



South Carolina
Department of Transportation

Request for Proposals

Final with Addendum 2



INTERSTATE 85 WIDENING

MM 98-106

DESIGN-BUILD PROJECT

PROJECT ID P027116

CHEROKEE COUNTY

SEPTEMBER 14, 2017

**Addendum 2 Date:
December 21, 2017**

INTERSTATE 85 WIDENING MM 98-106

Cherokee County, South Carolina

A Design-Build Project

Project ID P027116

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Request for Proposals Instructions

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**REQUEST FOR PROPOSALS
INSTRUCTIONS**

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1. PURPOSE OF REQUEST FOR PROPOSALS

The purpose of this Request for Proposals (RFP) is to select a Proposer to perform the Project services described in this RFP. SCDOT desires that this Project be constructed in a very efficient and timely manner. The proposed Project services are hereinafter referred to as the “Project”. “Proposer,” as used here, includes a firm or firms, consortia, partnerships, joint ventures, and other legal entities, which have been requested by South Carolina Department of Transportation (SCDOT) to submit a Proposal in response to this RFP. The Proposer shall become the Contractor if awarded the Contract.

It is not the intention of SCDOT to receive complete detailed Project analysis and design prior to the selection of a Proposer and the later execution of an agreement. Rather, the response to this RFP shall provide sufficient information to be evaluated by SCDOT to determine if the Proposal is in accordance with the specified process and criteria. The Proposal shall be specific enough on assumptions used in its preparation so as to provide the basis for determining a final agreement.

The information obtained under this RFP will become the property of SCDOT without restriction or limitation on its use. With the exception of Alternative Technical Concepts (ATCs), SCDOT shall have unrestricted authority to publish, disclose, distribute, or otherwise use in whole or in part any reports, data, or other materials prepared under this RFP. SCDOT shall retain ownership of all plans, specifications, and related documents.

2. PROJECT OVERVIEW

2.1 Project Description

SCDOT proposes improvements to an approximately 8-mile long section of the I-85 corridor designed to resurface or reconstruct pavement, increase capacity, and upgrade interchanges and overpass bridges to meet state and federal design requirements. SCDOT intends to widen I-85 from four to six lanes beginning at the Broad River bridge which is approximately MM 98 and ending just north of US 29 (Exit 106) at approximately MM 106 in Cherokee County. Interchanges will be improved at S-11-83, SC 5/198, S-11-99, and US 29. The overpass bridges at Norfolk Southern RR crossing will be replaced to provide greater horizontal clearances and meet current design requirements.

SCDOT intends to enter into a contract for services as detailed in the Agreement and Agreement Exhibits. The Proposer shall be responsible for meeting all Project requirements, specifications, and other applicable criteria as set forth in “Attachments A and B”. Attachment B is located on the SCDOT Design-Build website at http://www.scdot.org/doing/i85_widen.aspx.

2.2 Project Information

Project Information, containing electronic files applicable to the Project, will be posted on the SCDOT Design-Build website. The Project Information Package will include information describing the work performed or obtained by SCDOT prior to entering into the contract for the Project. The Project Information Package may contain additional information not provided at the RFQ stage. The Project Information Package, which is posted on the SCDOT Design-Build website, is for information only. SCDOT shall not be liable for the reliability or accuracy of the information contained therein. Any available existing roadway plans can be obtained from the SCDOT Design-Build website at [SCDOT Plans Online](#). Any available existing bridge plans will be provided to the short-listed Proposers via upload to a secured ProjectWise folder.

Proposers are encouraged to visit the Project site and to make any additional subsurface explorations or soil tests that the Proposer may desire for purposes of preparing the Proposal. The Proposer shall obtain any permits or permissions required prior to any additional subsurface exploration.

2.3 SCDOT Point of Contact

Ms. Carmen Wright is sole point of contact (POC) and addressee for receiving all communications about the Project with a copy to Barbara Wessinger, Alternate POC. The Alternate POC has been identified in the event of the unavailability of the POC but is not intended as a substitute for the POC. No contact is allowed with any SCDOT personnel concerning this Project except for questions of an administrative or contractual nature that shall be submitted in writing to the attention of the POC (email is acceptable) with a copy to the Alternate POC. This restriction is in effect until the contract has been awarded. Any Proposer engaging in prohibited communications may be disqualified at the sole discretion of SCDOT. Written inquiries from the Proposer's POC (as identified in the Proposer's SOQ) shall be sent to:

Mail Delivery: Ms. Carmen Wright (Ms. Barbara Wessinger)
Office of Project Delivery (Office of Chief Counsel)
South Carolina Department of Transportation
955 Park Street, Room 101 (Room 302)
Columbia, South Carolina 29202-0191

E-mail: WrightCL@scdot.org (WessingeBM@scdot.org)

2.4 RFP Committal

The submittal of a Proposal in response to this RFP shall constitute the Proposer's agreement to enter into a contract with SCDOT for the completion of the Project under the terms set forth in the Agreement and Agreement Exhibits attached hereto as "Attachment A".

2.5 NEPA Document/Permit

An Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) were prepared for the Project by the SCDOT. These documents are contained in Attachment B. The Proposer shall be responsible for complying with the NEPA determinations and all environmental commitments.

2.6 Interchange Justification Report/Interchange Modification Report

An Interchange Modification Report (IMR) has been approved by FHWA at Exit 98 and Exit 106 and they are included in Attachment B. Changes made to the IMRs will require SCDOT and FHWA review and approval

3. GENERAL INSTRUCTIONS

3.1 Design-Build Selection Method

For this Design-Build Project, SCDOT chose the two-phased selection method. Phase 1, which identified a short-list of qualified Proposers, is complete.

In Phase 2, SCDOT will invite each of the short-listed Proposers to submit their Proposals for completion of the Project. After evaluation of the Proposals, SCDOT plans to award and execute a contract with a single Proposer. Phase 2 includes the following steps:

1. SCDOT releases RFP for Industry Review
2. SCDOT holds Open-Forum Meeting with Proposers to clarify/revise RFP
3. SCDOT releases Final RFP
4. Proposers submit Preliminary Alternative Technical Concepts (ATC) and Confidential Questions
5. SCDOT conducts Confidential One-on-One Meetings with Proposers to discuss Preliminary ATCs and Confidential Questions
6. SCDOT accepts Non-confidential Questions and conducts Open-Forum Meetings with all Proposers, if necessary
7. SCDOT Responds to Preliminary ATCs
8. Proposers submit Formal ATCs and any additional Confidential Questions
9. SCDOT Responds to Formal ATCs

10. SCDOT accepts Non-confidential Questions and conducts Open-Forum Meetings with all Proposers, if necessary
11. SCDOT conducts Confidential One-on-One Meetings with Proposers to discuss Formal ATCs and additional Confidential Questions, if necessary
12. Proposers re-submits Formal ATCs, if necessary
13. SCDOT issues final ATC determination
14. SCDOT accepts Non-confidential and Confidential Questions and conducts Open-Forum and One-on-One Meetings, respectively, with all Proposers, if necessary
15. Proposers submit Technical Proposals
16. Proposers submit Cost Proposals
17. Technical Proposal Presentations
18. SCDOT evaluates Proposals
19. SCDOT selects a Contractor

These steps will be carried out following the Milestone Schedule in Section 8. The following paragraphs provide information detailing various steps of the process.

3.2 RFP for Industry Review

The intent of the RFP for Industry Review is to identify those areas of the RFP that may be in conflict with each other and to point out and clarify mistakes or ambiguities in the RFP.

3.3 Questions, Clarifications, and Open-Forum Meeting

Once the RFP for Industry Review is issued, the Proposers may submit questions and seek clarification relating to the RFP. An Open-Forum Meeting with all Proposers present will be held on the date provided in the Milestone Schedule to facilitate this purpose. The purpose of this meeting will be limited to editing the RFP for Industry Review. Non-confidential questions will be accepted via electronic upload to ProjectWise on the dates provided in the Milestone Schedule. Proposers shall submit their questions or comments using the Questions Submittal Form which can be downloaded from the SCDOT Design-Build website under the SCDOT Design-Build Documents and Standard Forms Section.

http://www.scdot.org/doing/constructionLetting_DesignBuild.aspx.

SCDOT reserves the right to accept or not accept non-confidential questions received after the milestone deadline. SCDOT will review all questions and/or requests for clarification received and, if it deems appropriate, in its sole discretion, may incorporate them in the Final RFP. SCDOT will make every attempt to provide verbal answers during the Open-Forum Meeting to the questions received. SCDOT's verbal answers to Proposers' questions are for general information only, are non-binding, do not constitute legal or other advice, and do not amend or form part of the Final RFP. Nothing discussed at this meeting shall change the requirements of the Final RFP.

3.4 Final RFP

After completion of the Questions, Clarifications, and Open-Forum Meeting stage, SCDOT may incorporate the Proposers' comments into the RFP, and a Final RFP will be issued. Items that are revised, inserted, or deleted will be highlighted in the Final RFP. In addition to releasing a highlighted version of the Final RFP, SCDOT will also concurrently release a clean version of the Final RFP where all revisions, insertions, and deletions are not highlighted. It is this clean version of the Final RFP that will be utilized if any future Addendums are required.

3.5 Non-confidential Questions and additional Open-Forum Meetings

Once the Final RFP is issued, SCDOT will allow Proposers to submit non-confidential questions to request clarification and point out mistakes or ambiguities in the RFP. SCDOT will review all non-confidential questions and/or requests for clarification received and, if it deems appropriate, in its sole discretion, may incorporate them in the RFP through an Addendum.

SCDOT may or may not verbally respond to the non-confidential questions received. If responses are provided, it will be verbally through an Open-Forum Meeting where all Proposers will be invited to attend. This meeting may be conducted via conference call. A Proposers' failure to attend this meeting will not relieve the Proposer of the responsibility for estimating properly the difficulty and cost of successfully performing the work, or for proceeding to successfully perform the work without additional expense to SCDOT. SCDOT's verbal responses to Proposers' questions are for general information only, are non-binding, do not constitute legal or other advice, and do not amend or form part of the Final RFP. Written responses to any questions will not be provided. Nothing discussed during the Open-Forum Meetings shall change the requirements in the RFP.

Non-confidential questions will be accepted via electronic upload to ProjectWise on the dates provided in the Milestone Schedule. Written questions submitted outside of these dates may not be accepted. If deemed necessary by SCDOT, Open-Forum Meetings will be held within 10 business days following receipt of non-confidential questions. Proposers must use the Question Submittal Form that is provided on the SCDOT

Design-Build website under the SCDOT Design-Build Documents and Standard Forms Section.

http://www.scdot.org/doing/constructionLetting_DesignBuild.aspx.

3.6 Confidential Questions

Once the Final RFP is issued, SCDOT will allow Proposers to submit confidential questions to provide the Proposer an opportunity to confidentially discuss the contents of his/her Proposal with SCDOT personnel. SCDOT will determine/confirm if questions submitted are considered confidential, as identified by the Proposer on the Question Submittal Form. If more than one confidential question on the same topic has been received from multiple Proposers, SCDOT has the right to revise the RFP to include that concept as an addendum to the RFP. If submitted confidential questions are determined to be of non-confidential nature or identify an error or omission in the RFP, SCDOT, if it deems appropriate, in its sole discretion, may incorporate them in the RFP through an Addendum.

SCDOT may or may not verbally respond to the submitted confidential questions during the Confidential Preliminary ATC Meeting and/or any Confidential One-on-One Formal ATC Meetings. SCDOT's verbal responses to Proposers' questions are for general information only, are non-binding, do not constitute legal or other advice, and do not amend or form part of the Final RFP. Written responses to confidential questions may be provided if deemed necessary during discussions at the meeting; however, such questions and answers will be identified and narrowly tailored. Nothing discussed during the Confidential Preliminary ATC Meeting and/or any Confidential One-on-One Formal ATC Meetings shall change the requirements in the RFP.

Confidential questions will be accepted via electronic upload to ProjectWise on the dates identified in the Milestone Schedule. Written questions submitted outside of these dates may not be accepted.

Confidential questions received on the dates prior to the Confidential Preliminary ATC Meetings with Proposers may be discussed at that meeting. For confidential questions received on the allowable date(s) after the Confidential Preliminary ATC Meeting, verbal answers may be answered with a Confidential One-on-One Questions Meeting/conference call which may be held within 10 business days following receipt of the confidential questions. Proposers must use the Question Submittal Form that is provided on the SCDOT Design-Build website under the SCDOT Design-Build Documents and Standard Forms Section.

http://www.scdot.org/doing/constructionLetting_DesignBuild.aspx.

3.7 Preliminary Alternative Technical Concepts

An ATC is a confidential request by a Proposer to modify a contract requirement, specifically for that Proposer, prior to the Proposal due date. Requests for contract modifications that may qualify as ATC's may include, but not be limited to, changes in design criteria, changes in alignments or location of facilities, changes to review and submittal processes, change in material or structure types, change in interchange type, etc. The ATC process provides an opportunity for design-build Proposals to promote innovation, find the best solutions, and to maintain flexibility in the procurement process. ATCs are evaluated for approval or disapproval by SCDOT within the deadline set forth in the Milestone Schedule. In order to be approved, an ATC must be deemed, in SCDOT's sole discretion, to provide a Project that is equal or better in quality or effect on an overall basis than the Project would be without the proposed ATC. Concepts that simply delete scope, lower performance requirements, lower standards, conflict with environmental commitments, or reduce contract requirements are not acceptable as ATCs. SCDOT reserves the right, in its sole discretion, to reject any ATC. No ATC shall be included in the Proposal unless approved by SCDOT in writing prior to the Proposal submission deadline.

3.7.1 Submittal of Preliminary ATCs

Preliminary concepts are intended to be an informal inquiry by the Proposer to explore a concept and a quick method by SCDOT to review and comment on potential development of ATCs prior to investment of time and resources by the Proposer. Preliminary concepts shall present a Description, Deviations, and a range of Costs, as further described in Section 3.8.1. Other items identified in Section 3.8.1 can be provided, but are not required. The amount of information provided shall be constrained to the boxes provided in the Preliminary ATC Submittal Form. SCDOT will allow one single tabloid sized attachment (11" x 17") for detailed drawings or sketches. Submission of preliminary concepts does not change or extend the submission deadline of Formal ATCs.

Proposers shall be limited to one package of preliminary concepts and the total number of preliminary concepts shall not exceed 20. If more than one preliminary concept on the same topic has been received from multiple Proposers, SCDOT has the right to revise the RFP to include that concept as an addendum to the RFP.

All preliminary ATCs shall be submitted electronically by uploading to ProjectWise in a single zip folder with each file name using the following format: PATCSummary_ProposerName or PATCNumber_ProposerName. The Proposers shall use the ATC Summary Form and the Preliminary ATC Submittal Form, which can be downloaded from the SCDOT Design-Build website under the SCDOT Design-Build Documents and Standard Forms Section.

http://www.scdot.org/doing/constructionLetting_DesignBuild.aspx.

The Proposer shall submit Preliminary ATCs for review in accordance with the Milestone Schedule. All Preliminary ATC information being exchanged between Proposers and SCDOT shall occur only on the specific dates shown, unless otherwise directed by the SCDOT POC.

3.7.2 Confidential Preliminary ATC Meeting

SCDOT will offer Confidential Preliminary ATC Meetings at the request of the Proposers. Proposers shall request a meeting in writing (email is acceptable) addressed to the SCDOT POC with a copy to the alternate POC by the date specified in the Milestones Schedule. SCDOT will reserve two hours of meeting time for each Proposer that requests a meeting, and SCDOT will give time of day preference in the order that requests are received. The purpose of this meeting is to provide the Proposer with the opportunity to confidentially discuss the preliminary ATCs and questions with SCDOT personnel. SCDOT may answer questions at the meeting verbally. Verbal responses are for information only and are not binding. Nothing discussed at this meeting shall change the requirements in the RFP.

3.7.3 Responses to Preliminary ATCs

SCDOT will provide a response to the Proposer in accordance with the Milestone Schedule. SCDOT responses will be “Favorable,” “Not Favorable,” “Addendum,” or “Not an ATC.” If additional clarification is needed after the Preliminary ATC Meeting, Proposers are responsible for sending the clarification as soon as possible so that SCDOT has an opportunity to assess the benefits of the concepts before providing a response in accordance with the Milestone Schedule. A favorable response by SCDOT in no way guarantees that the concept will become an approved formal ATC. The favorable response may be subject to conditions.

3.8 Formal Alternative Technical Concepts

3.8.1 Submittal of Formal ATCs

Each formal ATC submittal shall include the following.

- **Description:** A detailed description and schematic drawings of the configuration of the ATC or other appropriate descriptive information (including, if appropriate, specifications, construction tolerances, special provisions, proposed bridge types, product details, and a traffic operational analysis). Drawings shall clearly indicate what is specifically proposed for this project. Samples/Examples from other projects may be used but specific commitments shall be identified for this project (i.e. member sizes, material

requirements, etc. Specification and special provisions shall be supplied if the ATC covers materials, products, etc. not commonly used by SCDOT and not covered in the RFP package or references. Traffic analysis shall provide adequate information to clearly demonstrate the impacts of the proposal on the project and shall contain summaries where appropriate to aid in review

- **Usage:** Locations where and an explanation of how the ATC would be used on the Project
- **Deviations:** Clearly define all deviations related to the ATC to clearly demonstrate the validity of the ATC. Include an explanation of the nature of the proposed deviation and a request for approval of such deviations or a determination that the ATC is consistent with the requirements of the RFP
- **Justification:** Justify use of the ATC and why the deviations from the requirements of the RFP should be allowed
- **Schedule:** Proposed changes to the Project schedule if applicable. If early delivery is proposed, proposer shall clearly define any proposed liquidated damages or effect to contract if early date is not met.
- **Impacts:** Identify potential impacts on vehicular traffic, safety, community, utilities, right of way, and the environment
- **History:** A detailed description of other projects where the ATC has been used under comparable circumstances, the success of such usage, and names and telephone numbers of project owners that can confirm such statements
- **Risks:** A description of added risks to SCDOT and other persons/entity associated with implementing the ATC
- **Costs:** An estimate of the impact of the ATC on the Proposal Price and the ATC implementation costs to SCDOT, FHWA, Contractor, or other person during construction, maintenance and operations
- **Quality:** A description of how the ATC is equal or better in quality and performance than the requirements of the RFP
- **Operations & Maintenance:** Any changes in operation or maintenance requirements associated with the ATC.

The technical response to each item outlined above shall be provided in the Formal ATC Submittal Form. Text submissions shall be limited to the form and shall not be provided as attachments. Only drawing details, plan sheets, charts, tables, graphs, specifications, special provision, manufacturer data sheets and supporting reports/analyses can be provided as an attachment to the Formal ATC Submittal Form.

A maximum number of 10 formal ATCs may be submitted to SCDOT by the Proposer for consideration.

All formal ATCs shall be submitted electronically by uploading to ProjectWise in a single zip folder with each file name using the following format: FATCSummary_ProposerName or FATCNumber_ProposerName. The

Proposers shall use the ATC Summary Form and the Formal ATC Submittal Form, which can be downloaded from the SCDOT Design-Build website under the SCDOT Design-Build Documents and Standard Forms Section.

http://www.scdot.org/doing/constructionLetting_DesignBuild.aspx.

The Proposer shall submit formal ATCs in accordance with the Milestone schedule. All information being exchanged between Proposers and SCDOT shall occur only on the specific dates shown, unless otherwise directed by the SCDOT POC.

3.8.2 Review of Formal ATCs

Review of formal ATCs shall be in accordance with the information and Milestone Schedule provided herein.

- a. Initial Review: Upon completion of the initial review, SCDOT will make a final determination in accordance with Section 3.8.3, request more information, or provide a conditional response.
- b. More Information Needed: SCDOT may submit written questions to the Proposer as outlined in the Milestone Schedule, and/or request a one-on-one meeting in order to better understand the details of the formal ATC. In addition, for questions related to minor clarifications, SCDOT may submit written questions to the Proposer anytime during the initial review or any subsequent review. Proposers will then have the opportunity to resubmit according to the Milestone Schedule.
- c. One-on-One Meetings: Confidential One-on-One Formal ATC meeting(s) may be scheduled to fully understand the details of any formal ATCs. These meetings will be restricted to those persons involved in the review of the formal ATC and limited to discussions of the Proposer's formal ATC approach and any outstanding confidential questions. The purpose of this meeting is to discuss proposed changes, answer questions, and other relevant issues. Verbal responses are for information only and are not binding. Nothing stated at any formal ATC meeting(s) will modify the RFP or Contract Documents. SCDOT reserves the right to disclose to all Proposers any issues raised during the ATC meeting(s) in an addendum. However, SCDOT will not disclose any information pertaining to an individual Proposer's ATCs or other technical concepts to other Proposers.
- d. Conditional Response by SCDOT: If the SCDOT states a formal ATC is not approved in its present form, it may be reconsidered for approval upon satisfaction, in SCDOT's sole discretion, of certain identified conditions that must be met or certain clarifications or modifications that must be made by Proposer. The Proposer shall not have the right to incorporate this formal

ATC into the Proposal unless and until the formal ATC has been resubmitted in accordance with the Milestone Schedule, with the conditions, clarification and modifications satisfied, and SCDOT has made a final determination.

- e. No Response from SCDOT: If the Proposer does not receive correspondence from SCDOT in accordance with the Milestone Schedule, the formal ATC is deemed rejected by SCDOT, unless written notification to extend this period is given by SCDOT.

3.8.3 Final Determination of SCDOT

SCDOT will make one of the following written determinations with respect to each properly submitted ATC:

- a. The ATC is approved.
- b. The ATC is not approved.
- c. The submittal does not qualify as an ATC but appears eligible to be included in the Proposal without an ATC (i.e., the concept appears to conform to the RFP and to be consistent with other contract requirements).
- d. The ATC is deemed to take advantage of an error or omission in the RFP, or other documents incorporated into the contract by reference, the ATC will not be considered, and the RFP will be revised to correct the error or omission.
- e. More than one formal ATC has been received on the same topic and SCDOT has elected to exercise its right to issue an addendum to the RFP to include that topic.

Once an ATC has been approved, only the entire ATC is eligible for inclusion into the Proposal. The inclusion of partial ATCs into a Proposal is not allowed, unless the individual ATCs have received separate approval by SCDOT.

Each Proposer, by submittal of its Proposal, acknowledges that the opportunity to submit ATCs was offered to all Proposers, and waives any right to object to SCDOT's determinations regarding acceptability of ATCs.

3.8.4 Incorporation into Proposal

A Proposer has the option to include any or all approved ATCs in its Proposal. If SCDOT responded to an ATC by identifying conditions for approval, Proposer may not incorporate such ATC into the Proposal unless all conditions have been met. Copies of SCDOT's ATC approvals, which shall include the

ATC Summary Form for each incorporated ATC, shall be included in the Technical Proposal appendices. Proposals with or without ATCs will be evaluated against the same technical evaluation factors set forth in the Evaluation of Proposals section, and the inclusion of an ATC, including an ATC that provides technical enhancements, may or may not receive a higher technical rating. SCDOT approval of an ATC shall not be considered a guaranty that the Proposal incorporating the ATC will be selected. SCDOT's rejection of an ATC will not entitle the Proposer to an extension of the Proposal submission deadline on the Milestone Schedule or claim for additional costs or delays, including development costs, loss of anticipated profits, or increased material or labor costs. The Total Cost to Complete shown in the Cost Proposal shall reflect any incorporated approved ATCs. Except for incorporating approved ATCs, the Proposal may not otherwise contain exceptions to or deviations from the requirements of the RFP.

3.8.5 Value Engineering

An approved ATC that is not incorporated into the Proposal will not be considered a pre-approved value engineering change.

3.8.6 Abandonment of ATC by Proposer

If the approved ATC is abandoned by the Proposer, is unable to obtain required approvals, is otherwise proved to be infeasible, or fails to be constructed for any reason, the successful Proposer is obligated and required to complete the Project utilizing the original RFP requirements at the awarded cost, and shall be responsible for any redesign costs.

3.8.7 SCDOT's use of Concepts Contained in an ATC

SCDOT expressly reserves the right to adopt and use any ATC, approved or disapproved, by the successful Proposer on this contract or other contracts administered by SCDOT. By submitting a Proposal, all unsuccessful Proposers acknowledge that upon acceptance of the designated stipend, all approved or disapproved ATCs may be included in this contract or other contracts administered by SCDOT and shall become the property of SCDOT without restriction on use. Prior to contract execution, limited negotiations may be conducted as necessary to incorporate the ideas and concepts from unsuccessful Proposers, provided a stipend is accepted by the unsuccessful Proposer.

3.8.8 Proposer Obligations

The successful Proposer, in addition to performing all other requirements of the Contract Documents, shall:

- a. Obtain and pay the cost of obtaining all required approvals including approvals required to implement any approved ATC(s) incorporated into the Contract Documents;
- b. Obtain and pay the cost of obtaining any third party approvals required to implement any approved ATC(s) incorporated into the Contract Documents; and
- c. Unless otherwise noted in the Contract, be responsible for all costs and/or delays of any nature associated with the implementation of any approved ATC incorporated into the Contract Documents.
- d. Be solely responsible for reviewing the RFP and determining if the ATC deviates from the revised requirements if SCDOT revises the RFP after a formal ATC has been approved. The Proposer must submit a request for approval of all additional variances required within five (5) business days of receipt of the RFP addendum.

3.9 Stipends

By submitting a Proposal in response to the RFP, the Proposer acknowledges the following:

1. It is the intent of SCDOT to award a stipend of \$215,000.00 to each responsible and responsive Proposer subject to the terms of the Stipend Agreement set forth in Section 13 of the RFP Instructions.
2. If Proposer elects to receive a stipend, the Stipend Acknowledgement form and Stipend Agreement shall be signed by Proposer and submitted as part of the unsealed Technical Proposal. The Stipend Agreement will not count against the specified page limit.

4. PROPOSAL DEVELOPMENT AND SUBMITTAL

Proposals must be submitted separately in two parts, a Technical Proposal and a Cost Proposal. Required forms, conceptual plans, and approved ATCs used in preparing the Proposer's Cost Proposal shall also be incorporated in the Technical Proposal as Appendices. If a Proposer does not, at a minimum, submit a Technical Proposal Narrative and Technical Proposal Conceptual Plans, the submittal will be considered non-responsive and retained without further review/evaluation. Any concepts that conflict with the RFP specifications discovered during the evaluations or after award of the Project, and which are not approved as an ATC, shall not prevail over RFP specifications and shall be resolved at no expense to the SCDOT (i.e. time or cost).

4.1 Technical Proposal

The Technical Proposal Narrative shall contain no more than ten pages, excluding any plans, signed forms, and appendices. Any Conceptual Plans developed by the Proposer to accompany the Proposer's Narrative shall be incorporated in the Technical Proposal as Appendices.

The Technical Proposal Narrative shall be on single sided 8.5"x11" letter sized paper, with minimum twelve-point Times New Roman font and double line spacing for text. Any Conceptual Plans shall be provided in black and white on single sided 11"x17" paper unless otherwise noted herein.

The Technical Proposal Appendices shall only include:

Appendix A - Conceptual Plans

- A.1 – Roadway Plans
- A.2 – Maintenance of Traffic Plans and/or Documents
- A.3 – Bridge Plans

Appendix B - Required Forms

Appendix C - Approved ATCs being incorporated into the Proposer's Cost Proposal.

In addition to submittal of required appendices documents, to be responsive, the Technical Proposal shall include at a minimum a narrative describing the Project Delivery and Approach and Innovation and Added Value concepts.

In the Technical Proposal Narrative, Proposers shall respond to the following items and shall develop the narrative in the following sequence:

1. Describe the Project Delivery & Approach by discussing/providing the following. (25 points).
 - a. Identify the proposed schedule for implementing the Project. Include the sequence of construction, segmentation, if any, and material and equipment staging plan. Describe methods that will allow a reduction in the overall construction scheduled for the project. The Cost Proposal includes Construction Time so the narrative may not include the actual proposed time. The Proposer may use generalities to reference the proposed time.
 - b. Describe the proposed design submittal process and include a chart showing anticipated deliverables in sequence that will allow SCDOT to conduct efficient and complete reviews. Include discussion of how any proposed project phasing/segmentation will be addressed in the design submittal and review process. Dates do not need to be included in the chart showing anticipated deliverables.

- c. Describe approach for replacement of the Norfolk Southern Railroad overpass bridge at Station 1972+65 including railroad coordination and understanding of the railroad agreement requirements (i.e. plan reviews, flagging, etc.).
 - d. Discuss approach for tying this I-85 mainline widening and associated crossing route improvements to other on-going projects within or adjacent to the proposed project limits. Discussion should include, but not be limited to, coordination with the current contractor related to work schedule and traffic control. The following projects shall be included in the narrative:
 - I-85 Widening MM-77-98
 - I-85 over Norfolk Southern Railroad Bridge Replacement
 - S-11-83 Over Buffalo Creek Bridge Replacement
 - e. Describe the proposed approach for minimization, avoidance, and mitigation of environmental impacts. Describe the plan for obtaining permits and compliance with environmental commitments. Demonstrate knowledge of the critical elements of the compensatory mitigation plan in accordance with the USACOE Charleston District “Guidelines for preparing a compensatory mitigation plan” (latest edition)
2. Describe the Proposer’s Innovation and Added Value to the project that clearly provides additional benefit to SCDOT or the public (15 points). An innovative aspect does not include practices that are standard to the industry. Innovation may include the Proposer’s means and methods, roadway alignments, approach to Project, etc. If the Proposer wishes SCDOT to consider items to be innovative or to provide additional quality, these items must be described in this section to be eligible for any of these points. However, SCDOT reserves the right to assign points for all items deemed beneficial to SCDOT or the public that have not been identified in this section. In addition, the Proposer should consider, but not be limited to, the following items:
- a. Minimizing impacts to traffic including, but not limited to, the following.
 - Traffic shifts
 - Temporary lane closures
 - Construction Stages
 - Median access points along I-85 mainline and frequency of ingress/egress from mainline to the median
 - Traffic impacts to crossing routes
 - b. Managing risk associated with utilities, including, but not limited to minimizing impacts to prior rights utilities
 - c. Minimizing the Right-of-Way impacts to the Project, such as premiums, condemnations, relocations, etc.

- d. Improving long term pavement performance through the enhancement of durability, reduction of maintenance costs, or improvement of quality through innovation in materials and methods.

In the Technical Proposal Appendices, Proposers shall provide the following items.

3. Provide Conceptual Roadway Plans (30 points). The intent of conceptual roadway plans is for the proposer to clearly demonstrate their understanding of requirements of the RFP and the Team's approach to meet those requirements. The quality of the plans will be reviewed and scored for design content and compliance with RFP requirements, including ATC's, if any, rather than plan development/preparation conformance. The following shall be provided.

- a. Typical sections for all roadways including as a minimum (11"x17" plan sheets).
 - Design speed
 - Functional classification
 - Lane configuration and widths
 - Shoulder and median widths
 - Cross slopes
 - Point of grade
 - Notes and details as necessary
- b. Plan and profile for the entire project limits including interchange layouts (Roll-plots shall be black and white and at 1"=200' scale.).

Plan view shall include as a minimum:

- Geometric layout with reference data
- Superelevation data
- Taper lengths
- Deceleration/acceleration lengths
- Construction limits
- Control of access limits (mainline and interchange)
- Existing and proposed right-of-way
- Turning radii
- Lane alignment
- Clear zone limits
- Horizontal clearance at obstructions (any critical locations)
- Roadside barriers (location and type)
- Bridge and box culverts
- Limits of retaining walls
- Indicate any design exceptions approved in the RFP

Profile view shall indicate.

- Grades & elevations
 - Vertical curvature (PI station and elevation, length and K value, stopping site distance design speed met)
 - Bridge clearance envelopes
- c. Cross sections only where necessary to indicate a significant difference from the conceptual plans in the Project Information Package. These should be limited to only those showing a significant change and may be segmented for only the areas where changes occur (11"x17" plan sheets).
- d. Special emphasis details (where needed to clearly demonstrate understanding and approach - isolated locations such as ramp ties, wall types, etc.) (11"x17" plan sheets).
4. Provide Conceptual Maintenance of Traffic Plans (20 points). The plans shall depict the number of construction stages and a staging narrative within those plans to include duration of each stage. The plans shall be black and white and can be provided on roll-plots at 1" = 200' scale for the entire project limits including interchange layouts. Plan scale and detail for critical areas shall be appropriate for demonstrating transitions, directional flow, and all items below.
- a. Plan for areas deemed critical by the design team for staging concerns. These areas may require cross sections for more detail.
 - b. Plan for access to the median work zone (ingress and egress) including access spacing.
 - c. Plan for maintaining ramp traffic.
 - d. Plan for maintaining positive temporary drainage during stages.
 - e. Plan for placing girders over the interstate.
 - f. Plan for notifying the traveling public of upcoming stages.
5. Provide Conceptual Bridge Plans for all new, replacement, and widened bridges which shall consist of the following (10 points).
- a. Plan and profile of bridge showing horizontal and vertical clearances and expansion joint locations and types of joint materials.
 - b. Superstructure cross sections and substructure elevations showing pertinent structural elements, dimensions, and types of bearings.
 - c. Construction staging plan for bridge work including dimensions of temporary roadway widths both on the bridges and, where applicable, on the roadway beneath the bridges.
 - d. Bridge construction access plan showing areas used to access the bridge work and showing proposed equipment and material handling locations and staging.
 - e. Retaining wall envelopes at the bridge ends showing top of wall, ground lines, and bottom of wall (required only if retaining walls are proposed)

6. Required Forms include.

- a. Stipend Acknowledgement form
- b. Stipend Agreement
- c. EEO Certificate
- d. Non-Collusion Certificate
- e. Notice of Receipt of Addendum
- f. Updated Organization Chart and Affidavit Statement of Availability of Key Individuals

- Provide the organizational chart from the Proposer's Statement of Qualifications incorporating any approved changes by the SCDOT.
- The Proposer shall include notarized written statement from the Proposer's Project Manager indicating that the key individuals will be available at the times and durations required in the RFQ and RFP.

The Technical Proposal Narrative and Conceptual Plans submitted as a part of the Technical Proposal will be considered a commitment and shall become part of the contract. If awarded the Project, the Proposer commits to deliver this Project as set forth in their Technical Proposal and further agrees to correct all non-conforming aspects, omitted items, and deficiencies to the satisfaction of SCDOT and at no additional costs. If subsequent revisions to the Technical Proposal are desired by the Proposer, even if within the parameters of the RFP requirements, SCDOT approval will be required. SCDOT reserves the right to utilize the issue paper process to approve any desired revision.

4.2 Cost Proposal

The Cost Proposal shall be clearly marked as "Confidential Proprietary Information" by the Proposer and shall include the completed Cost Proposal Bid Form provided at the end of this document. The Cost Proposal Bid Form shall be sealed in a separate envelope and delivered as part of the Cost Proposal per the Milestone Schedule.

4.3 Proposal Submittal

Proposals must be submitted separately in two parts, a Technical Proposal and a Cost Proposal. Proposers are required to upload the Technical Proposal, signed forms, and appendices, online through ProjectWise in PDF format. Only one completed submittal per team will be accepted and shall be uploaded by either the lead contracting entity or lead design firm. Please be advised of the time required to set up new account. All requests for new accounts must be received 72 hours prior to the Proposal deadline indicated in the Milestone Schedule. More information is available at http://www.scdot.org/doing/constructionletting_projectwise.aspx.

Proposers are to physically deliver and submit three printed and bound hard copies of the Technical Proposal, signed forms, and appendices. Proposers are to physically deliver one sealed, printed copy of the Cost Proposal. Please deliver to:

Ms. Carmen Wright
Office of Project Delivery
South Carolina Department of Transportation
955 Park Street, Room 101
Columbia, South Carolina 29202-0191

Proposers are responsible for affecting delivery by the date in the Milestone Schedule. Late submissions will be rejected without opening. SCDOT accepts no responsibility for misdirected or lost Proposals.

4.4 Confidentiality of Proposals

Proposer shall specifically mark as “CONFIDENTIAL” any elements of their submission that they consider to contain confidential or proprietary information, and the release of which would constitute an unreasonable invasion of privacy. All markings must be conspicuous; use color, bold, underlining, or some other method in order to conspicuously distinguish the mark from the other text. Do not mark the entire Proposal as confidential or proprietary. **In the Technical Proposal appendix, Proposer shall include a list of page numbers that contain confidential and/or proprietary information. Failure to include this list in the Technical Proposal appendix waives the confidentiality protection and subjects the information to disclosure in accordance with the law.** In determining whether to release documents, the SCDOT will rely on the Proposer’s marking of each page or portions of pages of documents, as required by these instructions, as being either “Confidential” or “Trade Secret”. Proposer shall be prepared upon request to provide justification of why such materials shall not be disclosed under the South Carolina Freedom of Information Act, Section 30-4-10, et seq., South Carolina Code of Laws (1976) as amended. Proposals will be kept confidential and will not be disclosed, except as may be required by law.

4.5 Non-collusion and Equal Employment Opportunity Certification

Proposers shall certify that they have not participated in any collusion or otherwise taken any action in restraint of free competitive bidding in connection with the submission of this Proposal on this Project. A Proposal submitted without the non-collusion certification may be deemed non-responsive. The non-collusion certification form provided as part of this document shall be submitted as part of the Technical Proposal and will not count against the specified page limit. Each joint venture team member shall submit a separate non-collusion certification.

Proposers shall complete the Equal Employment Opportunity (EEO) Performance Certification form provided as part of this document. A Proposal submitted without the EEO certification may be deemed non-responsive. The EEO certification form shall be

submitted as part of the Technical Proposal and will not count against the specified page limit. Each joint venture team member shall submit a separate EEO certification.

5. EVALUATION OF PROPOSALS

5.1 Evaluation Committee

An Evaluation Committee (“Committee”) will be appointed by SCDOT to review the Proposals. The committee members will be comprised of SCDOT employees. In addition, SCDOT will assemble a group of resource members having expertise in the various disciplines required by the Project including FHWA.

5.2 Proposal Review

The Committee will review the Technical Proposals and determine responsiveness based on the Proposal Development criteria in Section 4. Cost Proposals will be accepted from those Proposers deemed to have Responsive Technical Proposals. Proposers that submit a non-responsive Technical Proposal will be sent a letter with a detailed explanation as to the reasons for determining non-responsiveness. All original copies of the non-responsive Technical Proposal(s) will be retained by SCDOT. Reasons for determining a Technical and/or Cost Proposal to be non-responsive may result from, but are not limited to, the following: failure to provide all information requested in the Proposal, failure to conform to the material requirements of the RFP, conflict of interests, conditional Proposals, failure to provide complete and honest information, or failure to complete the Cost Proposal Bid Form correctly. Technical and/or Cost Proposals which impose conditions that modify material requirements of the RFP may be rejected as non-responsive. Proposers will not be given an opportunity to correct any material nonconformity. Any deficiency resulting from a minor informality may be clarified or waived at the sole discretion of the SCDOT.

5.3 Technical Proposal Evaluation

All Technical Proposals will be evaluated and scored on a scale of 0 to 100 points prior to receipt of the Cost Proposals. A Technical Proposal Narrative outlining the Proposer’s Project Approach and Delivery which meets the expectations of SCDOT as described in the RFP will be scored at 25 points. Conceptual Plans providing a quality design through good engineering principles and practices will be scored at 60 points. Points will be deducted from the Project Approach and Delivery Technical Narrative and Conceptual Plans for aspects that do not conform to the RFP requirements, have omitted items, and contain deficiencies. At SCDOT’s discretion, points will also be deducted for aspects of a proposal that lack sound engineering judgement in accomplishing the scope of work, incorporate minimal design values in areas where higher values are more commensurate with the design context, or provide unsuitable quality. The Technical Proposal Narrative outlining the Proposer’s Innovation and Added Value that, in the opinion of the SCDOT, provide additional benefits and added value to the Project beyond that specified in the RFP requirements will be awarded up

to 15 points. Approved ATCs incorporated into a Proposal may or may not be considered additional benefits to SCDOT. A Proposer will be deemed non-responsive if the evaluation of their Technical Proposal results in a score less than 70. The following criteria will be used in determining the Technical Score.

Project Delivery and Approach	25 points
Conceptual Roadway Plans	30 points
Understanding of MOT	20 points
Conceptual Bridge Plans	10 points
Innovation & Added Value	15 points
Required Forms	<u>Pass/Fail</u>
Total Available	100 points

Each member of the Committee will examine each Proposal in detail to measure its contents against the evaluation factors and assign a score to each factor. The Committee will then meet and formulate its collective conclusions. The Committee must discuss significant variations in evaluator's scores or assessments of technical merit and resolve discrepancies or fully explain them. The Committee will assign the final score for each Technical Proposal by consensus.

The Proposer may be deemed non-responsive if all required forms are not included in the Technical Proposal Appendices. SCDOT reserves the right to request any required forms not included in the Technical Proposal. If the Proposer does not provide the omitted forms in the time allotted by SCDOT, the Proposer shall be deemed non-responsive.

5.4 Presentations

Proposers who have submitted responsive Technical Proposals will be invited by the Committee to make a presentation on the date identified in the Milestone Schedule. The Committee will be present during the presentations. The Committee may prepare questions and these questions may be sent to the Proposers prior to the presentation. The presentation will be scheduled for 50 minutes. SCDOT will terminate the presentation promptly at the end of the allotted time. The format for the Proposer's presentations is:

- Introduction of key individuals (5 minutes) (Proposer)
- Presentation by Proposer (20 minutes) (Proposer)
- Questions from the Committee on the presentation (15 minutes) (SCDOT)
- Wrap-up (10 minutes) (Proposer)

The Proposer's attendees may consist of the POC, key individuals identified in the Proposer's Statement of Qualifications, and other personnel shown on the Proposer's organization chart. However, the number of attendees shall not exceed 12 individuals.

The presentation will allow the Proposers an opportunity to further explain any aspect of their Technical Proposals, but will not be an opportunity to modify the contents of the proposal. The presentation shall not be used to fill in missing or incomplete information that was required in the Technical Proposal. The presentation shall not be used as an opportunity by the Proposers to improve or supplement their proposals. The presentation will not constitute discussions or negotiations. Proposers will not be permitted to ask questions of the Committee during the presentation. The Technical Proposal submitted electronically to the SCDOT will be made available to the Proposer via a computer with large monitors suitable for display to the Committee and the Proposer's attendees. The Proposers will be able to navigate through their proposal and plans via the SCDOT provided computer access.

The Proposers shall not bring additional information, including additional copies of the proposal, additional plan sheets, design calculations or handouts to the presentation and shall limit their discussion to the material provided as a part of their Technical Proposal, and any clarifying questions posed by SCDOT.

5.5 Clarifications

SCDOT, at its sole discretion, shall have the right to seek clarifications from any Proposer to fully understand information contained in their responses to the RFP. Clarifications mean a written or oral exchange of information which takes place after the receipt of Proposals when award without discussions is contemplated. The purpose of clarifications is to address minor or clerical revisions in a Proposal.

5.6 Technical and Cost Proposal Analysis

Upon delivery of the Proposer's Cost Proposal at the time and date outlined in the Milestone Schedule, the Technical Score and the Statement of Qualifications (SOQ) Score will be provided confidentially in a sealed envelope to each Proposer. After distribution of the scores, SCDOT will convene a closed session meeting; at which time, the Cost Proposals of Proposers with responsive Technical Proposals will be opened so that the analysis may be conducted.

The Total Cost to Complete and all other weighted criteria factors for each respective Proposer will be entered into the weighted criteria formula to determine a total weighed criteria score. Each Total Cost to Complete will be analyzed relative to the other weighted criteria factors and compared against the confidential SCDOT Engineer's Estimate. SCDOT will analyze the Proposals to determine if an award is justified. Upon completion of the analysis, the closed session will be adjourned and a public announcement will be made at the time and date outlined in the Milestone Schedule.

If upon analysis, there are no apparent concerns with the Proposals, the total weighted criteria score and the Cost Proposal information along with Technical Score and SOQ Score for each Proposer will be read aloud during the public announcement. SCDOT intends to award the contract to the Proposer with the highest Weighted Criteria Score.

However, the project may be cancelled after opening, but prior to the issuance of an award, when such action is determined in writing to clearly be in the best interest of the SCDOT. If the RFP is cancelled, Cost Proposals may be returned to the Proposers and a new solicitation may be conducted for the Project.

If upon analysis, there are concerns with the Proposals, the Cost Proposal information, Technical Scores, and SOQ Scores will not be read aloud and the Proposers will be advised whether SCDOT will hold discussions or cancel the procurement.

5.7 Weighted Criteria Determination

Award of the Contract, if made, will be made to the responsible and qualified Proposer whose submittals generate the highest Weighted Criteria Score. To determine the Weighted Criteria Score, the Proposer's Total Cost to Complete will have a weight of 65, the Proposer's Project Construction Time will have a weight of 10, the Proposer's SOQ Score will be brought forward from Phase 1 of the procurement and have a weight of 5, and the Proposer's Technical Proposal will have a weight of 20 for a Total Weight of 100.

The Proposer submitting the lowest Total Cost to Complete will be awarded the maximum number of points, 65. The next-lowest Total Cost to Complete will be awarded points based on the product of: (a) the ratio of the lowest Total Cost to Complete divided by the next-lowest Total Cost to Complete; and (b) 65 points (i.e., the points awarded for the lowest Total Cost to Complete), with such product rounded to the nearest one hundredth of a point. The process will continue for each of the remaining Proposer's Total Cost to Complete, with points being awarded based on the product of: (a) the ratio of the lowest Total Cost to Complete divided by the respective Proposer's Total Cost to Complete; and (b) 65 points (i.e., the points awarded for the lowest Total Cost to Complete), with such product rounded to the nearest one hundredth of a point. This same calculation will be used to award points for the Proposer's Project Construction Time.

The SOQ and Technical Score for each proposer is converted to a percentage and multiplied by the point value assigned to each category, with such product rounded to the nearest one hundredth of a point.

The following formula will be used to determine the Weighted Criteria Scores.

$$\text{Weighted Criteria Score} = \left(\frac{A_{low}}{A_n} * x_A \right) + \left(\frac{b_{low}}{b_n} * x_B \right) + \left(\frac{C}{100} * x_C \right) + \left(\frac{D}{100} * x_D \right)$$

low the lowest value from the proposals being scored

n the proposal that is being scored

x weight expressed as point values define above in this section

- A Total Cost to Complete all work to be performed under the contract
- b Construction time (b) is defined as calendar days from Notice to Proceed to Substantial Work Completion of the Project.
- C SOQ Score from RFQ phase
- D Technical Score

Example for Determining the Weighted Criteria Score

Proposal	Total Cost to Complete (A)	Weighted Cost Score (x=65)	Project Constr. Time (b)	Weighted Time Score (x=10)	SOQ Score (C)	Weighted SOQ Score (x=5)	Technical Score (D)	Weighted Technical Score (x=20)	Total Weighted Criteria Score
A	\$30,000,000	65.00	750.00	9.20	60.00	3.00	70.00	14.00	91.20
B	\$35,000,000	55.71	720.00	9.58	70.00	3.50	65.00	13.00	N/A
C	\$38,000,000	51.32	690.00	10.00	63.00	3.15	85.00	17.00	81.47
D	\$31,000,000	62.90	750.00	9.20	68.00	3.40	100.00	20.00	95.50

Note: In this example, Proposal B was determined to be non-responsive and Proposal D was determined to be the highest Weighted Criteria Score.

In the event that two or more Proposers are determined to have the same Weighted Criteria Score, the award, if made, will be made to the Proposer with the highest weighted score for the criterion with the highest weight.

5.8 Discussions

If necessary, after the Technical and Cost Proposal Analyses, SCDOT may hold confidential discussions with each responsive Proposer relating to aspects of their respective Proposal. The discussion process is intended to assure that Proposers fully understand the requirements of the RFP and that the evaluation team fully understands each qualified Proposer’s Technical Proposal and the Proposer’s ability to perform as needed. Discussions involve only a limited exchange of information. Discussions are not negotiations. If SCDOT determines that discussions are necessary, SCDOT will forward a written invitation to the responsive Proposers.

SCDOT reserves the right to hold multiple discussions at any length of time with all of Proposers. All discussions shall be controlled by the SCDOT POC. Proposers shall not communicate with any other SCDOT employees regarding these discussions except at the appropriate discussion meetings.

At the conclusion of discussions, SCDOT may either 1.) proceed with award of the contract to the selected Proposer based on the highest Weighted Criteria Score; 2.) issue a Request for Best and Final Offers; or 3.) cancel the procurement.

5.9 Best and Final Offer

At the conclusion of discussions, if SCDOT determines that Proposal revisions are warranted, SCDOT may issue a Request for Best and Final Offer (BAFO). If necessary, SCDOT may also revise the RFP to provide clarifications related to the Request for BAFO. The Request for BAFO will include instructions for preparing and submitting the BAFO and will include a new Milestone Schedule. If only Cost Proposal revisions are warranted, Proposers will revise and resubmit, and SCDOT will analyze the proposals as outlined in Section 5.6. If Technical Proposal revisions are warranted, Proposers will revise and resubmit, and the procurement process will return to Section 5. Only one Request for BAFO can be issued for this RFP.

5.10 Protest

5.10.1 Grounds for Protest

Protest of Contents of Solicitation (Invitation For Bids or RFPs or other solicitation documents, whichever is applicable, or any amendment to it, if the amendment is at issue): Any Proposer who is aggrieved in connection with a solicitation document shall file a written protest to SCDOT's Chief Procurement Officer (CPO), PO Box 191, Columbia, SC 29202, within five business days of the date of posting of the solicitation, RFQ, RFP, or other solicitation document or any addendums to it on the SCDOT design-build website.

Protest of Short-listing: Any Protestant who is aggrieved in connection with the selection of short-listed Proposers shall file a written protest with the CPO within five business days of the date the short-list is posted on SCDOT design-build website. Any matter that could have been raised pursuant to the Protest of Contents of Solicitation, section above, may not be raised as a protest of the selection of the short-list. The number of Proposers short-listed is not grounds for a protest.

Protest of Award: Any Protestant who is aggrieved in connection with the award of the contract shall file a written protest with the CPO within five business days of the date the Request to Award memorandum is posted on SCDOT design-build website. Any matter that could have been raised pursuant to the protest of contents of solicitation or short-listing, section above, may not be raised as a protest of award.

Exclusive remedy: The rights and remedies granted in this section to Proposers, either actual or prospective, are to the exclusion of all other rights and remedies of Proposers against the SCDOT.

Failure to file a timely protest: If protestant fails to request a protest within the five business days, the short-list and award shall be final.

5.10.2 SCDOT Procedures for Protest

Protest: A protest must be in writing, filed with the CPO, and set forth the grounds of the protest and the relief requested with enough specificity to give notice of the issues to be decided. The protest must be received by the CPO within the time provided.

Burden of Proof: The protestant challenging SCDOT's action bears the burden of proving the decision is arbitrary.

Duty and Authority to Attempt to Settle Protests: Before commencement of an administrative review, the CPO, or a designee of the CPO, may attempt to settle by mutual agreement a protest of an aggrieved Protestant, actual or prospective, concerning the solicitation, short-listing, or award of the contract. Any settlement reached by mutual agreement shall be approved by the CPO.

Administrative Review and Decision: If, after reasonable attempt, a protest cannot be settled by mutual agreement, the CPO, or a designee, shall promptly conduct an administrative review. The CPO shall commence the administrative review no later than five business days after a reasonable settlement attempt and shall issue a decision in writing within five business days of completion of the review. The decision must state the reasons for the action taken. The decision shall include findings of fact and conclusions of law, separately stated. A copy of the decision along with a statement of appeal rights set forth below must be mailed or otherwise furnished immediately to the protestant.

Finality of Decision and Appeal: The SCDOT's decision pursuant to the above paragraph is final and conclusive. A person adversely affected by the final decision can appeal to circuit court and hereby waives a trial by jury regarding any protest arising out of this procurement and any such trial will be a non-jury trial before the South Carolina Circuit Court in Richland County.

Stay of Award: The contract award is stayed until issuance of a final decision by the SCDOT. Once a final decision is issued, the filing of a petition to appeal that decision does not itself stay enforcement of SCDOT's decision to award the contract. SCDOT may grant or the reviewing court may order, a stay upon appropriate terms.

All Freedom of Information (FOIA) requests will be sent to the FOIA Officer in the SCDOT Office of Chief Counsel.

6. SELECTION OF CONTRACTOR

The Chairman of the Committee will present a report regarding the review of the Proposals along with the Technical and Cost Proposal Analysis results to SCDOT Director of Construction's Office and recommend selection of the Proposer with the highest Weighted

Criteria Score. The Director of Construction's Office may clarify any remaining issues regarding scope, schedule, financing, inclusion of ATCs, inclusion of any concepts submitted by another Proposer, or any information provided by the selected Proposer. The Director of Construction's Office will prepare a Secretary of Transportation Record of Approval Form requesting authorization to award and execute a contract. Upon approval by the SCDOT Secretary of Transportation, SCDOT will offer a contract to the selected Proposer. However, if the parties are unable to execute a contract, SCDOT may offer a contract to the Proposer with the next highest Weighted Criteria Score.

7. GENERAL INFORMATION

SCDOT reserves the right to terminate the evaluation of one or more of the Proposals if it is determined to be in the best interest of the state to do so.

SCDOT reserves the right, at its sole discretion, to either cancel this solicitation or to re-advertise in another public solicitation when it is in the best interest of the state to do so.

SCDOT reserves the right to reject any and all Proposals, or parts thereof, and/or to discontinue contract execution with any party at any time prior to final contract execution.

SCDOT assumes no liability and will not reimburse costs incurred by firms, whether selected or not, in developing Proposals or in contract execution.

SCDOT reserves the right to request or obtain additional information about any and all Proposals. SCDOT may also issue addendums to the RFP, which will be posted on the website and emailed to all Proposers' Points of Contact.

SCDOT reserves the right to revise or amend the RFP, specifications and/or drawings, including changes to the date the Proposal is due. Such changes, if any, will be announced by an addendum(s) to this RFP. All information relating to this RFP, including pertinent changes/addendums and other applicable information will be posted on SCDOT's Design-Build website http://www.scdot.org/doing/constructionletting_designbuild.aspx. If changes are made to the RFP within 10 days of the due date, Milestones may be adjusted accordingly. Proposers are strongly cautioned to check this site frequently to ensure they have the latest information.

Receipt of an addendum by the Proposer must be acknowledged in the space provided on the Addendum Notice to Proposer Transmittal Form posted on the SCDOT Design-Build website for this Project. Proposers shall submit the signed Notice with its Technical Proposal response to this RFP. Failure to acknowledge an addendum may result in rejection of the Proposal. Explanations or instructions given in a form other than an addendum or ATC response letter shall not be binding.

After award, if an unsuccessful Proposer would like to schedule a debriefing, Proposer shall submit a request within three business days from the date the award notification is posted on the SCDOT Design-Build website for this Project. Only written requests (emails are

acceptable) for a debriefing will be scheduled. Failure to request a debriefing within the three business day period waives the opportunity for a debriefing.

Proposer shall be held responsible for the validity of all information supplied in its Proposal, including that provided by potential subcontractors. Should subsequent investigation disclose that the facts and conditions were not as stated, the Proposal may be rejected or contract terminated for default if after award, in addition to any other remedy available under the contract or by law.

Proposer, by submitting a Proposal, represents that it has read and understands the RFP, its exhibits, attachments and addendums, and that its Proposal is made in compliance with the criteria of the RFP. Proposers are expected to examine the RFP, its exhibits, attachments and addendums thoroughly and should request an explanation of any ambiguities, discrepancies, errors, omissions, or conflicting statements therein. Failure to do so will be at the Proposer's risk. Proposer assumes responsibility for any patent ambiguity in the RFP, its exhibits, attachments and addendums that Proposer does not bring to SCDOT's attention.

No Proposal guaranty in the form of a Bid Bond is required for this procurement.

Proposal Acceptance Period - By submitting a Proposal, Proposer agrees to hold the Proposal offer available for acceptance a minimum of 90 calendar days after the submission of their Cost Proposal. If a BAFO is requested, Proposer agrees to hold the BAFO available for acceptance a minimum of 90 calendar days after the submission of their BAFO Cost Proposal.

Submission of a Proposer's bid is not considered complete until both the Technical and Cost Proposals are received by SCDOT.

If a Proposer withdraws any time during the procurement, the stipend shall be forfeited.

A business day is hereby defined as a day in which SCDOT Headquarters is open for business.

8. MILESTONE SCHEDULE

Milestone Schedule	Date/Time
Provide RFP for Industry Review to Short-list Proposers	Thursday, August 3, 2017
Deadline for Proposers to submit Comments/Questions on the RFP for Industry Review	Thursday, August 17, 2017 by 12:00pm EST
Open-Forum Meeting with Proposers for RFP for Industry Review Clarifications/Comments	Thursday, August 31, 2017 at 10:00am EST
Issue Final RFP	Thursday, September 14, 2017
Submittal of Preliminary ATC Package, Confidential Questions, and Non-Confidential Questions	Thursday, September 21, 2017 by 12:00pm EST
Confidential Preliminary ATC and Confidential Questions One-on-One Meetings with Proposers	Thursday, October 5, 2017
Submittal of Non-Confidential Questions	Thursday, October 12, 2017 by 12:00pm EST
SCDOT Responds to Preliminary ATCs	Thursday, October 12, 2017
Submittal of Formal ATCs for Initial Review and Submittal of Confidential Questions	Thursday, October 26, 2017 by 12:00pm EST
SCDOT Responds to Formal ATCs with final determination, asks questions/requests information, or provides conditional responses	Monday, November 13, 2017
Submittal of Non-Confidential Questions	Monday, November 13, 2017 by 12:00pm EST
Confidential Formal ATC One-on-One Meetings	Tuesday, November 14, 2017
Resubmittal of Formal ATCs in its final form (no revisions allowed after this submittal, unless requested by SCDOT)	Wednesday, November 22, 2017 by 12:00pm EST
SCDOT's Final Determination for Formal ATCs	Thursday, December 7, 2017
Submittal of Non-Confidential and Confidential Questions	Thursday, December 14, 2017 by 12:00pm EST
Submittal of Technical Proposals	Thursday, January 11, 2018 by 10:00am EST
Technical Proposal Presentations	Thursday, February 1, 2018
Submittal of Cost Proposals	Thursday, February 22, 2018 from 9:00 am to 10:00am EST
Public Announcement of the Technical and Cost Proposal Analysis (with team representatives present)	Thursday, February 22, 2018 at 1:00pm EST

9. COST PROPOSAL BID FORM

**INTERSTATE 85 WIDENING MM 98-106
Cherokee County**

CONTRACTOR: _____

ADDRESS: _____

Provide full Project scope as described in Attachment A.

TOTAL COST TO COMPLETE (A) = _____

Construction Time (Calendar Days) (b) = _____

No conditional Bids will be accepted and will be deemed non-responsive.

Signature Date

Printed Name

10. NON-COLLUSION CERTIFICATION

NON-COLLUSION CERTIFICATION

Project ID: P027116

IN ACCORDANCE WITH THE PROVISIONS OF S.C. CODE ANN. §§ 39-3-10 ET. SEQ., 39-5-10 ET. SEQ., 15 U.S.C. §45; 23 C.F.R. §635.112(F); AND 28 U.S.C. §1746, I HEREBY ACKNOWLEDGE THAT I AM AN OFFICER OF THE PROPOSER FIRM AND, UNDER PENALTY OF PERJURY UNDER THE LAWS OF THE UNITED STATES AND SOUTH CAROLINA, DECLARE, BY MY CERTIFICATION BELOW, THAT THE FOLLOWING IS TRUE AND CORRECT, AND FURTHER, THAT THIS FIRM, ASSOCIATION OR CORPORATION HAS NOT, EITHER DIRECTLY OR INDIRECTLY, ENTERED INTO ANY AGREEMENT, PARTICIPATED IN ANY COLLUSION, OR OTHERWISE TAKEN ANY ACTION IN RESTRAINT OF FREE COMPETITIVE BIDDING IN CONNECTION WITH THE SUBMISSION OF A BID PROPOSAL ON THE ABOVE REFERENCED PROJECT.

BY CHECKING THIS BOX , I CERTIFY THAT I HAVE READ, UNDERSTAND, ACCEPT, AND ACKNOWLEDGE ALL OF THE ABOVE STATEMENTS.

Executed on _____
(Date)

Signed: _____
(Officer/Proposer)

(Title)

(Address)

11. EQUAL EMPLOYMENT OPPORTUNITY CERTIFICATION

(COMPLETE THIS SECTION FOR FEDERAL PROJECTS ONLY) EQUAL EMPLOYMENT OPPORTUNITY PERFORMANCE

Select the Certification that applies to the PROPOSER:

Certification (1) or Certification (2)

Select the appropriate responses in the applicable Certification:

Certification (1): Pursuant to 41 C.F.R. §60-1.7(b)(1), Previous Equal Employment Opportunity Performance Certification, as the Prospective Prime Contractor, I HEREBY CERTIFY THAT I:

(a) **(HAVE / HAVE NOT)** developed and filed an Affirmative Action Program pursuant to 41C.F.R. §60-2 and/or 60-4;

(b) **(HAVE / HAVE NOT)** participated in a previous contract or subcontract subject to the equal opportunity clause;

(c) **(HAVE / HAVE NOT)** filed with the Joint Reporting Committee, the Director of Office of Federal Contract Compliance, or the Equal Employment Opportunity Commission, all reports due under the applicable filing requirements,

OR

Certification (2): I, HEREBY CERTIFY that as the Prospective Prime Contractor submitting this Proposal, **(CLAIM / DO NOT CLAIM)** exemption from the submission of the Standard Form 100 (EEO-1) due to the fact that it employs a total of less than fifty (50) employees under C.F.R. §60-1.7, or qualifies for an exempted status under 41 C.F.R. §60-1.5.

I FURTHER CERTIFY that the above Certification will be made part of any Subcontract Agreement involved with this project.

Executed on _____, 20 ____ .

Signed: _____
(Officer/PROPOSER)

Title: _____

Company: _____

Address: _____

Note: The above certification is required by the Equal Employment Opportunity Regulations of the Secretary of Labor (41 CFR 60-1.7(b)(1)), and must be submitted by PROPOSERS only in connection with contracts which are subject to the equal opportunity clause. Contracts that are exempt from the equal opportunity clause are set forth in 41 CFR 60-1.5. (Generally, only contracts of \$10,000 or under are exempt.)

Currently, Standard Form 100 (EEO-1) is the only report required by Executive Orders or their implementing regulations.

Proposers, Primary Members, or proposed Contractors and Consultants who have participated in a previous contract subject to the Executive Orders and have not filed the required reports shall note that 41 CFR 60-1.7(b)(1) prevents the award of contracts and subcontracts unless such contractor submits a report covering the delinquent period or such other period specified by the Federal Highway Administration or by the Director, Office of Federal Contract Compliance, U.S. Department of Labor.

12. STIPEND ACKNOWLEDGEMENT FORM

Stipend Acknowledgement Form

**INTERSTATE 85 WIDENING MM 98-106
Cherokee County**

Proposer: _____

ADDRESS: _____

The undersigned Proposer, hereby:

Waives the stipend for this Project.

Accepts the stipend for this Project.

By accepting the stipend for this Project, Proposer agrees:

- 1) to execute and include the Stipend Agreement in Article XIII of the RFP with their RFP response;
- 2) SCDOT will pay the stipend to each eligible unsuccessful Proposer, who has signed a Stipend Agreement, within ninety (90) days after execution of the contract or the decision not to award a contract;
- 3) to transfer all rights to its Work Product used to develop the Proposal as of the date of this acknowledgement. "Work Product" means all submittals, including ATCs, ideas, innovations, solutions, methods, processes, design concepts, materials, electronic files, marked up drawings, cross sections, quantity lists and intellectual property, made by Proposer during the RFP process, including the Proposal, exchange of information during the pre-Proposal and post-Proposal period.

Date

Proposer

Print Name

13. STIPEND AGREEMENT

STIPEND AGREEMENT
Project ID: P027116
Interstate 85 Widening MM 98-106
Cherokee County

THIS STIPEND AGREEMENT (the “Agreement”) is made and entered into as of the ___ day of _____, 20__, by and between the SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION (hereinafter “SCDOT”), and _____ (“Proposer”), with reference to the following facts:

SCDOT issued a Request for Proposal (“RFP”) for design and construction of the above-referenced Design-Build Project (“Project”), pursuant to procurement authority granted in Section 57-5-1625 of the S.C. Code of Laws, 1976, as amended. The RFP provided for payment of stipends as provided herein.

NOW, THEREFORE, Proposer hereby agrees as follows:

1. Work Product.

1.1 Proposer shall prepare and submit a responsible and responsive technical and cost Proposal that conforms in all material respects to the requirements and provisions of the RFP, as determined by SCDOT, and are timely received by SCDOT in accordance with the RFP Milestone Schedule.

1.2 By signing this Stipend Agreement, Proposer agrees to transfer ownership to SCDOT of the electronic copy and hard copy of all Work Product used to develop the Proposal. The Work Product (as defined below) shall become the property of SCDOT without restriction or limitation on its use, without further compensation or consideration, and can be used in connection with this Project or any future projects by SCDOT. Neither Proposer nor any of its team members shall copyright any of the material developed under this Agreement.

1.3 The term “Work Product” shall mean all material, electronic files, marked up drawings, cross sections, quantity lists, submittals, alternative technical concepts (ATC), ideas, innovations, solutions, methods, processes, design concepts, and intellectual property, made by or produced for Proposer in the development and submission of the technical and price Proposals, including exchanges of information during the pre-Proposal and post-Proposal period.

2. Compensation and Payment.

2.1 A stipend to Proposer for the Work Product described herein shall be \$215,000.00 and is payable on condition that Proposer (1) submitted a responsible and responsive technical and cost Proposal to the RFP which is not selected for award of this Project, or (2) was awarded the Contract but the Contract was terminated by SCDOT at SCDOT’s convenience after the Submittal of Proposal Date (See Final RFP Milestone schedule) but prior to the Notice to Proceed #1. Responsibility and responsiveness of the Proposal will be determined by SCDOT as a condition of payment.

2.2 SCDOT will pay the stipend to Proposer under the following conditions:

(a) Within ninety (90) days after execution of the contract or the decision not to award a contract, SCDOT will pay the stipend to the unsuccessful Proposer meeting the criteria of Section 2.1, provided that the Proposer submitted a signed a Stipend Agreement with its response to the RFP.

(b) If the procurement is suspended or cancelled prior to the Proposal Due Date (see FINAL RFP Milestone schedule), no stipend will be paid to Proposer.

(c) After the submittal of Proposals, but prior to award, if the procurement is cancelled, all Proposers that provide a responsive technical and cost Proposal to the final RFP and submitted a signed Stipend Agreement with their RFP shall receive the stipend

(d) In the event of a Best and Final Offer, only one stipend will be paid.

(e) No stipends will be paid for submitting RFQ responses.

(f) No stipends will be paid to a Proposer who withdraws at any time from this procurement.

2.3 Acceptance by the Proposer of payment of the stipend amount from SCDOT shall constitute a waiver by Proposer of any and all right, equitable or otherwise, to bring any claim in connection with this procurement, procurement process, award of the Contract, or cancellation of this procurement.

2.4 The Proposer awarded the contract shall be not eligible to receive a stipend.

2.5 If Proposer elects to waive payment of the stipend, SCDOT will not use the ideas or information contained in that Proposer's Proposal for this Project. However, the Proposer's Proposal will be subject to the South Carolina Freedom of Information Act.

3. Indemnities.

3.1 Subject to the limitations contained in Section 3.2, Proposer shall indemnify, protect and hold harmless SCDOT and its directors, officers, employees and contractors from, and Proposer shall defend at its own expense, all claims, costs, expenses, liabilities, demands, or suits at law or equity arising in whole or in part from the negligence or willful misconduct of Proposer or any of its agents, officers, employees, representatives or subcontractors or breach of any of Proposer's obligations under this Agreement.

3.2 This indemnity shall not apply with respect to any claims, demands or suits arising from use of the Work Product by SCDOT.

4. Compliance With Laws.

4.1 Proposer shall comply with all federal, state, and local laws, ordinances, rules, and regulations applicable to the work performed or paid for under this Agreement and covenants and agrees that it and its employees shall be bound by the standards of conduct provided in applicable laws, ordinances, rules, and regulations as they relate to work performed under this Agreement. Proposer agrees to incorporate the provisions of this paragraph in any subcontract into which it might enter with reference to the work performed pursuant to this Agreement.

4.2 The Proposer agrees (a) not to discriminate in any manner against an employee or applicant for employment because of race, color, religion, creed, age, sex, marital status, national origin, ancestry or disability of a qualified individual with a disability; (b) to include a provision similar to that contained in subsection (a) in any subcontract; and (c) to post and to cause subcontractors to post in conspicuous places available to employees and applicants for employment, notices setting forth the substance of this clause.

5. Assignment.

Proposer shall not assign this Agreement without SCDOT's prior written consent. Any assignment of this Agreement without such consent shall be null and void.

6. Miscellaneous.

6.1 Proposer and SCDOT agree that Proposer, its team members, and their respective employees are not agents of SCDOT as a result of this Agreement.

6.2 This Agreement, together with the RFP, as amended from time to time, the provisions of which are incorporated herein by reference, embodies the entire agreement of the parties. There are no promises, terms, conditions, or obligations other than those contained herein or in the RFP, and this Agreement shall supersede all previous communications, representation, or agreements, either verbal or written, between the parties hereto.

6.3 It is understood and agreed by the parties hereto that if any part, term, or provision of this Agreement is by the courts held to be illegal or in conflict with any law of the State of South Carolina, the validity of the remaining portions or provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the Agreement did not contain the particular part, term, or provisions to be invalid.

6.4 This Agreement shall be governed by and construed in accordance with the laws of the State of South Carolina.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

Witness:

SOUTH CAROLINA DEPARTMENT
OF TRANSPORTATION

By: _____

Chris J. Gaskins, PE, PG, DBIA
Design-Build Engineer

Recommended:

Brad Reynolds
Design-Build Program Manager

Proposer

Name of Proposer

Witness:

By: _____

Its: _____

AGREEMENT

**AGREEMENT
FOR THE DESIGN & CONSTRUCTION
of**

INTERSTATE 85 WIDENING FROM MM 98-106

Cherokee County, South Carolina

A DESIGN-BUILD PROJECT

**BETWEEN
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
AND**

_____ day of _____, 2018

Project ID P027116

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Interstate 85 Widening from MM 98-106
Cherokee County

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2. Schedule of Values
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5. Special Provisions and Contract Requirements
6. Railroad Design Criteria

WHEREAS, the South Carolina Department of Transportation, as an agency of the State of South Carolina, wishes to improve the safety and operation of the state highway system by widening Interstate 85 from approximate mile marker 98 to approximate mile marker 106 in Cherokee County (hereinafter referred to as “the Project”); and

WHEREAS, the South Carolina Department of Transportation, as a servant of the people of the State of South Carolina, wishes to see this strategic project completed; and

WHEREAS, limitations imposed by traditional methods of designing, and constructing highways would mean that the Project could be completed only after an unacceptable delay; and

WHEREAS, the South Carolina Department of Transportation, working with the Federal Highway Administration (FHWA), has devised an innovative plan to allow the commencement and completion of the Project in a timely and cost-effective manner; and

WHEREAS, pursuant to Section 57-5-1625 SC Code of Law, the South Carolina Department of Transportation desires to award a highway construction contract using a Design / Build procedure; and

WHEREAS, after a competitive process, CONTRACTOR has been selected to participate in this venture by designing and building the Project; and

WHEREAS, the South Carolina Department of Transportation wishes to avail itself of and rely on CONTRACTOR’s expertise and proven track record in designing and constructing such projects, on time and within budget; and

WHEREAS, CONTRACTOR wishes to provide that expertise and to participate in this venture for the good of the people of the State of South Carolina;

NOW THEREFORE, this Agreement is executed and made, effective as of the Effective Date as defined herein, between the SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION (“SCDOT”) and _____ (“CONTRACTOR”). In consideration of the covenants hereinafter set forth, the parties hereto mutually agree as follows:

I. CONTRACT DOCUMENTS

The Contract shall be composed of this Agreement and all exhibits, SCDOT's Request for Proposals and all attachments, Request for Qualifications and all attachments, CONTRACTOR's Proposal and all attachments, and CONTRACTOR'S Qualifications and all attachments. In case of conflict, the order of precedence of the Contract documents shall be: (1) this Agreement; (2) Agreement Exhibits; (3) SCDOT Request for Proposals (RFP) document and Attachment B; (4) CONTRACTOR's Proposal and attachments; and (5) SCDOT Request for Qualifications (RFQ) and CONTRACTOR's Statement of Qualifications (SOQ). In the event of a conflict between the Project Criteria and Special Provisions identified in the Agreement Exhibits, the order of precedence shall be (1) the Project Criteria and (2) Special Provisions. The Project Information Package is provided for information only. SCDOT shall not be liable for the accuracy of the information contained therein.

II. PROJECT SCOPE

A. Scope of Work

CONTRACTOR shall furnish all services, labor, materials, equipment, supplies, tools, transportation, and coordination required to perform all design, preliminary engineering, surveying, geotechnical services, scheduling, permitting, right of way services, procurement, construction, utility coordination, demolition, material disposal and any other services necessary to perform the Project as defined in the Project Scope of Work made a part hereof as **EXHIBIT 3**.

B. Design and Construction Responsibilities

1. CONTRACTOR, consistent with applicable state licensing laws, shall provide, through qualified South Carolina licensed design professionals employed by CONTRACTOR or procured from qualified, independent South Carolina licensed design consultants, the necessary design work, including, but not limited to, surveys, right of way services, roadway design, maintenance of traffic, geotechnical exploration and design, hydraulic analyses, storm water management, erosion control, superstructure design, and foundation and substructure design including seismic analyses for the preparation of the required drawings, specifications and other design submittals to permit CONTRACTOR to complete the work in accordance with the Contract.
2. CONTRACTOR shall provide through itself or subcontractors the necessary supervision, labor, inspection, testing, material, equipment, machinery, temporary utilities and other temporary facilities to permit performance of all demolition, earthwork, drainage, foundation work, maintenance of traffic, roadway work, structural work, excavation, erosion and sediment control work, field layout work, construction management and inspection, utility coordination and relocation, railroad coordination, CONTRACTOR quality control, and all other work necessary to complete construction of the Project in accordance with the Contract.

CONTRACTOR shall perform all design and construction activities efficiently and with the requisite expertise, skill and competence to satisfy the requirements of the Contract. CONTRACTOR at all times shall exercise control over the means, methods, sequences and techniques of construction. CONTRACTOR's operations and construction methods shall comply with all applicable federal, state and local regulations with regard to worker safety, protection and health and protection of the environment and applicable permit requirements.

3. CONTRACTOR shall design and construct the project in such a manner that the construction limits are contained within the approved environmental footprint to the extent possible. Where new right of way is required to construct the Project, the CONTRACTOR shall design and construct the Project so as to minimize the additional rights of way needed. The acquisition of rights of way, including both cost and services to acquire, shall be the responsibility of the CONTRACTOR and shall be done in accordance with Article VIII of this Agreement. CONTRACTOR shall furnish the SCDOT a copy of any agreements for the use of additional properties not acquired as right of way that are used in conjunction with the construction of this Project. CONTRACTOR shall abide by the provisions of all applicable environmental permits, any conditions of individual right of way agreements, and all environmental commitments. The CONTRACTOR shall sign the Contractor Certification Form and this agreement will be made part of the contract.
4. It shall be the responsibility of CONTRACTOR to determine and comply with all applicable federal, state, and local laws in connection with the services set forth in this Contract. This obligation shall include, but not be limited to, procurement of all permits and licenses not obtained by SCDOT provided, however, that with respect to any permit or licenses that must be obtained in the name of SCDOT, CONTRACTOR shall perform all functions within its power to obtain the permit, including mitigation, and SCDOT will fully cooperate in this effort and perform any functions that must be performed by SCDOT. CONTRACTOR shall be responsible for payment of all charges, fees, and taxes, and for providing all notices necessary and incident to the performance of the Project as of the Effective Date of this Agreement. The Contract Price shall include fees related to the above obligations and if any fees are waived by the regulatory or governmental entity, then the amount of the fee waived shall be deducted from the Contract Price.

C. Design Criteria

It shall be the responsibility of CONTRACTOR to design all aspects of the Project in accordance with the contract documents. For the Project, CONTRACTOR shall provide a completed set of construction plans signed and sealed by a licensed professional engineer in South Carolina. CONTRACTOR shall be fully responsible for the accuracy of the design and compliance with specifications, standards and Project Criteria.

D. Design Review

1. Prior to the Preconstruction Meeting, CONTRACTOR shall provide a Draft Design Review Submittal Schedule to SCDOT. The Design Review Submittal Schedule shall include a Gantt chart of the submittal packages and will serve as the basis for reviewing the design and construction plans. The Design Review Submittal Schedule shall be updated and included with each submittal package. CONTRACTOR, CONTRACTOR'S design consultant, subcontractors, suppliers and SCDOT shall discuss the schedule and procedures for submitting design plans at the Preconstruction Meeting. CONTRACTOR, CONTRACTOR'S design consultant, subcontractors and suppliers shall not provide any design deliverables until the Design Review Submittal Schedule is approved by SCDOT.
2. All submittal packages shall be uploaded electronically to ProjectWise and an email shall be sent to SCDOT that verifies the contents of the upload. A complete submittal package shall be limited to one phase (ex. Preliminary/ROW/Final/RFC) of one segment or structure and include all design deliverables specified in Exhibit 4z. Prior to beginning any construction activities, permanent or temporary, the Traffic Management Plan and Conceptual Work Zone Traffic Control plans for the entire project shall be submitted by the CONTRACTOR and approved by SCDOT.
3. If approved by SCDOT, one Maintenance of Traffic submittal package, including but not limited to, an NPDES permit application and related plans, may be allowed to provide the opportunity to begin construction of non-permanent work items, such as clearing and grubbing, shoulder strengthening, minor demolition not adversely impacting traffic or operations, etc.
4. CONTRACTOR shall provide submittal packages as defined in Exhibit 4z. Prior to commencement of permanent construction activities, SCDOT will have the right, but not the obligation, to review and comment upon all submittal packages. SCDOT reserves the right to provide comments on the design or plans at any time when an issue is identified that is not compliant with the RFP or is an error or omission.
5. All documents of a submittal package must be uploaded to ProjectWise by 11:59PM for the review period to begin the next business day. No more than one new submittal package shall be uploaded to ProjectWise within a five business day period. SCDOT reserves the right to utilize Bluebeam Studio to facilitate design reviews between SCDOT and the CONTRACTOR. The initial review period for each submittal package shall be 15 business days. SCDOT review comments will be sent to the CONTRACTOR, who shall respond within five business days and prior to subsequent phase submittals. SCDOT will then status CONTRACTOR'S responses and will provide additional comments, if warranted, within five business days. If any open comments remain after the initial 15 day review and subsequent 5 day review and comment periods, there will be no time constraint for the CONTRACTOR to respond. For all subsequent rounds of

CONTRACTOR responses, SCDOT will status CONTRACTOR'S responses and will provide additional comments, if warranted, within five business days. Review comments for Preliminary, ROW, and Final phases of each segment or structure shall be closed before the associated RFC plans are authorized to be submitted and prior to commencement of construction, demolition or disposal activities.

6. CONTRACTOR shall revise design deliverables and upload to ProjectWise for verification to allow SCDOT to close review comments. Verification design deliverables are not required for preliminary phase submittal packages. Verification design deliverables are required to close SCDOT comments in order to approve ROW and authorize RFC phase submittal packages. CONTRACTOR shall clearly identify and describe any changes made to a verification design deliverable that are unrelated to SCDOT review comments. A complete verification package shall include revised contents for all design deliverables with open SCDOT review comments and be submitted along with CONTRACTOR responses. After comments are closed and before RFC submittal packages are uploaded to ProjectWise, any changes made to design deliverables may, at the sole discretion of SCDOT, require a new submittal package be provided and require adjustment to the CONTRACTOR's Design Review Submittal Schedule.
7. The review and comment process is fully discretionary; however, no review or comment nor any failure to review or comment shall operate to absolve CONTRACTOR of its responsibility to design and build the Project in accordance with the contract or to shift responsibility to SCDOT.
8. SCDOT reserves the right to reject any submittal package that is deficient or incomplete. SCDOT will provide a written notice, including cause for rejection, for any submittal package that does not demonstrate the work can be completed in accordance with the Contract. Rejected submittal packages must be revised to comply with the Contract. Revised submittal packages will be considered a new submittal package and reviewed as described above. Rejected submittal packages shall not in any way serve to extend the construction time.

E. Maintenance of Traffic

The SCDOT work zone mobility requirements found within the documents known as *Rule on Work Zone Safety and Mobility: The Policy for South Carolina Department of Transportation* and *Rule on Work Zone Safety and Mobility: Implementation, Maintenance, and Safety Guidelines* shall apply to this project. These requirements apply to the CONTRACTOR, all subcontractors, all SCDOT staff and designated representatives acting on behalf of the SCDOT performing duties with responsibilities relative to a work zone, including but not limited to planning, project development, design, construction, and maintenance.

The CONTRACTOR shall design, develop, implement and maintain a set of coordinated strategies to manage the work zone impacts of the project designated as

the Transportation Management Plan. These strategies will include a Temporary Traffic Control plan, a Transportation Operations component, and a Public Information component. The Policy and the anticipated work zone impacts of the project shall determine the level of detail, content, and scope of the TMP. The primary component, the Temporary Traffic Control plan shall address traffic control and safety throughout and adjacent to the project site. A secondary component, the Transportation Operations plan, will address management of traffic operations in the project site and all adjacent areas impacted by the project. The final component, the Public Information plan, addresses communications with the public and entities impacted by the project. The CONTRACTOR's Transportation Management Plan and its components shall comply with the requirements of this Agreement and subsequent Exhibits, Part 6 of the Manual on Uniform Traffic Control Devices (MUTCD) latest edition, and SCDOT policies, standard specifications and all addendums to the standard specifications, the typical traffic control standard drawings for road construction, and procedures.

F. Ownership of Documents

Drawings, specifications, test data, inspection reports, QC documents, daily diaries and any other documents, including those in electronic form, prepared by CONTRACTOR or CONTRACTOR's consultants are "Project Documents". CONTRACTOR and CONTRACTOR's consultants shall be the owner of the Project Documents. Upon the Effective Date of this Agreement, CONTRACTOR grants SCDOT a nonexclusive license to reproduce the Project Documents for the purposes of, but not limited to, promoting, using, maintaining, upgrading, or adding to the Project. Upon completion of the Project or upon default by CONTRACTOR, CONTRACTOR shall provide copies of all Project Documents to SCDOT in the format designated by SCDOT.

G. Construction Criteria

CONTRACTOR shall construct the Project in accordance with all applicable Federal, State, and local statutes and regulations. All construction shall be performed in accordance with the following criteria, which are incorporated herein by reference and made a part hereof. The construction criteria are intended to be complementary and to describe and provide for a complete work. Where the following construction criteria conflict, the order of precedence shall be as listed below:

1. **EXHIBIT 4** – Project Design Criteria
2. **EXHIBIT 5** – Special Provisions
3. Final Construction Plans provided by SCDOT
4. SCDOT Standard Drawings, effective as of the most recent Standard Highway Letting prior to the release of the Final RFP ([see Design Build Website - http://www.scdot.org/doing/constructionLetting_DesignBuild.aspx](http://www.scdot.org/doing/constructionLetting_DesignBuild.aspx))

5. SCDOT Supplemental Specifications and Supplemental Technical Specifications, effective as of the release of the Final RFP ([see Design Build Website - http://www.scdot.org/doing/constructionLetting_DesignBuild.aspx](http://www.scdot.org/doing/constructionLetting_DesignBuild.aspx))
6. SCDOT Standard Specifications for Highway Construction, effective as of the release of the Final RFP ([see Design Build Website - http://www.scdot.org/doing/constructionLetting_DesignBuild.aspx](http://www.scdot.org/doing/constructionLetting_DesignBuild.aspx))
7. SCDOT Construction Manual, effective as of the release of the Final RFP
8. SCDOT Approval Sheets, Material Acceptance Policies and New Products Evaluation Summary (available on SCDOT internet website)

H. Project Management

1. CONTRACTOR shall be responsible for ensuring that the Project is constructed in conformance with the Contract, all referenced documents and specifications, and applicable laws and regulations.
2. CONTRACTOR shall provide project management services sufficient to supervise the activities of his own personnel and subcontractors. CONTRACTOR shall provide a sufficient number of persons on site, to the satisfaction of SCDOT, to provide for the construction management of the Project.
3. SCDOT will provide representatives assigned to the Project to monitor the construction and provide necessary coordination between SCDOT and CONTRACTOR. All costs for salary and equipment to maintain SCDOT employees will be provided by SCDOT at no expense to CONTRACTOR. SCDOT and FHWA, if applicable, representatives will have full and complete access to the Project, the work in progress, the "Daily Diaries", and to other technical documents and project records associated with design, construction, demolition, material disposal, materials, quality control, materials installation, and testing. SCDOT representatives will receive reasonable notice of and have the opportunity to participate in any meetings that may be held concerning the Project or the relationship between CONTRACTOR and their consultants and subcontractors when such meetings are associated with technical matters, progress, or quality of the Project. As used in this paragraph, "notice" shall require actual written notice to SCDOT's Agent.

I. Control of the Work

4. CONTRACTOR shall determine the appropriate means, methods and scheduling necessary to complete the work timely and in accordance with all construction requirements. SCDOT and FHWA, if applicable, will have the right to review and inspect the work at any time.

5. If, at any time, SCDOT observes or has actual notice of any fault or defect in CONTRACTOR's performance of this Agreement, SCDOT will give CONTRACTOR prompt written notice reasonably detailing the nature of the fault or defect. SCDOT is not required to discover or to accept defective or faulty work. SCDOT's right to have defective or faulty work promptly corrected shall not be waived by any action of SCDOT.
6. SCDOT will have the authority to suspend the work, wholly or in part, for such periods, as SCDOT may deem necessary, due to CONTRACTOR's failure to meet the requirements of the Contract in the performance of the work.
7. No inspection, acceptance, payment, partial waiver, or any other action on the part of SCDOT will operate as a waiver of any portion of this Agreement or of any power reserved herein or any right to damages or other relief, including any warranty rights, except insofar as expressly waived by SCDOT in writing. SCDOT will not be precluded or estopped by anything contained herein from recovering from CONTRACTOR any overpayment as may be made to CONTRACTOR.

J. Contract Deliverables

CONTRACTOR shall submit deliverables including, but not limited to, the following as set forth in the CONTRACT. All deliverables shall contain proper references to both the Contract ID number and the appropriate Project ID number for that specific location. Deliverables noted below with an asterisk shall be included in the Design Review Submittal Schedule and follow Design Review procedures as outlined in Article II, Section D of the Agreement.

1. Contract Deliverable Matrix
2. All deliverables as specified in **EXHIBIT 4z***
3. CPM Schedule, as specified in **Article IV**
4. Design Review Submittal Schedule including Gantt Chart of Submittals*
5. Schedule of Values, as specified in **EXHIBIT 2**
6. Design QC Plan*
7. Construction QC Plan
8. Clearing and Grubbing Plan
9. CONTRACTOR's Erosion Control Plan

10. SCDHEC Notice of Intent (NOI) for Stormwater Discharges Covered Under SC NPDES Construction General Permit SCR160000) & Storm Water Pollutant Prevention Plan and signed Contractor Certification Form (SCDHEC 0437)
11. Wetland and Stream Mitigation
12. Crane Operator Documents
13. Community and Public Relations Plan, as specified in **Article X** and **EXHIBIT 5**
14. EEO, DBE, and OJT Requirements, as specified in **Article XVIII & EXHIBIT 5**
15. Right-of-Way documents, as specified in **Article VIII**
16. Escrow Proposal Documents
17. CONTRACTOR's Materials Certification
18. Railroad Coordination Documents & Insurance Certificates per **EXHIBIT 6**
19. HAZMAT surveys for structures not already surveyed, SCDHEC Notice of Demolition for RCE Signature
20. Utility Coordination Reports, including Utility Agreements, and Supporting Documentation
21. Right of Way Plats and Monuments (per Preconstruction Advisory Memorandum #8)
22. Shop Plans and Working Drawings
23. As-Built Plans

III. CONTRACT PRICE/CONTRACT PAYMENTS

A. Contract Price

The "Contract Price" shall be \$_____. In consideration for the Contract Price, CONTRACTOR shall perform all of its responsibilities under the Contract. The Contract Price shall include all work identified in the Agreement and subsequent Exhibits and as identified in the Cost Proposal Bid Form – **EXHIBIT 1**.

B. Contract Price Adjustments

1. Allowable adjustments

The Contract Price may be adjusted to reflect the direct costs, plus an additional amount not to exceed 10% of the direct costs for the combined total of reasonable overhead* and profit, associated with any of the following:

- a. Amount added or deducted as the result of a “Change” or “Construction Change Directive”.
- b. Differing site condition as defined in Article XIII.
- c. Intentional or bad faith acts or omissions by SCDOT that unreasonably interfere with CONTRACTOR’s performance and cause delay of work on the critical path of the Project.
- d. Changes in legal requirements or regulations that are effective subsequent to the date of this Agreement.
- e. Discovery of hazardous materials not previously identified as set forth in Article XI
- f. Discovery of archeological or paleontological sites not previously identified as noted in Article X.
- g. Premium right-of-way costs and second appraisals as set forth in Article VIII. Only the actual premium right-of-way and actual second appraisal cost will be reimbursed. No additional amount for overhead, profit, bonds and insurance will be considered for this item.

*Overhead: The operating expense of a business exclusive of direct cost labor and material.

Other than as provided above, the Contract Price shall not be increased for contract time adjustments or delay damages. Contract Price adjustments shall be documented by Supplemental Agreement signed by both parties and shall be reflected immediately in the Schedule of Values. No claim by the CONTRACTOR for an adjustment hereunder shall be allowed if notice is not given prior to final payment under this Agreement.

2. Changes

- a. A “Change” shall be any deviation or variation from the Project Scope or the Project Criteria. No Change shall be implemented without the express written approval of SCDOT. A “Change” may be an “Additive Change” or a “Deductive Change”.
- b. SCDOT may initiate a change by advising CONTRACTOR in writing of the change. As soon thereafter as practicable, CONTRACTOR shall prepare and forward to SCDOT an estimate of cost or savings, and the impact to the schedule resulting from the change. SCDOT will advise CONTRACTOR in writing of its approval or disapproval of the change via “Issue Paper”. If SCDOT approves the change, CONTRACTOR shall perform the Services as changed.

3. Construction Change Directive

A Construction Change Directive is a written order from SCDOT directing a change prior to agreement with CONTRACTOR on adjustment, if any, to the Contract Price or Contract Time. If a price for the work cannot be agreed upon, CONTRACTOR shall perform the work under Force Account Procedures as outlined in Section 109.5 of SCDOT's Standard Specifications.

4. Direct Costs

For the purpose of a Contract Price Adjustment, "Direct Costs" shall be defined as:

- a. Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;
- b. Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;
- c. Actual costs of machinery and equipment owned by CONTRACTOR or any affiliated or related entity exclusive of hand tools;
- d. Actual costs paid for rental of machinery and equipment exclusive of hand tools;
- e. Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes;
- f. Additional costs of supervision and field office personnel directly attributable to the change or event; and
- g. Costs incurred or fees paid for design work related to the change or event.

C. Contract Payments

1. Schedule of Values

Prior to execution of this Agreement, CONTRACTOR shall provide a Schedule of Values acceptable to SCDOT and work may not start until the Schedule of Values is approved by SCDOT. The Schedule of Values will serve as the basis for cost loading of the CPM Schedule. The CPM schedule shall include sufficient information to provide for monetary and quantitative tracking of the work by SCDOT. Updates to the cost-loaded CPM schedule will serve as the basis for progress payments requested by and made to CONTRACTOR. If the Contract Price is adjusted, CONTRACTOR shall revise its Schedule of Values and the CPM Schedule to reflect the adjustment in the Contract Price. The revised Schedule of Values must be approved by SCDOT prior to the time for the

subsequent request for a progress payment otherwise no progress payments will be made. The Schedule of Values shall be incorporated herein as **EXHIBIT 2**. The Schedule of Values should include Lump Sum items that will serve as measurement and payment for any item referred to in this Contract as a “contract unit bid price” item.

2. Mobilization

Mobilization shall not exceed 5% of the Total Contract Cost as shown in the Schedule of Values. Mobilization will be paid in two (2) equal installments. The first will be paid in the progress payment immediately following Notice to Proceed, and the second will be paid at the start of construction.

3. Periodic Progress Payment Applications

No application for payment of the Contract Price shall be submitted until SCDOT gives a notice to proceed. Applications for payment of the Contract Price may be submitted once a month. Each application for payment of the Contract Price shall set forth, in accordance with the Schedule of Values and the cost-loaded CPM schedule, the percentage of all items comprising the work completed since CONTRACTOR’s immediately prior request for payment. The application for payment of the Contract Price may also request payment for equipment and materials not yet incorporated into the Project, provided that (i) SCDOT is satisfied that the equipment and materials are suitably stored at either the Project or another acceptable location, (ii) the equipment and materials are protected by suitable insurance and (iii) upon payment, SCDOT will receive title to the equipment and materials free and clear of all liens and encumbrances.

4. Periodic Progress Payments

SCDOT will review each application for payment. Upon approval by SCDOT of an application for payment, SCDOT will pay CONTRACTOR the undisputed percentage for the Project completed during the period covered by the application for payment. SCDOT will make each payment within twenty-one (21) days of the receipt of the corresponding Application for Payment. In the event of a dispute over the quality of work or percentage of the Project completed, SCDOT’s decision is controlling and final. Payment by SCDOT will not preclude or estop SCDOT from correcting any measurement, estimate, or certificate regarding the percentage completion of the Project, and future payments may be adjusted accordingly.

5. Prompt Payment of Subcontractors

CONTRACTOR shall comply with the requirements of the SCDOT Prompt Payment Clause Supplemental Specification.

6. Withholding of Payment

SCDOT may withhold all or part of any payment under the Contract for any of the reasons listed below. Any funds withheld will be released upon CONTRACTOR satisfactorily remedying the defect, fault, or failure and will be included in the next regularly schedule pay estimate. Payment will be subject to retainage if applicable.

- a. Defective work not remedied. Any such withholding, however, shall not exceed two times the reasonable cost of remedying the defective work. Defective work shall be defined as work or material not conforming to the requirements of the Contract.
- b. Reasonable evidence that the Work will not be Substantially Complete within the Construction Time as adjusted and that the unpaid balance of the Contract Price will not be adequate to cover Liquidated Damages for the actual unexcused delay;
- c. Failure to comply with the prompt payment provision of this Contract;
- d. Any fines or other charges to SCDOT due to CONTRACTOR's failure to comply with permit requirements or other regulations;
- e. Notice of cancellation of insurance;
- f. Failure to submit updated and approved CPM or Schedule of Values;
- g. Violation of QC plan requirements;
- h. Failure to follow specifications or procedures required by the Contract;
- i. Failure to comply with DBE, On-The-Job training, or Pre-Employment Training provisions;
- j. Failure to provide adequate work zone traffic control;
- k. Failure to provide adequate sediment and erosion control; or,
- l. Violation of any contract provisions.

D. Retainage

Provided the Project is proceeding satisfactorily, SCDOT will not withhold retainage. However, if at any time SCDOT determines that CONTRACTOR fails to meet contract terms or the Project is not proceeding satisfactorily, SCDOT may retain up to 10% of the Contract Price as retainage.

IV. CONTRACT TIME

A. Project Schedule

1. Time for Completion of Project: The Project shall be Substantially Complete within _____ calendar days from Notice to Proceed. The Notice to Proceed shall be no later than 45 days from the effective date of the Agreement. The PROPOSER must identify the time required for the construction time of the Project on the Cost Proposal Bid Form. Final Completion shall be reached as defined in paragraph 5 below.

Contract Time shall be the number of calendar days from effective date of agreement to Final Completion. Construction time is defined as calendar days from Notice to Proceed to Substantial Work Completion on the Project.

2. Substantial Work Completion: The Project shall be considered substantially complete when it is serviceable to the public, all lanes and ramps are open, and all work is completed except for “Project Close-out Activities”, “Project Close-out Activities” are defined as punch list items, site clean-up, demobilization, and final Project documentation, including but not limited to as-built plans.
3. Critical Path Method Schedule: CONTRACTOR shall prepare and maintain a schedule for the Project using the Critical Path Method of scheduling (hereinafter called “CPM Schedule”). Prepare a Level II CPM Schedule in accordance with this agreement and the SCDOT Supplemental Specifications with the following exceptions:
 - a. Submit to the SCDOT the initial baseline CPM schedule within 30 days from the Effective Date of this Agreement. No contract payment will be made to Contractor and no construction work may begin until a CPM baseline schedule is received and accepted by SCDOT. Update the baseline CPM schedule for monetary and quantitative tracking purposes as Released for Construction plans are developed.
 - b. Cost-load the CPM schedule using the expenses identified in the schedule of values. Use the schedule of values to establish Expense Categories and assign to the correct activities.
 - c. Include submittal activities. Allow duration for these activities to include SCDOT review periods.
 - d. Reuse of deleted activity ID’s from schedule update to schedule update is not allowed.
 - e. Failure to include any element of work or any activity including but not limited to utility relocation, right of way acquisition, and permitting will not relieve the CONTRACTOR from completing all work within the Construction Time at no additional time or cost to the SCDOT, notwithstanding the acceptance of the schedule by SCDOT.

- f. Develop project specific calendars reflecting all seasonal restrictions included in this Agreement and non-work days. Address durations for weather within activity duration, not within the calendar.
 - g. Use only a Work Breakdown Structure (WBS) to organize schedule activities. At a minimum, breakout the design and construction phases. These two breakouts should have the same parent within the structure.
 - h. Submit monthly updates no later than 15 days following the most recent estimate period end date, whether or not an estimate was generated. Set the data date the same as the most recent estimate period end date.
 - i. If SCDOT determines any schedule submission is deficient, it will be returned to the CONTRACTOR. A corrected schedule shall be provided within 7 calendar days from the SCDOT's transmittal date.
 - j. The schedule may indicate an early completion date. However, SCDOT will not be liable in any way for CONTRACTOR's failure to complete the Project prior to the specified Contract Time. Any additional costs, including extended overhead incurred between CONTRACTOR's scheduled completion date and the Contract Time, shall be the responsibility of the CONTRACTOR.
 - k. The schedule may include constraints to indicate the early completion of portions of the work. SCDOT will remove these constraints when determining the critical path of the schedule.
 - l. Include in each narrative a detailed listing of crews utilized on activities and their responsibilities. In lieu of this, the Contractor may request to submit a Resource Loaded CPM schedule.
4. Progress Review Meetings:
- a. Review Meetings shall be held between CONTRACTOR and SCDOT at least every 2 weeks. Periodic construction meetings shall be held by CONTRACTOR with its consultants and subcontractors to coordinate the work, update the schedule, provide information and resolve potential conflicts.
 - b. SCDOT and CONTRACTOR will hold a regular CPM Progress Meeting at which all principal parties are expected to attend. These meetings will be held the week before the application for payment is due so that job progress will coincide with the payment application. At this meeting, CONTRACTOR shall provide the most recent schedule with notations showing actual start dates, actual finish dates, and activity progress. If the schedule provided indicates an actual or potential delay to the completion of the Contract, CONTRACTOR shall provide a narrative identifying the problems, causes, the activities affected and describing the means and methods available to complete the Project by the Contract Time.

5. Final Completion: When CONTRACTOR believes that all elements of its work on the Project, including all of the requirements of the Contract, have been completed, it shall notify SCDOT in writing. Final Completion shall be achieved within 180 calendar days of Substantial Work Completion as defined in this Agreement. Within thirty (30) days thereafter, SCDOT will acknowledge project completion or will advise CONTRACTOR in writing of any aspect of the Contract or the Project Scope that is incomplete or unsatisfactory. CONTRACTOR shall complete all corrective action within thirty (30) days after written notification of incomplete or unsatisfactory items. CONTRACTOR will notify SCDOT in writing upon completion of necessary corrective action. SCDOT will verify satisfactory completion of the corrective action in writing to CONTRACTOR. Upon verification, the Project shall be deemed to have achieved Final Completion.
6. Inspection/Acceptance; No Waiver: No inspection, acceptance, payment, partial waiver, or any other action on the part of SCDOT will operate as a waiver of any portion of this Agreement or of any power reserved herein or any right to damages or other relief, including any warranty rights, except insofar as expressly waived by SCDOT in writing. SCDOT will not be precluded or estopped by anything contained herein from recovering from CONTRACTOR any overpayment as may be made to CONTRACTOR.

B. Time Adjustments

Time may be extended if there is a delay to the critical path of the Project caused by an event listed below. All requests for time extensions shall be made in writing to SCDOT within 20 days of the event causing the delay. All time extensions must be approved in writing by SCDOT. Time extensions may be allowed for the following events that affect the critical path:

1. Force Majeure as that term is defined in this Agreement in Article XIV;
2. Changes or construction change directives;
3. Differing site conditions as defined under Article XIII;
4. Injunctions, lawsuits, or other efforts by individuals or groups that hinder, delay, or halt the progress of the Project, provided that such efforts are not premised on alleged wrongs or violations by CONTRACTOR or its subcontractors;
5. Interference with or delay of work on the critical path of the Project by SCDOT; however, CONTRACTOR shall not be entitled to a time extension if SCDOT's actions are necessitated by CONTRACTOR's actions, omissions, failure to perform quality work, or failure to comply with contract requirements;
6. Changes in the legal requirements or regulations which are effective subsequent to the date of this Agreement;

7. Discovery of hazardous materials not previously identified as set forth in Article XI;
8. Discovery of archeological or paleontological remains not previously identified as set forth in Article X; or
9. Adverse utility relocation impacts meeting the requirements set forth in Article VII.
10. Adverse Railroad coordination impacts as set forth in Article VII.
11. Adverse permit acquisition impacts as set forth in Article IX.

C. Owner's Right to Stop Work

SCDOT will have the authority to suspend the work, wholly or in part, for such periods, as SCDOT may deem necessary, due to CONTRACTOR's failure to meet the requirements of the Contract in the performance of the work. Such suspension of the work shall not constitute grounds for claims for damages, time extensions, or extra compensation.

D. Liquidated Damages

CONTRACTOR shall pay liquidated damages to SCDOT in the amount of \$15,000.00 for each day for which construction is not substantially complete, as defined in Article IV.

CONTRACTOR shall pay liquidated damages to SCDOT in the amount of \$1,500.00 for each day that Final Completion, as defined in Article IV, is not achieved.

The parties acknowledge, recognize and agree that because of the unique nature of the Project, it is difficult or impossible to determine with precision the amount of damages that would or might be incurred by SCDOT as a result of the CONTRACTOR's failure to complete the Project as specified in the Contract. Therefore, any sums payable under this provision are in the nature of liquidated damages, and not a penalty, and are fair and reasonable and such payment represent a reasonable estimate of fair compensation for the losses that may reasonably be anticipated from such failure. Notwithstanding the above, liquidated damages are not intended to excuse the CONTRACTOR from liability for any other breach of its obligations under the Contract.

V. QUALITY ASSURANCE PROGRAM

A. CONTRACTOR's Responsibilities

CONTRACTOR shall be responsible for the QUALITY CONTROL Portion of the Program to include the items listed below. Work shall not commence until CONTRACTOR has met these requirements.

1. Quality Control Plan: CONTRACTOR shall submit a Quality Control (QC) Plan that outlines how CONTRACTOR shall assure that the materials and work are in compliance with the contract documents. The initial plan shall be submitted to SCDOT for review and approval at least five (5) business days prior to any design or plan submittal or the beginning of any construction activity. The plan shall be updated as necessary prior to the start of any specific construction operation. The plan shall include a list of SCDOT certified personnel responsible for management and quality control of the Project, and define the authority of each individual. The plan shall also include how CONTRACTOR will monitor quality and deal with failing materials. The QC Plan shall include the QC testing and sampling frequencies and shall indicate the frequency at which the QC Manager will provide QC test results to SCDOT. CONTRACTOR shall include summary of quantities to SCDOT for the purposes of meeting the minimum acceptance and independent assurance sampling and testing requirements for the Project.
2. Personnel: CONTRACTOR shall provide a sufficient number of SCDOT certified personnel to adequately control the work of the Project. Any personnel required to obtain samples or conduct material testing shall be SCDOT certified. CONTRACTOR shall provide SCDOT with copies of each individual's certifications for review and approval by SCDOT. Approved CONTRACTOR QC personnel shall be on the job at all times that permanent work items and materials are being incorporated into the project. CONTRACTOR's QC personnel shall not have any other project responsibilities.
3. CONTRACTOR Testing: Notwithstanding any required sampling and testing stipulated in Article II.G, the CONTRACTOR should establish additional sampling and testing to ensure that all workmanship and materials are in compliance with the contract requirements. Although not used for acceptance, QC testing and inspection shall ensure that quality has been incorporated into all elements of work prior to requesting acceptance testing and inspection. The QC Program should be sufficient in scope to remedy repeated discoveries of non-compliant work by those performing acceptance inspection and testing. Repeated observations of QC quality shortfalls shall be considered a breakdown of the QC program and shall be cause for investigation and corrective action prior to commencement of work areas affected. Corrective action may include the addition of new QC procedures, revision to existing QC procedures, re-training of QC personnel, removal and replacement of QC personnel, or other such actions which will restore the effectiveness of the QC program. All QC testing shall be performed in accordance with existing AASHTO, ASTM, or test methods used by SCDOT. The cost of these activities will be borne by CONTRACTOR. Additionally, CONTRACTOR is responsible for dynamic and static load testing of drilled shafts and piles in accordance with the requirements of **EXHIBITS 4 and 5**.
4. Testing Laboratories: All testing laboratories used on the Project must be AASHTO certified and approved by SCDOT thirty (30) days prior to beginning

the portion of work for which the laboratory will be performing the testing. Hot Mix Asphalt testing laboratories require SCDOT certification.

5. Mix Designs: Copies of all initial hot-mix asphalt mix designs and Portland Cement Concrete mix designs, along with supporting data, shall be submitted to SCDOT for review at least five (5) business days prior to use. All hot-mix asphalt mix designs will be prepared by personnel certified in Mix Design Methods. Portland Cement Concrete mix designs will be prepared by a certified concrete technician or a Professional Engineer. The Portland Cement Concrete mix proportions given in the specifications are to be followed. CONTRACTOR shall design the mix to obtain the strength and water/cement ratios given in the specifications, and shall provide workability, air content, gradation and suitable set times as set forth in the Standard Specifications. The SCDOT will be notified of any revisions to CONTRACTOR's mix design. Copies of such revisions will be sent to SCDOT for review at least ten (10) business days prior to use.
6. Materials Certifications: CONTRACTOR's QC Manager shall submit all material certifications to SCDOT prior to the CONTRACTOR incorporating the material into the project.

B. SCDOT Responsibilities

SCDOT will be responsible for the QUALITY ACCEPTANCE portion of the program to include: conducting inspections, acceptance testing, independent assurance testing and final project material certification.

1. Acceptance Testing: SCDOT personnel assigned to the Project, or qualified personnel retained by SCDOT, will conduct sampling and testing, separate from CONTRACTOR's testing, at the frequencies set forth in SCDOT's Quality Acceptance Sampling and Testing Guide. This testing will be used by SCDOT to determine the acceptability of the materials. All sampling and testing will be in accordance with existing AASHTO, ASTM, or SC test methods used by SCDOT. The cost of these activities will be borne by SCDOT. CONTRACTOR's QC Manager is required to coordinate all activities closely with SCDOT to allow the necessary acceptance testing to be conducted prior to proceeding to the next operation. The disposition of failing materials must be approved by SCDOT.
2. Independent Assurance Testing: SCDOT will be responsible for conducting Independent Assurance Testing. Personnel performing these tests will be SCDOT employees or qualified persons retained by SCDOT. Persons performing these tests will not be involved in Acceptance Testing. This testing will be used to ensure that proper sampling and testing procedures are being followed, and that testing equipment is functioning properly. This testing will consist of observing sampling and testing by both SCDOT personnel performing Acceptance Testing and CONTRACTOR personnel performing Quality Control Testing, as well as taking split samples for the purposes of comparison testing. Independent Assurance Testing will be at an approximate frequency of one-tenth of the

Acceptance Testing frequency. Independent Assurance test results will not be used for acceptance. The cost of these activities will be borne by SCDOT.

3. Materials Certification: SCDOT will be responsible for preparing the Materials Certification as required by the FHWA on federally funded projects.

C. CONTRACTOR's Obligation

SCDOT's testing in no way relieves CONTRACTOR of its obligation to comply with the Contract requirements. All materials incorporated into the Project must meet or exceed contract requirements and specifications. Further, any testing by SCDOT will not relieve CONTRACTOR of any of its warranty obligations.

VI. INSURANCE AND BONDING

A. Insurance

1. CONTRACTOR shall purchase and maintain insurance using a company or companies that maintain an A.M. Best rating of not less than A-VII with coverage forms acceptable to SCDOT. The insurance described below shall be maintained uninterrupted for the duration of the Project, including warranty periods, and shall protect CONTRACTOR from claims set forth below which may arise out of or result from CONTRACTOR's operations under the Contract, whether such operations be performed by CONTRACTOR or by any subcontractor or by anyone directly or indirectly employed by any of them or by anyone for whose acts any of them may be liable:
 - a. Claims under workers' or workmen's compensation, disability benefit and other similar employee benefit acts;
 - b. Claims for damages because of bodily injury, occupational sickness or disease, or death of CONTRACTOR's employees;
 - c. Claims for damages because of bodily injury, sickness or disease, or death of any person other than CONTRACTOR's employees;
 - d. Claims for damages insured by usual personal injury liability coverage which are sustained (1) by any person as a result of an offense directly or indirectly related to the employment of such person by CONTRACTOR, or (2) by any other person;
 - e. Claims for damages, other than to the work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
 - f. Claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

- g. Claims involving contractual liability insurance applicable to the Contractor's obligations under the indemnity provisions of this contract.
2. The minimum limits of liability for the following types of insurance are required, except where greater limits are required by statute:

- a. Workers' Compensation, including: Worker's Compensation Insurance/Employer's Liability

State Statutory limits	Employer's Liability
	\$100,000 per accident
	\$500,000 per disease
	\$100,000 each employee

- b. Commercial General Liability \$2,000,000 per occurrence
 \$4,000,000 annual aggregate

Commercial General Liability insurance shall be written on ISO occurrence form CG 00 01 (or substitute for providing equivalent coverage) and shall cover liability arising from premises, operations, independent contractors, products-completed operations, contractual liability and personal injury and advertising injury. The policy shall contain the per project endorsement.

- c. Business Automobile Liability \$1,000,000 per occurrence

This policy shall cover Any Auto, including Owned, Hired and Non-owned Automobiles. Business auto coverage shall be written on ISO form CA 00 01, CA 00 05, CA 00 12, CA 00 20, or a substitute form providing equivalent liability coverage.

- d. Umbrella Liability Coverage \$25,000,000 per occurrence
 \$25,000,000 annual aggregate

The general aggregate limit shall apply separately to the Project

3. Certificates of Insurance acceptable to SCDOT will be provided to SCDOT prior to execution of this Agreement. These certificates shall name SCDOT as an additional insured under the Commercial General Liability (CGL) arising out of both the on-going operations and completed operations of CONTRACTOR. Such additional insured coverage shall be endorsed to Contractor's CGL policy using ISO Additional Insured Endorsement form CG 2010 (10/01) and CG 2037 (10/01) or a substitute providing equivalent coverage, and included under the commercial umbrella. CONTRACTOR shall maintain continual additional insured status for SCDOT under the products-completed operations coverage for the time period required to satisfy the statute of limitation for South Carolina. CONTRACTOR shall also name SCDOT as additional insured under Business Automobile and Umbrella policies and reference the Project to which the certificate applies. The policies must contain a provision that coverage afforded will not be canceled or reduced until at least 30 days prior written notice has been given to SCDOT and

that the policies cannot be cancelled for non-payment of premiums until at least 10 days prior written notice has been provided to SCDOT. Send Notice of Cancellations to Director of Construction Room 330, PO Box 191, Columbia, SC 29202. Make certain that the policies are endorsed to reflect this requirement. Verification of additional insured status shall be furnished to SCDOT by including a copy of the endorsements with the Certificate of Insurance. This insurance, including insurance provided under the commercial umbrella shall apply as primary and noncontributory insurance with respect to any other insurance or self-insurance programs, including any deductibles, afforded to, or maintained by, SCDOT. CONTRACTOR'S deductibles shall not exceed \$1,000,000 without written consent of the SCDOT and that the certificates show the deductible amounts. CONTRACTOR shall provide a notarized letter from a Certified Public Accountant showing that they have the financial ability to cover the amount of the deductible at the time of the execution of the agreement and for every year thereafter until the insurance obligation ends.

4. Limits shown in this provision are minimum acceptable limits and in no way limit available coverage to the additional insured. CONTRACTOR's CGL and commercial umbrella policies shall contain no provision providing that the limits available to an additional insured are less than the limits available to the CONTRACTOR. SCDOT shall be given all the same rights and insurance coverage as CONTRACTOR. In the event that any insurer issues a reservation of rights for SCDOT as an additional insured, SCDOT shall be entitled to employ independent counsel, of its choice, at CONTRACTOR's expense.
5. There shall be no endorsements or modifications of the CGL limiting the scope of coverage for liability arising from explosion, collapse, underground property damage or work performed by contractors on behalf of SCDOT.
6. Hazardous Materials: If the CONTRACTOR is required to remove and haul any hazardous waste from the Project, or if the Project involves such similar environmental exposure, pollution liability coverage equivalent to that provided under the ISO Pollution Liability – Broadened Coverage for Covered Autos Endorsement (CA 99 48), shall be provided, and the Motor Carrier Act Endorsement (MCS 90) shall be attached. Limits of pollution liability shall be not less than \$1,000,000 per occurrence. Coverage shall apply on an “occurrence form” basis, shall cover at a minimum bodily injury, property damage, defense costs and clean-up costs and be extended to include non-owned disposal sites and transportation coverage. This insurance shall remain in effect after acceptance by Owner for the time period required to satisfy the statute of limitations in South Carolina. However, if coverage is written on a “claims made form”, then the Contractor's Pollution Liability coverage shall include a retroactive date that precedes the commencement of work under this Agreement. Such coverage shall apply as primary and non-contributory insurance with respect to any other insurance or self-insurance programs, including any deductibles, afforded to, or maintained by SCDOT.

7. Waiver of Subrogation: CONTRACTOR shall waive its rights against SCDOT, other additional insured parties, and their respective agents, officers, directors and employees for recovery of damages, or any other claims, to the extent these damages are covered by the CGL, business auto, pollution liability, workers compensation and employer's liability or commercial umbrella maintained pursuant to this section of the Agreement.
8. CONTRACTOR shall at the time of execution of this Agreement, obtain or require the Lead Designer to obtain, Errors and Omissions insurance for their Professional Liability, for all claims arising from the performance of professional services on the Project. The insurance coverage shall be for not less than \$10,000,000 per claim and in the aggregate. The coverage shall be continued for three (3) years after the date of Final Completion of the Project. Evidence of such insurance shall be provided to SCDOT at the time of the execution of the Agreement.
9. After Final Completion of the work, CONTRACTOR shall maintain CGL and commercial umbrella coverage to include liability coverage for damage to insured's completed work equivalent to that provided under ISO CG 00 01 for three (3) years or for the statute of limitations period for damages, whichever is greater.
10. By execution of the contract, the CONTRACTOR accepts the responsibility to provide the liability insurance policies and endorsements as specified herein. Failure of SCDOT to identify a deficiency in the Certificate of Insurance submitted by the CONTRACTOR's insurance agent as evidence of the specified insurance or to request other evidence of full compliance with the liability insurance specified shall not be construed as a waiver of the CONTRACTOR's obligation to provide and maintain the required insurance for the duration of the contract.

B. Bonding

1. CONTRACTOR shall at the time of the execution of this Agreement, provide SCDOT the following bonds:
 - a. A Performance and Indemnity Bond from a surety or sureties satisfactory to SCDOT. The amount of bond shall be equal to the Contract Price.
 - b. A Payment Bond from a surety or sureties satisfactory to SCDOT. The amount of bond shall be equal to the Contract Price.

These bonds shall be in accordance with the requirements of S.C. Code Ann. §57-5-1660, (1976 as amended) and S.C. Code Ann. §29-6-250 (2000). Bonds shall be issued by a surety company licensed in the State of South Carolina with an "A" minimum rating of performance as stated in the most current publication of "A.M. Best Key Rating Guide, Property Liability" and signed by the surety's agency or

attorney-in-fact. Surety must be listed on the current U.S. Department of the Treasury Financial Management Service list of approved bonding companies as approved for an amount equal to or greater than the amount for which it obligates itself in the Bond. If surety qualifies by virtue of its Best's listing, the amount of the Bond may not exceed ten percent of policyholders' surplus as shown in the latest A.M. Best's Key Rating Guide.

2. CONTRACTOR shall also provide a warranty bond, acceptable to SCDOT, in the amount of \$5,000,000 to cover the warranty obligations of the contract.

VII. UTILITIES AND RAILROAD COORDINATION

- A. As part of the Project Scope, CONTRACTOR shall have the responsibility of determining the extent of utility delineation and appropriate quality levels needed based on the utility information available, utility risks, and for coordinating the Project construction and demolition activities with all utilities that may be affected. CONTRACTOR shall be responsible for the cost of all utility coordination unless defined otherwise herein. If applicable, all temporary relocation costs as well as any other conflict avoidance measures shall be the responsibility of the CONTRACTOR. For those utilities that have prior rights SCDOT will be responsible for permanent relocation costs as defined by the Federal code. For those utilities where the CONTRACTOR determines that the SCDOT has prior rights, CONTRACTOR may exercise these rights and require the utility company to bear the costs of relocation. If there is a dispute over prior rights, SCDOT shall be responsible for resolving the dispute. SCDOT shall have final determination of the utility's prior rights.
- B. For those utilities requiring relocation, CONTRACTOR shall conform with SCDOT's "A Policy for Accommodating Utilities on Highway Rights of Way", the applicable State laws, and the Code of Federal Regulations, Title 23, Chapter 1, Subchapter G, part 645, subparts A and B. The CONTRACTOR is responsible for all costs associated with relocating utilities owned by SCDOT.
- C. The resolution of any conflicts between utility companies and the construction of the Project shall be the responsibility of the CONTRACTOR. If said utility companies interfere or fail to relocate conflicting utilities in a timely manner, SCDOT may, on an individual basis, consider a time extension for utility company delays when CONTRACTOR can demonstrate that appropriate coordination efforts have been made to expedite the utility relocation, and that the delay has a direct impact on the approved Critical Path. CONTRACTOR shall not be entitled to additional compensation for interference or delays in utility relocations. CONTRACTOR shall meet with the Department's Utilities Office within thirty (30) days of the Notice to Proceed to gain a full understanding of what is required with each utility submittal.
- D. CONTRACTOR shall design the Project to avoid conflicts with utilities where possible, and minimize impacts where conflicts cannot be avoided. If there is a dispute between the CONTRACTOR and SCDOT as to whether a utility relocation is required, SCDOT shall have the final determination. Additional utility relocations

desired by the CONTRACTOR for but not limited to construction staging, access or convenience, shall be the sole responsibility of CONTRACTOR and all associated costs shall be borne by the CONTRACTOR.

- E. CONTRACTOR shall initiate early coordination with all utilities and provide the utility companies with design plans for their use in developing Relocation Sketches as soon as the plans have reached a level of completeness adequate to allow the companies to fully understand the Project impacts. If a party other than the utility company prepares Relocation Sketches, there shall be a concurrence box on the plans where the utility company signs and accepts the Relocation Sketches as shown.
- F. CONTRACTOR shall be responsible for collecting and submitting to SCDOT the following from each utility company that is located within the project limits:
 - 1. **Relocation Sketches** including letter of “no cost” where the company does not have a prior right;
 - 2. **Utility Agreements** including documentation of prior rights, cost estimate and relocation plans where the company has a prior right; and/or
 - 3. **Letters of “no conflict”** where the company’s facilities will not be impacted by the Project. Include location sketches on SCDOT plans confirming and certifying that facilities are not in conflict.
 - 4. **Encroachment Permits** for all relocations regardless of prior rights.
- G. CONTRACTOR shall assemble the information included in the Utility Agreements and Relocation Sketches in a final and complete form and in such a manner that the Department may approve the submittals with minimal review. CONTRACTOR shall ensure that there are no conflicts with the proposed highway improvements, or between each of the utility company’s relocation plans. CONTRACTOR may not authorize the utility companies to begin their relocation work until authorized in writing by SCDOT. Any early authorization by CONTRACTOR shall be at the CONTRACTOR’s risk.
- H. At the time that CONTRACTOR notifies SCDOT that CONTRACTOR deems the Project to have reached Final Completion, CONTRACTOR shall certify to SCDOT that all utilities have been identified and that those utilities with prior rights or other claims related to relocation or coordination with the Project have been relocated or their claims otherwise satisfied or will be satisfied by CONTRACTOR.
- I. ~~CONTRACTOR shall accurately show the final location of all utilities on the as built drawings for the Project.~~ SCDOT reserves the right to request CADD files as needed.

If Railroad property is impacted by this project, the following provisions shall apply:

- J. CONTRACTOR is advised that information related to replacement of the Norfolk Southern (NS) railroad overpass bridge is included in Exhibit 6.
- K. Under the direction of and in coordination with SCDOT, the CONTRACTOR shall be responsible for all coordination with the involved Railroad Companies, including but not limited to, sending plans, meetings, correspondence, phone calls, writing/reviewing agreements, and etc. as may be necessary to secure the applicable executed railroad agreements, needed for the construction of the project, between the SCDOT and all involved Railroad Companies. All correspondence related to railroad agreements or conditions shall include the railroad file number and railroad milepost information. The CONTRACTOR shall be responsible for the cost of railroad coordination as defined herein.
- L. SCDOT will submit for approval, all required railroad agreements necessary for the Preliminary Engineering and Construction of the project. Upon approval, the SCDOT will submit the agreement to the Railroad Company for execution. The CONTRACTOR shall be responsible for assisting SCDOT in the development of the railroad agreement by providing requested information.
- M. The CONTRACTOR shall be responsible for all costs to the Railroad Company or Companies for services provided by the Railroad or the Railroad's Agent, as detailed in the executed Railroad Agreement between the SCDOT and the Railroad. This includes all expenses such as railroad flagging operations. The CONTRACTOR shall be responsible for all other costs associated with designing and constructing the project as described in the executed Railroad Agreement between the SCDOT and the Railroad Company. The CONTRACTOR shall include all costs associated with these requirements in the final bid price. Once a contract is executed, SCDOT shall administer invoicing for costs to the Railroad Company or Companies. Monies will be deducted from the CONTRACTOR's progress payments after payments are made to the Railroad Company.
- N. All design and construction activities in, adjacent to, over or under the railroad shall comply with all applicable Federal and State laws and standards, all terms identified in the Special Provisions for Protection of Railway Interests, and all terms of the final agreement executed with the Railroad Company.
- O. The CONTRACTOR shall be required to meet the Railroad's Insurance Requirements as specified in the Special Provisions for Protection of Railway Interests.
- P. The CONTRACTOR shall attend a mandatory meeting with the SCDOT's Utilities Office and Railroad Projects Office within thirty (30) days after the Notice to Proceed. The CONTRACTOR shall use the SCDOT approved agreement language and procedures, that will be provided in this meeting.
- Q. CONTRACTOR shall provide project specific information to SCDOT for inclusion into the agreements. The CONTRACTOR shall anticipate and include in the proposed

schedule a minimum 90-day approval time-frame for all railroad agreements. If said Railroad Companies interfere or fail to provide information in a timely manner, SCDOT may, on an individual basis, consider a time extension for Railroad Company delays when CONTRACTOR can demonstrate that appropriate coordination efforts have been made to expedite the railroad coordination, and that the delay has a direct impact on the approved Critical Path. CONTRACTOR shall not be entitled to additional compensation for interference or delays related to railroad coordination.

- R. CONTRACTOR shall anticipate the need for a separate right-of-entry agreement between the CONTRACTOR and Railroad for surveys, borings, etc. The required PE Agreement, between SCDOT and Railroad, must be executed before Railroad will review or comment on any design questions or submittals from the CONTRACTOR. The Construction Agreement, between SCDOT and Railroad, must be executed before any construction activities can begin at the railroads.
- S. CONTRACTOR is advised that all utility relocations required within railroad right-of-way will require separate agreements between the affected utility company and the Railroad.

VIII. RIGHT OF WAY ACQUISITION

A. Right of Way Services

CONTRACTOR, acting as an agent on behalf of the State of South Carolina, shall provide right of way services for the Project unless otherwise directed herein. CONTRACTOR shall use firm(s) from the SCDOT's current "on-call" list for right of way consultants, to provide right of way services. SCDOT's Right of Way office, through its assigned project manager and/or other designee, will retain final authority for approving just compensation, relocation benefits, administrative settlements, and legal settlements.

Right of way services shall include written appraisal, negotiation, acquisition, and relocation assistance services. CONTRACTOR shall be responsible for all costs related to these right of way services. CONTRACTOR will provide expert testimony and SCDOT will provide legal services necessary for any cases that are to be resolved by trial. Experts are defined as engineering and appraisal witnesses. SCDOT will designate a hearing officer to hear any relocation assistance appeals. SCDOT agrees to assist with any out of state relocation by persons displaced within the rights of way by arranging with such other state(s) for verification of the relocation assistance claim.

All offers of just compensation will be based on a written approved appraisal unless prior approval is given to CONTRACTOR by SCDOT. If SCDOT decides to utilize cost estimate offers, SCDOT will prepare the cost estimates and provide CONTRACTOR with the approved right of way cost estimate. SCDOT may allow offers to be made based on cost estimates on tracts estimated to be \$20,000.00 or less

and determined by SCDOT to be non-complicated. In the event the cost estimate offer is rejected by the property owner, a written appraisal shall be required.

SCDOT will be responsible for reviewing and approving all appraisals and setting just compensation. Appraisals will be reviewed and released within 15 business days of receipt. If appraisal review cannot be completed within 15 business days because of deficiencies within the appraisal the Rights of Way Consultant will be notified immediately of the appraisal status. SCDOT will provide appraisal reviews complying with the technical review guidelines of SCDOT's Right of Way Appraisal Manual. The review appraiser will be an SCDOT staff appraiser or a review appraiser from SCDOT's approved reviewer list. SCDOT will be responsible for review appraiser costs.

CONTRACTOR shall carry out the responsibilities as follows:

1. Acquire property in accordance with all Federal and State laws, guidelines, and regulations, including but not limited to the Uniform Relocation and Real Property Acquisition Act of 1970, as amended (the "Uniform Act"), the SCDOT Acquisition Manual, the SCDOT Appraisal Manual, SCDOT Relocation Manual, and the South Carolina Eminent Domain Procedure Act ("The Act"). CONTRACTOR shall not be entitled to an increase in the Contract Price for acquisition of borrow sources.
2. Submit procedures for handling right of way acquisitions and relocations to the SCDOT for approval prior to commencing right of way activities. These procedures are to show CONTRACTOR'S methods, including the appropriate steps and workflow required for appraisal, acquisition, and relocation. These procedures shall also include an appropriate time allowance for SCDOT's right of way project manager to approve just compensation, relocation benefits, administrative settlements, and legal court settlements.
3. CONTRACTOR shall be granted the authority to negotiate administrative settlements up to a set amount. This maximum administrative settlement amount for this Project shall be set by SCDOT's Right of Way office and provided in writing to the CONTRACTOR upon review and approval of the right of way procedures. SCDOT's right of way project manager will issue decisions on approval requests within three (3) business days concerning just compensation, relocation benefits, administrative settlements, and legal settlements. This commitment is based on the procedures providing a reasonable and orderly workflow and the work being provided to SCDOT's right of way project manager as completed. Regardless of amount, CONTRACTOR shall send all administrative settlements to SCDOT's right of way project manager for final concurrence and signature.
4. Utilize SCDOT's right of way project tracking system and provide an electronic status update a minimum of twice per month or upon request by SCDOT's right of way project manager.

5. As part of the right of way acquisition and relocation procedures, include a right of way quality control plan to the SCDOT for review prior to commencing right of way activities. SCDOT standard forms and documents will be used to the extent possible.
6. Provide a toll free telephone number for landowners and displaced persons to call and an office near the Project which is located within the State of South Carolina for the duration of the right of way acquisition and relocation services for this Project.
7. Provide a current title certificate by a licensed South Carolina attorney for each parcel within ninety (90) days of the date of closing or the date of filing of the Condemnation Notice.
8. Prior to preparing appraisals, CONTRACTOR shall determine the appraisal scope for each tract in conjunction with SCDOT's Chief Appraiser or designee. Appraisals shall be prepared in accordance with SCDOT's Right of Way Appraisal Manual. Appraisals shall be prepared by appraisers from SCDOT's approved list of active fee appraisers.
9. CONTRACTOR shall make direct payments of benefits to property owners for negotiated settlements, relocation benefits and payments to be deposited with the court that have been approved by SCDOT's right of way project manager. CONTRACTOR shall notify SCDOT monthly of all payments made.
10. Prepare and obtain execution of all documents conveying title. Prior to recording, CONTRACTOR shall present these documents to SCDOT's right of way project manager. The SCDOT's right of way project manager will review the documents and provide approval or further comments within five (5) business days. Upon approval, CONTRACTOR shall record documents conveying title to such properties to SCDOT with the Office of the Register of Deeds, and deliver all executed and recorded general warranty deeds to SCDOT. For all properties acquired in conjunction with the Project, title will be acquired in fee simple (except that SCDOT may, in its sole discretion and by written notification from SCDOT's right of way project manager, direct the acquisition of a right of way easement or permission, in lieu of fee simple title) and shall be conveyed to "The South Carolina Department of Transportation" by general warranty deed, free and clear of all liens and encumbrances except permitted encumbrances.
11. Because these acquisitions are being made as agent on behalf of the State of South Carolina, SCDOT shall make the ultimate determination in each case as to whether settlement is appropriate or whether the filing of a condemnation action is necessary, taking into consideration the recommendations of the CONTRACTOR. When SCDOT authorizes the filing of a condemnation, CONTRACTOR shall prepare a Notice of Condemnation in the name of SCDOT, and submit it to SCDOT for SCDOT to file and serve appropriate condemnation

documents and pleadings, and request priority status pursuant to S.C. Code Ann. Section 28-2-310(1976, as amended).

12. SCDOT shall prosecute condemnation proceedings to final judgment pursuant to the requirements of the South Carolina Eminent Domain Procedures Act. The procedure shall be by way of trial as provided by Section 28-2-240 of "The Act". SCDOT shall be responsible for obtaining legal representation and CONTRACTOR will be responsible for providing expert witnesses, necessary for condemnation actions. All settlements of condemnation cases shall be at SCDOT's sole discretion.
13. CONTRACTOR will be responsible for all contacts with landowners for rights of way or construction items and shall provide the following:
 - a. All Notices of Condemnation, issued pursuant to the authority granted, all titles of real estate and all right of way easements, recorded with the Office of the Register of Deeds or the Clerk of Court for the county or counties in which properties acquired through condemnation are located;
 - b. All drainage permissions, slope permissions, Right of Entry agreements, and releases;
 - c. A right of way agent's worksheet, or similar documentation substantially in the format of SCDOT Form No. 809, for each tract.
14. CONTRACTOR shall provide a right of way certification and SCDOT shall approve and sign that certification prior to CONTRACTOR entering the property. Only in exceptional circumstances will a certification be approved based on a right of entry. Certification may be on a tract-by-tract basis.
15. If after right of entry Certifications have been submitted there remains outstanding remaining tracts that have not been resolved, CONTRACTOR shall exercise care in its operations when working in proximity to adjacent developed properties, properties not yet acquired, and residences or businesses that are to be relocated. CONTRACTOR shall submit a plan to the SCDOT's right of way project manager for approval to:
 - a. Establish a clear zone adjacent to properties occupied by persons to be displaced in which construction equipment shall not be operated or parked,
 - b. Establish a clear zone for construction for properties occupied by persons to be displaced to prevent undue impacts or hardships,
 - c. Establish a method of protecting equipment from vandalism or unauthorized use,
 - d. Perform all burning in accordance with applicable laws and ordinances, with specific attention to SCDHEC's Bureau of Air Quality Control criteria which

- require compliance with the South Carolina Air Pollution Control laws, regulations, and standards as they concern the related work included in the Contract.
- e. Provide reasonable and safe access to residences or businesses that are to be displaced until such time as the property is vacant, and
 - f. Observe the property rights of landowners of adjacent and/or yet to be acquired properties.
16. CONTRACTOR shall use reasonable care in determining whether there is reason to believe that property to be acquired for rights of way may contain concealed or hidden wastes or other materials or hazards requiring remedial action or treatment. When there is reason to believe that such materials may be present, CONTRACTOR shall take steps consistent with customary industry standards to investigate. SCDOT shall be notified of the presence of such materials before an offer is made to acquire the property.
17. During the acquisition process and for a period of three years after final payment is made to CONTRACTOR for any phase of the work, all project documents and records not previously delivered to SCDOT, including but not limited to design and engineering costs, construction costs, costs of acquisition of rights of way, and all documents and records necessary to determine compliance with the laws relating to the acquisition of rights of way and the costs of relocation of utilities, shall be maintained and made available to SCDOT for inspection or audit.

B. Acquisition of Right-of-Way

- 1. The CONTRACTOR is responsible for verification of all information necessary for acquisition of the right of way and is responsible for all costs, excluding premium cost as defined below, associated with the purchase of the right of way.
- 2. Acquisition of any additional area (not right of way) desired by the CONTRACTOR for, but not limited to, construction staging, access or borrow pits, shall be the sole responsibility of CONTRACTOR, and any title or interest shall be secured in the name of the CONTRACTOR. CONTRACTOR shall provide SCDOT the location and documentation for these additional areas. CONTRACTOR shall furnish SCDOT a copy of any agreements, whether for purchase or lease, for the use of additional properties in conjunction with the construction of the Project. CONTRACTOR shall abide by the provisions of all applicable environmental permits, any conditions of individual right of way agreements, and all environmental commitments. Any necessary permit modifications are the responsibility of the CONTRACTOR. CONTRACTOR is responsible for all costs associated with these additional areas, including premium right-of-way costs. If additional right-of-way is necessary beyond what has been evaluated in the NEPA documentation, CONTRACTOR shall be responsible for any re-evaluation of the approved Environmental Documents.

3. Right of way acquisition costs shall be defined as amounts paid for: (1) direct payments for ownership or other property rights, and (2) direct payments for eligible relocation expenses as provided for under the Uniform Act less premium right of way acquisition costs.
4. Premium right of way acquisition costs shall be the amount a jury award or a settlement that exceeds "Just compensation." "Just compensation" shall be defined as the value SCDOT approves for a parcel after the following procedure: CONTRACTOR shall submit its recommendation for just compensation based on appraisals/appraisal reviews or cost estimates which support the recommendation. If SCDOT's right of way project manager approves CONTRACTOR'S recommendations, that value becomes just compensation. If SCDOT's right of way project manager does not approve the recommendation, CONTRACTOR or SCDOT shall obtain another appraisal using an appraiser from the SCDOT's approved list and submit this appraisal to SCDOT. SCDOT shall be responsible for the cost of the second appraisal. SCDOT shall assign a value to the parcel which shall be deemed just compensation supported by the appraisals for the parcel.
5. CONTRACTOR shall be responsible for right of way service costs and right of way acquisition costs.
6. SCDOT shall be responsible for premium right of way costs except for those additional areas explained above.
7. Upon final completion of the project, if any right of way condemnation actions are still pending, CONTRACTOR shall be responsible for adequate security to cover its contractual obligation relating to right of way acquisition.

IX. PERMITS

- A. All permits necessary for completion of this project shall be procured by the CONTRACTOR. The CONTRACTOR shall comply with all local, state, and federal permitting requirements. Regarding any permit or license that must be obtained in the name of SCDOT, the CONTRACTOR shall perform all functions within its power to obtain the permit or license, and SCDOT shall fully cooperate in this effort and perform any functions that must be performed by SCDOT. The CONTRACTOR shall submit permit applications to SCDOT. SCDOT will submit the permit application to the appropriate permitting agency indicating that CONTRACTOR is acting as an agent for SCDOT. If said regulatory agencies fail to issue permits in a timely manner, SCDOT may, on an individual basis, consider a time extension for permit approval delays when CONTRACTOR can demonstrate that the application was submitted in a timely manner, all reasonable efforts have been made to expedite the permit approval, and that the delay has a direct impact on the Critical Path. CONTRACTOR shall not be entitled to additional compensation for delays in permit approval.

X. ENVIRONMENTAL COMPLIANCE

A. Compliance with Environmental Commitments

CONTRACTOR shall comply with all Environmental commitments and requirements including, but not limited to, the following:

1. Compliance with the provisions of all environmental permits applicable to the Project. A copy of the environmental document is included in **Attachment B**. Environmental Commitments are included in **Exhibit 4**.
2. Compliance with those stipulations and conditions under which SCDOT received approval of the Environmental Document(s) and any modifications resulting from a re-evaluation of the Document(s). If the CONTRACTOR elects to construct the Project in a manner that is not consistent with the assumptions in the SCDOT prepared environmental documents, the CONTRACTOR will be responsible for revising the environmental documents and provide any additional studies that may be required. All revisions will require SCDOT and FHWA, if applicable, approval prior to any right of way acquisition or construction activity;
3. Compliance with applicable laws and regulations relating to potential or actual hazardous materials that may be encountered in the course of carrying out this Agreement;
4. Carrying out all necessary social, economic, and environmental studies required by regulatory authorities in the course of construction;
5. Cost, preparation, revision, acquisition, compliance, and adherence to conditions of any permits required by federal, state, or local laws or regulations; The CONTRACTOR is responsible for any mitigation required by permits. Compensatory mitigation may be available through an approved mitigation bank or Permittee Responsible Mitigation (PRM) as defined in EPA's 2008 Mitigation Rule; and
6. The resolution of any deviations from the contract documents, drawings or other information included in the environmental permits that would violate the intent or spirit of the permits. Any proposed changes within the permitted areas would need to be coordinated with SCDOT's Environmental Services Office.

B. Preconstruction / Partnering Conference(s)

CONTRACTOR shall conduct one (or more, if appropriate) pre-construction / partnering conference(s) prior to any construction activity to discuss environmental and permitting issues, which conference shall include all subcontractors, and, to the extent feasible, representatives from the U.S. Army Corps of Engineers, the S.C. Department of Health and Environmental Control Water Quality Division, the FHWA, CONTRACTOR, and SCDOT.

C. Protection of Archeological and Paleontological Remains and Materials

1. When archeological or paleontological remains are uncovered, CONTRACTOR shall immediately halt operations in the area of the discovery and notify SCDOT.
2. Archeological remains consist of any materials made or altered by man which remains from past historic or prehistoric times (i.e. older than 50 years) Examples include old pottery fragments, metal, wood, arrowheads, stone implements or tools, human burials, historic docks, structures or not recent (i.e. older than 100 years) vessel ruins. Paleontological remains consist of old animal remains, original or fossilized, such as teeth, tusks, bone, or entire skeletons.
3. SCDOT will have the authority to suspend the work for the purpose of preserving, documenting, and recovering the remains and materials of archeological and paleontological importance for the State. CONTRACTOR shall carry out all instructions of SCDOT for the protection of archeological or paleontological remains, including steps to protect the site from vandalism and unauthorized investigations, from accidental damage and from dangers such as heavy rainfall or runoff.
4. CONTRACTOR's Contract Time and or Contract Price shall be adjusted to the extent CONTRACTOR's cost and /or time of performance have been adversely impacted by the presence of archeological or paleontological remains.

D. Community and Public Relations Plan

The CONTRACTOR shall provide to SCDOT for review and written approval a Community Relations Plan as part of the Project in accordance with Exhibit 5. The Community Relations Plan shall describe how the CONTRACTOR will actively promote good relationships with local elected officials, the news media, and the community at large. All costs associated with community relations will be included in the Total Project Cost. SCDOT will expect the CONTRACTOR to maintain positive communications with the local community (including public meetings as necessary), the adjacent property owners, and local businesses. The Community Relations Plan shall be submitted within 45 calendar days after NTP.

XI. HAZARDOUS MATERIALS

- A. The CONTRACTOR is referred to Attachment A Exhibits and Attachment B for information and requirements regarding Hazardous Materials inspections and other environmental documentation regarding Hazardous Materials. The CONTRACTOR shall be responsible for handling, storage, remediation, and disposal of any materials, wastes, substances and chemicals deemed to be a solid waste or hazardous waste under applicable state or federal law, (hereinafter "Hazardous Materials") encountered at the Site which were identified in the Hazardous Materials inspections or other environmental documentation regarding Hazardous Materials provided in

Attachment A Exhibits and Attachment B and the cost of these activities shall be included in the Contract Price.

- B.** If the CONTRACTOR's plan includes demolition, removal, or disposal of existing structures not previously inspected by SCDOT, the Contractor is required to perform lead-based paint and asbestos inspections on the existing structures prior to performing those activities. The cost of the lead-based paint and asbestos inspections shall be included in the Contract Price. Removal of lead-based paint and asbestos and lead-based paint and asbestos containing materials identified by inspections shall be by a qualified independent firm retained by the Department or by negotiating a construction change directive with the CONTRACTOR as outlined in the procedures in Article XI.F.
- C.** If the CONTRACTOR's plan includes demolition, removal, or disposal of existing structures previously surveyed by SCDOT, but the asbestos inspection reports have expired, the CONTRACTOR is required to perform new asbestos inspections on the existing structures prior to performing those activities. The cost of the asbestos inspections shall be included in the Contract Price. The cost of removal, handling, storage, remediation, and disposal of asbestos containing materials identified in the expired inspection reports shall be included in the Contract Price.
- D.** A copy of the lead-based paint and asbestos inspection reports and the notification of demolition or renovation forms must be submitted to SCDHEC at least ten (10) working days prior to demolition of an existing structure. Prior to submitting the reports and forms to SCDHEC, the CONTRACTOR shall obtain the RCE's signature. The CONTRACTOR is responsible for obtaining all required permits to proceed with the work.
- E.** The CONTRACTOR is responsible for all necessary containment, removal, transportation, and disposal of the subsurface and surface Hazardous Materials identified in inspections or other environmental documentation provided in Attachment B in compliance with all applicable Federal (EPA, OSHA & DOT) and State (SCDHEC & SCDOT) and local (County and Municipality) requirements for Hazardous Materials and worker health and safety. The CONTRACTOR is responsible for obtaining all required permits to proceed with the work.
- F.** Unexpected Hazardous Materials – Upon encountering any unexpected Hazardous Materials, the CONTRACTOR shall follow the procedures as described below:
 - 1. CONTRACTOR shall stop Work immediately in the affected area and duly notify SCDOT and, if required by state or federal law, all government or quasi-government entities with jurisdiction over the Project or site.
 - 2. Upon receiving notice of the presence of Hazardous Materials, SCDOT will take necessary measures required to verify that the Hazardous Materials are remediated or rendered harmless. Such necessary measures will include SCDOT

either (i) retaining qualified independent firm or (ii) negotiating a construction change directive with CONTRACTOR.

3. CONTRACTOR shall resume Work at the affected area of the Project only after written notice from SCDOT that the (i) Hazardous Materials have been removed or rendered harmless and (ii) all necessary approvals have been obtained from all government and quasi-government entities having jurisdiction over the Project.
 4. CONTRACTOR's Contract Price and/or Contract Time shall be adjusted to the extent CONTRACTOR's cost and/or time of performance has been adversely impacted by the presence of Hazardous Materials.
 5. If a construction change directive is negotiated, the CONTRACTOR shall comply with Article XI.E.
- G.** For purposes of this Project, the Hazardous Material Generator shall be listed as "SCDOT" of any and all Hazardous Materials and/or hazardous wastes associated with work on the Project, with the exception that CONTRACTOR shall be the generator for all Hazardous Materials it, its consultants, subconsultants, subcontractors or suppliers, brings on to the Project or that is brought to the Project by them and subsequently is caused to be released on the Project by the CONTRACTOR, CONTRACTOR's design consultants, subcontractors and suppliers. The foregoing shall not preclude or limit any rights or remedies that SCDOT may have against third parties and/or prior owners, lessees, licensees and occupants of the Project's right of way.
- H.** SCDOT is not responsible for Hazardous Materials actually brought to the Project by CONTRACTOR, CONTRACTOR's design consultants, subcontractors and suppliers or anyone for whose acts they may be or are liable. SCDOT is not responsible for negligent or willful acts by CONTRACTOR, CONTRACTOR's design consultants, subcontractors and suppliers or anyone for whose acts they may be or are liable relating to Hazardous Materials found at the site. CONTRACTOR shall indemnify, defend and hold harmless SCDOT and SCDOT's officers, directors, employees and agents from and against all claims, losses, damages, liabilities and expenses, including attorney's fees and expenses arising out of or resulting solely from those Hazardous Materials actually brought to the Project or negligent or willful acts relating to Hazardous Materials, or both by CONTRACTOR, CONTRACTOR's design consultants, subcontractors and suppliers or anyone for whose acts they may be or are liable.

XII. DEMOLITION, REMOVAL & DISPOSAL OF STRUCTURES

CONTRACTOR shall be responsible for the demolition, removal and disposal of all structures and their appurtenances within SCDOT Right of Way necessary for the completion of the Project, to include those portions which may extend outside the right of way, but were purchased as a part of the acquisition process. Structures shall include the bridges identified in the scope of work and all buildings acquired for the Project. All

necessary permitting shall comply with Articles II.B.4 and IX of the Contract. Handling and disposal of Hazardous Materials shall be in accordance with Article XI of the Contract. Before demolition of the structures, the CONTRACTOR shall complete and submit a Notification of Demolition and Renovation form to the South Carolina Department of Health and Environmental Control.

XIII. DIFFERING SITE CONDITIONS

- A. "Differing Site Conditions" are defined as concealed or latent physical conditions at the Site that (i) materially differ from the conditions reasonably assumed to exist based on the information contained in the RFP, this Agreement and its Exhibits; or (ii) are of an unusual nature, differing materially from the conditions ordinarily encountered and generally recognized as inherent in the work. For this project, any naturally occurring subsurface soil conditions or other naturally occurring geotechnical conditions WILL NOT be considered a "Differing Site Condition". CONTRACTOR is responsible for all costs associated with all naturally occurring subsurface soil and geotechnical conditions encountered during the Project. SCDOT makes no warranties, expressed or implied, as to the completeness or correctness of the subsurface soil or geotechnical condition information provided under this Agreement and the CONTRACTOR shall use his own judgement in evaluating the nature of the subsurface conditions.
- B. Upon encountering a Differing Site Condition, CONTRACTOR shall provide prompt written notice to SCDOT of such condition, which notice shall not be later than twenty (20) days after such condition has been encountered. CONTRACTOR shall provide such notice before the Differing Site Condition has been substantially disturbed or altered and before any work is performed.
- C. Upon written notification, SCDOT will investigate the conditions and if it is determined that the conditions differ materially and cause an increase or decrease in the cost or time required for performance of the work, the Contract will be adjusted. No contract adjustment that results in a benefit to CONTRACTOR will be allowed unless CONTRACTOR has provided the required written notice.

XIV. FORCE MAJEURE

Delays or failures of performance shall not constitute breach of the Agreement if and to the extent such delays or failures of performance are caused by severe and not reasonably foreseeable occurrences beyond the control of SCDOT or CONTRACTOR, including, but not limited to: Acts of God or the public enemy; expropriation or confiscation of facilities; compliance with any order or request of any governmental authority other than SCDOT or a party in privity with it; a change in law directly and substantially affecting performance of the Project; Acts of War; rebellion or sabotage or damages resulting there from; fires, floods, explosions, or extraordinary accidents; riots or strikes or other concerted acts of workman, whether direct or indirect, or any similar causes, which are not within the control of SCDOT or CONTRACTOR respectively, and which by the exercise of reasonable diligence, SCDOT or CONTRACTOR are unable to prevent.

Any expense attributable to such occurrence shall not entitle CONTRACTOR to an adjustment in the Contract Price. Any critical path delay attributable to such an occurrence shall be added to the Contract Time.

XV. WARRANTY

- A. CONTRACTOR warrants that it will perform all services in accordance with the standards of care and diligence normally practiced by recognized engineering and construction firms in performing services and obligations of a similar nature. CONTRACTOR warrants that all materials and equipment furnished shall be of good quality and new unless otherwise authorized by SCDOT and that the construction shall conform to the Contract requirements. CONTRACTOR agrees to promptly correct, at its own expense, defects or deficiencies in materials and workmanship that appear prior to and during a period of three (3) years after Final Completion of the Project. This shall include all plant-produced materials (i.e. asphalt, concrete, etc.). CONTRACTOR shall not be responsible for damages caused by SCDOT's failure to provide timely notification of potentially damaged or defective work of which SCDOT had actual knowledge. CONTRACTOR shall properly perform, at the written request of SCDOT made at any time within the warranty period after Final Completion of the Project as defined in Article IV.A.5, all steps necessary to satisfy the foregoing warranty and correct any element of the Project or the services that is defective or does not reflect such standards of care and diligence. The cost of such corrective services shall be CONTRACTOR's responsibility.
- B. CONTRACTOR further warrants the performance of all bridge components on all structures for three (3) years from Final Completion of the Project. If a component fails to perform properly for any reason, including but not limited to normal wear and tear, the CONTRACTOR shall replace the failed component at no cost to SCDOT.
- C. The warranty periods begin at Final Completion of the Project. CONTRACTOR shall immediately abate any warranty deficiency that poses an unsafe condition to the public; otherwise deficiencies shall be corrected no later than 30 days from the determination of corrective action. In the event CONTRACTOR, after notice, fails to immediately abate the deficiency or fails to make correction within the prescribed thirty (30) days, SCDOT may have the deficiency corrected. All costs associated with such correction by SCDOT shall be the responsibility of the CONTRACTOR and his Surety. With respect to any component that is repaired or replaced pursuant to this warranty, the warranty period of that component shall be the longer of one year from repair or replacement of the component or the remainder of the original warranty period.
- D. CONTRACTOR shall take all steps necessary to transfer to SCDOT any manufacturer's or other third-party's warranties of any materials or other services used in the construction of the Project.

XVI. INDEMNITY

- A. CONTRACTOR shall indemnify, defend and hold SCDOT harmless from any and all claims, liabilities and causes of action for any fines or penalties imposed on SCDOT by any state or federal agency because of violation by CONTRACTOR or any of its subcontractors of any state or federal law or regulation.
- B. CONTRACTOR shall indemnify, defend and hold SCDOT harmless from any and all claims, liabilities and causes of action arising out of or resulting from, in whole or in part, the negligence or recklessness of CONTRACTOR or its agents, consultants and/or subcontractors.

XVII. TERMINATION AND CANCELLATION

A. Termination for Default

- 1. CONTRACTOR shall be in default of the Contract if it:
 - a. Fails to supply a sufficient number of properly skilled workmen, tools, materials and equipment to assure the prompt completion of the work;
 - b. Fails to perform work in accordance with contract requirements and/or refuses to remove or replace rejected materials or unacceptable work;
 - c. Discontinues the prosecution of the work;
 - d. Fails to resume work that has been discontinued within a reasonable time after notice to do so;
 - e. Becomes insolvent or is declared bankrupt or commits any act of bankruptcy or insolvency;
 - f. Allows any final judgment to remain unsatisfied for a period of 15 days;
 - g. Makes an assignment for the benefit of creditors;
 - h. Fails to maintain the Project schedule;
 - i. Commits a substantial breach of the Contract; or
 - j. For any other cause whatsoever, fails to carry on the work in an acceptable manner.
- 2. If CONTRACTOR does not commence work to cure the default within 15 days after receipt of written notice from SCDOT and thereafter diligently prosecute work to completion within a reasonable time as determined by SCDOT, then SCDOT will have full power and authority to terminate CONTRACTOR for

default and shall provide written notification of the termination to CONTRACTOR and Surety.

3. Upon termination for default, Surety will have the right to complete the contract and shall be given thirty (30) days, or longer in SCDOT's discretion, in which to resume the work. This procedure shall not in any way serve to extend the Contract Time. All charges incident to negotiation with the Surety and arranging for work to be resumed, including attorney's fees, shall be charged against CONTRACTOR or Surety as part of the cost of the work.
4. If Surety refuses to complete the work or fails to take over the work promptly as provided by this Agreement, then SCDOT may appropriate or use any or all materials and equipment on the job site as may be suitable and acceptable and may enter into an agreement for the completion of the Contract. All costs and charges incurred by SCDOT together with the cost of completing the work under the Contract will be deducted from any monies due or which may become due CONTRACTOR. If such expense exceeds the sum which would have been payable under the Contract, CONTRACTOR and Surety shall be liable and shall pay to SCDOT the amount of such excess.
5. Upon termination for default, all Project Documents, as defined in Article II.E, shall be surrendered forthwith by CONTRACTOR to SCDOT. SCDOT will be authorized to use the Project documents for the sole purpose of promoting, completing, using, maintaining, upgrading or adding to the Project. This authorization includes allowing design professionals to make changes, corrections, or additions to the Project documents for these purposes.
6. If, after termination, it is determined that the Contractor was not in default, or that the default was excusable, the rights and obligations of the parties shall be the same as if the termination had been issued for the convenience of the State.

B. Termination for Convenience

1. SCDOT reserves the right to cancel the Work upon ten (10) days written notice to CONTRACTOR. Should the Work be so canceled by SCDOT for convenience, CONTRACTOR shall be paid for the value of the Work, based upon the Schedule of Values, performed to the date of cancellation and demobilization together with any cancellation charges by vendors and subcontractors. CONTRACTOR shall also be entitled to the cost of securing the work, provided such cost is approved by SCDOT. In no event, however, shall the total payment to CONTRACTOR pursuant to such a cancellation exceed the Contract Price.
2. Termination of all or a portion of the Contract shall not relieve CONTRACTOR of any responsibility it would otherwise have for the work completed, or for any claims arising from that work.

3. Upon such termination, all Project Documents, as defined in Article II.E, shall be surrendered forthwith by CONTRACTOR to SCDOT. SCDOT will be authorized to use the Project documents for the sole purpose of promoting, completing, using, maintaining, upgrading or adding to the Project. This authorization includes allowing design professionals to make changes, corrections, or additions to the Project documents for these purposes.

XVIII. DISADVANTAGED BUSINESS ENTERPRISES

- A. DBE Goal - CONTRACTOR shall comply with the DBE goal and the requirements of the SCDOT DBE – Design Build Special Provision, attached hereto in EXHIBIT 5, and the SCDOT DBE Supplemental Specification.
- B. SCDOT'S Right to Audit - SCDOT will have the right to audit all documentation regarding DBE participation in the Project.

XIX. ON-THE-JOB TRAINING REQUIREMENTS

There is an On-The-Job Training requirement for this Project. The CONTRACTOR shall comply with the requirements, including the number of persons to be trained, provided in the Specific Equal Employment Opportunity Responsibilities Training Special Provisions within the Federal Aid Supplemental Specifications found in Exhibit 5. The CONTRACTOR shall submit its plan for On-the-Job Training to SCDOT for written approval prior to commencing construction activities.

XX. RECORD RETENTION

- A. CONTRACTOR shall maintain the following documents for a period of three (3) years or a period equal to the warranty period, whichever is longer, after Final Completion of the Project:
 1. All CONTRACTOR samples and test reports;
 2. Daily Diaries and any other documents required to be retained in accordance with the Quality Control Plan.
- B. During the retention period, SCDOT will be granted access to those documents upon reasonable notice. At any time during the retention period, SCDOT will have the option of taking custody of the documents. CONTRACTOR shall obtain a written release from SCDOT prior to destroying the records after the retention period.

XXI. AS-BUILTS

- A. In addition to those documents set forth elsewhere in this Agreement, CONTRACTOR shall provide to SCDOT prior to Final Completion, complete sets of as-built drawings (See Article XXI.D for details). As-built plans consist of the final version of the design plan CADD drawings that incorporate all changes, including any adjustments, relocations, additions and deletions that occurred during

construction. CONTRACTOR shall certify that the as-built plans are a true and correct representation of the work as constructed. If any design changes occur during construction, the plan sheets (or any other “job site record document” with a seal) revised after award of contract shall include a complete accounting and detail of the revisions and design changes. The P.E. responsible for the revisions shall seal each altered plan sheet (or any other “job site record document” with a seal). This documented information is to be part of the As-Built Plan requirements. The CONTRACTOR shall develop as-built plans in accordance with the SCDOT Manual of Instructions for the Preparation of As-Built Plans, edition effective as of the release of the Final RFP.

- B. Information regarding major revisions to the plans shall be noted in a revision box on the plans. The information listed in the revision box shall include: the initiator of the revision, a brief explanation of the nature of the revision, and acceptance and approval from CONTRACTOR, along with associated dates.
- C. In addition to the revisions that incorporated changes during construction, the as-built plans shall include the following information gathered during construction:
 - 1. The location and elevation of foundations remaining below grade.
 - 2. The final profile of each bridge constructed. The profile shall include the elevation along the centerline (or as specified by SCDOT) and a line three feet inboard of each gutter line. Points on the profile shall be taken at no greater than 25-foot intervals and shall include the beginning and end of each span.
 - 3. If any structure has pile foundations, information concerning the pile driving operation shall be listed to include pile and driving equipment data, final pile bearing, elevation of pile tip when plan bearing was obtained, final pile tip elevation, penetration into the ground, and PDA or WEAP analysis data. This information shall be entered on each footing or bent sheet, or be included as a new sheet inserted immediately following the pertinent footing or bent sheet.
 - 4. If any structure has drilled shaft foundations, information concerning the installation of the shaft shall be listed to include the drilled shaft report. This information shall be entered on each footing or bent sheet, or be included as a new sheet inserted immediately following the pertinent footing or bent sheet.
 - 5. The final location of all aboveground utilities, all subsurface utilities considered critical to the design of the project where SUE is performed and the final horizontal location of all relocated utilities. ~~The final horizontal location of all existing and relocated utility lines and structures that are within the right-of-way.~~ Include approved Utility Agreements, No Cost/No Conflict Letters, and Encroachment Permits.
 - 6. The final location and elevations of all pipes, culverts, and drainage structures.

7. To include all right-of-way revisions, permissions, and an updated right-of-way data sheet to show the date and manner of acquisition of each tract
- D. As-built plans shall be submitted as two (2) full size (36 inch x 22 inch) copies and one (1) copy on compact disc in a format acceptable to SCDOT. The levels and symbology of the as-built CADD drawings shall conform to SCDOT standard levels and symbology used to develop the design drawings for the Project.

XXII. ESCROW PROPOSAL DOCUMENTS

The Contractor shall submit bid documentation used to prepare the technical and cost proposals for this contract to the Department in accordance with the Supplemental Specification entitled Escrow Bid Documentation dated October 1, 2014.

XXIII. DISPUTE RESOLUTION

- A. Each party hereby waives a trial by jury regarding any dispute between them arising out of this Contract and any such trial will be a non-jury trial before the South Carolina Circuit Court in Richland County.
- B. In the event of a dispute between the parties, it shall be a condition precedent to litigation that the parties submit the dispute to the Standing Dispute Review Board pursuant to the Claims Procedure set forth in the Project Supplemental Specifications.
- C. CONTRACTOR consents that any papers, notices, or process necessary or proper for the initiation or continuation of any disputes, claims, or controversies relating to the Agreement; for any court action in connection therewith; or for the entry of judgment on any award made, may be served on CONTRACTOR by certified mail (return receipt requested) addressed to CONTRACTOR at the address provided in Article XXVI. Notice by certified mail is deemed duly given upon deposit in the United States mail.

XXIV. SCDOT'S AGENT

SCDOT will appoint an individual who will be authorized to act on behalf of SCDOT, with whom CONTRACTOR may consult at all reasonable times, and whose instructions and decisions will be binding upon SCDOT as to all matters pertaining to this Agreement and the performance of the parties hereunder.

XXV. ASSIGNABILITY

The Contract shall not be assignable by CONTRACTOR without the prior written consent of SCDOT. SCDOT may assign the Contract without the consent of CONTRACTOR.

XXVI. GENERAL PROVISIONS

- A. This Agreement shall be governed by and interpreted in accordance with the substantive laws of the State of South Carolina.
- B. Headings and titles of the various parts of this Agreement are for convenience of reference only and shall not be considered in interpreting the text of this Agreement. Modifications or amendments to this Agreement must be in writing and executed by duly authorized representatives of each party.
- C. In the event that any portion or all of this Agreement is held to be void or unenforceable, the parties agree to negotiate in good faith to reach an equitable agreement which shall affect the intent of the parties as set forth in this Agreement.
- D. All notices pertaining to this Agreement shall be in writing and, if to SCDOT, will be sufficient when sent registered or certified mail to SCDOT addressed as follows:

Deputy Secretary for Engineering
South Carolina Department of Transportation
Post Office Box 191
Columbia, South Carolina 29202-0191

All notices to CONTRACTOR shall be sufficient when sent registered or certified mail to CONTRACTOR addressed as follows:

(Insert CONTRACTOR'S address here)

- E. The Contract Documents set forth the full and complete understanding of the parties as of the Effective Date defined herein, and supersedes any and all agreements and representations made or dated prior thereto.
- F. The parties make no representations, covenants, warranties or guarantees, express or implied, other than those expressly set forth herein. The parties' rights, liabilities, responsibilities and remedies within respect to the work shall be exclusively those expressly set forth in this Agreement.
- G. In no event shall any failure by either party hereto to fully enforce any provision to this Agreement be construed as a waiver by such party of its right to subsequently enforce, assert or rely upon such provision.
- H. Nothing in this Agreement is intended to create any contract rights for any party other than SCDOT and CONTRACTOR, nor are any third-party beneficiary rights intended to be created hereby.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the Effective Date defined herein. The Effective Date is defined as the date signed by the Director of Construction on behalf of South Carolina Department of Transportation.

Witnesses:

Date: _____

Witnesses:

SOUTH CAROLINA DEPARTMENT
OF TRANSPORTATION

By: _____
Todd Steagall, P.E.
Director of Construction

Recommended:

Brian Parnell
Contract Administrator

CONTRACTOR

Name of Contractor

By: _____

Its: _____

CERTIFICATION OF CONTRACTOR

I hereby certify that I am the duly authorized representative of CONTRACTOR and that neither I nor the above CONTRACTOR I here represent has:

- a) employed or retained for a commission, percentage, brokerage, contingent fee, or other consideration, any firm or person (other than a bona fide employee working solely for me or the above CONTRACTOR) to solicit or secure this contract;
- b) agreed, as an express or implied condition for obtaining this contract, to employ or retain the services of any firm or person in connection with carrying out the contract, or
- c) paid, or agreed to pay, to any firm, organization or person (other than a bona fide employee working solely for me or the above CONTRACTOR) any fee, contribution, donation, or consideration of any kind for, or in connection with, procuring or carrying out the contract except as here expressly stated (if any);
- d) either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action, in restraint of free competitive bidding in connection with the submitted proposal.

By execution of this Agreement, CONTRACTOR certifies CONTRACTOR and all CONTRACTOR's consultants, sub-consultants, contractors, employees and agents will comply with South Carolina's Ethics, Government Accountability, and Campaign Reform Act of 1991, as amended. The following statutes require special attention: (a) Offering, giving, soliciting, or receiving anything of value to influence action of public employee - §8-13-790, 8-13-705, 8-13-720; (b) Recovery of kickbacks - §8-13-790, (c) Offering, soliciting or recovering money for advice or assistance of public official - §8-13-720, (d) Use or disclosure of confidential information - §8-13-725, (e) Persons hired to assist in the preparation of specifications or evaluation of bids - §8-13-1150, (f) Solicitation of state employees - §8-13-755, 8-13-760 and §8-13-725, (g) False Claims Act -§16-13-240. The state may rescind any contract and recover all amounts expended as a result of any action taken in violation of this provision.

I acknowledge that this certificate is to be furnished to the Department, the Federal Highway Administration, and the U. S. Department of Transportation, and is subject to applicable State and Federal laws, both criminal and civil.

I acknowledge that giving false, misleading, or incomplete information on this certification may subject me to prosecution under Section 16-9-10 of the South Carolina Code of Laws.

CONTRACTOR

Name of Contractor

By: _____

Date: _____

Its: _____

CERTIFICATION OF DEPARTMENT

I hereby certify that I am the Director of Construction for the South Carolina Department of Transportation (SCDOT) of the State of South Carolina and that the above CONTRACTOR or its representative has not been required, directly or indirectly, as an express or implied condition in connection with obtaining or carrying out this agreement to:

- a) employ or retain, or agree to employ or retain, any firm or person, or
- b) pay, or agree to pay, to any firm, person, or organization, any fee, contributions, donations, or consideration of any kind, except as here expressly stated (if any).

I acknowledge that this certificate is to be furnished to the Federal Highway Administration, and U. S. Department of Transportation, and is subject to applicable State and Federal laws, both criminal and civil.

SOUTH CAROLINA DEPARTMENT OF
TRANSPORTATION

BY: _____

TITLE: DIRECTOR OF CONSTRUCTION

Date: _____

DRUG-FREE WORKPLACE CERTIFICATION

In accordance with Section 44-107-30, South Carolina Code of Laws (1976), as amended, and as a condition precedent to the execution of this agreement, the undersigned, who is an authorized representative of the CONTRACTOR certifies on behalf of the CONTRACTOR that the PROPOSER will provide a drug-free workplace by:

- (1) publishing a statement notifying employees that the unlawful manufacture, distribution, dispensations, possession, or use of a controlled substance is prohibited in the CONTRACTOR's workplace and specifying the actions that will be taken against employees for violations of the prohibition;
- (2) establishing a drug-free awareness program to inform employees about:
 - (a) the dangers of drug abuse in a workplace;
 - (b) the person's policy of maintaining a drug-free workplace;
 - (c) any available drug counseling, rehabilitation, and employee assistance programs; and
 - (d) the penalties that may be imposed upon employees for drug violations;
- (3) making it a requirement that each employee to be engaged in the performance of the agreement be given a copy of the statement required by item (1);
- (4) notifying the employee in the statement required by item (1) that, as a condition of employment of this agreement, the employee will:
 - (a) abide by the terms of the statement; and
 - (b) notify the employer of any criminal drug statute conviction for a violation occurring in the workplace no later than five days after the conviction;
- (5) notifying the South Carolina Department of Transportation within ten days after receiving notice under item (4)(b) from an employee or otherwise receiving actual notice of the conviction;
- (6) imposing a sanction on, or requiring the satisfactory participation in a drug abuse assistance or rehabilitation program by, any employee convicted as required in Section 44-107-50; and
- (7) making a good faith effort to continue to maintain a drug-free workplace through implementation of items (1), (2), (3), (4), (5), and (6)

By execution of this Agreement CONTRACTOR certifies CONTRACTOR and all CONTRACTOR's consultants, sub-consultants, contractors, employees and agents will comply with all applicable provisions of the Drug-Free Workplace Act, Title 44, Chapter 107 of the South Carolina Code of Laws, as amended.

CONTRACTOR: _____
(Signature)

EXHIBIT 1

COST PROPOSAL BID FORM

PROPOSED COST PROPOSAL BID FORM
FOR
INTERSTATE 85 WIDENING MM 98-106
CHEROKEE COUNTY

The *Cost Proposal Bid Form*, as submitted by the selected PROPOSER, will be included with the completed agreement.

EXHIBIT 2

SCHEDULE OF VALUES

SCHEDULE OF VALUES
FOR
INTERSTATE 85 WIDENING MM 98-106
CHEROKEE COUNTY

A Schedule of Values, submitted by the selected PROPOSER and approved by SCDOT, will be included with the completed agreement.

EXHIBIT 3

SCOPE OF WORK

EXHIBIT 3 – SCOPE OF WORK

The project consists of all work necessary to reconstruct and widen from four to six travel lanes I-85 from the pavement joint at Station 1824+19.4 to Station 2269+29.50, for an approximate distance of 8.4 miles. The widening shall consist of one additional travel lane in each direction. The project also includes work required to tie this widening to the widening currently underway to the south of the Broad River Bridge. The limits required to tie extend to approximately Station 1813+00 in the SB direction and to approximately Station 1775+00 in the NB direction. The work required within these areas is generally related to restriping lane lines and shall be in accordance with the requirements of Exhibit 4c.

The project includes the removal and replacement of the Norfolk Southern Railroad overpass bridge at Station 1972+65.

Exceptions to the project include I-85 Bridge over Buffalo Creek and I-85 Bridge over Norfolk Southern Railroad. The limits of the exceptions shall be to the Begin and End Bridge Stations in the current construction plans which will be provided to Proposers upon request. However, coordination with other contractors completing these projects, as well as, coordination with the contractor completing work on I-85 between MM 77 to MM 98 shall be required. Coordination with NCDOT will be required for any work across or at the border between states.

This project includes providing ITS along I-85 mainline.

The project includes several interchange/slip ramp removals/replacements/improvements as listed below:

- Exit 98: Remove ramp;
- No slip ramps will be allowed. Remove all existing slip ramps within project corridor;
- Exit 100 (S-83, Blacksburg Highway): Remove and replace S-83 overpass bridge, reconstruct the interchange;
- Exit 102 (SC 5/198, North Mountain Street): Remove and replace SC 5/198 overpass bridge, reconstruct the interchange;
- Exit 104 (S-99, Tribal Road): Remove and replace S-99 overpass bridge, reconstruct the interchange;
- Exit 106 (US 29, East Cherokee Street): Remove and replace US 29 overpass bridge, reconstruct the interchange;

For a full understanding of the scope of the project and the criteria of the construction items needed for this project, review Exhibit 4, Exhibit 5, Exhibit 6 and Attachment B.

EXHIBIT 4

PROJECT DESIGN CRITERIA

EXHIBIT 4 – PROJECT DESIGN CRITERIA

This exhibit details the criteria by which the project shall be designed and constructed. These criteria are divided into subsections as listed below:

Exhibit 4a – Roadway Design Criteria

Exhibit 4b – Structures Design Criteria

Exhibit 4c – Pavement Design Criteria

Exhibit 4d – Traffic Design Criteria

Part 1 – Signing and Pavement Markings

Part 2 – Work Zone Traffic Control

Exhibit 4e – Hydraulic Design Criteria

Exhibit 4f – Geotechnical Design Criteria

Exhibit 4g – Environmental Design Criteria

Exhibit 4z – Project Design Deliverables

DESIGN REFERENCES

This exhibit describes the general design considerations and criteria for the proposed roadway approaches, hydraulics, structures, and surveys.

Design standards shall be in accordance with the following design references as supplemented or amended by Sections 4a, 4b, 4c, 4d, 4e, 4f, 4g, and 4z of this Exhibit. Any variation in design from the included information shall require written approval from SCDOT.

The Design-Build Firm shall prepare the design for the Project using the Design Standards and criteria that are most appropriate with proper consideration given to the design traffic volumes, adjacent land use, design consistency, aesthetics, ADA requirements, and this document.

The design elements shall include, but not be limited to, the horizontal and vertical alignments, lane widths, shoulder widths, median widths, cross slopes, borders, sight distance, side slopes, front slopes and ditches. The design developed by the Design-Build Firm shall be an engineering solution that is not merely an adherence to the minimum AASHTO and/or Department standards.

- AASHTO A Policy on Design Standards Interstate System, 2005
- AASHTO Drainage Manual, 2014 first edition
- AASHTO Guide for the Development of Bicycle Facilities, 1999
- AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities, 2004
- AASHTO Highway Drainage Guidelines, 2007
- AASHTO LRFD Bridge Design Specifications, 2012, Sixth Edition (with 2013 Interim Revisions)
- AASHTO Roadside Design Guide, with 2006 Chapter 6 update, 3rd Edition
- AASHTO Standard Specifications for Highway Bridges, 17th Edition
- AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, Sixth Edition
- AASHTO/AWS D1.5M/D1.5:2010 Bridge Welding Code, with 2011 interims
- AASHTO “Standard Specifications for Transportation Materials and Methods of Sampling and Testing” 2013 Thirty-Third Edition
- AASHTO An Informational Guide On Fencing Controlled Access Highways, 1990
- FEMA Regulations, 44CFR Chapter 1
- FHWA Manual on Uniform Traffic Control Devices, 2009
- FHWA Publication No. FHWA NHI-07-071 Earth Retaining Structures, 2008
- NCHRP Report 672, Roundabouts: An Informational Guide – Second Edition
- SCDHEC NPDES Construction Permit # SCR160000
- SCDHEC NPDES MS4 Permit # SCS040001
- SCDOT Access and Roadside Management Standards, August 2008 with updates
- SCDOT Americans with Disabilities Act Transition Plan, January 2009 with updates
- SCDOT Bridge Design Manual, 2006

EXHIBIT 4 – PROJECT DESIGN CRITERIA

- SCDOT Bridge Design Memoranda, effective between July 1, 2006 and the Final RFP release date
- SCDOT Bridge Drawings and Details, effective as of the Final RFP release date
- SCDOT Engineering Directives, effective as of the Final RFP release date
- SCDOT Geotechnical Design Manual, 2010 Edition (Version 1.1)
- SCDOT Geotechnical Drawings and Details, effective as of the Final RFP release date
- SCDOT Highway Design Manual, 2003, with updates effective as of the Final RFP release date and supplemented with AASHTO A Policy on Geometric Design of Highways and Streets, 2001
- SCDOT Instructional Bulletins, effective as of the Final RFP release date
- SCDOT Pavement Design Guidelines, July 2008 Edition
- SCDOT Plan Preparation Guide, 2000
- SCDOT Preconstruction Advisory Memorandums, effective as of the Final RFP release date
- SCDOT Preconstruction Design Memorandum, effective as of the Final RFP release date
- SCDOT Preconstruction Survey Manual, effective as of the Final RFP release date
- SCDOT Procedures and Guidelines for Work Zone Traffic Control Design, effective as of the Final RFP release date
- SCDOT Qualified Product Lists, effective as of the Final RFP release date
- SCDOT Requirements for Hydraulic Design Studies, May 2009
- SCDOT Road Design Reference Material for Consultant Prepared Plans, June 2010
- SCDOT Roadside Plants to Avoid/Trees with Limitations on R/W, October 2014
- SCDOT Seismic Design Specifications for Highway Bridges, 2008 (Version 2.0)
- SCDOT Standard Drawings, effective as of the Final RFP release date
- SCDOT Standard Specifications for Highway Construction, 2007
- SCDOT Stormwater Quality Design Manual, effective as of the Final RFP release date;
- SCDOT Supplement to the MUTCD
- SCDOT Supplemental Specifications (2007), effective as of the Final RFP release date
- SCDOT Supplemental Technical Specifications, effective as of the Final RFP release date
- SCDOT Traffic Signal Design Guidelines, 2009 with updates
- SCDOT Traffic Signal Material Specifications, effective as of the Final RFP release date
- SCDOT Traffic Signal Supplemental Specifications, effective as of the Final RFP release date
- SCDOT Street Trees and Sidewalk Planting Suggestions, May 2013
- SCDOT Vegetation Management Guidelines, effective as of the Final RFP release date
- SCDOT Roadway CADD Manual, effective as of the Final RFP release date
- South Carolina State Water Law
- The Rule on Work Zone Safety and Mobility, Policy and Guidelines
- The State Stormwater and Sediment and Erosion Control Regulations administered by DHEC, 26 S.C. Code Ann. Regs. 72-405 (Supp. 1995) et seq.
- TRB Highway Capacity Manual, 2010
- USACOE Charleston District “Guidelines for preparing a compensatory mitigation plan” (latest edition)
- United States Access Board’s Revised Draft Guidelines for Accessible Public Rights-of-Way (PROWAG), November 23, 2005

EXHIBIT 4 – PROJECT DESIGN CRITERIA

- International Building Code, effective as of the Final RFP release date
- ACI 318 Building Code and Commentary
- ASCE’s “Minimum Design Loads for Buildings and Other Structures”, latest edition

EXHIBIT 4a

ROADWAY DESIGN CRITERIA

1.0 GENERAL

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.

2.0 CRITERIA

Classify the terrain as rolling on all routes within the scope of work.

2.1 Functional Classification

The functional classification for each roadway is as follows:

- | | |
|---------------------|---------------------------|
| • Interstate 85 | Rural Arterial – Freeways |
| • Interchange Ramps | Rural Arterial – Freeways |

Interchange Cross-Over Roads

- | | |
|----------|-----------------|
| • S-83 | Rural Collector |
| • SC 5 | Rural Arterial |
| • SC 198 | Rural Collector |
| • S-99 | Rural Collector |
| • US 29 | Rural Arterial |

Frontage and Side Roads

- | | |
|-------------------------------|------------------------|
| • S-670 (Milliken Access Dr.) | Rural Local – Driveway |
| • Crawford Road | Rural Local – Group 4 |
| • S-352 | Rural Local – Group 4 |
| • S-667 | Rural Local – Group 4 |
| • Rock Springs Road | Rural Local – Group 4 |
| • S-73 | Rural Local – Group 4 |
| • S-52 | Rural Local – Group 4 |
| • S-669 | Rural Local – Group 4 |
| • S-657 | Rural Local – Group 3 |
| • S-151 | Rural Local – Group 3 |
| • S-65 | Rural Local – Group 4 |

- S-227 Rural Local – Group 4
- S-658 Rural Local – Group 4
- Mill Creek Road Rural Local – Group 4
- S-409 Rural Local – Group 4
- Wendy Drive Rural Local – Group 3
- Crossover Drive Rural Local – Group 3
 - Use the WB-62 design vehicle for Crossover Drive.

2.2 Design Speed

Interstate

- I-85 65 mph

Interchange Ramps

- Loops 30 mph
- Ramps* 45 mph

* See section 2.10 for Welcome Center ramps.

Interchange Cross-over Roads

- S-83 40 mph
- SC 5 45 mph
- SC-198 50 mph
- S-99 50 mph
- US 29 45 mph

Frontage and Side Roads

- S-657, Crossover Drive 25 mph
- Henson Rd Reloc., Wendy Rd., S-409 35 mph
- Crawford Road, Simper Rd Reloc., Rock Springs Rd. 40 mph
- All Other 45 mph

2.3 Traffic Lane, Shoulder & Median Criteria

Develop traffic lane, shoulder, and median widths in compliance with SCDOT Highway Design Manual.

Provide the minimum lengths for left-turn lanes as outlined in SCDOT HDM Figure 15.5J unless noted as otherwise below.

- **Left-turn Lane Storage Lengths** Minimum 150 ft. at SC 198 NB turning left onto S-667 (Shaman Road) Reloc.
- **Left-turn Lane Storage Lengths** Minimum 175 ft. at S-99 NB turning left onto S-657 (Gibbons Road) Reloc.

Interstate 85

- Through Lanes 12 ft. (Total of 6 lanes, one additional northbound lane and one additional southbound lane will be added.)
- Auxiliary Lanes 12 ft.
- Shoulder (outside) 12 ft. total (10 ft. paved, 2 ft. earth)
Minimum 10 ft. total on the existing bridges
- Shoulder (inside) (designed median less than 48 ft. including existing shoulder) Entire obtainable width paved with concrete median barrier

Minimum 5.0 ft. paved with concrete median barrier.

Minimum 4.75 ft. on the existing bridges where existing barrier is retained.

Minimum 4 ft. paved with concrete median barrier at bridge piers only

S-83

- Through Lanes 12 ft.
- Shoulders (outside) 10 ft. total (2 ft. paved, 8 ft. earth)
- Median (TWLTL) 15 ft. paved
- **Left-turn Lane Widths** **11 ft.**

EXHIBIT 4a – ROADWAY DESIGN CRITERIA

- **Left-turn Lane Lengths** Minimum 150 ft.
 - Left-turn lane lengths are dimensioned between ramp terminals across bridge over I-85.

SC 5/198

- Through Lanes 12 ft.
- Shoulders (outside) 10 ft. total (2 ft. paved, 8 ft. earth)
 - Outside shoulders shall be 10 ft. for the bridge over I-85.
- Shoulders (outside) 2 ft. curb and gutter with 6 ft. shoulder (earthen or sidewalk)
- Left-turn Lane Widths 11 ft.
- Left-turn Lane **Storage** Lengths Minimum 575 ft.
 - Left-turn lane **storage** lengths are dimensioned between ramp terminals across bridge over I-85.
- Median 4 ft. paved (**between ramp terminals across bridge over I-85**)
- **Median (TWLTL)** 15 ft. paved

S-99

- Through Lanes 12 ft.
- Shoulders (outside) 8 ft. total (2 ft. paved, 6 ft. earth)
- Left-turn Lane Widths 11 ft.
- Left-turn Lane **Storage** Lengths Minimum 475 ft.
 - Left-turn lane **storage** lengths are dimensioned between ramp terminals across bridge over I-85.
- Median 4 ft. paved (**between ramp terminals across bridge over I-85**)
- **Median (TWLTL)** 15 ft. paved

US 29

- **Through Lanes** 12 ft.
- **Shoulders (outside)** 2 ft. curb & gutter with 6 ft. earth shelf

EXHIBIT 4a – ROADWAY DESIGN CRITERIA

- Median (TWLTL) 15 ft. paved
- Raised Median Max. 20 ft. concrete
- Left-turn Lane Widths 11 ft.

Provide 12 ft. left-turn lane widths and minimum 135 ft. storage lengths directional median opening for left-turn onto the Crossover Drive (see project information package for concept).

Crossover Drive

- Through Lanes 12 ft.
- Shoulders (outside) 4 ft. earth

S-151

- Through Lanes 12 ft.

Interchange Cross-over Roads

- Median (TWLTL) 15 ft. paved

SC 5

- Provide curb and gutter with sidewalk up to commercial driveway closest to I-85 ramp terminals.

S-670 (Milliken Access Dr.)

- Through Lane 12 ft. total (driveway)
- Shoulders (outside) 4 ft. earth

One I-85 Northbound lane shall be dropped as an exit lane at Exit 106. The remaining two I-85 Northbound lanes shall be transitioned such that the inside shoulder width is 17.0' to accommodate a future 12' inside lane and 5.0' inside shoulder prior to the Exit 106 entrance-ramp "10' Gore Nose". The 17.0' inside shoulder shall extend to Sta. 2269+29.50.

One I-85 Southbound lane shall be added from the Exit 106 Southbound entrance ramp. From Sta. 2269+29.50 to south of the Exit 106 Southbound exit ramp, the inside shoulder shall be 17.0' to accommodate a future 12' inside lane and 5.0' inside shoulder. The two Southbound I-85 travel lanes shall be transitioned between the Exit 106 Southbound exit ramp and Exit 106 Southbound entrance ramp such that the inside shoulder transitions from 17.0' to 5.0'. The Exit 106 Southbound entrance ramp shall be design and constructed as if I-85 would have three through lanes.

Pavement markings shall be used to make the I-85 Southbound entrance ramp tie to the two I-85 Southbound lanes. See conceptual plans in Project Info Package for an example of designing for three lanes and striping for two lanes.

All dead end roads will be completed with cul-de-sacs. T-turn arounds will only be allowed with SCDOT approval.

If the inside shoulder width needs to be widened due to the bridge pier or horizontal sight distance on I-85 then use horizontal curves to develop the transitions based on an 80 MPH design speed. Horizontal sight distance shall be based on 65 mph design speed.

2.4 **Horizontal Curves**

Develop horizontal curves and superelevation in compliance with SCDOT Highway Design Manual Chapters and the SCDOT Standard Drawing.

For horizontal sight distance, use grade adjusted SSD values where the downgrades are 3 percent or greater on I-85.

If modifications to frontage and side roads result in tie-ins to existing roads at the begin/end of construction then match existing conditions.

Do not use broken-back curves. **Changes in alignment solely to eliminate the broken back curve at Exit 106 do not require an ATC.**

Rural Local Roads and Streets

- Superelevation (e_{\max}) 0.04 ft./ft. or 0.06 ft./ft.

2.5 **Vertical Curves, Grades, and Clearances**

Develop vertical curves, grades, and clearances in compliance with SCDOT Highway Design Manual.

Use grade adjusted K values where the downgrades are 3 percent or greater on I-85 except at Station 2055+70 in the NB direction.

Do not use spline grades. Spline grades are only acceptable on the ramps within the limits of the gore areas.

If the existing vertical clearance at overpass bridges on I-85 is less than 16 feet then retain or improve the existing vertical clearance during construction phases. Final vertical clearances shall be as specified in the SCDOT HDM.

Interstate

- Maximum 5%

- Minimum 0.3%

Existing vertical profiles along mainline interstate bridges that are to remain in place do not require profile adjustments. This includes the I-85 Overpass Over Norfolk Southern Railroad project (ID 0039094RD-J) which allowed 0.04% grade on I-85 southbound lane. Profile designs shall tie to existing profiles as close to the bridges as practical while maintaining smooth profiles.

2.6 Side Slopes

Develop side slopes in compliance with SCDOT Highway Design Manual.

Criteria is to be used everywhere except along the outside of I-85 where modified ditch grading is required to minimize impacts to adjacent frontage roads or existing right-of-way. See the preliminary cross sections in Project Info Package for an example of non-standard fill and cut slopes.

Any fill slope steeper than 2:1 shall require SCDOT approval.

2.7 Cross Slopes

Develop cross slopes in compliance with SCDOT Highway Design Manual.

- Travel Way 48:1 for up to two lanes from crown
- Travel Way 36:1 third or more lane from crown
- Shoulder (paved) 4 ft. or less Match travel way pavement slope
- Shoulder (paved) greater than 4 ft. 24:1

2.8 Clear Zones

Mainline Interstate and Ramps

Use the SCDOT HDM (2003 with updates) Chapter 14 and the *Roadside Design Guide* (AASHTO) edition 2006 with Chapter 6 Update, 3rd Edition based on traffic volumes, design speed, and slopes. Do not limit the clear zones provided in Figure 14.3A in the SCDOT HDM (2003 with updates) to 30 feet as indicated as a possibility in the footnote for this figure. When a range of values is shown, select higher value. 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 slopes 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, 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, protect substandard areas

contingent upon receiving SCDOT approval.

Where existing fill and cut slopes are presently protected by guardrail, replace damaged and/or substandard guardrail and extend/install new guardrail at locations that do not meet current standard. Also, clear and grind in accordance with SCDOT Vegetation Management Guidelines.

Any Other Roads

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

Provide clear zone for any facilities using curbs on this project in compliance with SCDOT HDM (2003 with updates) Chapter 14.

2.9 Sight Distance

Develop sight distance in compliance with SCDOT Highway Design Manual.

If widening into the median in curved sections of I-85 results in insufficient Stopping Sight Distance due to the barrier placement, increase the median shoulder width in order to achieve the required Stopping Sight Distance.

If necessary, shift the centerline of I-85 NB/SB and concrete median barrier to provide adequate stopping sight distance throughout the entire length of the horizontal curves. In areas where the concrete median barrier is shifted to provide adequate stopping sight distance, provide a minimum interior paved shoulder width of 4 feet.

2.10 Ramps

Develop ramps in accordance with SCDOT Highway Design Manual.

Parallel acceleration and deceleration lanes shall not be shorter than those shown in the preliminary roadway plans in Project Info Package.

Slip ramps referenced in the RFP include ramps that allow access to facilities other than main crossing routes. Slip ramps are to be eliminated within the project limits and no new slip ramps providing access to other facilities shall be allowed. Ramps shall provide direct access from the interstate mainline to the crossing route or from the crossing route to the mainline interstate.

- In areas where slip ramps are to be eliminated, remove all pavements, restore the area to its natural function, and grade to drain. Realign adjacent roadways as necessary to maintain local connectivity and eliminate interstate access.

- At the Welcome Center, tie SB Welcome Center exit ramp to existing horizontal curves carrying traffic to the passenger vehicle and truck lots and base the deceleration lane length on this condition. For the Welcome Center entrance ramp, retain existing horizontal curve leaving the facility and provide sufficient acceleration lane length based on the stop condition/right turn from the truck parking area.
- New loop ramps, with associated auxiliary lane, if required, must be offset to accommodate future 8-lane widening of I-85.
- New ramp terminal profiles at Exit 102 must accommodate through movement design speeds to accommodate future signalization.
- New ramp terminal profiles must accommodate intersection sight distance horizontally and vertically for crossroads.

2.11 Intersections

Develop intersections in compliance with SCDOT Highway Design Manual.

Multilane roundabouts are not allowed as an intersection type. Use design speeds specified in Section 2.2 to design roundabouts intersection sight distance (ISD) at the bridges. Refer to Attachment B for design criteria for single lane roundabouts.

Changing the intersection/control type for an intersection other than the recommended type in the traffic study will require an addendum to the traffic study and is at the discretion of SCDOT. Roundabouts shall not be used as an alternative intersection type at the following intersections:

- ~~S-83 Blackstock Hwy~~ and Milliken Access Drive
- N. Mountain Street and I-85 NB Ramp
- N. Mountain Street and I-85 SB Ramp
- N. Mountain Street and Henson Road

The SCDOT Design Manual, Figure 15.2D “Selection of Design Vehicle at Intersections” [pg 15.2(8)] will be used to determine design vehicle. When using Figure 15.2D for determining the design vehicle turning from Arterial and Collector roads, do not use the Local (Residential) facility designation.

- The design vehicle to be used at the intersection of S-99 and S-151/S-657 shall be a WB-62.
- The design vehicle to be used at the intersection of S-83 and Milliken Access Drive shall be a SU and a WB-62 shall be accommodated between the shoulder breaks or inside guardrail along the entire length of the drive.

- Maintain minimum 750' spacing between intersection of ramp terminals and intersection of adjacent side roads at Exits 100, 102, 104, and 106 per ARMS unless noted as otherwise below.
- Exit 100 – The intersection spacing between the northbound ramp terminals and Milliken Access Drive can be a minimum of 165'.
- Exit 104 – The intersection spacing between the northbound ramp terminals and S-657/S-151 can be a minimum of 340'.
- Exit 104 – The intersection spacing between the southbound ramp terminals and S-669 can be a minimum of 600'.

2.12 Roadside Barriers

Develop roadside barriers in compliance with SCDOT Highway Design Manual Chapter 14. Include the following items in the work:

Guardrail: Determine the existing guardrail or end treatments that do not meet current design standards. Replace existing guardrail and end treatments within the project limits that are damaged. Replace or reset existing guardrail and end treatments within the project limits that do not meet current design standards. Ensure that all new or reset guardrail and end treatments are listed on the Qualified Products Policies & Listings. Add new guardrail where necessary in order to meet current design standards.

For all non-interstate mainline routes, provide paving under guardrail in accordance with the guidance found in the Exhibit 5, Special Provisions, Section 403 using HMA Surface Type B, C or D at a rate of 300 psy.

For interstate mainline routes, provide paving under guardrail in accordance with the guidance found in the Exhibit 5, Special Provisions, Section 403 at the rates described herein. Use HMA Surface Type B, C or D at a rate of 300 psy for the entire 4 foot paving width specified in Section 403. Where the face of guardrail is within 2 feet of the edge of shoulder pavement, use a paving rate of 300 psy from the edge of paved shoulder thru the entire paving strip. When the distance between the edge of pavement and the face of the guardrail or the median obstacles is more than 2 feet and less than 20 feet as outlined in Exhibit 5 Section 403, pave the area with 8 inches of HMA. Place no less than 8 inches of dense graded HMA, including 200 psy Surface Type C as a wearing course. When guardrail is adjacent to noise barrier, extend paving under guardrail to the face of the noise barrier.

Use additional length guardrail posts with compressed guardrail shoulder break contingent upon receiving SCDOT approval only where right of way or environmental impacts dictate that standard guardrail shoulder break cannot be built.

Do not use three-beam guardrail with critical offset posts at the bridge piers.

Cable Median Barrier: Provide a single run of cable median barrier along Interstate 85 where medians are less than or equal to 72 feet and greater than or equal to 48 feet. Install cable median barrier in accordance with SCDOT standard drawings and specifications. Replace all existing mainline cable median barrier within the project limits that is damaged or does not meet current design standards. Include in this work 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.

Only single-run cable barrier is allowed. If double-run of cable barrier is warranted then use concrete median barrier with entire inside area paved to median barrier.

Concrete Median Barrier: Provide concrete median barrier along Interstate 85 where existing or proposed medians are less than 48 feet. When concrete median barrier is constructed, pave the inside shoulder to the barrier. Use single slope shaped concrete median barriers. Retain the existing jersey face median barrier across the existing bridges. Transition from single slope shaped barrier to the existing jersey face barrier in accordance with SCDOT Standard Drawings. If portions of existing jersey face median barrier approaching the existing bridges are in good conditions and criteria can be met with widening then the barrier can be retained.

Provide custom design where required in accordance with Exhibit 4b. Where barrier is removed in the vicinity of existing bridges, refer to Exhibit 4b for barrier requirements.

Concrete Roadside Barrier (outside)

Barrier treatment is required when the distance from proposed I-85 edge of travel way to proposed Frontage Road edge of travel way is 50' or less. Construct outside barrier as specified in Exhibit 4b, Sections 2.3.4 and 2.5.1. This requirement does not apply to the frontage road between existing exit 98 and 100 where the frontage road is to be converted to a private access road.

If barrier is needed on outside due to the minimum 50' distance described above then provide minimum clearance of 72' from FOB to FOB for 4 future 12' lanes and 2 12' shoulders. If proposed EOT of mainline and/or ramp/loop whichever is controlling is less than 50' from proposed EOT of the frontage road, then 72' plus any additional width for ramp/loop lane with required shoulder if necessary is required. For barriers adjacent to I-85 travel lanes, construct the traffic face of the barrier at an elevation that will accommodate the future widening of I-85.

If barrier is required, then the area from the edge of paved shoulder to barrier shall be paved with minimum 8" of Hot Mix Asphalt. Place no less than 8 inches of dense graded HMA, including 200 psy Surface Type C as a wearing course. If

the back slopes are steeper than 3H:1V then place Slope Protection - 4 inch Concrete meeting the requirements of Exhibit 4b.

2.13 Right-Of-Way and Control Of Access

Where it becomes necessary to construct retaining walls to contain cut slopes, establish the right-of-way limit a minimum of 1.2 times the wall height behind the fill face of the wall. Where it becomes necessary to construct retaining walls to contain fill slopes, establish the right-of-way limit as the lessor of either 15 feet beyond the exposed face of the wall or 1.2 times the wall height beyond the exposed face of the wall. In addition, right-of-way must completely cover all retaining wall footings, MSE wall reinforcing, and wall anchorages. Depending upon the design of the wall, additional right of way may be required to construct the wall.

On a single two-lane bridge, secure a minimum right-of-way width of 75 feet on each side of the structure centerline and minimum 75 feet from each end of the bridge; refer to SCDOT Highway Design Manual Chapter 30 Section 30.3.12.

Follow SCDOT, FHWA, and AASHTO guidelines for Control of Access. Maintain fully controlled access along interstate, all interchanges, and ramp terminals. Provide Controlled Access fencing for the entire project limits where the existing fencing must be relocated or is in poor condition as determined by the RCE. Fencing shall be in accordance with Standard Drawing series 806. Use Woven Wire Fence Type 5 with 3 strands of Barbed Wire in rural areas and where existing woven wire fence is present. Use Security Chain Link Fence 72" at interchanges where urban conditions exists (ex. Convenience stores, Hotels, restaurants, etc.) as determined by the RCE and in areas where existing chain link fence is present. In areas without existing Controlled Access fencing and in areas where Controlled Access fencing is to be relocated or reset, place new fence one foot inside the right-of-way. See Attachment B for typical details for fence locations.

2.14 Design Exceptions

An approved design exception for the crest vertical curve over Norfolk Southern Railroad has been provided in Attachment B.

EXHIBIT 4b

STRUCTURES DESIGN CRITERIA

1.0 GENERAL

Exhibit 4b contains requirements for:

- the replacement of the S-83, SC 5, S-99, US 29 Bridges over I-85, and the Norfolk Southern Rail Road Bridge over I-85
- Any other bridges determined necessary by design
- retaining walls,
- box culverts and box culvert extensions, and
- concrete median barriers and bridge pier protection.

2.0 CRITERIA

2.1 New Highway Bridges

2.1.1 Bridge Design

Design all new bridges in accordance with the requirements of the AASHTO LRFD Bridge Design Specifications. Use the HL-93 design live loading.

2.1.2 Seismic Design and Detailing

In accordance with the SCDOT Seismic Design Specifications for Highway Bridges, the Bridge Operational Classification (OC) for each bridge is “II.” Except SDC A and Single Span Bridges, submit Seismic Design Summary Reports according to the requirements shown in Exhibit 4z along with bridge structure plan submittals

The first paragraph of Section 8.7.3 of SCDOT Seismic Design Specifications for Highway Bridges is revised as follows:

“When the principal tension stress is less than the limit established by Equation (8-25), a minimum amount of joint shear reinforcement in the form of column hoops as determined by Equation (8-26) shall be detailed, otherwise the provisions of Sections 8.7.5 through 8.7.7 shall apply.”

The following note is added underneath Table 3.4 of SCDOT Seismic Design Specifications for Highway Bridges:

“6. Significant damage to end ben piles is allowed only with permission of SCDOT’s Regional Production Group (RPG) Structural Engineer, in consultation with the Structural Design Support Engineer.”

The last paragraph of Section 9.2.2 is revised as: “Shear keys shall be proportioned so that the height of the shear key, or distance to top of load application shall not exceed 0.3 times the length of the shear key parallel to the centerline of bridge. If for any reason the 0.3 ratio limit cannot be satisfied, the shear key shall be designed with adequate moment resistance no matter the shear key is designed to take the shear load or fail in shear

depending on the seismic design strategy. Expansion joint filler can be used to reduce the height of this contact region, where compressible joint material is used above.”

BRIDGE DESIGN MEMORANDUM – DM0115 is revised herein:

Page 3, the first sentence of **7.1.3 Local Member Ductility Capacity** is revised as follows:

Local member ductility is different from global ductility. The global ductility capacity is calculated by the global displacements, which include the foundation displacements, while the local ductility capacity of a member is defined using Equations 7-3a or 7-3b with the idealized local displacements. The local displacement ductility capacity shall be calculated for an equivalent member that approximates an idealized fixed base cantilever element or an equivalent member idealized as two cantilevered segments that approximate a fix head condition as defined in Figure 6.3 to 6.6

Page 3, Notes after Equation (7-3b) and “Where” on page 3 are replaced with the following:

μ_c is the local member ductility capacity, see Figure 6.3 & 6.5.

μ_{c1} is the local member ductility capacity of first cantilever segment, see Figure 6.4 & 6.6

μ_{c2} is the local member ductility capacity of second cantilever segment, see Figure 6.4 & 6.6

Page 4, the first sentence is replaced with “ $\Delta_c, \Delta_{c1}, \Delta_{c2}, \Delta_y, \Delta_{y1}, \Delta_{y2}$ are the idealized local member displacements calculated by equations given in Section 6.5.2 or equivalent equations disregarding the displacement of foundations”

Page 8, 9.2.2 **Concrete Superstructure Shear Key Design**: first paragraph is replaced with “Shear keys shall be provided at bents with expansion joints, except as noted for SDC A bridges.”

Page 8, 9.2.3 **Steel Superstructure Shear Key Design**: first paragraph is replaced with “Shear keys shall be provided at bents with expansion joints, except as noted for SDC A bridges.”

2.1.3 Corrosion Protection

Class 4000 concrete with galvanized reinforcing bars (excluding steel girder shear studs, prestressed concrete beam stirrups, or any steel studs and steel reinforcement extended into deck from diaphragms) is the approved corrosion protection system for use on bridge decks.

The bridge carrying SC 5/SC 198 shall be considered on the NHS system.

2.1.4 Design Thermal Movement

$$\Delta T = 1.2 \alpha L (T_{\text{MaxDesign}} - T_{\text{MinDesign}})$$

Deleted BDM 21.1.1.12 Example Problems

2.1.5 Dimensions

Construct the new bridges with bridge roadway widths that are equal to or greater than the approach roadway widths (traveled way plus median and shoulders) that are specified in Exhibit 4a.

2.1.6 Vertical Clearances

Provide a minimum of 17'-0" of vertical clearance under the new bridges over I-85. In addition, provide 17'-0" of vertical clearance over the future section of I-85. When calculating the future vertical clearance, assume the future section of I-85 has inside and outside shoulders that will be 12 feet in width, the future profile grade line will be in the center of four 12-ft. travel lanes, and the future profile grade line elevation will be adjusted such that the pavement elevation at the median barrier for the future section will match this project's pavement elevation at the median barrier.

2.1.7 Horizontal Clearances

Provide horizontal clearances under the new bridges over I-85 as shown on the drawing entitled "Horizontal Clearance Requirements under New Overpasses" in Attachment B.

2.1.8 Removal and Disposal of Existing Bridges

Remove and dispose of the existing bridges over I-85 in accordance with the Standard Specifications for Highway Construction, Exhibit 4g, and all applicable laws and regulations. If a portion of an existing structure is to be removed while traffic is maintained on the bridge, ensure the structural capacity will be adequate to accommodate the traffic loading for which the bridge was originally designed.

2.1.9 Superstructure Types

For this project, Section 12.3.3 of the SCDOT Bridge Design Manual does not apply. Allowable superstructure types are outlined in Sections 12.3.2.1, 12.3.2.2, 12.3.2.3, and 12.3.2.4 of the SCDOT Bridge Design Manual.

For prestressed concrete girder superstructures, use prestressed concrete girders that are “I” shaped. Design prestressed concrete girders so that the algebraic sum of the beam camber at prestress transfer due to prestress force, the beam dead load deflections due to non-composite dead load, and superimposed dead load deflections due to applied superimposed dead loads results in a positive (upward) camber. Include the dead load from the future wearing surface in the determination of camber.

For steel welded plate girder superstructures, use structural steel girders that are “I” shaped. For steel welded plate girder and steel rolled beam superstructures, use structural steel that conforms to the requirements of AASHTO M 270 and paint the steel in accordance with Section 710 of the Standard Specifications.

At each support of prestressed concrete girder, steel welded plate girder, and steel rolled beam superstructures, connect all beams and girders to the substructure using anchor bolts.

Detail all construction stages for girder bridges to consist of a minimum of two lines of girders.

Floorless culverts are classified as "Other Structure Types" (Section 12.3.3 of the SCDOT Bridge Design Manual) and are not permitted for this project.

2.1.10 Concrete Strengths

In prestressed concrete piles and beams, concrete design strengths are not allowed to exceed 8,000 and 10,000 psi maximum, respectively. Construct all cast-in-place concrete bridge components with Class 4000 concrete except as noted in Section 2.1.10. Construct all precast concrete bridge components with concrete having a minimum compressive strength of 5000 psi.

2.1.11 Final Finish of Exposed Concrete Surfaces

Final surface finish is not required on this project.

Apply an Anti-Graffiti Coating to exposed concrete surfaces of bridge abutment walls, including precast panels and coping of MSE Walls.

2.1.12 Lightweight Concrete

Lightweight Concrete is only permitted in cast-in-place deck slabs and barrier parapets. Use lightweight concrete that conforms to the requirements of the Sand Lightweight Concrete Special Provision in Exhibit 5. When calculating dead loads, include a minimum allowance of 7 pounds per cubic foot for reinforcing steel.

2.1.13 Post-Tensioning

Post-tensioning is not permitted for this project.

2.1.14 Bridge Decks

For girder and beam spans, construct bridge decks with reinforced cast-in-place concrete.

Apply a transverse Grooved Surface Finish to all bridge decks in accordance with Subsection 702.4.16 of the Standard Specifications for Highway Construction.

Make the connection of the reinforcing of decks between stages by lap-splice or mechanical splice.

Asphalt overlays are not permitted on bridge decks.

2.1.15 Stay-in-Place Bridge Deck Forms

The Contractor may use permanent stay-in-place bridge deck forms for concrete deck slabs between new beams and girders. Fabricate permanent stay-in-place bridge deck forms and supports from steel conforming to ASTM A 446/A 653, Grades 40 or 50, and having a coating class of G165 in accordance with ASTM A 525. Do not use fillers in the flutes of the stay-in-place forms. Fill form flutes with concrete as the deck slab is placed. Do not use permanent stay-in-place steel bridge deck forms in bays in which longitudinal deck construction joints are located and in bays between stages.

2.1.16 Barriers, Railing Walls, and Sidewalks

For bridges with a roadway approach with shoulders use the SCDOT Standard Barrier Parapet. At ends where thrie beam guardrail is required, detail the barrier using the standard barrier transition details shown on the Bridge Drawings and Details. Detail the barrier parapet parallel to the edge of the adjacent travel lane.

2.1.17 Bridge Drainage

Design and construct the bridge deck drainage and bridge end drainage to ensure that the minimum requirements of the SCDOT Bridge Design Manual are met and that erosion of the end fill slopes due to run off at the bridge ends is prevented.

2.1.18 Pile Sizes and Types

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

PILE TYPE	MINIMUM SIZE
Steel H-Piles	HP12x53
Steel Pipe Piles	12" Diam. (min. wall thickness equal to 1/2")
Solid Prestressed Concrete Piles	18" Square
Prestressed Concrete Pile Points	W8x58

2.1.19 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 does not apply for this project. Terminate steel pipe piles at the bottom of the end bent cap and footing. Connect the piles to the cap and footing using a reinforced concrete infill, with the reinforcing extending into the cap or footing. The minimum clearance of the reinforcement shall satisfy the requirement of SCDOT Design Memorandum DM0107.

2.1.20 Drilled Shafts

SCDOT Bridge Design Memorandum DM0111 contains a requirement to detail the portion of shaft below the construction casing with a diameter that is six inches smaller than the diameter of the casing. This six-inch reduction requirement does not apply to this project. For this project, detail the portion of the shaft below the bottom of the construction casing, whether in soil or rock, with a diameter that is at least two inches smaller than the diameter of the casing.

When the design for the upper portion of a drilled shaft requires a column reinforcement cage to be inserted into a larger diameter drilled shaft reinforcement cage, provide a construction joint in the shaft just below the bottom of the column cage. Prior to casting the upper portion of the shaft, remove all drilling fluids and unsound concrete and roughen the surface of the construction joint. Arrange for CSL testing to be performed prior to placement of the column reinforcement cage. Install the column reinforcement cage in the upper portion of the shaft prior to drilled shaft concrete placement in the splice region.

Drilled shafts that have a diameter of 6 feet or greater and a length of 5 feet or greater are considered to be mass concrete elements. See Exhibit 5 for specifications regarding concrete mix design, concrete placement, temperature control, and testing of these large diameter drilled shafts.

2.1.21 Crosshole Sonic Logging (CSL) Testing

Install Crosshole Sonic Logging (CSL) access tubes in all drilled shafts in accordance with the SCDOT Standard Specifications for Highway Construction, 2007 Edition. SCDOT will conduct CSL testing on all of the shafts. Acceptance of drilled shafts will be based on CSL testing. Install one CSL tube in the center of the drilled shaft for Thermal Integrity Profiling test for drilled shafts that have diameter of 6 ft. or larger. SCDOT will conduct TIP testing if mass concrete is used.

2.1.22 Substructures

Construct Interior Bents using cast-in-place reinforced concrete bent caps and columns supported on cast-in-place reinforced concrete drilled shafts or pile footings. Deep foundations are required to extend below any compacted fill.

Set the tops of footings in accordance with Section 19.5.5 of the SCDOT Bridge Design Manual. In cases where there is pavement above the footing, locate the top of footing a minimum of two feet below the bottom of the base course.

If a drilled shaft is extended above ground, above the scour line, or through liquefiable soil, structurally design the shaft as a column and detail the longitudinal reinforcing steel with a maximum spacing of 8 inches center-to-center.

Construct end abutments as either vertical abutments or spill through abutments (2:1 maximum slope). Construct vertical abutments and vertical abutment wing walls using cast-in-place reinforced concrete or MSE walls. For bridges crossing a highway, construct the vertical abutment parallel to the adjacent travel lane passing beneath the bridge. For stream crossings, vertical abutments and vertical abutment wing walls are not allowed within the limits of the 500 year water level. For spill through abutments, set the elevation of the berm so that the top of the berm is no greater than 4 feet below the superstructure.

At MSE walls, use bridge ends consisting of cast-in-place reinforced concrete caps supported with piles or cast-in-place reinforced concrete drilled shafts that are set back behind the MSE wall faces as shown in SCDOT Geotechnical Drawings and Details.

The following applies to bent cap cantilevers for end bents:

- For a cap supported by prestressed concrete piles, provide a minimum of the equivalent of 2 pile widths of distance from the centerline of the exterior pile to the end of the cap.
- Do not detail the intersection of the centerlines of bent and exterior beam/girder on the bent cap cantilever.
- Provide a distance from the centerline of exterior pile to the edge of a slab superstructure, measured along the bent cap centerline, that is less than or equal to 30 percent of the average pile spacing of the bent.

2.1.23 Integral Bent Caps

If integral bent caps are used on this Project, construct the caps using cast-in-place concrete.

2.1.24 Slope Protection

Provide concrete slope protection for the end fills under new bridges over I-85. If a bridge has a vertical abutment wall, provide concrete slope protection in the area under the bridge between the wall and the paved shoulder. Detail concrete slope protection with a minimum thickness of 4 inches and in accordance with Drawing No. 804-01 of the Bridge Drawings and Details and in accordance with the requirements of Section 804 of the Standard Specifications for Highway Construction.

For bridges crossing streams, protect the end fills with rip rap in accordance with Standard Drawing 804-105-00.

2.1.25 Bearing Plates

For beveled bearing plates, use a minimum thickness of 1 ½ inches at mid-section while maintaining 1 inch minimum at the low side.

2.1.26 Barriers Supported by Moment Slabs

When required, provide barriers supported by moment slabs that are designed in accordance with the AASHTO LRFD Bridge Design Specifications. Detail the moment slabs independently of MSE walls as shown on Drawing No. 713-01d of the SCDOT Geotechnical Drawings and Details.

2.1.27 Bridge Plans

As required by the SCDOT Bridge Design Manual, include in the bridge plans Reinforcing Steel Schedules and Quantities Tables for each bridge component (end bents, interior bents, spans, etc.). When these components are required to be constructed in stages, break the Reinforcing Steel Schedules and Quantities Tables down by stage. Immediately following the title sheet, provide a quantities sheet that includes a tabulation of estimated quantities and a summary of estimated quantities.

2.2 New Railroad Bridge

2.2.1 Bridge Design

Design the new Norfolk Southern Railway bridge at approximately MM 101 in accordance with the requirements of Attachment B. Fracture Critical bridges are not allowed unless a minimum 18'-0" of vertical clearance is provided above the interstate.

2.2.2 Vertical Clearances

Provide a minimum of 17'-0" of vertical clearance under the new bridges over I-85. In addition, provide 17'-0" of vertical clearance over the future section of I-85. When calculating the future vertical clearance, assume the future section of I-85 has inside and outside shoulders that will be 12 feet in width, the future profile grade line will be in the center of four 12-ft. travel lanes, and the future profile grade line elevation will be adjusted such that the pavement elevation at the median barrier for the future section will match this project's pavement elevation at the median barrier.

2.2.3 Horizontal Clearances

Provide horizontal clearances under the new bridge over I-85 as shown on the drawing entitled "Horizontal Clearance Requirements under New Overpasses" in Attachment B.

2.2.4 Removal and Disposal of Existing Bridge

Remove and dispose of the existing bridge over I-85 in accordance with the Standard Specifications for Highway Construction, Exhibit 4g, and all applicable laws and regulations.

2.2.5 Final Finish of Exposed Concrete Surfaces

Final surface finish is not required for this bridge.

Apply an Anti-Graffiti Coating to exposed concrete surfaces of bridge abutment walls

2.2.6 Slope Protection

Provide concrete slope protection for the end fills under new bridge over I-85. If a bridge has a vertical abutment wall, provide concrete slope protection in the area under the bridge between the wall and the paved shoulder. Detail concrete slope protection with a minimum thickness of 4 inches and in accordance with Drawing No. 804-01 of the Bridge Drawings and Details and in accordance with the requirements of Section 804 of the Standard Specifications for Highway Construction.

2.3 Retaining Walls

2.3.1 Mechanically Stabilized Earth (MSE) Walls

Design and construct MSE walls in conformance with Supplemental Technical Specification SC-M-713 and SCDOT Geotechnical Drawings and Details, Drawings No. 713-01 and 713-02. If MSE wall is adjacent to the drainage structure, the leveling pads of the MSE wall must be offset a distance away from the drainage structure to facilitate future maintenance and at an elevation which allows sufficient slope stability for open trench working condition.

At bridge abutments, construct MSE wall facing using precast concrete panels with a deep fractured fin finish in accordance with Standard Drawing 701-950-01.

Provide a minimum of 3 feet of clear distance between the fill face of the MSE wall panels and the piles or drilled shafts. For two staged walls (walls with both temporary and permanent faces), provide a minimum of 3 feet of clear distance between the fill face of stage 1 (temporary face) and the piles or drilled shafts.

Design wall heights and lengths to provide adequate cover for roadway and bridge drainage inlets and pipes in the roadway approaches. In addition, design wall heights and lengths to provide adequate slope transitions to maintain stable shoulders and slopes and design clearances and templates in accordance with the design criteria.

Do not use MSE wall structures, with panel type facings, that exceed heights of 40 feet. Do not use MSE wall structures, with modular block type facings, that exceed heights of 30 feet. Do not use MSE wall structures, with modular block type facings, that are visible to interstate traffic. Construct MSE wall facing using precast concrete panels with a deep fractured fin finish in accordance with Standard Drawing 701-950-01 for all MSE walls visible to interstate traffic.

Provide a concrete paved drainage ditch along the top of the wall as shown on the SCDOT Geotechnical Drawings and Details. Provide drainage inlets as necessary to prevent water from overtopping the wall.

2.3.2 Reinforced Concrete Walls

Base selection criteria for reinforced concrete walls on FHWA Publication FHWA NHI-07-071 entitled *Earth Retaining Structures, 2008*.

Design these walls in accordance with the AASHTO LRFD Bridge Design Specifications and FHWA Publication FHWA NHI-07-071 entitled *Earth Retaining Structures, 2008*.

Provide a concrete paved drainage ditch along the top of the wall if the retained soil slopes towards the back of the wall. Provide drainage inlets as necessary to prevent water from overtopping the wall.

Spread footings are permitted for concrete retaining walls that are not directly supporting bridges.

2.3.3 Other Wall Types

Other acceptable wall types include Precast Counterfort walls (which are permitted in conjunction with traditional MSE walls in partial rock cuts), Tangent Pile/Secant Pile walls, Anchored walls, Sheet Pile walls having reinforced concrete coping, Soldier Pile and Lagging walls, and Soil-Nailed walls.

Prior to commencing any designs of other wall types as specified herein, submit to SCDOT the wall type selected, design methodology, design criteria, and material and construction specifications for review. In the design criteria, include wall geometry and location, resistance factors, soil properties, and material properties of the wall. If the walls support bridge embankments, also submit conceptual bridge plans in accordance with Section 3.2 of the SCDOT Bridge Design Manual. Submit shop plans and any calculations for other wall types in accordance with Section 725 of the SCDOT 2007 Standard Specifications for Highway Construction.

Provide a concrete paved drainage ditch along the top of the wall if the retained soil slopes towards the back of the wall. Provide drainage inlets as necessary to prevent water from overtopping the wall.

All walls visible from the Interstate shall have a consistent wall finish to match either the MSE or reinforced concrete walls.

2.3.4 Traffic Railing

If the face of a retaining wall is located either within the clear zone or within 30 feet of the edge of a travel lane, design the wall for a Test Level 4 impact and provide a Test Level 4 barrier with a traffic face that is a minimum of 46 inches in height, measured from top of pavement to top of traffic face, and that has a constant 9.1 degree (1H:6.25V) slope away from traffic. This requirement applies to both sides of the wall. Except for cast-in-place concrete gravity and semi-gravity walls, barriers must be detailed independently of the wall and must be supported by a moment slab. An exception to this is that at the low side of wall only, the barrier detail described in Section 2.5.3, “Abutment Wall Protection”, may be used in lieu of the barrier supported by moment slab. For barriers adjacent to I-85 travel lanes, construct the traffic face of the barrier at an elevation that will accommodate the future widening of I-85. See Section 2.1.4 for assumptions of the future section of I-85.

2.3.5 Anti-Graffiti Coating

Apply an Anti-Graffiti Coating to exposed surfaces of retaining walls.

2.3.6 Plans Preparation

Include retaining wall plans within the set of roadway plans and number the sheets using an “S” prefix. However, if retaining walls are used as vertical bridge abutments, include the wall plans in the bridge plans. Include the following information in the wall construction plans:

2.3.6.1 Design Information

Indicate the design parameters.

2.3.6.2 Plan View

Provide a plan view that includes the following information and details:

- proposed wall location,
- centerline of roadway,
- stationing,
- stations and offsets of beginning and end of wall,
- length of wall,
- guard rail (if required),
- drainage basins/flumes,
- construction staging (if required),
- north arrow,
- existing structures, features, and utilities in vicinity of the wall if they impact construction,
- temporary shoring (if required), and
- boring locations.

2.3.6.3 Elevation View

Provide an elevation view that shows the top of the wall elevations, footing elevations (when applicable), and the existing ground line. In the elevation view, also show the final ground line along each face of the wall.

2.3.6.4 Details

Include details of each wall component and requirements of the architectural or finish treatment.

2.3.6.5 Cross Sections

Provide section views of the wall.

2.3.6.6 Reinforcing Steel Schedule and Quantities

If the construction of the wall includes reinforcing steel, include a reinforcing steel schedule that lists the reinforcing steel required for the wall. In this schedule, include the mark, number of bars required, and dimensions for each reinforcing bar. Also, provide a table of estimated quantities for each wall. For projects requiring stage construction, break the reinforcing steel schedule and quantities down by stage.

2.3.6.7 Special Details

Include details for construction of walls around buried foundations, drainage facilities, pipe penetrations, and utilities.

2.3.6.8 Boring Logs

Include copies of the boring logs.

2.4 **Box Culverts and Box Culvert Extensions**

2.4.1 Design Specifications

Design all new culverts in accordance with the requirements of the AASHTO LRFD Bridge Design Specifications. Use the HL-93 live loading.

The Contractor may design extensions of existing culverts in accordance with the Seventeenth Edition of the AASHTO Standard Specifications for Highway Bridges if the existing culvert was designed using the AASHTO Standard Specifications for Highway Bridges. If this option is selected, design for HS 20-44 Loading or an Alternate Military Loading of two axles four feet apart with each axle weighing 24,000 pounds, whichever produces the greater stress.

Hydraulically design culverts that convey water in accordance with the requirements of the SCDOT Requirements for Hydraulic Design Studies.

Perform subsurface investigations for culverts in accordance with the requirements of the SCDOT Geotechnical Design Manual.

Consider seismic effects for new culverts as required by the SCDOT Seismic Design Specifications for Highway Bridges.

2.4.2 Materials

Use Class 4000 concrete for cast-in-place elements of culverts and use Class 5000 concrete for precast elements of culverts.

Use reinforcing bars conforming to the requirements of ASTM A 706, Grade 60. Use Welded Wire Fabric that meets the requirements of AASHTO M 55 or AASHTO M 221.

2.4.3 Design and Detailing Requirements

2.4.3.1 General

Culverts will not be allowed as a substitute for bridges specified in this project. Construct culverts with four sides and using reinforced concrete.

Establish the length of the culvert so that, at the end of the culvert, the theoretical fill slope is 1 foot below the top of the top slab. Locate the culvert headwalls outside of the adjusted clear zone (see SCDOT Standard Drawing No. 805-010-00) where practical or shield the exposed portions of the structure appropriately.

Detail weep holes and French drains in accordance with Section 702 of the SCDOT Standard Specifications for Highway Construction. Locate the weep holes 12 inches above the normal water line.

For culverts that convey water, detail rip rap and geotextile fabric at both ends of the culvert in accordance with SCDOT Standard Drawing No. 804-205-00.

From the beginning of construction until the end of the 75-year design life of the culvert, limit the settlement to 8 inches. Limit the maximum allowable differential settlement along the length of a culvert to 1 inch per 50 feet of culvert length. If deep foundations are used to limit the settlement of a culvert, limit the longitudinal differential settlement between the culvert and the adjacent paved embankment to a maximum of 1 inch in 20 years.

Detail additional reinforcing steel at openings in the top slab or side walls to meet or exceed the reinforcement shown on SCDOT Standard Drawing No. 722-105-02.

Detail all box culverts, whether cast-in-place or precast, with cast-in-place wing walls, head walls, aprons, and cut-off walls on both the inlet and outlet ends. Do not use precast wing walls, head walls, aprons, cut-off walls, and footings.

In situations where guardrail is required and installation of the posts conflicts with the top slab of the culvert, detail a 12'-6" long span of nested guardrail to bypass the culvert if site and culvert geometry permit. For details of this nested guardrail, see SCDOT Standard Drawing No. 805-565-00. As shown on this drawing, detail a 10:1 or flatter slope for the shoulder area and maintain a minimum 5'-6" offset between the face of the guardrail and the back of the head wall. When nested guardrail is required, include on the plans a note specifying that the guardrail installation must comply with SCDOT Standard Drawing No. 805-565-00.

If guardrail is required and site and culvert geometry do not permit the nested guardrail installation, provide a moment slab to anchor the guardrail. Design and detail the moment slab to eliminate transfer of moment to the culvert barrel. If the moment slab is attached to the culvert barrel for resistance to sliding forces, design and detail the connection to resist horizontal sliding forces only.

2.4.3.2 Wing Walls

Wing walls are typically flared out approximately 30 degrees in relation to the centerline of the culvert, but the angle may vary

based on site conditions. Detail the wing walls so that the top of the wing wall is at least 12 inches above the finished ground line. Design and detail the wing wall height so that, at the junction of the wing wall and culvert barrel, the top of the wing wall is the same elevation as the top of the top slab of the culvert barrel. Extend the wing wall at least to a point where the soil can wrap around the exposed face of the wing wall, using a slope of 2H:1V or flatter, without encroaching on the projected barrel opening.

Support wing walls by footings or aprons, but assume no support from the culvert barrel(s).

Detail the thickness of wing walls equal to or greater than the exterior wall thickness of the culvert. If the maximum wing wall height is greater than 5 feet and the wing wall has a layer of reinforcing in each face, provide a minimum of 5 inches of clearance between the mats of reinforcing steel.

2.4.3.3 Aprons

For box culverts, detail aprons as continuously cast-in-place concrete placed from end to end of the wing walls. Aprons may cover the entire area between the wing walls and the ends of the culvert barrel(s) or may follow the edges of the wing wall/culvert barrel(s). Detail the thickness of the aprons equal to or greater than the thickness of the bottom slab unless the bottom slab thickness exceeds 12 inches. If the bottom slab thickness exceeds 12 inches, detail the apron thickness as 12 inches unless a thicker apron is required by design.

2.4.3.4 Cut-off Walls

Detail cut-off walls with a minimum thickness of 10 inches. Detail cut-off walls to extend a minimum of 2 feet below the bottom of the bottom slab or apron. Detail cut-off walls to extend to a depth 2 feet below the scour depth or into unweathered rock. If cut-off walls are used as structural elements, design and detail appropriate reinforcement.

2.4.3.5 Head Walls

Detail head walls with a minimum height of 12 inches above the finished ground line and a minimum thickness of 12 inches. Detail head walls to extend the full width of the culvert barrel(s).

Anchor the head walls to the top slabs of culverts with reinforcing steel that has been designed and detailed to resist overturning and

sliding. Detail each face of the head wall with a minimum of 0.2 square inches of reinforcing steel per foot in each direction.

2.4.3.6 Concrete Cover

For cast-in-place box culverts, provide concrete cover to reinforcing in accordance with the AASHTO LRFD Bridge Design Specifications. For W/C ratios that are less than or equal to 0.4, use a concrete cover modification factor of 1.0.

For precast box culverts in counties other than Beaufort, Berkeley, Charleston, Colleton, Dorchester, Georgetown, Horry, and Jasper, detail the clear cover as shown in ASTM C 1433 and ASTM C 1577. For precast box culverts that convey intermittent flow in Beaufort, Berkeley, Charleston, Colleton, Dorchester, Georgetown, Horry, and Jasper counties, detail the clear cover as shown in ASTM C 1433 and ASTM C 1577. For precast box culverts that convey permanent flow in Beaufort, Berkeley, Charleston, Colleton, Dorchester, Georgetown, Horry, and Jasper counties, detail a minimum of 3 inches of clear cover for reinforcing.

2.4.3.7 Existing Culverts and Extensions

Where a change in fill height is proposed for culverts remaining in place or being extended, evaluate the existing culvert to determine if it is structurally adequate to handle the revised loading conditions or if it will require total replacement.

Construct all box culvert extensions of existing cast-in-place culverts using cast-in-place concrete. Construct extensions of existing precast culverts using either precast sections or cast-in-place concrete. If precast sections are used, design and detail the extensions with a cast-in-place concrete transition between the end of the existing barrel and the first new section of precast barrel.

For extensions of existing culverts, detail adhesive anchors, #6 (#19) or greater in size, at a maximum spacing of 18 inches in the exposed ends of the existing barrel. Match the interior barrel shape of the new culvert to that of the existing culvert (i.e. chamfers, ledges, etc.) except as noted in Section 2.4.4.3.

2.4.4 Cast-in-Place Concrete Box Culverts

2.4.4.1 General

For culverts with skews greater than 25 degrees, design and detail the transverse reinforcing steel perpendicular to the longitudinal reinforcing steel. For lesser skew angles, design and detail the transverse reinforcing steel either perpendicular or parallel to the skew.

At the discontinuous edges of culvert barrel sections, design edge beams for the top and bottom slabs.

2.4.4.2 Slabs

Use a minimum thickness of 10 inches for cast-in-place box culvert top and bottom slabs.

2.4.4.3 Walls

Detail cast-in-place box culvert walls vertical and detail a minimum thickness of 8 inches. If the vertical opening dimension of the culvert is greater than 5 feet, provide a minimum of 5 inches of clearance between mats of reinforcing in the walls.

For extensions of existing multi-barrel culverts having interior wall thicknesses less than the new wall thicknesses, detail a minimum 6:1 transition at the junction of the new and existing interior walls.

2.4.4.4 Construction Joints

Limit the maximum pouring length of cast-in-place culvert barrel sections to 70 feet. Detail keyed transverse construction joints in the barrel(s) as required to meet this limit. Detail the longitudinal reinforcing steel continuous across the joints.

If the volume of cast-in-place concrete exceeds 225 CY in any pour, provide a pouring sequence on the plans. Complete all concrete pours in less than 5 hours. If a pouring rate greater than 45 CY/hr is needed, indicate on the plans the required pouring rate.

Detail a keyed construction joint in the walls, 4 inches above the top of the bottom slab. When the height of the wall, measured from the top of the bottom slab, is 8 feet or greater, also detail a keyed construction joint between the walls and top slab.

For construction joints located between elevations of extreme low tide and extreme high tide, include requirements on the plans for the joint to be sealed. Detail each exterior side of the joint with a

½ inch chamfer on the upper side of the joint. Specify on the plans that the Contractor seal this ½ inch chamfer with a bonding epoxy conforming to ASTM C 881, Type IV, Grade 3, and that the Contractor apply the epoxy in accordance with the manufacturer's written instructions.

2.4.5 Precast Concrete Box Culverts

2.4.5.1 General

Do not use precast box culvert sections if any of the following conditions exist:

- the design earth cover exceeds 20 feet,
- the design earth cover is less than 2 feet,
- the culvert is an extension of an existing cast-in-place culvert, or
- the culvert will be used for pedestrian traffic.

Use monolithically cast box culvert sections. Do not use precast concrete split box culvert sections.

2.4.5.2 Design Requirements

Design precast box culvert sections for new culverts in accordance with ASTM C 1577 except when clear cover for reinforcing is required to be 3 inches. Design precast box culvert sections for culvert extensions of existing precast culverts in accordance with either ASTM C 1577 or ASTM C 1433 except when clear cover for reinforcing is required to be 3 inches. For precast culverts having design fill heights greater than 5 feet, round the design fill height to the next higher 5 foot increment when using the tabulated design information from ASTM C 1577 or ASTM C 1433.

2.4.5.3 Detailing Requirements

Detail precast box culverts in accordance with SCDOT Standard Drawing No. 722-305-00 and Section 722 of the SCDOT Standard Specifications for Highway Construction. Require on the plans that the Contractor place all precast box culverts on a prepared bed of aggregate (Coarse Aggregate No. 5, No. 56, or No. 57) having a minimum thickness of 6 inches. Extend the aggregate bed the entire width and length of the culvert plus 3 inches beyond the outer walls of the barrel(s).

On the plans for precast box culverts, include details for cast-in-place wing walls, head walls, aprons, cut-off walls, and footings. Detail these cast-in-place elements in accordance with the requirements of Section 2.3.2. Attach these elements to the precast

culvert barrel(s) using #6 (#19) adhesive anchors detailed at a maximum spacing of 18 inches in the exposed ends of the barrel(s). Design these elements as self-supporting. Use the adhesive anchors only to control differential settlement.

Where multiple precast box culvert barrels are placed side by side, the plans shall require a 3½ inch minimum and 6 inch maximum space between adjacent barrel sections. The plans shall require this space to be filled with flowable fill or cast-in-place concrete. If the space is filled with flowable fill, the plans shall require that, at both the upstream and downstream ends, the last 6 inches of space between the barrels (measured along the longitudinal direction of the barrels) be filled with a cast-in-place concrete cap for the full height of the barrels.

2.4.6 Plans Preparation

Include culvert plans within the set of roadway plans and number the sheets using an “S” prefix. Include the following information in the culvert plans:

2.4.6.1 Title Blocks.

In the title blocks of the culvert sheets, include the fill height used to design the culvert, the culvert opening size (span x rise), the station at centerline of culvert, and the slope of fills.

2.4.6.2 Location Sketch.

Provide a location sketch that includes the following information and details:

- proposed culvert outline,
- existing culvert outline as a light, dashed line,
- centerline of roadway,
- direction of stationing,
- station of intersection of roadway centerline and culvert centerline,
- dimensions of culvert barrels,
- length of each end of culvert measured from the roadway centerline,
- skew angle,
- construction staging (if required),
- temporary shoring locations (if required for construction),
- permissible types of temporary shoring (if restricted),
- stream name,
- direction of flow,

- limits of riprap or note that riprap is in accordance with SCDOT Standard Drawing No. 804-205-00 (if required),
- north arrow,
- existing structures, features, utilities in vicinity of culvert if they impact culvert construction,
- invert elevations at each end of new culvert or both ends of each side being extended,
- boring locations, and
- hydraulic data.

2.4.6.3 Design Information.

Indicate the design specification and live load in the plans.

2.4.6.4 Plan View.

Provide a plan view that details the culvert, apron, cut-off wall, wing wall, and footing dimensions; the reinforcing bars, bar callouts, and bar spacing; and the location of any required transverse construction joints.

2.4.6.5 Cross Section

Provide section views of the barrel(s), wing walls, head walls, aprons, cut-off walls, and footings detailing the dimensions; the reinforcing bars, bar callouts, and bar spacing; the weep holes and french drains; and the location of construction joints.

2.4.6.6 Reinforcing Steel Schedule and Quantities

For each culvert, include a reinforcing steel schedule that lists the reinforcing steel required for the culvert. In this schedule, include the mark, number of bars required, and dimensions for each reinforcing bar. Immediately below the reinforcing steel schedule, include a list of estimated quantities for the culvert. Include all quantities required for construction of the culvert (e.g., reinforcing steel, concrete, piling, excavation, riprap, geotextile, etc.). For projects requiring stage construction, break the reinforcing steel schedule and quantities down by stage.

2.4.6.7 Boring Logs

Include copies of the boring logs in the plans.

2.5 Concrete Median Barriers and Bridge Pier Protection

2.5.1 Concrete Median Barrier

Unless permitted otherwise in Exhibit 4a, slope the exposed traffic faces of concrete median barrier at a constant 9.1 degrees (1H:6.25V) away from traffic. Design the barrier in accordance with AASHTO LRFD Bridge Design Specifications for a Test Level 4 impact. If the exposed portion of a median barrier exceeds a height of 56 inches above the pavement, the portion of the traffic face that is higher than 56 inches may be detailed vertical or sloped away from traffic at a rate other than 1H:6.25V. Provide a 6-inch minimum top barrier width and a minimum height, measured from top of pavement to top of barrier, of 56 inches. In grade separation sections, the 56 inch minimum height may be measured from the lower pavement surface. Apply the following requirements when designing concrete median barriers:

Utilize Class 6000 concrete as specified by Standard Drawing 805-800-1 or utilize Class 4000 concrete with a minimum 6000psi compressive strength at 28-days. If a Class 4000 concrete with a 6000 psi 28-day compressive strength is utilized, develop the mix design in accordance with section 701 of the Standard Specifications and demonstrate compliance of strength and workability prior to incorporating into permanent work.

Condition A – Concrete Median Barrier with grade separations of 18 inches or less: Use details from the SCDOT Standard Drawings. The following requirements apply to the details of Standard Drawings 805-810-01 and 805-810-02:

- Details 4, 5, & 15 – Align barrier expansion joints with rigid pavement expansion joints while maintaining the joint spacing limitations of both structures.
- All other details – Either isolate the barrier from rigid pavement by placing a bond breaker at the interface between the rigid pavement and the barrier foundation, or align expansion joints in barrier with pavement expansion joints within the joint spacing limitations of both structures. If bond breaker is used, seal the top of the joint with a silicone sealant having a width of 3/8 inch.

Condition B – Concrete Median Barrier with grade separations between 18 inches and 36 inches require a complete design, ~~or, with approval from SCDOT, the contractor may use other TL 4 single slope barrier designs that have been approved by FHWA.~~ Calculate and detail the minimum expansion joint spacing required for stability analysis to resist the overturning of the Test Level 4 impact force at the increased moment arm generated by the grade separation.

Condition C – Concrete Median Barrier with grade separations 36 inches and greater: In addition to the design requirements of Condition B, design the cantilever wall barrier in accordance with SCDOT seismic design requirements.

For Conditions B and C, when evaluating the stability of the barrier, use a transverse force of 10 kips. For Conditions B and C, design and detail the barrier to provide a minimum height, measured from top of higher pavement surface to top of barrier, of 46 inches. Use a 10:1 taper to transition between Condition A barriers and Conditions B and C barriers. Design and detail the barrier foundation independent of the rigid pavement. Provide an isolating bond breaker between the rigid pavement and the barrier structure and seal the top of the joint with a silicone sealant having a width of 3/8 inch.

2.5.2 Bridge Bent Protection

At each new bridge that crosses I-85, detail bridge pier protection for all interior bents that are adjacent to travel lanes. Use Test Level 5 details from the SCDOT Standard Drawings.

2.5.3 Abutment Wall Protection

At each new bridge that crosses I-85, detail bridge pier protection for the full length of all vertical abutments and vertical abutment wing walls that are adjacent to travel lanes. Use Test Level 5 details from the SCDOT Standard Drawings, except modify the barrier shape and provide backfill between the barrier and wall as shown on the drawing entitled “Rigid Barrier Adjacent to Wall” in Attachment B. Construct the barrier at an elevation that will accommodate the future widening of I-85. See Section 2.1.4 for assumptions of the future section of I-85.

EXHIBIT 4c

PAVEMENT DESIGN CRITERIA

1.0 GENERAL

Exhibit 4c contains requirements for:

- Hot Mix Asphalt (HMA) pavement and base for inside interstate widening
- HMA pavement for mainline resurfacing
- Resurfacing Limitations
- HMA pavement and base for reconstruction existing interstate mainline and outside widening
- HMA pavement and base for non-interstate routes
- Cross-Slope Correction
- Temporary pavement

2.0 CRITERIA

2.1 General Notes

If the final elevation is built up, and a new surface course of HMA is to be placed, mill and remove OGFC at a minimum. If the final elevation is staying the same, mill and remove/replace HMA surface and OGFC in accordance with the minimum treatment given in Section 2.3. Maximum allowable cut of the structure without reconstruction is identified in section 2.3

Use hot applied non tracking ultrahigh strength bonding coat as substitute for tack under all OGFC (See QPL #38).

Prior to placing the final permanent pavement markings, all asphalt areas not requiring pavement reconstruction or rehabilitation but requiring revised temporary or permanent pavement markings shall be milled 3-inches and resurfaced utilizing 200 psy hot mix asphalt HMA Surface Type A and 125 psy OGFC on interstate pavements. PCC pavement not requiring reconstruction shall be diamond ground full width for the pavement prior to placement of the final pavement markings. This shall be required from the south end of the Broad River bridge to the point required to allow for proper lane transitions as estimated in the Scope of Work. Existing pavement markings on bridge decks shall be removed and replaced to match new lane configurations.

Include full depth asphalt and concrete patching in accordance with the Special Provision in Exhibit 5. Full depth patching shall be conducted prior to variable build up or overlay. Patch interstate and non-interstate routes as directed by the RCE.

EXHIBIT 4c – PAVEMENT DESIGN CRITERIA

Overlay all surface planed or milled areas with at least 200 psy of the subsequent pavement course in the same paving season the surface planning or milling was conducted. Do not allow traffic to run on planed or milled surface for more than 3 weeks.

Utilize surface planning for any areas intended to carry traffic on the milled/planed surface. The test section and rideability requirements in Exhibit 5 SECTION 401: SURFACE PLANING OF ASPHALT PAVEMENT shall not be required where HMA Surface A and OGFC are being placed as subsequent lifts.

Carry the OGFC to a width of 4 feet over shoulders. For shoulders adjacent to barrier walls, carry the OGFC to the face of the drop inlets or 4 feet, whichever is less. Carry the OGFC along the ramp to the gore, then variably mill 0 to 1.5 inches over a minimum of 75 feet and terminate the OGFC in a neat, smooth transverse joint.

Milled-in rumble strips shall be used on all shoulders, both inside and outside, in accordance with Engineering Directive 53, SCDOT Standard Drawings and specifications for the entire project.

Cross-slope verification in accordance with Exhibit 5 – Special Provision is required for mainline interstate pavement.

Follow Asphalt Mix Design Guidelines found on SCDOT website for type, rate and application.

[http://www.scdot.org/doing/technicalPDFs/materialsResearch/Guidelines Asphalt Mix Selection.pdf](http://www.scdot.org/doing/technicalPDFs/materialsResearch/Guidelines_Aspphalt_Mix_Selection.pdf)

All CMRB shall be Method B curing. Perform CMRB using a minimum of 2 passes with the reclaimer. This can include a pulverization and mixing pass or two passes with cement. Additional passes may be needed to meet the requirements of the specification.

2.2 Inside Interstate Widening

Construct a new HMA pavement with the following characteristics. Select from the options below.

Layer Type	Option 1i	Option 2i	Option 3i
OGFC	125 ¹	125	125
Surface A	200	200	200

EXHIBIT 4c – PAVEMENT DESIGN CRITERIA

Intermediate A	600	600	300
CCPR ²			
Base A	750	900	625
GABC ³	10		
Soil-Cem ⁴		9	
CMRB ⁵			12

1: Rates for HMA are given in psy. Rates for other pavement layers are given in inches.

2: Cold Central Plant Recycled, see Exhibit 5, rate 3 – 4 inches per lift. This material may only be placed on the shoulder as a substitute for HMA base and a portion of the intermediate. It must be covered with a minimum of 500 psy of dense graded HMA. CCPR will not be allowed on the mainline interstate or ramps. The structural coefficient is 0.34 per inch.

3: Graded Aggregate Base Course

4: Soil-Cem, Section 301 Cement Modified Subbase. The contractor shall confirm suitability of soils for modification and provide mix design with a minimum strength, during production, of 300 psi for approval. Ensure the full width of the lane/pavement area is mixed.

5: Cement Modified Reclaimed Base, Section 306, The mixture shall consist of 40 – 50% Reclaimed Asphalt Pavement (RAP) or GABC combined with the subgrade. The contractor shall confirm suitability of soils for modification and provide mix design with a minimum strength, during production, of 450 psi for approval. Ensure the full width of the lane/pavement area is mixed.

New shoulder will match widening design with the exception that Cold Central Plant Recycled (CCPR) material will be allowed on the shoulder as seen in Note 2 above. If temporary pavement design is not used on the outside shoulder the shoulder shall match one of the options in section 2.4. ~~Ramps will be selected from one of the 3 options given above.~~ Ramps shall be selected from the options given for the crossing route or meet the structure requirement of the crossing route at a minimum.

2.3 Existing Interstate Resurfacing and Limitations

2.3.1 From the beginning of project to MM 102 Northbound

Existing structure exceeds required; allowable cut/reduction in structure 2 inches.

EXHIBIT 4c – PAVEMENT DESIGN CRITERIA

Minimum Rehabilitation Treatment:
Mill 3 inches, 200 Surface A, 125 OGFC

2.3.2 From MM 102 Northbound to the end of project Northbound

Requires additional structure; no allowable cut/reduction in structure.

Minimum Rehabilitation Treatment:
Remove OGFC (surface plane approximately 1.25 inches), 200 psy
Intermediate B, 200 psy Surface A, 125 OGFC

2.3.3 Southbound

Meets required Structure; no allowable cut/reduction in structure.

Minimum Rehabilitation Treatment
Mill 3 inches, 200 Surface A, 125 OGFC

2.3.4 Tie Pavement to Norfolk Southern Bridge Replacement Project

Tie into the new pavement being placed on that project. Remove and replace any OGFC within the limits of the bridge replacement project so as not to create a construction joint in the new OGFC.

2.4 Reconstruction Existing Interstate Mainline and Outside Widening

If final elevations exceed cut limitations, reconstruct the existing mainline pavement and outside widening with one of the following options.

Layer Type	Option 1o	Option 2o	Option 3o
OGFC	125 ¹	125	125
Surface A	200	200	200
Intermediate A	300	600	300
Base A	1250	1075	800
GABC ²	10		
Soil-Cem ³		9	
CMRB ⁴			12

1: Rates for HMA are given in psy. Rates for other pavement layers are given in

inches.

2: Graded Aggregate Base Course

3: Soil-Cem, Section 301 Cement Modified Subbase. The contractor shall confirm suitability of soils for modification and provide mix design with a minimum strength, during production, of 300 psi for approval. Ensure the full width of the lane/pavement area is mixed.

4: Cement Modified Reclaimed Base, Section 306, The mixture shall consist of 40 – 50% Reclaimed Asphalt Pavement (RAP) or GABC combined with the subgrade. The contractor shall confirm suitability of soils for modification and provide mix design with a minimum strength, during production, of 450 psi for approval. Ensure the full width of the lane/pavement area is mixed.

New outside shoulder will match widening design with the exception that Cold Central Plant Recycled (CCPR) material will be allowed on the shoulder as seen in Note 2 from section 2.2. New inside shoulder will match options from section 2.2.

2.5 Cross-Slope Correction

Surface plane approximately 1.25 inches uniform to remove existing OGFC. Perform full depth patching as directed by RCE. Cross-Slope correction shall be accomplished such that there is no reduction of existing pavement thickness other than what is allowed in section 2.3. Use Surface Type E for correction up to 1.5 inches. Use Intermediate Type B for correction that requires greater than 1.5 inches per lift.

2.6 Temporary Pavement

Design of temporary pavement is required. Information provided in this RFP should not be relied on for design and is given for information only. It is the responsibility of the Contractor to evaluate the information and perform additional investigation as necessary for the design. It is recommended to reconstruct or add additional structure to the of existing shoulders if being used as a temporary pavement due to the variance of thickness and existing conditions, including cracking and mixture quality. **If contractor is reconstructing or providing additional structure for temporary pavement it shall be for the shoulders entire width.** Provide design of any temporary pavement for approval by RCE prior to placing traffic on new alignment. If reconstruction is not selected for the existing shoulders, do not eliminate the potential of access to the original alignment for a minimum of 2 weeks after shifting traffic to the shoulders. The minimum structural number for a 1 year, 2 lane, temporary alignment of the mainline shall be 5.14.

EXHIBIT 4c – PAVEMENT DESIGN CRITERIA

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 foot straightedge.

If potholes appear in the temporary pavement the Contractor shall take action within one calendar day to temporarily fill all potholes 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. Any full depth patching required on temporary pavement is not to be paid for from full depth patching quantities included in Exhibit 5.

If temporary pavement is to be incorporated in the final pavement structure, it 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.

2.7 New Alignment and Reconstruction of Non Interstate Routes

If new alignment or reconstruction is required for non interstate routes, select from the options provided below for each routes assigned pavement group.

Exit	Road Number	Road Name	Pavement Group
100	S-83	Blacksburg Hwy	C
100	Non-SCDOT	Crawford	A
100	New Location	Simper	A
102	SC-5	N. Mountain St.	C
102	SC-198	N. Mountain St.	C
102	S-352	Henson Reloc.	A
102	S-667	Shaman	A
102	S-52	Holly Grove Rd.	A
102	S-73	Whites Farm	A
104	S-99	Tribal Rd.	C

EXHIBIT 4c – PAVEMENT DESIGN CRITERIA

104	S-657	Gibbons	A
104	S-151	Priester	A
104	S-669	Whites Farm	A
106	US-29	East Cherokee St	C
106	Relocation NB Fr Rd	Stoney Point Road	B
106	S-409	Lakeview	B
106	Non SCDOT	Wendy Dr	A

Pavement Group A Options

Layer Type	Option 1a	Option 2a	Option 3a	Option 4a	Option 5a
Surface B	200 ¹	200	200	200	200
Intermediate B					
CCPR ²	4		4		
Base A		450		450	
GABC ³	6	6			
Soil-Cem ⁴			7	7	
CMRB ⁵					10

1: Rates for HMA are given in psy. Rates for other pavement layers are given in inches.

2: Cold Central Plant Recycled, see Exhibit 5, rate 3-4 inches per lift.

3: Graded Aggregate Base Course

4: Soil-Cem, Section 301 Cement Modified Subbase. The contractor shall confirm suitability of soils for modification and provide mix design with a minimum strength, during production, of 300 psi for approval. Ensure the full width of the lane/pavement area is mixed.

5: Cement Modified Reclaimed Base, Section 306, The mixture shall consist of 25 – 50% Reclaimed Asphalt Pavement (RAP) or GABC combined with the subgrade. The contractor shall confirm suitability of soils for modification and provide mix design with a minimum strength, during production, of 450 psi for approval. Ensure the full width of the lane/pavement area is mixed.

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Pavement Group B Options					
Layer Type	Option 1b	Option 2b	Option 3b	Option 4b	Option 5b
Surface B	200 ¹	200	200	200	200
Intermediate B	200	200	200	200	200
CCPR ²	6		6		
Base A		600		625	
GABC ³	6	7			
Soil-Cem ⁴			7	8	
CMRB ⁵					12

1: Rates for HMA are given in psy. Rates for other pavement layers are given in inches.

2: Cold Central Plant Recycled, see Exhibit 5, rate 3-4 inches per lift.

3: Graded Aggregate Base Course

4: Soil-Cem, Section 301 Cement Modified Subbase. The contractor shall confirm suitability of soils for modification and provide mix design with a minimum strength, during production, of 300 psi for approval. Ensure the full width of the lane/pavement area is mixed.

5: Cement Modified Reclaimed Base, Section 306, The mixture shall consist of 25 – 50% Reclaimed Asphalt Pavement (RAP) or GABC combined with the subgrade. The contractor shall confirm suitability of soils for modification and provide mix design with a minimum strength, during production, of 450 psi for approval. Ensure the full width of the lane/pavement area is mixed.

Pavement Group C Options			
Layer Type	Option 1c	Option 2c	Option 3c
Surface A	200 ¹	200	200
Intermediate B	200	200	400
Base A	625	775	
GABC ²	10		
Soil-Cem ³		9	
CMRB ⁴			12

1: Rates for HMA are given in psy. Rates for other pavement layers are given in

inches.

2: Graded Aggregate Base Course

3: Soil-Cem, Section 301 Cement Modified Subbase. The contractor shall confirm suitability of soils for modification and provide mix design with a minimum strength, during production, of 300 psi for approval. Ensure the full width of the lane/pavement area is mixed.

4: Cement Modified Reclaimed Base, Section 306, The mixture shall consist of 25 – 50% Reclaimed Asphalt Pavement (RAP) or GABC combined with the subgrade. The contractor shall confirm suitability of soils for modification and provide mix design with a minimum strength, during production, of 450 psi for approval. Ensure the full width of the lane/pavement area is mixed.

2.8 Exit 106 Northbound Frontage Road Cul-De-Sac

Pavement surface type will be Asphalt having a thickness of not less than two, 200 psy lifts of Surface Type B and one 450 psy lift of Base Type A.

2.9 Exit 102 Henson Road Cul-De-Sac

Pavement surface type will be Asphalt having a thickness of not less than two, 200 psy lifts of Surface Type B and one 450 psy lift of Base Type A.

2.10 Exit 104 Holly Grove Road Cul-De-Sac

Pavement surface type will be Asphalt having a thickness of not less than two, 200 psy lifts of Surface Type B and one 450 psy lift of Base Type A.

2.11 Rehabilitation of Non Interstate Routes

Perform the required rehabilitation treatment for each route given below.

2.11.1 Exit 100

Blacksburg Hwy Rehab – Mill the existing pavement 2.0 inches uniform. Overlay with one lift of 200 psy Surface Type A.

Crawford Rehab- Mill the existing pavement 2.0 inches uniform. Overlay with one lift of 200 psy Surface Type B.

2.11.2 Exit 102

SC-5 Rehab - Mill the existing pavement 4.0 inches uniform. Overlay with one lift of 200 psy Intermediate Type B and one lift of 200 psy

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Surface Type A. Do not place traffic on the milled surface if the existing structure is reduced by more than 2 inches.

SC 198 Rehab –

From I-85 to S-11-73, Mill the existing pavement 2.0 inches uniform. Overlay with one lift of 200 psy Intermediate Type B and one lift of 200 psy of Surface Type A. Replace curb, saw cut and remove concrete driveway for tie in as directed by RCE, adjust storm drain boxes as necessary.

North of S-11-73, Mill the existing pavement 2.0 inches uniform. Overlay with one lift of 200 psy Intermediate Type B and one lift of 200 psy Surface Type B.

Henson Rehab - Mill the existing pavement 2.0 inches uniform. Overlay with one lift of 200 psy Surface Type B.

Shaman Rehab - Mill the existing pavement 2.0 inches uniform. Overlay with one lift of 200 psy Surface Type B.

Whites Farm Rehab - Mill the existing pavement 2.0 inches uniform. Overlay with one lift of 200 psy Surface Type B.

2.11.2 Exit 104

Tribal Rd Rehab –

Mill the existing pavement 2.0 inches uniform. Overlay with one lift of 200 psy Surface Type A.

Gibbons Rehab - Mill the existing pavement 2.0 inches uniform. Overlay with one lift of 200 psy Surface Type B.

Priester Rehab - Mill the existing pavement 2.0 inches uniform. Overlay with one lift of 200 psy Surface Type B.

Whites Farm Rehab - Mill the existing pavement 2.0 inches uniform. Overlay with one lift of 200 psy Surface Type B.

2.11.2 Exit 106

East Cherokee St Rehab –

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North of I-85, mill the existing pavement 2.0 inches uniform. Overlay with one lift of 200 psy Surface Type A.

South of I-85 to Lakeview Drive, reconstruct using an option given in Pavement Group C of section 2.7.

South of Lakeview Drive, mill the existing pavement 2.0 inches uniform. Overlay with one lift of 200 psy Surface Type A.

Lakeview Rehab-

On the section of Lakeview remaining Lakeview Drive, mill the existing pavement 2.0 inches uniform. Overlay with one lift of 200 psy Surface Type B.

On the section of Lakeview Drive being used as part of the Northbound Frontage Road relocation, reconstruct using an option given in Pavement Group B of section 2.7.

Wendy Drive Rehab - Mill the existing pavement 2.0 inches uniform. Overlay with one lift of 200 psy Surface Type B.

Stoney Point Rehab - Mill the existing pavement 2.0 inches uniform. Overlay with one lift of 200 psy Surface Type B.

NB Frontage Road Rehab - Mill the existing pavement 2.0 inches uniform. Overlay with one lift of 200 psy Surface Type B.

2.12 Tie ins of Existing Non Interstate Route Pavements

Mill the existing pavement 2.0 inches uniform. Overlay with one lift of 200 psy Surface Type B.

2.13 Pavement Design for Milliken and Atlas Drives

Provide 6 inches GABC and 200 psy Surface Type C.

EXHIBIT 4d

TRAFFIC DESIGN CRITERIA

Part 1 – Signing and Pavement Marking

1.0 GENERAL

1.1 Permanent Pavement Markings

Pavement marking work on this project consists of preparing detailed pavement marking plans and applying appropriate markings for the entire length of the project. All mainline and ramp edge lines and lane lines shall be to interstate standards as detailed in the Standard Drawings. Lane lines and edge lines shall be 6 inches in width. Exit and entrance gore markings shall be 12 inches in width. The final roadway surface material will determine which type of permanent marking material is to be applied. The CONTRACTOR shall use either polyurea or preformed tape (T-1) markings on concrete surfaces for the applications noted below. Thermoplastic markings shall be used on all asphalt surfaces. The CONTRACTOR shall install surface mounted raised pavement markers in accordance with the Standard Drawings. In Exhibit 4c Section 2.2 where rumble strips are to be placed not to interfere with future lanes at the transitions to and from two lanes, raised pavement markers shall be used in place of the rumble strips.

1.2 Permanent Signing

Signing work on this project consists of preparing a detailed, comprehensive signing plan for the I-85 mainline from approximately MM 98 (the north end of the I-85 bridge over the Broad River) to MM 106 (the South Carolina / North Carolina State Line) and any interchange ramps or crossing routes within that section; and fabricating, furnishing, and erecting new ground mounted and overhead mounted signs, breakaway posts, overhead sign structures and delineators. All signs, delineators, sign structures and supports shall be removed and replaced on I-85. The limits are also shown in the Conceptual Signing Plans for I-85 mainline are provided in Attachment B. All signs and supports shall be replaced except for LOGO signs on I-85. LOGO signs shall be relocated to new supports if impacted by staging or final design unless damaged in the whole project limits. All existing signing and/or structures located on I-85 mainline or within the project limits of this area shall be replaced and/or relocated if impacted by staging or final design. The location of the signing work begins on I-85 at approximately MM 98 (the north end of the I-85 bridge over the Broad River) to MM 106 (the South Carolina/North Carolina State Line) in Cherokee County. Impacts to LOGO signing include relocating, removing, or causing to be non-compliant.

2.0 CRITERIA

2.1 Permanent Pavement Markings

2.1.1 Thermoplastic Pavement Markings (Asphalt Surfaces)

All thermoplastic markings installed on the interstate mainline or any crossing routes shall meet the requirement of Section 627 of the Standard Specifications.

2.1.2 Polyurea Pavement Markings (Concrete Surfaces)

2.1.2.1 All polyurea markings installed on the interstate mainline, crossing routes or any bridge decks on this project shall be a liquid, multi-component system that includes highly reflective elements.

2.1.2.2 The polyurea pavement marking lines shall have a minimum dry thickness of 20 mils when placed on concrete and asphalt pavements. The pavement marking material and highly reflective elements shall be applied in a simultaneous operation.

2.1.2.3 The CONTRACTOR shall apply the polyurea resin, mixed at the proper ratio according to the manufacturer's recommendations, to the pavement surfaces within the proper application temperatures as determined by the material manufacturer. Highly reflective elements shall be injected into the molten (liquid) polyurea pavement markings in accordance with the manufacturer's recommendations using a dispenser approved by the manufacturers of both the polyurea materials and the highly reflective elements.

2.1.2.4 Upon curing, the markings shall be uniformly reflectorized and have the ability to resist deformation caused by traffic throughout the entire length of the line.

2.1.2.5 If requested by the Engineer, the manufacturer of the selected polyurea material shall provide a technical representative, or a manufacturer's certified representative, to assure proper application technique by the contractor during the initial installation of the product.

2.1.2.6 All materials with be accepted based on manufacturer's certifications.

2.1.3 Preformed Patterned Tape (T-1) Pavement Markings (Options for Concrete Bridge Decks)

2.1.3.1 The CONTRACTOR may choose to apply performed patterned tape markings to concrete bridge decks on this project. If this option is selected the markings shall be preformed patterned tape with a raised diamond pattern covered with ceramic

elements having a refractive index of 1.9 or greater. All preformed tape markings installed on the bridge decks on this project shall be installed with a truck mounted application system or other motorized applicator approved by the manufacturer.

- 2.1.3.2 The CONTRACTOR shall provide to the Department the manufacturer's normal warranty which shall guarantee the tape materials for a period of 72 months from the date of installation from failure to retain the minimum reflectance values provided by the manufacturer and from failure due to loss of material adhesion or complete wear through. If failure occurs, the manufacturer will provide the replacement materials to restore the markings to their original effectiveness.

2.2 Permanent Signing

2.2.1 Maintenance of Mainline and Ramp Directional and Information (LOGO) Signing Mounted on I-Beam Breakaway Posts

- 2.2.1.1 The existing mainline and ramp directional and information signs mounted on I-beam breakaway posts may have to be relocated due to the construction. Where relocation is necessary, the mainline signs should be mounted temporarily on 4"x6" wood posts using the method detailed on Standard Drawing 625-120-00. Ramp information signs (logo) should be mounted temporarily on 4"x4" wood posts. No separate payment will be made for these relocations. All signs are to be maintained throughout construction.

- 2.2.1.2 In addition, the CONTRACTOR will be responsible for replacing signs damaged during construction which are to be retained (i.e. logo signs) and erected as part of the permanent signing. A Department representative should conduct an inspection/evaluation prior to and at the conclusion of construction to determine in any damage occurred during execution of the contract.

2.2.2 Bridge Clearance and Crossing Route Information Signing

- 2.2.2.1 The CONTRACTOR will be required to erect bridge vertical clearance and crossing route number flat sheet signs on the new and existing bridges in both directions of travel. The signs shall be fabricated in accordance with the SCDOT sign numbers shown in the table below. The CONTRACTOR shall determine the actual minimum vertical clearance in each

direction after all interstate mainline or crossing route surfacing is completed.

SCDOT Sign Number	Sign Description	Crossing Route Type
W12-2P-78	Vertical Clearance	All
OHB M1-1-48	Crossing Route Information	Interstate – 2 or 3 digit
OHB M1-4-48	Crossing Route Information	US Route – 2 digit
OHB M1-4-60	Crossing Route Information	US Route – 3 digit
OHB M1-5-48	Crossing Route Information	SC Route – 2 digit
OHB M1-5-60	Crossing Route Information	SC Route – 3 digit
OHB M1-6-78	Crossing Route Information	Secondary Route – 2 digit
OHB M1-6-84	Crossing Route Information	Secondary Route – 3 digit

2.2.2.2 Detailed layouts for the signs in table are available from SCDOT – Director of Traffic Engineering, (803) 737-1462. Written requests for detailed layouts shall be addressed to the POC. Sign CADD files in Attachment B.

2.2.2.3 The vertical clearance sign shall be centered over the centerline of the interstate or crossing route travel way. The crossing route number sign shall be placed to the left of the vertical clearance sign with a minimum spacing of 8 feet between the right of the route number sign and the left of the clearance sign.

2.2.2.4 The flat sheet panels may be mounted on the outside beam on each side of the bridge using 3-M Very High Bond Tape in

accordance with the tape manufacturer's recommendations, or other method, such as direct bolting, approved by the Engineer.

2.3 Special Instructions to the Contractor

- 2.3.1 A conceptual signing plan is included in Attachment B of the RFP which shows the proposed sign locations and sign layouts for overhead signs as well as signs mounted on I-beam breakaway posts **along the I-85 mainline**. Additional signs not shown in the conceptual signing plan are listed at the bottom of this section. To aid in estimating the costs of signing work, notes are provided on the conceptual plan for each sign location that details the sign size, sign identification numbers and a brief description of work to be accomplished. The conceptual plan does not show the location of flat sheet signs mounted on u-section posts (mile markers, warning signs, regulatory signs, etc.) along the I-85 mainline. These signs should be included in the comprehensive signing plan and replaced as part of this contract. Additional sign changes that are not shown on the conceptual signing plans are the following. Replace the cantilever structure "Right Lane Ends 1 Mile" just prior to Shelby Rd northbound with a Truck Restriction Sign. Remove the flat sheet "Lane Ends" signs mounted on the barrier wall that will be added under the MM 80-96 project once the new lanes are opened. Remove the ground mounted "TRUCK RESTRICTIONS 1½ MILES AHEAD" and "TRUCK RESTRICTIONS NEXT 77 MILES" on I-85 southbound End prior to Shelby Rd that will be added under the MM 80-96 project. **The conceptual plan does not include flat sheet signs for the interchange ramps and crossing routes. These signs shall also be included in the comprehensive signing plan.**
- 2.3.2 The CONTRACTOR shall contact the Director of Traffic Engineering within 30 days of the issuance of the Notice to Proceed to review the conceptual signing plan and the overall signing requirements of the contract. A complete as built set of signing plans should be submitted to the Director of Traffic Engineering at the conclusion of the project. The Director of Traffic Engineering will provide an example set of interstate signing plans to the Contractor at this meeting to use as a guide in preparation of the as built signing plans.
- 2.3.3 Once the contract has been awarded, the successful CONTRACTOR is advised that SignCAD files for the all of the signs shown on the conceptual signing plan are available from the Director of Traffic Engineering. Written requests for the SignCAD files shall be addressed to the POC. The signs are designed using SignCAD software and Clearview Fonts.
- 2.3.4 Walkways should be included in the design of all new overhead structures as noted in the Standard Specifications. Sign lighting systems will not be required on the new overhead structures.

- 2.3.5 Guard rail should be included for all overhead uprights located within the clear zone on either side of the travel way. For guardrail installations that protect sign uprights, typically the face of the guardrail is located approximately 1 foot behind the edge of shoulder. The center of the upright should be located approximately 9 feet behind the face of guardrail.
- 2.3.6 The CONTRACTOR will be responsible for obtaining soil borings to be used for foundation designs for all new overhead sign structures.
- 2.3.7 The CONTRACTOR is advised that Logo signs may have to be relocated and I-beam supports replaced if exit ramps are significantly lengthened. Likewise, if entrance ramps are significantly lengthened, Speed Limit and Post Interchange Mileage signs that are noted as “Replace Sign – Refurbish Posts” will have to be relocated and I-beam supports replaced. Correct location for Speed Limit signs is 1500 feet beyond the end of the entrance taper. Correct location for Post Interchange Mileage Signs is 2500 beyond the end of the entrance taper.
- 2.3.8 The CONTRACTOR is advised that all signs have a unique barcode sticker attached to the back of each sign and each sign assembly has a unique barcode sticker attached to one post of the assembly. The CONTRACTOR will be required to record the barcode number for each sign and the associated assembly that is removed, replaced or relocated. These numbers and the date that the sign and assembly were removed, replaced or relocated shall be recorded on a form. This form shall be turned into the Resident Construction Engineer.

3.0 DELIVERABLES

3.1 Permanent Pavement Marking Plans

The Contractor shall submit Permanent Pavement Marking Plans with the Final Plans for SCDOT’s review. Permanent Pavement Marking Plans shall include, at a minimum, all items described in this section of the RFP and all other applicable design references listed in Exhibit 4.

3.2 Permanent Signing Plans

The Contractor shall submit Permanent Signing Plans with the Final Plans for SCDOT’s review. Permanent Signing Plans shall include, at a minimum, all items described in this section of the RFP and all other applicable design references listed in Exhibit 4.

3.3 As-Built Signing Plans

A complete as-built set of signing plans, including SignCAD copies of all layouts, shall be submitted to the SCDOT as directed by the Director of Traffic Engineering at the conclusion of the project.

EXHIBIT 4d

TRAFFIC DESIGN CRITERIA

Part 2 – Work Zone Traffic Control

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 CONTRACTOR 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 closure 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.

On multilane primary routes, avoid placement of signs on portable signs supports within paved median areas utilized for two-way left turns unless otherwise directed by the RCE.

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. Steel Plates are not allowed on interstates without prior approval from the Resident Construction Engineer.

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 September 1, 2015.

Primary and Secondary Routes –

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.

Interstate Routes -

I-85 Milepost 97.7 to Milepost 106.2

The Department prohibits lane closures on northbound I-85 Monday through Wednesday from 7:00 am to 7:00 pm, Thursday from 7:00 am to 8:00 pm, Friday from 7:00 am to 9:00 pm, Saturday from 8:00 am to 8:00 pm and Sunday from 9:00 am to 10:00 pm. The Department prohibits lane closures on southbound I-85 Monday through Thursday from 7:00 am to 8:00 pm, Friday from 7:00 am to 9:00 pm, Saturday from 8:00 am to 8:00 pm and Sunday from 10:00 am to 8:00 pm.

HOURLY LANE CLOSURE PROHIBITIONS (NORTHBOUND)	HOURLY LANE CLOSURE PROHIBITIONS (SOUTHBOUND)
MON-WED: 7AM-7PM	MON-WED: 7AM-8PM
THU: 7AM-8PM	THU: 7AM-8PM
FRI: 7AM-9PM	FRI: 7AM-9PM
SAT: 8AM-8PM	SAT: 8AM-8PM
SUN: 9AM-10PM	SUN: 10AM-8PM

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:

Primary and Secondary Routes –

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.

Interstate Routes -

I-85 Milepost 97.7 to Milepost 106.2

On Interstate 85, 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 northbound I-85 Monday through Wednesday from 7:00 am to 7:00 pm, Thursday from 7:00 am to 8:00 pm, Friday from 7:00 am to 9:00 pm, Saturday from 8:00 am to 8:00 pm and Sunday from 9:00 am to 10:00 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 median areas of southbound I-85 Monday through Thursday from 7:00 am to 8:00 pm, Friday

from 7:00 am to 9:00 pm, Saturday from 8:00 am to 8:00 pm and Sunday from 10:00 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 Construction (Sub-section 601.4) –

Sub-section 601.4.2 Construction Vehicles (paragraph 2) -

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 Category I Traffic Control Devices (Section 603) –

Sub-section 603.2.2 Oversized Traffic Cones (paragraph 6) -

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.

Sub-section 603.2.3 Portable Plastic Drums (paragraph 3) -

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)* ***

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.

2.6.6 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, Alpolite, 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.

2.6.7 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.

2.6.8 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.

2.6.9 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.

2.6.10 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.

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.

2.6.11 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.

2.6.12 Paving and Resurfacing (Sub-section 611.4.1) –

Sub-section 611.4.1.2 Requirements (paragraph 8) -

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)

Maintain the existing number of I-85 mainline lanes of traffic in each direction during the times of the lane closure restrictions. Maintain the existing number of travel lanes for all auxiliary lanes, on-ramps and off-ramps during the times of the lane closure restrictions unless otherwise approved by the Department. All ramps must maintain free-flow operation (no yield control) unless otherwise approved by the Department.

Entrance and exit ramps and loops at Exits 100, 102, 104, and 106 shall remain open at all times during construction.

Rest Area/South Carolina Welcome Center shall remain open and fully operational at all times.

The presence of acceptable grade elevation differences less or equal to 1” in milled areas or less than or equal to 2” in paved areas adjacent to a travel lane open to traffic are prohibited during weekends from 8:00 am Friday to 9:00 pm Sunday unless otherwise directed by the Engineer. When necessary, the weekend restriction may be extended due to the proximity of a holiday as directed by the Engineer.

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-85. 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.

Traffic Splits will not be allowed on this project. The only exception is the south end of this project where it will tie into the current I-85 (MM 77-98) widening project.

I-85 median access points will be permitted per the design criteria in Attachment B.

The Contractor is required to coordinate and match the staging tie ins of the work zone traffic control of the I-85 (MM 77-98) widening project immediately adjacent to this project to the south.

3.0 DELIVERABLES

Prior to submittal to SCDOT, subject all submittals to a thorough QC review.

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 CONTRACTOR are required and shall be submitted for review by the Department and must 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 and Staging Simulations

The Contractor shall submit Work Zone Traffic Control Plans and Staging Simulations 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. The Contractor may submit Draft Staging Simulations prior to the Final Staging Simulation for review.

EXHIBIT 4d

TRAFFIC DESIGN CRITERIA

Part 3 – Traffic Signals

1.0 GENERAL

The Contractor shall repair and maintain all signal related equipment during the construction of this project. During construction, it is anticipated that there will be impacts associated to the detection at the existing traffic signals listed below. The project shall provide video detection cameras for each approach at each existing intersection listed below to maintain detection for the duration of the project. In addition, once the construction impacting the detection at the existing traffic signals is completed, the damaged inductive loops shall be replaced in accordance with the latest SCDOT design standards. The project shall include permanent video detection and inductive loops for each signal approach at the new signal installations listed below.

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 4 Signal Staff should occur to ensure the work will avoid damaging traffic signal utilities as much as is feasible.

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

- N. Mountain Street @ I-85 Northbound Ramps
- N. Mountain Street @ I-85 Southbound Ramps

The signals at the intersections of N. Mountain Street at I-85 Northbound Ramps and N. Mountain Street at I-85 Southbound Ramps shall remain in operation for all existing traffic until the frontage road traffic is permanently re-routed onto the new roadways/intersections at each location.

Rebuild existing traffic signals at the following intersection locations with all new appurtenances. The traffic signals shall be completely installed, inspected, tested and fully operational prior to opening the new roadways/intersections controlled by the signals to traffic. The rebuild signal installations are:

- N. Mountain Street @ I-85 Northbound Ramps
- N. Mountain Street @ I-85 Southbound Ramps

2.0 CRITERIA

2.1 Project Description

The signal rebuilds at the intersections of N. Mountain Street at I-85 Northbound Ramps and N. Mountain Street at I-85 Southbound Ramps will require a full/new signal design. The signals shall incorporate steel strain poles, span wire, pedestrian signals, and ground-mounted cabinet and controller. Flashing yellow arrow heads will be used for permitted left turn movements and protected-

permitted left turn phasing shall be incorporated into the signal operation on the northbound left-turn onto I-85 Southbound On-Ramp.

The signals along N. Mountain Street shall be coordinated. Conduit with fiber-optic interconnect shall be installed along N. Mountain Street to connect signals at the intersections with the Northbound Ramps and Southbound Ramps. Coordinated signal timings will also be developed as part of this 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 during the project. These cameras will become SCDOT property and will remain in place 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.

2.2 QUANTITY LISTS

No quantities are provided in a design build project.

2.3 EQUIPMENT

2.3.1 **SCDOT Supplied Equipment:** The Department will not furnish signal equipment.

2.3.2 **Contractor Supplied Equipment:** 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.

Compatibility

- 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.

- 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.

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.

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 signal equipment and materials furnished by the CONTRACTOR. They are to be submitted TWO WEEKS PRIOR TO INSTALLATION to the Construction Office FOR APPROVAL. At the time of such submission, the CONTRACTOR shall provide a copy of the Transmittal Letter, to the Engineer.

Equipment substitutions in the life of the contract are only allowed if the contractor can show a valid hardship in remaining with the originally submitted equipment. A valid hardship may include drastic price increases, non-availability of type of equipment due to unforeseen delivery or material shortages (contractor ordering equipment late does not apply), vendor going out of business, etcetera. SCDOT may allow equipment substitutions if product is of better quality than originally submitted or if contractor is replacing non-QPL items with QPL or SCDOT Equipment Contract items, or if equipment is experimental in nature and SCDOT wants to test said equipment.

SCDOT will not pay for furnish and or installation costs of any materials installed without prior approval and acceptance, in accordance with iii and iv above.

Contractor to provide letter from the manufacturer of the cabinet and from the manufacturer of the controller indicating the equipment provided is the SCDOT QPL qualified equipment; Contractor to ensure all warranties, serial numbers, documentation, and receipts are provided with cabinet assembly and controller delivery.

Item	Make	Model #	Manufacturer	Is item on current QPL or is item under current SCDOT equipment contract (y or n)	If no, is cut sheet attached (y or n)	Serial #'s attached	Warranty info attached	Purchase date	Purchase invoice attached
Traffic Signal Cabinet									
Traffic Signal Controller									
Conflict Monitor									
Electrical Cable									
Communication Cable									
Fiber Optic Cable									
Fiber Interconnect Center / Fiber Splice									
Loop Wire and Sealant Splice Boxes / Junction Boxes									
Steel Cable									
Vehicle Signal Head with LED									
LED Blank Out Signs									
Optically Programmable Vehicle Signal									
Pedestrian Signal Head									
Pedestrian Push Button Station Assembly									
Steel Strain Pole									
Mast Arm									
Concrete Strain Pole									
Controllers and 332/336									
Spread Spectrum Radio									
Ethernet Extender									
Video Detection Systems									

2.4 SIGNAL INTEGRATION

Signal integration is not anticipated to be needed for this project. If damage to a cabinet occurs and a new cabinet/controller is required, integration would be the responsibility of the design build team, in accordance with 689.2 System Integration and Testing.

2.5 GENERAL PROVISIONS

All work under this Contract shall be performed under: the SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION, "STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION", Latest Edition; the SCDOT SUPPLEMENTAL SPECIFICATIONS FOR TRAFFIC SIGNALS; the SCDOT STANDARD DRAWINGS; these SCDOT TRAFFIC SIGNAL SPECIAL PROVISIONS; the "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES

FOR STREETS AND HIGHWAYS" (latest revision); the SCDOT TRAFFIC SIGNAL DESIGN GUIDELINES; and the PLANS.

Unless noted otherwise on the plans or in these Special Provisions this is a "turn-key" project, with the contractor furnishing and installing all equipment, complete and operational to the satisfaction of the Engineer.

The PLANS are schematic in nature, showing what is generally expected at each intersection. The CONTRACTOR must devise/refine the final details, working within the Supplemental Specifications, the Design Details, the Standards, and with the Engineer.

Any deviation from the Plans must be approved by the Engineer.

At Project completion all traffic signals/equipment shall be complete and operational, to the satisfaction of the Engineer.

The CONTRACTOR will install the traffic signal to provide a completely modern installation.

Notifications

Prior to beginning construction, the CONTRACTOR shall participate in a "Pre-Construction Conference" at a time and place to be scheduled by the Department's Resident Construction Engineer (RCE).

Unauthorized Work

Any work performed without notification of the proper parties in the Department, will be treated as un-authorized work (see Section 105.11 of the Standard Specifications), and could result in nonpayment to the CONTRACTOR for that work.

Power

The CONTRACTOR, prior to the beginning of any construction activity, shall coordinate as necessary with the Utility Company supplying the power for this project. A representative of the Utility Company should be present at the RCE's Pre-Construction Conference.

Maintenance during construction

The design build team shall be responsible for the maintenance and operation of all existing signals, from notice to proceed until the final acceptance of the project. Final acceptance occurs 60 days after all punch list items are completed and signal is accepted by SCDOT. This shall include all daily maintenance of signals and any emergencies which may arise. There is no separate pay item for maintenance during construction; maintenance is simply part of the construction process. Additional details on maintenance responsibility are found in these Special Provisions, *Section 10 Maintenance of Operations* and in the *SCDOT Traffic Signal Supplemental Specifications, 688.2 Temporary Adjustment of Traffic Signal Equipment and*

Timings.

2.6 PERMITS, CODES, LICENSES, & ABILITIES

All work shall be done in a workmanlike manner to meet the highest industry standards, all in accordance with the requirements of the latest editions of the National Electrical Code (NEC), the National Electrical Safety Code (NESC), the Illuminating Engineering Society (IES), the American National Standards Institute (ANSI), the National Electrical Manufacturer's Association (NEMA), and the regulations and standards of the local power company.

The prime contractor or subcontractor responsible for the performance of the work covered by these SCDOT TRAFFIC SIGNAL SPECIAL PROVISIONS **must be licensed by the SC Licensing Board For Contractors and possess a Journeyman Card issued by the South Carolina Municipal Association or as required by the city in which work occurs at the time work is performed.**

Further, at least one 'ON-SITE' field supervisor shall have LEVEL II or higher, Traffic Signal Certification by the International Municipal Signal Association (IMSA). Photo copies of the license and certificate (for both above) shall be submitted before work commences. The CONTRACTOR shall retain employee(s) holding the above certificate for the duration of the project; and the employee(s) shall be present **DAILY** and at the **FINAL INSPECTION.**

The CONTRACTOR shall employ persons capable of programming traffic signal controllers of the type used by this project. The CONTRACTOR shall possess both a desktop and a portable (laptop) computer, and be capable of using them to upload and download signal operating parameters.

In addition to the state requirements, all permits and licenses required by a City/County are the responsibility of the CONTRACTOR. The CONTRACTOR shall arrange with the utility company for hookup connections and attachment agreements.

2.7 INSPECTION

Engineer

During construction, the INSPECTION will be the responsibility of the Department. The Department's Construction Office, shall designate those individuals responsible for inspection, and may include a number of qualified persons, including DISTRICT ELECTRICAL SUPERVISOR (DES). For signals located within a local government that SCDOT has a signal maintenance agreement, the inspection personnel may include the local government's Electrical Supervisor to perform inspection for SCDOT.

Disputes

The CONTRACTOR is advised that in any dispute between the Contractor and the Manufacturer, concerning the operation/maintainability/reparability of any piece of equipment, THE DECISION OF THE ENGINEER SHALL BE FINAL.

Faulty Equipment

When equipment supplied by the Department is designated faulty by the Engineer, if it is under warranty, the Contractor shall return it to the Manufacturer for replacement. The Manufacturer shall furnish a replacement unit.

2.8 MAINTENANCE OF OPERATION

Fixed time operation of signals is not acceptable for this project. In accordance with 688.2 Temporary Adjustment of Traffic Signal Equipment and Timings – Continuity of Signal Operation CONTRACTOR shall provide temporary actuation devices such as video detection to maintain actuated signal control at all times. The temporary actuation devices shall be installed and operational, and operation shall be transferred to the temporary devices prior to demolition of the existing loop detector systems. It is not permissible to adopt “uncoordinated” operation of adjacent signals; and if the existing interconnection system is broken or disconnected, it shall be repaired immediately. If possible, the District Traffic ENGINEER should be requested to provide temporary controller time settings.

Existing traffic signals shall **REMAIN IN OPERATION** until the new/modified installation has been satisfactorily tested, and it has been placed in operation after approval by the Engineer. The Testing shall be accomplished without hazard to the traveling public and while the signal heads are suitably **BAGGED WITH BURLAP**. All signal heads in place, but not in use, shall be covered with **BURLAP**. **NOTE: PLASTIC BAGS ARE NOT ACCEPTABLE.**

After approval is received from the Engineer, the new signal heads shall be switched into service during that controller phase being displayed by the existing equipment; and the existing equipment shall be turned off simultaneously. Immediately after the new signal equipment has been made operational, the existing signal heads shall be turned off, and removed.

The Contractor is cautioned to PLAN their work to cause minimum interference with any existing signal operation. Adjustments in the existing equipment made necessary by the new installation will be made at the expense of the Contractor.

The Contractor shall retain ownership of the materials and equipment after the intersection has been made operational, until Inspection and Acceptance (either partial or final) has been made by the Engineer, when it then becomes SCDOT property. Prior to Acceptance, if the materials or equipment is damaged by

whatever cause, the Contractor shall be responsible for repair or replacement.

Operation, Maintenance and Emergency Service

The contractor shall be responsible for the maintenance and operation of all existing signals in the “LIST OF PROJECT TRAFFIC SIGNALS” from the date of the “NOTICE TO PROCEED” of the contract until the final acceptance of the project. This shall include all daily maintenance of signals and any emergencies which may arise. The CONTRACTOR is also responsible and liable for proper and safe operation of each signal. Herein, this activity will be termed "Maintenance".

▪ Restriction

The CONTRACTOR shall not change the phasing or other operation of a signalized intersection without Departmental approval.

▪ Procedure

At that point in the project when construction activity is about to occur which could Affect the operation of a particular signal, the CONTRACTOR shall request the Department's concurrence, and the CONTRACTOR shall assume responsibility for operations and maintenance of that traffic signal. This request shall be in writing to the ENGINEER and shall have a written response. In the absence of the request, any activity of the CONTRACTOR which affects the operation of a signal shall be deemed evidence of the CONTRACTOR's assumption of responsibility for the operation and maintenance of the signal.

▪ New Signals

Signals installed by the CONTRACTOR shall be maintained by the CONTRACTOR until the Department formally accepts the work.

▪ Requirements

The CONTRACTOR shall perform EMERGENCY REPAIRS AND SERVICES as required, to insure continuity of operation of listed traffic signals and associated equipment. **This shall include replacement of malfunctioning LED modules.**

▪ Technician

The CONTRACTOR shall provide at least one (1) qualified LOCAL signal technician, subject to call at all times, to provide emergency services as required to assure continuous and efficient operation of signal installations and systems. This shall include non-business hours, weekends, and holidays. The Technician shall be fully qualified to trouble-shoot, service, repair and/or replace traffic controllers and components, both electro-mechanical and solid-state. At the PRE-CONSTRUCTION CONFERENCE, the CONTRACTOR shall furnish the RCE with a LIST OF THE SIGNAL TECHNICIANS who will be

responsible for performing the emergency service, and the LOCAL PHONE NUMBER(S) of the CONTRACTOR's agent(s) (answering service, etc.), who will receive emergency calls during and after the CONTRACTOR's normal business hours.

- Repair Time

The CONTRACTOR shall be ON-SITE of the malfunctioning signal for emergency service within the maximum time listed in the following schedule

<u>Weekdays or Saturday</u>	<u>Maximum Time</u>
6 AM to 6 PM	1 hour
6 PM to 6 AM	4 hours
<u>Sundays or Holidays</u>	
Day or Night	4 hours

- Restoration of Normal Service

Once the CONTRACTOR has started repair work/emergency service, the CONTRACTOR shall restore a malfunctioning signal to normal phase operations uninterrupted.

- Time Changes (EST/DST)

As part of Maintenance, the CONTRACTOR shall reset all time clocks to local legal time.

- Records

The CONTRACTOR shall maintain a LOG of all trouble calls received, the response time, and the corrective action taken. The records and logs shall be available to Department personnel for review during normal working hours. All records and logs shall be turned over to the Department at FINAL ACCEPTANCE.

- Failure To Perform

In the event the CONTRACTOR fails to perform in accordance with requirements and schedules of this Specification, the Department reserves the right, without notice to the CONTRACTOR, to engage a Third Party to perform the maintenance and emergency service necessary to assure continuous traffic signal operation. Further, all expenses incurred by the Department in implementing this option, shall be deducted from the payment due the CONTRACTOR, plus a **FIFTEEN HUNDRED (\$1500) DOLLAR PENALTY FOR EACH OCCASION, FOR EACH DAY (UNTIL CORRECTED).** The penalty shall be forfeited as liquidated damages.

2.9 CONTRACT SCHEDULE

The **CONTRACTOR** shall furnish the Engineer with a **WEEKLY SCHEDULE** for the **TRAFFIC SIGNAL CONSTRUCTION** work, each Friday, for the week to come, listing the location and date of each intended activity. This will permit scheduling signal inspection personnel. Deviation from this schedule may cause the Department to delay Inspection and Payments.

2.10 PAYMENT FOR MATERIALS ON HAND

The attention of the **CONTRACTOR** is directed to Section 109.7 of the **STANDARD SPECIFICATIONS**; which is amended to include the following paragraphs.

When permitted by the Engineer, partial payment will be made for major traffic signal items that are being furnished by the **CONTRACTOR**. Certain items such as wooden poles, and other very heavy units not readily movable or vandalized, may be stored in un-secured locations either **ON-** or **OFF-SITE**. Other items such as signal heads, detector amplifiers, controllers, cabinets, and certain other major items may be stored in a secured/protected location either **ON-** or **OFF-SITE**. The equipment shall be labeled stating **SCDOT**, and the Project Name. Other requirements of Paragraph 109.8 remain applicable. Payment shall be in accordance with the following criteria:

1. For MATERIALS ON HAND, the Contractor may be paid at: FIFTY (50%) PERCENT OF THE CONTRACT UNIT PRICE OF ITEM, NOT TO EXCEED THE PAID INVOICE AMOUNT.
2. ONLY ITEMS MEASURED BY --EACH-- SHALL BE ELIGIBLE.
3. ONLY ITEMS WITH A UNIT PRICE EXCEEDING \$100 SHALL BE ELIGIBLE.
4. THE TOTAL INVOICE PRICE OF THE ITEMS SHALL EXCEED \$5000.

2.11 SUBMITTING AS-BUILT PLANS

After the completion of the project, the **CONTRACTOR** shall furnish to the Engineer, three (3) "red-lined" sets of Plans showing the exact locations and sizes of all conduits, poles, pedestals, splice boxes, detectors, and the routing and destination of all wires leaving the control cabinets.

2.12 FINAL INSPECTION

Request

The **CONTRACTOR** shall request Final Inspection one week prior to the desired day of inspection. Confirmation to the Resident Construction Engineer shall be provided forty-eight (48) hours prior to Final Inspection, that the project is on schedule and ready for inspection.

System Test

Upon completion of the Final Inspection and correction of any deficiencies, the work will be subject to a **sixty (60) day operational test** for the System, and for individual intersections. If during this period a problem arises in either the System or an individual traffic signal, it must be resolved, and a **NEW sixty (60) day test** period shall begin.

2.13 MAINTENANCE OF TRAFFIC

The Contractor shall execute the item of Traffic Control as required by the Standard Specifications, the plans, the Standard Drawings For Road Construction, these special provisions, all supplemental specifications, the MUTCD, and the Engineer.

2.14 FURNISH AND INSTALL DETECTOR LOOPS

The Contractor is hereby notified that All Catalog descriptions and documentation are to be submitted within (5) days after the bid openings to the Contracts Administrator.

The loops shall be installed in the surface course on all projects in Engineering Districts 3 and 4.

3.0 DELIVERABLES

3.1 Signal Plans

Provide Signal Plans in the Final Plan Submittal for the following signals installations:

- N. Mountain Street at I-85 Northbound Ramps
- N. Mountain Street at I-85 Southbound Ramps

3.2 As-Built Signal Plans

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

EXHIBIT 4d

TRAFFIC DESIGN CRITERIA

Part 4 – Intelligent Transportation System (ITS)

1.0 GENERAL

The Project involves the installation and replacement of an Intelligent Transportation System (ITS) along I-85 that provides full camera coverage of the freeway segment. This will include removal and disposal of existing ITS elements, furnishing and installing poles, lowering devices, fiber optic cable in conduits, service boxes, electrical services, and all miscellaneous hardware to make an operational system. SCDOT is responsible for the Work Zone Intelligent Transportation System (WZITS) on this project. The contractor has no WZITS responsibilities other than coordinating with SCDOT. The contractor is not required to leave existing ITS elements in place for the SCDOT to use for WZITS.

2.0 CRITERIA

The Project includes the removal and disposal of existing ITS elements, replacement and installation of an ITS System along I-85 through the entire project limits. See Exhibit 5 – Special Provisions for details regarding the ITS system. This is a turn-key project, with the CONTRACTOR removing existing ITS elements, furnishing and installing poles at approximately $\frac{3}{4}$ mile intervals or as needed for full video coverage, lowering devices, 144 SM fiber optic cable in conduits, service boxes, electrical services, and all miscellaneous hardware to make an operational system, as listed, complete to the satisfaction of the department. The existing dynamic message signs (DMS) shall be carefully disassembled and transported to the SCDOT Intelligent Transportation System Maintenance Facility; 1408 Shop Road, Columbia, SC, 29201. New structures in or near the locations of the existing DMS's shall be installed. All other existing ITS elements shall be disposed of.

A new DMS sign and structure along with a camera to view the sign shall be provided on southbound I-85 between the state line and the exit ramp to exit 106 (Hwy 29).

The existing over height sensors and signs for low bridges at exit 102 and 106 shall remain in place and in working order until the bridges are replaced and the height restrictions are removed. The maintenance and removal of the over height sensors and signs will be the responsibility of the contractor.

The weather station in the North East quadrant of Exit 102 can be removed by contractor if necessary for construction. Contractor will be responsible for disposal if removed. SCDOT will reinstall weather station once project is complete.

3.0 DELIVERABLES

Prior to submittal to SCDOT, subject all submittals to a thorough QC review.

3.1 Conceptual Design Plans

The contractor shall develop and furnish conceptual design plans as indicated in Exhibit 5.

3.2 As-Built Plans

The CONTRACTOR shall provide as-built plans to include: directional bore logs, conduit offsets every 500', GPS data of device locations, all service and pull boxes, power metering points, mid span and reel end splices (three complete sets). An electronic copy of all GPS data will be turned in at the same time as the as-built plans. Allocation drawing and Fiber Trak data entry will be furnished by the Department as part of the integration.

EXHIBIT 4e

HYDRAULIC DESIGN CRITERIA

1.0 GENERAL

Perform all hydrologic and hydraulic drainage designs in accordance with the “SCDOT’s Requirements for Hydraulic Design Studies”, May 2009, Stormwater Quality Design Manual, and Project Design Criteria as listed in EXHIBIT 4. Designs, at a minimum, to address include:

- Best Management Practices
- Bridge-Sized Culverts, Bridges and Scour (when applicable)
- Cross-line Pipes and Non-Bridge Sized Culverts
- Ditch Capacity and Stability
- Sediment and Erosion Control
- Stormwater Quality and Post Construction Designs
- Storm Sewer Systems
- Bridge Deck Drainage

2.0 CRITERIA

2.1 Roadway Drainage

- 2.1.1 Evaluate the hydrologic and hydraulic conditions for roadway drainage. Ensure offsite areas that affect the hydraulic systems and outfalls of this project are accounted for.
- 2.1.2 Perform hydraulic analyses, to include headwater and tail-water effects, on all cross-line and median drainage structures for the design storm event. Additionally, include the 50-year surcharging event for median inlets and the 100-year overtopping event for crosslines.
- 2.1.3 Design new and analyze existing closed-drainage systems with GEOPAK drainage software. Where warranted, use Type-25 catch basin in place of Type-15. Place inlets at staggered stations when a grade separation exceeds eighteen (18) inches or cantilever walls are used. Design northbound and southbound systems separately when inlets are staggered. Include offsite drainage areas and inflows in proposed designs. Do not include upstream systems in the designs but do account for the upstream drainage areas at the inlets. When tying into existing systems, at a minimum, include one downstream pipe link of the system in the design.
- 2.1.4 Perform open channel designs. Include ditch capacity and stability analyses on the median, sideline, and outfall ditches within the limits of the project. Provide additional information and analyses for those locations where structures are upsized to verify post conditions will not

create nor contribute to adverse downstream impacts. Minimize velocities to non-erosive rates.

- 2.1.5 Design temporary drainage systems for the 5-yr storm event and restrict spread to the shoulder width. Minimize ponding at flood sensitive locations and the low side of barrier walls.
- 2.1.6 Replace 15-inch piping with minimum 18-inch piping at all locations where design warrants retaining pipes, to include driveways.
- 2.1.7 Abandon pipes by filling with flowable fill. Note abandoned pipe locations on drainage sheets.
- 2.1.8 Convert in-place Type-5, 6 and 7 catch basins to Type-17 (719-017-RX) as appropriate. Replace with new structure where conversions are not practical. Replace all damaged Type-9 catch basins with Drop Inlet Type-112 (719-112-XX) within controlled access locations only. Replace all damaged Type-9 catch basins with Type-9 Ditch Installation (719-009-03) where practical. Replace all other damaged Type-9 catch basins using Type-9 Top Slabs with Integral Throat walls only (719-009-01). Repair or replace damaged inlets such as DI 24x24, Type-12 and Type-112.
- 2.1.9 Perform rehabilitations to washout areas and those locations where bridge downspouts tie into asphalt curbing. Repair existing concrete and asphalt ditches in accordance with Special Provision 815 Erosion Control.
- 2.1.10 At locations where fill height is greater than or equal to ten feet, provide a minimum five foot buffer between the toe of fill and the nearest top of bank of any sideline ditch or swale. See Attachment B for detail.
- 2.1.11 Outfall 2032+83LT and Outfall 2038+46LT: There is an existing offsite detention pond at the Exit 102 interchange. If the proposed interchange design impacts the pond's hydraulic capacity, the Contractor shall provide an equal or better system.

Outfall 2149+61 LT: There is an existing offsite detention pond at the Exit 104 interchange. If the proposed interchange design impacts the pond's hydraulic capacity, the Contractor shall provide an equal or better system.
- 2.1.12 Preliminary analyses are included under the Project Information Package folder. If the below crossings from these analyses are retained, perform the construction improvements as noted below and perform designs to meet the Hydraulic Requirements and mitigate adverse impacts without causing adverse downstream impacts outside of right-of-way:

Station 1834+32: If the 8’x8’ box culvert is retained, improve the downstream structure, existing 96-inch RCP under the frontage road, to meet the Hydraulic Design Requirements.

Station 2064+48: If the 4’x6’ box culvert is retained, remove the upstream 60-inch RCP and extend the 4’x6’ box culvert.

- 2.1.13 Perform field and video inspections on cross-line structures that have not been inspected, in accordance with the SCDOT’s Pipe and Culvert Inventory and Inspection Guidelines (2011) with exceptions noted herein.
- 2.1.13.1 Inspect pipes 18-inches and greater in diameter using a pipe camera system (no laser).
- 2.1.13.2 Inspect box culverts via direct measure techniques utilizing a video camera to document condition, jointing, and obstructions.
- 2.1.13.3 Perform a condition assessment to evaluate inlets, outlets, joints, cracks, spalling, slope, sediment, debris, efflorescence, and rust staining. Additionally note all drop inlet structural deficiencies—and outfalls in need of regrading for positive drainage or armoring.
- 2.1.13.4 Prepare a report and summary table for recommended alternatives. Acceptable alternatives are retain, replace, seal, clean, clean and line, or a combination of these. Label one table column *Evaluation of Pipe* as depicted in 2.1.14 and list the chosen alternatives. A SC Registered Professional Engineer shall sign the report.
- 2.1.13.5 SCDOT will take necessary measures to ensure the deficiencies are remediated, or rendered harmless, for box culverts and pipes 36-inches and greater which have not been inspected at the time of award of the contract. Such measures will include self-performing, retaining a qualified firm, or negotiating a construction change order with the Contractor. The Contractor is responsible for corrections of all deficiencies noted in the Inspection Summary chart included herein.
- 2.1.14 Implement the alternatives as directed in the below column *Evaluation of Pipe*. Structures within the project limits may be replaced in lieu of repair. Verify the hydraulic capacity of the pipes and culverts. When analyses do not demonstrate compliance with the Hydraulic Requirements

EXHIBIT 4e – HYDRAULIC DESIGN CRITERIA

and Criteria, replace the structures or make other improvements to the system to achieve compliance. Analyses shall reflect the “n” value for the liner material and any reduction in diameter. Add notes to the plan sheets for chosen alternatives.

Field and Video Inspection Summary for MM 98 - MM 106					
Scope Site ID	Hydro Reference Number	Station	Pipe / Culvert Type and Size (W x H)	Length (ft)	Evaluation of Pipe (based on video and field inspections)
9	Site 7	1834+32	8' x 8'	158	Clean culvert. Culvert is in good condition.
9a		1833+50	18"	145.1	Slip line pipe due to joint issues.
9b		1832+50	18"	146.7	Remove debris from pipe. Slip line pipe due to joint issues and cracking.
9c		1831+50	18"	118.4	Remove debris from pipe. Pipe in good condition.
9d		1830+00	18"	94.8	Remove debris from pipe. Pipe in good condition.
9e		1829+50	18"	74.7	Remove debris from pipe and downstream inlet. Pipe is in good condition.
9f		1829+00	18"	45.9	Slip line pipe due to joint issues.
10		1834+50	18"	88.5	Remove debris and slip line. The last joint at 84' should be replaced.
10a		1836+00	18"	137.3	Numerous cracks and offset joints/separations throughout length of pipe. Pipe should be replaced.
10d		1838+50	18"	85.6	Remove debris from pipe. Pipe in good condition.
11a	Site 9	1847+93	30"	76.7	Remove debris near downstream end of pipe causing obstruction. Pipe in good condition.
11b		1847+93	30"	75	Pipe in good condition.

EXHIBIT 4e – HYDRAULIC DESIGN CRITERIA

11c		1849+00	24"	145.2	Slip line pipe due to joint issues.
13	Site 10	1854+69	18"	148.5	Replace first 12.6' of pipe and slip line the remaining sections.
14a	Site 12	1858+83	24"	54.5	Remove debris from pipe and replace the first section of pipe (Frontage Road).
14b		1858+83	24"	178.9	Slip line pipe due to cracking/infiltration.
15	Site 13	1863+58	4' x 6' Box Culvert	256.4	Culvert in good condition. Seal cracks as noted in Pipe Inventory Summary.
16	Site 14	1865+79	18"	88	Replace first 18' of pipe from upstream end. Otherwise, the pipe is in good condition.
17	Site 15	1873+79	18"	159.6	Replace last joint of pipe under Frontage Road. Clean and retain remainder.
18	Site 16	1874+88	4' x 6' Box Culvert	263.4	Remove debris from culvert and seal cracks as noted in Pipe Inventory Summary.
19	Site 17	1884+43	30"	337.9	Remove debris from pipe. Pipe in good condition.
20	Site 18	1890+37	First three (3) sections are 72" pipe and the rest is 4' x 6' Box Culvert (cattle crossing)	168	Install a 24-inch pipe inside the box and existing pipe sections for hydraulic conveyance purposes. Fill the remainder of the box and 72" pipe voids with flowable fill.
21	Site 19	1898+40	18"	92.6	Slip line pipe due to joint issues.
22	Site 20	1900+14	7'x7' Box Culvert	360	Cracking along top, right, and left. Repair cracks and retain.
24	Site 21	1909+86	4' x 6' Box Culvert	278	Remove debris from culvert and repair wide displaced seam at 108'.

EXHIBIT 4e – HYDRAULIC DESIGN CRITERIA

25a		1913+00	18"	222.5	Remove debris throughout pipe especially at downstream end and slip line due to joint issues.
25b		1914+00	18"	222.2	Slip line pipe due to joint issues.
25c	Site 23	1917+16	18"	174.6	Remove debris near downstream end of pipe. Pipe in good condition.
25d		1918+50	18"	146.2	Slip line pipe due to joint issues.
25e		1920+00	18"	87.9	Slip line pipe due to cracking/infiltration.
25f		1920+50	24"	63.4	Remove debris near downstream end of pipe. Pipe in good condition.
25g		1921+50	24"	153.3	Slip line pipe due to joint issues.
25h		1923+00	24"	159.2	Slip line pipe due to joint issues.
25I-North		1919+00	24"	228.8	Remove debris from pipe. Pipe in good condition.
25I-South		1919+00	24"	18.6	Remove debris from pipe. Pipe in good condition.
26		1918+00	24"	178.8	Pipe not accessible. Pipe not inspected
27a		1928+00	24"	151.2	Replace pipe.
27b		1931+00	24"	200.9	Slip line pipe due to joint issues.
27c		1933+00	18"	158.6	Slip line pipe due to joint issues.
27d		1934+00	18"	160.2	Slip line pipe due to joint issues.
27e		1936+00	18"	170.7	Slip line pipe due to joint issues.
27f		1937+00	18"	72.8	Remove debris from pipe. Retain existing pipe.
27g		1939+00	18"	145.7	Remove debris from pipe. Retain existing pipe.
28		1942+00	18"	75	Remove debris from pipe. Retain existing pipe.

EXHIBIT 4e – HYDRAULIC DESIGN CRITERIA

29	Site 24	1945+56	12' x 10' Box Culvert	143	Box culvert in good condition.
31	Site 25	1958+06	18"	64.6	Remove debris from pipe and replace last section of pipe due to a joint separation.
33	Site 27	1969+45	4' x 6' Box Culvert (cattle crossing)	133	Install a 24-inch pipe inside the box for hydraulic conveyance purposes. Fill the remainder of the box, to include both NB and SB lanes, by filling the void with flowable fill. Protect the existing utility during this operation.
34a	Site 28	1973+13	18"	41	Remove debris. Pipe in good condition.
34b		1973+13	18"	44.3	Remove debris from pipe. Pipe in good condition.
35b-a	Site 29	1976+02	24"	121.6	Remove debris from pipe. Pipe in good condition.
35c		1976+00	18"	110.2	The pipe should be replaced and debris on the upstream inlet should be removed.
36a	Site 30	1982+48	18"	85.8	Pipe in good condition.
36b		1982+48	18"	64.6	Slip line pipe due to joint issues.
37a	Site 31	1989+06	24"	85.1	Replace the last section of pipe due to a joint separation.
37b		1989+06	24"	67.3	Pipe in good condition.
38a	Site 32	1998+61	18"	94.4	Pipe in good condition.
38b		1998+61	18"	62.2	Pipe in good condition.
39a	Site 33	2006+38	18"	64.7	Replace first and last joints of pipe due to joint separations.
39b		2006+38	18"	73.9	Pipe in good condition.

EXHIBIT 4e – HYDRAULIC DESIGN CRITERIA

40a	Site 34	2010+43	18"	73.5	Replace pipe from 63.5' to the end due to a joint separation.
40b		2010+43	18"	66.7	Pipe in good condition.
41	Site 35	2015+03	18"	76.1	Pipe in good condition. The outlet needs to be cleaned.
42	Site 36	2018+40	36"	345.8	Replace pipe.
43	Site 37	2022+99	18"	59.5	Replace last 10' of pipe due to broken pipe.
45a-b	Site 38A, Site 38B	2029+09	42"	272.3	Pipe in good condition.
47a	Site 41	2040+58	30"	77.3	Replace last 15' of pipe.
47b	Site 40	2040+58	30"	88	Pipe in good condition.
47c		2040+58	30"	69.6	Pipe in good condition.
47d		2040+58	30"	68.5	Pipe in good condition.
50		2046+00	18"	63	Pipe in good condition.
51a	Site 44	2055+19	24"	47.6	Pipe in good condition.
51b		2055+19	24"	58.3	Replace first and last sections of pipe.
51c		2055+19	18"	71.4	Slip line pipe due to cracking/infiltration.
52	Site 45	2058+62	18"	91.6	Replace pipe.
53	Site 46	2064+48	60" - 4' x 6' Box Culvert	240 (305)	Inspection abandoned due to excessive debris. Remove debris and inspect.
54	Site 47	2066+16	18"	104.8	Pipe in good condition.
55	Site 48	2075+51	18"	74.9	Pipe in good condition.
56	Site 49	2076+39	4' x 6' Box Culvert	232	Excessive cracking, breaks, and exposed rebar throughout. Repair culvert.

EXHIBIT 4e – HYDRAULIC DESIGN CRITERIA

57	Site 50	2082+58	4' x 4' Box Culvert	331	Cracking along most of the length with some rebar exposed. Repair culvert.
58a		2083+50	18"	83.3	Pipe in good condition.
58b		2083+50	18"	69.5	Pipe in good condition. Replace last section of pipe due to joint separation.
59	Site 52	2097+13	36"	253	Pipe in good condition.
60		2097+13	36"	388.4	VPI not complete due to pipe collapsing. Replace the last section of pipe.
61	Site 53	2114+83	6'x6' Box Culvert	318	Cracking along most of the length with some rebar exposed. Repair culvert.
62	Site 54	2116+00	18"	158.2	Pipe in good condition.
63	Site 55	2124+50	4' x 6' Box Culvert (cattle crossing)	130	Install a 24-inch pipe inside the box, to include both NB and SB interstate lanes and NB frontage road. Install a 30-inch pipe inside the SB frontage road, for hydraulic conveyance purposes. Fill the remainder of the void with flowable fill.
64a	Site 56	2130+20	30"	139.6	Slip line pipe due to joint issues.
64b		2130+20	30"	78.3	Pipe in good condition. Repair/replace last 12' of pipe.
64c		2130+20	30"	78.7	Pipe is in good condition.
65a	Site 57	2142+75	24"	63	Clean outfall and re-inspect.
65b-c		2142+75	24"	179.6	Slip line due to joint separations and cracking.
65d		2142+75	24"	86.3	Pipe is in good condition. No apparent issues from cracking.
66	Site 58	2147+84	30"	185	Major debris accumulation. Pipe not inspected. Clean pipe and inspect.

EXHIBIT 4e – HYDRAULIC DESIGN CRITERIA

67a	Site 59	2148+92	18"	72.8	Replace from joint separation to end of pipe. Retain under pavement.
67b		2148+92	18"	56.5	Pipe is in good condition.
67c		2148+75	18"	65	Repair connection to drainage box. Pipe is in good condition.
67d		2148+50	18"	48.9	Remove debris. Pipe is in good condition.
67e		2148+00	18"	60.9	Pipe is in good condition. No apparent issues from cracking.
68a	Site 60	2152+05	30"	69.4	Pipe is in good condition. No apparent issues from chip.
68b		2152+05	30"	71.6	Pipe is in good condition.
68c		2152+05	30"	86.1	Replace pipe due to joint separations and hydraulic issues.
69a		2160+00	24"	127.8	Remove debris. Pipe is in good condition.
69b		2161+00	24"	94	Remove debris. Pipe is in good condition.
69c		2162+00	24"	94.1	Remove debris. Pipe is in good condition.
69d		2163+00	24"	154	Replace pipe due to breaks.
70	Site 62	2164+36	4' x 6' Box Culvert	132	Culvert is in good condition.
70a		2165+00	24"	78	Remove debris and inspect pipe.
71a	Site 63	2170+41	36"	63.8	Major joint separation under travel lanes. Replace pipe.
71b		2170+41	36"	69.9	Pipe is in good condition.
72a	Site 64	2174+88	30"	104.4	Replace upstream segment and slip line.
72b		2175+00	30"	103.1	Replace downstream segment and slip line.

EXHIBIT 4e – HYDRAULIC DESIGN CRITERIA

76b	Site 65	2204+44	36"	243.1	Replace pipe due to severe cracking.
79	Site 66	2218+40	36"	215.3	Replace pipe due to severe cracking.
80	Site 67	2218+40	18"	108.2	Pipe is in good condition. No apparent issues from cracking.
82	Site 68	2223+93	36"	336.1	Replace pipe due to severe cracking.
83a-b		2224+64	18"	149.1	Repair upstream joint and slip line.
83c	Site 69	2226+83	18"	169.3	Major structural and hydraulic issues. Replace pipe.
84a-b	Site 70	2232+56	24"	208.4	Remove debris. Pipe is in good condition. No apparent problems with joint offsets.
85a	Site 71	2243+23	30"	97.4	The pipe should be replaced due to excessive cracking.
85b		2243+23	30"	204	Repair exposed gasket. Remove debris.
87		2255+00	18"	75.7	Pipe is in good condition.
88		2257+15	48"	269.9	Pipe not accessible. Pipe not inspected
89		2261+00	18"	84.9	Replace last pipe segment outside of I-85 roadway due to joint offset. Retain remainder of pipe.
90a		2268+50	42"	42.3	Pipe in good condition.
90b		2268+50	42"	59.5	Replace last pipe segment in I-85 median due to major cracking and joint offset. Retain remainder of pipe.
90c		2268+50	42"	66.3	Pipe is in good condition. Repair last joint offset with grout.

2.2 Bridge Hydraulics

The bridges within this project were previously widened. There are no bridge-sized culverts within the project limits. When hydraulic analyses dictate that existing structures need to be upsized or replaced and fall within the bridge category, design those structures per this section.

- 2.2.1 Model natural, existing, and proposed conditions for bridges and bridge-sized culverts that are to be constructed, replaced, widened, or extended over stream crossings using the 1-D model HECRAS. Refer to the HECRAS Reference Manual v4.1 or latest edition for guidance on setting up cross sections and other inputs within the model(s). In addition to the four cross sections described within the Manual, include additional cross sections, a minimum 500 feet upstream and downstream, as necessary to achieve a downstream limit where a change in starting elevation will not affect the computed high-water depth at the bridge and the upstream limit extends to the limit of backwater from the bridge.
- 2.2.2 Submit the preliminary model setup and results to the SCDOT before finalizing the model and performing scour calculations. Summarize the inputs and outputs, to include backwater, freeboard and FEMA requirements.
- 2.2.3 The Contractor shall perform the scour analysis for the 100-yr and 500-yr storms in accordance with the Department's Requirements, USGS, and the latest FHWA's HEC-18 and HEC-20 editions. Plot the 100-yr and 500-yr total scour lines on the bridge triple profile.
- 2.2.4 Protect the bridge end fills with riprap in accordance with Standard Drawing 804-105-00. Use minimum Class B riprap.

2.3 Floodplains and Floodways

- 2.3.1 This project falls within FEMA Flood Insurance Rate Maps (FIRMs) 45021C0180D, 45021C0070D, and 45021C0185D for Cherokee County. All FIRMS have an Effective Date of September 16, 2011.
- 2.3.2 The Contractor shall coordinate with the local County Floodplain Administrator to request for floodplain management compliance. Refer to the Environmental Assessment for guidance on impacts to Buffalo Creek on the south side of I-85 in the vicinity of Exit 100 in regards to obtaining a CLOMR.

2.4 Sediment and Erosion Control and Water Quality

- 2.4.1 Determine the classification of the receiving waterbodies and note downstream impairments.

- 2.4.2 Develop a plan to meet the requirements of SCDOT’s Construction Permit SCR160000 for erosion and sedimentation control during construction for the entire project length.
- 2.4.3 Provide additional water quality treatment when outfalls discharge to 303(d) listed, TMDL, and other sensitive waters. Exhaust all options prior to implementing structural controls.

2.5 NPDES Permitting

- 2.5.1 Prepare the NPDES permit package. The Contractor shall perform all agency coordination to obtain the permit. The SCDOT reviews, signs and submits the package to SCDHEC.
- 2.5.2 If Contractor intends to phase the NPDES permitting process, the Contractor shall coordinate a meeting with the District Contact, the Environmental Coordinator, and the Hydraulic Lead to explain the intent of the phasing and describe the proposed schedule for the submittals.

EXHIBIT 4f

GEOTECHNICAL DESIGN CRITERIA

1.0 GENERAL

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

- Design foundations for the proposed bridge structures and retaining wall structures. All subsurface exploration, geotechnical design, and construction for the Project shall be carried out in accordance with the design criteria below.
- Provide pile dynamic load testing as outlined in the design criteria and in accordance with the project specifications. The results shall be used to determine capacities of the associated foundation system.

2.0 CRITERIA

The Geotechnical Base Line Report prepared by HDR | ICA dated May 25, 2017, has been provided in the Project Information Package 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), 2010, Version 1.1. 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 GBLR (field and lab data only) as part of this RFP may be used in the design of this project at the Contractor's discretion. If the Contractor elects to use the geotechnical information in the Appendix of the GBLR, the Contractor shall verify that the information provided is applicable to the Contractor's specific design. The Contractor shall verify that geotechnical information provided in the Project Information Package meets the requirements for a geotechnical investigation for this specific project as required by 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

Design the proposed bridge structures in accordance with the GDM.

The Contractor shall be responsible for the load testing of all foundations used on this project. All testing reports for driven piles 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.

2.1.1 Pile Dynamic Load Testing with Pile Driving Analyzer

Pile dynamic load testing with pile driving analyzer (PDA) testing is required for concrete piles designed for this project. PDA is also required for steel piles not driven to practical refusal on rock or partially weathered rock. The Contractor shall select a testing firm for PDA Testing from those firms currently approved to provide foundation testing services on SCDOT's Foundation Testing On-Call Contract. In addition to the PDA testing, CAPWAP (Case Pile Wave Analysis Program) analysis shall also be performed. 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.

2.2 **Roadway**

Design all new roadway structures required for the Project in accordance with the GDM. The Contractor shall obtain SCDOT approval prior to using reinforced soil slopes (RSS). The Contractor shall obtain SCDOT approval prior to using fill slopes or ditch slopes steeper than 2H:1V.

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**

Seismic design of the bridge structures, roadway structures, and bridge embankments shall be required in accordance with the SCDOT Geotechnical Design Manual and SCDOT Seismic Design Specifications for Highway Bridges. Seismic evaluation is required for all bridge embankments, regardless of fill height.

Three-Point Acceleration Design Response Spectrum (ADRS) curves have been generated for the I-85 corridor. The ADRS curves are provided below for both seismic Site Class C and seismic Site Class D subsurface conditions. The appropriate ADRS curve shall be used in the design of each structure and embankment on the project.

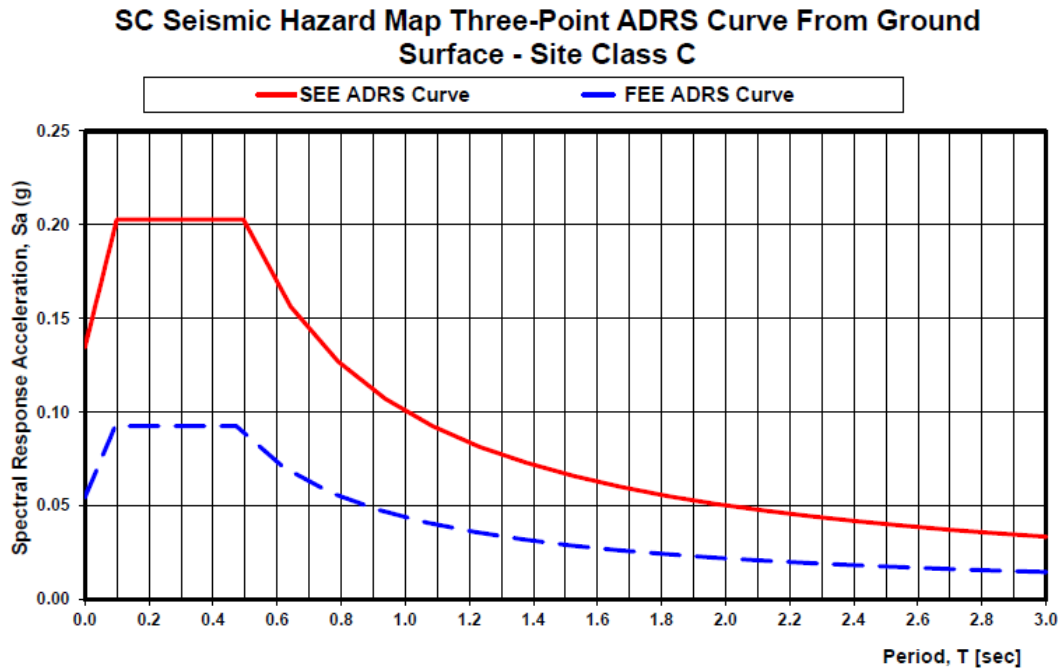
Site Class C

Design EQ	PGA	S _{DS}	S _{D1}
FEE	0.05	0.09	0.04
SEE	0.13	0.20	0.10

Site Class D

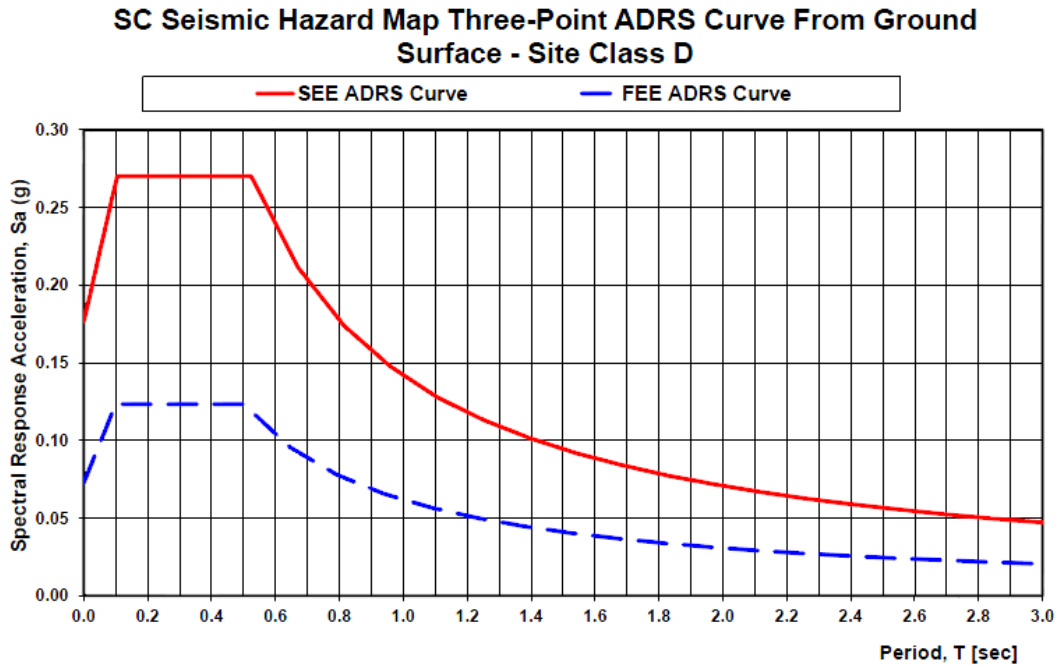
Design EQ	PGA	S _{DS}	S _{D1}
FEE	0.07	0.12	0.06
SEE	0.18	0.27	0.14

EXHIBIT 4f – GEOTECHNICAL DESIGN CRITERIA



FEE ADRS Curve Three-Point Method		SEE ADRS Curve Three-Point Method	
T	S _a	T	S _a
0.00	0.05	0.00	0.13
0.02	0.06	0.02	0.15
0.03	0.07	0.03	0.16
0.05	0.07	0.05	0.17
0.06	0.08	0.07	0.18
0.08	0.09	0.08	0.19
T _o	0.09	T _o	0.20
0.13	0.09	0.13	0.20
0.16	0.09	0.17	0.20
0.19	0.09	0.20	0.20
0.22	0.09	0.23	0.20
0.25	0.09	0.26	0.20
0.28	0.09	0.30	0.20
0.31	0.09	0.33	0.20
0.35	0.09	0.36	0.20
0.38	0.09	0.40	0.20
0.41	0.09	0.43	0.20
0.44	0.09	0.46	0.20
T _s	0.47	T _s	0.20
0.62	0.07	0.64	0.16
0.77	0.06	0.79	0.13
0.92	0.05	0.94	0.11
1.07	0.04	1.08	0.09
1.22	0.04	1.23	0.08
1.38	0.03	1.38	0.07
1.51	0.03	1.53	0.07
1.66	0.03	1.67	0.06
1.81	0.02	1.82	0.06
1.96	0.02	1.97	0.05
2.11	0.02	2.12	0.05
2.26	0.02	2.26	0.04
2.41	0.02	2.41	0.04
2.55	0.02	2.56	0.04
2.70	0.02	2.71	0.04
2.85	0.02	2.85	0.04
3.00	0.01	3.00	0.03

EXHIBIT 4f – GEOTECHNICAL DESIGN CRITERIA



FEE ADRS Curve Three-Point Method		SEE ADRS Curve Three-Point Method	
T	S _a	T	S _a
0.00	0.07	0.00	0.18
0.02	0.08	0.02	0.19
0.03	0.09	0.03	0.21
0.05	0.10	0.05	0.22
0.07	0.11	0.07	0.24
0.08	0.11	0.09	0.25
T ₀	0.10	T ₀	0.10
0.13	0.12	0.14	0.27
0.17	0.12	0.17	0.27
0.20	0.12	0.21	0.27
0.23	0.12	0.24	0.27
0.27	0.12	0.28	0.27
0.30	0.12	0.31	0.27
0.33	0.12	0.35	0.27
0.37	0.12	0.38	0.27
0.40	0.12	0.42	0.27
0.43	0.12	0.45	0.27
0.47	0.12	0.49	0.27
T _s	0.50	T _s	0.52
0.65	0.10	0.67	0.21
0.79	0.08	0.82	0.17
0.94	0.07	0.96	0.15
1.09	0.06	1.11	0.13
1.24	0.05	1.25	0.11
1.38	0.04	1.40	0.10
1.53	0.04	1.54	0.09
1.68	0.04	1.69	0.08
1.82	0.03	1.83	0.08
1.97	0.03	1.98	0.07
2.12	0.03	2.13	0.07
2.26	0.03	2.27	0.06
2.41	0.03	2.42	0.06
2.56	0.02	2.56	0.06
2.71	0.02	2.71	0.05
2.85	0.02	2.85	0.05
3.00	0.02	3.00	0.05

EXHIBIT 4g

ENVIRONMENTAL DESIGN CRITERIA

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.
- 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.
- 7) Contractor shall provide a summary report documenting how all commitments that fall within his responsibility have been satisfied.

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 Environmental Assessment 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) Based on preliminary design, it is anticipated that the proposed project will require a Department of the Army Section 404 Permit from the U.S. Army Corps of Engineers (USACE). The Contractor, with oversight from SCDOT, will be responsible for

preparing the permit application and the SCDOT will be responsible for submitting the permit application to USACE. In addition, mitigation will be required for impacts to waters of the U.S. The Contractor, in coordination with the SCDOT, will be responsible for obtaining suitable mitigation for the project in consultation with the USACE and other resource/regulatory agencies. The SCDOT/Contractor will provide the USACE with information regarding any proposed demolition activities during the Section 404 Permitting Process.

The Contractor shall comply with this commitment. The Contractor shall be responsible for permit acquisition, obtaining all mitigation, and compliance. 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 equal to or less than those presented in the Environmental Assessment Document for the Project. As written above; “any proposed demolition activities” refers to demolition activities which have the potential to impact USACE jurisdictional areas.

- 2) The selected contractor will send a set of final plans and request for floodplain management compliance to the local County Floodplain Administrator. A hydraulic analysis will be performed for each encroachment of a FEMA-regulated floodplain and a detailed hydraulic analysis will be performed during final design development and will be performed per the *SCDOT Requirements for Hydraulic Design Studies*. The proposed project will be designed to meet the “No-Rise” requirements.

The Contractor shall comply with this commitment.

- 3) It is anticipated that a Conditional Letter of Map Revision (CLOMR) would be necessary for impacts to Buffalo Creek on the south side of I-85 in the vicinity of Exit 100. The contractor would be responsible for coordinating with FEMA and local floodplain officials in the preparation of the CLOMR. The selected contractor will send a set of final plans and request for floodplain management compliance determination to the local County Floodplain Administrator.

The Contractor shall comply with this commitment.

- 4) The contractor shall 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 shall 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.

- 5) 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. At least four (4) weeks prior to construction/demolition/maintenance of the bridges and box culverts, the Resident Construction Engineer (RCE) will coordinate with SCDOT Environmental Services Compliance Office to determine if there are any active birds using the structure. After this coordination, it will be determined when construction/demolition/maintenance can begin. If a nest is observed that was not discovered after construction/demolition/maintenance has begun, the contractor will cease work and immediately notify the RCE, who will notify the ESO Compliance Division. The ESO Compliance Division will determine the next course of action.

The use of any deterrents by the contractor designed to prevent birds from nesting, shall be approved by the RCE with coordination from the ESO Compliance Division. The cost for any contractor provided deterrents will be provided at no additional cost to SCDOT.

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

- 6) If avoidance of hazardous materials is not a viable alternative and soils that appear to be contaminated are encountered during construction, the South Carolina Department of Health and Environmental Control (SCDHEC) shall be informed. Hazardous materials shall be tested and removed and/or treated in accordance with the United States Environmental Protection Agency and SCDHEC requirements, if necessary.

The Contractor shall comply with this commitment.

- 7) The SCDOT will acquire all new right-of-way and process any relocations in compliance with the Uniform Relocation Assistance and Real Property Acquisition policies Act of 1970, as amended (42 U.S. C. 4601 et seq.). The purpose of these regulations is to ensure that owners of real property to be acquired for Federal and federally-assisted projects are treated fairly and consistently, to encourage and expedite acquisition by agreements with such owner, to minimize litigation and relieve congestion in the courts, and to promote public confidence in Federal and federally-assisted land acquisition programs.

The Contractor shall comply with this commitment.

- 8) The contractor will follow the guidance contained in Engineering Directive Memorandum (Number 23), dated March 10, 2009, regarding Department procedures to be followed in order to ensure compliance with S.C. Code of 72-400, Standards for Stormwater Management and Sediment Reduction. SCDHEC may require additional water quality and stormwater measures during and after construction, which will be determined during the 404/401 permitting process.

The Contractor shall comply with this commitment.

- 9) State and local regulations regarding dust control and other air quality emission reduction controls will be followed. Current state best management practices (BMPs), will be followed during the construction of the project. These include covering earth-moving trucks to keep dust levels down, watering haul roads, and refraining from open burning, except as may be permitted by local regulations.

The Contractor shall comply with this commitment. BMPs provided above are for example purposes only. The clause “except as may be permitted by local regulations” only applies to refraining from open burning.

- 10) 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 650B and SCDOT’s Supplemental Specifications on Seeding and Erosion Control Measures (latest edition).

The contractor shall comply with this commitment.

- 11) To minimize construction noise, the contractor will be required to comply with *SCDOT 2007 Standard Specifications for Highway Construction*, which includes specifications regarding nuisance noise avoidance.

The Contractor shall comply with this commitment.

- 12) 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 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.

- 13) A final detailed hydraulic analysis will be conducted during final design development, and will be performed per *SCDOT Requirements for Hydraulic Design Studies*.

The Contractor shall comply with this commitment.

- 14) Georgia aster was found within the project study area along a stream north of I-85 near Shaman road, outside of the existing mainline corridor. The preliminary alternative alignment would not impact this area at this time, as it is outside of the construction limits. The design build contractor will be provided a map showing the avoidance area

for this species (Figure 8 of the NRTM found in Appendix C of the EA). Candidate species do not currently receive statutory protection under the ESA; thus, an effect determination was not completed. Should this species become listed, or if the final design of the preferred alternative changes in this area, SCDOT and/or FHWA would need to conduct additional consultation with the USFWS.

The Contractor shall comply with this commitment.

EXHIBIT 4z

PROJECT DESIGN DELIVERABLES

1.0 GENERAL

This exhibit describes the makeup of submittal packages used for Design Review.

2.0 SUBMITTAL PACKAGES

SUBMITTAL PACKAGE CONTENTS	HARD COPIES
Preliminary Submittal Packages	
Preliminary Road Submittal Packages shall include:	
<ul style="list-style-type: none"> • Preliminary Road Plans 	1HS
<ul style="list-style-type: none"> • Conceptual Work Zone Traffic Control Plans* 	
<ul style="list-style-type: none"> • Preliminary Roadway Drainage Design Report 	
<ul style="list-style-type: none"> • Preliminary Road Geotech Report 	
Preliminary Bridge Submittal Packages shall include:	
<ul style="list-style-type: none"> • Preliminary Bridge Plans 	1 HS
<ul style="list-style-type: none"> • Preliminary Bridge Hydraulic Design Report 	
<ul style="list-style-type: none"> • Preliminary Bridge Geotech Report 	
<ul style="list-style-type: none"> • Preliminary Seismic Design Summary Report 	
Right-of-Way Submittal Packages	
Right of Way Submittal Packages shall include:	
<ul style="list-style-type: none"> • Right-of-Way Plans 	
<ul style="list-style-type: none"> • Conceptual Work Zone Traffic Control Plans* 	
<ul style="list-style-type: none"> • Right-of-Way Hydraulic Reports 	
Final Submittal Packages	
Final Road Submittal Packages shall include:	
<ul style="list-style-type: none"> • Final Roadway Plans 	1 HS

EXHIBIT 4z – PROJECT DESIGN DELIVERABLES

• Work Zone Traffic Control Plans	
• Final Roadway Drainage Design Report	
• Final Road Geotech Reports	
Final Bridge Submittal Packages shall include:	
• Final Bridge Plans	1HS
• Final Bridge Hydraulic Design Report	
• Final Bridge Geotech Report	
• Final Seismic Design Summary Report	
RFC Submittal Packages	
RFC Road Submittal Packages shall include:	
• RFC Roadway Plans	1 FS
• RFC Roadway Drainage Design Report	
• RFC Work Zone Traffic Control Plans	
• RFC Road Geotech Reports	
• RFC Design Calculations	
RFC Bridge Submittal Packages shall include:	
• RFC Bridge Plans	1 FS
• RFC Bridge Hydraulic Design Report	
• RFC Bridge Geotech Report	
• RFC Seismic Design Summary Report	
• RFC Design Calculations	
Construction Submittals (including, but not limited to)**	

• Traffic Management Plan	
• Foundation Installation Plan Submittals	
• Foundation Testing Submittals	
• Hazardous Materials Testing Submittals	
• Shop Plans	
• Working Drawings	
• NPDES Submittals	
• Revised Permit Drawings	
• As-Built Signing Plans	
• As-Built Signal Plans	

* If ROW plans are not anticipated, these plans shall be included with the preliminary road plans.

** Reviews for these submittals are not held to the standard periods as outlined in Article II, Section D of the Agreement.

3.0 SUBMITTAL PACKAGE CONTENTS

3.1 All Submittals Packages

- Partial submittal of the required contents of the preliminary, right of way, or final submittal packages will not be allowed.
- Perform a thorough QC review of the submittal packages prior to submitting them to SCDOT.
- Digital or inked signatures are allowable for RFC documents. However, only one method of signature, digital or inked, is allowed per Project ID.
- Plans shall be submitted electronically as a landscape 22"x36" pdf file.
- Reports shall be submitted electronically as a portrait 8.5"x11" pdf file. Larger sheets may be included for charts, diagrams, etc.

3.2 Preliminary Submittal Packages

3.2.1 Preliminary Road Plans

- The plans shall include, but not be limited to, the following:
 - title sheet
 - roadway typical section
 - strip map, including property closures
 - roadway plan and profile

- cross sections
- clearing limits on plan view and cross sections
- drainage features
- existing right-of-way
- proposed right-of-way

3.2.2 Preliminary Bridge Plans

- The plans shall include, but not be limited to, all items described in Chapter 3 of the SCDOT Bridge Design Manual.

3.2.3 Preliminary Hydraulic Reports

- Preliminary Roadway Drainage Design Reports shall include, but not be limited to, the following:
 - Pre/post outfall summaries
 - HW/D summaries for crosslines
 - Open channel designs
 - Address permitting requirements
 - Field Investigation and Pipe Inspection Report
- Preliminary Bridge Hydraulic Design Reports shall include, but not be limited to, the following:
 - Preliminary Hydraulic Model Design and Supporting Documentation including Hydrology Data Sheets, the Hydraulic Design and Risk Assessment Form, and the NEPA Bridge Replacement Scoping Trip Risk Assessment Forms (for each applicable location)
 - Modeling files
 - Address permitting requirements (for each applicable location)
- NPDES permitting-if permitting is going to be phased, address how submittals will be phased and anticipated submission schedules.

3.2.4 Preliminary Road & Bridge Geotechnical Reports

- The geotechnical reports shall include, but not be limited to, the following:
 - all items described in Chapter 21 of the SCDOT Geotechnical Design Manual and the latest design memorandums

3.2.5 Preliminary Seismic Design Summary Report

- In the report, document the seismic design strategy that is planned to achieve the required seismic performance criteria for the bridge and describe the seismic design approach for the bridge. The report shall include, but be limited to, the following:

- a description of the project including bridge location(Longitude and Latitude),the geological and hydrological feature of the site, bridge preliminary configuration including layout, superstructure, substructure, bearing types, span lengths, end bent and interior bent type, skew angle, shear keys, expansion joints, wingwalls, backwalls, shearwalls etc,
- The seismic design specifications,
- The SEE,FEE Design Earthquakes, The ADRS data, the Operational classification, the Seismic Design Category (SDC),
- The analysis strategy to capture the structure seismic performance, including seismic models to be analyzed, how structure elements are going to be modeled,
- a discussion of the expected performance of the bridge in regard to elastic and inelastic behavior (locations where plastic hinging is expected), the expected service performance and damage levels,
- displacement and ductility criteria, according to the SCDOT Seismic Design Specifications for Highway Bridges,
- the name(s) of computer software that will be used for modeling,
- any unique structural and geotechnical issues affecting the seismic design, and the design response spectrum (when a site-specific study is required).
- attach any design variance or special permit that has been approved by SCDOT

3.3 Right-of-Way Submittal Packages

3.3.1 Right-of-Way Plans

- The plans shall include, but not be limited to, the following:
 - title sheet
 - roadway typical section
 - strip map, including property closures
 - right-of-way data sheet
 - roadway plan and profile
 - cross sections (include sediments basins, dams and crosslines)
 - clearing limits on plan view and cross sections
 - drainage features
 - existing right-of-way
 - proposed right-of-way

3.3.2 Conceptual Work Zone Traffic Control 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
- Where additional Right-of-Way is warranted for the purposes of Staging
- Separation of Adjacent Travel Lanes / Traffic Splits as described in the SCDOT Procedures and Guidelines for Work Zone Traffic Control Design
- Where the travel lane leaves the existing roadway bed or direction on new alignment (transition area) and returns (termination area)

3.3.3 Right-of-Way Hydraulic Reports

- Roadway Drainage Design Reports shall include, but not be limited to, the following:
 - Updates to the preliminary roadway drainage designs
 - Inlet spacing calculations and bridge deck drainage calculations
 - Geopak drainage summaries
 - Storm sewer system profiles for the design storm and the 50-yr event at sag locations
 - Sediment and erosion control designs
 - Water quality and post construction designs
 - Detention designs and supporting documentation
- NPDES package shall be provided for review in preparation for submittal to SCDHEC/OCRM.

3.4 Final Submittal Packages

3.4.1 Final Road Plans

- The plans shall include, but not be limited to, the following:
 - title sheet
 - roadway typical section
 - strip map, including property closures
 - right-of-way data sheet
 - roadway plan and profile
 - cross sections
 - clearing limits on plan view and cross sections
 - drainage design (include drainage tables per Plan Preparation Guide behind each drainage sheet)
 - existing right-of-way
 - proposed right-of-way
 - summary of estimated quantities
 - strip map including property closures
 - sediment and erosion control design
 - proposed barrier locations

- permanent signing plans
- permanent pavement markings plans
- traffic signal plans

3.4.2 Final Bridge Plans

- The plans shall include, but not be limited to all items described in Chapters 3 and 6 of the SCDOT Bridge Design Manual. Partial submittal of the required contents of the final set of plans will not be allowed for this project. However, the Contractor may divide the bridge into segments, with each segment having a stand-alone final set of plans which accounts for interaction of adjacent segments.

3.4.3 Work Zone Traffic Control Plans

- 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

3.4.4 Final Hydraulic Report

- Final Roadway Drainage Design Reports shall include, but not be limited to, the following:
 - Updates to the Right-of-Way hydraulic drainage designs
- Final Bridge Hydraulic Design Reports shall include, but not be limited to, the following:
 - Final Hydraulic Model Design and Supporting Documentation including all updated forms
 - Final Modeling files
 - Scour Study- additionally plot the 100- and 500-year lines on the bridge triple profile sheet (for each applicable location)
 - Address CLOMR and/or “No Impact” Certifications (for each applicable location)
 - Include the hydrology data for bridges, culverts and pipes greater than 48 inches on the bridge triple profile sheets
- Complete NPDES package

3.4.5 Final Road & Bridge Geotechnical Reports

- The geotechnical reports shall include, but not be limited to, the following:
 - all items described in Chapter 21 of the SCDOT Geotechnical Design Manual and the latest design memorandums
 - design details and plan notes along with data that are consistent with that shown in the final bridge and road plans

- Contractor’s designer shall prepare the required geotechnical bridge and roadway plan sheets that clearly detail any geotechnical requirements outlined in the reports

3.4.6 Final Seismic Design Summary Report

- In the report, describe the seismic design approach for the bridge. The report shall include, but not be limited to, the following:
 - A project description, including description of structure design changes made since preliminary submittal.
 - the Seismic Design Specifications,
 - seismic design criteria and objectives, including Operational Classification, design earthquake(s), ADRS, and SDC,
 - expected service performance and damage levels,
 - seismic design approach and strategy to achieve the required seismic performance; including seismic load path, potential plastic hinges, and any unique aspects of the project,
 - liquefaction assessment and any geotechnical recommendations,
 - seismic analysis/design software used in the project (include discussions regarding the structural and geotechnical modeling aspects for the bridge),
 - mass participation achieved, longitudinal and transverse fundamental periods, and
 - tabulated results from the design earthquake(s) tension and compression models and pushover models as applicable for variations of liquefaction and scour including:
 - displacement demand
 - yield displacement
 - displacement capacity
 - displacement performance limits
 - displacement capacity check
 - ductility demand check
 - ductility capacity check
 - seismic detailing, including design of cap support length, hinge region detailing, shear keys, anchor bolts, bearings, wingwalls, backwalls, shear walls, etc.
 - attach any design variance or special permit that has been approved by SCDOT

3.5 RFC Submittal Packages

- RFC submittal packages shall be submitted once all comments have been closed on all submittals for each phase (ex. Preliminary/ROW/Final/RFC) of a segment or structure and a request for RFC plans has been issued by the Construction Office.

- After all comments are closed, no changes shall be made to the design deliverables before providing a RFC submittal package.
- Insert RFC Plans into plan folders as detailed in the SCDOT Plan Preparation Guide and the SCDOT Bridge Design Manual if not submitted with digital signatures.
- The Engineer of Record, a licensed and registered Professional Engineer in the State of South Carolina, shall sign and seal all RFC plans and reports. RFC documents shall be original documents if not submitted with digital signatures.
- RFC documents submitted with digital signatures shall comply with the SCDOT Digital Signatures Manual.
- A complete set of design calculations shall be included with the RFC submittal package and at any point prior when requested by SCDOT.

3.6 Revisions to RFC Plans and Reports

- After providing a RFC submittal package, any subsequent changes to the RFC plans and reports will be considered revisions. Revisions shall be denoted as detailed in the design manuals or as directed by the Department.

3.7 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 shall be submitted for review by SCDOT and must be approved before any construction activities can begin.

3.8 Foundation Installation Plan Submittals

- Prepare Drilled Foundation Installation Plans (DFIP) and/or Pile Installation Plans (PIP) in accordance with the SCDOT Standard Specifications for Highway Construction, 2007 Edition. Submit all foundation installation plan submittals electronically. The Contractor's designer shall review and approve all DFIP and PIP (including pile driving criteria) 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. The Contractor's designer shall resolve all comments prior to re-submittal to SCDOT. SCDOT will review the DFIP and/or the PIP only to verify that the specifications have been addressed. The Contractor shall provide a supplement to the report containing the actual field conditions encountered and as-built foundation data and information after construction of the foundations is complete.

3.9 Foundation Testing Submittals

- 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 and Pile Driving Analyzer test reports.

3.10 Hazardous Materials Testing Submittals

- The Contractor shall submit to SCDOT:
 - Results of any hazardous materials analytical testing of sampled or excavated subsurface materials as outlined in the Agreement.
 - Manifests of all hazardous materials requiring disposal.

3.11 Shop Plans

- Submit shop plans, as defined by the Standard Specifications for Highway Construction, to the Contractor's designer for review and approval. Route all approved shop plans to SCDOT for review and distribution. Provide shop plan submittals that meet the criteria of Subsection 725.1.1 of the Standard Specifications for Highway Construction. After reviewing the plans, SCDOT will either distribute the plans or provide comments. If comments are provided, the Contractor's designer shall review the comments prior to resubmitting to the SCDOT for further review. The Contractor's designer shall stamp the shop plans "approved" prior to submittal to SCDOT. SCDOT will stamp and distribute the plans. Do not commence fabrication and construction/erection until after SCDOT distributes the plans. The responsible engineer, registered as a Professional Engineer in the State of South Carolina, shall seal, sign, and date all design calculations and shop plans.

3.12 Working Drawings

- Submit working drawings and design calculations, as defined by the Standard Specifications for Highway Construction, to the Contractor's designer for review and approval. Route all approved working drawings and design calculations to the SCDOT for review and distribution. Provide working drawings and design calculation submittals that meet the criteria of Subsection 725.1.2 of the Standard Specifications for Highway Construction. SCDOT will review the drawings and calculations and either provide acceptance of the drawings as prepared or provide comments. If comments are provided, the Contractor's designer shall review the comments prior to resubmittal to SCDOT for further review. The Contractor's designer shall stamp the working drawings and design calculations "approved" prior to submittal to SCDOT. SCDOT will stamp and distribute the drawings and calculations. Do not commence construction/erection until after SCDOT distributes the drawings and calculations. The responsible engineer,

registered as a Professional Engineer in the State of South Carolina, shall seal, sign, and date all design calculations and working drawings. SCDOT will review the working drawings and design calculations only to verify that the specifications have been addressed.

3.13 NPDES Submittals

- The appropriate level of design and review shall be completed prior to any NPDES package submittal.

3.14 Revised Permit Drawings

- Contractor shall provide to SCDOT revised permit drawings that show ROW limits that differ from those in the approved USACE Permit.

3.15 As-Built Signing Plans

- A complete as-built set of signing plans, including SignCAD copies of all layouts, shall be submitted to the SCDOT as directed by the Director of Traffic Engineering at the conclusion of the project.

3.16 As-Built Signal Plans

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

EXHIBIT 5

SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

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SPECIAL PROVISIONS

(1) SECTION 101: STANDARD DRAWINGS:

The Bidders are hereby advised that this project shall be constructed using the Current Standard Drawings with all updates effective at the time of this letting. For this design-build project, the time of the letting is the most recent Standard Highway Letting that occurred on or before the Final RFP release date. The Standard Drawings are available for download at http://www.scdot.org/doing/sd_Disclaimer.aspx. All drawings that are updated are labeled with their effective letting date in red.

The Standard Drawings are available to purchase through the SCDOT Engineering Publications Sales Center. The Engineering Publication Sales Center is located in Room 122 (College Street Entrance) of the SCDOT Headquarters Building, 955 Park Street, Columbia, South Carolina.

All references in the plans, standard specifications, supplemental specifications, supplemental technical specifications or special provisions to drawings under the previous numbering system are hereby updated to the new drawing numbers. Refer to sheets 000-205-01 through 000-205-07 to find new drawing numbers when looking for references to older drawing numbers. "Old sheet numbers" are also visible on the website when using the full set of drawings "current" search and are sortable by clicking the header over the appropriate column on the results page. Be aware that some older drawings now span over multiple pages due to detailing changes.

(2) SECTION 102: IMMINENT STANDARD DRAWINGS

On the Standard Drawings search page, enter status of Imminent with other fields blank to see a list of upcoming Standard Drawings and their corresponding effective let date. Imminent drawings may be used at any time they are available if approved by the Resident. Follow procedure shown in imminent drawings when noted in this section.

No imminent drawings are currently required on this project, but contractor is encouraged to review available imminent drawings for bidding upcoming projects.

(3) SECTION 102: STANDARD DRAWING ERRATA:

The Bidders are hereby advised that the following note changes apply to the published Standard Drawings.

On sheet **000-205-05**, add the following information under the columns below:

OLD DRAWING NAME	NEW DRAWING NAME
720-905-01 to 720-905-05	720-901-01 to 720-993-32

On sheet **605-005-05 (ver 1-1-2013)**, replace entire text of General Note #4 with the following text:

4. The square footage of sign panels attached to 2½" x 2½" 12 gauge sign support secured to a 3" x 3" 7 gauge breakaway anchor shall not exceed 20 square feet.

On sheet **720-305-00 (ver May 2008)**, delete the entire note directly above main detail:

~~If sidewalk exists, the driveway opening should...~~

On sheet **720-405-00 (ver May 2009)** Detail 2 replace dimension 2'-6" maximum with:

2'-6" minimum

On sheet **720-901-01 (ver Feb 2015)** replace note 5.04 with:

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

5.04 When a mid-block crossing is required, consider mid-block staggered crossing (720-955-41) to encourage eye contact between the pedestrian and the oncoming traffic. Always angle the stagger so that the pedestrian travels through the refuge facing the oncoming traffic.

On sheet 722-305-00 (ver May 2010) Detail 4 replace note “French Drain see note 21” with:

French Drain see note 4.5.

On sheet 722-305-00 (ver May 2010) table 722-305A, 4th column, change the following:

Delete (SF)

Replace text “up to 36” with “up to 3’X3’ ”

Replace text “larger than 36” with “larger than 3’X3’ ”

On sheet 804-105-00 (ver May 2008) Title Block replace text “Rirap (Bridge End)” with:

Riprap (Bridge End)

On sheet 805-325-00 (ver Jan 2011) detail 2 replace text “rectangular washers (FWR03) See 805-005-00” with:

“rectangular washers (FWR03) See 805-090-00”

On sheet 805-325-00 (ver Jan 2011) change text of note 5 to the following:

5. For project specific requirements such as additional offset blocks, extra length posts, and post attachment details, see Project Plans. Include all costs of project specific requirements in the Guardrail Thrie-Beam Bridge Connector pay item.

On sheet 805-330-00 (ver Jan 2011) detail 2 replace text “rectangular washers (FWR03) See 805-005-00” with:

“rectangular washers (FWR03) See 805-090-00”

On sheet 805-330-00 (ver Jan 2011) change text of note 4 to the following:

4. For project specific requirements such as additional offset blocks, extra length posts, and post attachment details, see Project Plans. Include all costs of project specific requirements in the Guardrail Thrie-Beam Bridge Connector pay item.

On sheet 805-510-00 (ver Jan 2011) detail 3 replace guardrail base plate note with the following:

See standard drawings 805-655-xx for guardrail base plate options.

On sheet 805-655-M1 (ver Jan 2011) replace note 30.4 with the following:

30.4 Install adhesive anchors to a depth sufficient to develop a minimum factored (reduced) ultimate tensile capacity of 21 kips per anchor bolt. Increase minimum embedment shown in detail 4 as required by adhesive manufacturer’s recommendations for the existing material properties, anchor bolt pattern, edge conditions, and any other design reduction.

On sheet 815-002-00 (ver Jan 2013) Type B, D1, & D2 Inlet Structure Filters, revise as follows:

Replace all references to #5 stone with #5 or #57 stone.

Payment for either #5 or #57 stone will be made under the pay item for **Aggregate No. 5 for Erosion Control (6 “ Uniform)**

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

(4) SECTION 103: BONDS AND INSURANCE:

Bonds and Insurance consists of all Bonds and Insurance required of the contractor. A maximum allowable amount of 2.0% of the total contract amount will be paid on the first pay estimate after work begins. If there is a remaining amount of the lump sum price for Bonds and Insurance after payments are made according to the limit above, then the remaining amount will be paid on the final estimate.

If special insurance is required by the contract provisions, such as railroad or coastal insurance, no maximum limit will apply to this bid item.

Item No.	Pay Item	Unit
1032010	BONDS AND INSURANCE	LS

(5) SECTION 103: MOBILIZATION – SUBCONTRACTOR:

Mobilization – Subcontractor consists of the preparatory operations for subcontractors including: moving personnel and equipment to the project site; paying bond and insurance premiums; establishing offices, buildings, and other facilities necessary for work on the project; and all other preparatory work or costs incurred before beginning work on the project.

Mobilization - Subcontractor is paid at the lump sum price bid, which price and payment is full compensation for organizing and moving all subcontractor forces, supplies, equipment and incidentals to the project site, regardless of the number of times such moves are made. The price and payment also includes costs for demobilization.

When the item Mobilization – Subcontractor is included in the bid items, payment will be made on the first four construction estimates. Each payment is for 25% of the lump sum price for Mobilization - Subcontractor, subject to the maximum total limit of 5.0% of the total contract amount.

If there is a remaining amount of the lump sum price for Mobilization after payments are made according to the limit above, then the remaining amount is paid after all work on the project has been completed and accepted.

Partial payment for this item in no way acts to preclude or limit any of the provisions of partial payments otherwise provided for by the Contract or these specifications.

Payment for this item includes all direct and indirect costs and expenses required to complete the work.

Pay items under this section include the following:

Item No.	Pay Item	Unit
1031100	MOBILIZATION – SUBCONTRACTOR	LS

(6) SECTION 105: CROSS SLOPE VERIFICIATION:

A. DESCRIPTION:

The cross slopes of the roadway are to be constructed as described in the RFP 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 RFP and this specification.

B. 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.

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

C. 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.

D. FINAL PAVEMENT CROSS SLOPE VERIFICATION:

Verify cross slopes along all interstate mainline lanes.

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.

E. 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.

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

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 HMA mixes.

F. 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 as defined in the Final Pavement Cross Slope Verification section
4. 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

(7) SECTION 106: SOURCE OF PRODUCTION OF IRON AND STEEL PRODUCTS:

Delete Paragraph 1 of Subsection 106.11 of the Standard Specifications and replace it with the following:

"On this project where steel or iron materials are used, all manufacturing processes for iron and steel material, including tie wire for reinforcing steel, must occur in the United States in accordance with 23 CFR Section 635.410(b)(1)(ii). This requirement includes the application of coating for these materials. Coating includes all processes that protect or enhance the value of the material to which the coating is applied."

(8) SECTION 106: SOURCE OF SUPPLY AND QUALITY OF MATERIALS:

Delete Paragraph 3 of Subsection 106.1 of the Standard Specifications and replace it with the following:

"When materials, components, or elements that are not specifically covered in the Standard Specifications, Supplemental Specifications, Supplemental Technical Specifications, or Project Special Provisions are proposed to be incorporated into the work, submit to the RCE a specification covering the proposed material, component, or element for review and acceptance prior to incorporating it into the work. Ensure that such materials, components, or elements meet the requirements of the AASHTO specifications that were effective as of the date of the Final RFP. If the materials, components, or elements are not covered in the AASHTO specifications, ensure that they meet the requirements of the ASTM specifications that were effective as of the date of the Final RFP. Submission of a specification for a material, component, or element not covered in the Standard Specifications, Supplemental Specifications, Supplemental Technical Specifications, or Project Special Provisions does not guarantee approval for use on the Project."

(9) SECTION 106: PLANT/FABRICATOR INSPECTION:

Subsection 106.4, **Plant Inspection**, of the Standard Specifications shall be amended with the following:

Change the subsection title to **Plant/Fabricator Inspection** and add the following sentence after the first sentence:

“Provide 14 calendar days written notice to the Materials and Research Engineer prior to beginning fabrication work for Department projects.”

(10) SECTION 106: QUALIFIED PRODUCT LISTINGS:

All references to “Approval Sheet” or “Approval Policy” are to be replaced with “Qualified Products Listings (QPL)” and “Qualified Products Policies (QPP)” respectively. This change includes all references in the SCDOT Standard Drawings, SCDOT Standard Specifications, SCDOT Supplemental Specifications, SCDOT Special Provisions, SCDOT Supplemental Technical Specifications, SCDOT Internet and Intranet websites, and all other documents produced by SCDOT.

(11) SECTION 106: SOUTH CAROLINA MINING ACT:

The South Carolina Mining Act Supplemental Specification dated March 20, 2003 is hereby modified as follows:

Paragraph 9 is hereby deleted and replaced with the following:

The deputy secretary for engineering, or his duly appointed representative, will make a final inspection of the reclaimed area and keep a permanent record of his approval thereof. A map or sketch providing the location and approximate acreage of each pit used on the project will be provided to the resident construction engineer for inclusion in the final plans.

The last paragraph is hereby deleted and replaced with the following:

The contractor shall comply with the provisions of the plan that are applicable to the project as determined by the engineer. Seeding or other work necessary to comply with the plan on pits furnished by the contractor shall be at the expense of the contractor. Seeding shall be in accordance with SC-M-810 (latest version) which can be found at http://www.scdot.org/doing/road_SupTechSpec.aspx.

(12) SECTION 107: PROJECT BULLETIN BOARDS:

In accordance with the Required Contract Provisions Federal-Aid Construction Contracts Section II, Item 3, Part d, add the following:

Single Location Projects – On projects in which work is performed at a single location (such as bridge replacement projects, two-lane to five-lane widening projects, etc.), mount the project bulletin board in a permanent location within the project limits so that it is visible and accessible at all times.

Multiple Location Projects – On projects in which work is being performed or has the capability of being performed at multiple locations (such as resurfacing projects, pavement marking projects, etc.), display a portable bulletin board with at least one of the prime contractor’s work crews. If the prime contractor is not performing work, display the portable bulletin board with at least one of the subcontractor’s work crews. Display the portable bulletin board in a location and a manner that is acceptable to the RCE. Notify the RCE and all subcontractors as to the location of the portable bulletin board. On resurfacing projects, mount an additional project bulletin board in a permanent location at the asphalt plant supplying asphalt mix to the project so that it is visible and accessible at all times.

(13) SECTION 107: FAIR LABOR STANDARDS ACT OF 1938, AS AMENDED:

Attention is directed to this Federal Legislation, which has been enacted into law. The contractor will be responsible for carrying out all of the provisions of this legislation, which may affect this contract.

(14) SECTION 107: CARGO PREFERENCE ACT REQUIREMENTS:

A. Use of United States-flag vessels – General Provisions:

"(1) Pursuant to Pub. L. 664 (43 U.S.C. 1241(b)) at least 50 percent of any equipment, materials or commodities procured, contracted for or otherwise obtained with funds granted, guaranteed, loaned, or advanced by the U.S. Government under this agreement, and which may be transported by ocean vessel, shall be transported on privately owned United States-flag commercial vessels, if available.

"(2) Within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, 'on-board' commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (A)(1) of this section shall be furnished to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590."

B. Use of United States-flag vessels - The contractor agrees:

"(1) To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels.

"(2) To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States. a legible copy of a rated, 'on-board' commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (B)(1) of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590.

"(3) To insert the substance of the provisions of this clause in all subcontracts issued pursuant to this contract."

(15) SECTION 107: CONTRACT PROVISION TO REQUIRE CERTIFICATION AND COMPLIANCE CONCERNING ILLEGAL ALIENS:

By submission of this bid, the bidder as the prime contractor does hereby agree:

- A. to certify its compliance with the requirements of Chapter 14 of Title 8 of the S.C. Code of Laws regarding Unauthorized Aliens and Public Employment;
- B. to provide SCDOT with any documents required to establish such compliance upon request; and
- C. to register and participate and require agreement from subcontractors and sub-subcontractors to register and participate in the federal work authorization program to verify the employment authorization of all new employees, or to employ only workers who supply the documents required pursuant to S.C. Code 8-14-20(B)(2).

(16) SECTION 107: IRAN DIVESTMENT ACT:

By submission of this bid/proposal, the bidder/proposer as the prime contractor/consultant/vendor does hereby certify his compliance to the following:

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

- A. **CERTIFICATION:** (a) The Iran Divestment Act List is a list published pursuant to Section 11-57-310 that identifies persons engaged in investment activities in Iran. Currently, the list is available at the following URL: <http://procurement.sc.gov/PS/PS-iran-divestment.phtm>. Section 11-57-310 requires the government to provide a person ninety days (90) written notice before he is included on the list. The following representation, which is required by Section 11-57-330(A), is a material inducement for the SCDOT to award a contract to you. (b) By signing your Offer, you certify that, as of the date you sign, you are not on the then-current version of the Iran Divestment Act List. (c) You must notify the SCDOT immediately if, at any time before posting of a final statement of award. You are added to the Iran Divestment Act List.
- B. **ONGOING OBLIGATIONS:** (a) You must notify SCDOT immediately if, at any time during the contract term, you are added to the Iran Divestment Act List. (b) Consistent with Section 11-57-330(B), you shall not contract with any person to perform a part of the Work, if, at the time you enter into the subcontract, that person is on the then-current version of the Iran Divestment Act List.
- C. **OPTION TO RENEW RESTRICTION:** Contractor acknowledges that, unless excused by Section 11-57-320, if the contractor is on the then-current Iran Divestment Act List as of the date of any contract renewal, the renewal will be void ab initio.

(17) SECTION 107: APPLICATION OF DAVIS-BACON AND RELATED ACTS TO INDEPENDENT TRUCK DRIVERS AND MISCELLANEOUS CONSTRUCTION ACTIVITIES:

June 13, 1990

- A. The Davis-Bacon and Related Acts apply when:
 - 1. A Contractor or Subcontractor hires a trucking firm or fleet of trucks to haul materials from a plant, pit, or quarry, which has been established specifically to serve (or nearly so) a particular project or projects covered by Davis-Bacon and Related Acts.
 - 2. A Contractor or Subcontractor hires a trucking firm or fleet of trucks to haul material from a non-commercial stockpile or non-commercial storage site outside the limits of the project to the project site.
 - 3. A Contractor or Subcontractor hires a trucking firm or fleet of trucks to haul excavated materials away from a Davis-Bacon covered project.
 - 4. A contractor or Subcontractor rents or leases equipment with an operator to perform work as called for under a Davis-Bacon construction contract.
 - 5. A common carrier is used for the transportation of materials from an exclusive material supply facility to fulfill the specific need of a construction contract.

The fleet owner is not considered a Subcontractor with regard to the 70% subcontracting limitations and would not have to be approved as a Subcontractor. However, payrolls must be submitted by truck fleet owner covering the truck drivers, and all requirements such as predetermined wages, overtime, etc., are applicable. Legitimate owner-operators (truck owner driving his own truck) must appear on the payroll by name and notation "truck Owner Operator" with no hours, etc. shown.

- B. The Davis-Bacon and Related Acts do not apply when:
 - 1. A Contractor or Subcontractor hires a trucking firm or fleet of trucks to haul materials from a commercial plant, pit, or quarry which had previously been established for commercial use and regularly sell materials to the general public.
 - 2. A Contractor or Subcontractor hires a trucking firm or fleet of trucks to haul materials from an established commercial plant, pit, or quarry to a stockpile outside the limits of the project.
 - 3. Bona fide owner-operators of trucks, who are independent contractors, use their own equipment to haul materials to or from or on a Davis-Bacon covered project. (One man-One truck)

The fleet owner is not considered a Subcontractor with regard to the 70% subcontracting limitation and would not have to be approved as a Subcontractor.

(18) SECTION 107: REQUIREMENTS FOR FEDERAL AID CONTRACTS WHICH AFFECT SUBCONTRACTORS, DBE HAULERS, MATERIAL SUPPLIERS AND VENDORS:

March 1, 2010

- A. The contractor's attention is directed to the requirements of Section I.2 in Form FHWA 1273 that is included in your contract documents as the Supplemental Specification "Required Contract Provisions Federal-Aid Construction Contracts". Section I.2 requires that "the contractor shall insert in each subcontract all of the stipulations contained in the Required Contract Provisions". This requirement also applies to lower tier subcontractors or purchase orders. These provisions must be physically included in your subcontracts. A reference to the applicable specification will not suffice.
- B. The contractor's attention is directed to the requirements of the Supplemental Specification "Standard Federal Equal Employment Opportunity Construction Contract Specifications". Section 2 requires that the provisions of this specification must be physically included in each subcontract with a value of \$10,000 or greater.
- C. The contractor's attention is directed to the requirements of the Equal Employment Opportunity Performance certifications in the Proposal Form Certifications and Signatures section of the contract. Section 1 concerning Equal Employment Opportunity must be physically included in each subcontract.
- D. Prior to the issuance of formal approval, all DBE subcontracts must include a signed copy of the subcontract agreement between the Prime Contractor and the DBE Subcontractor.
- E. Prior to the issuance of formal approval, of any DBE haulers, the contractor must submit a signed copy of the hauling agreement.
- F. The contractor's attention is further directed that sections 1, 2, 3, 8, 9, and 11 of Form FHWA 1273, or Sections 1, 3, 8 and 10 of Form 1316 (for Appalachian contracts only) must be physically included in each purchase agreement with a value of \$10,000 or greater with a vendor or supplier, and in open-end contracts where individual purchases are less than \$10,000 but where the total purchases accumulate to \$100,000 or more per year.

(19) SECTION 107: DISADVANTAGED BUSINESS ENTERPRISES (DBE) GOALS AND REQUIREMENTS:

A. GENERAL

For Design Build Projects, PROPOSER shall comply with the Disadvantaged Business Enterprises (DBE) Supplemental Specification, dated July 26, 2017, except as specifically modified pursuant to this special provision. This special provision modifies the timing and steps for which the PROPOSER is to obtain DBE committals for a design build project. The DBE goal on this project is twelve percent of the contract price.

B. DBE PROGRAM RELATED CERTIFICATIONS

By submitting a proposal and by entering into any contract on the basis of that proposal, the PROPOSER certifies to each of the following DBE Program-related conditions and assurances:

- 1. That the PROPOSER agrees to comply with the project construction and administration obligations of the USDOT DBE Program, 49 CFR Part 26 as amended, and the DBE Supplemental Specifications setting forth the SCDOT's DBE Program requirements.
- 2. PROPOSER shall comply fully with the DBE Program requirements in the execution and performance of the Contract. PROPOSER acknowledges that failure to comply may result in any one or more of the sanctions listed in the SCDOT's DBE Supplemental Specification.
- 3. To ensure that DBE firms have been given full and fair opportunity to participate in the performance of the contract, PROPOSER certifies that all reasonable steps were, and will be, taken to ensure that DBE firms had, and will have, an opportunity to compete for and perform work on the contract. The PROPOSER further certifies that the PROPOSER shall not discriminate on the basis of race, color, age, national origin, or sex in the performance of the contract or in the award of any subcontract. Any agreement between a PROPOSER and a DBE whereby the DBE promises not to provide quotations for performance of work to other PROPOSERS is prohibited.

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

4. PROPOSER shall make good faith efforts to obtain DBE participation in the proposed contract at or above the goal. The PROPOSER, by submitting its proposal, certifies the DBE participation information that will be submitted within the required time as specified herein is true, correct, and complete, and that the information to be provided includes the names of all DBE firms that will participate in the contract, the specific item(s) that each listed DBE firm will perform, and the dollar amounts of the participation of each listed DBE.
5. By submitting its proposal, the PROPOSER certifies that good faith efforts will be made on work that it proposes to subcontract; and that it will seek out and consider DBE firms as potential subcontractors and sub-consultants. The PROPOSER shall, as a continuing obligation, contact DBE firms to solicit their interest, capability, and prices in sufficient time to allow them to respond effectively, and shall retain on file proper documentation to substantiate its good faith efforts.
6. PROPOSER shall comply fully with all contractual and legal requirements of the USDOT DBE Program and SCDOT DBE Program, and shall cause each DBE firm participating in the Contract to fully perform the designated work items with the DBE firm's own forces and equipment under the DBE firm's direct supervision, control, and management. Where a contract exists and where the PROPOSER, DBE firm, or any other firm retained by the PROPOSER has failed to comply with federal or SCDOT DBE Program requirements, SCDOT has the authority and discretion to determine the extent to which the DBE contract regulations have not been met, and will assess against the PROPOSER any remedies available at law or provided in the contract.
7. If a bond surety assumes the completion of work, if for any reason the SCDOT has terminated the PROPOSER, the surety shall be obligated to meet the same DBE contract terms and requirements as were required of the original PROPOSER in accordance with the requirements of this contract.

C. DBE PROGRAM COMPLIANCE PROCEDURES

1. DBE Utilization Plan
 - a. Within thirty (30) calendar days from the effective date of the Agreement, the PROPOSER shall submit to the SCDOT a DBE Utilization Plan for review and approval. This plan shall include the following information:
 - 1) The various work elements the PROPOSER anticipates subcontracting to DBE firms in order to meet the established contract goal;
 - 2) The expected dollar amount and contract percentages of each work element to be applied towards meeting the contract goal; and
 - 3) Anticipated timeframes for which PROPOSER expects DBE subcontracts to be executed for each of the work elements identified.
 - b. The SCDOT will not accept or review any design submittals from the PROPOSER nor make any progress payments until the DBE Utilization Plan is approved by SCDOT. However, failure to promptly submit the DBE Utilization Plan will not delay the SCDOT's issuance of the Notice to Proceed thereby commencing Contract Time.
 - c. As the Project proceeds through the design phase, the PROPOSER may submit revisions to the approved DBE Utilization Plan, if necessary, for the SCDOT's consideration and approval. Reasons for the revisions shall be documented by the PROPOSER and included in the revision request.
 - d. In the DBE Utilization Plan submittal, CONTRACTOR shall designate and make known to the SCDOT a DBE liaison officer who is assigned the responsibility of administering and promoting an active and inclusive DBE program as required by 49 CFR Part 26, the SCDOT's DBE Supplemental Specifications, and this Special Provision.
 - e. After approval of the DBE Utilization Plan, PROPOSER may begin submitting DBE Committal Sheets for review and acceptance at the monthly Progress Meetings.
2. Establishing DBE Committals

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

- a. The PROPOSER shall aggressively implement the approved DBE Utilization Plan by submitting DBE Committal Sheets listing specific DBE firms to carry out the identified work elements. **The use of DBE firms and the information to be provided on the DBE Committal Sheet shall be as instructed in Part A of the SCDOT's DBE Supplemental Specification.**
 - b. The PROPOSER shall obtain the SCDOT's approval of all subcontracts as set forth in the SCDOT DBE Supplemental Specification.
 - c. PROPOSER shall not unilaterally terminate, substitute for, or replace any DBE firm listed on the Committal Sheet in whole or in part with another DBE, any non-DBE firm, or with the PROPOSER's own forces without the prior written consent of SCDOT as set forth in the SCDOT DBE Supplemental Specification.
 - d. The PROPOSER's Final DBE Committal Sheet, signed quotes are to be submitted to the SCDOT 30 days prior to beginning of construction activities. If the PROPOSER fails to meet the deadline, SCDOT shall withhold progress payments until the Final DBE Committal Sheet is submitted. Construction shall not begin until all DBE Committal Sheets are received by SCDOT. If the Final DBE Committal Sheet falls short of the DBE contract goal, the PROPOSER shall submit good faith efforts documentation in accordance with Part A of the DBE Supplemental Specification. This information is due within three (3) business days following the due date of the Final DBE Committal Sheet. If upon review of the Final DBE Committal Sheet, good faith efforts documentation and, if necessary, the findings of the Reconsideration Panel, the PROPOSER fails to meet the contract DBE goal or demonstrate good faith, the SCDOT will withholding monthly progress payments until compliance with DBE contract goal or PROPOSERs good faith efforts have been accepted by SCDOT.
3. Progress Review Meetings / Monthly Updates
- a. Implementation of the PROPOSER's DBE Utilization Plan shall be a discussion point during each progress review meeting (as required in the Agreement) until such time as the SCDOT deems it a closed issue. The PROPOSER's DBE liaison officer shall attend all progress review meetings until such time the issue is closed. At each progress review meeting, the DBE liaison officer shall provide a summary of the PROPOSER's progress towards implementing the DBE Utilization Plan as well as provide an updated DBE Committal sheet.
 - b. The PROPOSER shall provide the SCDOT monthly updates of its progress in accomplishing the DBE Utilization Plan. Monthly updates must include a copy of the latest committal sheet, signed quotes and copies of executed DBE subcontracts. The SCDOT's approval date of the DBE Utilization Plan will establish the date for which monthly updates are required of the PROPOSER.
 - c. The SCDOT, at its discretion, may withhold progress payments if the PROPOSER fails to submit monthly updates or any other submittal requirement on time or if the SCDOT believes the efforts of the PROPOSER in implementing the DBE Utilization Plan are insufficient.
4. PROPOSER's Obligation Post DBE Committal
- a. Once a firm is listed on the DBE Committal sheet, the PROPOSER shall administer the subcontract with the firm in accordance with the instructions provided in Part B of the SCDOT DBE Supplemental Specification.
 - b. It is the PROPOSER's responsibility to comply with all elements of the SCDOT's DBE Program and to continuously pursue DBE participation as the project progresses. If the PROPOSER's Final DBE Committal Sheet and good faith efforts fall short of meeting the project goal and/or payments to committed DBE firms were less than the committed amounts, SCDOT may impose one of the sanction set forth under Part B of the SCDOT DBE Supplemental Specifications.

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

- c. PROPOSER, for itself, for its design build team, and for its subcontractors and suppliers, whether certified DBE firm or not, commits to complying fully with all federal and state DBE provisions and agrees to assume these contractual obligations and to bind the design build team contractually to the same at the PROPOSER's expense.

(20) SECTION 107: LATE DISCOVERY OF ARCHAEOLOGICAL/HISTORICAL REMAINS ON FEDERAL AID PROJECTS AND APPROVAL OF DESIGNATED BORROW PITS:

August 7, 1991

A. LATE DISCOVERY OF ARCHAEOLOGICAL/HISTORICAL REMAINS ON FEDERAL AID PROJECTS

1. Responsibilities:

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. If any such cultural remains are encountered, the Resident Construction Engineer shall be immediately notified and all work in the vicinity of the discovered materials or site shall cease until the Department's Staff Archaeologist or the State Highway Engineer directs otherwise.

2. Applicability:

This provision covers all areas of ground disturbance resulting from this federal - aid contract, including but not limited to road construction, Department designated borrow pits, Contractor furnished borrow pits, and/or staging areas.

3. Cost Reimbursement and Time Delays:

Any extra work required by A(1) above within the project right of way or on Department designated borrow pits (see below) will be paid for in accordance with Subsection 104.05 of the Standard Specifications. Extra contract time may be provided under Subsection 108.06 of the Standard Specifications for archaeological work within the project right of way or on designated borrow pits.

NOTE: On Contractor furnished borrow pits the contractor is not entitled to any additional time or money for delay on impact resulting from A(1) above or for extra work required by A(1) above. Therefore, contractors may wish to retain professional archaeological services to better ensure that borrow pit areas are cleared of archaeological/historical remains prior to use on Federal aid projects.

B. APPROVAL OF DESIGNATED BORROW PITS ON FEDERAL AID PROJECTS (PLANT SITES WHICH QUALIFY AS COMMERCIAL ARE NOT INCLUDED)

In instances where the Department specifically designates the location of borrow pits on project plans or in contract specifications for use on a Federal aid project, an archaeological survey will be performed by Department archaeologists prior to award of contract.

This provision also applies to designated disposal sites, staging areas, haul roads, and job site field offices.

(21) SECTION 107: SPECIFIC EQUAL EMPLOYMENT OPPORTUNITY RESPONSIBILITIES TRAINING SPECIAL PROVISIONS:

August 20, 1975

Revised April 1, 2004

This Training Special Provision supersedes Subparagraph 7b of the Special Provision entitled "Specific Equal Employment Opportunity Responsibilities", (Attachment 1), and is in implementation of 23 U.S.C. 140(a).

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

As part of the contractor's equal employment opportunity affirmative action program, training shall be provided as follows:

The contractor shall provide on-the-job training aimed at developing full journeymen in the type of trade or job classification involved.

THE NUMBER OF TRAINEES TO BE TRAINED UNDER THE SPECIAL PROVISION WILL BE.

Road – 31 (at 520 hours each).
Bridge – 1 (at 1040 hours each).

In the event that a Contractor subcontracts a portion of the contract work, he shall determine how many, if any, of the trainees are to be trained by the subcontractor, provided however, that the Contractor shall retain the primary responsibility for meeting the training requirements imposed by this Special Provision. The Contractor shall also insure that this training Special Provision is made applicable to such subcontract. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training.

The number of trainees shall be distributed among the work classifications on the basis of the Contractor's needs and the availability of journeymen in the various classifications within a reasonable area of recruitment. Prior to commencing construction, the Contractor shall submit to the State Highway Agency for approval the number of trainees to be trained in each selected classification and training program to be used. Furthermore, the Contractor shall specify the starting time for training in each of the classifications. The Contractor will be credited for each trainee employed by him on the contract work who is currently enrolled or becomes enrolled in an approved program.

Training and upgrading of minorities and women toward journeyman status is a primary objective of this Training Special Provision. Accordingly, the Contractor shall make every effort to enroll minority trainees and women (e.g., by conducting systematic and direct recruitment through public and private sources likely to yield minority and women (trainees)) to the extent that such persons are available within a reasonable area of recruitment. The contractor will be responsible for demonstrating the steps that he has taken in pursuance thereof, prior to a determination as to whether the Contractor is in compliance with this Training Special Provision. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

No employee shall be employed as a trainee in any classification in which he has successfully completed a training course leading to journeyman status or in which he has been employed as a journeyman. The Contractor should satisfy this requirement by including appropriate questions in the employee application or by other suitable means. Regardless of the method used the Contractor's records should document the findings in each case.

The minimum length and type of training for each classification will be as established in the training program selected by the Contractor and approved by the State Highway Agency and the Federal Highway Administration. The State Highway Agency and the Federal Highway Administration shall approve a program if it is reasonably calculated to meet the equal employment opportunity obligations of the Contractor and to qualify the average trainee for journeyman status in the classification concerned by the end of the training period. Furthermore, apprenticeship programs registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau and training programs approved but not necessarily sponsored by the U.S. Department of Labor, Manpower Administration, Bureau of Apprenticeship and Training shall also be considered acceptable provided it is being administered in a manner consistent with the equal employment obligations of Federal Aid highway construction contracts. Approval or acceptance of a training program shall be obtained from the State prior to commencing work on the classification covered by the program. It is the intention of these provisions that training is to be provided in the construction crafts rather than clerk-typists or secretarial-type

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

positions. Training is permissible in lower level management positions such as office engineers, estimators, timekeepers, etc., where the training is oriented toward construction applications. Training in the laborer classification may be permitted provided that significant and meaningful training is provided and approved by the division office. Some off-site training is permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training.

Except as otherwise noted below, the cost for the training will be included in the contract price. There will be no reimbursement given by SCDOT for the hours of training that are provided on this project. However, a "Statement of Completed Training" will be required at the end of the project. The fact that the cost of the training must be included in the contract does not prohibit the contractor from receiving training program funds from other sources, if he so desires. Training hours may be counted if training is done off-site where the contractor does one or more of the following and the trainees are concurrently employed on a Federal Aid project: contributes to the cost of the training, provides the instruction to the trainee, or pays the trainee's wages during the off-site training period.

The training requirement will not be considered completed by the Contractor if either the failure to provide the required training, or the failure to hire the trainee as a journeyman, is caused by the Contractor and evidences a lack of good faith on the part of the Contractor in meeting the requirements of this Training Special Provision. It is normally expected that a trainee will begin his training on the project as soon as feasible after start of work the skill involved and remain on the project as long as training opportunities exist in his work classification or until he has completed his training program. It is not required that all trainees be on board for the entire length of the contract. A Contractor will have fulfilled his responsibilities under this Training Special Provision if he has provided acceptable training to the number of trainees specified. The number trained shall be determined on the basis of the total number enrolled on the contract for a significant period.

Trainees will be paid at least 60 percent of the appropriate minimum journeyman's rate specified in the contract for the first half of the training period, 75 percent for the third quarter of the training period, and 90 percent for the last quarter of the training period, unless apprentices or trainees in an approved existing program are enrolled as trainees on this project. In that case, the appropriate rates approved by the Departments of Labor or Transportation in connection with the existing program shall apply to all trainees being trained for the same classification who are covered by this Training Special Provision.

The Contractor shall furnish the trainee a copy of the program he will follow in providing the training. The Contractor shall provide each trainee with a certification showing the type and length of training satisfactorily completed.

The Contractor will provide for the maintenance of records and furnish periodic reports documenting his performance under this Training Special Provision, as required under the SCDOT approved training program.

Meeting the On-the-job Training Requirements or Making Good Faith Efforts to Meet the On-the-job Training Requirements. It is the Contractor's responsibility to meet the On-the-job Training Requirements stated in this section. Failure to meet the requirement or demonstrate good faith efforts, as determined by SCDOT, to meet the requirement may result in any one or more of the following sanctions:

- A. Withholding monthly progress payments;
- B. Declaring the Contractor in default pursuant to Section 108.10 of the Standard Specifications and terminating the contract;
- C. Disqualifying the Contractor from bidding pursuant to Regulation 63-306, Volume 25A, of the S. C. Code of Laws; and/or
- D. Requiring the Contractor to obtain On-the-job Training participation on future contracts to the extent the Contractor failed to meet or use good faith efforts to meet the On-the-job training contract requirement.

(22) SECTION 107: MONITORING OF CONSTR.-RELATED EARTHBORNE VIBRATIONS:

July 8, 2015

A. DESCRIPTION

The project construction will generate vibrations that will travel through the earth, which will subsequently be received or “sensed” by nearby structures and inhabitants. Specific procedures that will generate earthborne vibrations during bridge and roadway construction include (but are not limited to) the installation of piles, earthquake drains, shoring walls, general foundation construction, and vibratory compaction of unclassified or borrow excavation. To mitigate the risk of vibration-related damage to nearby structures, this specification outlines the Contractor’s responsibility for performing a program of pre-construction condition assessment and vibration monitoring during construction.

This specification is based, in part, on AASHTO R 8-96 (2004) *Standard Recommended Practice for Evaluation of Transportation-Related Earthborne Vibrations*. As discussed in AASHTO R 8-96 (2004), humans respond to a much broader range of vibration frequencies and intensities than structures. Intrusive vibration levels can annoy humans at much lower intensities than levels considered critical for structures. Thus, occupants of adjacent properties may perceive that the construction-induced vibrations may present risk to their structures. The recommended safe vibration limits are intended to mitigate the risk of structure damage, and more specifically, reduce the development of “threshold cracks” or cosmetic cracking. Such cracks may appear at lower vibration levels than the level at which architectural or minor structural damage would be expected to occur.

B. PRE-CONSTRUCTION CONDITION ASSESSMENT

The Contractor shall retain a geotechnical engineering firm to perform a pre-construction condition assessment to document the conditions of nearby buildings and other sensitive nearby structures prior to the beginning of construction. The assessment shall be performed on all properties adjacent to the project site and any other properties as directed by the Engineer. The assessment shall include any structures within 300 feet of any vibration inducing construction activity. The assessment should include video and photographic documentation of all exteriors and interiors, and installation of crack monitors on cracks that might propagate due to construction vibrations. All documentation of existing building conditions and information concerning the type and location of crack monitors shall be presented to the Engineer in a report prior to construction.

C. CRACK MONITORING DURING CONSTRUCTION

During all construction, the Contractor shall perform periodic readings of the crack monitors that were installed during the pre-construction condition assessment. All readings shall be provided to the Engineer within 48 hours of taking the reading. Provided that the crack readings confirm that vibrations are not contributing to increasing the crack width, the crack monitors may be read once per week. More frequent readings may be directed by the Engineer during activities that are expected to have greater earthborne vibrations (e.g., pile driving). If the crack readings suggest that vibrations from the project site are contributing to crack width, then the Contractor shall immediately notify the Engineer and review those activities that are generating the earthborne vibrations. The Contractor and his or her geotechnical firm shall then submit a detailed plan for repair, perform the repair at no cost to the Department and develop and submit for review a revised construction plan to address the vibration problems and minimize further damage and complaints.

D. VIBRATION MONITORING DURING CONSTRUCTION

1. Procedure - The Contractor shall monitor vibrations at no less than four locations at each specific site of construction activity along the perimeter of the project during all foundation and embankment construction activities. The locations shall be selected by the Contractor based on the location of the construction activities and their relative position to nearby offsite structures. Prior to construction, a plan of the monitoring locations shall be submitted to the

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

Engineer for acceptance. The locations of the vibration monitors shall be adjusted during construction with acceptance by the Engineer. The vibration monitors shall be established at the site so that background vibrations may be determined prior to beginning foundation or embankment construction. The sensitivity range of the seismograph shall be selected so that the recording is initiated below the maximum allowable particle velocity shown in Figure 1 and extends above the highest expected intensity. Specific activities of the vibration source shall be indexed in time to allow correlation with the arrivals on the vibration

2. Project Vibration Criteria - The maximum allowable particle velocity is shown in Figure 1. If the data from the monitors indicate that vibrations are exceeding the established criteria, then the Contractor shall immediately notify the Engineer and suspend those activities which are generating the earthborne vibrations, until the Contractor and his or her geotechnical firm have developed a revised construction plan to resolve the problem. The problem shall be resolved at no additional cost to the Department.
3. Instrumentation – The vibration monitors shall consist of digital seismographs that display the particle velocities and associated frequencies plotted against the criteria for this project (i.e., Figure 1). Each seismograph shall contain geophones with response capability in three mutually perpendicular axes or components: one vertical and two horizontal (radial and transverse). The frequency response of the geophones shall be linear from at least 4 Hz to more than 200 Hz. The sensitivity shall range from less than 0.02 in/sec to more than 5.0 in/sec. The BlastMate III by InstanTEL is one type of seismograph that is suitable for this project.
4. Calibration and Instrument Use - The Contractor shall field calibrate the vibration monitors before the start of each recording period. The transducer shall be positioned with the longitudinal axis toward the vibration source. Transducers must be adequately coupled with the ground. Operation of all vibration monitors shall be in accordance with the instrument manufacturer's instructions and recommendations. Vibration records shall be collected in waveform plot or strip chart plot. The peak vector sum of the particle velocity in longitudinal, transverse, and vertical planes shall be shown along with the respective dominant or principle frequencies. The highest recorded particle velocity (i.e., the vector sum of the three orthogonal directions), when indexed to a particle vibration event, shall be reported as the peak particle velocity. The recorded peak particle velocity shall be compared to criteria appropriate for the subject of concern.
5. Complaints - In the event of a complaint, the Contractor shall immediately contact the Engineer and review those construction activities that are inducing vibrations into the earth. The Contractor shall prepare a report documenting all relevant data such as the time and date presented in the complaint, a description of the construction activities during the subject time/date, data from the monitoring instruments for the subject time/date, complaint information and a description (including photographs, if possible) of the alleged damage. The Contractor and his or her geotechnical firm shall then submit a detailed plan for repair, perform the repair at no cost to the Department and develop and submit for review a revised construction plan to address the vibration problems and minimize further damage and complaints.

E. METHOD OF MEASUREMENT

In addition to the pre-construction condition assessment report, the Contractor shall also provide monthly reports containing the results of the crack monitors and vibration monitors during those activities that generate earthborne vibrations, including (but not limited to) ground improvement and foundation construction. The reports shall document that the Contractor is providing the work described by this specification.

F. BASIS OF PAYMENT

Payment shall be made in proportion with the percent of the project that is complete. Final payment of the remaining lump sum balance shall be made when vibration monitoring is complete as approved by the Engineer. Payments shall be made under:

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

Item No.	Pay Item	Pay Unit
1075001	MONITORING OF CONSTRUCTION-RELATED EARTHBORNE VIBRATIONS	LS

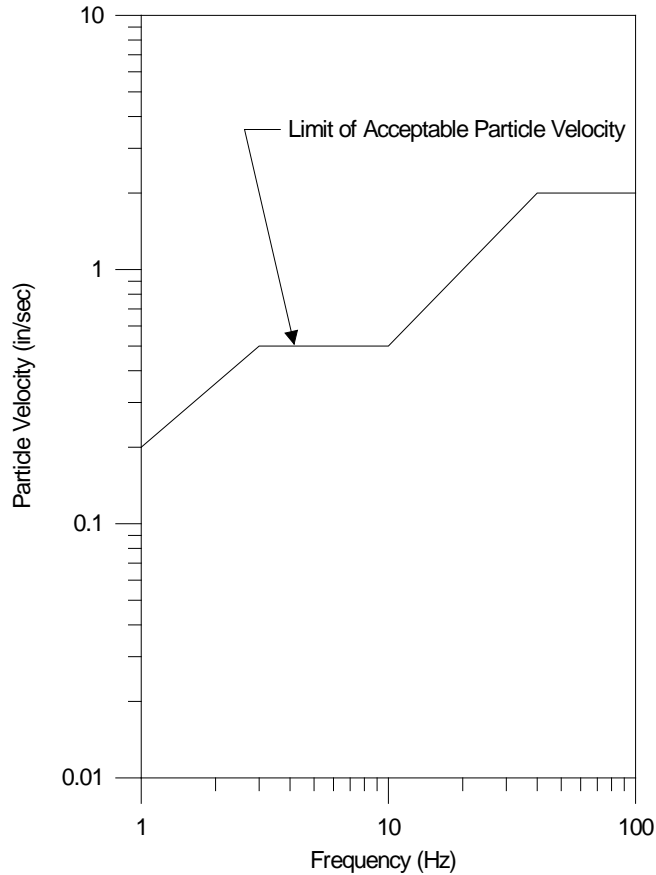


Figure 1 - Vibration Criteria (adapted from AASHTO R8-96)

(23) SECTION 107: COMMUNITY AND PUBLIC RELATIONS PLAN:

SCDOT will take the lead role on this project and be responsible for a portion of the public information efforts. Unless noted otherwise elsewhere in this RFP, the SCDOT responsibilities include:

- A. Developing and maintaining the project website
- B. Soliciting and administering advertisements and media announcements, as deemed necessary

The Contractor shall coordinate with the Department to promote public awareness for this project. The amount of public involvement required for this project is directly based on the Contractor's Transportation Management Plan and construction details. The Design- Build Team's responsibilities shall include:

- A. Providing details surrounding the impacts to the public
- B. Providing advance notice to the Department of upcoming project impacts
- C. Assisting the Department in the development of the target audience list
- D. Attending and/or speaking at public meetings
- E. Hand delivery of time sensitive informational materials
- F. Preparing advertisements and media announcements
- G. Preparing and forwarding direct mailers, flyers, and other promotional materials as necessary
- H. If required, organizing public meetings, including venue selection, reservation and fee

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

The Contractor shall hold an initial project coordination meeting with SCDOT at least one month prior to start of construction to discuss project impacts to the public. This information will be used by the Contractor to create a Public Information Plan.

The Contractor shall inform the Department at least twenty-one (21) calendar days in advance of any construction activity that will have significant impact on the public, including, but not limited to, the start of construction, major traffic shifts, road closures, ramp closures, detours, night work and project completion.

The Contractor will develop, with the assistance of SCDOT, the specific list of target audiences for this project. The following groups are identified as typical target audiences to receive informational materials:

- A. State Senator(s) and Representative(s)
- B. Chairman of the County Council
- C. County Administrator/Manager
- D. County Planner
- E. City Mayor (as appropriate)
- F. City Manager (as appropriate)
- G. Transportation services
- H. Emergency services
- I. Neighborhood groups and private homes
- J. Industry and businesses
- K. Chamber(s) of Commerce
- L. Individual schools effected by the project
- M. Public School District(s) and Transportation Office(s)
- N. Post Office
- O. Any other organization as deemed necessary by the Department

The minimum public information requirements solely associated with the Transportation Management Plans shall include, but not be limited to the following:

Public Meetings - If Beginning of Construction meeting for area businesses and residents is held, attending and I or speaking at this event.

Distribution of Informational Materials - For beginning of construction and for all road closures with detour routes, the Contractor shall be responsible for delivering time sensitive informational material provided by the SCDOT directly to portions of the target audience. If the Contractor informs the Department of the aforementioned activities less than twenty-one (21) calendar days in advance, the Contractor shall hand deliver the informational materials to the impacted target audiences.

The Department will be responsible for establishing, creating, maintaining and updating the project website for this project. However, throughout the project duration, the Contractor shall coordinate with the RCE to ensure the accuracy of the aforementioned project website. At a minimum, the Contractor shall designate a contact for public information inquiries and coordination. Throughout construction, at a minimum, this contact shall provide bi-weekly updates to the RCE, including, but not limited to, traffic control phasing, graphic illustrations, project pictures, etc.

The Contractor shall include in their Total Cost to Complete, all costs associated with their involvement in the Community and Public Relations Plan.

(24) SECTION 108: PARTNERING:

A. COVENANT OF GOOD FAITH AND FAIR DEALING

This Contract imposes an obligation of good faith and fair dealing in its performance and enforcement.

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

The CONTRACTOR and Department, with a positive commitment to honesty and integrity, agree to the following mutual duties:

1. Each will function within the laws and statutes applicable to their duties and responsibilities.
2. Each will avoid hindering the other's performance.
3. Each will proceed to fulfill its obligations diligently.
4. Each will cooperate in the common endeavor of the Contract.

B. PARTNERING

The Department encourages the foundation of cohesive partnering with the CONTRACTOR and its principle subcontractors and suppliers. This partnering is not a legal partnership as defined by South Carolina law. Partnering will be structured to draw on the strengths of each organization to identify and achieve reciprocal goals. The objectives are effective and efficient contract performance and completion within budget, on schedule, and in accordance with the Contract.

The establishment of a partnering charter will not change the legal relationship of the parties to the contract nor relieve either party from any of the terms of the Contract. Any cost associated with effectuating partnering will be agreed to by the Department and the CONTRACTOR and will be shared equally between them.

(25) SECTION 109: FUEL ADJUSTMENT INDEXES:

No fuel adjustment will be made on this Project.

(26) SECTION 109: REFERENCES TO UNIT PRICING:

Except listed below, any references in the contract documents to unit price, measurement, and payment, are typical references for design-bid-build contracts and are not applicable to the extent they effect payment on Design-Build contracts. The Design-Build contractor's schedule of values shall provide sufficient detail to compare work progress to the contractor's schedule and determine appropriate periodic payments.

The following Special Provisions contain unit rate and payment information specifically applicable to this Design-Build contract:

SECTION 105: CROSS SLOPE VERIFICATION

SECTION 306: CEMENT MODIFIED RECYCLED BASE

SECTION 401: HOT MIX ASPHALT (HMA) QUALITY ASSURANCE

SECTION 401: HOT-MIX ASPHALT RIDEABILITY

SECTION 401: FULL DEPTH ASPHALT PAVEMENT PATCHING

~~SECTION 409: OPEN GRADED FRICTION COURSE~~

SECTION 413: COLD CENTRAL PLANT RECYCLING MATERIALS

SECTION 501 ROLLER COMPACTED CONCRETE

SECTION 503: PORTLAND CEMENT CONCRETE PAVEMENT UNIT COST

SECTION 701: NON-CONFORMING CONCRETE

SECTION 806: REPAIR EXISTING CONTROL OF ACCESS FENCE

(27) SECTION 202: REMOVAL OF EXISTING GUARDRAIL:

Section 202.4.4.3 applies on this project.

(28) SECTION 202: RECLAIMING EXISTING ROADWAY:

A. DESCRIPTION

This work consists of the restoration of paved areas. These areas are typically shown as hatched areas on the plans when outside the construction limits.

B. MATERIALS

None

C. CONSTRUCTION REQUIREMENTS

1. Asphalt Pavement with Earth Base: Remove and dispose of areas of pavement shown as hatched areas on the plans. Grade the area to properly drain. Seed the area in accordance with Section 810.
2. Asphalt Pavement with Stone Base: Remove and dispose of areas of pavement and base shown as hatched areas on the plans. Grade the area to properly drain. Seed the area in accordance with Section 810.
3. Earth roadway or Bituminous Surfacing with Earth Base: Scarify existing areas of roadway. Grade the area to properly drain. Seed the area in accordance with Section 810.
4. Bituminous Surfacing with Stone Base: Remove and dispose of areas of pavement and base shown as hatched areas on the plans. Grade the area to properly drain. Seed the area in accordance with Section 810.

Suitable materials may be used for embankment construction on the project. In the event that removed materials are used for embankment construction a corresponding deduction in Unclassified Excavation will be made by the Resident Construction Engineer.

D. MEASUREMENT

Removed asphalt pavement greater than 2 inches in depth will be measured by the square yard. Removed bituminous surfacing with stone base will be measured by the cubic yard. Removed stone base will be measured by the cubic yard. Scarified areas will not be measured for payment.

E. PAYMENT

Removed asphalt pavement which is greater than 2 inches in depth will be paid at the unit price bid for Removal and Disposal of Existing Asphalt Pavement. Removed bituminous surfacing with stone base will be paid for at the unit price bid for Unclassified Excavation. Removed stone base will be paid for at the unit bid price for Unclassified Excavation. No payment will be made for scarifying earth roadway or bituminous surfacing with earth base. No separate or additional payment will be made for grading necessary to obtain proper drainage.

(29) SECTION 202: STAGED REMOVAL OF EXISTING BRIDGES:

For existing bridges that will be removed in stages, maintain stability of the existing structure at all times while traffic is on the bridge. At a minimum, replace tie rods after removal of any slab sections and maintain bracing on the existing piles at all times while traffic is on the bridge.

(30) SECTION 203: BORROW EXCAVATION:

Section 203.2.1.8 of the Standard Specifications is amended by adding the following:

Ensure that all borrow material placed on embankments meet or exceed the requirements for total and effective internal friction angle, cohesion, and total moist unit weight as specified by the

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

geotechnical design engineer of record. These requirements shall be determined by the following tests:

- A. Internal friction angle determined from either direct shear (AASHTO T236) or triaxial (AASHTO T297) testing on remolded specimens performed by the Contractor.
- B. Cohesion determined by triaxial (AASHTO T297) testing on remolded specimens performed by the Contractor.
- C. Total moist unit weight determined by standard proctor test (AASHTO T99) on remolded specimens performed by the Contractor.

Remold all samples to 95 percent of the maximum dry density as determined by the Standard Proctor test (AASHTO T99) and test at normal/consolidation stresses specified by the geotechnical design engineer of record. Conduct shear strength and soil classification testing (AASHTO M145) at the initial selection of the borrow pit, any subsequent changes in borrow pits, and for every 50,000 cubic yards of materials placed. This testing is in addition to the normal embankment and borrow sampling and testing requirements for classification and compaction in accordance with Section 203 and 205 of the SCDOT Standard Specifications for Highway Construction that are used for daily acceptance.

Perform additional shear strength testing and/or soil classification testing at no additional cost to the Department when the Department deems that the materials being placed appear to be different from those originally tested. Submit all test results to the RCE for approval prior to use in embankment construction. The RCE will also submit copies of the test reports to the Quality Assurance Engineer at the Office of Materials and Research. Use only qualified laboratories that are appropriately accredited by AASHTO to perform the test procedures required by this specification.

Do not use material derived from Unclassified Excavation to construct embankments unless that material meets the requirements for Borrow Material as stated above.

(31) SECTION 203: BORROW EXCAVATION (FOR SHOULDERS):

This work shall consist of satisfactory placement of all materials necessary to bring the shoulder grade to within 2 inches of the final pavement edge grade. The Contractor shall furnish all earth material necessary to eliminate any edge of final pavement to shoulder gradient differential that exceeds 2 inches. The quantities shown on the plans are the Engineering estimate of the number of units that will be necessary for this project, actual field measurements may cause these quantities to vary.

Selected materials shall be used for this operation. The selected material shall consist of a friable material such as topsoil, etc., containing grass roots and having the properties of being comparatively porous, capable of growing grass and of a stable nature in that when compacted it will resist erosion and be capable of supporting vehicles when relatively wet. When the area where material is to be placed, is greater than 4 feet in width, it shall be scarified and/or disked to a minimum depth of 3 inches prior to placing any material. Scarifying or disking is not required for areas less than 4 feet in width. Borrow shall be mixed with the existing scarified and/or disked shoulder material in such a manner as to provide a seed bed in accord with Section 810.15 of the Standard Specifications. The Contractor has the option of placing the borrow material (a) Prior to placing final surface course or (b) Following the placing of the finished surface course.

The method of measurement will be the volume in cubic yards, determined in accordance with Section 203 of the Standard Specifications. The Contractor, at his option, may elect to base the quantity measured on the loose volume at the point of delivery by scaling and counting the loads, with a deduction of 35 percent made for shrinkage. All cost for borrow material including obtaining, hauling, and placing shall be included in the unit price.

(32) SECTION 203: BORROW PITS:

A. PERMITTING OF BORROW PITS

Prior to using borrow material from commercial or other borrow pits located wholly or in part in wetland areas, the contractor shall submit written evidence that operations to obtain fill material from the borrow pit(s) have received all appropriate and necessary authorizations from federal, state, and/or local authorities.

Permitted Borrow Pits

If the appropriate federal, state, and local authorities have issued permits, the contractor shall provide to SCDOT copies of all permits issued for such borrow pit sites.

B. BORROW PITS WITHOUT SECTION 404 PERMIT

For borrow pit sites for which a Section 404 permit under the Clean Water Act has not been issued, the contractor shall provide SCDOT with copies of documentation provided by the contractor or its subcontractor(s) to the U.S. Army Corps of Engineers, which shall, at a minimum, clearly define the location of the borrow pits and any wetlands on the borrow pit site; describe the proposed activities and processes that will be used to prepare the site, obtain fill material from the site, and store material at the site; and request the U.S. Army Corps of Engineers to confirm in writing that no Section 404 permit is required for those operations. No operations shall take place at the borrow sites for at least thirty days from the date of the submission of confirmation request to the U.S. Army Corps of Engineers. After thirty-one days the contractor may begin work. The contractor shall also provide copies to SCDOT of any response(s) provided by the U.S. Army Corps of Engineers to its documentation.

C. RESPONSIBILITY

SCDOT has no obligation or duty to review, assess, evaluate, or act upon such documentation and maintains no authority or responsibility to alter, amend, reject, accept, or otherwise exercise any control over the contractor or subcontractor regarding compliance with Clean Water Act Section 404 and the implementing regulations for Section 404. Documentation submitted to SCDOT is for public information and coordination purposes only. The contractor is responsible for all costs related to the selection, operation, and/or activities at any borrow pit site in wetlands including fines, additional mitigation, and impact delays related to failure to obtain any and all necessary federal, state, and local permits and approvals for borrow pits and operations. Nothing herein shall affect in any way SCDOT's right to accept or reject any fill material not meeting the required technical specifications.

(33) SECTION 204: TEMPORARY SHORING WALL:

Subsection 204.4.5.2 of the Standard Specifications is amended to include the addition of the following section:

“The retaining wall system shall be designed to limit deformations (vertical and lateral displacements) that would affect the stability or performance of any adjacent structures (MSE walls, Bridge foundations, Pavement Structure, Approach Slabs, Embankment (stage construction), etc.). Deformations that must be limited shall include, but not be limited to, vertical settlement, sliding, bulging, bowing, bending, and buckling. Design criteria for allowable deformations shall be dependent on the type of structure that will be influenced by any deformation of the temporary shoring wall. Regardless of the type of structure being retained, the deformation criteria shall not exceed 3 inches without acceptance from the Geotechnical Design Support Engineer. An instrumentation plan for monitoring deformations of the temporary shoring and any adjacent structure shall be submitted along with the shop drawings. The instrumentation plan shall indicate the maximum allowable deformations of the temporary shoring and adjacent structures. Typical instrumentation used for monitoring deformations are survey targets, settlement monuments, crack gages, inclinometers, and tilt monitors. The monitoring locations shall be established in a manner that they can be monitored consistently and obtain repeatable measurements for the entire construction period. A monitoring schedule that the Contractor will use during construction will also

be included with the instrumentation plan. The Contractor shall submit periodic monitoring reports to the RCE in accordance with the approved instrumentation plan. Any changes in frequency of monitoring or report submittal must be sent to the Geotechnical Design Support Engineer for acceptance. If the initial instrumentation plan is found not to be documenting adequately the movements of the temporary shoring or adjacent structures, the Contractor will revise the instrumentation plan and resubmit the revised plan for review and acceptance. If the measured deformations exceed the maximum allowable deformations shown in the instrumentation plan, the Contractor will be required to stop work immediately, and at his own expense, correct the situation to the satisfaction of the Department prior to resumption of construction activities. Extended monitoring after construction may be required if adjacent structures have been affected by the construction. The extended monitoring of the adjacent structures shall continue until the structures have stabilized and the Department concurs with the results and conclusions of the monitoring report. All costs associated with developing the instrumentation plan, purchasing instrumentation, installing instrumentation, and monitoring of the instrumentation shall be included in the unit cost of the temporary shoring item.”

(34) SECTION 205: LIGHTWEIGHT AGGREGATES:

July 23, 2010

A. DESCRIPTION

This work shall consist of furnishing, loading, hauling, placing and compacting lightweight aggregates (either man-made or natural) for use as fill materials in accordance with these specifications. The lightweight aggregate must be manufactured by expanding shale, clay, or slate in a rotary kiln operation or be naturally made. Wood fiber, blast furnace slag, fly ash, shredded tires, or boiler slag will not be allowed. The material must be sub angular to angular conforming to ASTM C 330 (latest edition). The material requirements presented in this specification are appropriate for borrow materials placed in embankments or placed as retained materials. If lightweight aggregates are used as reinforced backfill materials for the construction of Mechanically Stabilized Earth (MSE) walls or other reinforced soil structures, additional material properties, construction, and testing frequency requirements may be required based on the appropriate specifications.

B. MATERIAL

The Lightweight aggregate must have a proven record of durability, be non-corrosive, and conform to the following requirements:

1. pH (AASHTO T-289): pH values shall range between 5 and 10.
2. Organic Content (AASHTO T-267): Organic content shall be less than 0.1 percent (weight of organic material to weight of total sample).
3. Soundness Loss (AASHTO T104): Soundness loss shall be less than 15% when subjected to 5 cycles of Sodium Sulfate.
4. Los Angeles Abrasion (AASHTO T96): Abrasion loss shall be less than 45%.
5. Chloride Content (AASHTO T291): Chloride content shall be less than 100 ppm.
6. Sulfate (AASHTO T-290): Sulfate content shall be less than 200 ppm.
7. Resistivity (ASTM D1125): Resistivity must be greater than 3000-ohm-cm. If resistivity is greater than 5000-ohm-cm, chloride and sulfate requirements and testing are waived.
8. Absorption (AASHTO T19): Absorption must be less than 6%.
9. Gradation (ASTM 136): The gradation will be as shown in the following Table. Other gradations may be acceptable upon approval by the Engineer.

Table – Lightweight Aggregate Gradation

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

Sieve Size or Number	Percent Passing
¾ inch	100
½ inch	90 – 100
3/8 inch	50 – 90
No. 4	0 – 50
No. 8	0 – 20
No. 16	Less than 10
No. 30	Less than 10
No. 50	Less than 5
No. 100	Less than 5

10. The coefficient of uniformity, C_u , shall be 4 or greater. The coefficient of uniformity, C_u , shall be computed as follows:

$$C_u = \frac{D_{60}}{D_{10}}$$

Where D_{60} is the particle diameter at 60% passing and D_{10} is the particle diameter at 10% passing. Written approval from the DOC will be required to use soils with a coefficient of uniformity, C_u , less than 4.

11. Aggregate loose unit weight (ASTM C29): The loose unit weight must be less than 45 lbs/ft³.
12. In-place density: (ASTM D4253, and D4254): The in-place compacted dry unit weight must be between 55 and 60 lbs/ft³. Material must be compacted to a minimum 65% relative density as determined by ASTM D4253 and D4254. Use a vibratory table when determining the maximum index density and unit weight in accordance with ASTM D4253. Determine the minimum index density and unit weight in accordance with ASTM D4254.
13. Angle of Internal Friction (AASHTO T 236): The minimum angle of internal friction must be 40 degrees. Test a saturated representative sample (with particles larger than 0.75 inch removed) in a round or square shear box that is a minimum of 12 inches across. Test sample shall be compacted to a minimum 65% relative density as determined by ASTM D4253 and D4254.

C. CONSTRUCTION

Place the lightweight fill in uniform layers. When required by the Engineer, compact each layer using vibratory compaction equipment weighing no more than 10 tons. Place layers no more than 12 inches in depth loose thickness and compact. Compact with three passes of an 8 – 10 ton vibratory roller in the vibratory mode if necessary, or as directed by the Engineer. In confined areas use vibratory plate compaction equipment (5 hp to 20 hp) with a minimum of two passes in 6" lifts for a 5 hp plate and 12" lifts for a 20 hp plate. The contractor must take all necessary precautions when working on or near the lightweight fill to ensure that the material is not over compacted. Construction equipment, other than for placement and compaction, must not operate on the exposed lightweight fill. Low ground pressure equipment (D6 LGP or lighter) is recommended for spreading and placing the lightweight aggregate.

D. TESTING FREQUENCY

All soil property requirements shall be tested during initial source evaluation or if a change in source is requested. Lightweight aggregate material shall be sampled once every 2,000 cubic yards and tested for gradation and pH. Lightweight aggregate material shall be sampled once every 5,000 cubic yards and tested for internal friction angle, organic content, resistivity, chloride content, and sulfate content. Chloride and sulfate content testing will not be required if resistivity test results indicate 5000 ohm-cm or greater. The internal friction angle shall be tested every 2,000 cubic yards if the gradation indicates that the coefficient of uniformity, C_u , is less than 4. A variation in testing frequency may be required if a variation in material gradation or composition is observed.

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

E. MEASUREMENT AND PAYMENT

Measurement of lightweight aggregate shall be the actual volume in-place at the project site. All costs for furnishing, loading, hauling, placing and compacting lightweight aggregates (either man-made or natural) shall be included in the unit price of the lightweight aggregates.

Payment will be made under:

Item No.	Pay Item	Pay Unit
2033020	BORROW EXCAVATION (LIGHTWEIGHT)	CY

(35) SECTION 205: HIGH-STRENGTH GEOTEXTILE FOR EMBANKMENT REINFORCEMENT:

April 21, 2015

A. DESCRIPTION

This work shall consist of furnishing and installing construction geotextiles in accordance with the details shown in the plans, specifications, or as directed by the RCE.

B. MATERIALS

A geotextile is defined as any permeable polymeric textile used with foundation, soil, rock, earth, or any other geotechnical engineering related material, as an integral part of a civil engineering project, structure, or system. Use geotextiles and thread used in joining geotextiles manufactured from fibers consisting of long-chain polymers, composed of at least 95 percent by weight of polyolefins or polyesters. Use geotextiles with fibers formed into a stable network such that the fibers or yarns retain their dimensional stability relative to each other, including selvages (edges) during shipping, handling, placement, and in service. Use geotextile free from defects or tears.

- 1. Minimum Average Roll Values:** All property values, with the exception of Apparent Opening Size (AOS), represent Minimum Average Roll Values (MARV) in the weakest principal direction. Provide geotextiles whose average test results from any roll sampled in a lot for conformance or quality assurance testing meets or exceeds minimum values provided in this Section.
- 2. Apparent Opening Size:** Values for Apparent Opening Size (AOS) represent maximum average roll values. Acceptance will be based on ASTM D 4759.
- 3. Reinforcement Geotextile:** Use reinforcement geotextile within existing and/or proposed fills for slope reinforcement.

Furnish geotextiles meeting the property requirements outlined in Table 1.

Table 1: High Strength Geotextile Properties (Design Requirements)^{1,2}

Property	Test Method	Geotextile Property Requirements
Long-Term Design Strength, T_{al} , MD		22,800 lb/ft
Long-Term Design Strength, T_{al} , XD		2,280 lb/ft
Sewn Seam Breaking Strength ^a	ASTM D4884	900 lbs/ft
AOS	ASTM D4751	$\leq (1.0 \text{ to } 2.0)D_{85(\text{soil})}$
Permeability	ASTM D4491	$\geq 10k_{\text{soil}}$
Default Pullout Friction Factor, F^*	ASTM D6706	$0.6 \tan \Phi$
Default Alpha, α	ASTM D6706	0.6
Ultraviolet Stability	ASTM D4355	$\geq 50\%$ after 500 hrs of exposure

- Notes:
- The test procedures shall conform to the most recently approved ATSM geotextile test procedures.
 - All numeric values represent Minimum Average Roll Value (MARV).
 - Applies to factory or field sewn seams.

4. Source Approval and Certification

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

Prior to construction, the Contractor shall submit to the Resident Construction Engineer (RCE) a Certification Package prepared by the geotextile reinforcement manufacturer. The Contractor shall allow 21 calendar days from the day the submittals are received by the RCE for review and acceptance. Submit the following information regarding each geotextile proposed for use:

- a. Manufacturer's name and current address;
- b. Full product name/number, including roll number;
- c. Geosynthetic material (i.e. polymer type) and structure (including fiber/yarn type);
- d. Proposed geotextile use(s); and
- e. Certified test results for the properties outlined in Table 1 and below in Section 4.

The Certification shall state that the furnished geotextile soil reinforcement is in full compliance with the design requirements as stated in this specification and the design drawings and is fit for use in long-term critical soil reinforcement applications. In addition to the minimum required properties in Table 1, the submittal shall also certify the following values for each geotextile soil reinforcement used on the project:

- a. The ultimate tensile strength, T_{ULT} , (MARV) for geogrid soil reinforcements, MD/XD
- b. The tensile strength at 5% strain, MD
- c. The creep reduced tensile strength, MD
- d. The geotextile's pullout coefficients (F^* , α)

The Contractor's submittal package shall include, but not be limited to, actual test results for tension, creep, durability, construction damage, joint/seam strength, pullout and quality control. A person having the legal authority to bond the manufacturer shall attest to the certificate. Any tests required shall be performed at no additional cost to the Department. If in the opinion of the RCE, the required documentation is not provided for individual reduction factors (RF) or pullout coefficients (F^* , α), default values for these design parameters shall be used in accordance with this specification.

a. Ultimate Tensile Strength (T_{ult}):

The ultimate tensile strength, T_{ult} , shall be determined from wide width tensile tests (ASTM D 4595). Geotextile samples tested in accordance with ASTM D 4595 shall be with an 8-inch width specimen, or a 4-inch specimen width with correlation to an 8-inch width. Correlation methodology shall be submitted to, and is subject to acceptance by the RCE. All geotextile strength tests (ASTM D 4595 and ASTM D 6637) shall be conducted at a strain rate of 10% per minute based on actual gage length necessary to meet the testing sample dimension requirements. Laboratory test results documenting the ultimate tensile strength, T_{ult} , in the reinforcement direction shall be based on the minimum average roll values (MARV) for the product.

b. Long-Term (Allowable) Design Tensile Strength (T_{al}):

The allowable tensile load per unit width of geotextile soil reinforcement, T_{al} , in accordance to the backfill type used shall be computed as follows:

$$T_{al} = \frac{T_{ult}}{RF}$$

c. Reduction Factor (RF):

The total reduction factor, RF, is the combined reduction factor for long-term degradation due to installation damage, creep, and durability. The total reduction factor, RF, shall be defined as follows:

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

$$RF = RF_{ID} \times RF_{CR} \times RF_D \geq 3.0$$

The individual reduction factors shall be documented in accordance with the site conditions, design calculations, and specifications. When sufficient documentation is not provided for individual reduction factors, RF_{ID} , RF_{CR} , and RF_D , a reduction factor RF of 7.0 shall be used. The reinforcement manufacturer shall certify and document the individual reduction factors as follows:

d. Installation Damage Reduction Factor (RF_{ID}):

The reduction factor for installation damage, RF_{ID} , shall be documented by field and laboratory test results and literature review, as described in ASTM D 5818 for the reinforced backfill specified or for more severe soils. Samples subjected to installation damage shall be tested for tensile strength and deformation characteristics in accordance with ASTM D 4595. Recommended values for reduction factors for installation damage (RF_{ID}) for various soils shall also be documented. The minimum installation damage reduction factor, RF_{ID} , shall be 1.1, regardless of product specific test results.

e. Creep Reduction Factor (RF_{CR}):

Laboratory test results documenting creep performance over a range of load levels, for a minimum duration of 10,000 hours based on tension creep test (ASTM D 5262) shall be required. Creep test samples shall be of sufficient width to be representative of overall product creep response (fiber creep testing will not be accepted).

The creep-limiting strength, T_1 , shall be based on extrapolating the 10,000 hours (or longer duration) tension creep tests to a 75-year design life, unless a 100-year design life is specified in the plans. The creep extrapolation method shall be based on methods described in FHWA NHI-10-025, "*Design and Construction of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes*" - Appendix "D". Laboratory test results and extrapolation methodology shall be documented.

The reduction factor for creep, RF_{CR} , is defined as the ratio of the average lot specific ultimate tensile strength, T_{ULTLOT} , to the creep-limiting strength, T_1 . The average lot specific ultimate tensile strength, T_{ULTLOT} , for the lot of material used for creep testing, T_{ULTLOT} , shall be determined from wide width tensile test, ASTM D 4595.

f. Durability Reduction Factor (RF_D):

The total reduction factor for durability, RF_D , shall be defined as the combined effects of chemical and biological degradation. Laboratory test results, extrapolation techniques, and a comprehensive literature review shall document the reduction factor for durability for all material components in accordance with FHWA NHI-09-087, "*Corrosion / Degradation of Soil Reinforcements for Mechanically Stabilized Earth Walls and Reinforced Soil Slopes*". The minimum durability reduction factor, RF_D , shall be 1.1, regardless of product specific test results.

g. Soil Reinforcement Pullout Coefficients (F^* , α):

The Certification Package shall document the pullout coefficients (F^* , α) meet or exceed the required coefficients necessary to obtain the T_{al} provided above where,

$$F^* = \text{Minimum pullout friction factor} = C_i \tan \Phi,$$
$$C_i = \text{Soil interaction coefficient} \geq 0.6$$
$$\Phi = \text{Soil Angle of Internal Friction}$$

The pullout friction factor, F^* , and the scale effect correction factor, α , shall be documented by laboratory testing from pullout tests. Pullout testing shall be conducted for site-specific materials or for materials representative of the reinforced backfill at confining

pressures specified by the Engineer. When laboratory tests are used from representative soils, the representative soils shall be documented by providing the soil's angle of internal friction, gradation, and coefficient of uniformity ($C_u = D_{60}/D_{10}$). Recommended pullout coefficients for various soil types shall also be documented. The pullout coefficients shall be determined by using the quick effective stress pullout tests ("Measuring Geosynthetic Pullout Resistance in Soil" per ASTM D 6706). The soil interaction coefficient, C_i , shall be documented when computing the pullout friction factor, F^* . When sufficient documentation is not provided for pullout coefficients, F^* and α , and the coefficient of uniformity, C_u , is greater or equal to 4, the default values indicated in this specification can be used. If the coefficient of uniformity of the reinforced backfill is less than 4, laboratory pullout test shall be required to determine pullout friction factor, F^* , and the default scale effect factor, α .

5. Sample Approval.

To confirm that the on-site geotextile meets the property values specified, random samples shall be submitted to the RCE for evaluation. The machine direction shall be marked clearly on each sample submitted for evaluation. The machine direction is defined as the direction perpendicular to the axis of the roll.

Cut a sample from the geotextile roll with the minimum dimensions of 4 feet by the full width of the roll beyond the first wrap. The geotextile samples shall be cut from the roll with scissors, sharp knife, or other suitable method that produces a smooth edge and does not cause geotextile ripping or tearing. Submit a manufacturer's certificate of compliance signed by an authorized manufacturer's official. The certificate must attest that the geotextile meets all the Minimum Average Roll Value (MARV) requirements specified in Table 1 as evaluated under the manufacturer's quality control program. Geotextiles supplied for construction of the project shall be certified in accordance with the following criteria. The tests described in the specification shall be conducted by the manufacturer or by an approved independent testing laboratory on samples taken from the same lot number as the material actually shipped to the project and at the specified frequency. The manufacturer or independent testing laboratory shall maintain the appropriate accreditations and must be preapproved by the Department. All rolls shall be marked with individual and distinct roll numbers. All roll numbers shall have traceable certified mill test reports from the given lot that they were manufactured. These test reports must be supplied to the Department prior to installation of any geotextile materials. After the sample and the required information have been submitted to the RCE, allow 30 calendar days for evaluation.

Product acceptance is determined by comparing the average test results of all specimens within a given sample to the Minimum Average Roll Values (MARV) listed in Table 1. Install geotextiles only after the material has been tested and/or evaluated and accepted. Replace all geotextiles installed prior to acceptance that do not meet specifications at Contractor's expense.

a. Sewn Seam Approval

If the geotextile seams are to be sewn in the field, the Contractor shall provide a section of sewn seam that can be sampled by the RCE before the geotextile is installed. The sewn seam shall be in accordance with ASTM 6193.

The seam sewn for sampling shall be sewn using the same equipment and procedures as will be used to sew the production seams. The seam sewn for sampling must be at least 6 feet in length. If the seams are sewn in the factory, the Contractor shall provide samples of the factory seam at random from any of the rolls to be used. Regardless of whether the seam is to be sewn in the factory or the field, the manufacturer and/or Contractor shall certify that the strength meets the requirement set forth in Table 1. If seams are to be sewn in both the machine and cross-machine direction, provide samples of seams from both directions. The seam assembly description shall be submitted by the

Contractor to the Engineer and will be included with the seam sample obtained for testing. This description shall include the seam type, stitch type, sewing thread type(s), and stitch density.

If sewn seams are used for seaming the geotextile, use thread that consists of high strength polypropylene or polyester. Do not use nylon thread. Use thread that is of contrasting color to that of the geotextile itself.

If the manufacturer can provide a T_{al} MD that is greater than the sum of the required T_{al} MD and sewn seam breaking strength (for each specified in the project plans), the sewn seams may be eliminated and a minimum overlap of 1 foot may be used.

6. Identification, Shipment and Storage

Conform to ASTM D 4873, *Standard Guide for Identification, Storage, and Handling of Geotextiles*. Clearly label each roll of geotextile shipped to the project with the name and address of the manufacturer, full product name/number, quantity, and roll number.

The RCE will reject materials that are mislabeled or misrepresented. Wrap each roll with a material that protects the geotextile, including ends of the roll, from damage due to shipment, water, sunlight, and contaminants. Maintain the protective wrapping during periods of shipment and storage. Do not damage the geotextile or wrapping when unloading or transferring from one location to another. Do not drag the rolls.

During storage, elevate geotextile rolls off the ground and adequately cover to protect them from the following:

- a. Site construction damage;
- b. Precipitation;
- c. Ultraviolet radiation including sunlight;
- d. Chemicals that are strong acids or strong bases;
- e. Flames including welding sparks, temperatures in excess of 140 °F (60 °C); and
- f. Mud, dirt, dust, debris and any other environmental condition that may damage the physical property values of the geotextile

C. CONSTRUCTION REQUIREMENTS

1. General

Prepare the surface on which the geotextile is to be placed so that no damage occurs to the geotextile. Do not drive or operate any construction equipment directly on the geotextile. Dispose of material with defects, rips, holes, flaws, deterioration, or other damage. Do not use defective material in the work. The manufacturer shall be present on site for a minimum of two days of geotextile installation such that the manufacturer observes any field-sewn seams.

2. Installation Plan

Within thirty (30) calendar days after award of the contract or no later than thirty (30) calendar days before beginning high-strength geotextile installation, the Contractor shall submit to the Department for review a high-strength geotextile installation plan that includes as a minimum the following information:

- a. The Contractor shall certify and provide proof to the Department of experience in the work described. The Contractor shall have successfully installed at least 500,000 square yards of any geotextile that has sewn seams during the last five years. In addition, the Contractor shall have successfully completed at least five projects within the last five years of similar size and complexity to that of the Project.

The Contractor's experience shall be documented by providing a project summary that includes for each referenced project, the project start and completion dates, total quantity of geotextile installed (specifically indicate if high-strength geotextile installed), and a detailed description of the project, site conditions, and subsurface conditions. The project description shall include details of the geotextile materials, the equipment and technique used to install the geotextiles, the average and maximum area of geotextile installed, the client name and address, the name and telephone number of the representative of the consultant and owner for whom the work was performed and who can attest to the successful completion of the work, and any other information relevant to demonstrating the Contractor's qualifications.

- b. Resume of supervisor documenting experience and qualifications in the installation of both normal and high-strength geotextile. The Contractor shall have a full-time supervisor who has been in responsible charge of supervising geotextile installation operations for at least five projects in the last five years. The supervisor shall be present at the work site at all times during installation operations. The acceptability of the supervisor, as well as any replacement for the supervisor, will be subject to the approval of the Department.
- c. Shop drawings showing the planned locations and elevations of all high-strength geotextiles. The installation sequence shall also be provided including any required staging. The shop drawings shall also show the location of the bridge abutment, and the limits of the final embankment and construction staging.
- d. Detailed description of proposed installation procedures
- e. Proposed methods and equipment for sewn seams

3. Site Preparation

Prepare the installation site by clearing, grubbing, and excavating or filling the area to the design grade. This includes removal of topsoil or vegetation. The RCE will identify soft spots and unsuitable areas during site preparation. This may include but not be limited to proof-rolling specific areas defined by the RCE. Excavate these areas and backfill with approved borrow or bridge lift material and compact as specified. The area to be covered by the geotextile shall be graded to a smooth, uniform condition free from ruts, potholes, and protruding objects such as rocks or sticks.

The Contractor may construct a working platform, up to 2 feet in thickness, in lieu of grading the existing ground surface. A working platform is required where stumps or other protruding objects which cannot be removed without excessively disturbing the subgrade are present. These areas shall be prepared in accordance with the 2007 Standard Specifications for Highway Construction. The stumps shall be covered with at least 6 inches of fill before placement of the first geotextile layer.

4. Geotextile Placement

The geotextile shall be spread immediately ahead of the covering operation. The geotextile shall be laid with the machine direction perpendicular or parallel to centerline as shown in Plans. All seams shall be sewn. Seams to connect the geotextile strips end to end will not be allowed. The geotextile shall not be left exposed to sunlight during installation for a total of more than 14 calendar days. The geotextile shall be laid smooth without excessive wrinkles. Under no circumstances shall the geotextile be dragged through mud or over sharp objects, which could damage the geotextile.

Small soil piles or the manufacturer's recommended method shall be used as needed to hold the geotextile in place until the specified cover material is placed. Remove wrinkles and folds by pulling the geotextile taut as required.

Should the geotextile be torn or punctured or the sewn joints disturbed, as evidenced by visible geotextile damage, subgrade pumping, intrusion, or roadbed distortion, the backfill

around the damaged or displaced area shall be removed and the damaged area repaired or replaced by the Contractor at no expense to the Department. The repair shall consist of a patch of the same type of geotextile placed over the damaged area. The patch shall be sewn at all edges.

If geotextile seams are to be sewn in the field or at the factory, the seams shall consist of two parallel rows of stitching, or shall consist of a J-seam, Type SSn-2. The two rows of stitching shall be 1 inch apart with a tolerance of plus or minus 0.5 inches and shall not cross, except for re-stitching. The stitching shall be a lock-type stitch. The minimum seam allowance, i.e., the minimum distance from the geotextile edge to the stitch line nearest to that edge, shall be 1.5 inches if a flat or prayer seam, Type SSa-2, is used. The minimum seam allowance for all other seam types shall be 1 inches. The seam, stitch type, and the equipment used to perform the stitching shall be as recommended by the manufacturer of the geotextile and as approved by the RCE.

The seams shall be sewn in such a manner that the seam can be inspected readily by the RCE or his representative. The seam strength will be tested and shall meet the requirements stated herein.

5. Fill Placement.

Embankment construction shall be kept symmetrical at all times to prevent localized bearing capacity failures beneath the embankment or lateral tipping or sliding of the embankment. Place fill over the geotextile by dumping onto previously placed material and pushing the material into place. Stockpiling of fill on the geotextile will not be allowed. Do not operate any construction equipment directly on the geosynthetic material under any circumstances.

Place the fill material in uniform layers so that there is a minimum lift thickness (loose) of 8 inches between the geosynthetic material and equipment tires or tracks at all times. The minimum thickness of the first lift is 8 inches. Do not allow construction equipment to turn on the first lift of material above the geosynthetic material. Do not blade the first lift placed over the geosynthetic material. If the subgrade is very soft with an undrained shear strength less than 500 psf, minimize pile heights to less than 3 feet and spread piles as soon as possible after dumping to minimize the potential for localized subgrade failure due to overloading of the subgrade.

Do not use sheepsfoot or studded compaction equipment on the first lift placed over the geosynthetic material. Stop vibrator on compaction equipment if pumping occurs. Do not operate any construction equipment that results in rutting in excess of 3 inches on the first lift. If rutting exceeds 3 inches, decrease the construction equipment size and/or weight or increase the lift thickness. Use only rubber-tired rollers for compaction if any foundation failures occur when placing subsequent lifts. Compact all lifts to the moisture and density requirements for each embankment specified in the Standard Construction Specifications. Do not blade material down to remove ruts. Fill any ruts or depressions with additional material and compact to the specified density.

A sandy material that meets the requirements of an A-2 AASHTO soil classification shall be the only borrow excavation soil allowed for placement between the lowest elevation geotextile and the bottom of the pavement section. The embankment fill soils shall be compacted in accordance with the 2007 Standard Specifications for Highway Construction. Fill shall be placed in 12-inch maximum lift thicknesses where heavy compaction equipment is to be used and 6-inch maximum uncompacted lift thicknesses where hand-operated equipment is used.

The geotextile shall be pretensioned during installation using either Method 1 or Method 2 as described herein. The method selected will depend on whether or not a mudwave forms during placement of the first one or two lifts. If a mudwave forms as fill is pushed onto the first layer of geotextile, Method 1 shall be used. Method 1 shall continue to be used until the

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mudwave ceases to form as fill is placed and spread. Once mudwave formation ceased, Method 2 shall be used until the uppermost geotextile layer is covered with a minimum of 1 foot of compacted fill. These special construction methods are not needed for fill construction above this level. If a mudwave does not form as fill is pushed onto the first layer of geotextile, then Method 2 shall be used initially and until the uppermost geotextile layer is covered with at least 1 foot of compacted fill.

Method 1

After the working platform, if needed, has been constructed, the first layer of geotextile shall be laid as outlined in the project plans and the joints sewn together. The geotextile shall be stretched manually to ensure that no wrinkles are present in the geotextile. The fill shall be end-dumped and spread from the edge of the geotextile. The fill shall first be placed along the outside edges of the geotextile to form access roads. These access roads will serve three purposes: to lock the edges of the geotextile to form access roads, to contain the mudwave, and to provide access as needed to place fill in the center of the embankment. These access roads shall be approximately 16 feet wide. The access roads at the edges of the geotextile shall have a minimum height of 2 feet completed. Once the access roads are approximately 50 feet in length, fill shall be kept ahead of the filling operation, and the access roads shall be kept approximately 50 feet ahead of this filling operation. Keeping the mudwave ahead of this filling operation and keeping the edges of the geotextile from moving by use of the access roads will effectively pre-tension the geotextile. The geotextile shall be laid out no more than 20 feet ahead of the end of the access roads at any time to prevent overstressing of the geotextile seams.

Method 2

After the working platform, if needed, has been constructed, the first layer of geotextile shall be laid and sewn as in Method 1. The first lift of material shall be spread from the edge of the geotextile, keeping the center of the advancing fill lift ahead of the outside edges of the lift. The geotextile shall be manually pulled taut prior to fill placement. Embankment construction shall continue in this manner for subsequent lifts until the uppermost geotextile layer is completely covered with 1 foot of compacted fill.

D. METHOD OF MEASUREMENT

Measurement of geotextile is on a square yard basis and will be computed based on the total area of geotextile shown in the plans, exclusive of the area of geotextiles used in any overlaps, seams, and/or joints. This shall include all costs associated with installation of the geotextile. Overlaps and any geotextile waste are an incidental item.

E. BASIS OF PAYMENT

Payment at the contract unit price is full compensation for all resources necessary to complete the item of work under the contract. Payment for the completed and accepted quantities is made under the following:

Item No.	Pay Item	Unit
2037110	GEOTEX REINF.	SY

(36) SECTION 205: MONITORING DEVICES – PIEZOMETER:

May 09, 2013

Supplemental Specification for Monitoring Devices – Piezometer is revised as follows:

Section 2 Paragraphs 2 and 3 shall be replaced with the following:

“Piezometer shall be installed from the working surface to the depths shown on the plans. These depths refer to the middle of the piezometer referenced to the original ground surface. Enough

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cable shall be provided to run from the pressure cell to the location of the Vibrating Wire Data Collection Center (VW-DCC) plus 10 feet for each instrument. The cable used to connect the pressure cell to the VW-DCC shall meet the requirements of the instrument manufacturer/supplier. The Contractor shall supply non-conductive conduit to encase the cable between the pressure cell and VW-DCC. The conduit shall have a minimal nominal diameter of 1 inch and meet the requirements of Schedule 80 materials. Provide enough conduit to enclose all lengths of buried cable from the pressure cells to the VW-DCC. All connects in the conduit and in the cable between the pressure cell and VW-DCC shall be water proof.

During roadway construction and any delay period for settlement, the piezometers will be read and analyzed by the Engineer at the same times outlined in the Special Provision for Settlement Plates. If the piezometers indicate excessive excess pore pressures at a given location during embankment placement operations, the placing of embankment material shall be suspended.”

The following shall be added to the end of Section 2 Paragraph 4:

“Figure 1 depicts the installation of a single piezometer in a borehole; however, multiple piezometers may be placed in the same borehole. The installation of multiple piezometers is not shown for clarity.”

Section 4 Paragraph1 shall be replaced with the following:

“Unit price bid for "Monitoring Devices-Piezometer" shall include all costs associated with supplying, installing, and maintaining the monitoring devices. The Contractor will monitor the devices throughout construction of the embankment and for up to a period of one year after the final delay period for settlement when embankment construction is completed. The Contractor will be responsible for ensuring the piezometers are in working order and accessible once the embankment is complete.”

(37) SECTION 305: MAINTENANCE STONE:

Maintenance Stone used on this project shall conform to the gradation requirements of Section 305, or to the gradation specified for Aggregate No. CR-14 in the Standard Specifications.

(38) SECTION 306: CEMENT MODIFIED RECYCLED BASE:

A. DESCRIPTION

This section contains specifications for the materials, equipment, construction, measurement, and payment for the modification of an existing paved roadway or shoulder by scarifying the existing pavement structure, mixing it with Portland cement, and constructing the base course in conformance with the lines, grades, dimensions, and cross-sections shown on the Plans or as directed by the RCE.

B. MATERIALS

1. Portland Cement - Use Portland cement that conforms to the requirements of Subsection 301.2.1.
2. Water - Use water conforming to the requirements of Subsection 701.2.11.
3. Asphalt Material – Use asphalt material conforming to the requirements of Subsection 301.2.4.

C. EQUIPMENT

Ensure that the equipment necessary for the proper construction of the work is on site and in acceptable working condition. Provide sufficient equipment to enable prosecution of the work in accordance with the project schedule and completion of the work in the specified time.

Construct the base with self-propelled rotary mixer(s)/reclaimer(s) capable of mixing in place to the required depth. The mixer(s)/reclaimer(s) shall have a mechanism for controlling the

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reclaimed material gradation via breaker bar and/or a door opening on the mixer(s)/reclaimer(s). Mixer(s)/reclaimer(s) shall be fitted with an integrated liquid injection system capable of introducing liquid into the cutting drum during the mixing process.

Provide a sufficient number of water trucks on the jobsite at all times of operation to maintain the moisture requirements listed in Subsection 9. Ensure that the water truck used in conjunction with the reclaimer uses a direct injection system, and additional trucks maintain surface moisture during grading and compaction work and until the curing treatment is applied in accordance with Subsection 13. Accomplish this using a controlled and uniform application of water without eroding or otherwise damaging the CMRB surface.

Provide a spreader/distributor capable of achieving consistent, accurate and uniform distribution across the entire length and width of the roadway while minimizing dust. Ensure that the spreader has adjustable openings or gate headers and is not solely dependent on vehicle speed to obtain the required spread rate.

Provide a combination of sheepfoot rollers, smooth wheel tandem rollers, and/or pneumatic-tired rollers that have the ability to adequately compact reclaimed material throughout the entire specified CMRB thickness. Ensure the necessary weight, size and number of rollers to achieve the requirements of Subsection 10.

D. CONSTRUCTION

Regulate the sequence of work to process the necessary quantity of material to provide the full depth of modification as shown on the Plans:

1. Ensure structural integrity of reclaimed material is consistent throughout the depth of the modification.
2. Ensure surface quality is sufficient to provide durable temporary pavement structure surface and supports permanent pavement structure performance.
3. Incorporate appropriate material as specified in the plans for drainage correction, cross slope correction or roadway strengthening.

E. QUALITY CONTROL PLAN, TEST STRIP & CORRECTIVE ACTION REQUIREMENTS

Prepare an annual Quality Control Plan that ensures that operational techniques and activities provide integral and finished material of acceptable quality for each Cement Modified Recycled Base project. Submit a Quality Control Plan for acceptance to the Chemical Stabilization Engineer (CSE) in writing a minimum of two weeks before work begins for the year.

The Quality Control Plan should include, but not be limited to addressing the following items:

1. Contingency plans for pulverization, mixing and compaction when specifications criteria are not met. Consider the specific roadway conditions of various project sites.
2. Plan for identifying in-situ moisture conditions, adjusting the moisture content to meet specifications, and maintaining moisture content through the time of curing. Include a description of the methods and minimum contractor testing for moisture. Consider specific environmental conditions of various project sites and schedules.

Test Strips

1. The first load of cement on the roadway will be used as a test strip to determine if the contractor is capable of producing a mixture according to specifications. Particular attention will be paid to the moisture and compaction requirements set in Subsection 10, mixing and processing requirements set in Subsection 9, pulverization requirements set in Subsection 7, depth requirements in Subsection 17, and cement tolerances in Subsection 8. Cease production after the first load if any of the requirements of the specification are outside of the tolerances and change procedures to contingency plans approved in the QC Plan to

continue work. Continue production as normal on the same day when the test strip meets the specification requirements.

2. The first load applied with the contingency plans will be used as a test strip to evaluate the corrective action plan. Cease production after this initial load of cement if the requirements of this specification are still not being met and submit a revised corrective action plan to the RCE for acceptance prior to continuing work.
3. If the requirements of this specification are not being met in a section not defined as a test strip (a section is defined as one load of cement) then one additional load of cement will be allowed. Cease production after this additional load of cement if the requirements are still not being met and submit a corrective action plan to the RCE for acceptance prior to continuing work.

F. SHOULDERS & ROADWAY PREPARATION

Remove all excess vegetation generated from the clipping and cleaning of shoulders from the roadway and any other debris, including Reflective Pavement Markers, prior to performing the mixing operations. Remove material from the shoulders as necessary to ensure proper drainage at all times.

G. PULVERIZATION

Provide means, methods, and equipment necessary to obtain satisfactory pulverization of the pavement so that at the completion of pulverization and mixing (prior to compactive efforts), a uniform mixture is created in which 100% of the reclaimed material mixture (by weight) passes a 3 inch sieve and 95% of the reclaimed material mixture (by weight) passes a 2 inch sieve. When necessary, SC-T-1 Section 6.6 will be used for sampling to run gradation tests. Rework areas not meeting this gradation control measure as necessary, adhering to the time limitations in Subsection 11. The pulverization pass is defined as at least one pass of the mixer prior to the application of cement. Additional passes are allowed. Lightly compact following each pass of the mixer to produce a uniform layer. Carefully control the depth of pulverization and conduct operations in a manner to ensure that the surface of the roadbed below the pulverized material remains undisturbed and conforms to the required cross-section. Means, methods and equipment including but not limited to additional passes of the reclaimer, milling in place or the use of supplementary equipment to achieve pulverization is the responsibility of the contractor and incidental to the process.

If the requirements of pulverization are not being met in a section not defined as a test strip (a section is defined as one load of cement) then one additional load of cement will be allowed. Cease production after this additional load of cement if the requirements are still not being met and submit a corrective action plan to the RCE for acceptance prior to continuing work.

H. APPLICATION OF CEMENT

The CSE will determine the rate of cement based on test results supplied in writing by the Contractor. Do not commence construction until an approved rate has been determined by the CSE. Allow two weeks from the date of submittal for the results and selection of appropriate cement rate. The test results will be conducted according to SC-T-26 by an AASHTO-accredited laboratory with material obtained from the roadway in which construction is to occur. Ensure that the roadway sampling and mix design testing is representative of the entire area and depth to be treated, several samples and/or designs may be necessary.

Spread Portland Cement uniformly on the pulverized material at the rate established by the CSE, taking care to minimize fugitive dust and minimize overlapping of the passes (maximum 6 inches). Apply cement only when the temperature is 40°F in the shade and rising, and no freezing temperatures are predicted for at least 48 hours. Do not perform work on frozen or excessively wet subgrade. A tolerance of 5% (of the rate) is allowed in the spread rate for individual sections (load of cement) of roadway; however, adjustments should be made in order to keep the actual spread rate as close to that established by the CSE. Only apply cement to such an area that all the operations (including final compaction) can be continuous and

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completed in daylight, unless adequate artificial light is provided. Ensure that all operations (including final compaction) can be completed within 3 hours of application of cement.

Do not allow the percentage of moisture in the reclaimed material mixture at the time of cement application to exceed the quantity that permits uniform and thorough mixture of reclaimed material or that creates instability of the roadway. Do not allow equipment, except that used in spreading and mixing, to pass over the freshly spread cement until it is mixed with the reclaimed material mixture.

If the requirements of cement application are not being met in a section not defined as a test strip (a section is defined as one load of cement) then one additional load of cement will be allowed. Cease production after this additional load of cement if the requirements are still not being met and submit a corrective action plan to the RCE for acceptance prior to continuing work.

I. MIXING & PROCESSING

Pulverize material as necessary to meet the requirements given in Subsection 7. The pulverization pass is defined as at least one pass of the mixer prior to the application of cement. Lightly compact following each pass of the mixer to produce a uniform layer.

After the cement has been applied per Subsection 8, mix and uniformly add necessary moisture to the reclaimed material to ensure that the moisture content is above the optimum value as set in the approved mix design when tested within 30 minutes of final compaction. Mix with at least one pass of the reclaimer after cement application at minimum. Additional passes are allowed, adhering to time limitations set forth within this specification. Ensure full width pulverizing and mixing by overlapping a minimum of 6 inches with each longitudinal pass, including at the longitudinal joint of each lane, and a minimum of 2 feet with each transverse joint. Additional mixing passes may be required in the contract documents. Lightly compact following each pass of the mixer to produce a uniform layer.

Immediately begin final compaction after the mixing process has been completed so that the requirements of Subsection 10 are met.

Remove excess material generated from the mixing process after final grading operations have been completed.

If the requirements of mixing and processing are not being met in a section not defined as a test strip (a section is defined as one load of cement) then one additional load of cement will be allowed. Cease production after this additional load of cement if the requirements are still not being met and submit a corrective action plan to the RCE for acceptance prior to continuing work.

J. COMPACTION

Before beginning compaction, ensure that the mixture is free from excessive fluff and overly compacted areas to allow for uniform compaction of the layer. Continue compaction until the entire depth of the base course mixture is uniformly compacted to not less than 95% of the maximum density. SC-T-23, SC-T-26, SC-T-27, or SC-T-29 will be used at the discretion of the RCE to determine the maximum density of the composite mix. If tests show that 95.0% requirement is not being met, adjust construction operations to obtain the required density. Complete the compaction work within 1 hour of the final mixing pass.

After the mixture is compacted, reshape the surface of the base course as necessary to conform to the required lines, grades, and cross-section. Perform light scarifying to a depth which removes the sheepsfoot imprints at minimum. Continue as required to obtain a uniform surface and to prevent scaling and delamination.

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Perform compacting and finishing in a manner that produces a smooth, closely knit surface, free from equipment imprints, cracks, ridges, or loose material. Maintain the moisture content of the mixture and surface above optimum moisture as determined by the pre-approved mix design, to the time of final curing coat being applied. The moisture content and density requirements for compaction will be tested for acceptance within 30 minutes of final compaction. Additional moisture contents tests will be randomly performed for acceptance through the curing application to ensure that the surface moisture is maintained above optimum moisture.

If the requirements of compaction are not being met in a section not defined as a test strip (a section is defined as one load of cement) then one additional load of cement will be allowed. Cease production after this additional load of cement if the requirements are still not being met and submit a corrective action plan to the RCE for acceptance prior to continuing work.

K. CONSTRUCTION LIMITATIONS

Perform work in daylight hours unless adequate artificial light is provided. Limit the area over which the cement-pavement mixture is spread so that all operations specified in Subsections 7, 8, 9, 10 and 13 are performed continuously until completion of a section (load of cement). Complete all grading and compaction work on a section (load of cement) within 2 hours after the initial mixing pass of the reclaimer unless the RCE approves a longer period.

If operations are interrupted for a continuous period of greater than 1 hour after the cement has been mixed with the reclaimed material, reconstruct the entire affected section (area of interruption) in accordance with these specifications. When the un-compacted reclaimed material mixture and cement is wetted so that the moisture content exceeds that specified, manipulate and aerate the mixture to reduce the moisture to the specified content provided the base course is completed within the time limits of these specifications.

Complete subsequent lifts of asphalt or chip seals which cover the Cement Modified Recycled Base curing methods and act as a final riding surface within 7 calendar days of completion of the CMRB section unless the RCE approves a longer period. If the roadway is longer than 4 lane miles, complete these subsequent lifts so that no more than 4 lane miles have temporary surface treatment on them at any time. A section is defined as the contract section of roadway receiving CMRB treatment. When using Curing Methods B or C, ensure that a milled surface is not left open to the public for more than 72 hours.

L. WEATHER LIMITATIONS

Apply cement only when the temperature is 40°F in the shade and rising, and no freezing temperatures are predicted for at least 48 hours. Do not perform work on frozen or excessively wet subgrade. The temperature restrictions for single treatment, when used as a curing option, shall meet the requirements of this reclamation specification. If the successive course is a final riding course, the seasonal restrictions of December, January and February apply unless otherwise approved by the DOC.

M. CURING

After the Cement Modified Recycled Base has been finished as specified, cure the surface using the specified method in the plans or contract. Dampen and sweep the CMRB immediately prior to the application of the surface treatment.

Curing Method A: Surface (Single) Treatment

Curing Method B: Surface (Single) Treatment with Milling

Curing Method C: Surface (Double) Treatment with Milling

After the Cement Modified Recycled Base has been finished as specified, protect the base from rapid drying and traffic by placing Asphalt Surface Treatment as specified in Section 406 or 407, with the exception that lightweight aggregate is not required and CRS-2 may be used in

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

place of CRS-2P. Perform this operation daily to protect the newly constructed Cement Modified Recycled Base, unless otherwise directed by the RCE.

Prior to placement of the HMA course in Methods B & C, mill the Cement Modified Recycled Base course surface to obtain a true and level finish for the asphalt placement. Ensure that a diamond milling pattern with a double or triple strike is clearly visible in the finished surface. Consider the final thickness during construction, leaving the specified depth of treatment after the milling has occurred. Ensure that the surface is left in a condition ready for paving, free from scabbing, scaling and other defects. Ensure that any structure lost to additional, deeper milling to remove these defects is replaced with asphalt. Include this cost in the Cement Modified Recycled Base price.

N. CONSTRUCTION JOINTS

At the end of each day's construction, form a straight construction joint as specified in Subsection 301.4.9.

O. SURFACE SMOOTHNESS

Ensure that the finished surface of the recycled base meets the requirements of Subsection 301.4.10. The grade of the road will be based on existing conditions of the roadway. Grade the cross slope to obtain positive drainage as well as smooth transitions from crown to superelevated sections of the roadway, re-grade roads with a pre-existing cross slope of 2% or greater to the same cross slope. On roads with a pre-existing cross slope of less than 2%, the Contractor and RCE will determine the measures required to obtain positive drainage and the final cross slope.

P. RIDEABILITY

Ensure that the final asphalt surface placed on Cement Modified Recycled Base course meets the Rideability requirements of SC-M-403 for either New Construction or Resurfacing, whichever is applicable based on the specified pavement structure.

Q. THICKNESS TOLERANCE

The thickness of the completed Cement Modified Recycled Base will be measured at random intervals not to exceed 1,000 feet in length. The average job thickness will be measured daily using the average value of all measurements taken by the inspector each day. Where the measured thickness is more than 1 inch greater than the specified thickness, the thickness of that location will be considered the specified thickness plus 1 inch. If the average job thickness varies from the specified job thickness by more than ½ inch, an adjusted unit price is used for calculating payment. The pay factor will be calculated as below and applied;

$$Pay\ Factor = 1 - \frac{|Average\ Job\ Thickness - Specified\ Job\ Thickness|}{Specified\ Job\ Thickness}$$

$$Adjusted\ Contract\ Unit\ Price = Pay\ Factor * Contract\ Unit\ Price$$

If the requirements of thickness (any single test value greater than 1 inch different from the specified depth) are not being met in a section not defined as a test strip (a section is defined as one load of cement) then one additional load of cement will be allowed. Cease production after this additional load of cement if the requirements are still not being met and submit a corrective action plan to the RCE for acceptance prior to continuing work.

R. OPENING TO TRAFFIC

Local traffic may use completed portions of the Cement Modified Recycled Base provided the base has hardened sufficiently to prevent marring, damaging or visible rutting of the surface by such usage. Ensure that no damage occurs to the curing coat. With approval of the District Office, temporary detours may be utilized during the reclamation process to reduce the traffic on the reclaimed roadway. Use the subgrade shoulders or completed pavement, when available, for transporting materials, workers, and equipment throughout the project. Do

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

not place construction equipment on the base without the approval of the RCE unless it is being used in the subsequent construction operation.

S. MAINTENANCE

Maintain the Cement Modified Recycled Base in accordance with Subsection 301.4.13.

T. MEASUREMENT

The quantity for the pay item Cement Modified Recycled Base (of the uniform thickness required) is the surface area of a uniform base constructed by applying and mixing cement with the subgrade as specified and is measured by the square yard (SY) of the modified base in-place, complete and accepted. Cement Modified Recycled Base constructed outside the designated area is not measured for payment.

The quantity for the pay item Portland Cement for Cement Modified Recycled Base is the weight of cement incorporated into the base at the rate established by the CSE and is measured by the ton (TON), complete and accepted. Portland cement incorporated in excess of 5% of the amount established by the CSE is not included in the measurement. Furnish the RCE with invoices of all cement received to verify weight.

U. PAYMENT

Payment for the accepted quantity of Cement Modified Recycled Base (of the uniform required thickness) or Portland Cement for Cement Modified Recycled Base, measured in accordance with Subsection 20 is determined using the contract unit bid price for the applicable item.

Payment for Cement Modified Recycled Base (of the uniform required thickness) is full compensation for constructing the Cement Modified Recycled Base course as specified or directed and includes pulverizing and scarifying the existing pavement, applying and spreading cement, processing and mixing base course material, watering and maintaining proper moisture content, compacting, finishing, curing, hauling and disposing of excess shoulder material and curing base course, forming construction joints, and all other materials, labor, equipment, tools, transportation, and incidentals necessary to complete the work in accordance with the Plans, the Specifications, and other terms of the Contract.

Base course that is deficient in thickness is paid for at the adjusted unit price specified in Subsection 20.

Payment for Portland Cement for Cement Modified Recycled Base is full compensation for furnishing and weighing the cement as specified or directed and includes all other materials, labor, equipment, tools, supplies, transportation, and incidentals necessary to complete the work in accordance with the Plans, the Specifications, and other terms of the Contract.

Payment for excess reclaimed material generated from the roadway (excluding shoulder material) is paid for as unclassified excavation.

Payment for each item includes all direct and indirect costs or expenses required to complete the work.

The unit price for calculating a thickness tolerance pay factor shall be \$5.00 per SY.

(39) SECTION 401: ASPHALT BINDER ADJUSTMENT INDEX:

The Liquid Asphalt Binder Adjustment Index Supplemental Specification dated March 3, 2009 applies to this project. For this project the Basic Bituminous Material Index will be determined on the first calendar day of the month in which this project is let. The index and adjustment table will be available on the internet at http://www.scdot.org/doing/constructionLetting_MonthlyIndex.aspx, or may be obtained from the office of the Contracts' Administrator.

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

The following is hereby included in the table entitled "Items of Work Eligible for A.C. Binder Adjustments" in the supplemental specification.

PREVENTATIVE MAINTENANCE SURFACE TREATMENT	SY	0.0026
ASPH. SURF. TREAT. (TRIPLE T-1)	SY	0.0024

All items of work included in this project, that are listed in the table entitled "Items of Work Eligible for A.C. Binder Adjustments" below paragraph 4 of the supplemental specification will be subject to price adjustment.

The following Section of the Supplemental Specification is hereby modified:

Additional Provisions:

The Department will calculate and apply asphalt binder index adjustments ~~fuel adjustments~~ to estimates based on index values set at the beginning of the estimate period.

Estimate period begins on the 1st of the month and ends on the last day of the month. The 1st of the month Index will be compared to the contract Base Index to determine index adjustments for the estimate period.

(40) SECTION 401: DRESSING OF SHOULDERS:

Prior to the placement of asphalt mixtures on existing roadways, the contractor will be required to remove all vegetation adjacent to the edge of pavement which impedes the placement of the asphalt mixture to the specified width. The contractor shall also remove and dispose of all excess asphalt which is disturbed during minor grading for widening, or during removal of debris or grass from existing surface during preparation of surface for new lift. After the asphalt mixture has been placed, the contractor shall blade the disturbed material to the extent that the shoulder is left in a neat and presentable condition. All excess material shall be removed from the project. No direct payment shall be made for this work; all costs are to be included in the price of other items of work.

(41) SECTION 401: SURFACE PLANING OF ASPHALT PAVEMENT:

A. GENERAL

1. Description:

This Special Provision replaces all references to Surface Planing of Asphalt Pavement in Subsection 401 of the Standard Specifications in their entirety. It does not replace or amend Subsection 611 of the Standard Specifications. It describes the material and construction requirements for the surfacing planing of existing asphaltic concrete pavement by micro-milling to remove wheel ruts and other surface irregularities, restore proper grade and/or transverse slope of pavement as indicated in the Plans or as instructed by the RCE. Ensure that the planed surface provides a texture suitable for use as a temporary riding surface or an overlay with OGFC with no further treatment or overlays. Do not use the planed surface as a temporary riding surface for more than ten days if no corrective action is required and no more than 21 days if corrective action is required unless otherwise instructed by the RCE.

B. REFERENCED DOCUMENTS

1. SCDOT Standard Specifications, Edition of 2007
2. SC-M-502, Rideability of PCC Pavement

C. EQUIPMENT

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

1. Provide power-driven, self-propelled micro-milling equipment that is the size and shape that allows traffic to pass safely through areas adjacent to the work. Also, use equipment with the following characteristics.
 - a. Ensure that the equipment is equipped with a cutting mandrel with carbide-tipped cutting teeth designed for micro-milling HMA and bituminous treated pavement to close tolerances.
 - b. Ensure that the equipment is equipped with grade and slope controls operating from a string line or ski and based on mechanical or sonic operation.
 - c. Ensure that the equipment is capable of removing pavement to an accuracy of 0.0625 inches.
 - d. Ensure that the equipment is furnished with a lighting system for night work, as necessary.
 - e. Ensure that the equipment is provided with conveyors capable of transferring the milled material from the roadway to a truck located to the side, rear, or front while minimizing airborne dust and debris.

D. CONSTRUCTION REQUIREMENTS

1. Follow the Plans to micro-mill the designated areas and depths, including bridge decks, shoulder, and ramps, as required. Ensure that the following requirements are met.
 - a. Prior to commencement of the Work, construct a test section that is 1156 feet in length with a uniformly textured surface and cross section on the road to be treated as approved by the RCE. Ensure that the final pavement surface has a transverse pattern of 0.2 inches center to center of each strike area and the difference between the ridge and valley of the mat surface in the test section does not exceed 0.0625 inches.
 - b. Milling depth may range up to 2 inches as necessary to fully remove existing OGFC surface, which has a typical nominal depth of one inch, as well as lesser depths on shoulders to provide a planar surface that allows appropriate drainage prior to placement of new OGFC. While milling depths over one inch are anticipated to ensure OGFC removal in low spots as well as to meet rideability requirements, milling depth should be minimized when possible to avoid excessive removal of the pavement structure while still removing all existing OGFC.
 - c. The Department will test the test section for rideability following Subsection 6 of SC-M-502 for diamond ground and textured existing concrete pavement, except that the maximum acceptable rideability is 90 inches per mile for each 0.1 mile segment. The first and last 50 feet of the test section will not be included in the two 0.1 mile segments. Provide the RCE with at least three business days of notice prior to need of rideability testing.
2. If any of the requirements of Section D.1 are not met, do no further work and provide a written plan of action to the RCE detailing what steps will be taken to improve operations. The RCE may require corrective action to the test section prior to acceptance or accept the test section as is. Once the plan has been approved by the RCE, construct a second test section at a different location from the first. If the second test section meets the requirements of Section D.1 and is approved by the RCE, continuous milling may commence. If the second test section fails to meet the requirements of Section D.1, continue to construct test 1156 foot sections until satisfactory results are achieved.
3. Once continuous operations commence, continue to produce a uniform finished surface and maintain a constant cross slope between extremities in each lane.
4. Provide positive drainage to prevent water accumulation on the micro-milled pavement as shown on the Plans or as directed by the RCE.

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5. Bevel back the longitudinal vertical edges greater than one inch that are produced by the removal process and left exposed to traffic. Bevel back at least 1.5 inches for each one inch of material removed. Use an attached mold board or other approved method.
6. When removing material at ramp areas and ends of milled sections, the transverse edges may be temporarily tapered 10 feet to avoid creating a traffic hazard and to produce a smooth surface. However, ensure that a neat transverse joint is created prior to the placement of the OGFC; do not terminate OGFC by “pinching” the OGFC over a tapered area.
7. Remove dust, residue, and loose milled material from the micro-milled surface. Do not allow traffic on the milled surface and do not place overlying layers on the milled surface until removal is complete.

E. ACCEPTANCE

1. Ensure that the micro-milling operation produces a uniform pavement texture that is true to line, grade, and cross section.
2. The Department will test and accept the milled surface for rideability as given in Subsections 6.2 through 6.4 of SC-M-502. The Adjusted Schedule of Payment given in Table 2 of Subsection 6 of SC-M-502 will apply to the contract unit price for the micro-milling as given in Subsection F of this special provision.
3. Micro-milled pavement surfaces are also subject to visual and straightedge inspections. Keep a 10-foot straightedge near the micro-milling operation to measure surface irregularities of the milled surface. Repair any areas exceeding 0.125 inches between the ridge and valley of the mat surface to the satisfaction of the RCE at no additional cost to the Department. Provide a written plan of action to the RCE for approval prior to performing any corrective action on the basis of rideability, grade, or surface texture.

F. MEASUREMENT AND PAYMENT

1. Measurement: The quantity measured for payment under this special provision is the number of square yards of micro-milled surface in place and accepted.
2. Basis of Payment: The quantity, as measured above, will be paid for at the contract unit price subject to the adjustments given herein, for which price and payment is full compensation for furnishing all materials, equipment, tools, labor, hauling, stockpiling, temporary asphalt, and any other incidentals necessary to satisfactorily complete the work. All reclaimed asphaltic pavement (RAP) becomes the property of the Contractor unless otherwise specified. No adjustment in the unit price for this item or other items will be considered for variations in the amount of RAP actually recovered.

Payment includes all direct and indirect costs and expenses required to complete the work. Payment will be made under:

Item No.	Pay Item	Unit
4013099	SURFACE PLANE ASPHALT PAVEMENT, VARIABLE	Square Yard

(42) SECTION 401: HOT MIX ASPHALT (HMA) QUALITY ASSURANCE:

Reference is made to the Supplemental Technical Specification “Hot Mix Asphalt (HMA) Quality Assurance.” For the purposes of applying this Supplemental Technical Specification, pay factor adjustments will be based on a unit price of \$65 per ton.

(43) SECTION 401: HOT-MIX ASPHALT RIDEABILITY:

Reference is made to the Supplemental Technical Specification “Hot-Mix Asphalt Rideability.” For the purposes of applying this Supplemental Technical Specification, pay factor adjustments will be based on a unit price of \$75 per ton.

(44) SECTION 401: FULL DEPTH ASPHALT PAVEMENT PATCHING:

A. DESCRIPTION:

The Contractor shall patch existing asphalt pavement at locations directed by the Engineer. This work shall consist of the removal of deteriorated pavement and replacing with a six (6) inch full depth asphalt plant mix patch.

B. CONSTRUCTION PROCESS:

The deteriorated pavement shall be removed to the width and length indicated by the RCE, with the face of the cut being straight and vertical. The pavement shall be removed to a depth of six (6) inches as directed by the RCE. In the event unstable material is encountered at this point, then such additional material shall be removed as directed by the RCE.

The volume of material removed below the patch shall be backfilled with crushed stone and thoroughly compacted in 4-inch layers with vibratory compactors. Prior to placing the asphalt patch material in the hole, the sides of the existing asphalt pavement shall be thoroughly tacked. The patch material shall then be placed in layers not exceeding 3 inches with each layer being thoroughly compacted with a vibratory compactor and pneumatic roller. The patch material shall be an approved SCDOT Asphalt Concrete Binder Course Mix. Patches shall be opened and filled in the same day. Asphalt mixture shall not be applied when the existing surface is wet or frozen. The finished patch shall be smooth riding. The patches are to be no less than six feet by six feet in size and should be spaced at not less than 25 feet between patches.

The quantity of full depth asphalt pavement patching to be paid for will be the actual number of square yards of existing asphalt pavement which has been patched and accepted. The work includes cleaning, removing, and disposing of debris from the patching work, furnishing and placement of crushed stone and asphalt patching material, and all other materials, labor, equipment, tools, supplies, transportation, and incidentals necessary to fulfill the requirements of this item of work.

The Contractor's bid shall include the following quantities of full depth asphalt pavement patching at the given unit price for each specified depth of patching:

6" – 3000 SY -\$40/SY

8" – 2000 SY -\$50/SY

10"- 2000 SY -\$60/SY

If more than the estimated square yards of patching are required by SCDOT, the Contractor will be paid at the unit prices listed above for each specified depth of patching. If less than the estimated square yards of patching are required by SCDOT, the Contractor shall reimburse SCDOT for the quantity of full depth patching that was not needed. Reimbursement will be paid to SCDOT at the unit prices listed above for each specified depth of patching.

(45) SECTION 403: PAVING UNDER GUARDRAIL:

August 17, 2011

Section 403 is expanded as follows:

A. GENERAL

Provide paving under guardrail as shown in the plans, in accordance with plan details and these special provisions. Pavement under guardrail shall only be placed where shown in the plans or as directed by the Engineer.

B. MATERIALS

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Pavement material under guardrail shall be the same as the hot mix asphaltic concrete surfacing being used on the adjacent roadway. Liquid asphalt binder shall be the same as that used for paving on the adjacent roadway.

Low-density Flowable Fill with a maximum 28-day compressive strength of 120PSI shall be used to fill leave out areas.

C. CONSTRUCTION

Place hot mix asphaltic concrete surfacing under guardrail in accordance with Section 401 of the Standard Specifications where indicated on the plans or as directed by the Engineer. Refer to details provided in this special provision for typical limits of paving and requirements for leave out areas around guardrail posts.

Pave area between the edge of pavement and the face of the guardrail when that distance is less than 20 feet.

Extend paving under guardrail to bridge end at locations where concrete approach slabs are used.

When at least one opening between parallel lines of guardrail is less than 20 feet wide, pave the entire area between the lines of guardrail.

When openings between parallel lines of guardrail are more than 20 feet wide, but obstructions such as bridge columns reduce the access between the guardrail and the obstruction to less than 20 feet and/or the distance between any two obstructions is less than 20 feet then the area with any single point of access less than 20 feet wide shall be paved.

When areas around obstructions are paved, no area should remain unpaved that will sustain plant life.

The top of pavement shall be constructed to be flush with surrounding earth shoulders and slopes.

Damage to pavement during subsequent construction, especially during driving of guardrail posts, should be minimized. Any damaged pavement must be restored to its original line and grade to the satisfaction of the Engineer.

Leave outs shown in the details shall be either formed or sawcut.

D. MEASUREMENT AND PAYMENT

Hot mix asphalt surface course shall be measured and paid for in accordance with Section 401 of the Standard Specifications.

Liquid asphalt binder shall be measured and paid for in accordance with Section 401 of the Standard Specifications.

When additional excavation is required to obtain the depth of pavement specified, this additional excavation will be measured separately and paid for by the cubic yard as unclassified excavation in accordance with section 203 of the Standard Specifications.

When borrow is needed to construct the area to be paved to meet the typical section, this borrow excavation will be measured and paid for separately as borrow excavation in accordance with section 203 of the Standard Specifications.

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The costs to provide the leave outs shall be considered incidental to the hot mix asphalt surface course and no separate measurement or payment shall be made for providing leave out areas.

Flowable fill for leave out areas will be measured and paid for in accordance with section 210 of the Standard Specifications.

Payment under this section will include the following:

Item No.	Pay Item	Unit
2031000	UNCLASSIFIED EXCAVATION	CY
2033000	BORROW EXCAVATION	CY
2103000	FLOWABLE FILL	CY
40110XX	LIQUID ASPHALT BINDER PG_ -22	TON
40303XX	HOT MIX ASPHALT CONCRETE SURFACE COURSE TYPE _	TON

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

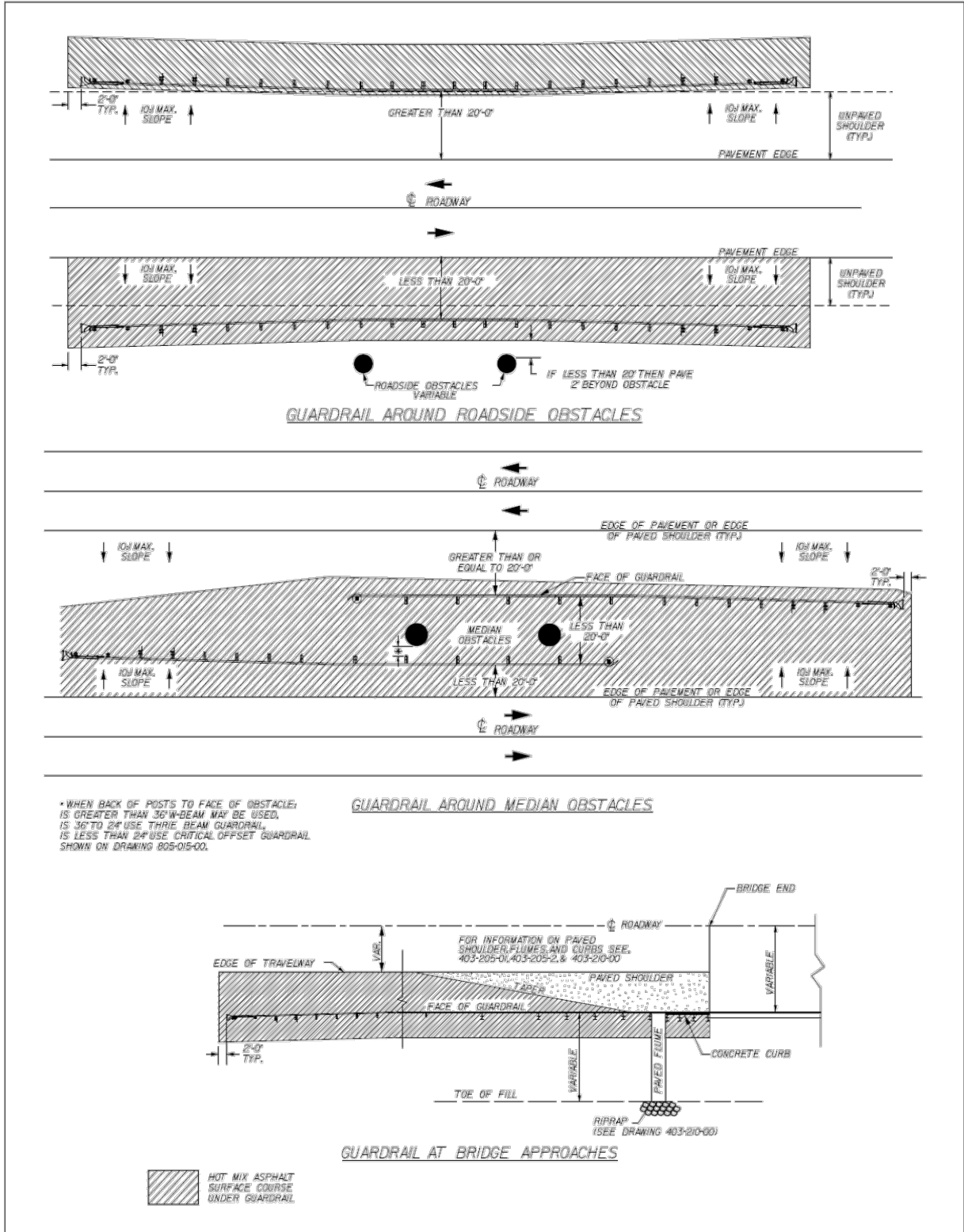


EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

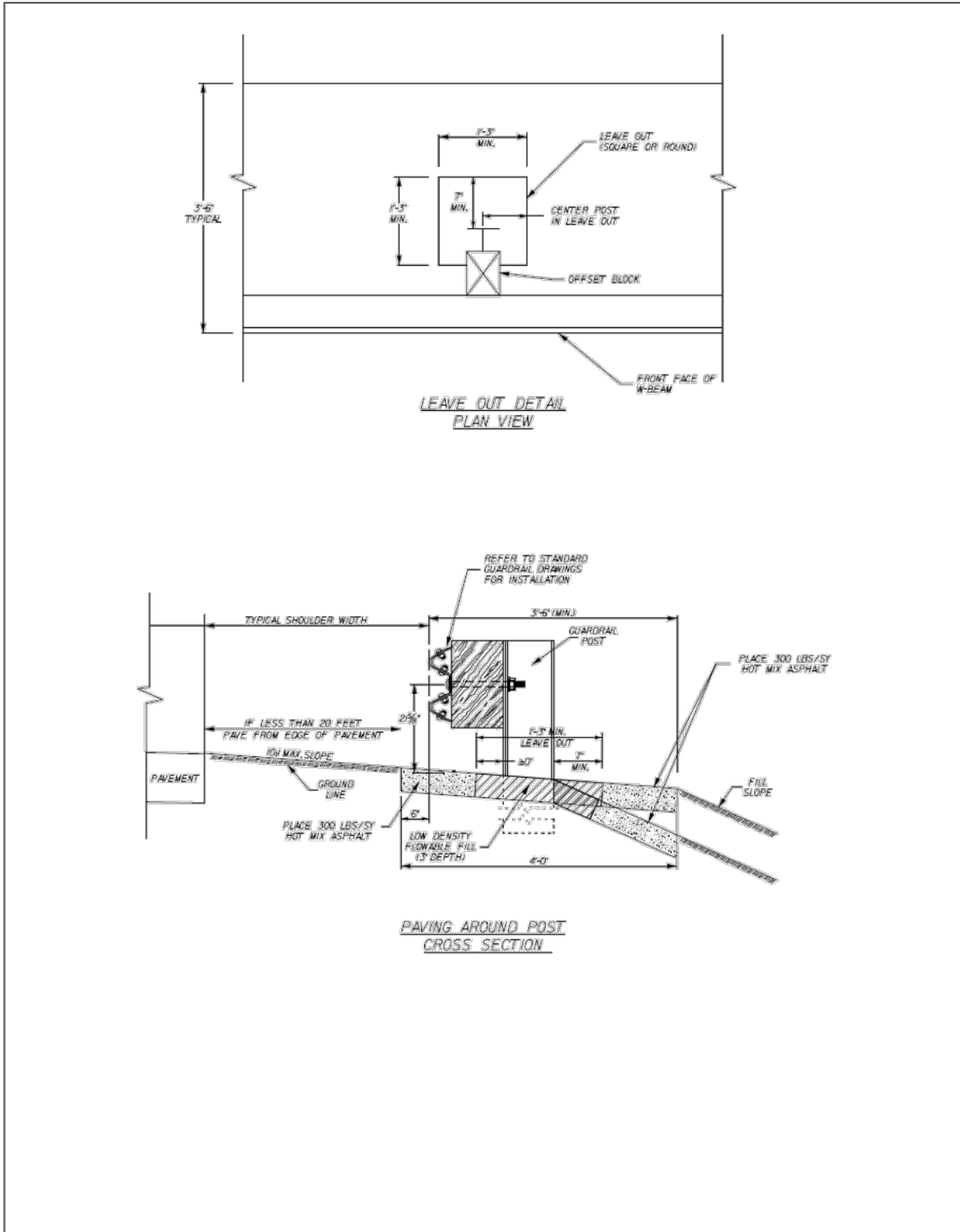


EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

(46) 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, see Exhibit 4c.
- 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 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

(47) SECTION 409: OPEN GRADED FRICTION COURSE

A. MATERIALS:

- 1. Coarse Aggregate Specification Requirement

Do not use aggregates other than crushed granite or gneiss. Use coarse and fine aggregate that does not have an excessive amount of mica or other deleterious material. All other specifications regarding LA abrasion and Micro Deval will apply as stated on section 409.2.2.

- 2. Hot Applied Non-Tracking Ultrahigh Strength Bonding Coat

Use Hot Applied Non Tracking ultrahigh strength bond product in lieu of the conventional emulsions listed in 401.4.18 as a tack or bonding layer between the surface and the OGFC. Ensure the product is placed in accordance with manufacturer's recommendations, or as deemed necessary by the AME.

- 3. Ambient and Surface Temperature

Place OGFC mix when ambient temperature is at or above 60°F and when the existing surface temperature is at or above 60°F. Monitor wind conditions in the field and discontinue operations in the event that severe weather is approaching, in order to prevent the OGFC from cooling too quickly or causing an unnecessary number of cold joint in the finished mat.

- 4. Truck Cover Requirements

Cover all loads of OGFC with a strapped down tarp to minimize heat loss of the OGFC mixture. Tarp shall overlap the truck bed a minimum of 6 inches.

B. CONTRACTOR PAVING PLAN:

Provide a detailed paving plan to the SCDOT a minimum of 15 working days prior to the pre-paving conference which will be held at the RCE's office prior to beginning the project. The paving plan may be altered if deemed necessary by the HMA Contractor and the RCE in order to maintain schedule and to provide consistent OGFC mixture.

Address each area shown below in the paving plan:

- 1. Monitoring

Install a Pave-IR system (MOBA or similar) on the asphalt paver that utilizes infrared sensors to continuously monitor and record the GPS location and temperature of the OGFC mixture as it is placed. This system shall be used on each paver utilized for OGFC, including ones use for paving ramps. One purpose of the system is to assist the HMA contractor by identifying segregation as it happens, so it can be corrected in a timely manner. Another purpose of this system is to document the location and duration of all paver stops, allowing the contractor to determine when and where changes are necessary to limit the duration of paver stops. All data recorded each night must be reviewed by the paving contractor prior to paving the next lot. Provide the RCE the summary report that lists the areas of thermal segregation as well as the location and duration of all paver stops greater than 60 seconds prior to paving the next day. The manufacturer must provide training to the HMA Contractor and to the RCE on how to use the IR system and interpret the collected data. Within 30 calendar days of completing the OGFC, the Contractor shall obtain all of the raw data collected from the manufacturer and provide a copy to the RCE.

2. Paver Operations

Include the HMA contractor's plan for a desired optimum paver speed in feet per minute to eliminate inconsistent movement of the paving operations and provide a more uniform OGFC finished mixture.

Include a plan on how the paver, screed, cold joint, and MTV will be preheated prior to paving each shift. In addition, explain how the paver and MTV will be cleaned properly after each shift to prevent contamination of the OGFC mixture.

3. OGFC Mix Temperature

Include a plan on how the mix temperature will be monitored by the Contractor prior to leaving the plant as well as prior to dumping into the MTV. Include a truck roadway mix target temperature with a tolerance of +/- 20° F. Target temperature will be in the specified range prior to load out into the asphalt paver.

4. Compaction

Provide a list of static rollers that will be used to compact the OGFC mixture. A diagram of the roller pattern will be required and used for the remainder of the construction project. The diagram should include the distance or range in feet where the rollers will be located behind the paver during compacting operations.

Include in the plan the Contractor's minimum mat temperature in advance of the first roller in the pattern to ensure the aggregate is seated in an acceptable range of temperatures. This minimum temperature should satisfy the manufacturer's guidelines for both the Non-Tracking Ultra High Strength Bonding Coat and OGFC.

5. General

List in the plan how the QC personnel will monitor rates of bonding coat, mat temperatures, roller patterns, etc. to ensure a quality paving project. State how QC personnel and paving foremen will communicate to ensure quality related issues such as plant production, trucking operations, paver speeds, etc. will be monitored and adjusted as necessary to ensure that issues are resolved.

C. TRUCKING PLAN:

1. Provide a Trucking Plan that calculates the number of trucks that will be used for each segment of mileposts of the project in order for the paving operation to be done in a continuous operation, without waiting for trucks and eliminate excessive standing idle time of trucks in line at the paver. This plan should include but not be limited to the following variables:

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

- a. Cycle Distance (miles) for each segment of roadway between turnaround locations
- b. Cycle Times (minutes) for each respective segment. This should be the sum of time associated with batching, tarping, hauling, un-tarping, dumping, returning, cleanout, release agent, etc..
- c. Target Tons per Hour respective to each lane/lane width.
- d. Target Paver Speed (ft/min)
- e. Number of Trucks Needed to maintain the Target Paver Speed.

2. The following is a Sample Trucking Plan:

Section	Cycle Distance (miles)	Cycle Time (min)	Avg Tons per Truck	Ideal Paver Speed (FPM)	#1 Lane Tons/Hr (16')	#1 Lane Trucks Needed
Exit 77 - Exit 79	10	58	20	25	147	7
Exit 79 - Exit 82	15.5	69	20	25	147	8
Exit 82 - Exit 83	18.5	72	20	25	147	9
Exit 83 - Exit 85	23	81	20	25	147	10
Exit 85 - Exit 88	27.5	90	20	25	147	11
Exit 88 - Exit 90	33	101	20	25	147	12
Exit 90 - NCSL	36	109	20	25	147	13

3. This is intended to be a live, working document the Contractor will use each shift to reduce paver stops. As the number of available trucks changes, the revised number can be inserted into the plan to back-calculate the Target Paver Speed to minimize paver stops.

(48) SECTION 413: COLD CENTRAL PLANT RECYCLED MATERIAL:

413.1 DESCRIPTION

These special provisions cover the requirements for Cold Central Plant Recycling Material (CCPRM). Cold Central Plant Recycling (CCPR) is a process in which recycled asphalt concrete pavement is processed and stabilized using foamed asphalt or emulsified asphalt at a plant and then placed using conventional asphalt paving equipment. **CCPRM will not be used as a final riding surface.**

413.2 MATERIALS

413.2.1 STABILIZING AGENT (EMULSIFIED OR FOAMED PG BINDER)

Use stabilizing agents that are either asphalt emulsion or PG 64-22 binder (must be listed on SCDOT Qualified Product List 37 or 38). Use emulsified asphalts that conform to the requirements of AASHTO M 208, M 140, or M 316 that is formulated for CCPRM use. Use PG 64-22 that meets the requirements of section 401.2.1.1 of the Standard Specifications. Emulsified Asphalt, used as a stabilizing agent, is not permitted when placement occurs during night time hours and will be opened to traffic the next morning.

413.2.2 WATER

Use water for mixing that meets the requirements of Section 701.2.11 of the Standard Specifications.

413.2.3 OTHER ADDITIVES (HYDRATED LIME OR PORTLAND CEMENT)

Use, if necessary, additional additives that meet the requirements in **TABLE 4**. In the case where an additional additive is used, show type and dosage as described in the Job Mix Formula submitted to the Department.

413.2.3.1 HYDRATED LIME

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Use hydrated lime that conforms to the requirements of AASHTO M 303, Type 1 from suppliers listed on the most recent edition of SCDOT Qualified Product List 39.

413.2.3.2 PORTLAND CEMENT

Use Portland cement that conforms to the requirements of Subsection 701.2.1 with the allowable maximum alkali content ($\text{Na}_2\text{O}+0.658\text{K}_2\text{O}$) increased to 1.0%.

413.2.4 ASPHALT TACK COAT

Use an asphalt tack coat material that meets the requirements of Subsection 401.4.18 of the Standard Specifications.

413.2.5 ASPHALT FOG SEAL

Use an asphalt emulsion fog seal material or PG 64-22 binder from Qualified Product Listing No. 37 / 38.

413.2.6 FINE AGGREGATE

Use a fine aggregate for the Grit application that conforms to FA 10 or FA 13 and from suppliers listed on the most recent edition of SCDOT Qualified Products List 1.

413.2.9 CRUSHED RECLAIMED ASPHALT PAVEMENT (RAP) MATERIAL

Additional RAP material (other than that reclaimed from the project) may be used and, if added, must meet the requirements of Section 401.2.2.6 of the Specifications and **TABLE 1**.

TABLE 1 – ADDITIONAL CRUSHED RAP

Tests	Method	Limit
Deleterious Materials: Clay Lumps and Friable Particles in Aggregate	AASHTO T 112	0.2% maximum
Maximum Sieve Size, 1.5 inches (37mm)	AASHTO T 27	100% Passing

413.2.10 ADDITIONAL AGGREGATE

Add additional aggregate if deemed necessary so the results of the job mixture meet the gradation requirements in **TABLE 3**. If additional aggregate is needed ensure that it comes from materials listed on Qualified Product List 1 and/or 2 and also meet the requirements of **TABLE 2**.

TABLE 2 – ADDITIONAL AGGREGATE

Tests	Method	Limit
Los Angeles Abrasion Value	AASHTO T 96	55% maximum loss
Sand Equivalent	AASHTO T 176	45% minimum
Maximum Sieve Size, 1.5 inches (37mm)	AASHTO T 27	100% Passing
Water absorption	AASHTO T 85	3% maximum

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413.3 JOB MIX FORMULA

Submit a job-mix formula (JMF) to the State Pavement Design Engineer for approval no less than 30 calendar days prior to the start of CCPRM operations. More than one JMF may be required to avoid any construction delays in case of materials changes. Ensure that the gradation of each JMF is within the bands shown in **TABLE 3**. Ensure that the contingency plan addresses actions to be taken if the gradation fails to meet these requirements. The RCE reserves the right to require appropriate measures be taken that may include stopping the work.

TABLE 3 – JMF GRADATION RANGE

Sieve Size	Gradation Band* (Percent Passing)	
	Lower	Upper
1.5"	-	100
¾", 3/8", No. 4, No. 8	Production targets set off of blended gradation	
No. 200	2	9

*Values based on AASHTO T 27 using washed, pulverized materials, prior to stabilization. For CCPRM using Foamed Asphalt, cement can be used as a portion of the material passing the No. 200 sieve.

Ensure that the following items are included on the JMF:

1. Target field density (nearest 0.1 lbs / #/ft³)
2. Target percent (nearest 0.1%) of the stabilizing agents to be added to the recycled mix
3. Target percent (nearest 0.1%) by weight of water (at room temperature) required
4. Expansion ratio, half-life characteristics, and temperature of asphalt binder at the time of dosage into foaming chamber (for mixtures using foamed asphalt). Minimum curing time/set time for the emulsified asphalt and temperature of emulsified asphalt at the time of dosage into the mixture (for mixtures using emulsified asphalt)
5. Target gradation for sieve sizes 1.5", ¾", 3/8", No.4 and No. 200 (including any aggregate to be added).

Note: If a change in source materials is made during construction, create and submit new JMFs to the RCE and ensure that they are approved prior to use on the project.

TABLE 4 – CCPRMJMF REQUIREMENTS

Item	Test Method	Criteria	Fabrication / Conditioning Procedure
<i>Emulsified Asphalt Stabilized Materials</i>			

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

TABLE 4 – CCPRMJMF REQUIREMENTS

Item	Test Method	Criteria	Fabrication / Conditioning Procedure
1	Moisture Density Relations AASHTO T 180, Method D	Determined by Design; Used to Establish Target Field Density	—
2	Mixture Stability Test ASTM D 5581 (6 in. specimens) or 150mm specimens) AASHTO T 245 (4 in. specimens)	2500 lbs. minimum (6 in. diameter specimen) Or (150mm diameter) 1250 lbs. minimum (4 in. diameter specimen)	Produce three specimens at 75 blows per side (or 30 gyrations per AASHTO T 312) and cured at 140°F ±5°F to constant mass, hold specimens at 104°F ±5°F for 2 hours ±5 min. in a forced draft oven immediately prior to testing.
3	Retained Stability ASTM D5581 (6 in. specimens) or 150 mm specimens) AASHTO T 245 (4 in. specimens)	Minimum 70% of results of item #2	Produce an additional three specimens and cure at 140°F ±5°F to constant mass. Vacuum saturate specimens to 55-65% moisture content, 77°F ±1.8°F water bath for 23 hours ±30 min and 104°F ±1.8°F water bath for an additional hour immediately prior to testing
4	Raveling Stability (ASTM D 7196)	Maximum 2%	Produce specimens using a gyratory compactor following AASHTO T 312 at 20 gyrations and cured at 50°F ±5°F for 4 hours ±5 min at 50% humidity.
5	Thermal Cracking (Indirect Tensile Test) AASHTO T 322	The critical cracking temperature must be less than or equal to the pavement temperature given for the project climate area and pavement depth by LTPPBind ¹ .	See Notes 1 through 7 below.

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TABLE 4 – CCPRMJMF REQUIREMENTS

Item	Test Method	Criteria	Fabrication / Conditioning Procedure
<i>Foamed Asphalt Stabilized Materials</i>			
1	Moisture Density Relations AASHTO T 180, Method D	Determined by Design; Used to Establish Target Field Density	----
2	Dry Indirect Tensile Strength AASHTO T 283 Section 11	45 psi minimum	Produce three specimens using 75 blows per side (or 30 gyrations per AASHTO T 312) compacted at or below OMC and cured as follows: 4 inch diameter specimens, oven dry at 104°F ±5 °F for 72 hrs ± 30 min. and cool to ambient temperature for 24 hrs ± 30 min.; 6 inch or 150 mm diameter specimens, air dried for 24 hours ± 30min., then an additional 48 hours at 104°F ±5 °F in sealed plastic bag, cool to ambient temperature for 24 hrs ± 30 min.
3	Retained Indirect Tensile Strength AASHTO T 283 Section 11	Minimum, 70% of the Dry ITS from Item 2	Produce an additional three specimens and cure according to Item 2, and then submerge in 77°F ± 1.8 °F water bath for 24 hours ± 30 min. prior to testing.
4	Expansion Ratio. Wirtgen 2012 Cold Recycling Manual	10 times when Aggregate Temperature is 50°F to 77°F 8 times when Aggregate Temperature is greater than 77°F	-----

TABLE 4 – CCPRMJMF REQUIREMENTS

Item	Test Method	Criteria	Fabrication / Conditioning Procedure
5	Half-Life Wirtgen 2012 Cold Recycling Manual	6 second minimum	----

JMF Notes:

1. Choose the specification temperature using current FHWA LTPPBind software, using the weather station closest to the project. Ensure that the required temperature is the coldest temperature at the top of the recycled layer, using 98% reliability.
2. Compact samples to 6 in(150mm) diameter and at least 4.52 inches (115mm) in height, compacted to within 1% of design air voids at the design stabilizing agent content. Cure compacted samples at 140 ± 5 °F no less than 48 hours \pm 30 mins. Before testing, check sample mass every two hours \pm 5 mins until change in mass between successive checks does not exceed 0.05%. After curing, saw-cut two specimens from each compacted sample to 2 in. in height. Perform bulk density testing after saw-cutting.
3. Prepare three specimens at each of the three testing temperatures.
4. Select two testing temperatures that bracket the specification temperature. For example, if the specification temperature is -13°F, then two of the selected testing temperatures will be -4°F and -22°F. A temperature of 14°F or -40°F would be used as the third testing temperature.
5. Perform the tensile strength test on each specimen directly after the tensile creep test (at the same temperature as the creep test).
6. The critical cracking temperature is defined as the temperature at the intersection of the thermal stress curve (derived from the creep data) and the tensile strength line (the line connecting the average tensile strengths at the three testing temperatures).
7. Ensure that the critical cracking temperature predicted by the Indirect Tensile Test is less than or equal to the pavement temperature given for the project climate area and pavement depth by LTPPBind.

413.4 QUALITY CONTROL PLAN

Prepare a Quality Control Plan to ensure that operational techniques and activities provide a homogeneous and finished material of acceptable quality meeting the requirements of this special provision. Conform the plan to show sampling and testing that will be performed to control the processes and ensure material compliance within the requirements of this special provision. Provide the Quality Control Plan and the JMF that is intended to be used to accomplish the work to the State Pavement Design Engineer for review and approval no less than 30 calendar days prior to the start of CCPRM operations.

For each CCPRM project, a project specific Quality Control Plan is required, and must include the following (minimum) information:

1. A description of the Quality Control organization, including the number of full-time equivalent employees or Sub-Contractors with specific Quality Control responsibilities and an organizational chart showing lines of authority and reporting responsibilities.
2. A listing by discipline with the name, qualifications, duties, responsibilities and authorities for all persons proposed to be responsible for construction Quality Control.

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3. A Quality Control Sampling, Testing and Analysis Plan with methods that include a description of how random locations for testing and sampling are determined.
4. Identification and description (and accreditation status) of the laboratories to be used for each type of testing.
5. Specific list of documentation for Quality Control activities.
6. Procedures to meet contract requirements and corrective action when QC criteria are not met.
7. Procedures to protect stabilized material from receiving excessive moisture from weather events (i.e. rain, fog, etc.) and corrective actions when criteria are not met.
8. Contingency Plan including: inclement weather, equipment breakdowns, materials shortages, deficient density of installed CCPRM, material doesn't break or cure in timely manner, as established by the JMF, gradation is outside of tolerances, and production modifications based on changes in ambient and/or material temperature

413.5 PLANT EQUIPMENT

413.5.1 CCPRM PLANT

Use a plant that is capable of homogeneously incorporating all stabilizing agent(s) and materials up to the sizes shown in **TABLE 3**. Ensure that the plant is capable of delivering the amount of additives to within +/- 0.2% of the required amount by weight of the pulverized asphalt material, except that a capability of adding up to 5% water by weight of the pulverized bituminous material is mandatory. Use automated systems to regulate the application of stabilizing agent(s) and water that adjust automatically to the mass of the material being processed. When using foamed asphalt, outfit the plant with a test or inspection nozzle at one end of the spray bar that can produce a representative sample. Use a plant that is capable of maintaining the temperature of the liquid asphalt at a minimum of 300°F. Ensure that the plant is equipped with the means for the operator to verify that the stabilizing agent(s) and water are being evenly distributed and that the correct dosage rates of each are being applied. Ensure that the plant has the ability to print out stabilizing agent(s) and water quantities used during production. Ensure that the equipment is operated in accordance with the manufacturer's recommendations.

413.5.2 PLANT SCALES

Use scales that are approved in accordance with the requirements of SC-M-401.

413.5.3 TRUCKS, TRUCK SCALES AND AUTOMATIC PRINTER SYSTEM

Use truck scales and an automatic printer system that meets the requirements of SC-M-401.

413.6 PLACEMENT OPERATIONS EQUIPMENT

413.6.1 ASPHALT PAVERS

Use an asphalt paver that meets the requirements of Section 401.3.10 of the Standard Specifications. Place CCPRM at the specified depth set forth in the plans and ensure that the mix is spread uniformly without segregation.

413.6.2 ROLLERS

Use rollers that are self-propelled. Ensure that at least one pneumatic tire roller has a minimum gross operating weight of not less than 50,000 lbs. Ensure that at least one double steel-wheeled vibratory roller has a gross operating weight of not less than 24,000 lbs. and a width of 78 inches. Ensure that all rollers have properly working scrapers and water spraying systems.

413.7 CONSTRUCTION

413.7.1 WEATHER RESTRICTIONS

Ensure that recycling operations are performed when both the ambient temperature and material to be processed (measured in the shade and away from artificial heat) is a minimum 50°F. Do not perform any work when the weather forecast calls for freezing temperatures within 48 hours after placement of CCPRM on any portion of the project.

413.7.2 PLACING AND FINISHING

413.7.2.1 TRIAL TEST SECTION

At least one week, but not more than 30 days prior to the start of production, construct a 1,000 foot long trial section, one-lane wide, at the designated thickness and designed optimal stabilizing agent(s) content provided in the approved JMF. Construct the trial section at a location approved by the RCE on the project using the same construction procedures and equipment intended for the entire project. Cease production after construction of the trial section until the trial section is evaluated and accepted by the RCE. The Trial Section will be considered a LOT and payment will follow the payment tables established in this special provision.

In the event the initial trial section fails to meet JMF on gradation, binder content, designated depth, and field density requirements, make necessary corrections and construct a second trial section on the project site. The RCE may require a Technical Representative present during mixing and placing operations for the second trial section. When a Technical Representative is required, they must remain present during mixing and placement of any additional trial sections until acceptance has been made by the RCE. Additionally, ensure that the Technical Representative is present for the next day of production to oversee the mixing and placing operation. If during the next production day, the materials meet the mixture and placement acceptance criteria, the Technical Representative will no longer be required on the project site. If additional trial sections beyond the first two are needed, construct the trial section at sites approved by the RCE.

Ensure that the Technical Representative meets the following criteria:

1. Have 2 years minimum experience with the CCPRM process
2. Have personally supervised a minimum of 5 successful CCPRM projects
3. Have personal experience in developing CCPRM mix designs
4. Have the experience to perform and supervise field process control testing
5. Submit a list of references, with current telephone numbers, of persons who are able to verify the experience required herein.

Consultants or manufacturer's representatives may be used to satisfy the technical representative requirements listed herein.

The initial trial section will be paid for at the contract unit price for CCPRM, to include price adjustments. If needed, the Department will pay for up to one additional trial section of CCPRM at the contract unit price, to include price adjustments. The Department will pay for a maximum of two trial sections at the contract unit price. If more than two trial sections are needed, the Contractor will bear all costs associated with producing and placing the material at a site approved by the RCE.

413.7.2.2 MATERIAL TESTING – QUALITY CONTROL

413.7.2.2.1 GRADATION AND BINDER CONTENT

CCPRM acceptance for gradation and binder content will be based on a mean of the results of each day's run - production. A lot will be considered to be acceptable for gradation if the mean of the test results obtained is within the tolerance allowed for the job-mix formula as specified in **TABLE 5**. If a lot does not conform to the acceptance requirements for gradation stop paving/production and take corrective measures to bring the gradation within tolerance of the approved JMF.

TABLE 5

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Process Tolerance on Each Laboratory Sieve and Asphalt Content: Percent Plus and Minus						
No. Tests	1 ½"	¾"	3/8"	No. 4	No. 200	
1	0.0	8.0	8.0	8.0	2.0	
2	0.0	5.7	5.7	5.7	1.4	
3	0.0	4.4	4.4	4.4	1.1	
4	0.0	4.0	4.0	4.0	1.0	
5	0.0	3.6	3.6	3.6	0.9	
6	0.0	3.3	3.3	3.3	0.8	
7	0.0	3.0	3.0	3.0	0.8	
8	0.0	2.8	2.8	2.8	0.7	
9 or more	0.0	2.3	2.3	2.3	0.6	

Establish, as part of the JMF, a target percent passing for the 1.5", ¾", 3/8", No. 4 and No. 200 sieves. Create the JMF(s) using either existing materials obtained directly from the project site (prior to the start of construction) or from an existing stockpile of RAP. Quality Acceptance testing will be conducted by obtaining a sample of the mixture from the truck prior to it leaving the plant. The sample frequency will use SC-T-101 at a rate of 1 sample per 1000 tons.

Determine the asphalt binder content using an asphalt ignition oven in accordance with SC-T-75. Ensure a mix correction factor is determined in accordance with SC-T-75 prior to production. Perform gradation on the extracted ignition sample using SC-T-102. Cure all extraction samples to constant weight in a 300-350°F oven until the weight loss in a 15 minute period does not exceed +/- 1.0 grams within consecutive 15 minute intervals. There will be no price adjustment for asphalt content.

413.7.2.2.2 STABILIZING AGENT CONTENT

Provide with each gradation sample a computer printout of the stabilizing agent content percentage/rate of the plant at the time of sampling. If the dosage rate is outside of 0.20 percentage points, stop paving/production and take corrective measures to bring the dosage rate within tolerance of the approved JMF. In addition, provide a daily summary of the stabilizing agent content percentage/rate to the RCE.

413.7.2.2.3 MOISTURE CONTENT

Report the percent moisture content for prior to performing the mix extraction using the following equation:

$$\% \text{ Moisture} = \frac{\text{Original Mass} - \text{Final Mass}}{\text{Final Mass}} \times 100$$

413.7.2.2.4 MIXTURE STABILITY

When emulsified asphalt is used as the stabilizing agent, acceptance for Mixture Stability will be based on results of samples taken at a frequency a minimum of once per day. If the results are less than the established job-mix target, a pay adjustment will be applied for the tonnage represented by the results in section 414.8.4 under Acceptance.

413.7.2.2.5 DRY INDIRECT TENSILE STRENGTH

When foamed asphalt is used as the stabilizing agent, acceptance for Dry Indirect Tensile Strength will be based on results of samples taken at a minimum of once per day. If the results

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are less than the established job-mix target, a pay adjustment will be applied for the tonnage represented by the results in section 414.8.4 under Acceptance.

413.7.2.2.6 HALF-LIFE AND EXPANSION RATIO

Verify and provide reports to the RCE confirming that each load of asphalt binder used for foaming meets the requirements of **TABLE 4**.

413.7.2.2.7 FIELD COMPACTION

Ensure compaction of the recycled mix is completed using rollers meeting the requirements of this specification. In addition, set the vibratory roller near the highest frequency and near the lowest amplitude setting without damaging the CCPRM. Ensure that final rolling eliminates pneumatic tire marks and to achieve density, and done using a double drum steel roller(s), either operating in a static, oscillating or vibratory mode. Use oscillating and vibratory mode only if it is shown to not damage the pavement. Complete finish rolling no more than one hour after paving is completed, unless otherwise approved by the RCE. Do not stop rollers and allow them to sit on the uncompacted material. Establish rolling patterns so that they begin or end on previously compacted material or the existing pavement. Perform rolling until the material reaches a density of 98 percent of the maximum target density from the JMF as measured via a nuclear density gauge following SC-T-30, SC-T-31, or SC-T-32.

Use a nuclear density gauge conforming to the requirements of SC-T-65 to determine mat density by the Direct Transmission method. Ensure that the nuclear density gauge has been calibrated within the previous 12 months. In addition, maintain documentation of such calibration service for the 12-month period from the date of the calibration service and furnish the same to the RCE if requested. Construct a control strip and establish a roller pattern in accordance with the requirements of SC-T-65. The control strip will be acceptable if the field proctor (AASHTO T 180, Method D) is at least 98 percent of the maximum target density from the approved JMF and the density of the compacted CCPRM course is not less than 98.0 percent of the maximum target density from the approved JMF. Construct an additional control strip when a change in the source of material is made, when a change in compaction equipment is made, when a significant change in the composition of the material occurs, a change in roadway conditions occurs, or when there is a failing test section.

413.7.2.2.8 DEPTH CHECKS

Perform depth checks at a minimum rate of twice per 5,000 linear feet after compaction by coring the newly CCPRM after compaction has been completed. Measure the depth by the height of the core in 3 separate evenly spaced measured transversely across the mat and average 3 readings. Use SC-T-101 to determine the random locations. The RCE will take verification measurements of the same core. Acceptance of CCPRM course for depth will be based on the mean result of measurements of samples taken from each LOT of material placed. A LOT will be considered acceptable for depth if the mean result of the tests is within the tolerance of the plan depth for the number of tests taken as shown in **TABLE 7**.

TABLE 7 – PROCESS TOLERANCE FOR DEPTH CHECKS

Plan Depth, inches	Tolerance, inches (Plus or Minus)		
	2 tests	3 tests	4 tests
≤ 4	0.45	0.35	0.30
>4 ≤ 8	0.65	0.50	0.40
>8 ≤ 12	0.90	0.70	0.50

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>12	1.00	0.80	0.60
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If the mean depth of a LOT of material is in excess of the tolerance, the payment will not be made for that material in excess of the tolerance for the plan depth specified throughout the length and width of the LOT of material represented by the tests. For excessive depth CCPRM courses, the rate of deduction from the tonnage allowed for payment as CCPRM course will be calculated based on the JMF weight per square yard per inch of depth in excess of the tolerance for plan depth and the number of tests taken as specified in **TABLE 7** or the RCE can require excessive material to be removed at no additional expense to the Department.

If the mean depth of a lot of material is deficient by more than the allowable tolerance for the plan depth specified, correction will be required and payment will be made for the quantity of material that has been placed in the lot. For sections of CCPRM course that are deficient in depth beyond the tolerance, furnish and place material specified for the subsequent course or as approved by the RCE to bring the deficient CCPRM course depth within the tolerance of the specified plan depth. This additional material will be placed at no additional expense to the Department.

413.7.2.2.9 FOGSEAL

Ensure that after compaction of the recycled material has being completed, a fog seal is applied to the recycled surface at a uniform application rate of 0.04 gal/sy residual using a emulsified asphalt or PG 64-22 binder. A light application of fine aggregated used as grit may be applied to the fog seal to aide in the reduction of CCPRM pickup and raveling (if necessary). Ensure that after fog sealing no traffic, including construction equipment, drives on the completed recycled material for at least two hours. After two hours rolling traffic may be permitted on the recycled material. This time may be adjusted by the RCE to allow establishment of sufficient cure so traffic will not initiate raveling. After opening to traffic, maintain the surface of the recycled pavement in a condition suitable for the safe movement of traffic. Remove all loose particles that may develop on the pavement surface without damaging the surface. Within the limits of the Contract, maintain the CCPRM material in good condition until all work has been completed and accepted. This maintenance includes immediate repairs or defects that may occur including raveling or other surface imperfections. Perform this work without additional compensation and repeat as often as may be necessary to keep the area continuously intact. Replace faulty work for the full depth of the layer.

413.7.2.2.10 VERIFICATION OF MOISTURE CONTENT

Prior to placing the asphalt concrete surface courses, or other applicable surface treatment, allow the CCPRM material to cure until the moisture of the material is a maximum of 50 percent of the optimum water content or until approval of the RCE is received. Measure the moisture content using AASHTO T 329 on samples taken from two random locations and immediately placed in a sealed plastic bag, as determined by the RCE for each production day. Other methods and sampling rates may be used if supplied in the Quality Control Plan and approved by the RCE. Split samples may be taken at the direction of the RCE. Split samples may be part of the random locations or at additional locations determined by the RCE. Apply a tack coat, in accordance with Subsection 401.4.18, prior to any additional asphalt layers. Do not use **CCPRM as a final riding surface.**

413.7.2.2.11 TESTING RECORDS

Ensure that all testing information is readably available during the performance of the work and all records are collected by the RCE prior to the next LOT. Provide accurate reports meeting the requirements of AASHTO R 18.

414.8 ACCEPTANCE

414.8.1 DAILY PRODUCTION - LOT

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For the purposes of acceptance, each day’s production will be considered a LOT. When paving is less than 2,000 feet, it will be combined with the next day’s production or added to the previous day’s production if it is the last day to create a lot.

414.8.2 MIX QUALITY ACCEPTANCE

If key test results are less than the established JMF target, a pay adjustment will be applied for the tonnage represented by the results using the **TABLE 8** for mix stability and **TABLE 9** for Indirect Tensile Strength.

TABLE 8 - Mix Quality – Stability (Foamed Asphalt)	
% of Job-Mix Target Stability	% of Payment
Greater than 99.0	100
95.0 to 99.0	95
90.0 to 94.9	90
Less than 90.0*	90% pay and Cease Production

* Immediately cease production and notify the RCE when results fall below 90.0% of the approved JMF target. Make any necessary corrective actions to the mix and provide verification to the RCE that it conforms to the approved JMF. Should the results fall below the minimum specified in **TABLE 4**, remove the material represented by the failing results and replace it at no cost to the Department. With approval of the RCE, subsequent paving operations can resume.

TABLE 9 - Mix Quality – Indirect Tensile Strength (Emulsified Asphalt)	
% of Job-Mix Target Dry Indirect Tensile Strength	% of Payment
Greater than 99.0	100
95.0 to 98.9	95
90.0 to 94.9	90
Less than 90.0*	90% and Cease Production

* Immediately cease production and notify the RCE when results fall below 90.0% of the approved JMF target. Make any necessary corrective actions to the mix and provide verification to the RCE that it conforms to the approved JMF. Should the results fall below the minimum specified in **TABLE 4**, remove the material represented by the failing results and replace it at no cost to the Department. With approval of the RCE, subsequent paving operations can resume.

414.8.3 Field Compaction

Measure density by taking a nuclear density reading from two random test sites selected by the RCE within every 1000 feet. Ensure that readings are not located within 12 inches of the edge of any application width for CCPRM. Nuclear density test locations will be marked and labeled by the RCE in accordance with the requirements of SC-T-101.

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The average of the density measurements taken for the LOT will be compared to the target nuclear density established by the approved JMF to determine the acceptability of the lot. Once the average density of the lot has been determined, do not provide additional compaction to raise the average. If two consecutive 1000 foot sections produce density results less than 98 percent of the target density, immediately notify the RCE and institute corrective action. By the end of the day's operations, furnish the test data developed during the day's recycling to the RCE. Verify results for every lot by performing a field proctor (AASHTO T 180, Method D). Ensure that the field proctor is at least 98 percent of the target density from the approved JMF. A pay adjustment for the tonnage represented by the LOT will be applied using TABLE 10.

TABLE 10 - PAYMENT SCHEDULE FOR LOT DENSITIES

% of Target Control Strip Density	% of Payment
98.0 or greater	100
97.0 to less than 98.0	95
96.0 to less than 97.0	90
Less than 96.0	75

414.8.4 LOT PAY FACTOR

The RCE will compute the Lot Pay Factor (LPF) once payments are determined using the tables for mix quality and field density using the following formula. The LPF will be rounded to the nearest 0.1%.

$$LPF = 0.50 (PF \text{ mix quality}) + 0.50 (PF \text{ Density})$$

414.9 MEASUREMENT

Measurement and payment for the Cold Plant Recycling Material (CCPRM) will be paid by the ton of the completed sections and will be paid for at the Contract unit price per ton. This price will be full compensation for removal, hauling and processing of the existing pavement (if RAP from the same project is used) and/or existing RAP stockpile(s); for additional aggregate if needed; for preparing, hauling, placing and compacting of all materials; furnishing stabilizing agents (PG Binder or Emulsion), fog seal, aggregate used in grit application and additives (lime and cement); for all freight involved; for all manipulations, rolling and brooming; for testing and documentation; asphalt supplier services; and for all labor, tools, equipment and incidentals necessary to complete the work. Net weight information will be furnished with each load of material delivered in accordance with the requirements of Section 401 of the Specifications. Batch weights will not be permitted as a method of measurement unless the Contractor's plant is equipped in accordance with the requirements of Section 401 of the Specifications, in which case the cumulative weight of the batches will be used for payment. The unit price for calculating pay factor will be \$48.00 per ton.

(49) SECTION 501: ROLLER COMPACTED CONCRETE:

A. GENERAL

1. Description: Roller Compacted Concrete (RCC) consists of aggregate, Portland cement and possibly other supplementary cementitious materials (fly ash, slag), and water. RCC is proportioned, mixed, placed, compacted, and cured in accordance with these specifications. Ensure that the RCC conforms to the lines, grades, thickness, and typical cross section shown in the plans or otherwise established by the RCE. When used as base course, it will be covered with one or more lifts of asphalt as shown on the Plans. Otherwise, the RCC will provide the final riding surface.

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B. SUBMITTALS

1. Proposed RCC mix design: At least 45 days prior to the beginning of placing of RCC in the roadway, submit a proposed mix design to the State Materials Engineer at the SCDOT Office of Materials and Research for review. If the mix design appears satisfactory to the SCDOT, prepare and test a trial batch mixture at the Contractor's facilities to verify that the design criteria for strength are met. Perform batch mixture preparation and testing in the presence of representatives of the SCDOT Office of Materials and Research. Make no production until an approved mix design has been obtained.

C. MATERIALS

1. General: The RCE will approve all materials to be used for RCC construction based on laboratory tests or certifications of representative materials that will be used in the actual construction. All materials must conform to Section 700 of the *SCDOT Standard Specifications for Highway Construction*, unless otherwise modified herein.
2. Portland Cement, Fly Ash, and Water-Granulated Blast Furnace Slag: All cementitious material must conform to Section 501.2.1. Pozzolanic substitution for Portland cement shall be allowed as specified in Section 701.4.9. If the use of silica fume is desired, have the type and usage pre-approved by the SCDOT State Materials Engineer.
3. Aggregates: Obtain all aggregates to be used from qualified sources appearing on the SCDOT Qualified Products Listing for aggregates. Use no aggregate where the plasticity index of the aggregate exceeds 5. Aggregates may be obtained from a single source or borrow pit, or may be a blend of fine and coarse aggregates. Use well-graded aggregate without gradation gaps and conforming to the following gradation:

Sieve Size	Percent Passing by Weight
1 inch	100
¾ inch	90-100
½ inch	70-100
3/8 inch	60-85
#4	40-60
#16	20-40
#100	6-18
#200	2-8

4. Water: Use only water conforming to Section 701.2.11 of the Standard Specifications.
5. Curing Compound: Where curing compounds are used, only those white-pigmented products shown in the current edition of SCDOT Qualified Products List 33 shall be used.

D. DESIGN STRENGTH

Use a mix design that demonstrates a compressive strength of 4000 psi within 28 days when specimens prepared according to ASTM C 1435 are tested according to AASHTO T 22. At least two sets of three cylinders will be produced, with one set being tested at 4 days and the other at 28 days. To determine the compressive strength for a set, two of the specimens will be tested. If the weaker of the two specimens is at least 90 percent of the strength of the stronger specimen, then the two values will be averaged to determine the overall compressive strength. If the weaker specimen has less than 90 percent of the strength of the stronger specimen, then the third specimen will be broken and all three specimens will be averaged. If one individual result is much lower or much higher than the other two due to defects in the specimen, that value may be discarded at the State Materials Engineer's discretion.

E. EQUIPMENT

1. General: Construct roller compacted concrete with any combination of equipment that will produce a completed pavement meeting the requirements for mixing, transporting, placing, compacting, finishing, and curing as provided in this specification.

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2. **Mixing Plant:** Locate the mixing plant within a thirty-minute haul time from the point of RCC placement. Use only plants capable of producing an RCC pavement mixture in the proportions defined by the final approved mix design and within the specified tolerances. The capacity of the plant must be sufficient to produce a uniform mixture at a rate compatible with the placement equipment. If the plant is unable to produce material at a rate adequate to prevent unnecessary cold joints and frequent paver stoppages, the RCE may halt production until such time that a plant of appropriate capacity is used. Have the plant inspected and approved by the SCDOT Office of Materials and Research prior to production of material under these specifications.
 - a. **Pugmill Plant:** Use only pugmill plants of the central plant type with a twin-shaft pugmill mixer, capable of batch or continuous mixing, equipped with synchronized metering devices and feeders to maintain the correct proportions of aggregate, cement, pozzolan, and water. Other pugmill plant requirements are as follows:
 - 1) *Aggregate Storage:* If previously blended aggregate is furnished, storage may be in a stockpile from which it is fed directly to a conveyor feeding the mixer. If aggregate is furnished in two size groups, follow proper stockpiling techniques to ensure aggregate separation.
 - 2) *Aggregate Feed Rate:* Use aggregate bins with a feed rate controlled by a variable speed belt, or an operable gate calibrated to accurately deliver any specified quantity of material. If two aggregate size stockpile sources are used, the feed rate from each bin must be readily adjustable to change aggregate proportions, when required. Feed rate controls must maintain the established proportions of aggregate from each stockpile bin when the combined aggregate delivery is increased or decreased.
 - 3) *Plant Scales:* Plant scales, if utilized, for any weigh box or hopper must comply with Section 701.3.2.
 - 4) *Cement and Pozzolan Material Storage:* Supply separate and independent storage silos for Portland cement and pozzolan. At plants with two or more silos in which different types of cement or cementitious materials are stored, ensure that each silo has a sign at each fill inlet to reduce the potential for loading errors. Make the sign from a durable material, with minimum two-inch high by ¼-inch wide letters that are raised, indented, or cut. Ensure that the sign clearly identifies the material that is in the silo and may be easily read even when completely coated with dust. Flat signs with painted or applied letters are not acceptable.
 - 5) *Pre-blended Portland Cement and Pozzolan:* If using pre-blended Portland cement and pozzolan (such as fly ash or slag), employ blending equipment acceptable to the RCE and demonstrate, with a testing plan, the ability to successfully produce a uniform blended material meeting the mix design requirements. Perform testing on at least a daily basis to ensure both uniformity and proper quantities.
 - 6) *Cement and Pozzolan Feed Unit:* Provide a satisfactory means of dispensing Portland cement and pozzolan, volumetrically or by weight, to ensure a uniform and accurate quantity of cementitious material enters the mixer.
 - 7) *Water Control Unit:* Use a water control unit capable of measuring the required amount of water for the approved mix by weight or volume. Ensure that the unit is equipped with an accurate metering device. Vary the amount of water to be used only with the approval of the RCE.
 - 8) *Gob Hopper:* For continuous operating pugmills, provide a gob hopper attached to the end of the final discharge belt to temporarily hold the RCC discharge in order to allow the plant to operate continuously.
 - b. **Rotary Drum Mixer:** Provide a rotary drum batch mixer capable of producing a homogeneous mixture, uniform in color, and having all coarse aggregate coated with mortar. Equip the mixer with batching equipment to meet the following requirements:
 - 1) *Weighing Equipment:* Measure the amounts of cement, pozzolan, and aggregate entering into each batch of RCC by direct weighing equipment. Use only weighing equipment that is readily adjustable in order to compensate for the moisture content of the aggregate or to change the proportionate batch weights. Include a visible dial

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- or equally suitable device that will accurately register the scale load from zero to full capacity. The cement and pozzolan may be weighed separately or cumulatively in the same hopper on the same scale, provided the cement is weighed first.
- 2) *Weigh Hoppers*: Use only bulk cement and pozzolan weigh hoppers that are equipped with vibrators to operate automatically and continuously while weighing hoppers are being dumped. Ensure that the weigh hopper has sufficient capacity to hold not less than 10 percent in excess of the cementitious material required for one batch.
 - 3) *Water Metering*: Measure the amount of water entering each batch of RCC by weight or volume. Use only equipment capable of measuring the water to within a tolerance of plus or minus one percent and equipped with an accurate gauge or dial measuring device. Vary the amount of water to be used only with the approval of the RCE. During batching, admit water to the mixer only through the water measuring device and then only at the time of charging.
 - 4) *Mixing Time*: Use only drum mixers equipped with an accurate clock or timing device, capable of being locked, for visibly indicating the time of mixing after all the materials, including the water, are in the mixer.
 - 5) *Recharging*: Discharge all material in the drum before recharging. Ensure that the volume of mixed material per batch does not exceed the manufacturer's rated capacity of the mixer.
3. *Paver*: Place RCC with a high-density asphalt-type paver subject to approval by the RCE. Use only pavers equipped with compacting devices capable of producing an RCC pavement with a minimum of 90 percent of the maximum density in accordance with AASHTO T 180, Method D prior to any additional compaction. Ensure that the paver is of suitable weight and stability to spread and finish the RCC material, without segregation, to the required thickness, smoothness, surface texture, cross-section, and grade.
 4. *Compactors*: Use self-propelled steel drum vibratory rollers having a minimum static weight of 10 tons for primary compaction. For final compaction, use either a steel drum roller, operated in a static mode, or a rubber-tired roller of equal or greater weight. Only use walk-behind vibratory rollers or plate tampers for compacting areas inaccessible to large rollers.
 5. *Haul Trucks*: Use trucks for hauling the RCC material from the plant to the paver with covers available to protect the material from inclement weather. To ensure adequate and continuous supply of RCC material to the paver, have a sufficient number of trucks. If the number of trucks is inadequate to prevent frequent starts and stops of the paver, cease production until additional trucks are obtained.
 6. *Water Trucks*: Keep at least one water truck, or other similar equipment, on-site and available for use throughout the paving and curing process. Equip such equipment with a spreader pipe containing fog spray nozzles capable of evenly applying a fine spray of water to the surface of the RCC without damaging the final surface.
 7. *Inspection of Equipment*: Before start-up, the Contractor's equipment will be carefully inspected. Should any of the equipment fail to operate properly, cease work until the deficiencies are corrected.
 8. *Access for Inspection and Calibration*: Provide the RCE or RCE's representative access at all times for any plant, equipment, or machinery to be used in order to check calibration, scales, controls, or operating adjustments.

F. CONSTRUCTION REQUIREMENTS

1. *Preparation of Subgrade*: Before the RCC processing begins, prepare the subgrade in accordance with Section 208 of the SCDOT Standard Specifications.
2. *Quality Control Test Specimens*: For each day's production, up to 1500 cubic yards of mix produced, prepare at least three sets of test specimens in accordance with ASTM C 1435 under the direct observation of the RCE or RCE's representative. A set of specimens consists of three cylinders. Make an additional three sets for each additional 1500 cubic yards or fraction thereof. Cure and transport the specimens to the Contractor's (or mix

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producer's) Office of Materials and Research-approved laboratory in accordance with ASTM C 31. Test two cylinders for compressive strength in accordance with ASTM C 39 at 3 days, 7 days, and 28 days under the direct observation of the RCE or RCE's representative. If the measured compressive strength between two cylinders varies by more than 10 percent of the stronger cylinder, test the third cylinder and average the results of the three cylinders. Otherwise, average the measured compressive strengths of the two cylinders tested at 28 days to determine the compressive strength of the lot. Retain the compressive strength test results for inspection by the RCE.

If the compressive strength measured at 3 days indicates that the 28-day compressive strength will be less than 3500 psi, investigate the potential causes of the low strengths and report to the RCE within 24 hours. If the compressive strength measured at 3 days indicates 28-day compressive strengths less than 3200 psi, immediately stop production and notify the RCE. Do not resume production until the cause of the discrepancy has been determined to the satisfaction of the RCE. The RCE may adjust compressive strength targets at 3 days as production continues based on field experience.

3. **Mixing Process:** Use the same mixture for the entire project unless otherwise stated in the project documents. If, during production, the source of Portland cement, pozzolan, or aggregates is changed, then suspend production and submit a new mix design to the RCE for approval. Do not exceed the manufacturer's rated capacity for dry concrete mixtures in the mixing chamber. Keep the sides of the mixer and mixer blades free of hardened RCC or other buildups. Routinely check mixer blades for wear and replace if wear is sufficient to cause inadequate mixing.

- a. *Mixing Time:* Use a mixing time adequate to ensure a thorough and complete mixing of all materials. Do not allow the mixing time, after all materials including water are in the mixer, to be less than 1½ minutes for one cubic yard and 20 seconds for each additional cubic yard.

- b. *Mixture Ingredient Tolerances:* Ensure that the mixing plant receives the quantities of individual ingredients to within the following tolerances:

Material	Variation by Weight
Cementitious Material	±2.0%
Water	±3.0%
Aggregates	±4.0%

- c. *Plant Calibration:* Prior to commencement of RCC production, carry out a complete and comprehensive calibration of the plant in accordance with the manufacturer's recommended practice. Provide all scales, containers, and other items necessary to complete the calibration. After completion of the initial calibration, calibrate the plant periodically as directed by the RCE. Plants listed on SCDOT Qualified Product List 28 at the time of RCC production are exempt from this requirement, although the SCDOT reserves the right to require additional calibration if variation in mixture quantities are suspected.

- d. *Daily Reports:* Supply daily plant records of production and quantities of materials used that day to the RCE. These records may be used as a check on plant calibration.

4. **Transportation:** Transport the RCC pavement material from the plant to the areas to be paved in dump trucks equipped with retractable protective covers for protection from rain or excessive evaporation. Ensure that the trucks are dumped clean with no buildup or hanging of RCC material in the corners. Have the dump trucks deposit the RCC material directly into the hopper of the paver or into a secondary material distribution system that deposits the material into the paver hopper. Dump truck delivery must be timed and scheduled so that RCC material is spread and compacted within the specified time limits.

5. **Placing:**

- a. *Subbase Condition:* Prior to RCC placement, ensure that the surface of the subbase is clean and free of foreign material, ponded water, and frost. Ensure that the subbase is

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uniformly moist at the time of RCC placement. If sprinkling of water is required to remoisten certain areas, ensure that the method of sprinkling will not form mud or pools of freestanding water. Correct soft or yielding subbase areas prior to placement of RCC as specified in Section F.1 above.

b. Weather Conditions:

- 1) *Cold Weather Precautions:* Employ cold weather precautions as detailed in Section 501.4.6 of the Standard Specifications.
- 2) *Hot Weather Precautions:* During periods of hot weather or windy conditions, take special precautions to minimize moisture loss due to evaporation. Cooling of aggregate stockpiles by shading or the use of a fine mist may be required. Protective covers may be required on dump trucks. Keep the surface of the newly placed RCC pavement continuously moist.
- 3) *Rain Limitations:* Conduct no placement of RCC pavement during rain conditions sufficient to be detrimental to the finished product. Placement may continue during light rain or mists provided the surface of the RCC pavement is not eroded or damaged in any way. Use dump truck covers during these periods. The RCE may terminate paving at any time when, in the RCE's judgement, the rain is detrimental to the finished product.

c. *Paver Requirements:* Place all RCC with an approved paver as specified in Section E.3 and also meet the following requirements:

- 1) *Filling the Paver:* Do not allow the quantity of RCC material in the paver to approach empty between loads. Maintain the material above the auger at all times during paving.

Stopping the Paver: Ensure that the paver proceeds in a steady, continuous operation with minimal starts and stops, except to begin a new lane. Maximum paver speed during laydown is 10 feet per minute. Higher paver speeds may be allowed at the discretion of the RCE if the higher speeds may be obtained without distress to the final product or cause additional starts and stops.

- 2) *Surface Condition:* Ensure that the surface of the RCC pavement is smooth, uniform, and continuous without excessive tears, ridges, or aggregate segregation once it leaves the paver.

d. *Inaccessible Areas:* Pave all areas inaccessible to either roller or paver with cast-in-place concrete meeting the compressive strength requirements of these specifications.

e. *Adjacent Lane Pavement:* Place adjacent paving lanes within 60 minutes. If more than 60 minutes elapses between placement of adjacent lanes, the vertical joint must be considered a cold joint and prepared in accordance with Section F.7 below. At the discretion of the RCE, this time may be increased or decreased depending on ambient conditions of temperature, wind, and humidity. Multiple pavers may be used in tandem to reduce the occurrence of cold joints.

f. *Hand Spreading:* Broadcasting or fanning the RCC material across areas being compacted is not permissible. Such additions of materials may only be done immediately behind the paver and before any compaction has taken place. Any segregated coarse aggregate shall be removed from the surface before rolling.

g. *Segregation:* If segregation occurs in the RCC during paving operations, placement shall cease until the cause is determined and corrected to the satisfaction of the RCE. If the segregation is judged by the RCE to be severe, remove and replace the segregated area at no additional cost to the Department.

6. Compaction:

- a. *Time to Compaction Start:* Ensure that compaction begins with the placement process and is completed within 60 minutes of the start of the mixing at the plant. The time may be increased or decreased at the discretion of the RCE depending on ambient conditions

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of temperature and humidity. Do not permit delays in rolling unless approved by the RCE. Plan operations and supply sufficient equipment to ensure that these criteria are met.

- b. *Rolling*: Determine the sequence and number of passes by vibratory and non-vibratory rollers to obtain the specified density and surface finish. Only operate rollers in the vibratory mode while in motion. Rubber-tire rollers may be used for final compaction. Use additional rollers if specific density requirements are not obtained or if placing operations get ahead of the rolling operations.
- c. *Rolling Longitudinal and Transverse Joints*: Do not operate the roller within 2 feet of the edge of a freshly placed lane until the adjacent lane is placed. Then, roll both edges of the two lanes together within the allowable time. If a cold joint is planned, then roll the complete lane and follow cold joint procedures as specified in Section F.7 below.
- d. *Inaccessible Areas*: Compact areas inaccessible to large rollers using walk-behind rollers or hand tampers.
- e. *Density Requirements*: Field density tests will be performed in accordance with SC-T-33 as soon as possible, but no later than 30 minutes after the completion of the rolling. Only wet density is used for evaluation. The required minimum density is 98 percent of the maximum laboratory density obtained according to AASHTO T 180 (Method D). The in-place density and moisture content may be determined with a nuclear moisture-density gauge. The gauge will be calibrated for moisture content at the beginning of the work and at any time during the work. RCC properly placed and compacted, but not meeting the density requirements, shall be cored and tested at the Contractor's expense. If the tested area achieves 28-day design strength, it will be paid at the full unit price. If the tested area indicates strength less than 3500 psi but greater than 3150 psi, payment will be made as follows:

Compressive Strength (psi)	Price Reduction (Percent of Unit Bid Price)
3300-3499	5
3150-3299	15

If the cores indicate strengths less than 3150 psi at 28 days or longer, the Department will evaluate the results and may reject the affected area and require removal and replacement or elect to pay at a reduced rate.

7. Joints:

- a. *Fresh Vertical Joints*: A joint is considered a fresh joint when an adjacent RCC lane is placed within 60 minutes of placing the previous lane or as specified by the RCE based on ambient conditions. Fresh joints do not require special treatment.
- b. *Cold Vertical Joints*: Any planned or unplanned construction joints that do not qualify as fresh joints are considered cold joints. Prior to placing fresh RCC mixture against a compacted cold vertical joint, thoroughly clean the cold joint of loose or foreign material. Wet the vertical joint face and maintain it in a moist condition immediately prior to placement of the adjacent lane.
 - 1) *Sawing Cold Vertical Joints*: For uncompacted surfaces or slopes more than 15 degrees from the vertical, cut the joint vertically for the full depth. Within 2 hours of final compaction, the edge of a cold joint may be cut with approved mechanical equipment. For edges cut after 2 hours, sawcut to the full depth of the pavement. Demonstrate any modification or substitution of the sawcutting procedure to the RCE for approval prior to use. In no case allow cutting of the edge to cause raveling or tearing of the surface. Moisten the cut edge immediately prior to placement of the adjacent lane.
- c. *RCC Pavement Joints at Structures*: Line structures such as manholes, valves, or concrete curb and gutter with joint filler as defined in Section 501.2.6.1 of the Standard Specifications.

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- d. *Control Joints*: Construct transverse contraction joints at regular intervals up to 20-feet in the RCC pavement to induce cracking at pre-selected locations unless otherwise indicated on the Plans or as directed by the RCE. At the option of the Contractor, soft-cut or green-cut saws may be utilized as soon as possible behind the rolling operation and set to manufacturer's recommendations. Conventional cut saws must be used as soon as the sawing operation will not result in raveling or other damage to the RCC pavement, but not more than 18 hours after RCC placement. Cut all joints to 1/4 the depth of the RCC pavement to a single saw blade width.
8. **Finishing**:

Ensure that the finished surface of the RCC pavement, when tested with a 10-foot straightedge or crown surface template, does not vary from the straightedge or template by more than 1/4 inch at any one point and shall be within 5/8 inch of the specified finished grade. When surface irregularities are outside these tolerances, diamond-grind the surface to meet the tolerance at no additional cost to the SCDOT.
9. **Curing**:

Immediately after final rolling and compaction testing, keep the surface of the RCC pavement continuously moist until an approved curing compound, a suitable prime coat, or a layer of asphalt concrete is applied.

 - a. *Water Cure*: Apply water cure by water trucks equipped with fog spray nozzles, soaking hoses, sprinkling system, or other means such that a uniform moist condition on the surface of the RCC is ensured. Apply this moisture in a manner that will not erode or damage the surface of the finished RCC pavement.
 - b. *Curing Compound*: Do not use curing compounds when the RCC material is to be promptly covered with asphalt. Apply curing compound as indicated in Section 501.4.11 of the Standard Specifications, except that the minimum rate of curing compound application is 0.09 gallons per square yard (11 square yards per gallon) unless a higher rate is specified by the curing compound manufacturer.
10. **Traffic**: Protect the RCC from vehicular traffic during the curing period. Completed portions of the RCC pavement may be opened to automotive and light truck traffic as soon as the strength is sufficient to prevent damage to the RCC. The pavement may be opened to unrestricted traffic after 4 days. If the temperature drops below 40° F, then the period of time the temperature is below 40° F will be added to the minimum time to opening.
11. **Maintenance**: Maintain the RCC pavement in good condition until all work is completed and accepted. Perform such maintenance at no additional cost to the SCDOT.
12. **Thickness**: Provide and operate equipment capable of extracting a small (approximately 1 inch diameter or greater) core to determine the pavement thickness. Extract samples in the presence of the RCE or RCE's representative unless otherwise directed.
13. **Thickness Tolerance** - The thickness of the completed RCC is measured at staggered intervals not to exceed 250 feet in length for two-lane roads. Measure the core to the nearest 1/8 inch at three different, evenly spaced locations and record the average. Where the RCC is deficient by more than 1/2 inch, correct such areas by removal and replacement. Where the measured thickness is more than 1/2 inch thicker than shown on the Plans, it is considered as the specified thickness, plus 1/2 inch. The average job thickness is the average of the depth measurements determined as specified above. Should this average thickness be more than 1/4 inch below the specified thickness, an adjusted unit price is used in calculating payment. This adjusted contract unit price bears the same ratio to the contract unit price as the square of the average thickness bears to the square of the specified thickness. When the contract includes more than one road, each road is considered separately.

G. UNIT PRICE

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1. A unit price of \$36/SY will be applied for the purpose of pay adjustment.

(50) SECTION 501: NONWOVEN GEOTEXTILE INTERLAYER FABRIC:

This Special Provision describes the construction and material requirements for installation of an interlayer fabric to be used between concrete pavement and cement stabilized aggregate base.

A. REFERENCED DOCUMENTS

ASTM D 4355 Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus

ASTM D 4491 Standard Test Methods for Water Permeability of Geotextiles by Permittivity

ASTM D 4595 Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method

ASTM D 4716 Standard Test Method for Determining the (In-plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head

ASTM D 5199 Standard Test Method for Measuring the Nominal Thickness of Geosynthetics

ASTM D 5261 Standard Test Method for Measuring Mass per Unit Area of Geotextiles

B. GENERAL

1. Provide and install a non-woven geotextile interlayer to be placed between concrete pavements and cement stabilized aggregate bases. The fabric is intended to provide limited drainage, separation between the base and pavement to retard the transmission of cracking, and relief of bedding stress due to movement of the concrete pavement on a stiff base. Attach the fabric firmly to the base to prevent movement during paving operations. Conduct paving operations to minimize fabric damage due to vehicle movements. Repair any damage prior to paving to ensure complete coverage of the base.

C. MATERIAL REQUIREMENTS

1. Geotextile requirements:
 - a. Fabric type: Provide a nonwoven needle-punched geotextile. Thermal treatment (calendaring or IR) is not acceptable.
 - b. Color: Ensure that the color is uniform and uses nominally the same color fibers throughout.
 - c. The following requirements must be met by 95% of samples. Minimum Average Roll Values (MARV) are also acceptable:
 - 1) Mass per unit area: Ensure that mass per unit area is greater than 450 grams per square meter (13.3 ounces per square yard) and less than or equal to 550 grams per square meter (16.2 ounces per square yard) when tested in accordance with ASTM D 5261.
 - 2) Thickness under load (pressure): Ensure that the thickness under load is greater than or equal to 3.0 mm at 2 kPa (0.12 inch at 0.29 psi), greater than 2.5 mm at 20 kPa (0.10 inch at 2.9 psi), and greater than 1.0 mm at 200 kPa (0.04 inch at 29 psi) when tested in accordance with ASTM D 5199.
 - 3) Wide-width tensile strength: Ensure the tensile strength is greater than 10 kN per meter (685 pounds per foot) when tested in accordance with ASTM D 4595.
 - 4) Maximum elongation: Ensure that the maximum elongation is less than or equal to 130 percent when tested in accordance with ASTM D 4595.
 - 5) Water permeability in normal direction under load (pressure): Ensure that the water permeability in the normal direction under load (pressure) is greater than or equal to

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1×10^{-4} meters per second (3.3×10^{-4} feet per second) when tested in accordance with modified ASTM D 4491 at 20 kPa (2.9 psi) or ASTM D 5493.

- 6) In-plane water permeability: Ensure that the in-plane water permeability (transmissivity) under load (pressure) is greater than or equal to 5×10^{-4} meters per second (1.6×10^{-3} feet per second) when tested in accordance with modified ASTM D 4716 at 20 kPa (2.9 psi) and is greater than or equal to 2×10^{-4} meters per second (6.6×10^{-4} feet per second) when tested in accordance with modified ASTM D 4716 at 200 kPa (29 psi) or ASTM D 6574.
- 7) Weather resistance: Ensure that the retained strength after 500 hours of weathering is greater than or equal to 60 percent of the initial strength when tested in accordance with ASTM D 4355.
- 8) Alkali resistance: Provide a manufacturer certification that the supplied material is composed of 96% or more polypropylene/polyethylene.

d. Certification: Prior to incorporation in the work, provide the RCE with a manufacturer's certification stating that the material being used meets all requirements of this Special Provision for each batch or lot of material. Ensure that the provided certification references the batch number(s) supplied and is attested to by the notarized signature of an officer of the manufacturing company. Also provide the RCE with a copy of the manufacturer's independent test data showing results for all the properties given in this section obtained by the test methods provided. Test data does not have to be batch or lot-specific.

2. Anchor system requirements:

- a. Fasteners: Use hardened steel pin fasteners with a galvanized finish intended for insertion in concrete by a powered fastening tool. Select a diameter and length adequate to anchor the geotextile such that normal paving operations do not dislodge the pins and the base is not damaged by the insertion.
- b. Discs: Provide thin, galvanized steel discs ranging from 2.0 to 2.8 inches in diameter with small stamped claws for holding the fabric and distributing the anchoring load.

D. CONSTRUCTION

1. Preparation of base: Repair any damaged or defective areas in the base to the satisfaction of the RCE. Thoroughly sweep the base immediately prior to fabric placement and ensure that the surface is free of loose debris.
2. Timing of placement: Place fabric no more than 3 days ahead of paving operations. If concrete is being placed by trucks directly in front of the paver, do not place fabric more than 650 feet ahead of the paver.
3. Placement: Roll the material onto the base, keeping the fabric tight with no wrinkles or folds. Roll out the sections of the fabric in a sequence that will facilitate good overfapping, prevent folding or tearing by construction traffic, and minimize the potential that the material will be disturbed by the paver. Overlap sections of the fabric a minimum of 6 inches and a maximum of 10 inches. Ensure that no more than three layers overlap at any point. Extend the fabric a minimum of 12 inches beyond the edge of the concrete pavement.
4. Anchoring: Secure the fabric with fasteners punched through the steel discs into the base. Space the anchors as necessary to securely hold the fabric in position during paving operations. However, maintain a maximum anchor spacing of 6 feet under all circumstances.
5. Construction traffic: Keep all nonessential traffic off of the fabric. Ensure that operations are staged such that no vehicles make sharp turning motions on the fabric. Remove and replace damaged fabric using required placement overlaps and sufficient anchors.
6. Moisture: Lightly but completely dampen the fabric ahead of the paving operations to ensure that the fabric does not draw water from the concrete. If the fabric is wetted due to precipitation or other reasons to the point of standing water or that free water appears when

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the fabric is walked on, allow the fabric to dry to a moist condition before continuing paving operations.

(51) SECTION 502: FULL DEPTH CONCRETE PAVEMENT PATCHING:

Description: The Contractor shall patch existing concrete pavement or roller compacted concrete as directed by SCDOT. This work shall consist of the removal of deteriorated pavement and replacing with an 8 inch full depth Portland Cement Concrete Pavement.

Construction Process: The deteriorated pavement shall be removed to the width and length indicated by the RCE, with the face of the cut being straight and vertical. The pavement shall be removed to a depth of 8 inches as directed by the RCE. In the event unstable material is encountered at this point, then such additional material shall be removed as directed by the RCE.

The volume of material removed below the patch shall be backfilled with crushed stone and thoroughly compacted in 4-inch layers with vibratory compactors. Patching shall be performed in accordance with Section 502 of the Standard Specifications and the Concrete Pavement Patching Drawings in Attachment B. The finished patch shall be smooth riding.

The quantity of full depth concrete pavement patching to be paid for will be the actual number of square yards of existing concrete pavement which has been patched and accepted. The Contractor's bid shall include 400 square yards of 8 inch full depth concrete pavement patching. If more than the estimated square yards of patching are required by SCDOT, the Contractor will be paid a unit price of \$150.00 per square yard. If less than the estimated square yards of patching are required by SCDOT, the Contractor shall reimburse SCDOT for the quantity of full depth patching that was not needed. Reimbursement will be paid to SCDOT at a unit price of \$150.00 per square yard.

(52) SECTION 503: PORTLAND CEMENT CONCRETE PAVEMENT UNIT COST:

The Contractor is obligated to comply with the 2007 Standard Specifications regarding compressive strength and thickness. This Special Provision establishes the Portland Cement Concrete unit cost for any payment adjustments associated with Supplemental Technical Specification SC-M-501, SC-M-502, SC-M-503, regarding compressive strength, rideability, and thickness. For purposes of applying any payment adjustments associated with these Supplemental Technical Specification, a unit price of \$45/SY will be used. SC-M-502DB no longer applies. SC-M-502 (04/16) will be applied to this contract unless noted otherwise in Exhibit 4c.

(53) DIVISION 600: FURNISH AND INSTALL DETECTOR LOOPS:

The Contractor is hereby notified that All Catalog descriptions and documentation are to be submitted within (5) days after the bid openings to the Contracts Administrator.

The loops shall be installed in the surface course on all projects in Engineering Districts 3, 4, 5, 6, & 7.

The loops shall be installed in the binder course for all projects in Engineering District 1.

The loops shall be on installed in the binder course on new construction projects, and in the surface for resurfacing projects in Engineering District 2.

(54) DIVISION 600: MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES:

The Contractor is advised that all work involving design or installation of traffic control devices, including but not limited to signs, pavement markings, elements of work zone traffic control, signals, etc., shall be in compliance with the FHWA's Manual on Uniform Traffic Control Devices (MUTCD), latest edition. The latest edition is defined as the edition that the Traffic Engineering Division of SCDOT recognizes as having been officially adopted (Engineering Directive, Memorandum 19) at the time the project is let, unless stated otherwise in the Special Provisions.

(55) DIVISION 600: EVALUATION OF RETROREFLECTIVITY:

Within 20 days of initial application, the Contractor shall arrange for an independent party to evaluate the retroreflectivity of the pavement markings using a mobile retroreflectometer utilizing 30 meter CEN geometry. All lines shall be measured in both directions. The independent party conducting the measurements shall furnish directly to the Department a report detailing the average of the readings over one mile segments for each type of long line (white edgeline, white lane lines, yellow edgelines) along the length of the project. Average measurements shall also be provided along each ramp. Interstate mile markers may be used for beginning and ending points, with the first and last segments in each direction being less than one mile in length. The initial minimum retroreflectivity values shall be as follows:

Retroreflectivity (mcd/lux/m²)

<u>White</u>	<u>Yellow</u>
450	350

A second evaluation shall take place within 20 days prior to the end of the 180 day observation period. The evaluation method shall be the same as described above. The 180 day minimum retroreflectivity values shall be as follows:

Retroreflectivity (mcd/lux/m²)

<u>White</u>	<u>Yellow</u>
400	300

All markings failing to meet the initial minimum retroreflectivity requirements by more than 50 mcd / lux / m² shall be replaced immediately at the Contractor's expense. All markings failing to meet initial requirements by less than 50 mcd / lux / m² may be reevaluated at the time of the 180 day evaluation unless the defect causing the lower readings is obvious to the Engineer.

(56) SECTION 600: INTELLIGENT TRANSPORTATION SYSTEM:

A. GENERAL PROVISIONS FOR INTELLIGENT TRANSPORTATION SYSTEM

The work on this project consists of a Contractor removing all existing ITS elements and furnishing / installing new ITS elements to include poles, lowering devices, fiber optic cable in conduits, service boxes, electrical services, Dynamic Message Signs (DMS) with structures in or near the locations of the existing DMS's and all miscellaneous hardware to make an operational system. This existing DMS's will be removed and returned to the SCDOT per the specification. All other elements shall be disposed of. **REMOVAL SALVAGE AND DISPOSAL OF EQUIPMENT AND MATERIALS.**

Control cabinets will be furnished by the SCDOT for Contractor installation. CCTV cameras will be furnished and installed by SCDOT forces on contractor installed poles with and without camera lowering devices. The need for a lowering device is at the Departments discretion and depends on the site terrain or need of a lane closure with a bucket truck. SCDOT forces will integrate project upon completion of fiber optic backbone.

All work involved in this contract shall be in accordance with the following publications:

The South Carolina "Specifications for Intelligent Transportation Systems", – referred to as the ITS Specifications

The AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals", (2001)

B. DEVICE LOCATION-EXPECTATION

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At the completion of the project, there shall be 100% video coverage of the construction limits. Cameras shall not be spaced more than ¼ mile apart (closer or farther apart locations can be considered during the design phase, depending on terrain). Fiber optic cable and service boxes shall be as far back to the ROW limits as possible. Guardrail shall be provided around poles that are closer than 46' to the travel way, unless break a way structures are used.

C. SUBMISSION:

SUBMISSION OF REQUIRED DESIGN INFORMATION AND DESIGN DRAWINGS:

It is essential that the ITS contractor make all required design submissions following award of this contract.

(57) SECTION 600: ITS ELEMENTS INSTALLATION:

A. PROJECT DESCRIPTION

1. Scope: ITS System – The Project includes the installation of an ITS System along I-85 throughout the limits of the project. See ITS Special Provisions for details regarding the ITS System. This will be a turn-key ITS project, with the CONTRACTOR furnishing and installing concrete or Steel poles along the mainline segments (at approximately ¼ mile intervals) and as necessary within the interchange area to achieve full video coverage. Full coverage includes the paved areas along the mainline and ramps and on crossroads between the interchange ramps. Occlusions such as sign trusses and bridge structures causing limited reduction in visibility are acceptable. The installation shall also include anchor foundations for steel poles, breakaway T-Bases for steel poles, lowering devices, 144 SM fiber optic cable in 2 inch conduits, fiber optic cable splicing and terminations, fiber optic cable testing, service boxes, pull boxes, electrical conduit, electrical cable, electrical services, and all miscellaneous hardware required to make an operational system per the specifications, as listed, complete to the satisfaction of the DEPARTMENT. The existing dynamic message signs (DMS) that are currently in place within the project limits shall be replaced with new DMS as part of the new ITS system. New DMS location shall be coordinated with the signing layout to avoid conflicts and/or spacing issues; new DMS location may be adjusted slightly relative to the existing location as required to avoid such conflicts. The CONTRACTOR shall develop and furnish conceptual plans a minimum of 45 days prior to commencing fabrication/construction activities. The CONTRACTOR shall also provide as-built plans to include: directional bore logs, conduit offsets every 500', GPS data of device locations, all service and pull boxes, power metering points, mid span and reel end splices (three complete sets). An electronic copy of all GPS data will be turned in at the same time as as-built plans. Allocation drawing and Fiber Trak data entry will be furnished by the Department as part of the integration.

Prior to commencing construction, the DEPARTMENT will remove all existing ITS cameras and cabinets only. **THIS DOES NOT INCLUDE** camera poles, cabinet bases, conduit, fiber, electric services, dynamic message signs and structures from the project.

The Department will furnish to the contractor local camera cabinets with control equipment and power supplies to be installed according to the specifications for INSTALL 332 AND SCIPCAB1 ITS CABINET ASSEMBLY.

The Supplemental Specifications provide detailed requirements for specific ITS components of this system. Elements of this ITS system to be shown in the conceptual design plans, and specified in the Supplemental Specifications, are briefly described as follows:

2. Spare parts: Per section 12 of the **FURNISH AND INSTALL PERMANENT DYNAMIC MESSAGE SIGN STANDARD**, section 3 of the **FURNISH AND INSTALL CAMERA LOWERING DEVICE** the CONTRACTOR shall furnish NEW spare parts as defined.

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3. Training: Per Section 6 of FURNISH AND INSTALL FIBER OPTIC CABLE, AND Section 11 of FURNISH AND INSTALL PERMANENT DYNAMIC MESSAGE SIGNS, and MAINTENANCE OF TRAFFIC the CONTRACTOR shall furnish training as defined.
4. The Local Control Cabinet (332 or 336 or SCIPCAB1: Department furnished 332 Control cabinets shall be installed on preformed concrete bases, a SCIPCAB1 Control cabinets shall be installed on a concrete pedestal mounted at each specified field site as shown on the Plans. Control cabinets shall be used to house the field control and communications equipment required interfacing the CCTV components to the field hub cabinet communications control and communications system, closures, and traffic control center (TCC) equipment. Control cabinets include all of the equipment needed to interface the CCTV cameras and the communication system.
5. Service boxes: Service boxes shall be installed as shown on the plans, though not to exceed a maximum of 2450 foot spacing or as indicated on plans. Service boxes shall all so be installed at CCTV, Field Hub, Hub Buildings and other locations as needed for fiber optic splicing and cable management. Each service box shall have the SCDOT Fiber Optics logo cast in the lids. Each service shall have a passive marker ball operating at 101.4 KHZ orange in color. In cases were a service box is to be used for electrical cabling the lids shall have the SCDOT Electrical logo cast, and shall have a red passive marker ball operating at 169.8KHZ installed. At each service box locations, a PNA type marker post shall be installed (orange top for fiber optic and red top for ~~electrical~~). GPS location shall be determined for all boxes installed and shown on as-built plans.
6. The Fiber Optic Backbone and Drop Cable: The fiber optic backbone shall be 144 fiber single-mode cable with twelve (12) buffer tubes with 12 fibers each. It shall be installed in a 2" conduit where shown. Splicing of the cable shall only be allowed at specified locations to be approved by the ITS Field Operations Manager. Buried backbone cable shall have orange marking tape above it and above ground cable markers at every service box. The drop cable or Gator patch shall also be single-mode and extend from 3M Brand splice closures to local cabinets. GPS locations shall be determined for all mid spans/reel end splices and shown on as-built plans No subsurface investigation has been done. It shall be the CONTRACTOR's responsibility to verify that the cable can be buried at specified depth using pre-plowing or other methods to be approved by SCDOT. **New 144 SM fiber optic Backbone cable installed along I-85 shall be a Prysmian and installed in accordance with the designated fiber allocations to be issued by the ITS Field Operation Manager. All terminations and splicing shall be in accordance with the designated fiber allocations to be issued by the ITS Field Operations Manager.**
7. TMC Equipment: All field equipment installed shall be made operational at its respective local TCC.

B. GENERAL PROVISIONS

1. All work under this Contract shall be performed under the latest editions of following standards:

THE SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION, "STANDARD SPECIFICATIONS FOR HIGHWAYS CONSTRUCTION", Latest Edition;

These SPECIAL PROVISIONS;

The "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", "MUTCD - 2009 Edition";

The "INTELLIGENT TRANSPORTATION SYSTEM SPECIFICATIONS";

The "NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)";

The "NATIONAL ELECTRICAL SAFETY COUNCIL (NESC)";

The "ELECTRONIC INDUSTRIES ASSOCIATION (EIA)";

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

The “NATIONAL ELECTRIC CODE (NEC)”;

The “United States Department of Agriculture Rural Utility Service (RUS)”; The “AMERICAN SOCIETY OF TESTING AND MATERIALS (ASTM);

The “AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)”, and

Any other standards, codes and ordinances that may apply.

2. Section numbers appearing in these SPECIAL PROVISIONS refer to the section numbers in the STANDARD SPECIFICATIONS referenced above.

MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES:

“The Contractor is hereby advised that the Department has adopted the MUTCD 2009 – Manual on Uniform Traffic Control Devices for use on all projects. All references to the South Carolina Manual on Uniform Traffic Control Devices (SCMUTCD) are hereby revised to read “MUTCD – 2009 Edition”.

C. CODES, LICENSES, & ABILITIES

1. All work shall be done in a workmanlike manner to meet the highest industry standards, all in accordance with the requirements of the latest editions of the National Electric Code (NEC), National Electrical Safety Council (NESC), the Illuminating Engineering Society (IES), American National Standards Institute (ANSI), National Electrical Manufacturer's Association (NEMA), and the regulations and standards of the local power company
2. The following supplements Section 102.1. The contracting firm responsible for the performance of the work covered by these SPECIAL PROVISIONS, **must be licensed as a General Contractor with a Classification of Public Electrical Utility (2U) by the SC Licensing Board for Contractors, and possess all other sub-classifications and licensing as required by the SC LLR.** Documentation of properly trained personnel for exothermic welding is required for all personnel performing exothermic welding. A copy of the documentation for exothermic welding shall be submitted to the Department.
3. Further, at least one ‘ON-SITE’ field supervisor shall have LEVEL II or higher, Fiber Optics for ITS Certification by the International Municipal Signal Association (IMSA). Photo copies of the license and certificate shall be submitted before work commences. Contractor personnel performing Fiber optic testing, splicing, terminating, and/or troubleshooting shall have Level II IMSA Fiber Optics for ITS or ETA FOI certification. The CONTRACTOR shall retain employee(s) holding the appropriate licenses to conduct this type of work for the duration of the project; and the employee(s) shall be present ***DAILY and*** at the ***FINAL INSPECTION***. The CONTRACTOR shall submit the names and copies of these licenses and certifications to SCDOT prior to contract award.
4. The CONTRACTOR shall employ persons capable of installing all the components of this ITS project as described in the Plans and Specifications. The CONTRACTOR shall possess all the necessary equipment and be capable of using it to install, integrate and maintain all the ITS components into a functional system that will allow the SCDOT Traffic Control Center (TCC) operators and system supervisors to monitor, detect and verify incidents on the Interstate.

D. SYSTEM INTEGRATION

Furnished by the Department- includes cameras, camera pipe adaptors, encoders, fiber transceivers, fiber mux, and integration.

E. SUPPLEMENTAL SPECIFICATIONS

The ITS components shall be constructed in accordance with the detailed “SUPPLEMENTAL SPECIFICATIONS, and the plan details; which by reference are made a part of these SPECIAL PROVISIONS. These documents may be obtained from the SCDOT, Director of Traffic Engineering, Advanced Systems Coordinator, P.O. Box 191, Columbia, SC 29202-0191.

F. SPECIAL INSTRUCTIONS TO CONTRACTOR

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

1. This is a "TURN-KEY" project. The plans will be field reviewed with the Contractor and SCDOT engineers before installation begins. Any field supervisor for the contractor must be at this review. The CONTRACTOR must devise/refine the final details, working within the Supplemental Specifications, the Design Details, the Standards, and with the ENGINEER. The ENGINEER must approve the Plans as submitted by the contractor before construction begins.
2. At project completion, all ITS components shall be complete and operational to the satisfaction of the ENGINEER.
3. The CONTRACTOR shall furnish and install conduit, service boxes, and stainless steel pull boxes where needed or as shown on the plans.
4. The CONTRACTOR SHALL FURNISH AND INSTALL ALL MATERIALS such as, EDCO surge suppressors, equipment racks, wood poles, fiber optic cables, electrical and coax cables, conduit, miscellaneous fittings, electrical service parts, clamps, ground rods, tape, fiber optic Siecor or equivalent interconnect centers, and all other needed materials.
5. The CONTRACTOR SHALL INSTALL 332 base-mounted or SCIPCAB1 pedestal mounted cabinets as shown in the plans.
6. The CONTRACTOR will install all new ITS components to provide a state-of-art installation. The CONTRACTOR shall install a new METERED ELECTRICAL SERVICE indicated on the Plans. NOTE: the service may be either: underground or overhead; depending on the latest requirements of the power company. GPS locations shall be determined at each meter location and shown on as-built plans Bids should be prepared accordingly. The CONTRACTOR shall furnish and install ALL NEW ELECTRICAL CABLE.
7. In addition to the state requirements, all permits and licenses required by a City/County are the responsibility of the CONTRACTOR. The CONTRACTOR shall arrange with the utility company for hookup connections and attachment agreements.
8. Camera lowering devices shall be installed at all locations with CCTV unless otherwise indicated by SCDOT.
9. Submittal Data Requirements: The CONTRACTOR shall provide six (6) copies of complete and thorough submittal data for all components and materials of the Intelligent Transportation system (ITS) project on the date of the preconstruction meeting. Work cannot begin on any part of the project until the Complete Submittal Data Package is approved by the Department. The submittal data shall be furnished to the DEPARTMENT Project Engineer. Submittal data shall include complete technical and performance specifications on all hardware, materials and installation wiring/cabling to be performed on the ITS project. Each package of submittal data shall be neatly organized and separated by hardware item and shall contain an index of all submittal data documents included in the package. The index shall name each submittal data document, what ITS system component the document is submitted for, and the specific manufacturer model, part and revision number of the subject hardware or software item exactly as the item is proposed to be provided. Any submittal data document or documentary item that is not listed in the index shall not be accepted for review. Each package of submittal data shall address all of the components and materials necessary for a complete ITS system as spelled out in the specifications; separate submissions for individual ITS system components and materials are not permissible. Typical submittal data which is required for all ITS system components shall include, but is not limited to, manufacturer's specifications, operating/maintenance, troubleshooting manuals, schematic wiring diagrams with detailed parts lists, materials lists and assembly drawings for the components used on this project, camera control, acceptance testing procedures, and detailed warranty and guarantee information for each component.
10. Contractor shall be responsible for new electrical and fiber optic cable locates during project. Contractor shall be responsible for locating PUPS tickets for all new electrical and fiber optic cable locates within the project area throughout the duration of the project.

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11. Contractor is responsible for preventive maintenance on all new components with in the project. Preventive maintenance shall start upon notice to proceed. Preventive maintenance consists of cleaning cabinets, changing filters, weed and grass control, rodent control and repairs as needed. Preventive maintenance is to be performed every three months during project. New components installed shall be serviced every three months after installation until completion of project. Upon award of contract the Contractor will be given a Preventive maintenance checklist to be followed for servicing components. Preventive Maintenance check list shall be filled out for each CCTV, DMS sign, and Hub locations, and shall be turned in to the ITS Central Maintenance Facility for review.
12. **SUBMISSION OF REQUIRED DESIGN INFORMATION AND DESIGN DRAWINGS:**
It is essential that the signing contractor make all required design submissions within 90 days following award of this contract, except as follows:

Section 9.103 of Signing Specifications is amended to also require that design drawings for Overhead Sign Structures and the details of footings be submitted within 90 (ninety) calendar days following award of the contract.

Section 9.104 of the Department's SPECIFICATIONS FOR SIGNING EXPRESSWAYS AND FREEWAYS is revised to require that the independent registered Professional Engineer who checks the designs for the overhead structures and footings be licensed by the State of South Carolina.

OVERHEAD SIGN STRUCTURE DESIGN:

Section 9.101 of the Signing Specification is amended to require stiffener plates between the base plate of all cantilever structures and the upright. The plates should be equally spaced about the base plate between the anchor bolt holes. All structures shall have at least six (6) anchor bolts per base plate. Also, the Contractor shall provide direct bolted connections of the sign to the structure sign hangers at the top and bottom of the signs. This shall be provided at all four corners of the sign. The top hole on each hanger shall be slotted to provide for adjustment.

Soil borings are not provided for the locations of the new Overhead Structures. The Contractor will be responsible for obtaining subsurface investigation data at the locations of the overhead structures shown in the plans for the purpose of overhead structure footing design. Special Note: Footings shall be designed using a maximum allowable toe pressure of 2000 pounds per square foot.

G. ACCEPTANCE

This project requires a 30 (thirty) day burn in period. All equipment shall operate satisfactorily for a period of 30 calendar days prior to final acceptance of the project. Any items deemed non-operational in that time period will cause the burn in period to start over. The burn in period shall not begin until all equipment is installed and operational. The burn-in period shall not begin until a punch list, generated by the final inspection, is complete.

H. INSPECTION

1. Resident Construction Engineer (RCE): During construction of the ITS portion of the Project periodic Inspections will be made by the RCE and by the Department's ITS staff. The Department's RCE is the designated representative of the Engineer, for the purposes of this project.
2. Disputes: The CONTRACTOR is advised that in any dispute between the CONTRACTOR and the manufacturer, concerning the operation/maintainability/reparability of any piece of equipment, THE DECISION OF THE ENGINEER SHALL BE FINAL.
3. Faulty Equipment: The CONTRACTOR shall be responsible for the labor cost to remove and replace faulty equipment. The CONTRACTOR shall be responsible to have a replacement part in place no later than 24 hours from the reported failure of the equipment.

Any delay that is documented by the RCE as late or non-responsive by the CONTRACTOR in replacing the faulty equipment within the specified period of time shall be assessed at a \$500 PER DAY liquidated damages penalty.

I. MAINTENANCE OF TRAFFIC

The CONTRACTOR shall maintain traffic throughout the length of this Project as required by the Manual on Uniform Traffic Control Devices and other applicable SCDOT Standards for traffic control. As part of the plans, the contractor shall provide traffic control plans prior to beginning work. Any necessary lane closures will have to be approved by the ENGINEER two weeks prior closing the lane. Interstate lane closures shall be done only at night. Shoulder closures are required when work is performed within 30 feet of the travel way. This includes the parking of vehicles or equipment.

Should the CONTRACTOR believe a lane closure is necessary to perform the work specified herein, the CONTRACTOR shall submit to the ENGINEER a written request at least two (2) weeks in advance of the proposed closure. The request for lane closure shall include:

1. Date and times that the closure is required.
2. Reason for the closure, and why the work cannot be accomplished without the requested closure.
3. A plan showing the lane(s) to be closed, the extent of the closure, the work area, and the proposed signing and other traffic control devices to be installed by the CONTRACTOR for the maintenance and protection of traffic during the closure.
4. Date and time that the closure will cease and related signing and other traffic control devices will be removed and normal traffic control will be re-established.

The RCE shall review the request, and shall approve, reject, or identify modifications to the plan necessary for approval.

Training-

Training will be furnished as part of the Traffic Control bid item with no additional cost to the Department.

5. The Contractor will be required to furnish approved Supervisor and Advanced work zone traffic control training courses for up to ten (10) SCDOT employees, as part of Traffic Control. The Department reserves the right to allow others to attend training.
6. Training shall be scheduled on a date selected by ITS Field Operations Manager during the project (contractor should note that this training may be required at the beginning of the project however must be conducted prior to Substantial completion of ITS infrastructure for this contract.)
7. Work zone training will be conducted in accordance to the below specifications by a recognized organization.

Approved Work Zone Traffic Control Training Providers:

The SCDOT recognizes the following organizations as acceptable providers of an advanced work zone traffic control training program, a “Flagger Training” course or the optional basic work zone traffic control training course:

8. American Traffic Safety Services Association (ATSSA)
9. Institute for Transportation Research and Education at North Carolina State University (ITRE)
10. Carolinas Association of General Contractors (AGC)
11. National Safety Council - South Carolina Chapter

These organizations provide work zone traffic control training in compliance with the MUTCD and reference requirements specific to SCDOT. Therefore, work zone traffic control training provided by entities other than those listed above are not considered comparable and shall be unacceptable.

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Specific course material for work zone traffic control training courses designated as “Basic”, “Advanced”, “Supervisor” or “Flagger” and any additional training courses not specified here is determined by the work zone traffic control training course provider and has undergone review and received acceptance by SCDOT. Also, the passing score for each training course is determined by the work zone traffic control provider.

J. WEEKLY ITS SCHEDULE

For the duration of this project, the CONTRACTOR shall furnish on each Friday to the RCE, a WEEKLY SCHEDULE for the week to come, listing the location and date of each intended activity. This will permit scheduling ITS inspection personnel. Upon contractor not showing up nor notifying the Inspector of changes to the schedule there will be a penalty of \$500.00 per hour after the first hour of delay. Deviation from this schedule may cause the DEPARTMENT to delay inspection and payments.

K. MOBILIZATION

Description: This item shall consist of performing preparatory operations, including moving personnel and equipment to the project site; paying bonds and insurance premiums, establishing CONTRACTOR’S offices, buildings and other facilities necessary for work on the project and for all other work and operations which must be performed or cost incurred prior to beginning work on the project.

Construction Requirements: All work performed in providing the facilities and services shall be done in a safe and workmanlike manner.

L. FURNISH AND INSTALL CONDUIT

DESCRIPTION: This work shall consist of furnishing and installing conduit and fittings of the types and sizes specified herein, at locations shown on the Plans, or as established by the ENGINEER in accordance with these Specifications. All materials will be subject to inspection for condition by the ENGINEER, just prior to incorporation into the work.

1. MATERIALS: MATERIALS SHALL MEET THE REQUIREMENTS LISTED BELOW:

- a. **STEEL CONDUIT: STEEL ELECTRICAL CONDUIT SHALL BE RIGID, HEAVY-WALL, GALVANIZED STEEL, MEETING THE REQUIREMENTS OF FEDERAL SPECIFICATION WW-C-581, AND AMERICAN STANDARDS ASSOCIATION SPECIFICATIONS USAS C-80.1-1966.**
- b. **PVC CONDUIT: PLASTIC CONDUIT SHALL BE SUNLIGHT RESISTANT POLYVINYL CHLORIDE (PVC), SCHEDULE 80, MEETING THE REQUIREMENTS OF NATIONAL ELECTRICAL MANUFACTURING ASSOCIATION (NEMA) SPECIFICATION TC-2 AND UNDERWRITER LABORATORY (UL) STANDARDS UL-514; AND/OR ASTM D-1784. FITTINGS SHALL MEET NEMA TC-3 AND UL-514. NO QUARTER SIZE CONDUIT SHALL BE USED. CONDUIT SIZES SHALL BE AS FOLLOWS: 1 INCH, 2 INCH, 3 INCH AND SO ON.**
- c. **HDPE ROLLED CONDUIT: UNDERGROUND FIBER SHALL BE INSTALLED IN ROLLED CONDUIT, PLOWED OR DIRECTIONAL BORED (TRENCH LESS) IN. EACH RUN SHALL HAVE ONE (1) CONDUIT INSTALLED. THIS CONDUIT SHALL BE A MINIMUM OF SCHEDULE 80 OR SDR 11 HDPE (HDPE SHALL BE ORANGE IN COLOR FOR FIBER OPTIC CABLE INSTALLATIONS AND RED IN COLOR FOR ELECTRICAL). IT SHALL BE BURIED AT A MINIMUM OF 36”.**
- d. **FLEXIBLE WEATHER-TIGHT STEEL CONDUIT: WEATHER-TIGHT/LIQUID-TIGHT FLEXIBLE STEEL ELECTRICAL CONDUIT SHALL BE SINGLE STRIP, HELICALLY WOUND, INTERLOCKING GALVANIZED STEEL. IT SHALL BE MADE LIQUID-TIGHT BY AN EXTRUDED POLYVINYL CHLORIDE JACKET; AND SHALL MEET THE REQUIREMENTS OF UL-360.**
- e. **FITTINGS: ALL CONDUIT BODIES, 90° BENDS, WEATHERHEADS, ELBOWS, NIPPLES, COUPLINGS, AND OTHER HARDWARE SHALL BE MADE OF THE SAME MATERIAL AND QUALITY AS THE CONDUIT RUN AND SHALL BE INCIDENTAL TO CONDUIT INSTALLATION. HDPE COUPLING SHALL BE HYDRAULICALLY PRESSED ON TYPE. HDPE COUPLINGS SHALL BE CARLON BARBED COUPLINGS BS2.375 OR APPROVED EQUAL. CATALOG CUTS ARE REQUIRED FOR HDPE COUPLINGS FOR APPROVAL.**

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- f. **GROUND BUSHINGS:** GROUNDING BUSHINGS SHALL BE THREADED, MADE OF MALLEABLE IRON, GALVANIZED STEEL, OR BRASS; AND SHALL HAVE AN INSULATING PLASTIC INSERT, AND LAY-IN LUGS TO HOLD No. 6 AWG COPPER WIRE.
 - g. **PULLING LINE:** THE PULLING LINE SHALL BE MULETAPE WP1250P OR DETECTABLE MULETAPE DT1250/4P, HAVING A MINIMUM STRENGTH OF 1250 LBS, WHICH SHALL BE PULLED INTO ALL UNDERGROUND CONDUIT RUNS, AND SHALL REMAIN THEREIN FOR FUTURE USE.
 - h. **WARNING TAPE:** UNDERGROUND WARNING TAPE SHALL BE HEAVY DUTY B-720 POLYETHYLENE, 0.89 MM (3.5 MILS) THICK, BY 76 MM (3 INCHES) WIDE, WITH APWA COLOR ORANGE FOR FIBER AND RED FOR ELECTRIC LINES. THE TAPE SHALL BE PLACED ABOVE ALL TRENCHED CONDUIT RUNS, JUST BEFORE THE FINAL BACK-FILL.
 - i. **CONCRETE:** CONCRETE USED FOR PATCHING PAVEMENT SHALL BE SCDOT STANDARD SPECIFICATION CLASS X ACCORDING TO SECTIONS 701, 702, 703, AND 704.
 - j. **BITUMINOUS ASPHALT:** BITUMINOUS ASPHALT FOR PATCHING PAVEMENT SHALL BE SCDOT STANDARD SPECIFICATIONS, SECTION 403.
 - k. **MARKING WIRE:** ALL UNDERGROUND CONDUITS CONTAINING FIBER OPTIC CABLE SHALL HAVE A FOUR (4) CONDUCTOR DETECTABLE MULETAPE TYPE DT1250/4P PULLED IN FOR FUTURE LOCATE SERVICES. THE DETECTABLE MULETAPE SHALL BE SPLICED THROUGH ALL JUNCTION POINTS AND GROUNDED TO A RUS 13 5/8"X8' GROUND ROD IN SERVICE BOXES AND CONNECTED TO THE GROUND BUSS IN CABINETS.
2. **CONSTRUCTION METHODS:**
- a. **General:** Conduit shall be installed as either a riser, or be trenched, plowed or directional bored (trench less).
 - b. **Plans:** All conduit shall be installed as trenched, plowed or riser unless specifically shown on the plans as or site determined by SCDOT as directional bored. Conduit off-set shall be performed every 500' and shown on as-built plans. Directional bore log indicating depth of conduit shall be shown on as-built plans.
 - c. **Depth:** Unless shown otherwise, conduits shall be placed a minimum depth of thirty-six (36) inches below surface grade, when approved by the Engineer a min. of 24" cover when rock is encountered, rock being defined in section 203.2.1.7 of the Standard Specifications of Highway Construction Edition of 2007, and shall slope at a minimum rate of 150 mm (six inches), per 30 meters (100 ft.) of length, to a service box hole or drain. All conduit runs shall be cleaned and swabbed before cables are installed. In poles, cabinets, and buildings, duct-seal shall be used to effectively seal the opening.
 - d. **Direction:** Changes in direction of conduit shall be accomplished by the use of standard bends, elbows, or by bending the steel conduit. Steel conduit, if bent, shall have a uniform radius that will fit the location, with a minimum radius of six (6) times the internal diameter of the pipe. Sharp kinks in the conduit or the substitution of unlike materials will not be permitted.
 - e. **Fittings:** Standard manufactured conduit bodies, condulets, weatherheads, elbows, nipples, tees, reducers, bends, couplings, expansion couplings, unions, etc., of the same materials and treatment as the straight conduit, shall be used as required throughout the conduit line except that weatherheads shall be malleable iron clamp on type Arlington Industries, Inc. catalog number 145 MFG number 00145 or approved equal. All fittings shall be tightly connected to the conduit. A solvent-weld cement shall be used for fitting connections with PVC conduit. Where steel conduit mates PVC, an adapter coupling shall be used and sealed waterproof. Where HDPE mates PVC an approved adapter coupling shall be used. Where HDPE meets PVC a service box shall be installed.

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

- f. Cutting: Nipples shall be used to eliminate cutting and threading where short lengths of conduit are required. Where it is necessary to cut and thread steel conduit, no exposed threads will be permitted. All conduit fittings shall be free from burrs and rough places; and all cut conduits shall be reamed before fittings and cables are installed. All conduit runs ending in a junction box, hand box, or other approved junction point, shall be provided with a bushing to protect the cable from abrasion. Conduit being placed for future use shall be capped.
- g. Location: Where conduit passes under a curb, an 'X' shall be cut in the curb, over the conduit. Where there is no curb, a stake shall be driven in the ground at the end of the conduit to mark its location.
- h. Riser: Attach conduit risers to wood poles; or where specified, to the outside of steel poles. Use stainless steel bands for steel poles. Use stainless steel or hot dipped galvanized conduit clamps/straps and galvanized screws on wood poles. Attachment shall be in accordance with the plans or Standard Drawings. Furnish each Riser with a weatherhead, which shall not be measured.
- i. Trenching (Non-Paved Surface): Trenches shall be excavated to such depth as necessary to provide (24" minimum in rock, , rock being defined in section 203.2.1.7 of the Standard Specifications of Highway Construction Edition of 2007, when approved by the Engineer) 36 inches minimum cover over the conduit. Cinders, broken concrete, or other hard abrasive materials will not be permitted in the back-filling. The trench shall be free of such materials before the conduit is placed. Contractor shall supply approved back fill material as needed in such cases. No conduit shall be placed prior to inspection by the ENGINEER. Back-fill shall be compacted, and the surface restored.
- j. Trenching (In Paved Surface): Trenches across driveways or streets shall be cleanly saw cut about 150 mm (six inches) wide. The conduit shall be placed and the back-fill shall be compacted, and the patch shall be of like material and thickness as was removed. NO additional payment shall be made for the bituminous or concrete patching material, unless a pay item has been established for such.
- k. Bored and Jack (Pushing): Where shown on the Plans as bored or jacked, certain steel conduit to be placed under existing roadways, driveways, sidewalks, or other paved surfaces, shall be bored and jacked. Such conduit shall be placed by jacking, boring, pushing, or other means approved by the ENGINEER, without cutting or removing pavement.
- l. Bored and Jack (Pulled): When the ITS design anticipates that high-accuracy directional boring techniques will be used, and two (2)- two (2) inch schedule 80 or SDR 11 HDPE conduits pulled back through the bore, then a pay item will be established for: SCHEDULE 80 PVC CONDUIT (trench less). The directional boring method shall be approved by the ENGINEER, and shall in no way crumple or damage the conduit.
- m. Placed Before Pouring: Where shown on the Plans, PVC conduit, with flexible weather tight conduit, shall be placed in roadways or structures, prior to pouring the concrete. Typical usage would be a bridge deck. The conduit shall be firmly attached to the bottom reinforcement bar mat, or to the bottom wire-mat, using plastic tie-wraps every 0.60 meter (two feet). At expansion joints, 1.2 meter (four ft.) lengths (typical) of flexible weather-tight steel conduit shall be used to accommodate movement. These shall be installed to NEC standards for concrete structural installations and usage, including any recommended lubricants and sleeves. All conduit ends etc. shall be plugged to prevent concrete penetration. When used on a bridge, there will usually be service-box(es) near the centerline, and the conduit will terminate in service-boxes at each end.

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- n. Restoration: The CONTRACTOR shall restore all cuts, trenches, and openings to the original condition. Grass surfaces shall be replaced with pre-grown, cut turf (sod, in accordance to section 813 of the SSHC), in existing lawns. Seeding shall be performed in accordance to the Standard Specifications of Highway Construction Edition of 2007 as listed below. Other dirt areas shall be raked, seeded, and fertilized. While care should have been used to avoid them, any damaged trees and shrubsshall be replaced (if directed by the ENGINEER). See seeding with straw or hay mulch and sod specifications for restoration pay items.
- o. Method A: Seeding with Straw or Hay Mulch: Sow seed as specified in Method A of **Subsection 810.4.11**. Within 24 hours following covering of the seed, uniformly apply straw or hay mulch material at the rate of 2 tons per acre. Spread mulch by hand, by appropriate mechanical spreaders, or by blowers. Use mulch that allows sunlight to penetrate and air to circulate but also partially shades the ground and conserves soil moisture. To be paid at the line item for 8101000 Seeding (Mulched) MSY.
- p. Sod: Provide sod that consists of living, well-established growth, predominantly of the grass specified in the Special Provisions. Provide vigorous, well rooted, healthy turf, free from disease, insect pests, weeds, other grasses, stones, and any other harmful or detrimental materials. To be paid at the line item for: 8131000 Sodding MSY
- q. Rock Boring: When ITS design anticipates rock being encountered or the Engineer deems it necessary rock boring techniques will be used. The Rock Boring method shall be approved by the ENGINEER, and shall in no way crumple or damage the conduit.
- r. Bridge attachment: When attaching to a bridge, rigid galvanized steel conduit shall be used. Conduit supports and hardware shall be Stainless steel and installed using an approved epoxy anchor. Conduit supports shall be installed a maximum of 5 feet apart and bent closed at the bottom. Conduit straps shall be two hole heavy duty stainless steel. Conduit shall have approved heavy duty galvanized steel expansion couplings at every expansion joint inbridge. Approved in line stainless steel pull boxes shall be installed on bridge attachments for pull points that are over 500 feet at no additional cost to the Department. There shall be a service box set at both ends of bridge to make transition from PVC or HDPE conduit to ridged galvanized steel conduit for bridge crossing. All conduit, expansion couplings, couplings, conduit supports, bolts, nuts, anchors, epoxy, unions, and all other incidental material will be included in the pay item for LF Bridge attachment.
- s. Proofing: Prior to installing cable or fiber into conduit and Department acceptance the conduit must be proofed. Proofing the existing conduit ensures that all obstructions are cleared and that conduit continuity and alignment is good. A rigid mandrel designed for HDPE roughly 90% of the inner diameter of the conduit shall be used to perform the proof. Proofing conduit is typically performed by pushing or pulling a rigid mandrel attached to the end of a pull line or fiberglass rodder and pulled or pushed through the conduit. If the mandrel makes its way through the conduit without any difficulties experienced, then the conduit has “proofed out,” and no repairs should be necessary. If it does not make it through the conduit it must be repaired prior to installing cable or fiber and prior to acceptance. All conduit must be proofed prior to final acceptance.

M. EROSION CONTROL

1. **DESCRIPTION: THIS SECTION CONTAINS SPECIFICATIONS FOR THE MATERIALS, EQUIPMENT, CONSTRUCTION, MEASUREMENT, AND PAYMENT FOR THE PLACEMENT OF TEMPORARY EROSION CONTROL MEASURES TO PREVENT EROSION AND WATER POLLUTION THROUGH THE USE OF BEST MANAGEMENT PRACTICES INCLUDING THE USE OF ROLLED EROSION CONTROL PRODUCTS, SILT FENCES, SEDIMENT TUBES, AND TEMPORARY SEEDING IN CONFORMITY WITH THE PLANS THE SPECIFICATIONS, SCDOT STANDARD DRAWINGS, OR AS DIRECTED BY THE RCE.**

2. **SEDIMENT TUBES: SEDIMENT TUBES ARE TEMPORARY EROSION CONTROL DEVICES INSTALLED ALONG CONTOURS, IN DRAINAGE CONVEYANCE SWALES, AND AROUND DRAINAGE INLETS TO REDUCE THE EFFECTS OF SOIL EROSION AND TO RETAIN SEDIMENT. LOCATIONS FOR INSTALLATION WILL BE DESIGNATED ON THE PLANS OR BY THE RCE 8152007 SEDIMENT TUBE LF**
3. **SILT FENCES: CONSTRUCT THE SILT FENCE IN ACCORDANCE WITH PLANS OR SCDOT STANDARD DRAWINGS OR AS APPROVED BY THE RCE. PLACE SILT FENCES BEFORE THE MAJOR CONSTRUCTION IN AN AREA IS STARTED.**

Maintain the silt fence until its capacity has been reached or erosion activity in the area has stabilized. Remove sediment accumulated along the fence when it reaches approximately one-third of the height of the fence, especially if heavy rains are expected. Remove trapped sediment or stabilize on site.

Inspect the silt fence every 7 days. Immediately correct any deficiencies. Remove filter fabric and replace whenever it has deteriorated to such extent that it reduces the effectiveness of the silt fence. In addition, review daily the location of silt fences in areas where construction activities have changed the natural contour and drainage runoff to ensure that the silt fences are properly located for effectiveness. Install additional silt fences as directed by the RCE where deficiencies exist.

If a silt fence or portion of a fence is located in an area where removing the sediment is not possible, then install a second silt fence, if necessary, at the discretion of the RCE. In this case, payment for both silt fences and portions involved is made at the unit price for silt fence.

Remove silt fence within 30 days after final stabilization is achieved or after temporary Best Management Practices (BMP) are no longer needed. Permanently stabilize disturbed areas resulting from fence removal. The fence materials remains the property of the Contractor and may be used at other locations provided the materials meet the appropriate requirements contained in this specification and/or on the Plans.

Silt Fence LF

Replace/Repair Silt Fence LF

4. **TURF REINFORCEMENT MATTING (TRM)**
 - a. Type 1: Provide a Type 1 TRM consisting of a web of mechanically or melt bonded polymer netting, monofilaments or fibers entangled to form a strong three-dimensional stable net structure utilizing bonding methods including polymer welding, thermal or polymer fusion or the placement of fibers between two high-strength biaxial oriented nets mechanically bound by parallel stitching with polyolefin thread. The RCE may allow a degradable fiber matrix to be used to provide immediate coverage for bare soil.
 - b. Type 2: Provide a Type 2 TRM consisting of a web of mechanically or melt bonded polymer netting, monofilaments or fibers that are entangled to form a strong three-dimensional stable net structure utilizing bonding methods including polymer welding, thermal or polymer fusion or the placement of fibers between two high-strength biaxial oriented nets mechanically bound by parallel stitching with polyolefin thread. The RCE may allow a degradable fiber matrix to provide immediate coverage for bare soil.
 - c. Type 3: Provide a Type 3 TRM consisting of a web of mechanically or melt bonded polymer netting, monofilaments or fibers that are entangled to form a strong three-dimensional stable net structure utilizing bonding methods including polymer welding, thermal or polymer fusion or the placement of fibers between two high-strength biaxial oriented nets mechanically bound by parallel stitching with polyolefin thread. Do not use a TRM manufactured from discontinuous or glued netting in this category. Ensure that the material is 100% synthetic and resistant to biological, chemical, and ultraviolet degradation.
 - d. Type 4 (High Survivability): Provide a Type 4 TRM consisting of a geosynthetic matrix that exhibits a very high interlock and reinforcement capacities with both soil and root systems, demonstrates a high tensile modulus, and is specially designed for erosion

control applications on steepened slopes and vegetated waterways. Do not use a TRM manufactured from discontinuous netting, netting loosely held together by stitches or glue, or composites. Ensure that the material is 100% synthetic and resistant to biological, chemical, and ultraviolet degradation. Furnish a Type 4 TRM with high loading and/or high survivability capabilities for field conditions such as long term maintenance, structural backfills protecting critical structures, utility cuts, and traffic areas with the potential for high abrasion, higher required factors of safety, and/or general durability concerns

Turf Reinforcement Matting (TRM) Type1 MSY

Turf Reinforcement Matting (TRM) Type2 MSY

Turf Reinforcement Matting (TRM) Type 3 MSY

Turf Reinforcement Matting (TRM) Type4 MSY

N. FURNISH AND INSTALL ELECTRIC SERVICE

Description: This work consists of furnishing and installing complete electrical services to provide electric power to the ITS components, at locations shown determined by the contractor and SCDOT, and in accordance with power company procedures. GPS locations shall be provided at each meter location and shown on as-built plans. This includes all necessary poles, conduit and incidentals. Contractors are advised that location may require long conduit runs for power. These runs SHALL be included in the "ELECTRICAL SERVICE".

1. GENERAL

- a. Standards: All work is to be in accordance with the Standards, or the REQUIREMENTS OF THE LOCAL POWER COMPANY. All work shall be in accordance with the National Electric Code (NEC), and applicable local codes.
- b. Meeting: The ENGINEER, the CONTRACTOR, and the power company representative shall discuss the project at the "Pre-Construction Meeting", and arrange the schedule for power connection. Additional meetings will be held as necessary to satisfy all concerns about electrical service.
- c. Schedule: The CONTRACTOR shall make all necessary arrangements with the power company to insure having the needed power available at each location. Difficulties in securing the service of the power company are to be immediately reported to the ENGINEER.
- d. Location: The CONTRACTOR shall determine the exact location of the electric service. When a wood pole is to be used for power company attachment and meter base, the pole shall be set within 15 feet of the cabinet or device it's feeding. Engineer shall approve final location of service pole prior to installation. The nature of the service is not shown on the Plans, and shall be finalized as:
 - 1) Electrical service from the power head to the local cabinet assembly;
 - 2) Electrical service from the local cabinet assembly to the field hub;
 - 3) Electrical service from the power panel to the Hub building.
- e. Meter: The electric service will usually be METERED. The CONTRACTOR shall provide hardware accordingly.

2. MATERIALS

THE POWER CONNECTION SHALL BE 100 AMP SINGLE-PHASE, 120/240 VOLT, 3-WIRE, 60 HERTZ ALTERNATING CURRENT SUPPLY FOR CCTV/HUB CABINETS AND DMS SIGNS. THE POWER CONNECTION SHALL BE 200 AMP SINGLE PHASE, 120/240, 60 HERTZ ALTERNATING CURRENT SUPPLY FOR HUB BUILDINGS.

- a. Meter: The contractor shall furnish a Mid- West R102EN METER BASE/POWER PANEL (CAN) or as indicated on plans, for the CCTV cabinet or Field HUB cabinet, a Cutler hammer MB816B200BTS Meter base/power panel for Hub building, which the CONTRACTOR shall install. Contractor shall install an EDCO EMC-240B surge

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

arrestor on the power panel at all metering locations and shall be wired according to manufactures spec.

- b. Disconnect Switch: The disconnect switch shall be NEMA STANDARD TYPE 3R, weatherproof. It shall be CIRCUIT BREAKER TYPE, 100 AMP rated and have a tab for padlocking the cover closed. It shall be of 3-WIRE DESIGN (2-circuit), with solid neutral. Disconnect switch shall be a Siemens Model WO408ML1125 or approved equal or as indicated on the plans. The CONTRACTOR shall twist a No. 6 AWG wire through the padlock tab, to prevent unauthorized entry (until SCDOT installs their padlock). Pedestals (or lintels) for services or disconnect switch shall be an 8”X8”X96” Allied Concrete Products Lintels or approved equal, whenever possible the same Pedestal shall be utilized for the installation of the disconnect and the SCIPCAB1 cabinet assembly. If the Power company metering location is greater than 100 feet from the cabinet or is placed on the opposite side of the road, a disconnect switch shall be installed on a concrete pedestal not greater than 15 feet from the cabinet. The disconnect switch shall have a 100 AMP rating and shall be a circuit breaker type. In cases where one meter location is going to feed two ITS devices, the breakers shall be sized to accommodate both devices.

- c. Rating: To provide a maximum of future flexibility, and a minimum of voltage-drop to meter/power panel, the components of the electrical service shall have the ratings stated. (Shall be wired to supply a min. of 100 amp 120/240 volt service at meter).

4) DISCONNECT BREAKER:

Panel rating: (for uniformity)	100 AMP (200 AMP for Hub Building)
Circuit breaker (single pole)	30 AMP Camera or as indicated on the plans
Circuit breaker (double pole)	50 AMP DMS

(If needed an additional circuit breaker may need to be installed for AC or future use).

5) CABLE:

- 3-Wire THHN/THWN – MIN SIZE No. 2/0 AWG copper (Hub Building)
 - 3-Wire THHN/THWN – MIN SIZE No. 4 AWG copper (from meter to power company attachment)
 - 3-Wire (W, BL, RD), THHN/THWN – MIN. SIZE No. 10 AWG copper or as indicated on the plans (from power panel to CCTV/Hub cabinet)
- (Wire size to be determined by the length of run and voltage drop according to NEC to supply 100 AMP to all meter panels (except Hub Building),), breaker sizes shall be 50 AMP to DMS signs, 30 AMP to CCTV cabinet or as indicated on the plans, 50 AMP to Hub cabinet and 200 AMP to Hub building).

6) CONDUIT:

- PVC Schedule 80 – MIN. SIZE 25 mm (1 in.)
- (Conduit size shall be determined by the conductor size; **NO** quarter or half size conduit).

- d. Ground Rod: One or more ground rods shall be installed at the service pole; and where applicable, at the controller itself. The ground rod shall be min. 16 mm by 2.4 meters (5/8 in. by 8 ft.) (minimum), copper-clad RUS 13, with brass or bronze ground rod clamp. Additional ground rods may be needed to achieve proper resistance to ground (not to exceed eight ground rods). The controller ground rod shall be exothermically welded (by personnel properly trained to make exothermic welds). Grounding system shall be no greater than 15 ohms. Grounding systems shall be tested using the fall of potential method and shall be overseen by the engineer.

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- e. Ground Wire: The grounding wire for the service shall be No. 6 AWG, bare, 7 stranded wire. (Note that this is in addition to the solid grounding wire running down each wooden pole and shall be stapled at a min of every 16 inches with a coil of solid copper wire at the bottom and top of pole.) For grids the ground wire shall be #4 AWG (7) seven stranded or larger around concrete poles and # 2 or larger around Hub Buildings. The grounding for the service shall be connected to the cabinet ground rod with AWG 6 and the pole ground grid shall be connected to the cabinet ground rod in the electric service pull box, (located at the cabinet) to make up a complete grounding system.
- f. Conduit: Conduit and fittings used for the electric service shall be PVC Schedule 80, MIN. Size 25 mm (1 in.) diameter. Contractor shall use 1 inch, 2 inch, 3 inch, etc. conduit sizes. No quarter or half size conduit shall be used. It shall extend from the point of power company attachment, through the meter and disconnect assembly, to the controller cabinet (See FURNISH AND INSTALL CONDUIT Specifications). All HDPE pipe to be used for electrical underground service shall be RED in color.
- g. Weatherhead: A weatherhead mating to the above conduit shall be used with overhead service connections. Weatherhead shall be malleable iron clamp on type Arlington Industries, Inc. catalog number 145 MFG number 00145 or approved equal. Also used shall be a strain Clevis, to create a 200 mm (1 ft.) minimum drip loop.
- h. Cable: The electrical cable installed from the point of power company attachment to the Communication Local Cabinet or the Communication Hub Cabinet, shall be: Type THHN/THWN, sized per length of run and voltage drop and above table, 3-WIRE, (white, black, red) 600 Volt, copper only, stranded, with cable lugs. Wire sizes AWG 6 and smaller shall have colored insulation (Red, Black, White, and Green). Wire sizes larger than AWG 6 shall be marked with phasing tape (Red, Black, and White) at every termination point. Grounding conductors shall be bare copper or have Green insulation. At no place shall the non-metered service cable be in the same conduit as any other control and or electric cables.
- i. Hardware: All hardware used shall be rustproof: steel parts shall be stainless steel or Hot Dipped galvanized. Stainless steel $\frac{3}{4}$ " bands shall be used for attachment to steel/concrete poles. The bands are to be spaced every 1.0 meter (3 ft.) maximum. When specifically required by the utility company or on wood poles, stainless steel conduit or Hot Dipped galvanized clamps/strap, fastened with hot dipped galvanized or stainless steel screws, may be substituted for the bands. A neutral spool bracket shall be furnished and installed by contractor for the power company attachment **(house knobs are not acceptable)**.
- j. Power Service Assembly: Lightweight corrosion resistant aluminum construction (painted gray). 14 gauge galvanized post with high quality electro-deposition gray paint finish. UL listed NEMA 3R construction. 10,000 AMPS RMS symmetrical short circuit rating, 22,000 AMPS rating available when appropriate 22,000 AIC breaker is field installed. 100 AMP (200 amp for hub buildings) continuous, 120/240 V single phase 4 jaw ring type meter socket. Loop feed 350 KCMIL single phase line terminals as standard. Main breaker (bolt in main on 200 amp service), convertible 2 circuit load center, or 12 circuit plug-in load center. Lockable, sealable covers provided with stainless steel latches. Parallel wired units are copper bussed from the meter socket to the load center. Multi-breaker UL listed accepts GE, Bryant, Challenger, Westinghouse, Square D. "Homeline" or ITE plug-in circuit breakers. Dead front construction for maximum user safety. Fully accessible line terminal compartments.
- k. Pull Box: A 17"X30"X28" pull box shall be installed within five (5) feet of cabinet location. The pull box shall be an Armormat A6001640TAPCX28, 17"X30"X28" or approved equal. See Furnish and Install Service/Pull Box. Electrical pull boxes shall not be placed over 500' feet apart without Department approval. All pull boxes containing electrical cable shall have SCDOT ELECTRIC logo cast on lids. All pull boxes containing electrical cabling shall have a PNA dome pack post cable marker 3" in dia,

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6' long with a 16" Red top with approved labeling and phone number (labeling information and phone number to be supplied by Engineer for each project) or approved equal. There shall be a Red passive marker ball operating at a frequency of 169.8KHZ installed in all pull boxes containing electrical conductors. The red passive marker balls shall be compatible with a Metro Mark passive marker locator 760Dx or approved equal. GPS location shall be provided for all boxes installed and shown on as-built plans.

3. CONSTRUCTION METHODS

- a. The electrical service shall be installed in accordance with all applicable codes, regulations, and the REQUIREMENTS OF THE POWER COMPANY, with the final location being determined in the field. Typical construction methods are shown on the Installation Details, and the Standards.
- b. The CONTRACTOR shall obtain all ELECTRIC PERMITS required; and shall arrange for INSPECTION at completion.
- c. The CONTRACTOR shall install the power service and post locations as shown on the Plans at the back edge of the right-of-way. The power company will supply power to the power service.
- d. At locations where need is determined by the contractor, transformers shall be installed to compensate for voltage drops in service. All work to comply with the NEC.

4. EQUIPMENT POWER

- e. Normal: For equipment for this Contract, (while operating from a 115 VAC, \pm 10%, sixty (60) Hz, commercial grade, non-dedicated power service), shall be capable of providing the following:
 - 7) Proper regulation for AC outputs, up to one-hundred and fifty percent (150%) of normal load.
 - 8) Sufficient internal electronic noise and transient immunity, so that equipment fed by this service will not be affected by either noise or transients.
 - 9) Equipment power supplies of sufficient design to prevent extraneous coupling of signals between equipment.
 - 10) Complete internal surge protection (in addition to that of the cabinet).
- f. Additional: Where electronic problems can be traced to Radio Frequency Interference (RFI), as shown by an oscilloscope, then the CONTRACTOR shall provide additional isolation, filters, capacitors, etc. to eliminate the problem.

5. GROUND SYSTEM

The resistivity of the electrical system EARTH GROUND shall be FIFTEEN (15) OHMS OR LESS, as measured with an appropriate instrument which was calibrated not more than twelve (12) months prior to the date of performing such tests. Test shall be over seen by Engineer and documented results given to DOT. Contractor shall add appropriate grounding to achieve the above requirements if needed (not to exceed eight ground rods).

CATALOG CUTS ARE REQUIRED

O. FURNISH AND INSTALL FIBER OPTIC CABLE

DESCRIPTION: THIS ITEM SHALL CONSIST OF FURNISHING AND INSTALLING SINGLE-MODE FIBER OPTIC (SMFO) CABLE IN CONDUIT AND RISERS OR OVERHEAD LASHED TO NEW MESSENGER CABLE. THE PAY ITEM FURNISH AND INSTALL FIBER OPTIC CABLE ALSO INCLUDES ALL ITEMS AND EXPENSES ASSOCIATED WITH THE ITEMS LABELED FIBER OPTIC COMMUNICATION PLANT – TESTING, FURNISH AND INSTALL FIBER INTERCONNECT CENTERS AND CLOSURES. THE CONTRACTOR SHALL FURNISH ALL ATTACHMENT HARDWARE, SPLICE ENCLOSURES AND INSTALLATION GUIDES NECESSARY TO INSTALL THE FIBER OPTIC CABLE. CABLE SHALL BE PRYSMIAN FLEXLINK MATCHING THE EXISTING PRYSMIAN 144 SM FIBER. CONTRACTOR SHALL HAVE INDEX OF REFRACTION LABELED ON AS-BUILT FOR ALL FIBER CABLE.

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1. General: The cable shall meet all requirements stated in RUS-90 as well as those stated within this specification. The cable shall be an accepted product of the United States Department of Agriculture Rural Utility Service as meeting the requirements of RUS-PE-90. The cable shall be new, unused, and of current design and manufacture.

The single-mode fiber used in the cable shall conform to the following specifications:

Fiber Coating	Corning CPC6 or approved equal
Cladding Diameter:	125.0 + 1.0 μ m by fiber end measurement
Outer Coating Diameter	245 \pm 5 μ m
Core-Clad Concentricity	\leq 0.5 μ m
Cladding Non-Circularity:	\leq 1.0%
Fiber Curl	\geq 4.0m radius of curvature
Index of Refraction 1310/1550 nm	1.4693/1.4690
Mode field diameter – 1310	9.2 \pm 0.4 μ m
Mode field diameter – 1550	10.5 \pm 1.0 μ m
Cable Cutoff Wavelength	ccf \leq 1260nm
Refractive Index Profile	Matched clad, step index
Zero Dispersion Wavelength	1304nm \leq \pm o \leq 1324 nm
Zero Dispersion Slope	<0.092 ps/(km-nm)
Dispersion 1330 nm	<3.5ps/(nm-km)
Dispersion 1550 nm	<18ps/ (nm-km)
Point Discontinuity	\leq 0.10 dB at 1310 and 1550 nm
Attenuation at Water Peak (Uncabled Fiber)	<1.5 dB/km at 1383 \pm 3nm
Attenuation vs. Wavelength	1285 \leq 1310 \leq 1330nm – 0.05 dB/km
	1525 \leq 1550 \leq 1575 nm – 0.05 dB/km
Attenuation vs. Bending	1 turn (32 mm) at 1550nm \leq 0.50 dB
	100 turns (50mm) at 1550nm \leq 0.10dB
Polarization Mode Dispersion Coefficient	\leq 0.2 ps/ \sqrt km
Temperature Cycling	\leq 0.05 dB/km (-40 C to 85 C)
Temperature-Humidity Cycling	\leq 0.05 dB/km – 10 C to 85 C, 4 to 98% RH
Water immersion, 23 C	\leq 0.05 dB/ km
Heat Aging, 85 C	\leq 0.05 dB/ km
Proof Test	\geq 100 kpsi

2. Fiber Characteristics

All fibers in the cable shall be usable fibers and meet required specifications.

All optical fibers shall be sufficiently free of surface imperfections and inclusions to meet the optical, mechanical, and environmental requirements to this specification. Each optical fiber shall consist of a doped silica core surrounded by a concentric silica cladding.

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The coating shall be a dual-layered, UV cured acrylate applied by the fiber manufacturer. The coating shall be capable of being mechanically or chemically striped without damaging the fiber.

Optical fibers shall be placed inside a loose buffer tube.

EIGHT through TWELVE (8-12) buffer tubes, each containing twelve (12) single-mode fibers shall be furnished. The fibers shall not adhere to the inside of the buffer tube.

Each fiber shall be distinguishable from each other by means of color coding according to the following.

These colors shall meet EIA/TIA-598, *“Color Coding of Fiber Optic Cables”*.

Buffer tubes containing fibers shall also be color coded with distinct and recognizable colors according to the following.

1. **Blue**
2. **Orange**
3. **Green**
4. **Brown**
5. **Slate**
6. **White**
7. **Red**
8. **Black**
9. **Yellow**
10. **Violet**
11. **Rose**
12. **Aqua**

Buffer tubes shall be of a dual-layer construction with the inner layer made of polycarbonate and the outer layer made of polyester. Fillers may be included in the cable core to lend symmetry to the cable cross-section where needed.

Each buffer tube shall be filled with a non-hygroscopic, electrically non-conductive, homogenous gel. The gel shall be free from dirt and foreign matter. The gel shall be readily removable with conventional non-toxic solvents. Water blocking tape is an acceptable substitute.

Buffer tubes shall be stranded around a central member using the reverse oscillation, or “SZ” stranding process.

Binders shall be supplied with sufficient tension to secure the buffer tubes to the central member without crushing the buffer tube. The binders shall be non-hygroscopic, non-wicking (or rendered so by the flooding compound), and dielectric with low shrinkage.

The cable shall contain a central member that is intended to prevent buckling of the cable. The central anti-buckling member shall consist of a glass reinforced plastic rod.

The cable shall contain at least one (1) ripcord under the sheath for easy sheath removal.

Tensile strength shall be provided by high tensile strength aramid yarns and fiberglass. The high tensile strength aramid yarns/fiberglass shall be vertically stranded evenly around the cable core. All cable shall be sheathed with medium density polyethylene. The minimum nominal jacket thickness shall be 1.4 mm. Jacketing material shall be applied directly over the tensile strength members and flooding compound. The jacket or sheath shall be free of holes, pits and blisters.

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The maximum pulling tension shall be 2700 N (600 lbs.) during installation (short-term) and 600 N (135 lbs.) long-term installed.

The shipping, storage, installation and operating temperature range of the cable shall be – 40° C to 70° C.

3. Drop Kit

When specified on the Plans, the CONTRACTOR shall furnish and install all necessary items required for connectivity of a device to the network via fusion splice of a drop cable to the network trunk cable. This assemblage of items shall be known as a drop kit. The drop kit consists of the drop cable assembly, fiber optic splice closure, termination's splices and splice trays. **The "Gator Patch" product is acceptable for this application. Gator Patch if used takes the place of the interconnect center.**

4. Quality Assurance Provisions

All optic fibers shall be proof tested by the fiber manufacturer at a minimum load of 100 kpsi.

All optical fibers longer than 1,000 meters shall be 100% attenuation tested by the manufacturer. The attenuation of each fiber shall be provided with each cable reel. Fibers less than 1,000 meters shall be tested for continuity.

5. Splice Closure – Underground

a. Use: The closure shall be 3M brand only no exceptions, designed for use under the most severe conditions such as moisture, vibration, impact, cable stress and flex temperature extremes as demonstrated by successful passing the factory test procedures and minimum specifications listed below. The closure will be installed inside service boxes. For more details see FURNISH AND INSTALL SERVICE BOXES. The closures shall be incidental to the fiber optic cable installation.

b. Physical Requirements

- 1) The closure shall handle up to four (4) cables in a butt configuration. A butt adapter may be used to increase capacity to six (6) cables.
- 2) The closure shall prevent the intrusion of water without the use of encapsulate.
- 3) The closure shall be capable of accommodating splice organizer trays, which accept mechanical, fusion, or multi-fiber array splices. The splice closure shall have provisions for storing fiber splices in an orderly manner, mountings for splice organizer assemblies; add space for excess or non- spliced fiber. Splice organizers shall be re-enterable. Splice cases shall hold a minimum of two (2) splice trays to a maximum of six (6) splice trays, with each tray housing 24 splices.
- 4) Closure re-entry and subsequent reassemble shall not require specialized tools or equipment. Further, these operations shall not require the use of additional parts.
- 5) The splice closure shall have provisions for controlling the fiber bend radius to a minimum of 38 mm.

6. CERTIFICATION: The CONTRACTOR shall provide certified test results from the manufacturer showing the cable furnished has been tested. The test shall be approved by SCDOT prior to its implementation. **Note: Catalog cuts shall be submitted at pre-con.**

7. LABELING AND DELIVERY

The SMFO cable furnished by the CONTRACTOR shall be packaged on non-returnable wooden reels. The reels shall not contain imperfections such as broken flanges or nails that may cause damage to the cable as it is unreeled.

Both the top and bottom ends of the cable shall be available for testing on the reel. The ends of the cable shall be sealed to prevent the ingress of moisture.

8. CONSTRUCTION METHODS

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a. General

The CONTRACTOR shall take every precaution to ensure the fiber optic cable is not damaged during storage and installation. The fiber optic cable shall not be stepped on by workers, or run over by any vehicle or equipment. The fiber optic cable shall not be pulled along the ground, or over or around obstructions.

It shall be the responsibility of the CONTRACTOR to coordinate his overhead and underground construction activities on a continuing basis with each of the utility agencies that have facilities in the immediate vicinity.

The fiber optic cable shall be installed in conduit with other cables only where specifically called out in the Plans.

Where fiber optic cable is to be installed on overhead poles, the CONTRACTOR shall exercise care in temporary placement of installation equipment to provide safety to the public and to prevent damage to existing facilities. Should the CONTRACTOR cause damage to any existing cables and/or equipment, the CONTRACTOR shall immediately notify the ENGINEER. The affected owner and the CONTRACTOR shall repair or have the repair made at no additional cost.

During installation, the CONTRACTOR shall provide cable blocks at least every 50 feet to guide the cable and reduce pulling tension. All pulling equipment and hardware that will contact the cable during installation must maintain the minimum bend radius of the fiber optic cable as listed in Table 1. Corner blocks, appropriately sized to ensure that the minimum bending radius of the cable is maintained, shall be provided whenever fiber optic cable must be pulled around a corner.

Table 1
Fiber Optic Minimum Bend Radius Chart

Nominal Cable Diameter		Minimum Bend Radius (no tension) Installed		Minimum Bend Radius (under tension)	
Millimeters	Inches	Centimeters	Inches	Centimeters	Inches
6.0 – 10.0	(1/4 – 3/8)	10.0	(4.0)	15.0	(6.0)
10.1 – 15.0	(4/10 – 6/10)	15.0	(6.0)	22.5	(9.0)
15.1 – 20.0	(10/16 – 8/10)	20.0	(8.0)	25.0	(10.0)
20.1 – 23.0	(13/16 – 9/10)	23.0	(9.0)	25.0	(10.0)
23.1 – 25.0	(15/16 – 1.0)	25.0	(10.0)	30.0	(12.0)

In the case where the plans call for fiber optic installations in conduit, the fiber optic cable shall not be pulled through any intermediate junction box, manhole, pull box, pole base or any other opening in the conduit unless specifically required by the ENGINEER in specific facilities. The necessary length of cable to be installed shall be installed from one junction box, manhole, pull box, pole base, or cabinet to the immediate next downstream manhole, box, pole base, or cabinet. The remaining length of cable to be installed in the next conduit shall be carefully stored in a manner that is not hazardous to vehicular traffic, yet ensures that no damage to the cable shall occur. The cable shall be stored in a manner that shall allow that length of cable to be safely pulled into the next conduit. The ENGINEER shall approve the storing methods to be used.

Cable reel lagging shall remain on the cable reels until they arrive at the pulling site. If the lagging has been removed, the CONTRACTOR shall securely fasten the cable ends to avoid damage during transit.

If the cable must be unreeled during installation, the “figure-eight” configuration shall be used to prevent kinking or twisting of the fiber optic cable. The preferred size of the “figure-eight” is 15 feet with each loop about eight (8) feet in diameter. The fiber

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optic cable shall not be coiled in a continuous direction except for lengths of 100 feet or less.

In case of aerial installations, the CONTRACTOR shall not increase the tension on the messenger cable to which the fiber optic cable has already been lashed.

At the completion of a day's installation, the CONTRACTOR shall protect the cable from the ingest of moisture by placing a cable cap and/or several wraps of tape on the tip of the cable.

The CONTRACTOR shall record the cable meter marks at the fiber splice points on a set of as-built Plans. Two (2) copies of the Plans showing the meter marks shall be provided to the RCE. The meter marks are most easily obtained while forming drip loops.

For aerial installations, the CONTRACTOR shall route the fiber optic cable on the inside of messenger intersections at dead ends and crossovers.

b. Aerial Installation

1) General

All fiber optic cable installation shall be in buried conduit.

Where the Plans call for aerial installation, the CONTRACTOR shall install new 1/4" messenger cable and shall lash the fiber optic cable to the new messenger.

Aerial cable shall be installed either manually or by using the moving reel method. If the CONTRACTOR proposes to use the moving reel method, the CONTRACTOR shall submit to the RCE the cable manufacturer's recommended procedures for this installation technique at least seven (7) days prior to beginning the installation of the fiber optic cable.

The required clearances between the fiber optic cable and the utility features shall be maintained as follows unless otherwise noted on the Plans:

a) A minimum of four (4) inches vertical clearance and 12 inches minimum total (diagonal) separation shall be maintained to the telephone and/or cablevision facilities.

b) A minimum of 40 inches vertical clearance shall be maintained to all electrical transformers.

c) A minimum of 40 inches vertical clearance shall be maintained to all electric lines (including street light circuits).

Relocation of overhead utilities will be made by others and is not a part of this Contract.

Where called for on the Plans or as directed by the ENGINEER, fiberglass extension arms shall be furnished and utilized to install the new fiber optic cable. Such fiberglass extension arms shall be an MIF PH6-2 or approved equal.

Where called for on the Plans, the CONTRACTOR shall install down guys as shown in the typical diagrams in the Plans. Guy guards shall be constructed of #18 hot dipped galvanized steel. All guy hardware shall be on the same bolt with the J-hook.

The CONTRACTOR shall use a Kellems → (or approved equal) grip wire mesh pulling grip and swivel to prevent damage to the cable during cable pulls.

The CONTRACTOR shall provide drip loops for the fiber optic cable at all utility poles to which the fiber optic cable is attached. The drip loops must be of the "smooth curve" type and shall be at least of the recommended dimensions for a drip loop in the typical details. Drip loops shall be formed by hand or by using an expansion loop-forming tool. Straps and spacers shall be used to support the cable

in the absence of lashing wire support and to hold the cable bundles together. The strap and spacer shall be installed no closer than four (4) inches to the first bend in the drip loop.

Where called for on the Plans, the CONTRACTOR shall install backlashes in the fiber optic cable as necessary. The CONTRACTOR shall utilize sixteen (16) inch fiber optic strand storage bracket (Multilink model number 2116-SSPTB or approved equivalent) which are also known as "fiber optic sno shoes". All hardware necessary for the installation of the backlash including the "fiber optic sno shoes", and lashing of the additional cable, shall be incidental to the cost of furnishing and installing the fiber optic cable.

The straps and spacers used for drip loops and other fiber optic cable handling purposes shall be hand-tight only. The strap and spacer must be loose enough to allow longitudinal travel by the cable, but tight enough to prevent the strap and spacer from moving on the messenger cable.

2) Lashing

The fiber optic cable shall be overlashed to the new messenger installed by the CONTRACTOR. The lashing shall be accomplished with aluminum wrapping tape spaced at intervals not exceeding 380 mm or with 1.5 mm (minimum) diameter galvanized steel spiral cable wrap. Wrapping tape, if used, shall be 1.3 mm x 7.6 mm, and at least four (4) turns shall be used. Lashing shall be accomplished in the manner that results in the wire and the cable appearing to be an integral part of the support cable. Fiber optic cable shall be installed without loose lashing, twisting or weaving along the messenger.

The CONTRACTOR shall terminate the lashing wire with a lashing wire clamp as the cable run is lashed up, span-by-span. The lashing wires shall be terminated as follows:

- a) Place a cable spacer between the fiber optic cable and the messenger.
- b) Locate lashing wire clamp two (2) inches from strap and spacer. Pull enough lashing wire out of lasher to terminate into the lashing wire clamp.
- c) Wrap the lashing wire three (3) times around only the messenger between the lashing wire clamp and the planned location of the first wrap around both the strand and fiber optic cable.
- d) Secure the lashing wire as shown in the typical details.

c. Underground Installation

Where shown on the Plans, the fiber optic cable shall be installed in new or existing underground conduit, 36" deep. Typically, the drop cable from the backbone to the local cabinets is installed in one 2 inch schedule 80 PVC, or as indicated on the Plans.

1) Conduit

Conduit size and type are specified on the Plans. For additional information concerning conduit see FURNISH AND INSTALL CONDUIT. This section concerns the procedure for installing cable inside the conduit.

Seven (7) days prior to the installation of fiber optic cable in conduit is performed, the CONTRACTOR shall provide the RCE with four (4) copies of the cable manufacturer's recommended and maximum pulling tensions. Included with these pulling tensions shall be a list of the cable manufacturer's approved pulling lubricants. Only those lubricants in the quantity recommended by the fiber optic cable manufacturer shall be approved for use.

When installing the cable in underground conduit, the maximum allowable pulling tension for the cable installation by the CONTRACTOR shall not exceed 70

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percent of the manufacturer's maximum pulling tension. If the cable is pulled by mechanical means, a dynamometer (clutch device) approved by the ENGINEER shall be used to ensure that a maximum allowable pulling tension is not exceeded at any time during installation.

Fiber optic cable shall not be pulled over edges or corners, over or around obstructions or through unnecessary curves or bends. Approved cable guides, feeders, shoes and bushings shall be used to prevent damage to the cable during installation.

Sealing bushings rather than weatherheads shall be used on all risers containing fiber optic cable. The sealing bushings shall conform to the typical detail shown.

Conduit bends and cabinet entrance fittings used by the fiber optic cable network shall be designed to accommodate the bending radius limitations of the fiber optic cable used.

The CONTRACTOR shall pull an adequate amount of fiber optic cable into the various cabinets and service boxes. The following table shows the amount of slack cable that should be provided in the various type cabinets and service boxes:

a) Local cabinet	50 feet
b) SCIPCAB1	3 feet
c) Field hub cabinet	50 feet
d) Service boxes	100 feet
e) Hub building	100 feet

The length of slack for each of these cabinet types should be divided evenly between entering and exiting cable. For example, the field hub cabinet should have 50 feet of slack on the entering cable and 50 feet of slack on the exiting cable for a total of 100 feet. If service box is within 50 feet of local or hub cabinet, the cable slack can be cut in half in the cabinets. Service boxes and hub buildings should have 100 feet of slack on the exiting and 100 feet of slack on the entering cable for a total of 200 feet. When Gator Patch cables are used in local cabinets there should be 25 feet of slack in cabinet (for SCIPCAB1 there shall be no more than 3 feet of slack) and 100 feet of slack entering into the service box. Maintenance loops should follow the same cable slack measurements listed for service boxes. After the fiber optic cable has been spliced, the cable shall be neatly coiled (with tie-wraps placed on the cable) and placed on top of the fiber interconnect center or on the bottom of the cabinet. The cable shall be readily accessible to enable maintenance personnel to perform splicing of the cable in a vehicle located near the controller cabinet.

All metal conduits shall be grounded. All conduit, terminal cabinets, anchor bolts and reinforcing bar cages shall be made mechanically and electrically secure to form a continuous system and shall be effectively grounded. The grounding or bonding conductor shall be #6 AWG bare stranded copper wire.

Bonding of metallic conduit in service boxes and other installations, where the conduit is not coupled, shall be coupled with metallic conduit ground bushings having smoothly rounded, molded, insulated inserts and bonding jumpers.

The CONTRACTOR shall furnish and install all grounding facilities.

2) Buried Cable Markers

Buried cable markers shall be located along the buried cable line at locations shown on the Plans and/or shall be placed at every service box and not more than every 2450 feet apart. The marker shall be a PNA dome pack post cable marker 3"

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in dia., 6' long with a 16" orange top with approved labeling and phone number (labeling information and phone number to be supplied by Engineer for each project) or approved equal. An Orange passive marker ball shall be placed in every service box containing fiber or communications cable with a frequency of 101.4KHZ, that is compatible with a MetroMark passive marker locator 760Dx or approved equal.

9. SPECIAL INSTRUCTIONS TO CONTRACTORS

- a. Fiber optic cable, of the type and size specified, will be measured by the linear foot of cable actually furnished and installed, completely in place and accepted, using an optical time-domain reflectometer (OTDR).
- b. The jacket shall have "Grabber" brand cable (stock no. VF0G – 07) markers. The markers shall be six (6) inches long, orange in color and read as follows in black: "SCDOT FIBER OPTIC CABLE (803) 737- 1893". Two Grabber brand cable markers shall be placed on cable in each service box and shall be visible when the lid is removed. For aerial installation, the cable markers shall be placed on each side of every pole approximately two (2) feet from the pole. The CONTRACTOR shall install three (3) additional markers on the cable between the poles, spaced equally apart along the span.
- c. The SMFO cable shall be spliced only at those points shown in the Plans or as approved by the ITS Field Operations Manager, (minimum distance between reel end or end to end splices shall be no less than 15,000 feet of cable length). Back bone cable shall not have intermediate splices and all drop cables shall connect to the back bone cable using mid-span entry. The designated splices shall be in the fiber interconnect centers that are proposed for installation in the field hub cabinets, ITS hub and at service boxes as designated on the Plans. If fiber optic cable splice locations are not labeled on the plans the ITS Field Operations Manager shall designate where splices will be allowed. The CONTRACTOR shall order cable in reel lengths that are of sufficient length (>15,000') to require no intermediate splicing of the cable.
- d. The CONTRACTOR shall furnish and install single-mode fiber optic cable as the transmission medium for the video signals, the data communications trunk, and the data communication channels between the field devices and the hub building. The CONTRACTOR shall furnish, install, splice and test all the fiber optic cables. No separate payment shall be made for furnishing and installing splicing kits, fiber optic cable caps, breakaway swivels, moisture sealants, terminators, splice trays, fiber connector panels, jumper cables, connectors, and accessories to complete the fiber optic network. These items shall be considered as incidental and their costs shall be included in the cost to furnish and install the fiber optic cable. No separate payment will be made for equipment used by the CONTRACTOR to install, splice and test the fiber optic cable, the cost of which shall be included in the unit price to furnish and install the cable.

The number of fibers in each cable shall range from twelve (12) fibers through four (4) fibers in the drop cable to 144 fibers in the backbone cable. The number of fibers provided in any particular section of cable shall be as indicated in the Plans.

The following specifications provide detailed operational and technical requirements for specific elements of the communication system. The ITS Field Operations Manager shall designate the fiber allocations for all communications and integration into existing system. Elements of the fiber optic system shall include, but not be limited to, the following:

- 1) Single-mode optical fiber cables used for CCTV data transmission from local field equipment cabinets to the hub building. Transceivers shall be furnished and installed by the Department for video transmission and camera control data transmission over the fiber optic links between the field cabinets and hub building.

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- 2) Two single-mode fibers will be used between the local cabinets (two fibers in and two fibers out) for communications. The allocations for the fibers to be used will be designated by the ITS Field Operations Manager.
- 3) Single-mode optical fiber cables used for data communication between the field equipment cabinets. The fiber cables will link the field cabinets in a network having a fiber optic backbone as shown in the Plans.
- 4) UPC ST connectors, patch panel modules, connectorized cable assemblies, and jumpers.

10. TRAINING

The Contractor will be required to furnish training for the testing and maintenance of the fiber optic infrastructure installed on this contract. The training will consist of classroom and "hands-on" training. The Training will be ETA and IMSA compliant and will include ETA FOI, IMSA Fiber Optics for Traffic Systems Tech. Levels I and II certification testing and certifications for each SCDOT employee in attendance.

Training will be furnished as part of the Furnish and Install Fiber Optic Cable bid item with no additional cost to the Department.

- a. The classroom training will consist of a minimum 40 hours (or as required to achieve certifications for both ETA FOI and IMSA Level I and II) of classroom instruction for up to ten (10) SCDOT ITS maintenance personnel and will include hands on training, ETA and IMSA Fiber Optic Technician certification testing, certifications and written instruction. The Department reserves the right to allow others to attend training.
- b. The testing and maintenance training will be conducted at the ITS Maintenance Facility in Columbia SC. Training dates and times shall be approved by the ITS Field Operations Manager prior to scheduling. A list of attendees will be given to the contractor by the ITS Field Operations Manager for scheduling and testing purposes. Training shall be scheduled on a date selected by ITS Field Operations Manager during the project (contractor should note that this training may be required at the beginning of the project however must be conducted prior to Substantial completion of ITS infrastructure for this contract.)

CATALOG CUTS ARE REQUIRED

P. FIBER OPTIC COMMUNICATION PLANT - TESTING

Description: The CONTRACTOR shall test the fiber optic cable before and after installation in accordance with the procedures in this project's special provisions. The results of the tests shall be provided to the DEPARTMENT'S project resident construction engineer (RCE). The CONTRACTOR shall test all used or spare/unused fibers.

1. FIBER OPTIC CABLE TEST

- a. Continuity: Prior to the installation of any fiber optic cable, the CONTRACTOR shall test the continuity of each fiber using an optical time domain reflectometer (OTDR). The test shall be conducted while the fiber is still on the reel and the test results shall be provided to the RCE.
- b. Splice Loss: After the installation of the fiber optic cable, the CONTRACTOR shall test the dB loss for every splice of the fiber optic cable in accordance with procedures established in the OTDR operator's manual. The testing may be done in conjunction with the splicing of the cable. Any splice that has a splice loss >0.05 dB shall be re-spliced.

The CONTRACTOR shall provide hardcopy test results to the ITS Field Operations Manager that identify the location of the splice (camera/DMS #, splice tray #), the fiber (by buffer tube and fiber color), and the splice loss in dB.

- c. Connector/End Splice Testing: The CONTRACTOR shall test each connector/end splice loss bi-directionally using an OTDR, in accordance with procedures established in the OTDR operator's manual. The average mated connector/end splice

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loss shall be <0.5 dB. Individual mated connector pair/end loss shall be <0.7 dB. Any connector/end splice with a loss greater than 0.7 dB shall be replaced by the CONTRACTOR. Any replacement connectors/ends shall also be tested.

- d. End-to-End Attenuation Testing: The CONTRACTOR shall perform end-to-end testing of each fiber between each place point at 1310 nm, and 1550 nm bi-directionally in accordance with EIA/TIA 526-7.

The CONTRACTOR shall provide hardcopy test results to the ITS Field Operations Manager that identify the two (2) ends of the test site, the fiber tested, the wavelength tested, the reference power output, and the system attenuation in dB.

The contractor shall provide to the Department three hard copies and three electronic copies on CD of the OTDR test results of all fiber optic cable installed on project. Contractor will supply to the Department any software required to open the OTDR electronic files at no additional cost to the Department.

The CONTRACTOR shall provide OTDR signature traces of all fibers between all CCTV locations and ITS control centers for system documentation and restoration purposes.

Q. FURNISH AND INSTALL FIBER INTERCONNECT CENTERS AND CLOSURES

Description: **This item is to be included in the cost for FURNISH AND INSTALL FIBER OPTIC CABLE.** These items shall consist of furnishing and installing fiber interconnect centers and fiber optic interconnect closures. All in-ground (below grade) **Splice Enclosures shall be of the 3M brand**, no exceptions. Included in these items are the splicing of the fiber optic cable; furnishing and installing splice trays, interconnection sleeves, jumpers, connectors and other hardware that may be needed to house the coiled fiber optic cable and the fiber optic splices. The centers and closures will have a varying number of splice trays and splices and shall be housed at locations such as: at base mounted 332A local cabinet, at field hubs (332A cabinet) and the hub building, and inside service boxes for drop cables to local cabinets or inside service boxes at reel termination points. Closures may be needed when the fiber optic cable is transitioned from a buried location to an aerial crossing at a river or railroad crossing. GPS location shall be provided for mid spans/reel end splices and shown on as-built plans.

1. MATERIALS

The CONTRACTOR shall furnish and install Gator patch cables or Department approved Siecore or CCS01U rack-mounted fiber optic interconnect centers at field cabinets or hubs. The CONTRACTOR shall also provide 3M splice closures at locations for drop cables and reel end splices. The fiber interconnect centers shall include strain-relief hardware, be rack-mountable and typically have the following capacities and locations:

- a. At each of the base mounted local cabinets, there shall be one (1) splice/organizing tray and termination/connection capacity for a minimum of six (6) fibers and shall have ST connectors installed or a Gator patch.
- b. At a field hub cabinet there shall be one or two (1-2) splice/organizing tray and termination/connection capacity for twelve to one hundred forty four (12-144) fibers.
- c. At hub building, there shall be four (4) splice center/organizer trays with a capacity to hold a total of 144 splices each.

The fiber optic 3M brand closures shall typically have the following capacities and locations:

- d. At fiber optic backbone reel end locations with a 144-splice closure capacity.
- e. At drop locations as specified on drawing with a 12-splice closure capacity.

The fiber interconnect center and closures shall be located in the cabinet or service boxes such that the slack fiber optic cable stored on top of the fiber interconnect center (as required in the Special Provision – Furnish and Install Fiber Optic Cable) can be easily removed (along with the fiber interconnect center) from the cabinet and taken to a maintenance vehicle for splicing, if necessary.

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The interconnect centers shall be equipped with fiber connector panels with factory-installed interconnection sleeves. The interconnection panels shall be clearly labeled (transmit/receive). The interconnection sleeves shall be type ST compatible, with ceramic insert, and composite housing for single-mode fiber optic cable. The trays shall be a Siecor type or approved equivalent.

The CONTRACTOR shall furnish pigtail fiber optic cable assemblies with type UPC-ST compatible connectors factory-installed on one (1) of the assemblies. The pigtails shall be fusion-spliced to the fiber optic communication cable in each splice tray. The appropriate number of pigtail assemblies shall be furnished and installed in each fiber interconnect center.

2. SPLICING OF THE FIBER OPTIC CABLE

a. Splicing Methods

All splicing shall be done by means of a fusion-splice technique, which induces less than 0.09 dB attenuation. Bare fibers shall be completely recoated with a protective RTV gel or similar substance prior to application of the sleeve or housing to protect the fiber from scoring, dirt, or microbending. Each spliced fiber shall be packaged in a heat shrunk protective sleeve or housing. All splices shall be performed in accordance with the cable manufacturers and the splice manufacturer's recommendations. During splicing, the CONTRACTOR shall maintain the continuity of the buffer tube and fiber color.

Incoming fibers shall be provided with five (5) feet of coiled slack and spliced to a pigtail of the same type fiber. Pigtails shall have a minimum length of five (5) feet and shall have a factory-installed UPC-ST compatible connector. The pigtails shall have an attenuation of less than 0.5 dB. The UPC-ST connector shall mate with the connector panels installed in the fiber interconnect center.

Unused optical fibers shall be properly protected with sealed end caps.

The CONTRACTOR shall record the meter marks on the cable sheath at each splice point. These marks shall be provided to the owner on a sheet of as-built system plans at the completion of the project.

The CONTRACTOR shall label all fiber optic patch panels and jumpers. Labeling shall match DMS and Camera addressing numbers, if fiber port is unassigned, the fiber destination location shall be used for labeling. The labeling shall be approved by the Engineer.

b. Jumpers

If necessary, the CONTRACTOR shall furnish and install single-mode fiber optic cable assemblies with UPC ST connectors factory-installed on each end (jumpers). These assemblies will be used to connect the fiber optic modem to the connector panel. These jumpers will not be paid for directly, but shall be considered incidental to the item Furnish and Install Fiber Optic Modem.

c. Future Applications

The fiber optic communications network is being designed and constructed to accommodate future applications. The CONTRACTOR shall only fusion splice the necessary fibers at local cabinet locations. However, the CONTRACTOR shall splice all fibers at reel end splices. Complete fiber optic cable count shall be terminated at Hub building, TMC facilities and/or other head end location. All pigtail assemblies shall be connected by the CONTRACTOR to the connector panels installed in the fiber interconnect center. The transmit and receive designations of each fiber pair shall be clearly labeled on the front of the connector panel. Each fiber termination/connection shall be tested for attenuation.

CATALOG CUTS ARE REQUIRE

R. FURNISH AND INSTALL PRESTRESSED CONCRETE POLES

Description: The following specification covers design, fabrication and installation of pre-stressed spun concrete poles. Poles shall be designed and constructed so that all wiring and grounding facilities are concealed within the pole. All handholes, wire inlets/outlets, inserts for pole steps, thru-bolt holes and ground wire shall be cast into the pole during the manufacturing process. These specifications are for typical 80-foot and 60-foot concrete poles to be used for installations with Closed Circuit Television (CCTV) assemblies. Pre-stressed concrete poles shall be Stress Crete SCDOT camera poles or approved equal.

1. DESIGN

- a. Poles shall be designed considering the application of both dead load and wind load. The moment at any point along the length of the pole is to be the sum of moments resulting from dead loads and forces from wind loads. The wind force is to be computed by multiplying the specified wind pressure by the effective projected area (EPA) of the individual components.
- b. The P-Delta secondary moments due to the deflected unbalance of the structure must be accounted for in the design and shown in any calculations submitted.
- c. Poles shall be designed to meet AASHTO requirements for wind loading.
- d. Manufacturer shall supply engineering calculations which support pole design, hardware when applicable and foundation design when soil borings are provided. Calculations shall be approved and stamped by a registered professional engineer.
- e. Poles shall be designed such that the deflection does not exceed 1.1% of the free height of the pole at its maximum EPA under a wind loading equivalent to ½ the designated ultimate wind speed, including a 1.3 gust factor.
- f. The natural frequency of the pole shall be limited to 0.8 cycles/sec. The manufacturer shall provide calculations verifying the above requirements.
- g. The structural design shall provide for both multiple point and one point lifting.
- h. Poles shall be designed such that the forces imposed in handling, transportation and erection including a 1.3 impact factor, shall not exceed its cracking moment when handled at the pickup point locations indicated by the manufacturer.

2. MATERIALS

- a. Concrete: The concrete mix shall be designed to achieve a minimum 28-day compressive strength of 8,000 psi. Concrete test reports shall be kept per ASTM C-99 and certified by a registered professional engineer. Cement shall conform to the latest requirements of Type I, II or III Portland Cement in accordance with ASTM- C150. Maximum size aggregate may be ¾ inch or 75% of the clear spacing between main reinforcing steel and surface of pole. Any water/reducers, retarders, or accelerating admixtures shall conform to ASTM-C494. Water shall be free from foreign materials in amounts harmful to concrete and embedded steel.
- b. Pre-stressing Steel: Pre-stressing steel reinforcement shall conform to uncoated 7-wires, stress-relieved strand (including low relaxation) per ASTM-A416 and shall be limited to ½ inch diameter.
- c. Spiral Reinforcement: Steel spiral reinforcement shall conform to the requirements of ASTM-A82 and shall not be less than 0.150 inch diameter. The pitch of the spiral steel shall not be greater than 3.2 inches or the radius of the pole, whichever is less.
- d. Hardware: All structural steel shall conform to ASTM-A36 and be hot-dip galvanized in accordance with ASTM- A123. Zinc alloy AC41A for inserts, hand hole frames and covers, shall conform to ASTM-B240. All bolts, nuts, washers and other fasteners must be either stainless steel or hot-dip galvanized per ASTM-A153.

3. MANUFACTURE

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- a. All manufacturing tolerances, details or reinforcement and finishes shall be in accordance with "Guide Specification for Pre-stressed Concrete Poles", as published in the May-June 1982 issue of the Journal of the Pre-stressed Concrete Institute.
- b. Poles shall be pre-stressed concrete poles, manufactured by the centrifugal spinning process.
- c. Poles shall be round in cross-section with hollow center.
- d. Pre-stressing forces shall be limited to 65% of the ultimate yield strength of the pre-stressing strand.
- e. Forms shall be designed to provide a minimum concrete cover of $\frac{3}{4}$ " inch over the spiral steel.
- f. Poles shall have a smooth natural form finish, soft gray color.
- g. The manufacturer shall have a minimum of ten years of experience in the design and production of centrifugally spun concrete poles.
- h. Pole will be of single piece construction through 130 ft., unless otherwise specified.

4. POLE ACCESSORIES

- a. Nameplate: A brass or aluminum nameplate shall be cast into the wall of the pole approximately five (5) feet above the ground line identifying the name of the manufacturer, job identification (SCDOT project number) or order number, overall length, manufacturer date, and actual weight.
- b. Two (2) four (4) inch x ten (10) inch conduit entrance opening shall be centered 18 inches below grade.
- c. An internal wire support shall be located directly above each wire inlet/outlet and be accessible from the handhole opening.
- d. The pole base shall be plugged to provide extra bearing surface.
- e. Grounding - A #4 stranded copper ground wire shall be cast into the pole. The ground wire shall be terminated in a copper/tank ground at the top platform/crossarm level and approximately 12 inches below grade. Ground grid shall be connected to the cabinet ground and electric service ground in the electrical pull box located at the cabinet. The copper tank ground shall provide a $\frac{1}{2}$ inch tapped insert for the grounding of hardware. The tank ground shall be connected to the camera lowering device at the top of the pole with AWG 4 stranded bare copper. This internal grounding system, shall meet NFPA and UL96 requirements.
- f. A minimum size three and one-half (3-1/2) inch x eight (8) inch reinforced hand hole frame with curved cover shall be centered 24 inches above grade for both 80 feet and 60 feet poles. This hand hole shall have the manufacturer recommended attachments installed for the camera lowering device wench to be used on this contract.
- g. A minimum size three and one-half (3-1/2) inch x eight (8) inch reinforced hand hole frame with curved cover shall be centered 48 inches above grade 90 degrees offset from other hand holes for cable access on both 80 feet and 60 feet poles.
- h. A minimum size three and one-half (3-1/2) inch x eight (8) inch reinforced hand hole frame with curved cover shall be centered 52 inches above grade for both 80 feet and 60 feet poles. There shall be an eye bolt installed 90 degrees offset from the hand hole inside of pole. The eyebolt shall be installed to manufactory recommendations to secure the camera-lowering device's lowering cable.
- i. A minimum size three and one-half (3-1/2) inch x eight (8) inch reinforced hand hole frame with curved cover shall be centered 20-23 feet above grade for both 80 foot and 60 foot poles.

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

- j. A minimum size two (2) inch x eight (8) inch reinforced hand hole frame with curved cover shall be centered 48 - 49 feet above grade for the 60 feet pole only and 67 – 69 feet above grade for 80 pole.

5. INSTALLATION

Prior to installation, the CONTRACTOR shall conduct the necessary soil samples and geotechnical analysis to determine installation depth and foundation design requirements for each pole. The samples should be taken at the locations where the poles are to be installed and a copy of the analysis submitted to the SCDOT project engineer for consensus. The analysis results should provide a recommendation of the back fill material, depth and diameter requirement for the concrete pole. Final pole installation location shall be approved by the ITS Field Operations Manager prior to installation. GPS location shall be provided for camera pole and shown on as-built plans. When pole is to be installed on steep slopes or hills contractor shall furnish and install a level 12'X12' class A concrete pad around pole for access and maintenance purposes, at no additional cost to the department. A service box shall be installed in pad with 2- two (2) inch spare conduits extending out two (2) feet past the edge of pad for future access. The conduit locations shall be marked with an X in the concrete pad.

For bidding and estimating purposes, an embedment depth of ten percent (10%) of the overall pole length plus an additional four (4) feet may be used. Sixty feet CCTV poles shall have a typical 36-inch diameter hole.

- a. Grounding Grid: There shall be a four point grounding grid 7' x 7' around pole which shall be connected to copper/tank ground 12 inches below grade. The grid shall consist of a min. of four RUS 13 ground rods 5/8 inch by eight feet long copper clad, a min. of #4 AWG bare 7 stranded copper wire. Ground grid shall be connected to the cabinet ground and electric service ground in the electrical pull box located at the cabinet. Additional ground rods may be required to achieve proper resistance to ground (not to exceed eight ground rods). Connections to rods shall be by a method of exothermic weld connections. Ground grid shall meg <15 ohms and shall be tested using the fall of potential method and test shall be overseen by Engineer.
- b. Plumbing Pole: Poles shall be plumbed (straight) before back filling, to Engineers approval.
- c. Access Holes: Pole shall be set so that top Access hole in pole is no more than four (4) and one half (½) feet above finished grade and no less than four (4) feet above finished grade.
- d. Back fill Material: Back fill material shall be crush and run in typical installations. No soil samples and geotechnical analysis have been made. Contractor is responsible for all soil samples and geotechnical analysis. Where deemed necessary by Engineer, Class A Concrete shall be used for back fill material at no additional cost to the Department.

CATALOG CUTS ARE REQUIRED

S. FURNISH AND INSTALL STEEL POLES

Description: The following specification covers design, fabrication and installation of Steel poles. Poles shall be designed and constructed so that all wiring and grounding facilities are concealed within the pole. All hand holes, wire inlets/outlets are fabricated into the pole during the manufacturing process. These specifications are for typical 50-foot steel poles to be used for installations with Closed Circuit Television (CCTV) assemblies. Steel poles shall be Valmont CCTV Camera Poles SC drawing 12768-1 or approved equal.

1. DESIGN

- a. Poles shall be designed considering the application of both dead load and wind load. The moment at any point along the length of the pole is to be the sum of moments resulting from dead loads and forces from wind loads. The wind force is to be computed by multiplying the specified wind pressure by the effective projected area (EPA) of the individual components.

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

- b. The P-Delta secondary moments due to the deflected unbalance of the structure must be accounted for in the design and shown in any calculations submitted.
- c. Poles shall be designed to meet AASHTO requirements for wind loading.
- d. Manufacturer shall supply engineering calculations which support pole design, hardware when applicable and foundation design when soil borings are provided. Calculations shall be approved and stamped by a registered professional engineer.
- e. Poles shall be designed such that the deflection does not exceed 1.1% of the free height of the pole at its maximum EPA under a wind loading equivalent to $\frac{1}{2}$ the designated ultimate wind speed, including a 1.3 gust factor.
- f. The natural frequency of the pole shall be limited to 0.8 cycles/sec. The manufacturer shall provide calculations verifying the above requirements.

2. Materials

Hardware: All structural steel shall conform to ASTM-A36 and be hot-dip galvanized in accordance with ASTM- A123. Zinc alloy AC41A for inserts, hand hole frames and covers, shall conform to ASTM-B240. All bolts, nuts, washers and other fasteners must be either stainless steel or hot-dip galvanized per ASTM-A153.

3. Manufacture

Pole will be of single piece construction, unless otherwise specified.

4. Pole Accessories

- a. Nameplate: A nameplate shall be installed on the pole approximately three (3) feet above the ground line identifying the name of the manufacturer, job identification (SCDOT project number) or order number, overall length, manufacturer date, and actual weight.
- b. Grounding: A #4 stranded copper ground wire shall be connected to a grounding lug inside of pole. The ground wire shall be terminated a multi-point grounding system (not to exceed eight ground rods) connected to the cabinet ground and electric service ground in the electrical pull box located at the cabinet.
- c. There shall be two hand holes fabricated into pole at measurements as shown on Valmont Drawing 12768-1 or as approved by the Department

5. Installation

Final pole installation location shall be approved by the ITS Field Operations Manager prior to installation. GPS location shall be provided for camera pole and shown on as-built plans.

- a. Grounding Grid: There shall be a multi point grounding not to exceed 8 ground rods, which shall be connected to the inside of the pole with a mechanical lug. The grounding shall consist of a min. of three RUS 13 ground rods 5/8 inch by eight feet long copper clad, a min. of #4 AWG bare 7 stranded copper wire. Grounding shall be connected to the cabinet ground and electric service ground in the electrical pull box located at the cabinet. Additional ground rods may be required to achieve proper resistance to ground (not to exceed eight ground rods). Connections to rods shall be by a method of exothermic weld connections. Grounding shall meg <15 ohms and shall be tested using the fall of potential method and test shall be overseen by Engineer.
- b. Plumbing Pole: Poles shall be plumbed (straight), shims may be used to plumb per manufacture recommendation and to Engineers approval.
- c. Breakaway T Base: Transformer Base, TB1-17 Modified w/ Pelco Door & Washers, Alum Pelco's TB1-17 Transformer Base stands 17" tall with a 13.12" square top, 15.38" square bottom, and has a 10½"-13½" top bolt circle and 10½"-1215/16" bottom bolt

circle. Comes complete with an aluminum Pelco door and 8 heavy duty galvanized steel washers. Install in accordance to the manufacture recommendations.

- d. Anchor Foundation: Foundation Anchor Assy, 8" Sch 20 x 5'-0" 11" to 17" Bolt Circle, 1"-8NC Hardware Pelco's schedule 20 foundation anchors feature a top plate which enables the bolt head to be inserted after the anchor is in place. This eliminates the necessity of digging under the plate to install base bolts. The carriage bolts are locked in place by the slots in the top plate, which prevent them from turning. For street and highway lighting. Typically for poles ranging from 30'-50' in height. (wt. 184 lbs). Install in accordance to the manufacture recommendations. PB-5534-GLV

Foundation Anchor Assy, 10" Sch 20 x 10'-0" 13-1/2" to 17" Bolt Circle, 1"-8NC Hardware Pelco's foundation anchors feature a top plate which enables the bolt head to be inserted after the anchor is in place. This eliminates the necessity of digging under the plate to install base bolts. The carriage bolts are locked in place by the slots in the top plate, which prevent them from turning. For street and highway lighting. Typically for poles ranging from 30'-50' in height. (wt. 359 lbs) Install in accordance to the manufacture recommendations. PB-5535-GLV

CATALOG CUTS ARE REQUIRED

T. FURNISH AND INSTALL CAMERA LOWERING DEVICE

Description: The camera lowering device shall be designed to support and lower a standard closed circuit television camera, lens, housing, dome, PTZ mechanism, cabling, connectors and other supporting field components without damage or causing degradation of camera operations. All components of the lowering device shall be installed so that they function properly with other ITS components. The device shall be used in conjunction with concrete or steel support poles. Camera lowering device shall be a Camera Lowering Systems (CLS) CDP6-16HDBP series or approved equal. Lowering device to be offset a minimum of 90 degrees off access holes. Lowering devices should typically be ordered with 105 feet of lead cable and 18 inch pigtail on lowering head. All lowering devices and lowering winches shall be designed for eighty (80) feet camera poles. When deemed necessary by the Department the Contractor shall furnish longer lead cables as needed per project.

1. Materials

- a. Top Plate or Arm Mounted Assembly

The headframe assembly shall be designed to bolt to a round cross section on top of pole structure.

The interface and locking components shall be made of stainless steel and or aluminum. All external components of the lowering device shall be made of corrosion resistant materials, powder coated, galvanized, or otherwise protected from the environment by industry-accepted coatings to withstand exposure to a corrosive environment.

The lowering device shall be a "single cable" system, with the control cable remaining stationary in the pole during the lowering process. Camera lowering tool is a LT-1R-11-XX or approved equal.

The only cable permitted to move within the pole or lowering device during lowering or raising shall be the stainless steel lowering cable. All other cables must remain stable and secure during lowering and raising operations.

- b. Camera Mounting Assembly

The camera mounting assembly shall be a two piece design for easy camera mounting.

- 1) Both sections shall be made of corrosion resistant cast aluminum.
- 2) The top half shall be mounted and gasketed to the bottom of the disconnect unit. It shall extend into the cylinder of the disconnect unit and designed to repel water.

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- 3) Inside the top half, it shall have provision to mount additional weights for lightweight cameras or other equipment.
- 4) All parts shall be made of extra heavy construction.
- 5) The camera connection box shall be adaptable to all brands of cameras by means of a one and one half inch NPT receptacle.
- 6) The two piece construction shall feature a lower box that hinges down for easy access to wiring. It shall contain a large capacity-splicing compartment for camera power, signal leads, surge suppression equipment, and connectors. The internal cavity shall be a minimum 8.5 inches square X a minimum 4.5 inches deep (per half) with a 1.5 inch NPT female pipe thread centered in the bottom.
- 7) All hardware shall be made of stainless steel.

The hoist cable shall be stainless steel wound anti-rotational aircraft cord minimum of 1/8 inch diameter manufactured to meet MIL-W83420C.

c. Electrical Connection

- 1) The coaxial and electrical disconnect unit shall meet or exceed sine vibration tests of 3.5 g's within the frequency range of 5-60 Hz in all three axes for minimum of six 5-minute cycle each axes. It shall meet or exceed random vibration tests of frequency range 60-1000 Hz at .025 g²/Hz applied for 30 minutes in each of the three axes. It shall have results to exhibit no signal or electrical discontinuities greater than 10 microseconds. Tests applicable to Electrical Disconnect Unit and attached component.
- 2) The EDU shall have a 3-way tracking guide and support. It shall be constructed of precision cast high strength aluminum alloy 356-T6. A permanently fixed position piece incorporating a special tracking guide system permits the moveable portion of the Disconnect Unit to align in the same position every time the system is operated, thereby eliminating the need to re-orientate the camera. The Electrical Disconnect Unit shall have twin high strength notches securing the load of the Lower Contact Assembly and camera.
- 3) The MULTI-CONTACT Connector assembly shall be modular for easy installation and retrofit requirements. All pin and socket contacts shall be insertable and removable. The connector shall have a maximum of 16 copper alloy C14500, size 12 contacts (.095" Dia.) rated at 35 Amps with gold plating per MIL-G-45204. All hardware shall be corrosion resistant stainless steel. It shall have a self-aligning and self-adjusting mechanical system comprised of two principal assemblies:

Two UPPER CONTACT HALVES shall house the socket contacts. It shall incorporate spring assisted polymer contact body with precision-machined guideposts. The socket contact body shall have integral guideposts for precise contact alignment. The composite cable shall be terminated directly into the upper contact halves and shall run splice free to the CCTV cabinet. Composite cable shall be Camera Lowering Systems 663-229-RG59-09 16HD-CQ or approved equal.

Two LOWER CONTACT HALVES shall house the pin contacts comprised of spring assisted polymer contact body with precision-machined guidepost receivers. The pin contact body aligns with guideposts of integral socket bodyguideposts.

- 4) The EDU cover shall be a one-piece hydro-spun heavy gauge stainless steel. The unit shall have a guidepost constructed of precision cast high strength stainless steel. It shall utilize a cast-in-place guide bar for precise alignment of Lower Contact Assembly with the fixed portion of the EDU.
- 5) The cables shall meet the following minimum requirements:
 - a) Camera Control Cable – Shall be a Camera Lowering System 663-229-

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

RG59-09 16 HD-CQ or approved equal. All camera control cables shall incorporate a cat-5 or cat-6 cable for IP camera connections along with all other conductors for analog cameras in one single jacketed cable. The cable shall be splice free. All connectors shall be equipped with a strain-relief.

- b) Video Cable - The video cable between the camera unit and the video transmitter shall be made with RG-59U coaxial cable. All cable runs shall be continuous and un-spliced. Connectors shall be BNC or MS. All connectors shall be equipped with a strain-relief.

2. CONSTRUCTION METHOD

The lowering device shall not be installed on pole prior to delivery to installation location. After pole is delivered to the location where it is to be erected, the lowering device shall be installed. The clam shell or junction box shall not be mounted prior to pole being set. The Clam shell or junction box shall be mounted after the pole is erected by means of lowering the device and then installing. Care shall be taken while the pole is being erected to insure lifting cables do not rest against or damage lowering device. It is the contractor's responsibility to insure the lowering device is level and straight after erection of pole, to the satisfaction of the Department.

3. SPARE PARTS

As part of the contract bid for **FURNISH AND INSTALL CAMERA LOWERING DEVICE**, at the time of final acceptance of the project, the Contractor shall furnish to the SCDOT the following for use as spare parts.

These parts will be new:

- a. Five (5) spare Camera Lowering Systems (CLS) CDP6-16HDBP series per spec
- b. Two (2) spare LT-CC-90 Lowering tool with SS aircraft cable each including Dewalt 20 volt ½" hammer drills (DCD985L2)

CATALOG CUTS ARE REQUIRED

U. INSTALL 332 AND SCIPCAB1 ITS CABINET ASSEMBLY

DESCRIPTION – This work shall consist of installing a Department supplied Type 170 332 cabinet assembly or SCIPCAB1 cabinet assembly used to house the transceivers and splice tray equipment or gator patch to transmit the signals and connect to the fiber optic cable back to the hub building or TMC.

Where references are made to Caltrans specifications, the CONTRACTOR is directed to the Traffic Signal Control Equipment Specifications, as published by the State of California Business, Transportation & Housing Agency: Department of Transportation, Current Edition, and all current addenda. The ITS cabinet assembly, as described below, shall conform to all applicable sections of the Caltrans specifications, South Carolina DOT Standard Specifications and to the supplemental requirements of this section.

1. General Requirements

The CONTRACTOR shall install the ITS cabinet assemblies as called for in the Plans and shall conform to all materials and installation requirements of this section.

2. Materials

a. Standard Cabinet Housing

1) General Requirements

Unless otherwise specified, all cabinet housings shall conform to the cabinet housing details as defined in Chapter 6, Section 2 (Housing Number 2) and the cabinet housing details of the Caltrans specification. All cabinets shall exhibit a smooth, uniform natural aluminum finish. The police panel and associated wiring

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

circuits are not required as part of this cabinet assembly. All cabinets shall have hooks, welded to the inside of the front cabinet door, for hanging the plastic documentation pouch.

All bolts, nuts, washers, screws, hinges, hinge pins and other related hardware shall be stainless steel.

Unless otherwise specified in the Plans, all 332 equipment cabinet assemblies shall be configured for base-mounting. The cabinet bottom shall be open and set on prefabricated concrete base. Prefabricated concrete bases shall be set on a 12 inch bed of crush and run leveled and compacted. Cabinet must be level and plumb. All SCIPCAB1 equipment cabinet assemblies shall be configured for mounted on a prefabricated concrete pedestal. Prefabricated concrete pedestals shall be set 3 feet in the ground and back filled with ready mix concrete, a minimum of 5 feet above grade.

2) Standard Cabinet Housing

The cabinet housing (see Detail Drawing 1) shall be a standard Model 332 housing with approximate exterior dimensions of 66 inches (H) by 24 inches (W) by 23 inches (D).

All cabinet housings shall be equipped with the standard EIA 19-inch rack cabinet cage as described in Section 3 of the Caltrans specification. Side panels within the two sides of the cabinet cage shall be installed as. Each side panel shall be fabricated from 5052 sheet aluminum alloy with a minimum thickness of 0.125 inches.

SCIPCAB1 cabinet housing with approximate exterior dimensions of 16 inches (H) by 14 inches (W) by 12 inches (D).

The 332 cabinet housing shall be equipped with a rack-mounted fiber interconnection panel or Gator patch and appropriate fiber jumper cables between the interconnection panel and the fiber optic transceivers. The fiber interconnection panel shall be no more than one rack unit high (1.75 inches) and no more than 12 inches deep (Multilink FRM012X, Siecor C-MIC-012 or CCSO1U or approved equivalent). The panel shall be fabricated from aluminum or painted steel and shall include an easily accessible enclosed compartment with fiber routing guides, cable strain-relief guide and grounding lug. Cable entry holes closed with rubber or soft plastic poke-through grommets shall permit cable entry from the rear, sides or bottom of the enclosed compartment. The panel shall be capable of terminating a minimum of 144 fibers. A minimum of two (2) single-mode ST connectors shall be provided to terminate the fibers in the fiber drop cable as shown in the Plans. The ST connectors furnished with the fiber interconnection panel shall be fully compatible with the ST connectors terminated onto the fiber drop cable and the fiber jumper cable. All ST connectors in the fiber interconnection panel shall be identified in the cabinet documentation by type (UPC, single-mode, ceramic, composite, etc.).

The 332 cabinet housings shall be equipped with a cabinet sliding drawer. The drawer shall be an aluminum storage compartment mounted in the rack assembly with the approximate following dimensions: 1.75 inches (H) x 16 inches (W) x 14 inches (D). This compartment shall have telescoping drawer guides to allow full extension from the rack assembly. When extended, the storage compartment shall open to provide storage space for cabinet documentation and other miscellaneous items. The storage compartment shall be of adequate construction to support a weight of 25 lb. when extended. The top of the storage compartment shall have a non-slip plastic laminate attached, which covers a minimum of 90% of the surface area of the top.

b. Internal Cabinet Assembly Components and Wiring

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

1) Surge Suppression

The cabinet shall have a Department supplied model 4000 Hawk modular power unit or Approved equal.

3. INSTALATION

All 332 or SCIPCAB1 cabinet assemblies which includes the concrete base or pedestal shall be installed where shown on the Plans and shall be plumb and level. The cabinet assembly shall be provided with a grounding system in accordance with the DEPARTMENT'S Standard Specification. The CONTRACTOR shall measure the resistance to ground in the presence of the ENGINEER and it shall be <15 ohms. The ground conductor between the cabinet grounding terminal and the ground rod shall not be spliced. The cabinet assembly grounding system shall be connected to the camera pole ground grid and the electric power service ground in the 17X30X28 pull box placed within five feet of cabinet to form a complete grounding system. Cabinets shall be installed approximately five feet from the CCTV pole, insuring that the cabinet will not interfere with the lowering tool. The Cabinet shall be placed so that the equipment side is facing away from the pole or DMS sign location. The ITS Field Operations Manager shall designate the cabinet location in the event the cabinet has to be set further than five feet from the CCTV pole. The DMS sign cabinets shall be Ledstar ACAS74A01R10 or approved equal located on upright of structure or as shown on plans. All cabling and wiring entering the cabinet housing shall be enclosed in conduit. A spare 2" conduit shall be installed for future use. All cabling and wiring inside the cabinet, including field wiring, shall be secured and neatly dressed and shall have sufficient slack [minimum two (2) feet] for cabinet equipment maintenance and re-termination of the field wiring. Fiber drop cables into the cabinet shall be routed to provide as much physical protection as possible, shall be secured through the cabinet, and shall be strain-relieved within the fiber termination unit.

Electrical power cable, grounding bushing or utilize myers hub, control cabling and fiber optic cabling shall enter the SCIPCAB1 cabinet housing in a continuous run of 2" aluminum conduit or rigid galvanized steel to extend from bottom of SCIPCAB1 cabinet to a minimum of one (1') foot below grade. When disconnect and or power meter is located on the same pedestal, the electrical power cabling shall enter the bottom of the SCIPCAB1 cabinet housing in a 1" metallic sealtight flex. SCIPCAB1 cabinet assembly shall be banded to the pedestal using stainless steel banding in two locations or with factory mounting hardware. Whenever possible the SCIPCAB1 cabinet assembly shall be mounted on the opposite side of the pedestal from the disconnect or meter can.

4. Certification

Prior to installation, the CONTRACTOR shall submit to the ENGINEER design details and drawings in complete evaluation of the materials, and comparison with these specifications. Any exception to these specifications must be stated in writing at that time.

5. Guarantee

- a. The CONTRACTOR shall furnish the ENGINEER with any warranties or guarantees on all electrical or mechanical equipment that are provided by the manufacturer or vendor, as customary trade practice.

-and/or-

- b. The CONTRACTOR shall warranty or guarantee the satisfactory in-service operation of all electrical or mechanical equipment and related components, for a period of six (6) months following project final acceptance.

CATALOG CUTS ARE REQUIRED

V. FURNISH AND INSTALL ELECTRIC FLUSH UNDERGROUND ENCLOSURE

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

DESCRIPTION – This work shall consist of furnishing and installing ELECTRIC FLUSH UNDERGROUND ENCLOSURE (service boxes) at the locations determined by the Contractor and SCDOT and in accordance with these Specifications. The service box shall consist of a box and cover, installed over a min. 6 inches of aggregate. The service box is intended for use for the power supply for the cameras and detection devices and is intended for use of coil of fiber optic cable and future splice of the fiber optic cable near bridge decks. The contractor is cautioned that some boxes may be installed over existing conduit with existing cable. The contractor is responsible for installation without damage to the existing items. Any damage shall be repaired by the contractor at no cost to the Department. Any damage to the existing fiber optic cable shall be repaired within twelve (12) hours of damage. A penalty of \$100.00 per hour shall be imposed for every hour past twelve that it takes to repair existing fiber cable. Service boxes shall be Armorcast A6001430TAPCX30 or High Line HIGHLINEPHA30483H04 furnished with a two- piece non-skid cover or approved equal. All Electrical pull boxes shall be an Armorcast A6001640TAPCX28 or approved equal. It shall be installed on in the dirt, at the depth so as the top is flush with the ground. GPS location shall be provided for all boxes and shown on as-built plans.

1. Materials

Shall meet the following requirements:

a. Box and Cover

The service boxes shall consist of a base having an open top (the box), with a separate removable two piece cover. . They shall be GRAY IN COLOR. Two piece covers shall have the LEGEND "SCDOT Fiber optic" or "SCDOT Electrical", as required. In the case were both fiber optics and electrical cable will pass thru the same box the LEGEND shall have "SCDOT FIBERIELEC". They shall use HEX-HEAD stainless steel bolts. The PHYSICAL FEATURES AND THE NOMINAL SIZE AND DIMENSIONS for the box and cover, are shown on the Standards or the Design Details, and are listed below:

	WIDTH	LENGTH	DEPTH
SERVICE BOX:	30in.	48in.	30in.
Pull Box:	17in.	30in.	28in.

(Service, Splice box for fiber optics and for electric services when deemed necessary by the engineer)

b. Design Load

Boxes shall be designed to survive a tandem wheel load specified by AASHTO H 20-44, being 32,000 pounds (14,514.9 kg) per axle, or 16,000 pounds (7257.6 kg) per tandem wheel pair. This 16,000 pound (7257.6 kg) dead load shall be multiplied by 1.3 impact factor, to obtain the DESIGN TEST LOAD OF 20,800 pounds (9434.7 kg). Thus, boxes shall be designed and tested for the following test loads: Cover-vertical load 20,800 pounds distributed over a 10 in. x 20 in. area (9434.7 kg over .254 x .508 m). Box- vertical load 20,800 pounds distributed over a 5 in. x 20 in. area (9434.7 kg over .127 x .508 m). Box-lateral load of 600 pounds per square foot (28728 Pascals). The cover deflection shall be less than 0.5 inch (1.27 cm); and the box deflection less than 0.25 in./ft. of length (.635 cm/.3 m). (Because of quoted references, English units are first.)

c. Western Underground Committee (WUC)

Using the above specified loads, the service boxes shall meet or exceed the WUC "Recommended Guide No. 3.6, Non-Concrete Enclosures". Structural requirements shall include: testing for vertical load on cover; vertical load on box; lateral load on box. Further they shall meet WUC recommendations for: accelerated service per ASTM D-756; chemical resistance per ASTM D-543; simulated sunlight resistance per ASTM G-53; plus water absorption; and flammability. Covers shall be skid-resistant, with a minimum coefficient of friction of 0.5.

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

d. Concrete

Concrete for patching shall be DHPT Class A, mixed and installed in accordance with Section 700 of the STANDARD Specifications.

e. Aggregate

Crushed stone for the service box shall be DHPT Aggregate Numbers 5 or 57. Service boxes shall be set on a min.36" X 54" bed of aggregate min. 6 inches deep.

2. Certification

- a. The Bidder shall provide certification from the manufacturer or vendor that the above material specifications have been met, including written results for Western Underground Committee tests.

NOTE: CATALOG CUTS ARE REQUIRED.

- b. The CONTRACTOR shall provide the DEPARTMENT with all guarantees offered by the manufacturer.

3. Construction Methods

a. Construction

- 1) The service boxes shall be constructed as indicated in the Design Details or the Standards, at locations shown on the Plans.
- 2) The service boxes shall be constructed such that when the box and covers are in place, they are flush with the adjacent pavement, ground, or sidewalk, as shown in the Design Details or the Standards. Patching concrete shall be placed around any box installed in pavement.
- 3) Boxes shall be placed at least 0.3 meters (one ft.) behind the curb-line or edge of roadway or as shown on the Plans.

b. Conduit

- 1) See FURNISH AND INSTALL CONDUIT Specifications.
- 2) Conduit shall enter the box at the bottom and extend at least six inches above the aggregate.
- 3) Conduit shall enter from the direction of the run unless otherwise permitted by the ENGINEER.
- 4) All metallic conduit ends within the box shall have grounding bushings with plastic inserts; and shall be bonded with one another with #6 AWG bare copper ground wire. PVC conduits greater than 3" shall have end bushings to prevent chaffing.
- 5) After the electrical/communication cable is placed, the completed conduit ends shall be packed with "duct-seal" or other equivalent material to prevent water from entering the conduit. Spare conduit shall be capped.

c. Grounding

- 1) Service box shall have one 5/8" X 8' copper clad ground rod installed for grounding of detectible muletape or tracer wire for fiber optic cable. The Detectable muletape conductors shall be bonded to the ground rod with a mechanical ground rod connector. Ground rod shall be installed so that the top of the ground rod is 6 to 8 inches below the box lid (allowing easy access for locating personnel to connect inductance equipment to tracer wire). There shall be a min. three feet of slack on detectible muletape.
- 2) All service boxes shall have accurate GPS coordinates with accuracy of 3 feet or less marked on as-built plans. GPS coordinates shall be obtained using a Department approved device. All service boxes shall have a red or orange passive

marker ball with a frequency of either 101.4KHZ for fiber or 169.8KHZ for electrical that is compatible with a MetroMark passive marker locator 760Dx or approved equal. All service boxes shall have a 16" RED or ORANGE Top (as required) above ground cable marker type PNA Dome Pack cable post marker 3" dia., 6' long or approved equal.

CATALOG CUTS ARE REQUIRED

W. FURNISH AND INSTALL PERMANENT DYNAMIC MESSAGE SIGN

Description - The following provides a description of a dynamic message sign using amber LED display elements and various subassemblies, with the intent of providing interchangeability between signs and compatibility with software used. This section describes the minimum requirements for the sign. All items furnished shall be new and shall be the latest version.

It is understood and agreed by the Contractor that equipment shall be complete and shall include all items necessary for the proper functioning of the DMS System. All DMS local controllers shall be Ethernet connectible without any additional upgrades or expense to the Department. Even though every item necessary may not be specifically mentioned or described, the Contractor is responsible for constructing a complete and functioning sign system. Any additional items that are required to make the sign system perform properly but which are not mentioned herein shall be supplied and furnished by the Contractor at no additional charge. Structures for the DMS should be included with the DMS for bidding and payment. Fiber optic cable and Equipment from sign to Controller shall be single mode or multimode fiber and equipment. Fiber terminations and splicing shall be in accordance to the Furnish and Install Fiber Interconnect Centers and Closures Section 1 and 2. Fiber optic cable shall meet the specifications for Furnish and Install Fiber optic Drop cable. DMS signs shall be LedStar VMS-68R6-3X21 Full Matrix Capable and Daktronics or approved equal. If structure is to span a cross both directions of roadway, the structure shall be designed for a load rating sufficient for installing one sign in each direction. Catwalks for bridge structures, cantilever, and any other shall extend from sign to vertical up right.

1. General

The sign display shall only consist of LED illumination technology.

Remote RS232 port shall be provided in the DMS housing to access the local port of the DMS controller.

Displays shall be three (3) lines of 18" characters, 21 characters per line.

Displays shall be readable from a distance of 900 feet.

Sign display and all components will be housed in a waterproof walk-in enclosure.

a. LIGHT EMITTING DIODES (LED)

LEDs shall be untinted, non-diffused, high-output, solid state lamps utilizing indium aluminum gallium phosphide (ALInGAP) LED technology, manufactured by Avago or equal.

LEDs shall emit a true amber color at a wavelength of 592 nm (± 4 nm).

LED size shall be T-1 $\frac{3}{4}$ (5mm).

LEDs shall be nominally rated for 100,000 hours of operation under field conditions, which shall include operating temperatures between -22° and +185°F.

LEDs shall have a 15° - 17° viewing angle and shall all be of the same degree viewing angle and manufacturer for all signs.

LEDs shall have no less than 50% of the normalized intensity at their 15° viewing angles.

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LEDs shall be soldered to circuit boards with through-hole type circuit board mounting.

Surface mounting of LEDs will not be allowed.

b. PIXELS

Each light-emitting pixel of an LED display shall consist of a cluster of closely spaced LEDs.

Pixels shall be constructed with strings of LEDs. The number of LEDs in each string shall be determined by the manufacturer, as necessary to produce the candela requirement as stated herein.

LED pixels shall produce the luminous intensity levels required herein at a drive current of 20 mA per string with a forward voltage drop not to exceed 24 VDC. The LED drive current shall be adjustable up to, but not exceed, 30 mA per string.

Each pixel shall produce a luminous intensity of 40Cd when driven with a LED drive current of 20 mA per string.

LED pixels shall be driven with direct-drive pulse width modulation. Maximum pulse amplitude shall not exceed 30 mA.

Materials used in the fabrication of LED clusters shall contain UV light inhibitors and shall be designed for direct exposure to sunlight.

Each LED pixel shall be rated for outdoor use over the environmental range expected for the sign locations (including heat absorption due to sunlight).

LED pixels shall be attached to the display panel with a secure fastening system.

LED pixels shall be mounted perpendicular to the display panel.

Visors shall be installed above each pixel or row of pixels for maximum contrast and legibility without interference to the LED display. Alternate methods may be utilized upon approval of the Engineer. The Contractor shall submit complete descriptive literature to the Engineer to substantiate an alternate method.

LED pixels shall be replaceable either individually or in groupings. Groupings with three (3) or more pixels shall be permitted only if bench level repairs and replacements to individual pixels are possible.

Pixels shall be replaceable from the inside of the walk-in display. Clusters and modules shall be interchangeable between signs employing the same display technology.

Characters formed by the DMS displays shall have a minimum of seven (7) pixels in height. The number of pixels making up the character width shall vary by the operator. The horizontal spacing between pixels shall be equal to the vertical spacing between pixels. From the center of the last column of pixels in one module to the center of the first column of pixels in the adjacent module shall equal the spacing between pixels in the same modules.

Character display shall be all upper case letters, all punctuation marks, all numerals 0 to 9, and special user characters such as #, &, *, +, <, >.

c. MODULES

All modules shall consist of pixels arranged by forming a column of seven (7) pixels high by five (5) rows wide. The vertical and horizontal spacing from center of pixel to center of pixel shall be equal. The spacing shall be such that seven (7) pixels high shall form 18" characters. Modules shall be interchangeable among all signs in this project. Modules shall be easily removable for service/replacement with simple hand tools from inside the walk-in enclosure.

d. TEMPERATURE SENSOR

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Adjustable temperature sensors to monitor the interior temperature of the DMS enclosure are required. Sensor parameters shall be adjustable by commands from the central, local, or laptop computers to activate/deactivate the fans and heaters. Sensor operating range shall be from +40°F to +150° F. When the temperature in the enclosure reaches +140 degrees F, the local controller will be prompted and when the temperature goes back down to +100 degrees F, the local controller will be prompted again.

e. DRIVER BOARDS

LED driver boards shall be in the DMS housings for all signs. Plug-in locking connectors shall be provided on each driver board for all connections. Connectors shall be held in place with screws. Driver boards shall be easily removable for service/replacement with simple hand tools. Driver boards shall control a single 5X7 LED module. Driver boards and all electronic circuit boards installed in the DMS housing shall be thoroughly coated with an acrylic coating for moisture-resistance. **Each driver board shall have an on-board microprocessor capable on internal diagnostics, LED current measurement and adjustment.**

f. Photo-Electric Sensors

Three (3) commercially available, watertight and dust-proof photoelectric sensors shall be mounted on the enclosure or structure in a position where a technician can easily access them for repair or maintenance. The sensors shall be automatically adjustable by the software for the DMS System or manually set, to a minimum of seven (7) levels. The sensor will be positioned so that front, rear and ambient lighting levels can be detected.

g. Power Supplies

Power supplies shall operate from 120 VAC power. The LED displays shall be operated at low internal DC voltage not exceeding 24 VDC. Power supplies shall be solid state transformer type regulated output. Electronic switching type power supplies will not be allowed. Signs shall be powered with one supply for each 1/3 of the display. Power supplies shall be wired in a redundant configuration such that failure of any supply shall result in a backup supply providing power. The backup power supply shall be rated such that it can operate the entire LED section under full load conditions. Power supplies shall operate from -22o to +185o F. Power supplies shall be short circuit protected by DC power off. Power supplies shall also be protected by a minimum overload allowance of 105% and have an efficiency rating of at least 75%.

h. Sign Face Coverings

Signs shall have polycarbonate sign face coverings. Coverings shall be weather tight, ultraviolet protected, non-diffusing, polycarbonate, with anti-reflective coating and a minimum ¼ inch thick. Sign face shall be designed to minimize bowing. Sign face cover panels shall be installed and removed using simple hand tools.

i. Walk-In Housing

Sign housing, framing, and mounting members shall be designed to withstand a wind velocity in accordance with *AASHTO's Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals* and PE certified. The DMS should be constructed with a metal walk-in enclosure excluding the face and the enclosure of welded aluminum type 6061-T6, 5052-H38, 5052-H38, 5052-H34 or of an Engineer approved alternate at least 1/8" thick. The seams should be continuously welded using an inert gas process and all welds should be ensured to be solid with no cracks or blowholes. The housing should be constructed with a maintenance-free clear aluminum finish, with the exception of the front of the housing, which will be painted matte black. A complete description of the painting process, along with a sample of the finish on a 12" x 12" sheet of the same type of aluminum that is used to construct the DMS enclosure, should be submitted to the Engineer for approval. The enclosure should be

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designed and constructed to resist torsion twist and warp, present a clean and neat appearance, and protect the equipment within from moisture, dust and corrosion. The interior surfaces of the enclosure should be painted with a dull black enamel to reduce internal reflection.

Lifting eyes or the equivalent shall be provided for moving and mounting signs. DMS housings shall be designed such that the DMS can be shipped and temporarily stored, without damage or undue stress, prior to installation on the overhead support structure. The DMS shall be shipped with a temporary wood support frame that will permit the storage of the DMS in a vertical position without damage to the sign housing. The DMS shall be furnished with all required hardware for attachment on overhead sign structures. The attachment devices will be of a type where the sign face can be adjusted +/- 3 degrees vertically and horizontally once installed. The Contractor can propose an alternate method of sign face tilt to be approved by the Engineer.

The requisite dimensions will determine the height and length of the sign enclosure. The sign will consist of three (3) lines of copy, with 21 18-inch high characters per line and a minimum of one-half the letter height distance between lines. The border will be a minimum of 12 inches on all sides of the active display area.

The minimum height of the interior, from the top of the walkway to the lowest framing member or other obstruction shall be 72 inches. The minimum distance from the interior rear wall of the DMS housing to the closest display component shall be 36 inches. This free space shall be maintained across the entire interior of the sign housing. Structural members shall be designed and positioned so as to not be an obstruction to free movement by maintenance technicians throughout the 72-inch height of the housing interior. A level walkway shall be installed in the bottom of the DMS housing for maintenance personnel to walk. This walkway shall be a minimum of 24" wide and shall run the entire length of the sign. The walkway's top surface shall be non-slip and free of obstructions that would present a tripping hazard to maintenance personnel.

All DMS equipment, components, modular assemblies, and other materials located in the DMS housing shall be removable, transportable, and capable of being installed by a single technician. Structural members and components thereof are not included in this requirement. The DMS housing shall be constructed so that all maintenance and repair is performed from within the DMS housing, except for the sign face, necessary external repairs, and any miscellaneous devices required to be installed on the outside of the housing.

Housings shall have interior, non-corrosive, metal cage support frames to mount the display clusters. The cage support frames shall be designed to withstand and minimize vibration effects to the display and/or electronics.

Doors shall be installed on one or both sides of the housing and shall open to the outside and to the rear of the DMS housing. DMS housing doors shall be watertight/dust-proof doors with minimum doorway opening dimensions of six (6) feet high by two (2) feet wide. Doors shall be provided with continuous stainless steel hinges. A four (4) inch kick plate shall be provided at the base of both DMS door openings above the internal walkway. DMS housing doors shall have a stop to retain the door open at the full position. The DMS housing door shall be furnished with a door lock that is keyed. All locks shall be keyed alike, and the Contractor will furnish the Engineer with five (5) keys per DMS. The latching/locking mechanism shall include a handle on the interior of the housing so that a person with no key or tools could not become trapped inside the housing. A metal pocket will be provided on the inside of the door of sufficient size to hold documents relating to the sign, such as wiring diagrams, instructions and specifications. One of the door openings will require removable rails on the inside of the housing. Rails shall be installed horizontally and spaced vertically every 12 inches to a height of 48 inches above the internal walkway. When installed the side rails will not interfere with the operation of interior handle on the door. The rail size

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shall be as required to conform to OSHA and all other applicable regulations. Rails shall be attached to the sign housing with stainless steel hardware and designed for removal with simple hand tools. The Department will advise the Contractor prior to installation on which end the rails will be required.

Fans or other forced air devices of sufficient size to circulate air through the interior of the enclosure for maintenance personnel shall be provided. Fans shall be provided to maintain operating temperature for all equipment in the sign. A minimum of two exhaust fans shall be provided to ventilate the enclosure. A separate set of fans shall be used to provide airflow over the LED's and the entire sign face. The Contractor shall provide copies of applicable regulations dealing with personnel ventilation systems and proof of compliance with each requirement. An adjustable timer that will deactivate fans after the set time has expired shall control the maintenance personnel ventilation system. The timer shall be adjustable up to at least four (4) hours and shall be located just inside the DMS housing door, within easy reach for a maintenance technician, and without having to enter the DMS housing.

The DMS housing shall include 15 AMP, 120 VAC duplex electrical outlets, with ground fault circuit interrupters, for use by maintenance personnel. A minimum of two (2) duplex outlets, one at each end of the enclosure, shall be located within the DMS enclosure. Additional duplex electrical outlets may be required so that there is a maximum of 12-feet between outlets.

The walk-in housing shall contain enough internal fluorescent lighting to provide maintenance personnel with a minimum of 240 watts of evenly distributed lighting. Ballast shall be rated for operation in zero degree temperatures. There shall be a protected cover over the lamps. Two (2) three-way switches shall control the interior lighting system and shall be located just inside the DMS enclosure, at both ends, within easy reach from outside the enclosure through each door opening.

Signs shall contain a minimum of three (3) thermostatically controlled fans and electric heating elements (if required by manufacture) to prevent condensation on the inside of the display windows. Electric heating elements are needed if required by the manufacture to prevent condensation. Adjustable thermostat on/off parameters for the control of the fans and electric heaters for the display window shall be adjustable from the local or central computers. Fans shall be designed to provide the cubic feet per minute (CFM) required to properly remove condensation on the inside of the display window. Cooling fans shall be located behind the display modules and shall blow air directly on the back of the LED pixels. Fans shall be designed to properly cool the enclosure and display modules. Heaters shall operate from a 240-volt, 60 Hz, single-phase AC power. Fans shall operate from 120-volt, 60-Hz, single-phase AC power. Vents for fan intake and exhaust shall be weatherproof in design. Filters shall be sized so that standard "off-the-shelf" filters will fit. Filters shall be installed and removed from inside the walk-in enclosure.

j. Local Controller

Each sign installation shall include an associated controller installed in a ground-mounted cabinet on a concrete base at the location shown on the plans. **The local controller shall be operated by the Departments existing DMS control software (LEDMASTER), or its existing VIKON software. The successful contractor must include integration of the signs with one of the above software packages in his bid.** The controller shall be orientated so that a technician working at the controller can easily see the message displayed on the DMS. DMS sign cabinet shall be **installed as shown on plans or on upright of structure, face cabinet as directed by ITS Field Operations Manager.** The DMS local controller will include all necessary cabling, conduit, terminal blocks to connect the DMS to the local controller, and devices required for Ethernet network connection and dial-up phone connections to a central controller. Each DMS local controller will have its own unique address for communications. The controller cabinet assembly shall be a LedStar Model

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CAS36A03R11 or ACAS74A01R10 or approved equal. The 332 or 336 cabinets shall meet the Furnish and Install 332 Cabinet Specifications for this project. The controller cabinet will include (but not be limited to) the following:

- Power supply and distribution with back panel.
- Power line surge protection devices, UPS system and local disconnect.
- Communication surge protection devices.
- Microprocessor-based controller, menu driven, with software integrated with SCDOT's software.
- Lamp driver and control system (unless integral to the DMS).
- Communication interface with modem and serial port for dial-up operation to the central controller.
- Serial port for laptop computer connection with a three (3) foot connector cord to allow operation of the laptop outside the cabinet.
- Local control panel with remote/local control switch.
- Adjustable shelves as required for components.
- Interior lighting and duplex receptacle.
- Interior ventilation.
- All interconnect harnesses, connectors, and terminal blocks.
- All necessary installation and mounting hardware.
- Communications from the local controller to the sign shall be over single mode or multimode fiber optic cable. The fiber cable and transceivers shall meet the specifications for those components spelled out in their respective specifications in this contract. The single mode fiber optic transceivers shall be Optelecom 9245 or equal.

The DMS controller and associated equipment will be housed in a NEMA 3R cabinet made of 5052-H32 sheet aluminum at least 1/8" thick. All seams will be welded with continuous solid welds. The cabinet shall be sized to house all equipment plus 20% vacant space for future equipment requirements. The cabinet shall be a Caltrans specified 332 cabinet shell (see Install 332 cabinet specifications).

k. Central Controller

Deleted for this project.

l. Sign Structures

The contractor is responsible for the design, manufacture and construction of each sign structure needed for the DMS. Each structure that spans a cross both directions of road way shall be designed to handle one sign in each direction. Catwalks for bridge structures, cantilever, and any other shall extend from sign to vertical up right. Each structure shall be made part of the bid item for the DMS. Reference is made to SCDOT's Signing Specifications. The Contractor must perform all cross-sections as outlined in the Signing Specifications. Overhead structures which are fabricated incorrectly and do not fit the specific location shall be replaced by the Contractor at no additional cost to the Department. Alterations that involve cutting or welding or any procedure which will damage the factory-applied protective finish of the posts will not be allowed after the structures are fabricated.

SUBMISSION OF REQUIRED DESIGN INFORMATION AND DESIGN DRAWINGS:

It is essential that the signing contractor make all required design submissions within 90 days following award of this contract, except as follows:

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Section 9.103 of Signing Specifications is amended to also require that design drawings for Overhead Sign Structures and the details of footings be submitted within 90 (ninety) calendar days following award of the contract.

Section 9.104 of the Department's **SPECIFICATIONS FOR SIGNING EXPRESSWAYS AND FREEWAYS** is revised to require that the independent registered Professional Engineer who checks the designs for the overhead structures and footings be licensed by the State of South Carolina.

2. OVERHEAD SIGN STRUCTURE DESIGN

Section 9.101 of the Signing Specification is amended to require stiffener plates between the base plate of all cantilever structures and the upright. The plates should be equally spaced about the base plate between the anchor bolt holes. All structures shall have at least six (6) anchor bolts per base plate. Also, the Contractor shall provide direct bolted connections of the sign to the structure sign hangers at the top and bottom of the signs. This shall be provided at all four corners of the sign. The top hole on each hanger shall be slotted to provide for adjustment.

Soil borings are not provided for the locations of the new Overhead Structures. The Contractor will be responsible for obtaining subsurface investigation data at the locations of the overhead structures shown in the plans for the purpose of overhead structure footing design. **Special Note: Footings shall be designed using a maximum allowable toe pressure of 2000 pounds per square foot.**

a. System Maintenance

The Contractor will be responsible for all routine or preventive maintenance, repair (up to and including replacement) of defective parts, and any operating costs of the DMS System until final acceptance of the project. Any repair or replacement will be performed within twenty-four (24) hours of discovery or notification of a non-working piece of equipment or part.

The Engineer will have the option of placing individual DMS Systems in operation before the complete system is operational. This will not constitute acceptance of the individual DMS System nor relieve the Contractor of maintenance or operating costs for the individual DMS System.

b. Warranties

The Contractor will warrant all equipment, devices, and components provided for this project from defects in workmanship for a period of five (5) years from the final acceptance date.

c. Training

The Contractor will be required to furnish training for the operation and maintenance of the equipment installed on this contract. The training will consist of classroom and "hands-on" training. **Training will be furnished as part of the DMS bid item with no additional cost to the Department.**

The classroom training will consist of 16 hours of classroom instruction for the operators of the system and will include written instruction in the form of a notebook of operating procedures for all functions of the DMS System. This includes, but is not limited to, the operations required when polling signs for diagnostics, adding messages, changing a message, paging or flashing messages on the DMS, and diagnostics of the local controller.

The maintenance training will consist of a notebook of all preventive maintenance requirements for all equipment, devices, and components of the DMS System. In addition, the Contractor will furnish personnel to work with SCDOT maintainers of the DMS System during the construction period for any sign systems placed in operation, and for a period of six (6) months from the date of final acceptance. This person will be required to report to the central location of the SCDOT maintenance personnel daily

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and accompany the SCDOT maintenance person as he performs routine preventive maintenance and emergency repairs, offering instructions and assistance. The Contractor person will also be on call twenty-four (24) hours a day, seven (7) days a week, for emergencies. This person is expected to be located within thirty (30) minutes of the project for emergency calls.

d. DMS Spare Parts

As part of the contract bid for DMS, at the time of final acceptance of the project, the Contractor shall furnish to the SCDOT the following for use as spare parts. These parts will be new.

Ten (10) spare Pixel Ten (10) spare Driver Card

Ten (10) spare sign controllers Five (5) spare power units

Ten (10) spare Ground Controller with Ethernet 10/100 port Five (5) ITS Cabinet for DMS includes Controller Five (5) Optelecom 9245DT and 9245DR Sets(single mode)

Ten (10) Temperature Sensor Ten (10) Photo Sensor

e. Controller Functions

The local controller shall respond to the following basic command types. The commands can come from the central controller or the laptop controller in the field. The DMS controller shall be NTCIP compliant. Remote RS232 port shall be provided in the DMS housing to access the local port of the DMS controller. **All Controllers shall be Ethernet IP compatible without any additional upgrades or firmware.**

- 1) Blank sign
- 2) Display message
- 3) Report status of DMS displays
- 4) Execute sign test
- 5) Reset

The local controller will automatically report the following by initiating a phone call to the central computer. If the central computer's line is busy, the sign controller will keep trying until it gets through.

- 6) Loss of AC power to the DMS.
- 7) Restoration of AC power to the DMS.
- 8) Loss of communication to the DMS.
- 9) The inability of the DMS to respond to a command from the local controller or the local controller cannot respond to a command from the central or laptop controller.
- 10) The failure of any pixel or module to operate when required and the identification of which pixel or module has failed.
- 11) The local controller software will be programmed to produce a report once every twenty-four (24) hours, by time of day and duration, of the messages displayed on the DMS, any pixel outage, any power outages, and any errors experienced by the DMS. This report can be automatic or manual, at the discretion of the operator.

The local controller will, when polled from the central or laptop, respond to the following:

- 12) Message being displayed
- 13) Temperature inside the sign housing
- 14) Status of all components

- 15) Any error messages

CATALOG CUTS ARE REQUIRED

X. FURNISH AND INSTALL WOOD POLES

DESCRIPTION - This work consists of furnishing and installing CCA treated wood poles for electric services or in this project for overhead fiber installation, of the types and sizes shown on the Plans, in accordance with these Specifications, and in close conformity with the lines shown on the Plans, or as established by the Engineer. Each wood pole installation shall include all related overhead and underground hardware, and back guy assemblies.

1. Materials

Materials used shall meet the following requirements.

a. Wood Pole

1) Wood

Each pole shall be Southern Yellow Pine that is cut, stored, seasoned, and manufactured in accordance with specification ANSI 05, 1-19-79. Prohibited defects include: red heart, shakes in the tops of poles, short crooks, double-sweep, splits or through-checks, nails & spikes, and excessive knots. Scars shall not be deeper than 2.5 cm (1 inch), nor longer than one (1) metre (3 feet). Poles shall not have excessive butt-swell, nor more than one twist per pole length. Sweep in two planes is prohibited.

2) Straightness

All poles shall be straight to the extent that a line drawn from the center of the butt end, to the center of the tip end shall lie within the middle two-thirds of the body of the pole at all points. Poles shall also be free from short crooks, in which the surface deviation from straightness in any 1.5 metres (5 feet) of length, exceeds 38 mm (1.5 inches) at any location, as determined by a straight edge.

3) Treatment

Each pole shall be prepared and pressure-treated in accordance with American Wood Preservers Association (AWPA) Standards C1, C3, C4, and M1. Treatment shall be "SALT TREATED", CCA- CHROMATED COPPER ARSENATE, and shall conform to AWPA Standard P5. The retention of the treatment shall be tested in accordance with AWPA Standard M2. The minimum penetration shall be 7.6 cm (3 inches), or 90 percent of the sap-wood. The retention shall be at least 9.6 kgs per cubic metre (0.60 POUNDS PER CUBIC FOOT), as determined by AWPA Standards.

4) Size

POLE SHALL BE CLASS II 35 FEET OR 40 FEET CLASS V 25 FEET (for service feed only) as stated on the Plans.

5) Brand

Each pole shall have a "brand" 3.6 metres (12 feet) above the butt-end, showing the Manufacturer, Plant-location with month and year of treatment, "Southern Pine CCA 0.60 (9.8)", and the Pole Class and Length. A Metal Tag showing Pole Length and Class shall be fixed to the butt-end; and the Length and Class shall be stamped on the top-end.

6) Inspection

Each pole shall have the "Brand Mark" of an inspection-company that has been approved by the Department.

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b. Back-Guy Anchor

Wood Poles require the installation of one-or-more back-guy cable assemblies, as needed. (See BACK-GUY.) The installation shall be made in accordance with the Installation Details, or the Standards.

c. Ground Wire

Each pole shall be grounded in accordance with the Installation Details or the Standards. A No. 6 AWG, SOLID, bare-copper ground wire (ASTM B2) shall run the length of wooden poles, and extend 15 cm (6 inches) above the top end.

d. Ground Rod

The Ground Rod shall be copper-clad, conforming to RUS 13, having a minimum size of 1.6 CM DIAMETER BY 2.4 METRES IN LENGTH (5/8 inch by (8 feet). A ground rod clamp shall also be used (heavy duty bronze or brass).

2. Construction

a. Location

The general location of each pole is shown on the Plans. The Contractor shall determine the final location of the pole, which shall be approved by the Engineer. Consideration shall be given to the property lines, underground utilities, and overhead clearances (including the guy anchor assembly).

b. Hole

A hole shall be drilled TWO METRES (6 feet) DEEP, or as shown on the Plans. The diameter shall be larger than the pole by approximately 10 cm (4 inches) all around. The hole shall be of uniform diameter, and cleanly augured.

c. Sidewalk

When the pole is installed in a side walk, then the hole shall be cleanly cut 15 cm (6 inches) larger than the pole on all sides. After installation of the pole, and back filling the hole, then expansion joint material shall be placed around the pole, and tacked in place. Conduit running to the pole shall be installed at this time, in the cut. Concrete shall be poured around the pole to a depth of 10 cm (4 inches) and neatly troweled level. This work shall be considered incidental to pole installation, unless a pay item has been established for concrete patching or side walk.

d. Installation

Poles shall be vertical, except at corners, where they shall be RAKED away from the strain, 5 to 10 cm (2 to 4 inches) per 3 metre (10 feet) length. Back guy assemblies shall be installed in line with the strain of each span wire. After installing, the hole shall be back-filled with clean earth or sand (no rocks or debris), placed in 30 cm (1 foot) layers; each layer moistened and compacted. Excess earth shall be removed from the site. (A 5 cm (2 inch) mound around the pole base is acceptable.)

e. Utility Poles

Where poles are to be used for joint-use UTILITIES, they shall be installed in accordance with all local codes, and with the requirements of the Utility Company. Cross Arms shall be provided if required by the Utility Company.

f. Grounding

Each pole shall have a No. 6 Bare SOLID copper ground wire running the entire length. The ground wire shall be securely attached and bonded while the wood pole is laying on the ground. It shall extend 15 cm (6 inches) above the top end, have a 60 cm (2 foot) coil (slack) at the top end, and extend down to the bottom, and have another 60 cm (2 foot) coil on the bottom end. The ground wire (and the coils) shall be attached using galvanized 30 mm (1-1/2 inch) wire staples, on 60 cm (2 foot) centers above 3

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metres (14 feet), and on 30 cm (1 foot) centers below 3 metres (14 feet). (The spacing change will be at 2.4 metres (8 feet) above grade.)

g. Ground Rod

One wood pole at each intersection shall have a GROUND ROD. Usually this would be the pole having the electrical service from the Power Company. The ground rod shall be driven vertically into the earth, until it extends about 5 cm (2 inches) above local grade. Then a separate No. 6 AWG bare, STRANDED copper wire shall be used to bond the electrical service and the overhead cable (and pole ground wire) system to the ground rod, using a grounding clamp.

h. Back Guying

Wood poles used to support service wire could require back guying, especially at turns. (See BACK- GUY.) It is the responsibility of the Contractor to install sufficient numbers of back guy assemblies, to insure the stability of wood pole installations. This may include: double-guying; extra large anchors; or Re- guying Utility Company poles. The Contractor shall inform the Engineer when additional back guy assemblies are required. When the back guy is installed in a side walk, then the procedures of paragraph 2.3 above shall be followed.

3. ACCEPTANCE

Acceptance of each wood pole shall include checking for the pressure-treatment inspection company Brand Mark, plus visual inspection by the Engineer. The visual inspection shall be made of the pole, overhead cables, grounding, and back guy assembly. The complete installation shall be structurally sound, and the final pole placement shall be vertical, or raked as specified. Poles NOT meeting this inspection, shall be replaced by the Contractor, without further cost to the project.

CATALOG CUTS ARE REQUIRED

Y. FURNISH AND INSTALL STEEL CABLE

DESCRIPTION – This work shall consist of furnishing and installing splice-free lengths of Steel Cable with cable supports, installing back guys, etc., at locations shown on the Plans or as established by the Engineer.

1. Materials

Materials shall meet requirements listed below:

a. Fabrication

Steel Cable shall be fabricated of seven (7) steel wires, Class A double galvanized in accordance with ASTM A-475, and twisted into a single concentric strand to conform with the following schedule:

Diameter mm	(inches)	Strand Size (AWG)	Tensile Strength	
			Newtons	(pounds)
6.35	(1/4)	14	14,011	(3,150)
9.53	(3/8)	11	30,913	(6,950)

b. Usage

1) Span Wire

All Steel Cable used as span wire shall be 9.53 mm (3/8 inch) in diameter, unless otherwise noted on the Plans.

2) Messenger Wire

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All Steel Cable used as messenger shall be 6.35 mm (1/4 inch) in diameter, unless otherwise noted on the Plans.

3) Tether Wire

All Steel Cable used as tether wire shall be 6.35 mm (1/4 inch) in diameter, unless otherwise noted on the Plans.

4) Back Guy

All Steel Cable used for back guying shall be 9.53 mm (3/8 inch) in diameter, unless noted otherwise on the Plans.

c. Cable Supports

1) Aluminum Tie-wrap

Shall be Flat Aluminum Armor Tape, 1.2 mm (0.05") Thick X 7.6 mm (0.30") Wide, typically furnished in 4.5 kg (10 pound) coils.

2) Where specifically required, Support Rings (also called "cable rings", "messenger rings") shall be galvanized in accordance with ASTM A-153, and the design approved by the Engineer, and shall be 3 to 8 cm (2 to 3 inches) in diameter (to contain the Electrical Cables), and sized to specifically match the Steel Cable.

d. Miscellaneous Hardware

1) All hardware and fittings shall be of the type shown on the Standards or the Construction and Installations Details.

2) All hardware and fittings shall be made of galvanized steel or non-corrosive metal. The tensile strength of all hardware shall be equal-to or greater-than the Steel Cable installed.

3) All oval eye-bolts used to connect the automatic compression dead-end clamps to wooden poles, shall be 1.9 cm (3/4 inch) diameter. S-hooks shall be the same diameter as the cable. Fiberglass insulators shall be fabricated from epoxy-resin impregnated fiberglass strands, and have a ten-sile strength fifty (50%) percent greater than the Steel Cable.

2. Certification

The Bidder shall provide a Certification from the Manufacturer or Vendor, that the Steel Cable has been tested to meet or exceed the required tensile strength.

3. Construction Methods

a. Span Wire

1) General

All Span Wire shall be installed as shown the Standards, or on the Construction and Installation Details. Note that different methods and materials are required for Wood Poles and Steel Poles.

a) Before erecting the Span Wire, the Contractor shall determine the length of cable required to span the distance indicated on the Plans. Sufficient additional length shall be allowed to compensate for sag, pole connections, and adjustments, to make the whole assembly consistent with the Design Details, or the Standards. NO MID-SPAN SPLICES SHALL BE PERMITTED.

b) The Contractor shall set the Span Wire so that the height of the installed signal heads, including all hardware, shall conform to the clearances shown on the Design Details or the Standards, or as directed by the Engineer.

c) The Span Wire shall not be permanently "tied-off" until all signal heads,

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

signs, and cables are in place.

- d) The Contractor shall not erect any Span Wire which lays on, or is likely to rub a Utility Company's cable. If a Span Wire, as erected, is within 15 cm (6 inches) of any other cable, wire, or structure, it shall be protected with plastic wire-guards.
- e) When required by the Utility Company, or by the applicable electrical Code, strain- type fiberglass insulators shall be installed.

2) Cables from STEEL POLES

Steel Poles are essentially electrical conductors.

- a) A Roller Type Pole Clamp shall be used, attached at the proper height.
- b) The free-end of the cable shall be secured with a 15 cm (6 inch) galvanized steel clamp, with 16 mm (5/8 inch) galvanized bolts. The clamp shall be placed approximately 30 cm (1 foot) from the pole. Cable-grips are not permitted.
- c) The ends of the cable shall be covered with "servisleeves" to prevent unraveling.
- d) The SAG shall be THREE (3%), TO FIVE (5%) PERCENT, fully loaded.

3) Cables from WOODEN POLES

Wooden poles are essentially electrical insulators, and thus require extensive GROUNDING and BONDING procedures, as shown on the Construction and Installation Details, and the Standards.

- a) The SAG shall be typically FIVE (5%) PERCENT, fully loaded.
- b) The height of attachment shall be sufficient to provide the required road-clearance, including sag.
- c) Shall be installed in accordance with the requirements of the Utility Company.
- d) May require the installation of a back guy assembly as required in FURNISH AND INSTALL BACK GUY
- e) Shall be electrically bonded.

b. Messenger Wire

- 1) Where Messenger Wire is attached to traffic signal poles, it shall be installed in the same manner as specified for span wire, but with relatively little sag.
- 2) Where Messenger Wire is attached to utility poles, it shall be installed in accordance with the UTILITY COMPANY'S SPECIFICATIONS.

c. Tether Wire

Where Steel Cable is specified to tether signal heads and/or traffic signs, it shall be installed as indicated on the Construction Details, or Standards. Generally, galvanized S-hooks should be used at the pole ends to permit "break-away" action.

d. Back Guy

See FURNISH AND INSTALL WOOD POLES. See FURNISH AND INSTALL BACK GUY. See the CONSTRUCTION AND INSTALLATION DETAILS.

e. Cable Supports

- 1) Cable supports shall be used to support electrical cables from span wire and messenger wire. Cable Supports shall be spaced at 25 CM (10 INCH) INTERVALS.

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

- 2) When Aluminum Tie-Wraps are used, they shall be installed by wrapping 3-full turns TIGHTLY around the bundle formed by the steel cable and all electrical cables, then cutting off from the tape coil.

Z. FURNISH AND INSTALL BACK GUYS

DESCRIPTION – This work consists of furnishing and installing Back-Guy cable assemblies to secure wood poles, at locations shown on the Plans, and in accordance with these Specifications, and the Installation Details and Standards.

RESPONSIBILITY – It is the responsibility of the CONTRACTOR to assure that the number and size of Back-Guy assemblies is fully sufficient to anchor every wood pole, corner messenger cable pole, and Utility Company pole (where required).

1. Materials

Materials used shall meet the following requirements:

a. Assembly

From the top-down, a Back-Guy Assembly shall consist of: eye-type thru-bolt, guy-hook, strandvise, jumper-bonding clamp, the steel cable (10 mm (3/8-inch) guy-cable stranded), another strandvise, and a Screw-type guy anchor.

b. Rust Proof

All parts shall be as shown on the Installation Details or the Standards. All hardware shall be hot-dip galvanized in accordance with ASTM Standard A-153.

c. Parts List

Acceptable parts are listed below:

- 1) Guy Anchors – One piece screw type guy-anchors, shall conform to EEI-TD-2, 25 mm (1 in.) diameter, 2.4 METRES (8 FEET) LONG, thimble eye type. (Joslyn No. J-6550-WCA or approved equal)
- 2) Guy Guards shall be Joslyn J5518 or approved equal yellow plastic (PVC) sunlight resistant, 2.4 metres (8 ft.) long.
- 3) Spool Insulators shall be a Joslyn J101 or approved equal.
- 4) Neutral Spool bracket (Clevises) shall be a Joslyn J251 or approved equal.
- 5) Machine Bolts shall be Joslyn J8812 through J8818 or J8912 through J8918 or approved equal.
- 6) Lock washers shall be Joslyn J139 or J140 or approved equal.
- 7) Reliable Universal Strandvise (or approved equal) shall be used for guy and messenger cable deadends.
- 8) Oval Bolts shall be Joslyn J9412 through J9418 or J9512 through J9518 or approved equal.
- 9) Oval Eye Nuts shall be Joslyn J1092 or J1093 or approved equal.
- 10) Square Washers shall be Joslyn J1074 or J1078 or approved equal.
- 11) Curved Square Washers shall be Joslyn J6822 or J133 or approved equal.
- 12) Cable – SEE FURNISH & INSTALL STEEL CABLE; using the 10 MM (3/8 IN) DIAMETER CABLE SIZE.
- 13) Cable Clamps: 3-bolt clamps shall conform to EEI-TDJ-23, (100 mm (4 in.) and 150 mm (6 in.) sizes)
- 14) Nuts shall be Joslyn J8563 or J8564-1 or approved equal.

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- 15) Side-walk Bridge-over shall be Joslyn J1502 and J1501 with galvanized ridged conduit between or approved equal.
- 16) Lag Bolts shall be Joslyn J8652-1/2HH or J8754P or approved equal.
- 17) Guy Attachments (Hooks) shall be Joslyn P134AXW or approved equal.
- 18) Bonding Clamps shall be Joslyn J8300 or approved equal.

2. CONSTRUCTION

- a. A Back-Guy Assembly shall be installed:
 - 1) Where shown on the plans;
 - 2) In conjunction with installation of Steel Cable as span wire;
 - 3) In conjunction with the installation of a wooden pole;
 - 4) Where required by the Utility Company to "dress" pole to which signal equipment is attached; or, At corner/turning wood poles that are used for messenger cable runs.
- b. The installation of the wood pole, Back-Guy Assembly, and the span wire, shall have the construction staged for the safety of the motorist, pedestrian, and ITS construction worker.
- c. See WOOD POLE.
- d. **The span wire, service wire, and Back-Guy Assembly shall be stretched, adjusted, and then ADJUSTED to produce the specified amount of span wire sag, the proper clearance, and still create a nearly vertical wood pole.**
- e. The CONTRACTOR shall assure that the Back-Guy Assembly is sufficiently strong to handle the pull of all span wires. This shall include consideration of the earth/soil type into which the ground anchor is buried. The CONTRACTOR shall furnish EXTRA LARGE ANCHORS and/or MULTIPLE-ANCHOR ASSEMBLIES if needed. Special anchors shall be used for solid rock.
- f. Where a pedestrian sidewalk is adjacent to a wood pole, the CONTRACTOR shall furnish as an incidental item, a sidewalk "bridge-over" assembly.
- g. The compass angle of the Back-Guy shall be reasonably IN LINE with the strain of the overhead cable: that is, in line with each span wire. Thus most signal poles should have two (2) Back-Guys, installed at right angles to each other. The use of a single diagonal Back-Guy is generally unacceptable.
- h. The Back-Guy shall be installed (wherever possible) to provide as a minimum: rise=2 / run=1 (i.e. 2/1). For example, if the Back-Guy is attached at 8 metres (26 feet), the anchor should be at a minimum of 4 metres (13 feet) from the pole. This corresponds to an angle with the earth of about 60 degrees.
- i. All work shall be performed within the public Right of Way, and particular care shall be taken to assure that the Back-Guy does not extend into private property.
- j. The Back-Guy shall be installed where it will not interfere with traffic, giving particular attention to private driveways. Where damage is likely (say, edge of driveway), then a STEEL GUY GUARD shall be installed to protect the cable. When shown on the Plans, a CONCRETE TIRE/WHEEL STOP (curb) shall be placed at the base of the Back-Guy, anchored/pinned with 400 mm (2 ft.) pieces of reinforcement bar.
- k. NO splices shall be allowed in the steel cable.

3. INSPECTION

The Engineer shall inspect each installation of wood pole, span wire, and Back-Guy, for proper clearance, dress, and tension. At the direction of the Engineer, the CONTRACTOR shall re-install or replace improper installations, without further compensation.

CATALOG CUTS ARE REQUIRED

AA. REMOVAL SALVAGE AND DISPOSAL OF EQUIPMENT AND MATERIALS

DESCRIPTION – This item consists of the Removal and Salvage, or the Removal and Disposal of equipment and materials, during the construction of this project. Construction includes new installations, and the modification, or removal of existing ITS devices. It shall be disposed of, as stated below:

1. GENERAL

a. Removal and Salvage

These items are to be carefully removed from the job site, salvaged, and returned to the Department. The items of major equipment to be salvaged are listed on the Plans. The Contractor shall deliver, (and obtain a RECEIPT for), the salvaged equipment, to: **SCDOT Intelligent Transportation Systems Maintenance Facility ** in Columbia, SC Contact the ITS Field Operations Manager at (803)-737-0394 for deliveries.

b. Disposal

Material NOT to be salvaged, shall be removed from the job site, become the property of the Contractor; and should be properly disposed of by the Contractor, at an APPROVED LAND FILL (or material reclamation yard). Any materials designated as HAZARDOUS WASTE shall be disposed in accordance with regulations enforced by the SC Department of Health and Environmental Control (DHEC), Bureau of Solid and HAZARDOUS Waste; (803)-734-5000 for information.

c. Inspection

Removal and disposal quantities will not be measured as pay items, but shall be included in the price bid for Removal, Salvage, and Disposal. FINAL ACCEPTANCE and Final Payment will be withheld, if the Contractor has not removed unneeded equipment from the job site, and if the Contractor cannot present RECEIPTS from the Shop showing that the salvaged equipment has been delivered to the Department as specified.

d. Holes

Every hole caused by removing old equipment shall be filled THE SAME DAY. It shall be back-filled, compacted, and reseeded/sodded, to the satisfaction of the Engineer. Holes in PAVEMENT shall be cleanly side-trimmed, then brought to grade and finished with the same paving material as the adjacent pavement. Sidewalk "squares" shall be completely replaced (complete square), using forms and expansion material.

2. SPECIFIC ITEMS

a. Controllers and Cabinets

Controllers and Cabinets to be removed by the Department. Contractor to be responsible for the foundations of ground-mounted cabinets and shall be removed completely or cleared to 0.3 meters (1 ft.) below ground.

b. Cameras

Cameras units to be removed by the Department. and salvaged shall be carefully dismantled, keeping as much of the

c. Wood Poles

Wood Poles that are not utilized in the new ITS system, and are not required by other utilities, shall be removed and disposed of. Back guys, grounding systems, and miscellaneous hardware shall be disposed of.

d. Concrete Poles

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

Concrete poles shall be removed and disposed of by contractor.

e. Miscellaneous Equipment

Minor equipment shall be removed from the site and discarded. This includes steel cable, electrical cable, fiber optic cable, concrete pads, and spliceboxes/pullboxes/handboxes. Underground conduit and detector loops not utilized, shall be abandoned in place.

f. DMS and Structures

The DMS shall be carefully removed and turned in to the Department. Care shall be taken to insure the DMS sign is not damaged during removal or delivery to the ITS Field Operations Office. The structure shall be removed and disposed of by the contractor.

BB. INSTALL DEPARTMENT SUPPLIED EQUIPMENT

DESCRIPTION - This work shall consist of installing equipment that will be supplied by the department, at the locations designated on the Plans, in accordance with the appropriate Specification, and the applicable Design Detail or Standard.

1. Materials

The Plans and BID or Proposal Forms, state specifically which material will be supplied by the Department. ALL OTHER MATERIALS SHALL BE ASSUMED TO BE FURNISHED BY THE CONTRACTOR. The Contractor should refer to the appropriate "Furnish and Install ..." Specification to determine what other materials will be required to complete the installation. Those materials must be required to complete the installation. Those materials must then meet the physical Specifications stated. The Contractor shall also supply all miscellaneous materials that will result in a complete and acceptable project.

2. Certification

The Contractor shall provide certification that any material they supply for this item will meet the Specifications.

3. Guarantee

For any materials they supply, the Contractor shall furnish the Department with all warranties offered by the manufacturer as normal trade practice.

4. Construction Methods

a. General – All workmanship and construction methods shall be in accordance with the appropriate Specification and in agreement with the applicable Design Detail or Standards.

b. Example – As an example, take the BID item – "INSTALL CONTROLLER BASE-MOUNTED CABINET-- EACH". The Contractor shall then refer to the Specification titled "INSTALL CONTROLLERS AND CABINET". They shall then furnish any other necessary materials, and shall complete the work needed to result in a finished installation. The Contractor shall also refer to the Plans, and to the Design Details and Standards.

c. The Contractor is responsible for picking up the equipment to be supplied, at the ITS Field Operations Office located in Columbia SC or appropriate DOT Depot or Shop, and for providing any loading equipment and trailers required. Receiving and pick up of Department furnished items shall be scheduled 48 hours in advance with the ITS Field Operations Manager located in Columbia SC. The Specified Units shall be that stated in the "Install..." specification.

CC.SCDOT INTELLIGENT TRANSPORTATION SYSTEMS SPECIFICATIONS FOR THE REPLACEMENT OR NEW INSTALLATION OF TRAFFIC COUNTING, CLASSIFICATION OR WEIGH-IN-MOTION SYSTEMS

GENERAL DESCRIPTION

This work shall be performed by the SCDOT Intelligent Transportation Systems (ITS) Staff and the on-call ITS Maintenance/Installation Contractor. All equipment and labor will be provided by the ITS Field Operations Unit. Contact the ITS Field Operations Manager located at 1408 Shop Rd. Columbia, SC 29201, Phone: (803) 737-1163 for cost estimates, scheduling, reclaiming, reinstallations, maintenance and installations.

(58) SECTION 601: PENALTY FOR VIOLATING LANE CLOSURE RESTRICTIONS:

The Contractor is advised that the Lane Closure Restrictions outlined in the Traffic Control Special Provisions will be strictly enforced. Should lane closures remain in place or not be completely removed by the time specified in the Traffic Control Special Provisions, a penalty will be assessed at the rate of **\$2,500.00 (Two Thousand Five hundred Dollars)** for each 1/4 hour interval (or any portion thereof). Should lane closures remain in place or not be completely removed for a period of longer than one hour beyond the time specified by the Traffic Control Special Provisions the penalty will increase to **\$5,000.00 (Five Thousand Dollars)** for each 1/4 hour interval (or any portion thereof).

(59) SECTION 605: PERMANENT CONSTRUCTION SIGNS:

Utility locations must be performed prior to the placement of Permanent Construction Signs. State Law requires that the location of each sign be marked with a white line in the roadway or a stake in the shoulder. The locator company will mark 25 feet on either side of the location. The responsibility for marking the sign locations prior to the contractor calling PUPS for utility locate lies with the party responsible for lines and grades on the project. If Construction Lines and Grades is a pay item, then the Prime Contractor is responsible for marking the sign location. If this is not included, it is the Department's responsibility to mark the locations.

Prior to marking the sign location, care must be taken when marking the signs to ensure that there are no obstructions or other mitigating factors that will cause the sign to be moved outside of the 50 foot utility window. Any costs associated with staking out the sign locations are considered incidental to the cost of Permanent Construction Signs.

Requests for utility locates must be specific and isolated to the sign locations if no ground disturbing activities are occurring outside of the sign placement.

(60) SECTION 610: WORK ZONE TRAFFIC CONTROL PROCEDURES:

The first sentence of Section 610.3 of the 2007 Standard Specifications is hereby revised to:

"Ensure that background color of personal protective apparel is either fluorescent Yellow-Green or fluorescent Orange-Red, and meets ANSI Standard 107-2004 National Standard for High Visibility Apparel Class 2 (or Class 3 as necessary) Performance Criteria, or latest edition."

Note #12 of Standard Drawing 610-005-00 is hereby revised to:

"During nighttime flagging operations, flaggers shall wear a Safety Vest and Safety Pants meeting ANSI Standard 107-2004 National Standard for High Visibility Apparel Class 3 Performance Criteria, or Latest Edition, and a Hardhat. The color of the apparel background material shall be either fluorescent Yellow-Green or fluorescent Orange-Red."

(61) SECTION 653: RETROREFLECTIVE SIGN POST PANELS:

Section 653 is hereby modified as follows:

A. 653.2 MATERIALS

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

Add the following paragraph:

Use retroreflective sign post panels constructed of a nonmetallic composite or 3mm aluminum composite material approved by the SCDOT covered with a 3-inch wide type III sheeting. Use sheeting that meets the requirements of Section 651.2.3. Use approved panels included on the Approved Products List For Traffic Control Devices in Work Zones.

B. 653.4.2 ERECTION

Add the following paragraph:

Mount the panel for the full length of the post from the sign to within 6 inches above the edge of the roadway. Mount panel only on post specified in the plans or special provisions. Secure the panel to the post with a minimum of 3 5/16-inch bolts and a lock washer and flat washer between post and nut, or tamper-resistant and rust-resistant screws. Use bolts, washers and nuts meeting the requirements of section 651.2.2. Provide the sheeting in the color that matches the background color of the sign except that the color for the “Yield” and “Do Not Enter” signs shall be red. Install panels to both posts, if there are two posts supporting the sign.

C. 653.5 MEASUREMENT

Replace with the following:

653.5 Measurement

The quantity for the pay item U-Section Post for Sign Support – (2 or 3)P, U-Section Post for Sign Bracing –2P or retroreflective sign post panel is the length of U-section post used for sign support or bracing or panel and is measured to the nearest 1/100 of a linear foot (LF) of the required post or panel, complete and accepted.

D. 653.6 PAYMENT

Replace with the following:

653.6 Payment

Payment for the accepted quantity for U-Section Post for Sign Support – (2or 3)P, U-Section Post for Sign Bracing –2P or Retroreflective Sign Post Panel, measured in accordance with Subsection 653.5, is determined using the contract unit bid price for the applicable pay item, and the payment includes all direct and indirect cost and expenses necessary to complete the work.

Payment is full compensation for fabricating and erecting U-section posts or braces or panels as specified or directed and includes providing mounting hardware; removing and disposing of existing signs supports, braces, and mounting hardware removed or replaced; replacing or relocating supports or braces shown on the Plans or directed by the RCE; and all other materials, labor, equipment, tools, supplies, transportation, and incidentals necessary to fulfill the requirements of the pay item in accordance with the Plans, the Specifications, and other terms of the Contract.

Pay items under this section include the following:

Item No.	Pay Item	Unit
6531205	U-SECTION POST FOR SIGN SUPPORTS – 2P	LF
6531210	U-SECTION POST FOR SIGN SUPPORTS – 3P	LF
6531215	U-SECTION POST FOR SIGN BRACING – 2P	LF
6531500	REFLECTIVE SIGN POST PANELS	LF

(62) DIVISION 700: ANTI-GRAFFITI COATING:

July 27, 2015

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

E. GENERAL

The anti-graffiti coating system shall be applied to locations as described in Exhibit 4 and in accordance with this Specification. Anti-graffiti coatings intended for use under this Specification shall be of a composition capable of preventing the adhesion of and facilitating the removal of acrylic, polyurethane, and alkyd spray paint. Use a clear, non-sacrificial anti-graffiti coating for all applications.

F. MATERIALS

All anti-graffiti coatings must possess the physical and handling characteristics that are compatible with the requirements of this Specification. Anti-graffiti coating shall be manufactured by one of the approved manufacturers listed on the most recent Qualified Product List 7, titled "Qualified Spray-On/Brush-On Surface Coatings for Concrete Finish". Contractor shall ensure that the anti-graffiti coating is compatible with the selected applied Finish Coating, if applicable.

Anti-graffiti coatings shall contain less than 5.0 lb/gal volatile organic compounds (VOC) as defined by 40 CFR Part 59, Subpart D. The manufacturer shall supply the following additional information:

- 7. Technical data sheet that includes installation instructions and graffiti removal instructions, including any solvents or other materials, as necessary. Graffiti removal must be accomplished with nonproprietary cleaners as defined in ASTM D 6578.
- 8. Certification that non-sacrificial anti-graffiti coating shall not blister, crack, check, chalk, delaminate, or exhibit a color change of more than 8 dE94 (or dE76) CIELAB units for a period of one year after installation.

Clear coating must contain a UV degradable color for inspection purposes. UV degradable color must dissipate in a reasonable time period to allow inspection but not detract from visual impact of the structure.

Additionally, submit a certification that the coating meets the following laboratory performance requirements:

Additional Laboratory Performance and Tests		
Test	Method	Limits
Graffiti Resistance	ASTM D 6578; Use identified marking materials; initial and re-cleanability; and after exposure initial and re-cleanability	Cleanability Level 1, 2, or 3
Fluid Resistance	ASTM D 1308; Paint thinner, gasoline	No blistering, discoloration, softening, or adhesion loss

G. APPLICATION

Apply an anti-graffiti coating or coating system in accordance with manufacturer's product data sheet and as specified herein, when the ambient temperature is between 40° and 90°F, and the surface temperature is between 50° and 85°F and rising.

Ensure all concrete has cured a minimum of 30 days before applying anti-graffiti coating. Do not apply coating when precipitation is expected within 12 hours of the completion of application or the relative humidity is above 88%.

H. PROTECTION OF ADJACENT SURFACES

Consider wind direction, velocity and geographic location as having a major impact on all cleaning and anti-graffiti coating operations. Use all necessary precautions to prevent cleaning and anti-graffiti coating materials from being dispersed outside the work site. If conditions are such that material is dispersed to areas where vehicles or other property may be damaged,

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

suspend operations until conditions improve and work can continue without affecting adjacent property.

Protect all surfaces not intended to be coated, which are adjacent to, or in close proximity to the surfaces to be coated, during the application of anti-graffiti coating. Clean surfaces that are to be coated, as per the manufacturer's product data sheet.

I. SURFACE PREPERATION

Prior to applying any anti-graffiti coatings, prepare all surfaces to be coated in accordance with ASTM D 4261 or ASTM D 4258 and the manufacturer's product data sheet. When the anti-graffiti coating or coating system is to be applied over an existing coating, apply a test patch (minimum area of 4 square feet) in accordance with this Specification. Allow the test patch to cure a minimum of 7 days without any defects. No time extension will be granted as a result of this test requirement.

J. BASE COAT

Apply the base coat, if part of the system, as specified by the manufacturer. Unless otherwise specified by the manufacturer, ensure the cured base coat has a minimum dry film thickness of 4.0-8.0 mils.

K. FINISH COAT

When applicable, ensure the base coat surface is clean and cured to a dry hard state according to the manufacturer's instructions before applying the finish coat. Mix finish coat and apply in accordance with the manufacturer's instructions. Ensure the cured finish coat of the two coat system has a minimum dry film thickness of 2.5-5.0 mils. Apply as many coats as necessary to provide a finish coat which is a uniform continuous film over the entire surface, free of pinholes, runs, sags, or any other deficiencies. Finish coat shall be considered "non-sacrificial".

L. CORRECTION OF DEFICIENCIES

Remove all applied anti-graffiti coatings identified by the Engineer as damaged, defective, or otherwise not meeting these Specifications, in accordance with the manufacturer's recommendations. Prepare the surface and reapply the coating in accordance with the manufacturer's recommendations and as specified herein, at no additional cost to the Department.

M. REMOVAL OF GRAFFITI BEFORE ACCEPTANCE

Remove all graffiti from areas receiving anti-graffiti coating, at no additional cost to the Department. Ensure all federal, state, and local environmental regulations are met when removing graffiti. Removal shall be in accordance with manufacturer's recommendations.

(63) SECTION 701: SAND LIGHTWEIGHT CONCRETE:

Use sand lightweight concrete, where specified in the plans, complying with the requirements of this Special Provision.

Sand lightweight concrete is composed of portland cement, fine aggregate, lightweight coarse aggregate, water, and admixtures. Provide sand lightweight concrete that complies with the applicable requirements of Section 701 of the Standard Specifications and the additional requirements herein.

At least 35 days prior to the proposed use, submit for approval a mix design from a testing laboratory accredited by the AASHTO Accreditation Program. Provide a mix that obtains a 28-day design compressive strength equal to or greater than 4000 psi and satisfies the following design criteria:

TEST	TEST METHOD	REQUIREMENT
Max. Unit Weight, plastic, lbs/ft ³	AASHTO T 121	120
Max. Unit Weight, dry, lbs/ft ³	ASTM C567 using equilibrium (air	115

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	dried) unit weight	
Min. Relative Dynamic Modulus, (percent)	AASHTO T 161 Procedure A	80

When submitting the mix design, include the source of the aggregates, cement, and admixtures and the gradation, specific gravity, and fineness modulus (fine aggregate only) of the aggregates. Submit test results showing the mix design conforms to the criteria, including the 28 day compressive strength of a minimum of six cylinders. Provide a mix design that produces an average compressive strength sufficient to ensure that a minimum strength of 4000 psi is achieved in the field.

Produce an additional mix in accordance with AASHTO M 195 to determine the drying shrinkage. The maximum drying shrinkage for this mix is 0.07%.

For lightweight coarse aggregate, use expanded shale or slate that meets the requirements of AASHTO M 195. Provide lightweight coarse aggregate that meets the gradation table below.

GRADATION OF LIGHTWEIGHT CONCRETE AGGREGATE	
Sieve Size	Passing Square Opening Sieves (Percent by Weight)
1"	100
3/4"	90-100
3/8"	10-50
No. 4	0-15

Determine the soundness in accordance with AASHTO T 104. Loss of more than 10% of the lightweight aggregate in five cycles of the accelerated soundness test using sodium sulfate is not permitted.

Ensure the lightweight aggregate will have a wear of not more than 40% when tested in accordance with AASHTO T 96.

Ensure that lightweight aggregate has an absorbed moisture content equal to the 24 hours absorption as determined by AASHTO T 84 or T 85 when it is proportioned and incorporated into the mix. Consult with the lightweight aggregate supplier regarding minimum absorption required for proper performance of aggregate in concrete mixtures.

Have a representative from the manufacturer of the lightweight aggregate attend and participate in the Pre-pour Conference and also provide technical assistance in the production of the lightweight concrete at the batch plant and/or site for the first day of lightweight concrete mixing and placement operations.

Do not use AASHTO T 152 to determine the air content. Determine air content in accordance with AASHTO T 196.

Determine the plastic density (unit weight) of lightweight concrete in accordance with AASHTO T 121. Perform density tests for acceptance of lightweight concrete after final corrections for entrained air and slump have been made. When a density test is made and the results of the test exceed the specified maximum, perform a check test immediately from the same load of concrete. If the average of the 2 test results exceeds the specified maximum density, the load is rejected.

The quantity for Sand Lightweight Concrete is the volume of specified concrete within the neat lines of the structure as shown on the Plans or as revised by the RCE and is measured by the cubic yard (CY) of concrete, complete, and accepted. Deductions are made for the volume of embedded items, except for reinforcing steel; however, no deduction is made for edge chamfers of 3/4 inch or smaller.

(64) SECTION 701: STRUCTURAL CONCRETE TABLE:

Note 4,

The first paragraph is amended as follows:

“Use Class 4000DS concrete for both drilled shaft and steel pipe pile concrete plug construction”

The second paragraph is amended as follows:

“Design the mix for Class 4000DS concrete and determine the proportions of cement, fine aggregate, coarse aggregate, water, and water reducing/ retarding admixture that produces a workable concrete mix meeting the following criteria:”

(65) SECTION 701: NON-CONFORMING CONCRETE:

For purposes of applying the reduced payment and below strength provisions of Subsection 701.2.12.4 of the Standard Specifications, a unit price of 850 dollars per cubic yard will be used for normal weight concrete and a unit price of 880 dollars per cubic yard will be used for sand lightweight concrete.

(66) SECTION 704: PRESTRESSED CORED SLABS:

Subsection 704.4.6 of the Standard Specifications is amended as follows:

- A. Delete Paragraph 2 of Subsection 704.4.6.2 and replace it with the following:
“Provide holes and recesses at locations indicated in the Shop Plans for insertion of the 1¼ -inch diameter transverse tie rods.”
- B. Delete the last sentence of Subsection 704.4.6.4 and replace it with the following:
“Make certain of the correct alignment of the holes for the transverse tie rods.”
- C. Delete Subsection 704.4.6.5 and replace it with the following:
704.4.6.5 Transverse Tie Rods

In each span, place 1¼-inch diameter transverse tie rods and tighten to a snug fit. After the 1¼-inch diameter transverse tie rods have been tightened in a span and before any equipment, material or barrier parapet is placed on the span, fill the shear keys, dowel holes, and tie rod recesses with the non-shrink grout as indicated on the Plans and allow curing for a minimum of 3 days. To prevent leakage of grout, place foam backer rod or other material acceptable to the RCE along the bottom of the joint between adjacent slab units. Ensure that the grout reaches a compressive strength of 5000 psi in 24 hours. Properly remove any foreign substance/materials including grease from the exposed portions of transverse tie rods before grouting the recesses.

With the approval of the RCE, material and equipment may be placed on the cored slab spans after the transverse tie rods have been tightened, the grout in shear keys has cured for 3 days minimum, and the grout has reached a compressive strength of 5000 psi.”

(67) SECTION 711: PILE AND DRIVING EQUIPMENT DATA FORM:

Pile and Driving Equipment Data Form is included in Attachment B.

(68) SECTION 711: GALVANIZED STEEL H PILING AND SWAY BRACES:

March 16, 1999

A. GENERAL

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

This Supplemental Specification covers the cleaning, hot dip shop galvanizing, field cleaning and field repair of galvanizing for new Steel H Bearing Piling and Steel Sway Bracing where required and detailed in the plans.

B. SURFACE PREPARATION

The coating applicator shall pre-clean the material to be galvanized in accordance with accepted methods to produce an acceptable surface for hot dip galvanizing.

C. SHOP GALVANIZING

Hot dip galvanizing of iron and structural steel shapes shall be produced utilizing lead free technology. Steel H Bearing Piling and Steel Sway Braces shall be hot dip galvanized in accordance with the latest ASTM A 123 Specification to provide a uniform minimum coating thickness of 3.5 mils (89 µm). Shop repair of coatings not meeting the above minimum thickness requirements will not be allowed.

Galvanizing practices and procedures shall protect against possible embrittlement of the steel as described in ASTM A143.

Inspection and testing of hot dip galvanized coatings shall be done under the requirements of ASTM A 123.

The coating applicator shall have available for inspection a quality assurance manual and shall submit an original and two copies of the coating applicator's notarized Certificate of Compliance that the hot dip galvanized coating meets or exceeds the specified requirements of ASTM A 123 as modified by this Specification.

Galvanized members shall be stored, protected, handled and loaded in accordance with industry standards to protect the coating.

D. SHOP INSPECTION

Inspection of galvanizing practices and procedures will be performed by the Department's Research and Materials Laboratory. As soon as the project has been awarded, the Contractor shall notify the Research and Materials Laboratory at (803) 737-6698, P. O. Box 191, Columbia, South Carolina 29202. The Contractor shall provide the name and address of the coating applicator so that the inspection arrangements can be made.

E. FIELD REPAIR OF GALVANIZING

Field repair of galvanized coatings may be used to repair damaged areas, weld areas at pile splices, weld areas at sway braces to piles or other areas of coating damage. All field repairs shall be made in accordance with ASTM A 780. The Engineer shall be the sole judge of damaged areas that require field repair of the galvanized coating.

When galvanized members are to be field welded the Contractor shall clean the area at the weld location for a distance sufficient to provide an area free of coating for the weld metal to be deposited. The Contractor's cleaning method shall be pre-approved by the Engineer and cleaned areas shall be inspected and approved prior to field welding.

F. METHOD OF MEASUREMENT

The galvanizing of Steel H Bearing Piling and Sway Braces will not be measured for payment. All cost for galvanizing shall be included in the price bid for the item galvanized.

G. BASIS OF PAYMENT

All costs for labor, materials, equipment, tools and other incidentals required to galvanize the Steel H Bearing Piling and Sway Braces shall be included in the price bid for those items. No separate payment will be made for galvanizing.

(69) SECTION 712: DRILLED SHAFT FORMS:

Drilled Shaft Forms are included on the Construction Extranet.

(70) SECTION 714: SMOOTH WALL PIPE:

A. REFERENCE

SCDOT Supplemental Technical Specification SC-M-714

B. DESCRIPTION

When bid items for smooth wall pipe are listed in the EBS file and/or proposal, the SCDOT will allow the use of reinforced concrete pipe, spiral ribbed aluminum pipe or high density polyethylene pipe in accordance with the specifications found in SC-M-714 (latest edition), the Standard Drawings, and this Special Provision. The plans may indicate reinforced concrete pipe only and are hereby superseded by this Special Provision.

C. MATERIALS

Smooth wall pipe is either Reinforced Concrete Pipe (RCP: 714-205-XX), Spiral Ribbed Aluminum Pipe (SRAP: 714-605-XX), or High Density Polyethylene pipe (HDPE: 714-705-XX) as described in SCDOT Supplemental Technical Specification SC-M-714 and in the SCDOT Standard Drawings. Use smooth wall pipe culvert from manufacturers listed on Qualified Product Lists 30, 68, or 69. No value engineering application is required in order to use alternate pipe.

For the following counties: Berkeley, Beaufort, Charleston, Colleton, Dorchester, Georgetown, Horry, and Jasper, provide pipe joints meeting AASHTO M 315 for RCP or passing the 13 psi pressure test as indicated on the QPL for SRAP or HDPE. Take care to properly lubricate and equalize pipe gaskets as indicated in the **SCDOT Standard Drawings** and **SC-M-714** to prevent gaskets from “rolling” during installation. For all other counties, provide pipe joints meeting AASHTO M 198, M 315, or passing the minimum 10 psi pressure test unless specific pipe joints are indicated in the plans or special provisions.

No other pipe type will be accepted as an alternate.

D. CONSTRUCTION REQUIREMENTS

Use only pipe that conforms to the minimum and maximum fill height limitations indicated on the appropriate standard drawing. Unless indicated otherwise in the plans, determine pipe fill height based on the following formula:

Fill Height = Elevation (top of curb or max grade above pipe) – Elevation (pipe crown)

For all locations where new pipe is being attached to an existing system, use one of the following options:

1. Any existing pipe may be extended using any acceptable alternate pipe type by using a drainage structure at the interface between the different pipe types. The drainage structure* may consist of standard junction boxes, manholes, catch basins, drop inlets, or circular drainage structures detailed on **SCDOT Standard Drawings**. For larger diameter pipe, custom drainage structures may be required. Field cut existing pipe to remove damaged joint (if applicable) and install new drainage structure at the field cut interface. Always fully clean existing pipe and pipe joints before installing joint sealant or gaskets and attaching new pipe.
2. For locations where existing pipe properties cannot be directly matched, use a custom designed interface* (concrete collar, proprietary mastic wrap, custom coupling band, etc.) appropriate to interface the existing pipe to the new pipe of the same type. Submit interface drawings and design for review by the Engineer of Record and the Design Standards Engineer. Always fully clean existing pipe and pipe joints before installing joint sealant or

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

gaskets and attaching new pipe. Replace existing pipe that has joint damage before connecting new pipe to the system.

3. Any existing pipe may be extended using new pipe with the same joint profile and wall properties of the existing pipe. Always fully clean existing pipe and pipe joints before installing joint sealant or gaskets and attaching new pipe. Verify* the following parameters before ordering new pipe:
 - a. For RCP to RCP, confirm wall thickness, joint profile shape, and compatibility with existing manufacturer's pipe. Replace existing pipe that has joint damage before connecting new pipe to the system.
 - b. For SRAP to SRAP, replace existing pipe that has joint damage before connecting new pipe to the system.
 - c. For HDPE to HDPE, confirm the manufacturer of the existing pipe and the joint compatibility with the new pipe. Provide a new gasket when connecting to existing spigot end of HDPE pipe. Replace existing pipe that has joint damage before connecting new pipe to the system.
 - d. For CAAP to CAAP, confirm the type and size of end corrugations of the pipe. When existing pipe has full helical corrugations, provide new connecting pipe with one end fully helical and fully helical coupling band. When end corrugation size does not match the corrugation size shown on SCDOT Standard Drawings, provide a drainage structure (described above) at the interface. Replace existing pipe that has joint damage before connecting new pipe to the system. Do not install CAAP as smooth wall pipe; however, use these requirements when plans specify installing new CAAP.

The **RCE** will verify that connections between existing pipe and new installed pipe have been handled with one of the options listed above. Repair or replace all existing to new joint interfaces that do not meet the requirements above at no additional cost to **SCDOT**.

In all installations, provide the RCE with a complete pipe table indicating the following: Plan Pay Item, Plan Pipe Description, Plan Quantity, Installed Pipe (diameter, type, class/gage), Installed Quantity, and description of interface used to join new pipe to existing pipe for each occurrence.

In cases where 2 or more different pipe types are installed, provide a copy of the proposed installation layout on the drainage/plan sheets to the RCE indicating which pipe is installed at each location.

E. MEASUREMENT

Measure smooth wall pipe in accordance with methods specified in SC-M-714 for the pipe material installed.

*No measurement will be made for drainage structure, designed interface, or field verification performed at each interface between existing pipe and new pipe unless drainage structure/interface is specified in the plans.

F. PAYMENT

Payment will be made for smooth wall pipe regardless of the type of material installed. Payment for smooth wall pipe is as specified in SC-M-714 for the pipe material installed.

*Include all costs for work related to connecting new pipe to existing pipe in the unit bid price of the new pipe. This connection work includes: drainage structure at the interface, custom designed interface, field verification of existing pipe and compatibility with new pipe, new gaskets, new joint sealant, new coupling bands, removal, and disposal of damaged sections of existing pipe.

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

ITEM NO.	DESCRIPTION	UNIT
7143XXX	X" SMOOTH WALL PIPE	LF
7143XXX	X"x X" SMOOTH WALL PIPE CUL.TEE	EA
714XXX	X" x X" SMOOTH WALL PIPE CUL.WYE	EA
7144XXX	X" SMOOTH WALL PIPE X DEG BEND	EA
7144XXX	SMOOTH WALL PIPE INCR.- X" TO X"	EA

(71) SECTION 714: PIPE END TREATMENTS (2/5/2010):

A. REFERENCE

SCDOT Supplemental Technical Specification SC-M-714

B. DESCRIPTION

For exposed pipe culvert ends, provide an end treatment in accordance with this special provision.

C. MATERIALS

Rigid pipe culvert is Reinforced Concrete Pipe (RCP: 714-205-00). Flexible pipe culvert is either Spiral Ribbed Aluminum Pipe (SRAP: 714-610-00), High Density Polyethylene pipe (HDPE: 714-705-00), or Corrugated Aluminum Alloy Pipe (CAAP: 714-605-00).

Use minimum Class B riprap for pipe up to 84" diameter. Use minimum Class C riprap for pipe 84" diameter or larger.

Use minimum Class 4000 concrete (4000P for precast).

Use ASTM A-706 grade 60, low-alloy steel deformed rebar.

Use minimum AASHTO M-196 Alclad 3004-H32 alloy aluminum.

Use Type M Mortar Grout unless specified otherwise.

D. CONSTRUCTION REQUIREMENTS

Use one of the following end treatments as specified in the plans or special provisions:



For all exposed crossline pipe ends, when an end treatment is not specified in the plans, use **Pipe Riprap Protection** (804-3xx-xx). For flexible pipe larger than 24" diameter, install pipe straight headwall, pipe end structure, flared end section, or wingwall section in addition to riprap. For all exposed driveway pipe ends where no end treatment is specified in the plans, use **Pipe Riprap Protection** (804-3xx-xx) unless directed otherwise by the engineer.

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS



Use **Beveling of Pipe End** (719-610-00) when specified in the plans or special provisions. Beveled ends may only be used on flexible pipe up to 24" diameter and on rigid pipe up to 60" diameter. When beveling of pipe ends is specified on flexible pipe larger than 24" diameter, install pipe straight headwall, pipe end structure, flared end section, or wingwall section. Use factory fabricated beveled ends for all pipe types unless approved by the Engineer.



Use **Pipe Straight Headwall** (719-605-00) when specified in the plans or special provisions. Use straight headwall only in locations where pipe exposed end does not face the direction of traffic.



Use **Pipe End Structure** (719-615-00) when specified in the plans or special provisions. Use pipe end structure in locations where pipe exposed end faces the direction of traffic. Pipe end structures may be used in other locations if approved by the RCE.

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS



Use **Pipe Flared End Section** when specified in the plans or special provisions.



Use **Pipe Wingwall Section** when specified in the plans or special provisions.

Completely seal interface between pipe and end treatment with grout. If bricks or shims are used to place pipe, take care to remove all air pockets and voids when grouting.

For systems not designed in the SCDOT Standard Drawings, provide shop drawings, installation procedure and design calculations for review by RCE. Design must include provision to control erosion around the structure and prevent the separation of the end treatment from the pipe system. Design must provide for a proper seal at all construction joints including the interface between the pipe and the structure. Design must be self-supporting and not induce any additional loads on the pipe. Submit designs for consideration as new standard drawings to the Design Standards Engineer at the address listed in the SCDOT Standard Drawings book.

E. MEASUREMENT

Measure pipe in accordance with SC-M-714

Measure end treatments in accordance with Standard Specifications, Standard Drawings, or Special Provisions

F. PAYMENT

Beveling of pipe ends will be in addition to the standard pipe pay item. Payment for the item Beveling of Pipe Ends includes all labor required to factory (or field, if approved) fabricate a bevel on one end of pipe.

Pipe culvert and end treatments, measured as provided in **SC-M-714 Subsection x.4**, are paid for at the contract unit price for the respective items, which price and payment is compensation for furnishing all material, labor, equipment, tools including hauling and placing all pipe sections and materials, excavation of the entire standard trench, bedding, and pipe backfill as described in the measurement section (both structural and embankment backfill in this region), removal of existing pipe to be replaced, constructing pipe joints, removal of old end treatments, cleaning out pipe, disposal of surplus materials, all visual inspection, and all incidentals necessary to complete the work.

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

Add the following paragraph to SC-M-714 subsections x.5:

Payment for riprap and geotextile for erosion control under riprap as measured in subsection x.4 includes all direct and indirect costs and expenses necessary to complete the work.

(72) SECTION 719: CAST IN PLACE CONCRETE PIPE COLLAR:

A. DESCRIPTION

A cast in place concrete pipe collar is used to provide a permanent connection between two pipe culverts of the same diameter but different joint profiles. Pipe collars can be used between two pipe of the same material or different material. Use only pipe that conforms to SC-M-714, Permanent Pipe Culverts.

B. MATERIAL

Use minimum class 4000 concrete.

Use reinforcement steel conforming to ASTM A706 Grade 60.

See SCDOT Standard Drawings or Project Plans for other material requirements and design details.

C. CONSTRUCTION REQUIREMENTS - GENERAL

Follow SCDOT Standard Drawings 719-705-xx for minimum dimensions and details. Use geotextile wrap on joint to minimize concrete intrusion into the joint during the forming and curing process.

D. MEASUREMENT

Measure concrete pipe collars by each location where pipe diameter of different joint profiles are to be connected. Include in measurement all materials and work to complete the pipe collar as shown in the Standard Drawings or plans.

E. PAYMENT

Payment will be made for each location.

ITEM NO.	DESCRIPTION	UNIT
7197051	CONCRETE COLLAR FOR UP TO 12" PIPE	EA
7197052	CONCRETE COLLAR FOR UP TO 24" PIPE	EA
7197053	CONCRETE COLLAR FOR UP TO 36" PIPE	EA
7197054	CONCRETE COLLAR FOR UP TO 48" PIPE	EA
7197055	CONCRETE COLLAR FOR UP TO 60" PIPE	EA
7197056	CONCRETE COLLAR FOR UP TO 72" PIPE	EA

(73) SECTION 724: ELASTOMERIC BEARINGS:

724.4.4 Installation. Paragraph 4 was revised as follows

Exercise caution where field weld or shop weld is made while elastomeric bearing pad is in contact with the metal. Do not expose the elastomer or elastomer bond to instantaneous temperatures greater than 400°F or any temperature limit set by the fabricator whichever is lower. Any damage to elastomeric bearing due to welding is cause for rejection. Monitor temperature by use of heat crayons.

(74) SECTION 727: CROSSHOLE SONIC LOGGING OF DRILLED SHAFT FOUNDATIONS:

Crosshole Sonic Logging (CSL) Testing is required for all drilled shafts. SCDOT shall be responsible for all CSL Testing.

(75) DIVISION 800: GEOTEXTILE FOR DRAINAGE FILTRATION:

October 15, 1991

A. ACCEPTANCE

The Contractor shall supply to the Resident Engineer, prior to placing the material, certified test results from a recognized laboratory of those tests specified herein. Acceptance will be based on the test results meeting these requirements¹ and the material meeting all stated specifications. The Resident Engineer shall submit the certified test results to the Research and Material Engineer for acceptance. Test data shall be no more than 1 year old at the time it is furnished to the Department. Once a fabric has been accepted, it will be listed on an Approval Sheet, and only those materials listed will be acceptable. Test data must be resubmitted for reapproval every 2 years. No fabric will be used nor will payment be made for fabric until the fabric certification is received and approved by the Research and Materials Engineer. The Department reserves the right to sample and test any of the fabrics, or other materials used in drainage filtration, at any time.

B. PIPING RESISTANCE (SOIL RETENTION - ALL APPLICATIONS)

1. Soils with 50% or less particles by weight passing U.S. No. 200 sieve:

$$\text{EOS No. (fabric)} \geq 30 \text{ U.S. Std. Sieve No.}$$

2. Soils with more than 50% particles by weight passing U.S. No. 200 sieve:

$$\text{EOS No. (fabric)} \geq 50 \text{ U.S. Std. Sieve No.}$$

Note:

- a. Whenever possible, fabric with the lowest possible EOS No. should be specified.
- b. When the protected soil contains particles from 1 inch size to those passing the U.S. No. 200 sieve, use only the gradation of soil passing the U.S. No. 4 sieve in selecting the fabric.

C. PERMEABILITY

Critical/Severe Applications *	Normal Applications
$k(\text{fabric}) \geq 10 k(\text{soil})^2$	$k(\text{Fabric}) \geq k(\text{soil})^2$

*Woven monofilament fabrics only; percent open area ≥ 4.0 and EOS No. ≤ 100 sieve.

D. CHEMICAL COMPOSITION REQUIREMENTS/CONSIDERATIONS

1. Fibers used in the manufacture of civil engineering fabrics shall consist of long chain synthetic polymers, composed of at least 85% by weight of polyolefins, polyesters, or polyamides. These fabrics shall resist deterioration from ultraviolet exposure.
2. The engineering fabric shall be exposed to ultraviolet radiation (sunlight) for no more than 30 days total in the period of time following manufacture until the fabric is covered with soil, rock, concrete, etc.

E. PHYSICAL PROPERTY REQUIREMENTS (ALL FABRICS)

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

	Class 1 Fabric ³ Protected	Class 2 Fabric ³ Unprotected
Grab Strength (ASTM D-4632 or ASTM D-1682)	80 lbs.	180 lbs.
Seam Strength ⁴ (ASTM D-4632 or ASTM D-1682)	70 lbs.	160 lbs.
Puncture Strength (ASTM D-3787)	25 lbs.	80 lbs.
Burst Strength (ASTM D-3786)	130 psi.	290 psi.
Trapezoid Tear (ASTM D-4533)	25 lbs.	50 lbs.
Ultraviolet Degradation at 150 hours (ASTM D-4355)	70%	70%

¹ All numerical values represent minimum average roll values (i.e., any roll in a lot should meet or exceed the minimum values in the table). Use values for the weaker principal direction. Lots should be sampled according to ASTM D-4354.

² Permeability should be based on the actual fabric open area available for flow. For example, if 50% of the fabric area is to be covered by flat concrete blocks, the effective flow area is reduced by 50%.

³ Fabric is said to be protected when used in drainage trenches or beneath/behind concrete (Portland or asphalt cement) slabs. All other conditions are said to be unprotected,

Examples of each condition are:

Protected: highway edge drains, blanket drains, smooth stable trenches < 10 feet in depth. In trenches, in which the aggregate is extra sharp, additional puncture resistance may be necessary.

Unprotected: stabilization trenches, interceptor drains on cut slopes, rocky or caving trenches or smooth stable trenches > 10 feet in depth.

⁴ Values apply to both field and manufactured seams.

(76) DIVISION 800: GEOCOMPOSITE WALL DRAIN:

May 6, 2003

A. DESCRIPTION

A geocomposite wall drain is a prefabricated drain system that is used to provide drainage behind retaining walls. The geocomposite drain consists of a flexible plastic drainage core bonded to a non-woven geotextile. Geocomposite wall drains shall be placed continuously along the back of the wall as shown in the plans or as otherwise directed by the Engineer. The Contractor shall furnish all necessary labor, equipment, and materials and perform all operations necessary for the installation of geocomposite wall drains in accordance with the details shown on the plans and with the requirements of this specification.

B. ACCEPTANCE CRITERIA

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

The Contractor shall supply to the Engineer, prior to placing the material, certified test results of those tests specified herein from a recognized laboratory. Acceptance will be based on the test results meeting the geocomposite system properties, drainage core properties, and geotextile properties stated in this specification. The Engineer shall submit the certified test results to the Research and Material Engineer for acceptance. Test data shall be no more than one year old at the time it is furnished to the Department. Geocomposite wall drains shall not be installed until the material certification is received and approved by the Research and Materials Engineer. The Department reserves the right to sample and test any of the materials used in the geocomposite wall drain system.

Labeling, shipment, and storage of the geocomposite wall drain materials shall follow ASTM D 4837. Product labels shall clearly show the manufacturer or supplier name, style number, and roll number. Geocomposite rolls shall be wrapped with a material that will protect the geocomposite drain from damage due to shipment, water, sunlight, and contaminants. The protective wrapping shall be maintained during periods of shipment and storage.

C. MATERIAL

The geocomposite wall drain shall be prefabricated type made up of a lightweight, high impact polymeric drainage core bonded to the geotextile at intervals not exceeding 1.5 inches. The geocomposite wall drain shall be solid backed allowing drainage of water on only one side. The non-woven geotextile is thermal (heat) bonded or fungicide glue bonded to the polymeric drainage core. The geocomposite product sheets or rolls shall have a minimum width of 3 feet with a minimum coverage area of 40 square feet. A geotextile flap shall be provided along all drainage core edges. This flap shall be of sufficient width for sealing the geocomposite drain edge to prevent soil intrusion into the drainage core during and after installation. The geotextile shall cover the full length of the drainage core.

The wall drainage system shall meet the following geocomposite system properties in addition to the individual component properties of the polymeric drainage core and the non-woven geotextile. All numerical values listed in the required property tables shown below represent minimum average roll values (MARV) per ASTM D 4759 unless indicated otherwise. Values for the weaker principal direction should be used. Testing shall be performed in accordance with the methods referenced in this specification. Sampling of lots shall be in accordance with ASTM D 4354.

GECOMPOSITE SYSTEM PROPERTIES		
TEST	METHOD	LIMIT
Flow Capacity (gpm/ft. width) At a hydraulic gradient of 1.0 and a minimum normal stress of 3600 psf (Normal load maintained for 300 hours or until equilibrium)	ASTM D 4716	14

DRAINAGE CORE PROPERTIES		
TEST	METHOD	LIMIT
Thickness (inches)	ASTM D 1777	0.3 minimum / 0.5 maximum
Compressive Strength (psf) At 20% Deformation (10,000 hour minimum duration)	ASTM D 1621	14,000

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

GEOTEXTILE PROPERTIES		
TEST	METHOD	LIMIT
AOS (Equiv. U.S. Sieve)	ASTM D 4751	50 maximum average roll value
Permittivity (sec ⁻¹)	ASTM D 4991	1.0
Grab Tensile Strength (lbs.)	ASTM D 4632	80
Grab Tensile Elongation (%)	ASTM D 4632	50
Trapezoidal Tear Strength (lbs.)	ASTM D 4533	40
Puncture Strength (lbs.)	ASTM D 4833	50
Burst Strength (psi)	ASTM D 3786	150
Ultraviolet Stability (%) (Retained strength after 500 hours of exposure)	ASTM D 4355	70

D. CONSTRUCTION REQUIREMENTS - GENERAL

The Contractor shall check the geocomposite wall drain upon delivery to ensure that the proper material has been received. The geocomposite wall drain shall be protected during shipment and storage at the construction site from temperatures greater than 71 °C, mud, dirt, debris, and any other environmental condition that may damage the material's physical property values. The wall drainage system shall be protected from direct sunlight in accordance with the manufacturer's recommendations.

The geocomposite wall drain will be rejected at the time of installation if it has defects, tears, punctures, flaws, deterioration, or damage incurred during manufacture, shipment, or storage. Torn or punctured sections shall be removed or repaired as directed by the Engineer. Any geocomposite wall drain damaged during manufacture, shipment, or storage shall be replaced by the Contractor at no additional cost.

If at any time the Engineer determines that the method of installation does not produce a satisfactory wall drainage system, the Contractor shall alter his method and/or equipment as necessary to comply with this specification.

The geocomposite wall drain shall be installed in accordance with the plans and specifications. The surface that the geocomposite drain will be placed against shall be cleaned by removing all soil, debris, and irregularities that will prevent intimate contact between the surface and the geocomposite drain. The geocomposite wall drain shall be secured to the wall using metal stick clips, adhesives, or as recommended by the manufacturer. The geocomposite wall drain shall be installed so as to allow weepholes, as shown in the plans, to drain water from the drainage core and underdrain pipes.

All joints shall be formed by peeling or trimming the geotextile off the attached section to expose 3 inches of the drainage core. The drainage core of the second section being attached is then overlapped 2 inches over the first drainage core. The joint is then covered by reattaching the geotextile flap and securely fastening it to the lower geotextile by means of a continuous strip of 3 inch wide waterproof plastic tape. Each overlapping course shall be shingled in the direction of water flow. If joints cannot be formed by interlocking the cuspatations, then the drainage core should be butted together and covered with continuous, 6 inch wide geotextile. The geotextile fabric shall be centered over the joint and securely fastened to the two geocomposite drains with 3 inch wide waterproof plastic tape.

All exposed edges of the geocomposite wall drain shall be covered with geotextile by tucking and securing a minimum of 4 inches of geotextile behind the drainage core. This may be done by using the geotextile flaps at the edges or using a 12 inch wide continuous strip in the same manner, taping it to the exposed fabric 4 inches in from the edge with a continuous strip of 3 inch wide waterproof plastic tape, and folding the remaining geotextile and tucking it behind the drainage core edge.

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

If the geotextile is torn, perforated, or ripped during installation, it shall be patched or replaced as directed by the Engineer. The damaged section shall be cut out and replaced completely or repaired by placing a piece of geotextile over the damaged area and providing a minimum of 4 inches of overlap on all sides over the damaged area and secured with 3 inch wide waterproof plastic tape. Damaged drainage core sections shall be discarded and replaced. Any geocomposite wall drain damaged during installation shall be replaced or repaired by the contractor at no additional cost.

The underdrain pipes and free draining aggregate shall be placed as shown in the plans or as directed by the Engineer. A positive outlet for the water in the geocomposite drain shall be maintained at all locations. Weepholes shall not be sealed or made ineffective by the wall drain material. This may involve making a hole in the drainage core at the weephole location. The geotextile drainage filtration fabric used to envelop the underdrain system shall be tucked 6 inches behind the geocomposite drain and overlapped over the geocomposite drain a distance of 12 inches and continuously secured with 3 inch wide waterproof plastic tape.

Backfill shall be placed immediately over the geocomposite wall drain. The contractor shall backfill against the wall in a manner that does not damage the geocomposite drainage system. Care shall be taken to avoid excessive settlement of the backfill material. The geocomposite wall drain shall not be exposed for more than seven days prior to backfilling. Any geocomposite drainage system component that is damaged during the backfilling operation shall be replaced or repaired as directed by the Engineer.

E. METHOD OF MEASUREMENT AND BASIS OF PAYMENT

Geocomposite wall drains will not be measured for payment. The cost of the geocomposite wall drain shall be included in the cost of the retaining wall or wall system where the drainage system is being installed.

(77) SECTION 805: THREAD LOCKING GUARDRAIL HARDWARE:

Use a permanent thread locking compound meeting Military Specification Mil-S-46163A Type I, Grade L. Follow the thread locking compound manufacturer's directions and apply compound to all the fasteners within Type T End Treatments, Impact Attenuators, and Crash Cushions. Apply compound to all guardrail fasteners across bridges or on base plate mounted posts, or in locations directed by the Resident Construction Engineer.

(78) SECTION 805: TL3 TYPE T TANGENT END TERMINALS:

Qualified Product List 49 provides minimum length of continuous w-beam from the impact head for each proprietary Test Level 3 product. All radius, kinks, and transition sections must occur outside of the continuous w-beam section. SCDOT Standard Drawing 805-710-00 shows the required installation for systems with a 50' w-beam requirement. Where the design requires immediate transition from w-beam to thrie-beam at the end of the Type-T, confirm that adequate space exists in advance of the impact head before selecting a system that requires any length greater than 50'. The pay length for the TL3 Type T end terminal is shown in Special Provision Drawing 805-710-SP. No additional measurement or payment will be made for additional w-beam required by the selection of a proprietary product. Where sites do not accommodate longer end treatments, use a system with a 50' continuous w-beam section. When design includes a tangent installation of standard w-beam rail behind the 50' section, the designed rail will be measured and paid at 50' from the impact head as shown in the plan quantities.

For products with a 62'-6" requirement, see drawing 805-710-SP in Attachment B for additional guidance.

(79) SECTION 805: RESETTING GUARDRAIL:

Existing steel beam guardrail that is determined to be in acceptable condition by the RCE, using the below criteria, may be reset in conformance with Section 805.4.3 of the 2007 SCDOT Standard

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Specifications. The Contractor shall inspect all guardrail on the project and notify the RCE in writing of any guardrail that will be permanently reset. Provide this notice to the RCE a minimum of two weeks prior to permanently resetting any guardrail on the project. If existing wood posts are planned to be reset, all existing wood posts shall be replaced with steel posts.

Resetting Guardrail Acceptance Criteria:

- A. Any guardrail components that are bent, flattened, torn, deformed, exhibit signs of rust, or damaged in any way shall not be reset.
- B. Guardrail with obsolete components and guardrail systems that are not on the SCDOT Qualified Products List (QPL) shall not be reset.
- C. Section 805.4.3 disallows resetting guardrail posts. This shall only apply to existing wood posts.

(80) SECTION 806: REPAIR EXISTING CONTROL OF ACCESS FENCE:

Repair, replace or reset any damaged control of access fencing or fence components within the project limits, as directed by the RCE. Remove and dispose of existing fences, trees, brush, stumps, logs, weeds, or other debris that interfere with the construction of the fence. No separate measurement or payment shall be included for installing new, replacing existing or resetting existing fence based on the CONTRACTOR's designs. However, CONTRACTOR's bid shall include 1000 linear feet of Repair of Existing Control of Access Fence. Should the actual length of fence repairs vary from this estimated value by more than 25%, a change order will be generated by the RCE to adjust the contract value based on the actual repaired length of fence as measured by SCDOT inspectors, utilizing a unit price of \$15.00/LF, regardless of fence type. Ensure all waste materials and debris generated during this work is disposed of promptly and at appropriate waste facilities.

(81) SECTION 809: RIGHT OF WAY PLAT:

F. DESCRIPTION

The contractor by the "Substantial Work Complete" date shall prepare a right of way plat signed and sealed by a Professional Land Surveyor (PLS) licensed to practice in the state of South Carolina. The right of way plat shall be in accordance with the requirements of Section 49-460-A "General Property Survey" as outlined in the South Carolina "Standards of Practice Manual" for land surveyors. A copy of the plat will be recorded, by the contractor, in the Register Mesne Conveyance (RMC) office of the county or counties in which the project resides. The contractor will provide one copy of the plat on a full sized plan sheet(s) (22" X 36") and submit to the resident construction engineer to be included in the as-built plans.

G. MATERIALS: REBAR CAP R/W MARKER

Materials used shall comply with those listed on SCDOT Standard Drawing Nos. 809-10500or 809-110-00.

H. CONSTRUCTION REQUIREMENT

The PLS shall set right of way markers along all new right of way lines as well as along any present right of way being retained by the Department at intervals listed on the SCDOT Standard Drawings. Right of way markers shall not be placed at points common to side property lines and/or corners. In the event that the plan reflects a break in the right of way along a side property line the right of way marker will not be set without the side property line being retraced and established by way of survey. The PLS shall prepare a plat documenting the location of all Right of Way Markers set and reflecting the as-built station and offset from the plan alignment. The plat shall show the entire project corridor as an enclosed strip or parcel of land to include the mainline and all side roads as defined on the project plan.

I. MEASUREMENT AND BASIS OF PAYMENT

The item Right of Way Plat is paid on a lump sum (LS) basis; and therefore, there is no specific measurement for this item. The unit price bid for Property Right of Way Plat shall include all costs for labor, materials, equipment, services of a PLS and any related fees or costs associated with producing a plat, recording the plat at the RMC office, and all required copies. Each marker

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

placed in accordance with the Standard Drawings complete and accepted will be measured and paid at the unit price bid.

Bid Item Number	Description	Unit
8091010	RIGHT OF WAY MARKER (REBAR AND CAP)	EA
8091000	RIGHT OF WAY MARKER (REINFORCED CONCRETE)	EA
8091050	RIGHT OF WAY PLAT	LS

(82) SECTION 815: ANIONIC POLYACRYLAMIDE FOR EROSION CONTROL:

A. DESCRIPTION

This work consists of applying a product containing anionic polyacrylamide to disturbed land areas as a means of controlling erosion. The work also consists of the use of solid form anionic polyacrylamide as a means of sediment control.

B. MATERIALS

The product to be used is to be specific to the area to be treated. Product selection and application rate is to be determined by a testing laboratory acceptable to SCDOT. Preliminary site-specific assessment (soil and water testing) by a qualified manufacturer must be conducted to select media, additives, application rate, application method and maintenance procedure tailored to site-specific soil characteristics, topography, hydrology, and the type of erosion targeted. A copy of the test results is to be provided to the Engineer.

Anionic polyacrylamide, in pure form, shall have less than or equal to 0.05% acrylamide monomer by weight, as established by the Food and Drug Administration and the Environmental Protection Agency. The maximum application rate of polyacrylamide, in pure form, shall not exceed 200 pounds/acre/year, or 10 pounds/acre per single application event.

The polyacrylamide shall have a charge density of 10% to 55%, by weight. The polyacrylamide shall have a molecular weight of 6 to 24 Mg/mole.

The polyacrylamide and polyacrylamide mixtures shall be noncombustible.

Cationic forms of polyacrylamide are not allowed for use due to their high level of toxicity.

Polyacrylamide shall be non-toxic. A toxicity report is required to be submitted to the Engineer.

C. CONSTRUCTION REQUIREMENTS

Liquid and powder forms of polyacrylamide are to be either applied directly to the exposed soil surface or applied as a tackifier with temporary seeding to prevent detachment of soil particles during the establishment of vegetation.

In the solid form, the polymer is to be placed directly into the storm water runoff to enhance eroded particle settlement in a trapping device.

Polyacrylamide shall be mixed and/or applied in accordance with all Occupational Safety and Health Administration (OSHA) Material Safety Data Sheet (MSDS) requirements and the manufacturer's recommendations for the specified use conforming to all federal, state and local laws, rules and regulations. The Contractor is responsible for obtaining all required permits.

Emulsion batches shall be mixed following recommendations of a testing laboratory that determines the proper product and rate to meet site requirements.

Additives such as fertilizers, solubility promoters, or inhibitors, etc. to polyacrylamide shall be nontoxic.

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Care is to be taken when using polyacrylamide adjacent to natural water bodies.

D. METHOD OF MEASUREMENT

The application of polyacrylamide for erosion control will be measured by the surface area treated at the recommended rate of application. Quantities are to be computed to the nearest MSY (Thousand Square Yards). Solid form anionic polyacrylamide is to be measured by weight in pounds, in place and accepted. The Contractor is required to provide, to the Engineer, invoices for all polyacrylamide products used on the project.

E. BASIS OF PAYMENT

The accepted quantity of “Anionic Polyacrylamide For Erosion Control” will be paid at the contract unit price, which price and payment shall be full compensation for all materials, labor, tools equipment, and incidentals necessary to complete the work herein described in a workmanlike and acceptable manner. Solid form anionic polyacrylamide is to be paid for by the pound. Bid Item Numbers and Descriptions are as follows:

Bid Item Number	Description	Unit
8152020	ANIONIC POLYACRYLAMIDE FOR EROSION CONTROL	MSY
8152025	SOLID FORM ANIONIC POLYACRYLAMIDE	LBS

(83) SECTION 815: EROSION CONTROL MEASURES:

In addition to the erosion control measures specified in the Plans, Standard Specifications, Supplemental Technical Specifications and the Special Provisions, the CONTRACTOR is advised that all land disturbing activities (clearing and grubbing, excavation, borrow and fill) are subject to the requirements set forth in the following permits and regulations:

- A. South Carolina Code of Regulations 63-380, Standard Plan for Erosion, Sediment, and Stormwater Runoff Control.
- B. Erosion and Sediment Reduction Act of 1983 (Title 48, Chapter 18 of the South Carolina Code of Laws of 1983, as amended). Section 70 of this code authorized the South Carolina Department of Health and Environmental Control (SCDHEC) to administer this regulation with respect to lands under the jurisdiction of the South Carolina Department of Transportation.
- C. National Pollutant Discharge Elimination System (NPDES) General Permit Number SCR160000, effective January 1, 2013: The Environmental Protection Agency, in accordance with the Federal Clean Water Act, has granted to the South Carolina Department of Health and Environmental Control (SCDHEC) the authority to administer the Federal NPDES permit program in the State of South Carolina.

In accordance with the NPDES General Permit, the Contractor must sign a Contractor Certification. The Contractor shall refer to the Construction Extranet for the certification form. By signing this form, the Contractor acknowledges that upon award and execution of the Contract, he/she accepts/ understands the terms and conditions of the *Storm Water Pollution Prevention Plan (SWPPP)* as required by the NPDES General Permit and may be legally accountable to SCDHEC for compliance with the terms and conditions of the *SWPPP*. In addition, the Contractor certifies that the NPDES certification statement status is made part of all its subcontracts.

The Contractor will complete and forward an updated SCDOT approved *Notice of Intent (NOI)* to the SCDOT Construction office to submit to SCDHEC. If the Coastal Zone Consistency (CZC) permit has not been approved it shall be forwarded by the Contractor to SCDOT to submit to SCDHEC as part of *NOI* package. If SCDHEC does not send a letter within 10 business days of receipt of the *NOI*, authorizing coverage, denying coverage, or advising that a review of the *CECP* will take place, coverage will be automatically granted.

Prepare and submit a *Contractor's Erosion Control Plan (CECP)* to the RCE before the pre-construction conference. Ensure that the plan meets the requirements of the NPDES General Permit. The plan will be reviewed and approved by the Department before commencing any land disturbing activities.

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At the pre-construction conference, with contactors performing land-disturbing activities present, the *CECP* will be explained and discussed so that the Contractor is made aware of their responsibilities in the *CECP*.

Once approved, fully implement the *CECP*. Coordinate the prompt installation of erosion control devices with construction activities to maintain compliance with the above regulations and NPDES General Permit.

Conduct an Erosion and Sediment Control Inspection by an appointed Certified Erosion Prevention and Sediment Control Inspector (CEPSCI) from the Contractor and the Department at least every 7-calendar days. Both parties will acknowledge participation in the inspection by signing the inspection report and include their inspector's CEPSCI number on the report. Correct deficiencies noted during these inspections within the assigned priority period. If deficiencies are not corrected within this timeframe, the RCE will stop all work (except erosion and sediment control measures) until the deficiencies are corrected.

Give special attention to critical areas within the project limits (i.e., running streams, water bodies, wetlands, etc.). In these areas, the RCE may direct the Contractor to undertake immediate corrective action, but in no case allow these deficiencies to remain unresolved more than 7 days or 48 hours in accordance with their assigned priority after being identified during the Erosion and Sediment Control Inspection.

Closely follow the grading operations with the seeding operations. Shape and prepare the slopes for seeding as the grading progresses. Unless the RCE grants prior written approval, limit the amount of surface area exposed by land disturbing activities to 750,000 square feet. Commence seeding operations within 7 days following completion of construction activities within an area.

Initiate stabilization measures within 7 days for an area where construction activities will be temporarily or permanently ceased for 14 days or longer.

Coordinate the installation of all other permanent erosion control items with the grading and seeding operations. These items include, but are not limited to, asphalt gutter and riprap. Construct gutter work before or promptly after the seeding is performed. Place riprap at the ends of pipe immediately after the pipe is laid and promptly install riprap ditch checks after ditch work has been performed.

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 lbs/sy HMA Surface Course Type C or D. 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).

Failure to adequately comply with the provisions as detailed above or any other required erosion control measures will result in stoppage of all contract operations (except erosion and sediment control measures) until corrective action has been taken. Additional sanctions may be invoked by the SCDHEC in accordance with their authority.

Keep the following documents at the RCE's office from the start of construction until the site is finally stabilized:

- A. Copy of the *CECP*,
- B. Copies of Contractor Certification statements,
- C. Copy of the permit,
- D. Letter from DHEC authorizing permit coverage if provided by SCDHEC, and
- E. A marked-up set of site plans.

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When uniform perennial vegetation achieves a cover density of 70%, submit a *Notice of Termination (NOT)* to SCDHEC to terminate coverage. Include a signed statement with the *NOT* certifying that all work on the site has been completed in accordance with the *SWPPP* and the NPDES General Permit for all sites one acre or greater.

Fines assessed on the Department by SCDHEC as the result of the CONTRACTOR's non-compliance or violation of said permit provisions will be paid by the Department and will subsequently be deducted from any monies due or that may become due to the CONTRACTOR. In case no monies are due or available, the fines incurred will be charged against the CONTRACTOR's Surety.

REQUIRED CONTRACT PROVISIONS FEDERAL-AID CONSTRUCTION CONTRACTS

- I. General
- II. Nondiscrimination
- III. Nonsegregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Compliance with Governmentwide Suspension and Debarment Requirements
- XI. Certification Regarding Use of Contract Funds for Lobbying

contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

Contracting agencies may reference Form FHWA-1273 in bid proposal or request for proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

1. Equal Employment Opportunity: Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR 60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the

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provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the

grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurance Required by 49 CFR 26.13(b):

a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on [Form FHWA-1391](#). The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the

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work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. Davis-Bacon and Related Act Provisions

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

1. Minimum wages

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be

compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b. (1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

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(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program. Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

2. Withholding

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

3. Payrolls and basic records

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g. , the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at <http://www.dol.gov/esa/whd/forms/wh347instr.htm> or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency..

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of

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Compliance” required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

4. Apprentices and trainees

a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).

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Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

5. Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

6. Subcontracts. The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

7. Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

8. Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

9. Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

10. Certification of eligibility.

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.

3. Withholding for unpaid wages and liquidated damages. The FHWA or the contacting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.

4. Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified

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elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term "perform work with its own organization" refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

- (1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
- (2) the prime contractor remains responsible for the quality of the work of the leased employees;
- (3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
- (4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

5. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of

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construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.

2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200.

1. Instructions for Certification – First Tier Participants:

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal

Government, the contracting agency may terminate this transaction for cause of default.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. "First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed

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by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

* * * * *

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. Instructions for Certification - Lower Tier Participants:

(Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.

"First Tier Covered Transactions" refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (<https://www.epls.gov/>), which is compiled by the General Services Administration.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

* * * * *

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * * * *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000 (49 CFR 20).

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

ATTACHMENT A - EMPLOYMENT AND MATERIALS PREFERENCE FOR APPALACHIAN DEVELOPMENT HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS ROAD CONTRACTS

This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph (1c) shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph (4) below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which the participant estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, the participant shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within one week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph (1c) above.

5. The provisions of 23 CFR 633.207(e) allow the contracting agency to provide a contractual preference for the use of mineral resource materials native to the Appalachian region.

**STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION
CONTRACT SPECIFICATIONS**

**NOTICE OF REQUIREMENT FOR AFFIRMATIVE
ACTION TO ENSURE EQUAL EMPLOYMENT
OPPORTUNITY (EXECUTIVE ORDER 11246)**

1. The Offeror's or Bidders attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.
2. The goals and timetables for minority and female participation expressed in percentage terms for the Contractor's aggregate work force in each trade on all construction work in the covered area are as follows:

Goals for Women Apply Nationwide

GOALS AND TIMETABLES

<i>Timetable</i>	<i>Goals (percent)</i>
From Apr. 1, 1976 until March 31, 1979----- --	3.1
From Apr. 1, 1979 until March 31, 1980----- --	5.1
From Apr. 1, 1980 until March 31, 1981----- --	6.9

Goals for Minority Participation

South Carolina

SMSA Counties:..... Greenville, Pickens, Spartanburg	16.0
Non-SMSA Counties:..... Abbeville, Anderson, Cherokee, Greenwood, Laurens, Oconee, Union	17.8
SMSA Counties:..... Lexington, Richland	23.4
Non-SMSA Counties..... Calhoun, Clarendon, Fairfield, Kershaw, Lee, Newberry, Orangeburg, Saluda, Sumter	32.0
Non-SMSA Counties..... Chesterfield, Darlington, Dillon, Florence, Georgetown, Horry, Marion, Marlboro, Williamsburg	33.0
SMSA Counties:..... Berkeley, Charleston, Dorchester	30.0
Non-SMSA Counties..... Colleton	30.7
Non-SMSA Counties..... Beaufort, Hampton, Jasper	29.8
Non-SMSA Counties..... Chester Lancaster York	15.7
Non-SMSA Counties..... Barnwell, Edgefield, McCormick, Allendale, Bamberg	32.8
SMSA Counties:..... Aiken	27.2

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical areas where the work is actually performed. With regard to this second area, the Contractor is also subject to the goals for both its federally involved and nonfederally involved construction.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 Shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a) and its efforts to meet the goals established for the geographical area where the contract resulting from this solicitation is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees of trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the subcontractor, employer identification number, estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the contract is to be performed.
4. As used in this Notice and in the contract resulting from this solicitation, the "covered area" is (insert description of the geographical areas where the contract is to be performed giving the state, county, and city, if any). The "covered area is the SMSA County or Counties or Non-SMSA County or Counties in which the contract work is performed.

**STANDARD FEDERAL EQUAL EMPLOYMENT
OPPORTUNITY CONSTRUCTION CONTRACT
SPECIFICATIONS
(EXECUTIVE ORDER 11246)**

1. As used in these specifications:
 - a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;
 - b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;
 - c. "Employer identification number" means the Federal Social Security number used on the Employers Quarterly Federal Tax Return, U. S. Treasury Department Form 941.
 - d. "Minority" includes:
 - (i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
 - (ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin regardless of race);
 - (iii) Asian or Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
 - (iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

affiliations through membership and participation or community identification).

2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.
 3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U. S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.
 4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in which it has employees in each construction trade in which it has employees in the covered area. Covered construction contractors performing construction work in geographical areas where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notices form and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress toward its goals in each craft during the period specified.
 5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.
 6. In order for the non-working training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U. S. Department of Labor.
 7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:
 - a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor where possible, will assign two or more women to each construction project.
- The Contractor shall specifically ensure that all foremen, superintendents and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority of female individuals working at such sites or in such facilities.
- b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available and maintain a record of the organization's responses.
 - c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may taken.
 - d. Provide immediate written notification to the Director when union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet his obligations.
 - e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.
 - f. Disseminate the Contractor's EEO policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.
 - g. Review at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with on-site supervisory personnel such as Superintendents, General Foremen, etc., prior to the initialization of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.
 - h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.
 - i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

- later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures and tests to be used in the selection process.
- j. Encourage present minority and female employees to recruit other minority persons and women and where reasonable, provide after school, summer, and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.
 - k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.
 - l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.
 - m. Ensure that all seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.
 - n. Ensure that all facilities and company activities are non-segregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
 - o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.
 - p. Conduct a review, at least annually of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.
8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a contractor association joint contractor-union, contractor-community, or other similar group of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the contractor's minority and female work force participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.
 9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).
 10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.
 11. The Contractor shall not enter into any Subcontract with any person or firm debarred from the Government contracts pursuant to the executive Order 11246.
 12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and the Equal Opportunity Clause, including suspensions, termination and cancellation of the existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended. and its implementing regulations, by the Office if the Federal Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of the specifications and Executive Order 11246, as amended.
 13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4-8.
 14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any employee identification number when assigned, social security number, race, sex status(e.g., Mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and location at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that the existing records satisfy this requirement, contractors shall not be required to maintain separate records.
 15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents(e.g. those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

GENERAL DECISION NUMBER SC46

General Decision Number: SC170046 01/06/2017 SC46

Superseded General Decision Number: SC20160046

State: South Carolina

Construction Type: Highway

Counties: Abbeville, Cherokee, Chester, Chesterfield, Clarendon, Dillon, Greenwood, Lancaster, Lee, Marion, Marlboro, McCormick, Oconee and Union Counties in South Carolina.

HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects & railroad construction; bascule, suspension & spandrel arch bridges designed for commercial navigation, bridges involving marine construction; and other major bridges).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.20 for calendar year 2017 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2017. The EO minimum wage rate will be adjusted annually. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/06/2017

SUSC2011-037 09/15/2011

	Rates	Fringes
CARPENTER (Form Work Only).....	\$ 14.00	
CEMENT MASON/CONCRETE FINISHER		
Abbeville, Cherokee,		
Chester, Greenwood,		
Lancaster, McCormick,		
Oconee, Union.....	\$ 11.63	
Chesterfield, Clarendon,		
Dillon, Lee, Marion,		
Marlboro.....	\$ 13.02	
GUARDRAIL INSTALLER, Includes		
Guard Rail/Post Driver		
Installation		
Abbeville, Cherokee,		
Chester, Chesterfield,		
Clarendon, Dillon,		

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

Greenwood, Lancaster, Lee,
 Marion, Marlboro,
 McCormick, Union.....\$ 12.52
 Oconee.....\$ 12.65

IRONWORKER, REINFORCING.....\$ 15.64

LABORER

Asphalt, Includes Asphalt
 Distributor, Raker,
 Shoverler, and Spreader.....\$ 10.96
 Common or General
 Abbeville, Greenwood.....\$ 8.85
 Cherokee.....\$ 9.40
 Chester.....\$ 9.55
 Chesterfield.....\$ 9.93
 Clarendon, Dillon, Lee,
 Marion, Marlboro.....\$ 10.00
 Lancaster.....\$ 9.67
 McCormick, Union.....\$ 9.39
 Oconee.....\$ 9.47
 Luteman.....\$ 10.93
 Pipelayer.....\$ 13.87
 Traffic Control- Cone
 Setter.....\$ 12.47
 Traffic Control-Flagger
 Abbeville, Cherokee,
 Chester, Chesterfield,
 Clarendon, Dillon,
 Greenwood, Lee, Marion,
 Marlboro, McCormick,
 Oconee, Union.....\$ 10.15
 Lancaster.....\$ 10.83

POWER EQUIPMENT OPERATOR:

Backhoe/Excavator/Trackhoe
 Abbeville, Cherokee,
 Chester, Greenwood,
 Lancaster, McCormick,
 Oconee, Union.....\$ 16.25
 Chesterfield, Clarendon,
 Dillon, Lee, marion,
 Marlboro.....\$ 15.08
 Bulldozer.....\$ 13.66
 Crane.....\$ 20.12
 Grader/Blade
 Abbeville, Cherokee,
 Chester, Greenwood,
 Lancaster, McCormick,
 Oconee, Union.....\$ 16.20
 Chesterfield, Clarendon,
 Dillon, Lee, Marion,
 Marlboro.....\$ 15.85
 Loader (Front End).....\$ 15.51
 Mechanic.....\$ 18.22
 Milling Machine.....\$ 15.51
 Paver

3.40

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Abbeville, Cherokee,
 Chester, Greenwood,
 Lancaster, McCormick,
 Oconee, Union.....\$ 14.58
 Chesterfield, Clarendon,
 Dillon, Lee, Marion,
 Marlboro.....\$ 13.39
 Roller
 Abbeville, Cherokee,
 Chester, Greenwood,
 Lancaster, McCormick,
 Oconee, Union.....\$ 11.22
 Chesterfield, Clarendon,
 Dillon, Lee, Marion,
 Marlboro.....\$ 11.95
 Screed.....\$ 12.45
 Tractor.....\$ 13.26

TRUCK DRIVER

Dump Truck
 Abbeville, Cherokee,
 Chester, Greenwood,
 Lancaster, McCormick,
 Oconee, Union.....\$ 12.83
 Clarendon, Dillon, Lee,
 Marion, Marlboro.....\$ 11.69
 Lowboy Truck
 Abbeville, Cherokee,
 Chester, Greenwood,
 Lancaster, McCormick,
 Oconee Union.....\$ 14.19
 Chesterfield, Clarendon,
 Dillon, Lee, Marion,
 Marlboro.....\$ 14.16
 Single Axle, Includes
 Pilot Car
 Abbeville, Cherokee,
 Greenwood, Lancaster,
 McCormick, Oconee, Union...\$ 10.83
 Tractor Haul truck.....\$ 16.25

 WELDERS - Receive rate prescribed for craft performing operation to which
 welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the "SU" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

EXHIBIT 5 – SPECIAL PROVISIONS AND CONTRACT REQUIREMENTS

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

EXHIBIT 6

RAILROAD INFORMATION

1. General Information

The proposed Project intersects Norfolk Southern Railroad at the following locations:

- I-85 MM 100.6

This location will require Vandal Fencing as specified in the Norfolk Southern Public Projects Manual.

2. Railroad Coordination

The Contractor shall be responsible for all railroad coordination and for all conditions related to railroad impacts. The Contractor shall forward all railroad coordination materials through SCDOT. The RR requirements are included in Attachment B.