0.25		0.19	0.64
	0.20	0.25		0.22	0.64
	0.23	0.25		0.25	0.64
	0.26	0.25		0.28	0.64
	0.29	0.25		0.31	0.64
	0.32	0.25		0.35	0.64
	0.35	0.25		0.38	0.64
	0.38	0.25		0.41	0.64
	0.41	0.25		0.44	0.64
Ts	0.44	0.25	Ts	0.47	0.64
	0.59	0.18		0.62	0.48
	0.74	0.15		0.77	0.39
	0.89	0.12		0.92	0.33
	1.04	0.10		1.07	0.28
	1.19	0.09		1.22	0.25
	1.34	0.08		1.36	0.22
	1.49	0.07		1.51	0.20
	1.64	0.07		1.66	0.18
	1.79	0.06		1.81	0.17
	1.95	0.06		1.96	0.15
	2.10	0.05		2.11	0.14
	2.25	0.05		2.26	0.13
	2.40	0.05		2.41	0.12
	2.55	0.04		2.55	0.12
	2.70	0.04		2.70	0.11
	2.85	0.04		2.85	0.11
	3.00	0.04		3.00	0.10

3.0 DELIVERABLES

Geotechnical reports shall, as a minimum, contain all that is described in Chapter 21 of the SCDOT Geotechnical Design Manual and the latest design memorandums. The reports shall have design details and plan notes along with data that are consistent with that shown in the preliminary and final bridge and road plans. In addition, the Contractor's designer shall prepare the required geotechnical bridge and roadway plan sheets that clearly detail any geotechnical requirements outlined in the reports. The reports and plans shall bear the legible seal, date, and signature of the responsible engineer registered as a Professional Engineer in the State of South Carolina. Each report shall be submitted to SCDOT along with the preliminary or final bridge or roadway plan submittal. The review of the reports and plans will be performed in accordance with the submittal plan review process.

All submittals to SCDOT shall be subjected to a thorough QC review by the Contractor prior to submittal and all final submittals shall be signed and sealed by the Engineer of Record who shall be licensed and registered as a Professional Engineer in the State of South Carolina.

3.1 Preliminary Geotechnical Design Submittals

The Contractor shall submit to SCDOT:

- One (1) Hard and Electronic Copy of the Preliminary Bridge Geotechnical Engineering Report for each of the five interstate mainline bridge crossings (two bridge structures per report).
- One (1) Hard and Electronic Copy of the Preliminary Roadway Geotechnical Engineering Report to include roadway embankments, retaining walls, culverts, and/or any other roadway structure.

3.2 Final Geotechnical Design Submittals

The Contractor shall submit to SCDOT:

- One (1) Hard and Electronic Copy of the Final Bridge Geotechnical Engineering Report for each of the five interstate mainline bridge crossings (two bridge structures per report).
- One (1) Hard and Electronic Copy of the Final Roadway Geotechnical Engineering Report to include roadway embankments, retaining walls, culverts, and/or any other roadway structure.

3.3 Foundation Installation Plan Submittals

The Contractor shall prepare Drilled Foundation Installation Plans (DFIP) and/or Pile Installation Plans (PIP) in accordance with the SCDOT Standard Specifications for Highway Construction, 2007 Edition. The Contractor shall prepare a Micropile Installation Plan containing at a minimum, the requirements outlined in Section 8.3 of Publicaton No. FHWA NHI-05-039. The Contractor shall submit all foundation installation plan submittals electronically. The

Contractor's designer shall review and approve all DFIP, ~~and~~ PIP (including pile driving criteria), and Micropile Installation Plans prior to submitting the foundation installation plans to SCDOT for review and acceptance. SCDOT will review the foundation installation plans and provide either acceptance or comments. Comments must be resolved by the Contractor's designer prior to re-submittal to SCDOT. The Contractor is reminded that SCDOT reviews the DFIP, ~~and/or the~~ PIP, and Micropile Installation Plan only to verify that the specifications have been addressed. After construction of the foundations is complete, the Contractor shall provide a supplement to the report containing the actual field conditions encountered and as-built foundation data and information.

3.4 Foundation Testing Submittals

The Contractor shall submit to SCDOT an electronic copy of all applicable Foundation Testing reports for all bridge and roadway structures to include but not limited to Shaft Load Test, Micropile Verification and Proof Load Tests, and Pile Driving Analyzer test reports.

EXHIBIT 4g

ENVIRONMENTAL DESIGN CRITERIA

Addendum #2

1.0 GENERAL COMMITMENTS

The Contractor shall avoid impacts to the environment to the most practicable extent. In cases where impacts cannot be avoided, the Contractor shall minimize impacts to the environment to the most practicable extent. As a minimum the Contractor shall include the following in the Project:

1) The Contractor is responsible for the preparation, revision, acquisition, and adherence to conditions of any permits required by federal, state, local laws or regulations. The Contractor is responsible for any mitigation required by permits.

2) The Contractor is responsible for any modifications or revisions to the environmental documents and permits that result from deviations in the project design and environmental impacts as stated in the environmental documents.

3) The Contractor shall provide an Environmental Compliance Plan for the Project. The plan shall be submitted to SCDOT for approval prior to any construction activity. The plan shall identify specific measures that the Contractor will implement to assure compliance with all environmental documents, permits, and other environmental commitments. The plan shall also designate specific personnel that are charged with carrying out monitoring and compliance activities included in the Environmental Compliance Plan.

4) The Contractor shall stake out and delineate the jurisdictional areas using temporary barrier fence (refer to Supplemental Specification) in accordance with the preliminary jurisdictional determination issued by the USACE.

5) Fines assessed by any agencies to the Department as the result of the Contractor's non-compliance or violation of said permit provisions shall be paid by the Department and subsequently deducted from the Contractor's monthly pay estimate.

6) The Contractor shall coordinate all permitting through SCDOT's Environmental Services Office.

2.0 ENVIRONMENTAL DOCUMENT COMMITMENTS

The Contractor shall comply with all Environmental Commitments related to the Project. The Agreement, Article X, includes details related to Environmental Compliance. The CE-C Document and other environmental information are provided in Attachment B. The following list of Environmental Commitments and instructions serves as a guideline for the relationship between SCDOT and the Contractor as it pertains to fulfilling the Environmental Commitments for the Project.

1) Impacts to jurisdictional waters will be permitted under a Department of the Army Section 404 permit from the U.S. Army Corps of Engineers. Based on preliminary design, it is anticipated that the proposed project would be permitted under SCDOT's General Permit (GP). The required mitigation for this project will be determined through consultation with the USACE and other resource agencies.

The Contractor shall comply with this commitment. The Contractor shall be responsible for permit acquisition, all mitigation, and compliance. The Contractor shall not use onsite mitigation. The USACE permit shall be acquired in the name of SCDOT and all coordination shall be conducted through SCDOT. Contractor shall ensure that proposed design has impacts less than those presented in the CE-C Document for the Project.

2) Stormwater control measures, both during construction and post-construction, are required for SCDOT projects with land disturbance and/or constructed in the vicinity of 303(d), TMDL, ORW, tidal, and other sensitive waters in accordance with the SCDOT's MS4 Permit. The selected contractor would be required to minimize potential stormwater impacts through implementation of construction best management practices, reflecting policies contained in 23 CFR 650 B and SCDOT's Supplemental Specifications on Seed and Erosion Control Measures (latest edition).

The Contractor shall comply with this commitment. The SCDHEC permit shall be acquired in the name of SCDOT and all coordination shall be conducted through SCDOT.

3) The contractor will be required to minimize possible water quality impacts through implementation of construction BMPs, reflecting policies contained in 23 CFR 650B and the Department's Supplemental Specifications on Seeding and Erosion Control Measures (latest edition). Other measures including seeding, silt fences, sediment basins, etc. as appropriate will be implemented during construction to minimize impacts to Water Quality.

Contractor shall comply with this commitment. The SCDHEC permit shall be acquired in the name of SCDOT and all coordination shall be conducted through SCDOT.

4) The federal Migratory Bird Treaty Act, 16 USC § 703-711, states that it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product, manufactured or not. The Department will comply with the Migratory Bird Treaty Act of 1918 in regard to the avoidance of taking of individual migratory birds and the destruction of their active nests. Prior to construction/demolition of the bridges the Resident Construction Engineer (RCE) will coordinate with SCDOT Environmental Services Office to determine if there are any active nests on the bridge. After this coordination, it will be determined whether construction/demolition can begin. After construction/demolition has begun, measures can be taken to prevent birds from nesting, such as screens, noise producers, and deterrents etc. If during construction or demolition a nest is observed on the bridge that was not discovered during the biological surveys, the contractor will cease work and immediately notify the SCDOT Environmental Services Office. SCDOT biologists will determine whether the nest is active and the species utilizing the nest. After this coordination, it will be determined whether construction/demolition can resume or whether a temporary moratorium will be put into effect. All costs for determining the

need for, the placing of deterrents, and applying of all special actions including, but not limited to, removing nests and any costs associated with conducting work in compliance with the Migratory Bird Treaty Act as stated herein will not be paid for separately but will be considered to have been included with other items of work.

The Contractor shall comply with this commitment. The Contractor is advised that this commitment applies to existing, temporary, and new structures.

5) The existing structures shall be removed and disposed of by the Contractor in accordance with Subsection 202.4.2 of the Standard Specifications. The Contractor's attention is called to the fact that this project may require removal and disposal of structural components containing lead-based paints. Removal and disposal of structural components containing lead- based paints shall comply with all applicable Federal, State, and Local requirements for lead as waste, lead in air, lead in water, lead in soil, and worker health and safety.

The Contractor shall comply with this commitment. The commitment applies to any portion of existing structures containing lead-based paint. The Lead Paint and Asbestos Surveys are included in Attachment B. If removal/demolition is required, the Contractor shall survey at no cost to SCDOT any structures or portions of structures that have not yet been surveyed and shall handle any newly identified structures or portions of structures containing lead-based paint in compliance with this commitment.

6) The contractor and subcontractors must notify their workers to watch for the presence of any prehistoric or historic remains, including but not limited to arrowheads, pottery, ceramics, flakes, bones, graves, gravestones, or brick concentrations during the construction phase of the project, if any such remains are encountered, the Resident Construction Engineer (RCE) will be immediately notified and all work in the vicinity of the discovered materials and site work shall cease until the SCDOT Archaeologist directs otherwise.

The Contractor shall comply with this commitment and the Agreement, Article X, Paragraph C. The Cultural Resources technical documents are included in Attachment B.

2. **PROJECT DESCRIPTION**

During rehabilitation of the ramps along this project it is anticipated there will be impacts associated to the detection at the traffic signals listed above. It is unacceptable for these traffic signals to operate in a pre-timed manner during the construction project. Therefore, the project should include any temporary detection measures (such as video detection cameras) that would be needed if damage to the existing inductive loops occurs during this project. In addition, once the rehabilitation is completed, the inductive loops should be replaced in accordance with the latest SCDOT design standards for stop bar loops. The project shall include permanent video detection for each signal approach at each intersection listed above in addition to the inductive loops.

In addition to maintaining the detection, any work at the ramps that impacts the traffic signal, such as damage to fiber interconnect or any other signal appurtenances shall be immediately repaired/replaced. Coordination with the District 1 Signal Staff should occur to ensure the work will avoid damaging traffic signal utilities, as much as is feasible.

The intersections involved are shown on the above "List of Traffic Signals within Project".

All signal work shall be inspected by the District Signal Shop. Any modifications to the signal work shall be approved by the District Traffic Engineer.

Include the District Signal Shop in all Preconstruction conferences.

Provide a redline signal plan to the District Signal Shop after the signal work is completed.

Full Continuity of Operation shall be provided; and shall include the installation of a temporary controller, if needed. Operation shall be transferred to the temporary controller, simultaneously turning off the old controller.

Below is more information concerning any changes, revisions, or clarifications to the SCDOT Traffic Signal Supplemental Specifications and/or pay items for this particular contract:

Mobilization: 103.1 Mobilization, 103.2 Mobilization of Material

No changes, revisions, or clarifications.

Wiring: 675.1 Electrical Conduit, 677.1 Electrical Cable, 680.2 Splice Box/Junction Box, 680.1 Electric Service

No changes, revisions, or clarifications.

Communications: 676.1 Fiber Optic Training, 676.2 Fiber Optic Test Equipment, 677.2 Communication Cable, 677.3 Fiber Optic Cable, 677.4 Fiber Interconnect Center, 677.5 Fiber Optic Modem, 677.6 Factory Terminated Patch Panel, 677.7 Spread Spectrum Radio Assembly

No changes, revisions, or clarifications.

Detection: 678.1 Detector Loop, 688.3 Video Detection – Loop Emulation System

Provide permanent video detection cameras for each signal approach for each intersection listed above ~~as necessary for temporary detection~~ during rehabilitation. These cameras will become SCDOT property and will ~~may~~ remain in place ~~at the~~

~~discretion of the District Traffic Engineer~~ in addition to the inductive loops. Replace any damaged inductive loops and reconnect to traffic signal.

Signal Supports: 682.1 Wood Pole, 682.2 Back Guy, 682.3 Steel Cable, 688.5 Steel Strain Pole and Foundation, 688.6 Concrete Strain Pole, 690.1 Steel Pole with Mast-Arm

No changes, revisions, or clarifications.

Signal Heads, Pedestrian Treatments, Illuminated signs, solar flashing assemblies: 682.4 Pedestrian Pole and Base, 686.1 LED Modules and/or Polycarbonate Vehicle Signal Head and/or Backplate, 686.2 Optically Programmable Vehicle Signal Head, 686.3 Pedestrian Signal Head, 686.4 Pedestrian Push Button Station Assembly with Sign, 686.5 Symbolic LED Blankout Sign, 688.9 Solar Powered Flasher Assembly

No changes, revisions, or clarifications.

Cabinet Items: 688.7 Controller and 332/336 Cabinet, 688.8 Remote Splice/Flasher Cabinet

No changes, revisions, or clarifications.

Service Items: 688.1 Removal Salvage and Disposal of Equipment and Materials, 688.2 Temporary Adjustment of Traffic Signal Equipment and Timings, 689.2 System Integration and Testing, 689.3 Traffic Signal System Training

No changes, revisions, or clarifications.

3. **QUANTITY LISTS**
   No quantities are provided in a design build project.

4. **EQUIPMENT**
   a. SCDOT Supplied Equipment - The Department will not furnish signal equipment.
   b. Contractor Supplied Equipment
      i. The CONTRACTOR shall furnish all **new** equipment (submittal of invoices required), including incidental items; used, refurbished equipment or any equipment past warranty will not be accepted.
      ii. Compatibility
         1. To insure compatibility, any additional equipment required during the life of this contract, as Change Order or Extra Work, shall be purchased by the CONTRACTOR from the same Manufacturer as the original item.
         2. When installing equipment such as signal heads or pedestrian equipment, where some existing equipment is being retained, the contractor shall provide the same type of equipment, as is remaining, for visual compatibility.
      iii. The CONTRACTOR shall submit for approval a list of equipment including make, model number, manufacturer serial numbers, and warranty information, in a format similar to chart on next page. The chart shows a list of potential furnished signal equipment. Documentation only has to be submitted for the furnish items required for this contract. At the time of such submission, the CONTRACTOR shall provide a copy of the Transmittal Letter, to the Engineer.
      iv. If equipment is on the SCDOT Equipment Contract or the SCDOT QPL, catalog cut sheets do not have to be provided. On all other equipment, the CONTRACTOR shall submit for approval, catalog descriptions and documentation--THREE (3) COPIES--for each class of

In the event the Contractor violates or fails to comply with any of the requirements of these Special Provisions:

A. The Railway Engineer may require that the Contractor vacate Railway property.

B. The Engineer may withhold all monies due the Contractor on monthly statements.

Any such orders shall remain in effect until the Contractor has remedied the situation to the satisfaction of the Railway Engineer and the Engineer.

16. PAYMENT FOR COST OF COMPLIANCE:

No separate payment will be made for any extra cost incurred on account of compliance with these special provisions. All such costs shall be included in prices bid for other items of the work as specified in the payment items.

Office of Chief Engineer
Bridges & Structures
Norfolk Southern Corporation
1200 Peachtree Street, N. E.
Internal Box 142
Atlanta, GA 30309

Date:
File:
Milepost:

(85) DIVISION 400 & 500: CROSS SLOPE VERIFICIATION:

August 26, 2015
Updated

1 DESCRIPTION

The cross slopes of the roadway are to be constructed as detailed in the plans and within the tolerances listed in this specification. It is the responsibility of the Contractor to ensure that the roadway cross slopes meet the requirements of the plans and this specification.

2 RESPONSIBILITIES

Carefully review the plans to determine the amount of information that has been provided by SCDOT prior to bidding. The following paragraphs explain the Contractor responsibilities based on the information contained in the plans.

2.1 SURVEY CONTROL:

The Contractor shall be responsible for establishing the survey control information. This information will include control points, horizontal alignment, and stationing. Surveys shall be in accordance with the SCDOT Pre-Construction Survey Manual (Latest Edition). http://www.scdot.org/doing/survman.shtml

2.2 SUPERELEVATION:

The Contractor shall be responsible for establishing the superelevation transition points with station reference at the following points along horizontal curves: begin and end of superelevation, flat cross slopes within superelevation transition, remove crown, begin and end of maximum superelevation, PC's, PT's, and cross slopes on begin and end of bridges. The Contractor shall establish superelevation in accordance with the SCDOT Highway Design Manual (Latest Edition).

2.3 EXISTING CROSS SLOPE DATA:
The Contractor shall be responsible for obtaining existing cross slope data.

2.4 SUBMITTALS:
The Contractor shall ensure that all deliverable documents are signed and sealed by a Professional Engineer qualified to practice in South Carolina. The Contractor and/or Professional Engineer shall give depositions and testify in court to the methodology, the accuracy of obtained cross slope, and that all criteria stated in this provision were met upon the request of the Department.

3 CONTRACTOR PLANNING PROCESS

3.1 INITIAL PAVEMENT DATA SURVEY:
The Contractor shall be responsible for collecting elevation data for the edge of each travel lane at even 100-foot stations in tangents and 50-foot stations in curves, begin and end of superelevation, flat cross slopes within superelevation transition, remove crown, begin and end of maximum superelevation, PC's, PT's, and cross slopes on begin and end of bridges. Record elevation data to the hundredth of a foot.

3.2 CALCULATING CROSS SLOPE:
The cross slope of a travel lane in the cross section view is the ratio or percent based on the change in horizontal compared to the change in vertical. Cross slope is calculated by subtracting the difference in elevation between the two edges of the travel lane and dividing this difference by the lane width. For example, a typical 48:1 Normal Crown (NC) pavement cross slope is calculated as -0.0208 ft/ft or -2.08% for a 12 foot lane (Figure 1). Figure 2 shows an example of a Remove Crown (RC) pavement cross slope which is calculated as +.0208 ft/ft or +2.08% for the 12 foot lane on the high side of superelevation.

3.3 ACCEPTABLE TOLERANCES OF CROSS SLOPES:
Tolerance Level 1 for cross slopes shall be + 0.00174 ft/ft of the design cross slopes.
Tolerance Level 2 for cross slopes shall be + 0.00348 ft/ft of the design cross slopes.

3.4 INITIAL CORRECTIVE MEASURES PLAN:
Submit to the RCE a summary of the Initial Pavement Data Survey. The data submitted for review shall include the following information for each travel lane:

Station	LETL Elevation	RETL Elevation	Lane Width	Calculated X-slope	Plan X-slope	Deviation	Tolerance Level

1. Station
2. Left Edge of Travel Lane Elevation (LETL) in ft
3. Right Edge of Travel Lane Elevation (RETL) in ft
4. Lane width in ft
5. Calculated cross slope in ft/ft
6. Plan cross slope in ft/ft
7. Deviation between calculated cross slope and plan cross slope
8. Tolerance Level (1, 2, or Out of tolerance)

The Contractor is required to prepare a plan to correct the cross slopes in the areas that are **outside of Tolerance Level 2**. The Contractor shall identify the areas that require corrective action. Submit an Initial Corrective Measures Plan to the Resident Construction Engineer for approval. The submittal will include the elevations, milling depths, and buildup thicknesses for HMA, and areas of grinding and replacement for PCC for each edge of the travel lane and shoulder break points including the face of concrete barrier wall required to achieve the plan cross slopes and proper superelevation. The Contractor shall include an estimated quantity of corrective actions.

The RCE must approve the Initial Corrective Measures Plan prior to beginning corrective measures.

4 CONSTRUCTION PROCESS

4.1 INITIAL CORRECTIVE MEASURES:

For HMA pavement, perform all initial corrective measures prior to placing the first uniform overlay. For PCC pavement, corrective measures will be completed as a part of the application of a final surface texture. Follow the plan that was approved by the RCE.

4.2 PROGRESS MEASUREMENTS:

The Contractor shall verify cross slope measurements after the following work activities:

1. Completion of initial corrective measures (milling and/or build-up for HMA, grinding and replacement for PCC)
2. After each uniform lift of pavement prior to the final surface overlay (HMA)

Elevation data is to be collected at the edge of each travel lane perpendicular to the roadway centerline at the following locations:

1. Minimum of one random location every 300 feet in tangent sections as determined by the Department
2. Begin and end of superelevation, flat cross slopes within superelevation transition, remove crown, begin and end of maximum superelevation, PC's, and PT's
3. Cross slopes on begin and end of bridges

Submit to the RCE a summary of the progress measurements for information only. The data submitted for review shall include the following information for each travel lane in the shown format:

Station	LETL Elevation	RETL Elevation	Lane Width	Calculated X-slope	Plan X-slope	Deviation	Tolerance Level

1. Station
2. Left Edge of Travel Lane Elevation (LETL) in ft
3. Right Edge of Travel Lane Elevation (RETL) in ft
4. Lane width in ft
5. Calculated cross slope in ft/ft
6. Plan cross slope in ft/ft
7. Deviation between calculated cross slope and plan cross slope
8. Tolerance Level (1, 2, or Out of tolerance)

4.3 CONSTRUCT UNIFORM LIFTS OF ASPHALT:

Construct uniform lifts of asphalt in accordance with the plan typical sections. Continue to monitor the construction process by conducting a Progress Measurement after each

uniform lift of asphalt prior to the final lift (excluding Open Graded Friction Course (OGFC) if specified). For information only, submit the results to the RCE for each lift. Areas outside of Tolerance Level 2 will require correction prior to placing subsequent uniform lifts.

4.4 FINAL PAVEMENT MEASUREMENT:

Calculate the pavement cross slopes after placing the final surface (prior to OGFC if specified). Verify that the correct cross slopes have been obtained. Elevation data is to be collected at the edge of each travel lane perpendicular to the roadway centerline at the following locations:

1. Even 100-foot stations in tangent sections and even 50-foot stations in curves
2. Begin and end of superelevation, flat cross slopes within superelevation transition, remove crown, begin and end of maximum superelevation, PC's, and PT's
3. Cross slopes on begin and end of bridges

Submit to the RCE a summary of the final pavement measurements. The data submitted for review shall include the following information for each travel lane:

Station	LETL Elevation	RETL Elevation	Lane Width	Calculated X-slope	Plan X-slope	Deviation	Tolerance Level

1. Station
2. Left Edge of Travel Lane Elevation (LETL) in ft
3. Right Edge of Travel Lane Elevation (RETL) in ft
4. Lane width in ft
5. Calculated cross slope in ft/ft
6. Plan cross slope in ft/ft
7. Deviation between calculated cross slope and plan cross slope
8. Tolerance Level (1, 2, or Out of tolerance)

Areas outside of **Tolerance Level 1 and within Tolerance Level 2** will be subject to review by the RCE and the DCE. The DCE will either require corrective measures at the Contractor's expense, or will provide a memo of acceptance with a pay reduction.

Areas outside of **Tolerance Level 2** will be subject to review by the DCE and the Director of Construction. The Director of Construction will either require corrective measures at the Contractor's expense, or will provide a memo of acceptance with a pay reduction.

4.5 PERFORMANCE ADJUSTMENTS

For Final Pavement Measurements within **Tolerance Level 1**, no pay adjustment will be made.

For Final Pavement Measurements outside of **Tolerance Level 1**, the DCE will either require corrective measures at the Contractor's expense, or will provide a memo of acceptance with a pay reduction of $200/100' for each travel lane over the length of the section. The section length(s) will be determined as follows:

The beginning of each section will be halfway between the first point outside Tolerance Level 1 and the previous (adjacent) point within full compliance. The end of each section will be halfway between the last point outside Tolerance Level 1 and the adjacent point which is within full compliance. The minimum section length will be 100 feet. This amount will be deducted from monies due for pavement mixes.

For Final Pavement Measurements outside of **Tolerance Level 2**, the DOC will either require corrective measures at the Contractor's expense, or will provide a memo of acceptance with a pay reduction of $300/100' for each travel lane over the length of the section. (This pay reduction will be in addition to the $200 pay reduction for being outside of Tolerance Level 1.) The section length(s) will be determined as follows:

The beginning of each section will be halfway between the first point outside Tolerance Level 2 and the previous (adjacent) point within Tolerance Level 2. The end of each section will be halfway between the last point outside Tolerance Level 2 and the adjacent point which is within Tolerance Level 2. The minimum section length will be 100 feet. This amount will be deducted from monies due for pavement mixes.

For PCC pavements if corrective actions are made, refer to SC-M-503 for determining Thickness Tolerances.

5 AS-BUILT PLAN SHEETS AND ELECTRONIC DELIVERABLES

After any Performance Adjustments have been settled, provide final pavement cross sections on full size (22" x 36") plans sheets and submit to the RCE for inclusion in the as-built plans. Include the final disposition of cross slopes outside of the specified tolerances (i.e. corrected survey data, memo of acceptance from DOC, etc).

The as-built construction plans should include the following:

1. Control points, horizontal alignment, and stationing used to construct the project.
2. Superelevation with horizontal curve data.
3. Cross sections at even 100-foot stations in tangents and 50-foot stations in curves.
4. Cross sections at the begin and end of superelevation, flat cross slopes within superelevation transition, remove crown, begin and end of maximum superelevation, PC's, PT's, and cross slopes on begin and end of bridges.
5. Corresponding electronic files on CD-ROM or DVD to include all files used to develop the survey for the project, all files used to verify the cross slopes for the project, superelevation calculations, and any Microstation CADD files that pertain to the cross sections.

6 METHOD OF MEASUREMENT:

6.1 Measurement will be made for Cross Slope Verification after the RCE has reviewed and approved the work, including all submittals. Measurement is one lump sum.

6.2 No measurement will be made for any items of work required to make corrections to the final pavement cross slopes as deemed necessary by the Department.

7 BASIS OF PAYMENT:

7.1 Cross Slope Verification will include any costs for interpreting the data, electronic and hard copies of survey data for the Engineer, traffic control, and any and all, tools, labor, and equipment necessary to perform the cross slope verification. The RCE will approve payment based on the following schedule:

Approval of the Initial Corrective Measures Plan	40%
Submittal of Progress Measurement for First Uniform Lift	60%
Submittal of the Final Pavement Cross Slope Measurements	80%

Acceptance of the As-Built Plan Sheets and Electronic Data	100%

7.2 The bid item number and description is:

ITEM NUMBER	DESCRIPTION	UNIT
1055102	CROSS SLOPE VERIFICATION	LS

(86) SECTION 403: WARM MIX ASPHALT – ASPHALT INTERMEDIATE COURSE TYPE B (SPECIAL):

WMA Intermediate B Special will utilize the same specifications for Intermediate B with several exceptions:

A. The mix must use WMA Technology using a chemical process on QPL # 77 to utilize maximum reduction in temperature to improve constructability in the field placement operations.

B. The mix will require the exact same requirements as stated in SC-M-402 with exception of target air voids. The air voids will be targeted at 2.5-3.0% on the mix design to increase binder content and improve field compaction and fatigue resistance.

C. The placement rate will also be different than conventional mix in order to make necessary repairs to the milled pavement sections during one lane closure sequence.

D. In place density will be measured and accepted by using the gauge in lieu of taking roadway cores. A test strip will be required on the shoulder of the roadway to set up a roller pattern and establish target density. Ensure in place density is acceptable by taking 6 inch roadway cores at the end of the test strip to verify maximum compaction effort is obtained. All other mix acceptance testing will follow SC-M-400 using the same mixture acceptance criteria as the Intermediate Course Type B.

Item No.	Pay Item	Unit
4112320 X	**WMA Intermediate Course Type B "Special"**	**TON**

(87) SECTION 815: EROSION CONTROL MEASURES - DITCHES:

Within existing right of way, clean and repair existing concrete paved ditches that will be retained. Within existing right of way, clean and repair existing asphalt paved ditches that are to be retained and overlay with 200 lb/sy HMA Surface Course Type B or C. Stabilize new ditches in accordance with the SCDOT Requirements for Hydraulic Design Studies (May 26, 2009), the SCDOT Water Quality Design Manual (December 2014) and as needed for erosion control utilizing SCDHEC Best Management Practices (BMP's).