



Shelby County
Tennessee

Mark H. Luttrell, Jr., Mayor

SEALED BID
Shelby County Government
Purchasing Department

160 N. Main, Suite 900
Memphis, TN 38103

Issued: December 20, 2013
Due: January 23, 2014 at 2:30 P.M. (Central Standard Time)

SEALED BID # SBI-000222B

FITE ROAD AND BRIDGE IMPROVEMENTS PROJECT

STP-M-7900(29)

PIN 043071.00

Completion Date: 1,095 Days

Shelby County Government is soliciting Sealed Bids for the provision of Construction Services to provide road improvements and construction of a bridge in Shelby County, Tennessee. The Sealed Bid is located on the County's website at www.shelbycountyttn.gov and click the link "Department" at the top, then "P" for the Purchasing Department, then click on the link "Bids."

A voluntary pre-bid conference will be held at 9:00 A.M., January 8, 2014 at the following location, Shelby County Roads and Engineering Department, Conference Room, at 6449 Haley Road, Memphis, Tennessee 38134.

The bid, as submitted, should include all estimated cost related to the services requested in this Sealed Bid. If selected, your proposal will be the basis for negotiating a contract with Shelby County Government. Respondents requesting additional information or clarification are to contact, Nelson Fowler at nelson.fowler@shelbycountyttn.gov.

Bids must be received in the office of the Administrator of Purchasing no later than 2:30 P.M. on January 23, 2014. Bids will be publicly opened at that time and all interested bidders are invited to attend. Bids should be addressed

Nelson Fowler, Manager A
Shelby County Government
160 N. Main, Suite 900
Memphis, TN 38103

The package containing an original (clearly identified as original) and four (4) copies of your proposal must be sealed and marked with the bidders name and "CONFIDENTIAL, "FITE ROAD PROJECT", SEALED BID # SBI-000222B noted on the outside.

THE LABEL, WHICH IS ATTACHED TO THE BID NOTIFICATION LETTER SHALL BE COMPLETELY FILLED OUT AND ATTACHED TO THE BID SUBMISSION ENVELOPE. YOU MUST DISPLAY YOUR CURRENT E.O.C. ELIGIBILITY NUMBER ON THE OUTSIDE OF YOUR ENVELOPE. UNLESS THE LABEL IS COMPLETELY FILLED OUT AND YOUR CURRENT CERTIFICATION NUMBER OR ELIGIBILITY NUMBER IS NOTED THEREON, YOUR BID WILL BE RETURNED TO YOU UNOPENED. SHOULD YOUR LABEL BE LOST OR MISPLACED, PLEASE NOTE THE APPROPRIATE INFORMATION IN THE LOWER LEFT-HAND CORNER OF YOUR ENVELOPE.

Sincerely,

Nelson Fowler, Manager A
Purchasing Department, Shelby County Government

TABLE OF CONTENTS

Instruction to Bidders

Supplemental Specifications to The Standard Specifications.....	Revision Date
Supplemental Specification to Section 100.....	09/03/13
Supplemental Specification to Section 200.....	08/06/12
Supplemental Specification to Section 300.....	01/05/10
Supplemental Specification to Section 400.....	06/12/13
Supplemental Specification to Section 500.....	12/13/10
Supplemental Specification to Section 600.....	06/25/12
Supplemental Specification to Section 700.....	06/12/13
Supplemental Specification to Section 800.....	05/05/10
Supplemental Specification to Section 900.....	06/12/13

The above Supplemental Specifications, revised as noted, are incorporated by reference for bidding purposes and will be printed with the Contract after awards. These Supplemental Specifications may be obtained from the Department at Suite 700, James K. Polk Bldg., Nashville, Tennessee or viewed on the Department's website at <http://www.tdot.state.tn.us/construction>.

Special Provisions Regarding	Special Provision No.....	Date
Unbalanced Bids.....	SP102B	03/01/06
Employing and Contracting with Illegal Immigrants	SP102I	02/05/07
Section 105 – Control of Work, Critical Path Method (CPM) Schedule	SP105E	10/19/12
Buy America Requirements	SP106A	06/20/11
Water Quality & Storm Water Permits	SP107FP	02/13/12
Contractor Employee Safety And Health Program.....	SP107SHP	02/06/10
Specialty Items.....	SP108A	03/01/06
Embankment (Compacted in Place)	SP205A	02/01/02
Reinforced Soil Slopes.....	SP205RSS	09/01/09
Asphalt Pavement Safety Edge	SP407SE	04/04/11
Retaining Walls.....	SP624	08/06/12
Traffic Signals	SP730M	03/01/06
Seeding With Wood Cellulose Fiber Mulch	SP801A	03/15/06
Equal Employment Opportunity	SP1230	03/01/06
Standard Federal Equal Employment Opportunity	SP1231	03/01/06
Construction Contract Specifications (Executive Order 11246)		
Notice of Requirement for Affirmative Action to Ensure Equal	SP1232	10/19/12
Employment Opportunity (Executive Order 11246)		
Training Program Requirements.....	SP1240	05/11/09
Disadvantaged Business Enterprise Participation	SP1246	11/10/08
DBE Contract Goals.....	SP1247	09/17/11
Required Contract Provisions Federal – Aid Construction Contracts	SP1273	05/01/12
Tennessee Department of Transportation Minimum Wage Scales For.....	SP1320	01/09/13
..... Federal-Aid Construction and State Funded Construction		
Federal Wage Rates.....		01/09/2013
State Wage Rates.....		01/02/2013

Special Provision For Protection of Railway Interest	322
Special Provision Regarding Environmental Concerns	332
Special Provision Regarding Seeding	333

SECTION A REQUEST FOR PROPOSAL

I.	INTRODUCTION	336
II.	MINIMUM BIDDER REQUIREMENTS	336
III.	CORRESPONDENCE	337
IV.	PROPOSAL SUBMISSION DEADLINE	337
V.	PROPOSAL TIMELINE.....	338
VI.	PROPOSAL CONDITIONS.....	338
	A) CONTINGENCIES	
	B) MODIFICATIONS	
	C) PROPOSAL SUBMISSION	
	D) INCURRED COSTS	
	E) FINAL AUTHORITY	
	F) PROPOSAL VALIDITY	
	G) DISCLOSURE OF PROPOSED CONTENTS	
	H) LIVING WAGE	
	I) NON-DISCRIMINATION AND TITLE VI	
	J) LOSB	
	K) DRUG-FREE WORKPLACE AFFIDAVIT	
	L) GRATUITY DISCLOSURE FORM	
	M) FORMS TO BE SUBMITTED	
VII.	GENERAL REQUIREMENTS	357
VIII.	AWARD OF CONTRACT.....	357
IX.	NOTICE TO BIDDERS.....	358

SECTION B PROPOSAL AND CONTRACT REQUIREMENTS

I.	PROPOSAL.....	360
II.	BID FORM.....	364
III.	PROPOSAL RESPONSE SHEET	373
IV.	CONTRACT.....	374
V.	CONTRACT BOND.....	388

SECTION C SHELBY COUNTY SPECIAL PROVISIONS

SECTION D APPENDIX

I.	PHASE II ENVIRONMENTAL SITE ASSESSMENT
II.	FITE ROAD EXTENSION – PSI SOILS REPORT DATED 2/16/2004
III.	SUBSURFACE EXPLORATION REPORT
	FITE ROAD RETAINING WALL #1 (2/11/2012)
IV.	SUBSURFACE EXPLORATION REPORT
	FITE ROAD RETAINING WALL #2 (2/10/2012)

ATTENTION

It shall be the bidders' responsibility to confirm that the Contract Proposal contains all the documents indicated on the Table of Contents.

Should any omissions occur, the appropriate documents may be obtained from Shelby County upon request.

COUNTY OF SHELBY

INSTRUCTIONS TO BIDDERS

BIDS TO BE RECEIVED

JANUARY 23, 2014

Sealed bids for the construction of the following projects will be received by the **COUNTY of SHELBY, 160 N. MAIN STREET, Suite 900** until **2:30 PM, JANUARY 23, 2014** and opened publicly at **160 N. MAIN STREET, Suite 900, 2:30 PM, JANUARY 23, 2014**. The reading of the bids will begin at **2:30 PM**.

The proposed construction shall be performed in accordance with the most current version of the Standard Specifications for Road and Bridge Construction of the Tennessee Department of Transportation, and the Standard Roadway and Structures Drawings of the Tennessee Department of Transportation which are incorporated herein by reference and made a part hereof. In addition, only the Special Provisions contained within the applicable Contract Proposal will be considered binding. Any reference to any Special Provision not contained within the applicable Contract Proposal shall be disregarded. All questions related to the Contract Proposal, Plans, Specifications or Special Provisions shall be directed to the **NELSON FOWLER, MANAGER A SHELBY COUNTY GOVERNMENT, 160 N. MAIN STREET, Suite 900, MEMPHIS, TN 38103 (901-222-2250)**. Information received from other offices of the **COUNTY** strictly advisory.

IMPORTANT NOTICE TO BIDDERS:

Prospective bidders should read the following instructions carefully before submitting their bids. Special attention is called to the regulations of the **COUNTY** that total bids, rather than unit prices, will be read. Proposals shall be rejected as being irregular if they fail to contain a unit price for each item listed. Extensions of the various items must be sub-totaled, carried forward, and shown as a grand total following the last proposal item. All entries must be in ink.

After a bidder has deposited a proposal with the **COUNTY**, he can withdraw it only on written request in accordance with Subsection 102.07 of the Tennessee Department of Transportation Standard Specifications.

Totals read at the opening of the bids are not guaranteed to be correct and no final award of the contract will be made until bids and extensions have been checked and re-checked.

On all projects which are financed in whole or in part by funds received through Federal agencies and/or the Tennessee Department of Transportation, the awarding of contracts by the **COUNTY** will be subject to approval by the Tennessee Department of Transportation. The **COUNTY** reserves the right to reject any bid proposal which is not acceptable to the parties as listed, although such bid proposal would otherwise qualify as the lowest and best bid under the Tennessee Department of Transportation Standard Specifications.

The **COUNTY** reserves the right to reject any or all Proposals, to waive technicalities or to advertise for new Proposals, if in the judgment of the awarding authority, the best interest of the **COUNTY** will be promoted thereby.

The **COUNTY** reserves the right to cancel the award of any Contract, at any time prior to execution of said Contract by all parties without any liability against the **COUNTY**.

The awarding of the contract or rejection of all proposals will be made within 30 days after the formal opening of the proposals. Upon award, a detailed letter of instructions will be forwarded along with appropriate documents to the low bidder.

The **COUNTY** hereby notifies all bidders, that it will affirmatively insure that in any contract entered into pursuant to this advertisement, disadvantaged business enterprises will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the basis of age, race, color, religion, national origin, sex or disability in consideration for an award.

The **COUNTY** is an equal opportunity affirmative action employer, drug-free, with policies of nondiscrimination on the basis of race, sex, religion, color, national or ethnic origin, age, disability, or military service.

PREQUALIFICATION OF BIDDERS:

Each prospective bidder and subcontractor will be required to file a document entitled "Prequalification Questionnaire." The foregoing shall be filed on a form provided by the Tennessee Department of Transportation. The form must be filled out completely, and the truth and accuracy of the information provided must be certified by a sworn affidavit signed by an officer, partner, owner or other authorized representative of the applicant who has authority to sign contracts or other legal documents on behalf of the applicant. A prospective bidder must be prequalified by and in good standing with the Tennessee Department of Transportation prior to the issuance of a proposal form. A prospective subcontractor must be prequalified by and in good standing with the Tennessee Department of Transportation prior to being approved as a subcontractor. Each prospective bidder or subcontractor shall notify the Tennessee Department of Transportation if there is any subsequent change in the name, organization or contact information provided.

Prospective bidders' "Prequalification Questionnaire" shall be filed with the Tennessee Department of Transportation at least fourteen (14) days prior to the date of opening bids on any letting in which the applicant intends to submit a bid to the **COUNTY**, or at least fourteen (14) days prior to the date on which the applicant requests approval as a subcontractor under a contract awarded by the **COUNTY**. Bidders intending to submit proposals consistently shall complete and submit the prequalification application annually; however, this document may be changed during such period upon submission of additional favorable reports or upon receipt by the Tennessee Department of Transportation of substantiated evidence of unsatisfactory performance. The Tennessee Department of Transportation reserves the right to request additional information and documentation to clarify and/or verify any information submitted in an applicant's prequalification application.

**The prequalification form can be found at the web address
<http://www.tdot.state.tn.us/construction>**

A proposal to be used for non-bidding purposes may be issued to any interested party regardless of prequalification.

PROPOSAL BOND

Each proposal must be accompanied by a bidder's bond, or Cashier's Check, or Certified Check made payable to the **COUNTY** in an amount equaling not less than five percent (5%) of the amount bid. In the case of optional items in the proposals, the amount of the bidder's bond or check must be in an amount equaling not less than five percent (5%) of the total amount of the bid based on the high option.

If the bidder's bond is offered as guaranty, the bond must be on the form furnished by the **COUNTY** and made by a surety company, qualified and authorized to transact business in the State of Tennessee and must be acceptable to the **COUNTY**.

If a check is offered as guaranty, the check of the successful bidder will be cashable at the discretion of the **COUNTY**, pending the satisfactory execution and acceptance of the contract and the contract bond.

ISSUANCE OF BIDDING DOCUMENTS

Shelby County Government is soliciting Sealed Bids for the provision of Construction Services to provide road improvements and construction of a bridge in Shelby County, Tennessee. The Sealed Bid is located on the County's website at www.shelbycountyttn.gov and click the link "Department" at the top, then "P" for the Purchasing Department, then click on the link "Bids." It is the responsibility of the Contractor to download Plans and Bid Book from the Shelby County website as directed above.

The Tennessee Department of Transportation is on a cash basis for sales of Standard Specifications and Standard Drawings. Requests for documents must be accompanied by cash, check, money order, or they may be mailed to the buyer C.O.D. Tennessee Department of Transportation Standard Drawing Books will be furnished by the Tennessee Department of Transportation at **\$100.00** per book plus **9.25%** sales tax, for in-state delivery. Tennessee Department of Transportation Standard Specifications for Road and Bridge Construction, dated March 1, 2006, will be furnished by the Tennessee Department of Transportation at **\$12.00** per book plus **9.25%** sales tax, for in-state delivery. There will be a minimum charge of \$2.00 on any purchase. All documents will be furnished without refund and transmitted at your risk.

When two or more contractors wish to bid together in a joint venture, each contractor will be required to make a written request for such a proposal to the **COUNTY**. This request shall be signed by an authorized signatory of each firm.

Requests for joint venture proposals may be made in person or by telephone. However, the proposal for said joint venture will not be issued until the request in writing, as set forth above, is received by the **COUNTY**.

REJECTION OF PROPOSALS

Proposals will be rejected as irregular if prior to the formal opening of the Proposal all of the following documents have not been signed: (1) the bidder shall sign by written signature the Proposal form, (2) the bidder shall sign by written signature the Proposal Certification form, (3) the bidder shall sign by written signature the Proposal Bond form or the Proposal Guarantee, whichever is applicable, (4) the Agent or Attorney-in-Fact representing a Surety Company shall sign by written signature the Proposal Bond, if applicable. In addition, Proposals will be rejected if any of the above signatures are a reproduced copy, such as, but not limited to a photostatic copy or a facsimile transmission. An original, dated and valid Power of Attorney for the Attorney-in-Fact must accompany the Proposal and the Contract. The accompanying Power of Attorney must be dated, and the date must be the exact same date as the date on the Proposal Bond. The Proposal and the Proposal Bond, including the attached Power of Attorney, shall be valid and binding for 60 days subsequent to the date of opening bids.

Proposals shall be completed on the forms as issued. Please review a part of Subsection 102.02 of the Tennessee Department of Transportation Standard Specifications stating: "All of the documents that are bound therein are part of the Proposal and shall not be detached." Proposals shall not be taken apart. Proposals taken apart may be subject to rejection. Also, please review a part of Subsection 102.09 of the Tennessee Department of Transportation Standard Specifications stating: "Proposals will be rejected as being irregular if they are not prepared on the prescribed forms; if they show any omissions, alterations of form, additions, or conditions not called for, unauthorized alternate bids, or irregularities of any kind; or if they fail to contain a unit price for each item listed." Proposals shall be completed on the forms as issued. Photostatic or facsimile copies of Proposal sheets may not be attached to the Proposal. Proposals containing forms not issued by the COUNTY may be subject to rejection.

ADDENDA

Addenda to the Proposal will be acknowledged by all bidders. Failure to acknowledge receipt of Addendum Letters is grounds for rejection.

RETAINAGE

Effective for all contracts, the COUNTY will not hold retainage. In addition, the Contractor will not be able to hold retain age from the subcontractor.

SUBCONTRACTS

Your special attention is called to Section 105 - Control of Work, and Section 108 - Prosecution and Progress of the Tennessee Department of Transportation Standard Specifications, concerning duties of the contractor and subletting of contracts.

CHANGED CONDITIONS

Your special attention is called to Section 104.02 of the Tennessee Department of Transportation Standard Specifications, concerning changed conditions on this contract.

[COUNTY Officer]

The following information applies to Federal-Aid construction projects:

NOTICE TO ALL BIDDERS

To report bid rigging activities call:

1-800-424-9071

The U.S. Department of Transportation (DOT) operates the above toll-free "hotline" Monday through Friday, 8:00 a.m. to 5:00 p.m. eastern time. Anyone with knowledge of possible bid rigging, bidder collusion, or other fraudulent activities should use the "hotline" to report such activities.

The "hotline" is part of the DOT's continuing effort to identify and investigate highway construction contract fraud and abuse and is operated under the direction of the DOT Inspector General. All information will be treated confidentially and caller anonymity will be respected.

STATE

OF

TENNESSEE

(Rev. 05-05-10)
(Rev. 11-01-10)
(Rev. 12-13-10)
(Rev. 10-31-11)
(Rev. 06-25-12)
(Rev. 08-06-12)
(Rev. 10-19-12)
(Rev. 06-12-13)
(Rev. 09-03-13)

March 1, 2006

Supplemental Specifications - Section 100
of the
Standard Specifications for Road and Bridge Construction
March 1, 2006

Subsection 101.13, Second paragraph, first sentence, **Delete** "Revisions and Additions."

Subsection 101, Add the following definition

"Amendment. A revision to the electronic bid file which may include adjusting a quantity, adding, deleting, or revising a pay item(s).

Subsection 101.47, Second sentence, **Replace** "Revisions and Additions" with "Supplemental Specifications"

Subsection 101.57, **Delete** the entire paragraph and replace with the following

"A company authorized to guarantee a bidder's proposal and a contractor's performance and payment obligations under a contract and which is authorized to do business in the State of Tennessee."

Subsection 102.01, **Replace the entire subsection with the following:**

102.01-Prequalification Questionnaire and Competency of Bidders. Each prospective bidder and subcontractor will be required to file a document entitled "Prequalification Questionnaire." The foregoing shall be filed on a form provided by the Department. The form must be filled out completely, and the truth and accuracy of the information provided must be certified by a sworn affidavit signed by an officer, partner, owner or other authorized representative of the applicant who has authority to sign contracts or other legal documents on behalf of the applicant. A prospective bidder must be prequalified by and in good standing with the Department prior to the issuance of a proposal form; however this standing does not prohibit any person from requesting or obtaining a void proposal form for any purpose other than submitting a proposal to the Department. A prospective subcontractor must be prequalified by and in good standing with the Department prior to being approved as a subcontractor. Each prospective bidder or

subcontractor shall notify the Department if there is any subsequent change in the name, organization or contact information provided.

Prospective bidders' "Prequalification Questionnaire" shall be filed with the Department at least fourteen (14) days prior to the date of opening bids on any letting in which the applicant intends to submit a bid to the Department, or at least fourteen (14) days prior to the date on which the applicant requests approval as a subcontractor under a contract awarded by the Department. Bidders intending to submit proposals consistently shall complete and submit the prequalification application annually; however, this document may be changed during such period upon submission of additional favorable reports or upon receipt by the Department of substantiated evidence of unsatisfactory performance. The Department reserves the right to request additional information and documentation to clarify and/or verify any information submitted in an applicant's prequalification application.

Prospective subcontractors will be required to pre-qualify prior to approval of the subcontracts by the Department and must also submit a prequalification application annually.

The Department reserves the right to refuse to issue a proposal form when a bidder is in default or delinquent for any of the following reasons:

- a) When a "Prequalification Questionnaire" has not been filed with and examined by the Department or when the bidder, in the opinion of the Commissioner, is not qualified.
- b) Default of existing contract (s).
- c) When a bidder has an existing incomplete contract (s) with the Department which is behind schedule to the extent that it may hinder or prevent prompt completion of any additional contract (s).
- d) When a bidder has been suspended, debarred, or otherwise excluded under the Department's rules governing contractor debarment and suspension, Chapter 1680-5-1, or under applicable Federal rules governing the suspension and debarment of contractors.

Subsection 102.02 Contents of Proposal Forms, Revise entire subsection to the following:

102.02-Contents of Proposal Forms. Upon request, the Department will furnish the Bidder an electronic proposal form which will contain an "Instructions to Bidders" form, Supplemental Specifications, Special Provisions, and proposal guaranty form. The proposal form will state the location and description of the contemplated construction. The proposal form will state the time in which the Work must be completed, the amount of the Proposal Guaranty, and the date, time and place for the opening of Proposals. The Plans and Specifications are as much a part of the Proposal form as if they were bound therein. All of the documents that are bound therein are part of the Proposal.

The prospective bidder will be required to pay the Department the sum stated in the Instructions to Bidders for each electronic proposal form. Plans will be available for the sum stated in the notice to Contractors.

Subsection 102.03 Interpretation of Quantities in Bid Schedule, Revise entire subsection to the following:

102.03-Interpretation of Quantities in Bid Schedule. The quantities appearing on the electronic bidding file are approximate only and are prepared for the comparison of bids and award of Contract. The Department does not guarantee or assume any responsibility that quantities indicated on the Plans or given in the electronic bidding file will hold in the

construction of the project and the Contractor shall not plead deception or misunderstanding because of variation from these quantities or of variation from the location, character or any other conditions pertaining thereto. Payment to the Contractor will be made only for the actual quantities of work performed and accepted, and materials furnished in accordance with the Contract. The schedule of quantities of work to be done and materials to be furnished may be increased, decreased, or omitted as hereinafter provided under **Subsection 104.02**.

Subsection 102.05 Preparations of Proposals, Revise entire subsection to the following:

102.05-Preparation of Proposals. A document entitled "Instructions to Bidders" is bound into the electronic proposal form. The proposal form shall be electronically signed in exact accordance with these instructions using the electronic bidding file furnished by the Department. The proposal guaranty form shall be handled similarly. The completed electronic bidding file, inclusive of the proposal form as described in **Subsection 102.02** and the bid prices described below, shall then be submitted to the Department in exact accordance with the applicable part of these instructions.

The electronic bidding file contains the contract bid items and associated estimated quantities. The following stipulations shall apply to electronic bidding:

- (a) It is the bidder's responsibility to compare the bid quantities indicated on the plans to those contained on the electronic bidding file to ensure they are the same. Any discrepancies are to be called to the Department's attention immediately.
- (b) Any revisions to the Contract Proposal regarding bid items or quantities will be accompanied by an amendment to the electronic bidding file with the revision date indicated. The amended electronic bidding file is to be utilized in the formulation of the bid.

Some proposals may contain numerous alternates. The Contractor will be required to bid on only 1 alternate for each construction item unless otherwise specified. The proper procedure for entering alternate bids is to enter prices for the intended alternate item(s) of construction and leave the undesired alternate item(s) of construction blank. The electronic bidding program allows only for 1 alternate to be bid. If prices are entered for more than 1 alternate, the electronic bidding program will not tabulate the total. Instructions for electronic bidding are available from the Headquarters Construction office and the method of entering alternates is explained therein.

The electronic bidding program will perform all extensions of the estimated quantities and unit or lump sum prices, calculate the total bid and allow the printing of a complete set of bid item sheets with appropriate subtotals and grand total bid price.

Subsection 102.06 Delivery of Proposals, Revise entire subsection to the following:

102.06-Delivery of Proposals. Each Proposal must be submitted via the Internet using the electronic bidding program.

No proposal will be considered or accepted which has not been received by the Department previous to the hour of the date and at the place set forth for the opening thereof in the Advertisement or Instruction to Bidders.

Subsection 102.07 Withdrawal of Proposal, Revise entire subsection to the following:

102.07-Withdrawal of Proposal. Any Bidder may withdraw his Proposal through the electronic bidding program prior to the hour of bid opening as indicated in the Advertisement for Bids and in the Instruction to Bidders

Subsection 102.08 Public Opening of Proposals, Revise entire subsection to the following:

102.08-Public Opening of Proposals. Proposals will be opened and either read publicly or bid totals will be furnished and posted on the date, time, and place indicated in the Advertisement for Bids and Instruction to Bidders. Bidders, authorized Agents, and interested parties are invited to be present.

Subsection 102.09 Rejection of Proposals, Revise entire subsection to the following:

102.09-Rejection of Proposals. Proposals will not be rejected if they condition their consideration upon the elimination of other proposals submitted by the same bidder, provided that any selection of awards will be made by the Department. A Bidder may tie the acceptance or rejection of 2 or more of his proposals on the condition that either all of his proposals are accepted or that they are all rejected, in which case his bids must be the lowest responsible bid on each project before they will be considered.

Proposals may be rejected by the Commissioner if any of the unit prices contained therein are obviously unbalanced, either excessive or below the reasonable cost analysis value.

Proposals will be rejected as being irregular if they are not prepared on the prescribed forms; if they show any omissions, alterations of form, additions, or conditions not called for, unauthorized alternate bids, or irregularities of any kind; or if they fail to contain a unit price for each item listed. In the case of authorized alternate items, a unit price on only 1 of the alternates will be required, unless otherwise specified in the Contract.

Proposals will be rejected as irregular if they are not electronically signed by an authorized representative of the bidder. The electronic signature on the electronic bidding file serves as signatures for the Proposal form, Proposal Certification form and the Proposal Bond form, if applicable. If the bidder elects to submit the Proposal Guarantee, the Proposal Guarantee Form must be signed by written signature and in the possession of the Department prior to the formal opening of the Proposal. The Agent or Attorney-in-Fact representing a Surety Company shall electronically sign the electronic Proposal Bond, if applicable. An original, dated and valid Power of Attorney for the Attorney-in-Fact must accompany the Proposal and the Contract. The accompanying Power of Attorney must be dated, and the date must be the exact same date as the date on the Proposal Guaranty Bond. The Proposal and the Proposal Guarantee Bond, including the attached Power of Attorney shall be valid and binding for 60 days subsequent to the date of opening bids. As an alternative, Surety Companies may submit an original, unnumbered Power of Attorney suitable for photocopying to the Department. Surety Companies choosing this alternative will be required to furnish the Department with a letter on the company letterhead and signed by an officer of the company authorized to appoint Attorneys-in-fact. A draft copy of this letter is available from the Department upon request.

Proposals will be rejected as irregular when submitted by a Bidder who has not qualified as required by the Commissioner under the authority given him by Tennessee Code Annotated.

All prime Contractors, except mowing and litter removal Contractors, must be licensed with the Tennessee Department of Commerce and Insurance (TDCI), Board for Licensing Contractors (BLC). The Contractor must be licensed in the general classification (e.g. Heavy Construction (HC), Highway, Railroad, Airport Construction (HRA), Specialty (S), Municipal and Utility

Construction (MU), or Electrical Contracting (CE)) for the type of work in the project which they will perform. A Proposal submitted by a Bidder will be considered for Award for twenty-one (21) days after the Proposals are opened. If the Bidder does not have a license with the TDCI, on or before twenty-one (21) days after Proposals are opened, the Bidder will be considered non-responsive and their Proposal will be rejected as irregular. The next lowest responsible Bidder would then be considered for Award. If the next lowest responsible Bidder does not have a license on or before the twenty-one (21) days after the Proposals are opened, they also would be considered non-responsive, and the subsequent Bidder will then be considered.

Bidders that are domestic or foreign Corporations, Limited Liability Companies, Limited Partnerships, or Limited Liability Partnerships, must be in good standing with the Secretary of State (i.e. have a valid Certificate of Existence/Authorization). If a Bidder is not in good standing with the Secretary of State (i.e. have a valid Certificate of Existence/Authorization) on or before twenty-one (21) days after Proposals are opened then the Bidder will be considered non-responsive and their Proposal will be rejected.

Reasonable grounds for believing that any Bidder is interested in more than 1 Proposal on the same project or that there has been collusion among the Bidders will cause a rejection of all Proposals in which the Bidders involved are interested.

A Proposal will be rejected, at the discretion of the Commissioner, if a Bidder or any member of the firm, partnership, or corporation represented in his Proposal is related either by blood or marriage within the fourth degree, computing by the civil law, to any member of the Department, or if any member of the Department will have any financial interest in the Contract.

The right is reserved to reject a Proposal from a Bidder who has not paid or satisfactorily settled all legal debts due on former contracts in force at the time of the letting.

All Proposals will be rejected that do not contain the Proposal Guaranty of the character and amount indicated in the proposal form.

The apparent low bidder on each project is required to complete and submit the TDOT form "Certification Regarding Subcontractor Bid Quotes" (Bidders List) electronically. The apparent low bidder shall submit this form before the close of business (4:30 PM, Central Time) five (5) calendar days after the date on which bids are required to be submitted. Emergency contracts will not require a bidders list. Failure to complete and submit this form within the time period may result in the rejection of the bid.

Until the execution and approval of the Contract by the Department, the right is reserved to reject any and all Proposals and to waive technical errors.

Subsection 103.01 Consideration of Proposals, Revise entire subsection to the following:

103.01-Consideration of Proposals. The Internet bid shall be recognized as the only official bid.

After the Proposals are opened and read, they will be compared based on the summation of the products of the unit bid prices and the approximate quantities. The results of such comparisons will be made available to the public.

The right is reserved to reject any or all Proposals, to waive technicalities or to advertise for new Proposals, if in the judgment of the awarding authority, the best interest of the Department will be promoted thereby.

Subsection 103.04, Award of Contract, add the following as the second paragraph:

TDOT will only award a contract to a contractor that is licensed with the State of Tennessee, except if the contract is for mowing or mowing and litter removal, Contractors for mowing or mowing and litter removal type contracts must be registered with the Secretary of State, if applicable, before a project will be awarded.

Section 104-SCOPE OF WORK, Add the following to the Table of Contents “104.02- Alterations in Plans or in Character of Construction.”

Subsection 104.02, Significant Changes in the Character of Work, (4), Revise subsection to the following:

4. An adjustment of the contract terms in accordance with number 2 above will be made only if the Engineer orders, in writing, an alteration in the work or in the quantities that significantly change the character of work. The term “significant change” shall be construed to apply only to the following circumstances:
 - (a) When the character of the work as altered differs materially in kind or nature from that involved or included in the original proposed construction or
 - (b) When a major item of work is increased or decreased by more than 25 percent of the original contract quantity (adjustments shall apply only to that portion in excess of 125 percent of original contract quantity, or in case of a decrease, to the actual quantity performed).

The above provides for adjustments resulting from formal change orders by the Engineer, in writing. Either party may initiate an adjustment and both must be in agreement before the work is performed.

Subsection 104.03 Remove and replace entire subsection to the following:

104.03-Extra Work. When unforeseen work results for any reason and is not handled as prescribed elsewhere herein, the Engineer and the Contractor will attempt to agree on equitable prices. When such prices are agreed upon, a Change Order will be executed, and a Construction Change will be issued by the Engineer. When equitable prices are not agreed upon mutually, the Engineer may issue a written order that the Extra Work be completed on a force account basis and paid for as provided in **Subsection 109.04.**

When the Change Order process is initiated, the Contractor shall be required to submit to the Project Supervisor detailed breakdowns for Materials, Labor, Equipment, Profit and Overhead. Profit and Overhead shall not exceed 15% of the subtotal of Materials, Labor and Equipment. When the Change Order is initiated for subcontractor items, the Prime Contractor’s administrative cost shall not exceed 5% of the subcontractor’s total (materials, labor, equipment, profit & overhead).

The requirement for detailed cost breakdowns may be waived when a Bid Item History exists for the proposed item(s), and the contractor’s requested price is within 10% of the Regional, 3 year historic cost for that item. In any case, the Department reserves the right to request detailed information from the Contractor for any Change Order request.

Subsection 104.04 Maintenance of Traffic, Delete “with 30,000 or greater Average Daily Traffic or any interstate routes,” from the third paragraph. **Change** “ three (3)” to “seven (7)” in the third paragraph. **Delete** “(these restrictions apply to state routes with 30,000 or greater Average Daily Traffic or any interstate route);” from the fifth paragraph. **Add** “without the

written consent of the Engineer.” to the end of the fifth paragraph. **Delete** “In addition, any state routes less than 30,000 ADT shall have no lane closures, or any lane restrictions of any type will be allowed on Good Friday, Labor Day, Memorial Day, July 4th, and the working day immediately preceding and including the holidays of Thanksgiving, and Christmas Day without the written consent of the Engineer.” from the sixth paragraph.

Subsection 104.06 First sentence, **Replace** the word “sectiot”, **should read** “section”

Subsection 104.11. **Revise** entire subsection to the following:

104.11-Final Cleanup. Before final acceptance of the Work, the entire rights-of-way, all material pits, all waste areas, all areas and access roads used by the Contractor, all streams in or over which he has worked, and all ground occupied by the Contractor, in connection with the Work, shall be cleaned of all forms, falsework, temporary structures, temporary erosion control measures, excess materials, equipment, rubbish, and waste, and all parts of the work shall be left in a neat and presentable condition. The entire right-of-way, all material pits, all waste areas, all areas and access roads used by the Contractor shall be final stabilized per the TN NPDES Construction General Permit criteria or per the agreed upon Reclamation Plan. Final cleanup shall include the mowing of the rights-of-way as required. If the project was graded under a previous Contract, final cleanup will be performed within the construction limits of work being performed and other areas disturbed or otherwise requiring cleanup due to the Contractor's operations. No rubbish, waste or debris shall be deposited on or in sight of the rights-of-way. All damage to private and public property shall be replaced, repaired, or settled for.

Subsection 104.12 Add the following to Section 104 of the Standard Specifications.

104.12- Value Engineering Change Proposal (VECP).The Contractor may request a modification to the plans, the specifications or other contract requirements based on a Value Engineering Change Proposal (VECP) submitted to the Department specifying a cost reduction change. This will not apply to a proposal unless it is identified as a VECP at the time of its submittal.

Value Engineering Change Proposals (VECP) are those which would require a change in the contract and would result in an immediate net savings to the Department without impairing essential functions and characteristics of the project, including but not limited to the service life, reliability, economy of operation, maintenance and safety features. VECP's that propose a total savings of less than \$25,000 (twenty-five thousand dollars) will normally not be considered unless there are other non-monetary savings to be realized.

The Contractor may submit for review a “VECP Concept” provided that it contains enough information to clearly define the work involved and the benefits to be realized. The “VECP Concept” shall state all applicable design criteria that will be used in the VECP design. Written notification by the Department that the review has been completed and that the “VECP Concept” appears to be favorable merely indicates that the engineering and plan development may continue for submittal of the VECP proposal and is not authorization for any construction work to begin. Should the final design not reflect the expected benefits, the Department may reject the “VECP Concept” and the VECP without recourse by the Contractor.

The following information, as a minimum, shall be submitted with each proposal to the Engineer, allowing adequate time for Department analysis and processing without interference with project schedules:

- (a) A description of the difference between the existing contract requirements and the proposed change, and the comparative advantages and disadvantages of each.
- (b) An itemized list of the contract changes required if the VECP is accepted, and any recommendation as to how to make each such change.
- (c) A separate detailed cost estimate for (1) the affected portions of the existing contract requirements and (2) the VECP.
- (d) A prediction of any effects the proposed change will have on other Department costs, such as costs of maintenance and operation.
- (e) A statement of the time by which a supplemental agreement must be issued in order to obtain the proposed cost reduction for the project, noting any effect on the contract completion time or delivery schedule.
- (f) The date(s) of any known previous or concurrent submissions of the same proposal and any previous actions by the Department.
- (g) The contract items of work affected by the proposed change, including any quantity changes.

Proposed construction changes in pavement design, right of way, relocation of bridges, etc. or changes in the environmental impact statement will not normally be considered as an acceptable VECP. The Department may determine at any point during the evaluation process that the VECP is not cost effective and summarily reject the VECP.

While a VECP is being considered by the Department, the contractor shall continue to perform the work in accordance with the requirements of the contract. The Department has no obligation but to review the VECP and shall not be liable for failure to accept or act upon any VECP or for any delays to the work due to the submitted proposal. The Department shall be the sole judge of the acceptance or rejection of a VECP, either wholly or in part. If an agreement has not been reached by the date that the contractor's VECP specifies that a decision should be made, or such other date as the contractor may have specified in writing, the VECP shall be deemed rejected.

The Contractor shall have no claim against the Department for additional costs or delays resulting from the rejection of a VECP, including but not limited to, "VECP Concept" acceptance, engineering and development costs, loss of anticipated profits, and increased material or labor costs.

The Department will not accept a VECP that is similar to a change in the plans or specifications under consideration by the Department for the project at the time the proposal is submitted; nor will the Department accept a proposal based upon, or similar to, standard specifications, general use special provisions or standard drawings adopted by the Department after the advertisement for the contract. The Department reserves the right to make such changes without compensation to the Contractor under the provisions of Subsections 104.02 and 104.03 of the standard specifications.

The Department will determine the estimated net savings from the adoption of all or any part of the VECP. In determining the estimated net savings, the Department may disregard the contract bid prices if, in the judgment of the Department, such prices do not represent a fair measure of the value of the work to be performed or to be deleted.

In the event the Department accepts the VECP the contractor thereby grants to the Department all rights to adoption of the proposal for general use on other contracts without obligation or compensation of any kind.

Acceptance of a VECP will be by supplemental agreement incorporating the changes necessary to permit the VECP, or any part of it, to be put into effect. The supplemental agreement shall also set forth the estimated net savings to the Department and further provide that the contractor be paid 50 percent of the actual net savings.

The cost to the contractor to develop and implement the VECP and any design (including redesign by a Tennessee licensed engineer, preparation of new reproducible plans, etc. and any other information requested by the Department to facilitate its review) shall be incidental to the contractor and shall in no way affect the VECP payment herein before specified. The cost to the Department to review the VECP shall be incidental to the Department and shall not affect the VECP payment.

The actual net savings will be determined when the work in the VECP and Supplemental Agreement is completed. If upon completion of the work proposed in the VECP it is determined that the supplemental agreement did not adequately address a change in quantities for other pay items that were either increased or decreased substantially as a result of the change proposal, those additional costs or savings shall be included in the actual net savings determination. A single payment will be made to the contractor representing fifty percent (50%) of the actual net savings once all items are considered.

If the completed VECP results in an increase in cost such that there is no net savings, those costs above the original contract costs as proposed in the VECP and supplemental agreement will be reimbursed at a rate of fifty percent (50%).

The preparation of the VECP, its acceptance and performance of the work shall not extend the contract completion time unless the supplemental agreement provides an extension.

Subsection 105.02 Add the following as the first paragraph:

All contractors and subcontractors directly engaged in the erection or removal of falsework, temporary structures, structural steel, precast prestressed or mild steel reinforced concrete bridge beams or girders over active highway traffic lanes, on any route, railroad or any stream deemed navigable to commercial or pleasure water craft, shall be required to submit an erection plan prepared and stamped by a Tennessee registered engineer. Falsework (steel stay-in-place forms, overhang jacks, etc.) for bridge deck construction shall be installed in accordance with the manufacturer's recommendation and will not require a submittal. See also Subsection 602.41, 602.42, and 604.06.

Subsection 105.06, Revise the entire subsection to the following:

105.06-Planning of the Operations-Preconstruction Conference. After execution of the Contract by both parties thereto and prior to beginning work, the Contractor shall furnish the Engineer a complete and practicable plan of operations which shall provide for orderly and continuous performance of the Work. The plan of operations shall be in such form and in such detail as to show properly the sequence of operations, the location of operations and the period of time required for completion of the portion of the Work under each item or group of like items in the schedule. The plan of operations shall show the controlling item of work during each phase and a revised schedule shall be submitted when changed conditions warrant. An anticipated

schedule may be submitted by the Contractor that will show the anticipated monthly progress for the duration of the Contract. If the Contractor does not submit an anticipated schedule, then a straight-line curve will be used to determine progress. The plan of operation shall indicate the manpower and equipment to be available to handle the several phases of the Work. If the Contractor so elects, the Work may be scheduled by the Critical Path Method (CPM); and if called for in the Proposal, utilization of the Critical Path Method (CPM) shall be mandatory. When required, the CPM should be updated at least every 30 days as directed by the Engineer.

Subsequent to submission of the plan of operation, the Contractor shall attend a preconstruction conference called by the Engineer. He shall have available at such meeting all data necessary to substantiate his plan of operation and the scheduling thereof.

In addition to this basic plan of operations, the Contractor shall keep the Engineer notified of his planned or contemplated operation details sufficiently in advance of starting each phase so that inspection may be arranged by the Engineer. Such notice shall include the nature and location of the work planned or contemplated, the date and time of starting, and any hours outside of the conventional working day and working week during which the prosecution of such work is contemplated. The performance of any work without such notice to the Engineer and in the absence of inspection or the written waiver thereof, in itself, shall constitute sufficient grounds for rejection of such portion of the work.

Subsection 105.09 Construction Stakes, Revise the 12th paragraph to the following:

All staking shall be performed by qualified engineering or surveying personnel who are trained, experienced and skilled in construction layout and staking of the type required under the contract and who are acceptable to the Engineer. The personnel shall perform this staking under the direct supervision of a Tennessee licensed Professional Engineer or a Tennessee Registered Land Surveyor experienced in the direction of such work and acceptable to the Engineer.

Subsection 105.10. Revise entire Subsection to the following:

105.10-Authority and Duties of Inspectors. Inspectors employed by or contracted with the Department will be authorized to inspect all work done and all materials furnished. Such inspection may extend to any part or to all of the Work and to the preparation, fabrication, or manufacture of materials to be used including offsite waste and/or borrow areas. The Inspectors will have the authority to reject defective material and to suspend any construction that is being improperly done, subject to final decision by the Engineer. Inspectors will not be authorized to revoke, alter, enlarge, or relax the provisions of the Specifications, nor will they be authorized to approve or accept any portion of the completed project, or to issue instructions contrary to the Plans and Specifications. At the request of the Contractor, instructions from an Inspector may be had in writing on important items.

Subsection 105.11. Revise entire subsection to the following:

105.11-Inspection of Work. All materials and each part or detail of the Work shall be subject to inspection by the Engineer, or his representative including waste and /or borrow areas. He shall be given free access to all parts of the Work at all times and shall be furnished all information, facilities, and assistance by the Contractor as may be required to make complete and detailed inspection. Any work done or materials used without supervision or inspection by an authorized

Department representative may be ordered removed and replaced at the Contractor's expense unless the Department representative failed to inspect after having been given reasonable notice in writing that such portion of the Work was to be performed.

At any time before acceptance of the Work, the Contractor shall remove or uncover such portion thereof as may be directed. If examination discloses that the Work is acceptable under the terms of the Contract, the Contractor shall return it to the original condition, and the cost of exposing the Work for examination and of returning it to the original condition shall be paid for as Extra Work. If the Work exposed and examined does not prove acceptable, the cost of uncovering, or removing, or replacing all of the material involved, in full accordance with the Specifications and Plans, and of restoring the Work, shall all be at the expense of the Contractor. When any unit of government or political subdivision or any railroad corporation is to pay a portion of the cost of the Work covered by the Contract, its respective representatives shall have the right to inspect the Work. Such inspection shall in no sense make any unit of government or political subdivision or any railroad corporation a party to the Contract, and shall in no way interfere with the rights of either party hereunder.

Upon failure on the part of the Contractor to comply forthwith with any order of the Engineer made under the provisions of this Subsection, the Engineer will have authority to cause unacceptable work to be remedied or removed and to deduct the costs from any monies due the Contractor. In the event that monies due or to become due the Contractor are not sufficient to defray the costs of such repairs or replacements, then the Department will hold the Contractor's Surety liable for the costs incurred. Any Construction performed by the Department under these provisions will not waive any provisions of the Contract nor relieve the Contractor in any way the responsibility for the construction performed by him.

Subsection 105.13. Revise entire Subsection to the following:

105.13-Completion of Specific Sections of a Project. The Department may accept a section or sections of a project before the entire project is completed. Such section(s) shall be of reasonable length, as determined by the Engineer, and shall be completed in full accordance with the Plans, Specifications and all other applicable provisions of the Contract. When such section(s) is fully completed, the Engineer, after final inspection, will accept the section(s) and the Contractor will be relieved of any further work in connection therewith or any cost of maintenance thereof.

The Department may require a specific section or sections of a project to be completed prior to the completion of the entire project. Such section(s) shall be completed in full accordance with the Plans, Specifications and all other applicable provisions of the Contract. All provisions of the above paragraph regarding final inspection, acceptance, further work and maintenance shall apply.

After any offsite waste and/or borrow area (s) are no longer needed, the contractor shall ensure that the disturbed area is stabilized per the TN NPDES Construction General Permit criteria or per the agreed upon Reclamation Plan. After the area has reached final stabilization, the contractor shall request a meeting with the Engineer to perform a final inspection. Once the area is deemed acceptable, the contractor is responsible for terminating any Contractor obtained permits.

The acceptance of a section or sections of a project shall in no way void or alter any of the terms of the Contract.

Subsection 105.15. Revise entire Subsection to the following:

105.15-Acceptance. Upon due notice from the Contractor of presumptive completion of the entire project, the Engineer will make an inspection. If all construction provided for and contemplated by the Contract is found to be completed to his satisfaction, then that inspection shall constitute the final inspection and the Engineer will make the final acceptance and notify the Contractor in writing of his acceptance as of the date of the final inspection.

If, however, the inspection discloses any work, in whole or in part, as being unsatisfactory, the Engineer will give the Contractor the necessary instructions for correction of same, and the Contractor shall immediately comply with and execute such instructions. Upon correction of the Work, another inspection will be made which shall constitute the final inspection, provided the Work has been satisfactorily completed. In such event, the Engineer will make the final acceptance and notify the Contractor in writing of this acceptance as of the date of final inspection.

If exclusive offsite waste and/or borrow area(s) were used as part of the project, the Contractor must provide the Engineer proof of permit termination for all waste and/or borrow area(s) before the Engineer can start the process for final acceptance of the project. If the Contractor wishes to continue use of the waste and/or borrow area(s), the contractor shall provide the Engineer with a letter indicating the intended use and updated documentation.

Subsection 105.18 Method of Measurement, Remove and Replace Payment Schedule Table with the following:

PAYMENT SCHEDULE

Estimate Number or Percent of Total Contract Amount of Previous Estimate	Total Percent of Construction Stakes, Lines, and Grades Lump Sum Bid Item
Estimate # 1	20%
Estimate # 2	40%
10%	50%
20%	60%
40%	70%
60%	80%
80%	100%

Subsection 106.04, Fourth paragraph, Insert the word “notarized” in the first sentence, as follows

“A notarized Certificate of Compliance...”

Section 107-Legal Relations And Responsibility, Left out “107.02-Load Restrictions on Projects Under Construction.”

Subsection 107.02 Load Restrictions, Revise entire Subsection to the following:

107.02-Load Restrictions.

(a). Delivery of Materials. The gross weight of trucks delivering material to construction projects shall be governed by State Law as set forth in Tennessee Code and Federal Law. All delivery trucks shall conspicuously display the tare weight, the allowable gross weight for State Highways, and the allowable gross weight for the Interstate System on the side of each truck. The Bridge Formula shall be used to determine allowable Interstate System gross weights as defined in the Federal Highways Administration's publication, *Bridge Formula Weights*.

The operation of equipment of such weight, or so loaded, as to cause damage to structures, the roadway, or to any other type of construction will not be permitted. Hauling of materials over the base course or surface course under construction shall be limited as directed. No loads will be permitted on a concrete pavement, base, or structure before the expiration of the curing period. The Contractor shall be responsible for all damages done by equipment used in construction of the project.

In such cases where it is necessary to haul material over a structure, other than structures with posted load limitations, the Contractor shall be required to limit the gross loads to the weights listed below. The loads posted for structures with weight limitations shall not be exceeded unless adequate shoring is provided and written permission is granted by the Department's Division of Structures.

Maximum axle load	32,000 lbs.
.....	(14,515 kg.)
Maximum load per axle on tandem axles	24,000 lbs
.....	(10,886 kg.)
Maximum total load.....	90,000 lbs.
.....	(40,824 kg.)

The contractor will be further required to place approved temporary guides on the bridge floor, as directed by the Engineer, in order to position the wheel loads as nearly as possible directly over the bridge girders. He shall keep the bridge floor clean so as to reduce impact forces. The maximum speed permitted will be 15 miles(25 kilometers) per hour.

Upon completion of hauling over the bridge, the Contractor will be required to clean the bridge floor, curbs and rail in a manner acceptable to the Engineer.

(b). Construction Loads. Construction loads include all material, component, equipment, and personnel loads applied to the structure other than those which are a consequence of permanent elements of the structure in their final state of construction. All construction loads not essential to the active construction work shall be prohibited from placement on the structure. Construction loads on bridges applied anytime subsequent to the placement of girders shall not exceed 50 pounds per square foot based on a uniform distribution of load. Loads characterized as non-uniform in nature shall be reconciled either by analysis equating load to an effective uniform load or employment of timbers or other means approved by Engineer to distribute construction loads. Length of load distribution may be taken as the bridge beam spacing (or slab span between walls for concrete culverts) occurring at the location of load application. The Contractor will be responsible for submitting to the Engineer all analysis and supplementary support details required to

effect proper construction load distribution. Contractor is advised that if concrete is mounded ahead of the screed machine during placement of the deck, that any portion extending above the screed elevation is considered a construction load in applying the provisions of this section. Construction loads shall be placed as optimally as reasonable to minimize loads on the structure. When the area occupied by construction loads in any structure span exceeds 25% of the area of that span the Contractor shall be required to submit a diagram detailing the location, character, sequence and weight of all construction loads applied to the structure to TDOT Division of Structures for approval. This submittal shall be executed a minimum of 30 days in advance of the planned operation. These provisions supplement those of Subsection 604.28.

Subsection 107.06 Federal Aid Provisions (b). Revise Subsection b to the following:

All waste and borrow areas outside the project right-of-way must be in compliance with Section 106 of the National Historic Preservation Act. The Contractor must furnish the TDOT Engineer and the Environmental Division with an Archaeological Clearance certified by the State Historic Preservation Office on all non-commercial material sources requiring excavation and/or fill.

Regardless of prior certification, if prehistoric remains or human burial sites are encountered at any time during construction, such operations shall be suspended and the Engineer and the State Historic Preservation Office shall be notified immediately.

All waste and borrow areas from outside the project right-of-way must comply with Section 7 of the Endangered Species Act. The contractor must furnish the TDOT Engineer and the Environmental Division with Threatened and Endangered Species Clearance from the Tennessee Wildlife Resource Agency and the U.S. Fish and Wildlife Service on all waste and borrow sites located outside project right-of-way.

The Archaeological Clearance certification, and the Threatened and Endangered Species Clearance from the Tennessee Wildlife Resource Agency and the U.S. Fish and Wildlife Service, must be furnished to the TDOT Engineer and the Environmental Division Permits Section, 30 days prior to work being started on all waste/borrow sites outside of the project right-of-way.

107.14-Legal Responsibilities of the Contractor. Revise entire subsection to the following:

107.14-Legal Responsibilities of the Contractor. In addition to the specific legal responsibilities set forth in **Subsections 107.01 through 107.12**, the Contractor is charged with other broad legal responsibilities under these Specifications. These responsibilities include but are not limited to various areas as follows:

- (a) To perform the Work in accordance with all of the terms of the Contract (**Subsection 104.01**), including Construction Changes (**Subsection 104.02**), the supply and use of materials of the required quality (**Subsection 106.01**), the maintenance, during construction and until final acceptance, of all completed portions of the Work (**Subsection 104.06**), and the final cleanup (**Subsection 104.11**).
- (b) To maintain traffic (**Subsection 104.04**), including the use of all proper and necessary protective devices and procedures (**Subsection 104.05**).

- (c) To conduct all operations so as to protect the members of the general public, residents near the project, workmen engaged in or on the Work, and representatives of the State, the Federal Government and railroads, while they are engaged in duties connected with the Work. All workers within the right-of-way shall wear head protection meeting the current requirements of the American National Standards Institute (ANSI). Also, all workers within the right-of-way shall wear high-visibility safety apparel. High-visibility apparel shall be considered personal protective clothing that meets performance Class 2 or Class 3 of the ANSI/ISEA 107-2004 publication. Class 3 apparel shall be required for night work.

This responsibility also extends to the protection of public and private property under all circumstances.

- (d) To hold harmless and defend against all claims of whatsoever nature arising out of the Work, the State, any political subdivision thereof, and all employees of the State, the Federal Government, and any railroad involved. This responsibility generally extends to innocent third parties.
- (e) To pay just claims for materials, supplies, equipment, tools, labor, and all other items, against him or any Subcontractor, in connection with the Work.

It is the intent of these Specifications that the Contractor shall familiarize himself fully with these responsibilities and with the many others which are clearly inferred from the Contract but are not enumerated here; and that he makes certain that all things required to be performed are performed in such manner as to fulfill the responsibilities involved and that all appropriate and required precautions be taken at all times.

Subsection 107.20 No Waiver of Legal Rights, Delete and replace with the following:

107.20-No Waiver of Legal Rights. The Department shall not be precluded or estopped by any measurement, estimate, or certificate made either before or after the completion of the Work or by final acceptance of the Work according to **Subsection 105.15** from showing the true amount and character of the Work performed and materials furnished by the Contractor, nor from showing that any such measurement, estimate, or certificate is untrue or is incorrectly made, nor from showing that the Work or materials do not in fact conform to the Contract. The Department shall not be precluded or estopped, notwithstanding any such measurement, estimate, certificate and payment, or acceptance in accordance therewith, from recovering from the Contractor or his Sureties, or both, such overpayment or damages as it may sustain or damages due to the Contractor's failure to comply with the terms of the Contract. The Department shall retain and apply monies owed to the Contractor under any Department Contract, or claim and recover by process of law such sums, in order to correct any error or make good any defects in the Work or materials.

Neither the acceptance by the Department, or any representative of the Department, nor any payment for or acceptance of the whole or any part of the Work, nor any extension of time, nor any possession taken by the Department, shall operate as a waiver of any portion of the Contract or of any power herein reserved, or of any right to damages. A waiver by the Department of any breach of the Contract shall not be held to be a waiver of any other or subsequent breach.

Subsection 108.06- Determination of Time for Completion, Replace entire subsection with the following:

108.06-Determination of Time for Completion. The Contractor shall complete the Work in full accordance with **Subsections 104.01 and 105.03** within the number of working days or calendar days or by the completion date stipulated in the Proposal. If a number of working days govern in connection with a specific Contract, the Engineer will apprise the Contractor, monthly, of the number of accumulated working days charged against him. Protest by the Contractor, in such connection, shall be filed within five working days of receipt of the information. The Engineer will review such protest and the supporting information and will render decision either affirming or correcting the accumulated number of working days previously reported.

When the contract time is on a calendar day basis, it shall consist of the number of calendar days stated in the Contract counting from the effective date of the Engineer's order to commence work, including all Sundays, holidays and non-work days. All calendar days elapsing between the effective dates of any orders of the Engineer to suspend work and to resume work for suspensions not the fault of the Contractor shall be excluded.

When the Contract completion date is a fixed calendar date, all work on the project shall be completed on or before that date.

If satisfactory fulfillment of the Contract requires performance of work in greater quantities than those set forth in the proposal, the contract time allowed for performance may be proportionally increased for major items only, as defined in section 101.64, if the Engineer determines that the increase in quantities for the major items has affected the completion of the project. If the contract requires a mandatory Critical Path Method (CPM), or contains an incentive clause, or a bonus clause for early completion, the Engineer shall not proportionately increase the working time. The Engineer will determine if the added work or increased quantities impact the submitted critical path workflow and will adjust the working time accordingly, but the incentive clause date or the bonus clause date will not be adjusted unless otherwise allowed in the Contract.

If the Contractor finds it impossible for reasons beyond his control to complete the Work within the contract time as specified or as extended in accordance with the provisions of this Subsection, he may, at any time prior to the expiration of the contract time specified or as extended, make a written request to the Engineer for an extension of time setting forth therein the reasons which he believes will justify the granting of his request. The Contractor's plea that insufficient time was specified is not a valid reason for extension of time. If the Engineer finds that the Work was delayed because of conditions beyond the control and without the fault of the Contractor, he may extend the time for completion by a properly executed Supplemental Agreement in such amount as the conditions justify. The extended time for completion shall then be in full force and effect the same as though it were the original time for completion except incentive clause date or the bonus clause date will not be adjusted unless otherwise allowed in the Contract.

Final acceptance will be made by the Engineer as prescribed in Subsection 105.15 and in accordance with the following:

State Funded Projects:

Upon presumptive completion of the project and due notice from the Contractor, the Engineer will make an inspection. If all items of work are completed to his satisfaction, the Engineer will accept the project and stop time charges as of the date of the inspection. However, if the inspection reveals that some items of work remain to be completed, the Engineer will direct the Contractor to complete these items and continue charging time until

all work has been satisfactorily completed, regardless of the number of inspections required prior to project acceptance.

Federal-Aid Projects:

The procedure for Federal-aid projects will be the same as noted above for wholly State funded projects except that time charges will be suspended during the time interval between presumptive acceptance by the Engineer and the date of inspection by the Federal Highway Administration (FHWA). Should the FHWA Engineer find any work unsatisfactory, time charges will be resumed the day after the inspection during which such determination is made until correction of such work.

In the event further inspections by FHWA are required, the procedure described herein will be repeated until final acceptance of the project.

Subsection 108.07-Failure to Complete Work on Time, Remove entire subsection and replaced with the following:

108.07-Failure to Complete the Work on Time. For each calendar day over and above the stipulated completion date on which any portion of the Work remains incomplete, a sum of money shall be deducted from monies due the Contractor, not as a penalty but as liquidated damages. The amounts to be deducted shall be as set forth below.

<u>Original Contract Amount</u>		<u>Daily Charge</u>
\$0 -	\$500,000	\$170.00
>500,000 -	1,000,000	\$420.00
>1,000,000 -	2,000,000	\$740.00
>2,000,000 -	10,000,000	\$1,000.00
>10,000,000 -	20,000,000	\$1,600.00
>20,000,000		\$1,800.00

Permitting the Contractor to continue and finish the Work or any part of it after the time fixed for its completion, or after the date to which the time for completion may have been extended, will in no way operate as a waiver on the part of the Department of any of its rights under the Contract.

Subsection 108.08(a) Default, Replace the first sentence with the following:

The Department reserves the right to terminate, by a written Contract Termination Notice, any Contract, of which these Specifications are a part, if the Contractor:

Subsection 108.08(b) Without Fault, Replace the first sentence to the following:

The Department may, by a written Contract Termination Notice, with the approval of the Federal Highway Administration where applicable, terminate any Contract or a portion thereof after determining that for reasons beyond the control of the Contractor, the work contracted for cannot be completed. Such reasons for termination may include, but need not necessarily be limited to one of the following:

Subsection 108.08(c) New, Insert (c) Convenience with the following paragraphs.

(c) Convenience

The Department may, by a written Contract Termination Notice, with the approval of the Federal Highway Administration where applicable, terminate any contract, or any portion thereof for the Department's convenience, when the Engineer determines that, a termination is in the best interest of the Department.

A termination of the contract for convenience may be directed at any time after the Department has made a determination to award a contract. Such reasons for termination may include, but are not limited to:

1. Insufficient funds by the Department due to extenuating circumstances;

2. Orders from duly constituted authorities relating to energy conservation;
3. Restraining orders or injunctions obtained by third party citizen action resulting from federal or state environmental protection laws or where acts or omissions or persons or agencies whether or not the Contractor primarily caused the issuance of such order or injunction;
4. Occurrence of an environmental situation of a significant nature that would require extensive and time-consuming delays in the work for the purposes of identification, evaluation, and possibly mitigation;
5. Occurrence of a previously undiscovered error in the bid documents;
6. Any other circumstances determined by the Department to be in the best interest of the Department and/or public.

In addition to the general reservation of the right to terminate for convenience under this section, the bidding documents may provide for a termination of the contract for convenience under this section upon the occurrence or non-occurrence of a specified event after bid opening.

Under any of the above circumstances for termination, the Engineer will deliver to the Contractor and the Surety a written Contract Termination Notice for reasons that will be set forth therein. The Notice shall specify the extent to which performance of work is terminated under the Contract and the effective date of termination. Unless otherwise directed by the Engineer, upon receipt of a Contract Termination Notice, the Contractor, or his Surety, shall immediately:

1. Stop work as directed in the Notice.
2. Place no further orders or subcontracts for materials, services or facilities except as approved by the Engineer to complete work not terminated.
3. Terminate all orders and subcontracts for the terminated work.
4. Deliver to the Engineer completed or partially completed plans, drawings, information and other property required to be furnished under the contract.
5. Take any action that the Engineer directs to protect and preserve contract-related property that is in the possession of the contractor in which the Department has or may acquire an interest.
6. Provide all other information included in this section and/or as requested by the Engineer.
7. Complete all work not terminated.

If the Contract or any portion thereof is terminated before completion of all items of work in the contract; payment will be made for the actual number of units of items of work completed at the contract unit prices and as mutually agreed for items or work partially completed. No claim for loss of overhead or anticipated profits, including anticipated earnings on usage of owned equipment, and impact, delay, or other direct or indirect costs resulting from this termination, will be compensated as part of any settlement. Items that are eliminated in their entirety by the termination, will be paid according to **subsection 109.05**.

Completed or partially completed work will be paid for at the contract unit prices of the actual number of units or items of contract work completed prior to the effective date of the termination, or on a force account basis, as determined by the Engineer.

Reimbursement for organization of the Work (when not otherwise included in the contract) and moving equipment to and from the job will be considered where the volume of work completed is too small to compensate the Contractor for these expenses under the contract unit prices, the intent being that an equitable settlement will be made with the Contractor. The Department may consider reimbursing the Contractor for actual work done and actual costs incurred by the Contractor before notification. It may include only such cost items as mobilization, subcontractor costs not otherwise paid for, actual idle equipment costs only for any time the work is stopped in advance of the termination date, and guaranteed payments for private land usage as part of the original contract (when not otherwise included in the contract). Any claim request for additional costs, not covered in this section or elsewhere in the contract, shall be submitted within 60 calendar days of the effective termination date.

Acceptable materials, obtained by the Contractor for the Work, that have been inspected, tested, and accepted by the Engineer, and that are not incorporated in the Work, may, at the option of the Engineer, be purchased from the Contractor. The Contractor shall submit the proof of actual cost, as shown by receipted bills and actual cost records. The Engineer, as shown by actual cost records, may designate all actual costs for delivery at such points of delivery to be added to this cost. If the Engineer and the Contractor do not agree to purchase such materials, the Department may reimburse the Contractor for any reasonable restocking fees and handling costs incurred by the Contractor in returning said materials to the vendor. In the event that only portions of the contract work are eliminated, the Department may stop delivery and payment for materials made unnecessary.

Termination of a Contract or a portion thereof shall not relieve the Contractor of his responsibilities for the completed Work, nor shall it relieve his Surety of its obligation for and concerning any just claims arising out of the Work performed.

Subsection 109.02 Add the following to the end of Subsection 109.02:

The prime contractor must pay each subcontractor for work performed under its subcontract no later than 30 days from the date the prime contractor receives payment for the work from the Department. The prime contractor must pay each material supplier for materials supplied to the project no later than 30 days from the date the prime contractor receives payment for the material from the Department. In addition, all subcontractors, at all tiers, must make payment no later than 30 days to each subcontractor and material supplier for work and/or material provided for the project once they receive payment from the prime contractor or subcontractor. The prime contractor shall provide monthly payment certification to the Department entitled "Prompt Payment Certification Form". An officer of the prime contractor shall sign the "Prompt Payment Certification Form". The Department will withhold estimate payments if information is not submitted. The Department will withhold estimate payments for subcontracted items if subcontractors, at any tier, or materials suppliers are not paid. Also, all required certifications must be in the field office and accepted before such work is deemed satisfactorily completed. Any delay or postponement of payment from the above referenced time frame will result in accrual of interest as provided under TCA, Section 12-4-707(b).

The prime contractor, or subcontractors, at any tier, shall not withhold any retainage from progress payments made to their subcontractors.

The contractor shall also document on the "Prompt Payment Certification Form" the actual amount paid to any certified Disadvantaged Business Enterprise (DBE) or certified Small Business Enterprise (SBE) during the estimate period certification is being made.

Subsection 109.04-Methods of Payment for Extra Work, (a) Labor, Add "for profit and overhead" to the end of the second sentence.

Subsection 109.04-Methods of Payment for Extra Work, (c) Materials, Add "for profit and overhead" to the end of the sentence.

Subsection 109.04-Methods of Payment for Extra Work, (d) Equipment, Revise to the following:

(d) Equipment

Equipment used for Force Account work shall be of the size, type and number necessary to perform the required work in an economic and expeditious manner.

The Contractor shall submit for approval a list of all contractor owned equipment or equipment rented from another contractor (i.e. an entity not in the commercial rental business), including the manufacturer, make, model, year of manufacture, type of fuel, and other necessary information to determine proper hourly payment rate. The hourly rate shall not exceed the Monthly rate less the regional adjustment and age adjustment, as published in "*The Rental Rate Blue Book for Construction Equipment*" published by Equipment Watch, Prism Business Media, divided by 176. The contractor shall also submit for approval the hourly operating cost for all equipment. The hourly operating cost shall include all costs and labor for routine maintenance and servicing, including but not limited to fuel, lubrication, filters, blades, belts, pumps, lines, hoses, teeth, tires, tracks, etc.. The hourly operating costs shall not exceed the rates published in "*The Rental Rate Blue Book for Construction Equipment*". The rental rates will be paid for the actual time that the equipment is in operation. The weekly, daily or hourly premium equipment rates shown in the Blue Book shall not be used.

Contractor owned equipment or equipment rented from another contractor that has been approved for force account work that remains idle or on standby will be paid at a rate of 50% of the hourly rate calculated above. Idle equipment shall not be paid for more than 8 hours in a day or 40 hours in a week or on days of inclement weather when no other work is taking place. Equipment that is inoperable will not be paid idle time. The Department will determine if it will be more cost effective to pay idle time on approved equipment or for multiple mobilizations.

For equipment being used to complete force account work for part of the day and idle for a part of a day, the total hours that can be charged will be 8 hours, unless the equipment is in operation for more than 8 hours. Idle time will not be paid for any equipment which operates more than 8 hours in a day

Equipment that is rented or leased from a commercial rental company will be paid for at actual invoice price, provided the prices are fair and reasonable but not to exceed the monthly rate published in "*The Rental Rate Blue Book for Construction Equipment*". The Department will pay a mark up of 15% for all rented/leased equipment for profit and overhead. The contractor shall also submit for approval the hourly operating cost for all rented/leased equipment if the rent/lease agreement does

not include these expenses. The mark up will not apply to hourly operating costs. Rented or leased equipment will not be subject to payment for idle time. The Department will determine if it will be more cost effective to leave the equipment on site idle paying invoice price or pay for multiple mobilizations.

Subsection 109.04-Methods of Payment for Extra Work, (e) Transporting Equipment, Revise to the following:

(e) Transporting Equipment

When it is necessary to bring approved equipment to the project site, the contractor will be reimbursed for these costs and the costs to return it to its original location. The cost to return shall not be more than the cost to deliver. If a piece of equipment is delivered to the project site and used for other contract pay items then return costs will not be reimbursed.

If the equipment is transported by the contractor, then payment will be by hourly rate as calculated in 109.04 (d) for other equipment. If the equipment is transported by common carrier, then payment will be the actual invoiced amount with no markup.

Subsection 109.04-Methods of Payment for Extra Work, (f) Subcontracting and Professional Services, Revise to the following:

(f) Subcontracting and Professional Services.

The contractor will be paid an administrative fee of 5% for all approved force account work completed by subcontractors and for approved special services associated with the force account work. Invoices shall be submitted for all subcontracted and professional services rendered.

Subsection 109.04-Methods of Payment for Extra Work, (g) Miscellaneous, Revise to the following:

(g) Miscellaneous.

No additional allowance will be made for general superintendence (Superintendent), time keepers, the use of small tools, or other costs for which no special allowance is herein provided.

Subsection 109.04-Methods of Payment for Extra Work, (h) Compensation, Revise to the following:

(h) Compensation.

The Contractor's representative and the Engineer shall compare records of the cost of work done as ordered on a force account basis at the end of each day's work.

Subsection 109.04-Methods of Payment for Extra Work, (I) Statements, Revise to the following:

(i) Statements.

No payment will be made for work performed on a force account basis until the Contractor has furnished the Engineer with duplicate certified itemized statements of the cost of such force account work detailed as follows:

1. Name, classification, date, daily hours, total hours, rate, and extension for each laborer and foreman.
2. Designation, dates, daily hours, total hours, rental rate, and extension for each unit of machinery and equipment.
3. Quantities of materials, prices, and extensions.
4. Transportation of materials.
5. Cost of property damage, liability and workmen's compensation insurance premiums, unemployment insurance contributions and social security tax.

Statements shall be accompanied and supported by receipted invoices for all materials used, including transportation charges. However, if materials used on the force account work are not specifically purchased for such work but are taken from the Contractor's stock, then in lieu of the invoices, the Contractor shall furnish an affidavit certifying that such materials were taken from his stock, that the quantity claimed was actually used, and that the price and transportation claimed represent the actual cost to the Contractor.

Subsection 109.06, Remove and Replace the entire subsection with the following:

When requested in writing by the Contractor and approved by the Engineer, partial payment of non-perishable materials that will be permanently incorporated into the project may be made. These materials must be stockpiled in an approved manner on or near the project site or in special cases at an off-site location because of fabrication. These off-site locations should be limited to special cases where the material cannot be readily stockpiled at the project site such as steel structure components, prefabricated bridge components, etc. Material stored at an off-site location shall be clearly marked with the project information. A map noting the location shall be provided to the Project Supervisor. The material stockpiled on the project site shall be stored in an approved manner so that the quality of the material is not compromised. No payment will be made prior to inspection and documentation by a TDOT representative. Material, whether stored on-site or off-site, shall be readily identifiable in order to reference the quantity and assigned project.

Materials that may be included in partial payments: aggregates (stored on project, not at quarry), reinforcing steel, bridge piling, structural steel (fabricated units or steel delivered to fabricator if designated for particular project), precast concrete structures, traffic signal equipment, electrical equipment, fencing materials, sign materials, guardrail, and others as approved by the Project Supervisor.

Materials that may not be included in partial payments: Living or perishable plant materials, seed, fuel, used materials, form lumber, falsework, temporary erosion items, and other temporary items that will not become part of the completed work.

The payment for stockpile materials is initiated by the Contractor with a request to the Project Supervisor. The request shall be made in writing and shall contain the following information:

- I. Request for stockpile payment that includes the following information:
 - a. Contract and Project Numbers
 - b. Item Number and Description as stated in the Contract Proposal

- c. Quantity and Unit of measure
 - d. Conversion factor, if applicable
2. Written statement of assurance that material will be used on the specific project
3. Written consent of Prime Contractor's surety
4. Copy of certified paid invoice (in order to certify, a representative of the supplier must mark the invoice as paid in full, sign and date)
5. If the certified paid invoice is unavailable, a stockpile payment may be conditionally approved with receipt of the Surety's consent and a copy of the unpaid invoice. However, the contractor must submit the certified paid invoice within 30 days following the date of the progress payment for which the stockpiled material was paid. If the certified paid invoice is not submitted, the stockpile payment will be deducted from the following progress payment. In addition, any further requests for stockpile payment of that item must be accompanied by a certified paid invoice, or stockpile payment will not be paid.
6. Material certifications/Test reports for the material.

Partial payment will only be considered for an invoice or accumulation of invoices totaling \$5,000.00 for each eligible pay item. Individual invoices shall not total less than \$2,500.00. Invoices may include tax and freight. Partial payment shall not exceed 100% of the invoice amount or 75% of the contract unit price, whichever is less.

Stockpile payments shall not exceed the contract amount, unless the contract amount is increased by an approved change order. Payments will not be made for items that will be incorporated permanently into the project within 30 days from request of stockpile payment.

The Contractor shall assume full responsibility for the stockpiled materials from the elements and against loss or damage by any cause. In the event any of these stockpiled materials become lost, stolen, impaired or damaged after partial payment has been made, the monetary value of the lost, stolen, impaired or damaged material as may have been paid for in a current estimate will be deducted from the next estimate, and no further payment will be made until such material has been satisfactorily replaced in accordance with specification requirements.

The department will not withhold retainage from the Contractor. No monthly estimate or partial payment will be made when the total value of the work done since the last previous monthly estimate amounts to less than \$1000.00.

After the first partial payment, the Department reserves the right to withhold any subsequent partial payments until it has been completely satisfied by the Contractor that his labor, material, and equipment costs and any claims for other reasons are paid on a current basis. Should any defective construction or material be discovered, or should a reasonable doubt arise as to the satisfactory quality of any part of the construction completed prior to final acceptance and payment, there will be deducted from the first estimate rendered after the discovery of such defective or questioned construction, and if necessary, from subsequent estimates, an amount sufficient to insure the replacement of such work by the Contractor or by others as may prove necessary.

Subsection 109.08 New, insert the following:

109.08-Payment of Costs Owed to the Department.

The Contractor, without prejudice to the terms of the Department Contract, shall be liable to the Department for any or all of the following: fraud or such gross mistakes as may amount to fraud, the Department's rights under any warranty or guarantee, or any latent defects in the work.

The Department reserves the right to set off against any amount otherwise due the Contractor or his Sureties, or both, under this Contract or under any other contract or arrangement, including payment obligations under **Section 109.04** of these Specifications, that the Contractor or his Sureties, or both, has with the Department, the following:

1. any costs that the Department has incurred due to noncompliance with this contract by the Contractor or his Sureties, or both, and
2. any other amounts that are due and payable from the Contractor or his Sureties, or both, to the Department

200SS

200SS

Sheet 1 of 31

STATE

OF

TENNESSEE

Rev. 10-20-07
Rev. 03-23-09
Rev. 05-5-2010
Rev. 08-06-2012

March 1, 2006

Supplemental Specifications - Section 200

of the

Standard Specifications for Road and Bridge Construction

Subsection 201.03-Clearing and Grubbing. Replace the entire subsection with the following:

201.03-Clearing and Grubbing. The Engineer or Contractor when required will establish rights-of-way lines and construction lines, and the Engineer will designate all trees, shrubs, plants, and other objects to remain. The rights-of-way necessary for construction, as directed by the Engineer, shall be cleared of all dead trees, stumps, brush, projecting roots, hedge, weeds, pole stubs, logs, and other objectionable material. All trees, stumps, roots, pole stubs, brush, hedge, and other protruding obstructions within the area bounded by lines 5 ft. (1.5 m) outside the construction lines shall be completely grubbed except sound undisturbed stumps and roots which will be a minimum of 5 ft. (1.5 m) below subgrade or slope of embankment may be allowed to remain in place provided undercutting or other corrective measures, or topsoil stripping is not stipulated in the Plans or directed by the Engineer and providing stumps do not extend more than 6 in. (15 cm) above the ground surface. This work shall be done in advance of excavation and embankment operations.

Before construction activities begin, two types of areas must be marked within the project site. First, the limits of disturbance (clearing limits) must be clearly marked using staking or another acceptable visible marking method. Second, any environmentally sensitive areas such as streams, wetlands, buffers and ARAP boundaries that are included in the project boundaries must be marked with highly visible markers. Highly visible markers must be readily visible to project personnel including equipment operators.

Clearing and grubbing operations shall be avoided in areas designated to remain undisturbed as specified in the project's Stormwater Pollution Prevention Plan and any other applicable environmental permits. For clearing and grubbing activities associated with borrow pits or waste areas furnished by the Contractor, the borrow pits or waste areas must be approved in advance by the Project Supervisor, the Environmental Coordinator, and the Environmental Division and operated and maintained in accordance with the Procedures for Providing Offsite Waste and Borrow on TDOT Construction Projects Manual.

When embankments are to be constructed in swampy areas, and undercutting or other corrective measures are not stipulated in the Plans or directed by the Engineer for these areas, undisturbed trees and stumps may be cut off at not more than 6 in. (15 cm) above the ground surface or low water level and the stump and root mass remain in place, if approved by the Engineer.

Unless marked for removal by the Engineer, living trees more than 5 ft. (1.5 m) outside the construction lines of the road are to be undisturbed, and are to be protected by the Contractor during construction of the project. Cut or scarred surfaces of trees or shrubs shall be treated with a paint prepared especially for tree surgery.

Clearing of hedge, weeds, pole stubs, logs, and other objectionable material inside the rights-of-way but outside the construction lines shall be completed to the ground surface.

Low hanging branches and unsound or unsightly branches on trees or shrubs designated to remain shall be removed as directed. Branches of trees extending over the roadbed shall be trimmed to give a clear height of 20 ft. (6 m) above the roadbed surface. All trimming shall be done by skilled workmen and in accordance with good tree surgery practices.

Trees more than 5 ft. (1.5 m) outside the construction lines and marked for removal by the Engineer shall be cut off within 6 in. (15 cm) of the ground surface. All stumps more than 5 ft. (1.5 m) outside the construction lines shall be trimmed to within 6 in. (15 cm) of the ground surface.

Wood debris that is chipped on site shall be properly disposed of so that does not become part of embankment. Within the areas where embankments are to be constructed, all depressions resulting from grubbing operations shall be backfilled with suitable excavation material and compacted in accordance with the provisions of Section 205 to natural ground elevation before embankment construction is started.

Depressions in excavation areas which are below finished subgrade elevation resulting from grubbing operations shall be backfilled with suitable material and compacted to finished subgrade in accordance with the provisions of Section 205 during the excavation operations.

Backfilling shall be completed a satisfactory distance ahead of embankment construction operations.

All slopes of cuts, embankments, ditches, channels, waterways and all structures both old and new, shall be cleared of all brush, hedges, weeds, heavy vegetation, and other objectionable material; and shall be maintained in a neat and satisfactory condition until the project is accepted.

Areas approved as borrow pits by the Engineer shall be cleared and grubbed of all trees, stumps, brush and heavy vegetation. Areas designated for obtaining construction material other than borrow material shall be cleared and grubbed of trees, stumps, brush and vegetation, and in addition shall be stripped of overburden laying above the material to be obtained. This work shall be completed well in advance of the removal of borrow or construction materials. Any offsite borrow areas must also be in accordance with the Procedures for Providing Offsite Waste and Borrow on TDOT Construction Projects Manual

Areas within the limits of all drainage structures shall be cleared of all objectionable material to within 3 in. (75 mm) of the ground surface. Such areas shall extend the full length of the structures, as measured along the center-line of the highway, and to the rights-of-way lines along lines parallel to the centerline of the inlet and outlet channel or drainage of the structure. These areas shall also include the entire area of all easements obtained for drainage purposes.

Subsection 201.04- Disposal of Debris. Replace second paragraph with the following:

When permitted by the Engineer, perishable materials and debris may be removed from the rights-of-way and disposed of at locations off the project, outside the limits of view from the project during all seasons as long as the work is in accordance with the Procedures for Providing Offsite Waste and Borrow on TDOT Construction Projects Manual. The cost involved shall be

included in the bid cost for the project. In addition the material shall be disposed of in accordance with all applicable laws and ordinances regarding solid wastes as per Tennessee Department of Environment and Conservation requirements.

Subsection 201.05-Method of Measurement. Add the following to the end of the first paragraph.

“When the bid schedule contains an item for Clearing and Grubbing on a lump sum basis, no measurement of area will be made.”

Subsection 201.06-Basis of Payments. Revise entire subsection to the following:

“Payment for Clearing and Grubbing shall be made at the contract unit price per lump sum and shall be full compensation for completing the Clearing and Grubbing as outlined on the Plans and in these Specifications.”

Payment for Clearing and Grubbing (Borrow Pits) at the contract unit price per acre (hectare) shall be full compensation for completing the Clearing and Grubbing of Department furnished borrow pits as outlined in the Plans and in these Specifications. These borrow areas will be furnished in accordance with the Procedures for Providing Offsite Waste and Borrow on TDOT Construction Projects Manual.

Subsection 202.03-General. Replace the last sentence of the first paragraph with the following:
Material disposed of on private property shall be disposed of in accordance with the Procedures for Providing Offsite Waste and Borrow on TDOT Construction Projects Manual.

Subsection 202.04- Removal of Bridges, Culverts, and Other Drainage Structures. Replace the entire subsection with the following:

202.04-Removal of Bridges, Culverts, and Other Drainage Structures. Bridges, culverts and other drainage structures in use by traffic shall not be removed until satisfactory arrangements have been made to accommodate traffic. All bridge, culvert and drainage structure removal from streams must comply with any terms and conditions specified in applicable environmental permits, including the TN Construction General Permit. The Contractor will use highly visible markers to clearly mark permit boundaries and disturbed area limits.

Unless otherwise specified or directed, such portions of the substructures of bridges located in a stream shall be removed to 1 ft. (30 cm) below the adjacent ground level or natural stream bottom or the lowest scour elevation shown on the contract plans if shown to uncover the existing portion of the substructure. An exception to the above rule may occur if such portions of the substructure of a bridge are located in a stream or wetland, and then it shall be subject to the requirements set out in the permit form of the applicable State and Federal agencies approving the location and plans and authorizing the construction of the bridge. Where such portions of existing structures lie wholly or in part within the limits for a new structure, they shall be removed as necessary to accommodate the construction of the proposed structure.

Steel bridges, precast or precast prestressed bridges and wood bridges designated to become the property of the Department shall be carefully dismantled without unnecessary damage. All such material shall be stored as specified in **Subsection 202.03.**

The removal of bridge decks shall be governed by the following:

1. Where bridge decks are to be wholly removed, but the girders are to remain in service;
 - A. If the contractor elects to employ concrete saws to aid in the removal of the concrete deck, sawing transverse, the depth of the cut may not exceed the following :
 - Decks supported by steel beams or girders, 3-in. (75mm.)
 - Decks supported by prestressed concrete beams, 3-in. (75mm.)
 - Decks of cast-in-place hollow box or t-beam bridges, 1-in. (25mm.)
 - B. The remainder of the slab depth under the cuts must be completed using pneumatically or electrically operated chipping hammers, not exceeding 60 lbs. (27.2 kgs.) in weight.
 - C. Longitudinal saw cuts may be full depth, but no closer than –
 - Decks supported by steel beams or girders, within 1-in. (25 mm) of the widest top flanges.
 - Decks supported by prestressed beams, within 1 in. (25 mm) of the top flange.
 - Decks of hollow boxes or t-beam bridges, within 1-in. (25 mm) of the web, unless otherwise noted on the contract plans.
2. Where only the slab overhangs are to be removed, and if the contractor elects to employ concrete saws to aid in the removal of overhangs, only the top 1-in. (25 mm) of the slab may be saw cut. Pneumatically or electrically operated chipping hammers, not exceeding 60 lbs. (27.2 kgs.) in weight may be used to remove the remainder of the concrete. Care shall be taken not to damage transverse slab reinforcing bars.
3. Where bridge decks are to be removed as part of complete bridge demolition and the contractor elects to employ concrete saws in the removal of the deck, the depth of the cuts may not exceed the following:
 - A. Decks supported by steel beams or girders, the plans depth of slab minus 1-in. (25 mm).
 - B. Decks of hollow box or t-beam bridges; if not otherwise shown on the contract plans, the contractor shall submit a plan to the engineer for approval.

The use of hoe rams, pneumatic shears, pavement breakers, or other heavy equipment to remove slabs, where girders or adjacent slab portions are to remain, is strictly prohibited.

Blasting or other operations necessary for the removal of an existing structure or obstruction, which may damage new construction, shall be completed prior to placing the new work, or adequate precautions shall be taken to prevent such damage.

Subsection 203.01 Description. Add the following as the last paragraph to this Subsection:

The Contractor must address both natural and created steep slope areas as required in the TN Construction General Permit. Steep slope requirements for erosion prevention and sediment controls and stabilization shall be in accordance with the TN Construction General Permit and any other applicable environmental permits.

Subsection 203.02-Classification. Replace the entire subsection with the following:

(a) Road and Drainage Excavation (Unclassified).

All excavation performed under this Section, including portland cement concrete located above subgrade elevation, other than Borrow Excavation, Channel Excavation, and Undercutting, will be considered unclassified excavation regardless of the nature of the material excavated.

(b) Borrow Excavation.

Borrow Excavation shall consist of material required for the construction of embankments or other portions of the work and shall be obtained from approved sources outside the right-of way limits in accordance with the Procedures for Providing Offsite Waste and Borrow on TDOT Construction Projects Manual, unless otherwise designated in the Plans. However, any material, other than Borrow Excavation (Unclassified), as may be found in the excavation that meets the specifications of the designated borrow material may be used in the project in accordance with the conditions prescribed in **Subsection 104.10**. However, if the flattening of certain cut slopes on projects graded under previous contracts is desirable and approved in writing by the Engineer, the Contractor will be permitted to use this material for borrow provided the material is satisfactory and in accordance with plans approved by the Engineer, and provided he complies with the requirements of **Subsection 203.04** regarding borrow areas. Borrow material shall not be obtained from wetland areas, unless otherwise noted on the Plans and approved by applicable environmental permits

Borrow shall be classified as Borrow Excavation (Solid Rock), Borrow Excavation (Graded Solid Rock), Borrow Excavation (Unclassified), or Borrow Excavation (Select Material). Borrow Excavation (Solid Rock) shall consist of the removal and satisfactory placement of non-degradable rock which cannot be economically excavated by the proper use of a power shovel or without the use of explosives. Borrow Excavation (Unclassified) shall consist of the removal and satisfactory placement of all approved material encompassed under the classification of Borrow Excavation (Solid Rock) and all other approved material.

Borrow Excavation (Graded Solid Rock) shall consist of the removal and satisfactory placement of sound, non-degradable rock with a maximum size of 3 ft. (1 m). At least 50 percent of the rock shall be uniformly distributed between 1 ft. (30 cm) and 3 ft. (1 m) in diameter and no greater than 10 percent shall be less than 2 in. (50 mm) in diameter. The material shall be roughly equi-dimensional in shape. Thin, slabby material will not be accepted. The Contractor shall be required to process the material with an acceptable mechanical screening process that produces the required gradation. When the material is subjected to five alternations of the sodium sulfate soundness test (AASHTO T 104), the weighted percentage of loss shall be not more than 12. The material shall be approved by the Engineer before use.

Borrow Material other than solid rock shall be AASHTO M 145, classification A-6 or better if reasonably available. If classification A-6 is not reasonably available, the borrow shall be no worse than the predominant soil type in the roadway excavation based on AASHTO classification.

Borrow Excavation (Select Material) for special construction purposes shall meet the requirements set forth in the Contract.

Material obtained from an approved borrow source off the right-of-way as provided in this Subsection shall not be utilized to produce processed aggregate as described in Section 903. In no case shall material excavated from an offsite borrow source be utilized in base or other paving courses above the elevation of the subgrade.

Unless otherwise designated in the Contract, the Contractor shall make his own arrangements for obtaining borrow material in accordance with the Procedures for Providing Offsite Waste and Borrow on TDOT Construction Projects Manual.

(c) Channel Excavation (Unclassified).

This item shall consist of the removal and satisfactory disposal of all material, regardless of its nature and the manner in which it may be removed, that is excavated for channel changes in widening, deepening, and straightening existing channels or constructing new ones, which have a width at the bottom of more than 14 ft. (4 m) as indicated on the Plans. All other similar excavation with a bottom width 14 ft. (4 m) or less, as shown on the Plans, shall be paid for as Road and Drainage Excavation (Unclassified). Any channel excavation that includes an existing stream or a proposed stream relocation must be constructed as specified in the applicable environmental permits.

(d) Undercutting.

This item shall consist of removing and disposing of unsatisfactory materials below grade in cut sections, from areas upon which embankments are to be placed, and may also include material excavated below the Foundation elevation for pipe, box culverts and box bridges as described in **Subsection 204.12**. Undercutting does not include the stripping, stockpiling and placing of topsoil, described in **Subsection 203.06**, nor does it include step-benching in the preparation of embankment areas on hillsides. Disposal of undercutting material off rights-of-way shall be conducted in accordance with the Procedures for Providing Offsite Waste and Borrow on TDOT Construction Projects Manual.

Subsection 203.04 General. Replace the entire subsection with the following:

203.04-General. Prior to beginning excavation, grading, and embankment operations in any area, all necessary Clearing and Grubbing, Removal of Structures and Obstructions and placement of Erosion Control Devices in that area shall have been performed in accordance with **Section 201**, **Section 202** and **Section 209**, respectively, of these Specifications.

Excavation materials shall be removed in such a manner that the slopes may be neatly trimmed to the lines given. The Engineer may change the slopes shown on the original cross sections, depress raised medians or islands, raise depressed medians or islands or daylight cuts to increase or decrease the quantity of Road and Drainage Excavation (Unclassified) provided the material can be excavated without blasting and these changes are set in the slope stakes prior to commencement of excavation of the affected slopes, medians or islands. Any additional material

thus obtained shall be paid for at the contract unit price bid for Road and Drainage Excavation (Unclassified).

Excavation required to correct slides, regardless of its location relative to the theoretical slope line, or excavation required to prevent potential slides including blasting, and the dressing, reshaping or flattening of the affected slopes as directed by the Engineer, shall be paid for under the Item for Road and Drainage Excavation (Additional Material) in accordance with **Subsection 203.10**. If it becomes necessary to flatten a slope to correct a slide or prevent a potential slide after the cut has been started but not completed, payment under Road and Drainage Excavation (Additional Material) will be limited to material removed between the original staked slope line and the newly established slope line above the elevation to which the cut has been made. All other material will be paid for at the contract unit price of Road and Drainage Excavation (Unclassified). Seeding, sod and other incidental items required to repair the slide area will be paid for at the contract unit price bid for the respective items.

If more material is required to complete the embankments after all cuts have been brought to grade and all Road and Drainage Excavation (Unclassified) has been removed from within the balance, additional materials shall be obtained from within the rights-of-way by flattening, widening or daylighting cut slopes, and by depressing raised medians or islands at locations designated and as directed by the Engineer provided:

- (a) The cost of this material is more economical than borrow excavation.
- (b) The material is available within the adjusted balance where the shortage exists or the material may be hauled outside the limits of adjusted balance if the cost of the material is more economical than borrow when the additional cost of overhaul is considered.
- (c) The material can be excavated without blasting.
- (d) There is a minimum of 20 ft. (6 m) between the top of the existing slope and the top of the new slope and minimum of 5 ft. (1.5 m) between the top of the new slope and Rights-of-Way Line or Control Access fence. The 20 ft. (6 m) minimum will not apply when the existing slope is 4:1 or flatter or to overlapping or near overlapping slopes in medians or between parallel roads or ramps. The 20 ft. (6 m) minimum may be reduced at the written request of the Contractor.

This additional material is to be paid for under the item for Road and Drainage Excavation (Additional Material) in accordance with **Subsection 203.10**.

When additional material is paid for under the item for Road and Drainage Excavation (Additional Material) and additional clearing and grubbing is required, the additional clearing and grubbing will be measured and paid for by the acre (hectare), provided the item for Adjusted Clearing and Grubbing is in the Contract, or as negotiated. No additional payment will be made for extra handling of stockpiled topsoil made necessary by the use of the item for Road and Drainage Excavation (Additional Material).

The roadbed through rock cuts shall be constructed to the grading line shown on the Plans, with an allowable working tolerance of plus 1 to minus 3 in. (plus 25 to minus 75 mm). The portions of the roadway that are less than 3 in. (75 mm) below grade shall be brought to grade with spalls or other suitable granular material that is available from the excavation within the

balance. If such excavation is not available, the Engineer may direct the Contractor to use approved base material for capping. Payment for furnishing and placing said base material will be made at the contract unit price bid per ton (metric ton) for the applicable Item in **Subsection 303.14**. When base material is not a bid item in the Contract, the material shall be furnished under the provisions of **Subsection 104.03**. If the roadbed is excavated in excess of 3 in. (75 mm) below the grading line shown on the Plans, the Contractor will be required to furnish and place at his own expense sufficient amounts of spalls or base material to bring the roadbed to a line 3 in. (75 mm) below the grading line.

Where sodding is indicated on the Plans to be placed on rock cuts, the rock shall be removed to 1 ft. (30 cm) below the grading line and backfilled to grade with earthen material prior to placing the sod. Measurement and payment of this work will be made under Items for Roadway and Drainage Excavation (Unclassified) and Sodding (New Sod).

All suitable materials removed from the excavation areas shall be used in the construction of embankments, intersecting road approaches, and in such other places as directed. Embankment construction shall be performed in accordance with the provisions of **Section 205** of these Specifications.

When boulder formations occur, the roadbed in the excavation area shall be scarified and all boulders removed to a depth of 12 in. (30 cm) below grade. The cavities thus formed shall be backfilled with suitable material and compacted.

All rock cuts shall be presplit at the outside limits of the cut areas. Presplitting shall consist of forming a plane of split rock prior to any primary blasting. The plane shall be formed for the entire depth of the cut or to a predetermined bench level. Presplitting shall be accomplished by drilling holes of appropriate size to the desired depth along the outside limits of the cut area, loading such holes with appropriate charges of explosives, stemming with minus 3/8 in. (9.5 mm) clean stone chips to the collar of the holes and detonating simultaneously. The initial horizontal spacing of holes and vertical spacing of charges and blasting cord for simultaneous detonation shall be as recommended by a reliable powder company. Adjustments of horizontal hole spacing and vertical spacing of charges shall be made as necessary to obtain a relatively smooth shear plane. Sand, gravel, clay, or dirt will not be permitted for stemming. In drilling holes for presplitting, the drills shall be plumbed for vertical slopes or set on the required slope when other than vertical slopes are specified, and all holes shall be drilled in the same plane. Presplitting will not be required on slopes flatter than 1 to 1. After presplitting is done, the drilling of primary blast holes shall be kept at least 3 ft. (1 m) or more from the presplit face. Presplitting of rock cuts under bridge sites shall be in accordance with the provisions of this Subsection and hole spacing shall be as specified under **Subsection 204.08**. Blasting records shall be made available on request by the Engineer. Blasting shall not be permitted within 300 ft. (100 m) of any Structure or concrete until at least 72 hours have elapsed after placement of the concrete. The Contractor will be responsible and replace and/or repair any and all damages at no expense to the Department.

All loose rock on cut slopes shall be removed immediately. Excavation material shall not be wasted, deposited or disposed of outside the construction lines unless directed by the Engineer. All excavation material wasted, deposited or disposed of outside the construction lines must be in accordance with the Procedures for Providing Offsite Waste and Borrow on TDOT Construction Projects Manual. Obliteration of old roadways shall include all grading operations necessary to incorporate the old roadway into the new roadway and surroundings in order to provide a pleasing appearance from the new roadway.

Removal of concrete pavement, base, parking strip, sidewalk, curb and gutter, etc. will be paid for under the classifications as prescribed in **Subsections 202.06 and 203.02(a)**. Roadway obliteration will be paid for as Road and Drainage Excavation (Unclassified).

When the Contractor's excavating operations encounter remains of prehistoric people's dwelling sites or artifacts of historical or archaeological significance, the operations shall be temporarily discontinued. The Engineer will contact archaeological authorities to determine the disposition thereof.

The Engineer shall designate as unsuitable those soils that cannot be properly compacted in embankments. All unsuitable soil shall be disposed of as directed at no additional cost.

When the location of unstable soil is shown on the Plans, its removal and replacement shall be as shown.

The Contractor shall notify the Engineer sufficiently in advance of opening any borrow area so that, after stripping, cross section elevations and measurements of the ground surface may be taken, and so that the borrow material can be tested before being used. The borrow area shall be approved in accordance with the Procedures for Providing Offsite Waste and Borrow on TDOT Construction Projects Manual. At least 14 days' time shall be allowed for testing borrow materials or other material from roadside pits that is proposed for construction purposes.

Unless otherwise permitted, borrow material shall not be placed until after the roadway excavation has been placed in the embankments. If the Contractor places more borrow than is required and thereby causes a waste of excavation, the amount of such waste will be deducted from the borrow volume as measured in the borrow area. The Contractor shall not excavate beyond the dimensions and elevations established.

When the Contractor elects to remove highway fencing to obtain borrow materials, the fencing shall be replaced with new fence at the Contractor's expense. The Contractor shall be responsible for the confinement of livestock when a portion of the fence is removed.

Borrow pits shall be approved in accordance with the Procedures for Providing Offsite Waste and Borrow on TDOT Construction Projects Manual and excavated in such a manner that they will be self-draining where possible and practicable, and shall be of a shape that can be easily cross sectioned.

When the Contractor's excavation operations are completed the area shall have a neat appearance. All borrow areas, except those portions which are under water in the case of pits which are not self-draining, shall be covered with topsoil and stabilized in accordance with the Procedures for Providing Offsite Waste and Borrow on TDOT Construction Projects Manual.

Furnishing and placing of topsoil and seeding (with mulch) shall be performed in accordance with the provisions of **Subsection 203.06** and **Section 801**, respectively.

Furnishing and placing topsoil and stabilization of borrow areas, as specified above, shall be included in the bid cost for the project as specified in the Procedures for Providing Offsite Waste and Borrow on TDOT Construction Projects Manual.

The Contractor's attention is called to **Sections 53-801 through 53-809** of the **Tennessee Code, Annotated**, the provisions of which apply to borrow pits 1 acre (4047 m²) or more in size that are not self-draining. Full information regarding the requirements to be complied with and the necessary permits which the property owner must secure for the construction of a pond, lake, borrow pits, etc., one acre or larger which is not constructed to drain, will be supplied upon application to the Tennessee Department of Environment and Conservation.

All existing roads within the right-of-way and not in the graded area that are to be abandoned shall be scarified, obliterated, top-soiled, and seeded. Scarifying and obliterating the pavement

will not be measured and paid for directly, but the cost will be included in the cost of other items. Topsoil will be measured and paid as outlined in **Section 203.09** and **203.10**. Seeding, in accordance with **Section 801** of these Specifications, will be measured and paid for under the item for Seeding.

When additional material is paid for under the item for Road and Drainage Excavation(Additional Material) and additional clearing and grubbing is required, the additional clearing and grubbing will be measured and paid for by the acre (hectare), provided the item for Adjusted Clearing and Grubbing is in the Contract, or as negotiated. No additional payment will be made for extra handling of stockpiled topsoil made necessary by the use of the item for Road and Drainage Excavation (Additional Material).

Subsection 203.05-Undercutting. Add the following as the last sentence of the first paragraph:

If undercutting material is to be disposed of off rights-of-way, disposal shall be conducted in accordance with the Procedures for Providing Offsite Waste and Borrow on TDOT Construction Projects Manual, and the site to be used for disposal must be approved in advance by the Project Supervisor, Environmental Coordinator, and the Environmental Division.

Subsection 203.06-Stripping, Stockpiling and Placing Topsoil. Revise the first paragraph to the following:

203.06-Stripping, Stockpiling and Placing Topsoil. The Engineer will designate areas between slope stake points in both cut and fill from which the existing topsoil shall be stripped and stockpiled. The quantity of topsoil to be stripped shall be sufficient to provide, over all areas to be seeded, a depth of 2 to 3 in. (50 to 75 mm) of the material. If the quantity of topsoil available in such areas is insufficient, the Contractor shall make up the deficiency with topsoil from an approved borrow area in accordance with the Procedures for Providing Offsite Waste and Borrow on TDOT Construction Projects Manual. The quantity of topsoil from such a source shall be measured by cross sectioning the area before and after removal.

Subsection 203.07-Disposal of Excess or Unsuitable Material. Revise the entire subsection to the following:

203.07-Disposal of Excess or Unsuitable Material. Excess excavation material shall be used to raise, widen or flatten the slopes of embankments; to fade embankments into cuts; or be placed in such other locations and for such purposes as the Engineer may direct.

Specific instructions will be given by the Engineer regarding the disposal of surplus material. Excess or unsuitable material placed within the rights-of-way limits shall be placed and compacted in accordance with **Subsection 205.04**. Foundation preparation for and drainage through these waste areas shall be equivalent to that provided for the adjacent roadway embankment.

If no suitable place can be found to dispose of excess or unsuitable material within the limits of the rights-of-way, the Engineer may direct the Contractor to provide a suitable site off the rights-of-way at no additional cost in accordance with the Procedures for Providing Offsite Waste and Borrow on TDOT Construction Projects Manual.

Furnishing and placing topsoil and seeding waste areas inside the Rights-of-Way shall be measured and paid for at the contract unit prices bid for the respective items. Furnishing and

placing topsoil and seeding on waste areas outside the Rights-of-Way in accordance with the above provisions will not be paid for directly, and the costs thereof shall be included in the unit price bid for other items of construction.

When waste material is placed off the rights-of-way which, in the judgment of the Engineer, are so removed from the rights-of-way as to not constitute a potential threat to the stability of the project, the contractor should follow the requirements outlined in the Procedures for Providing Offsite Waste and Borrow on TDOT Construction Projects Manual to ensure the waste area is properly designed, regulated, and implemented.

Subsection 203.09-Method of Measurement. Delete the next to the last paragraph which begins with, "Overhaul of Road and Drainage Excavation".

Subsection 203.10-Basis of Payment. Delete the last paragraph.

Subsection 204.02-Classification (g) Bedding Material for Support for Pipe Culverts. Add the following sentence to (g):

"Payment for Type "A" or Type "B" backfill including bedding material will be included in the unit price of the pipe unless otherwise specified in the plans."

Subsection 204.06 Add the following before section (a)

"The contractor shall submit for approval a proposed mix design in accordance with **Subsection 604.03.**"

Subsection 204.06 (a), second paragraph, Delete the first sentence and replace with the following:

"The above Specification Limits may be adjusted by the Engineer to obtain the consistency required for satisfactory flow."

Subsection 204.08-Excavation (a) and (c). Replace Subsection (a) and (c) with the following:

(a) Bridges, Box Culverts and Other Major Structures.

Before excavation is started the Engineer or Contractor when required, will set stakes locating and outlining the structure and cross section for excavation computations. The Contractor will also use highly visible markers to mark disturbed area and undisturbed area limits. Highly visible markers must be readily visible to project personnel including equipment operators. No excavation shall be started prior to that time.

All structure excavation shall be cut to the lines and elevations indicated on the Plans, or as directed by the Engineer. Working variations outside the neat lines will be permitted; however, only that excavation outlined under **Subsection 204.12** will be measured for payment.

No excavated materials shall be deposited or disposed of outside the construction lines unless directed and approved by the Engineer in accordance with the Procedures for Providing Offsite Waste and Borrow on TDOT Construction Projects Manual.

When solid rock is encountered in roadway cut sections and channel sections under bridges, presplitting operations shall be performed in accordance with the provisions of **Subsection 203.04.** Hole spacing along bridge abutment sites shall not exceed 12 in. (30 cm). Where overshooting of rock, beyond the cut sections shown on the bridge plans

cause modification of bridge abutments or span lengths, such modifications shall be made at the contractor's expense.

Inclined surfaces of rock used as foundation shall be excavated either level or in steps. When necessary, as determined by the Engineer, to obtain good bond, the surface of rock foundation shall be roughened, or suitable anchors installed. Over-excavations that require re-design, or increased bridge length and/or quantities, or supplemental retaining walls or other earth retaining structures shall be paid at the expense of the Contractor.

Existing concrete foundations, boulders, or ledge streaks of rock projecting into the bottom of the excavation shall be removed to a depth of 6 in. (15 cm) below foundation elevation, and the space backfilled with approved material and thoroughly compacted.

Excavation below bridge foundation elevations as given shall be done only upon direction of the Engineer. All materials moved without such authority shall be replaced by the Contractor without compensation by constructing a sub-footing of the same materials as the footing of the structure unit and 6 in. (15 cm) wider on every side.

(c) Utilization of Excavated Materials.

All suitable excavated material shall be utilized as backfill or embankment. Excess or unsuitable material shall be disposed of in such a manner as not to obstruct the stream or otherwise impair the efficiency or appearance of the structure. No excavated material shall be deposited at any time in such a manner as to endanger a partly finished structure.

The Contractor shall handle and deposit excavated materials in such a manner as to furnish proper protection to materials which will be incorporated in the structure.

In streams, the disposal of material will be subject to the laws of the U.S. Government and requirements set out in the TN Construction General Permit and any other applicable environmental permits.

Subsection 204.09-Protection of Excavation. Replace the entire subsection with the following:

204.09-Protection of Excavation. The Contractor will be held responsible for protecting his excavation and shall take every precaution to maintain the excavation intact.

Cofferdams or cribs, used in the preparation and protection of the foundation, in general, shall be carried well below the bottom of the footings, shall be substantially braced in all directions; and shall be of such construction as will permit them to be pumped and maintained free of water until the construction therein has been completed. All dewatering of work areas of must comply with the requirements of the TN Construction General Permit and shall not cause a water quality violation. Unless otherwise specifically indicated on the Plans, the interior dimensions of the cofferdam will be such as to give sufficient clearance to provide for the construction and inspection of forms; and to provide for the handling and pumping of leakage outside of the footing area. Cofferdams or cribs which tilt or move out of position during the process of sinking shall be righted or enlarged in order to provide the necessary clearance.

Cofferdams or cribs shall be so constructed as to protect the foundation and the construction therein against damage from a rise in the stream.

Timber, or bracing of a cofferdam or crib may extend into or through the substructure only with the written permission of the Engineer, obtained before the construction of the cofferdam or

crib has been started. In addition, the cofferdams for structure widening shall not be braced off of the existing structure.

The Contractor shall submit drawings, prepared by and stamped by a Professional Engineer licensed in Tennessee, showing details of his proposed cofferdam, or crib construction to the Engineer, prior to starting any work. The type and clearance of cofferdams, or cribs, insofar as they affect the finished structure or part thereof, will be subject to the approval of the Engineer but the design and successful construction shall be the responsibility of the Contractor. Work in a stream shall not begin until applicable permits from state and federal agencies have been obtained. Cofferdam construction shall be in accordance with the requirements of the permit(s).

Cofferdams or cribs, with all falsework, sheeting, bracing, etc. shall be removed by the Contractor after the completion of the sub-structure therein, unless otherwise directed. The removal shall be affected in such a manner as not to disturb nor mar the completed work.

If the foundation excavation has become disturbed or distorted, it shall be cleaned out and restored to satisfactory condition at the Contractor's expense.

Subsection 204.10-Foundation Preparation. Replace the entire subsection with the following:

204.10-Foundation Preparation.

(a) Bridges, Box Culverts, and Other Major Structures.

The preparation of foundations for bridges, box culverts and other major structures, in addition to the stipulations set out in **Subsections 204.08** and **204.09**, shall be in accordance with the following:

When the foundation has been completed to foundation elevation as given, the Engineer shall be notified and the construction therein withheld pending his inspection and approval of the foundation.

When directed by the Engineer, unless piles are indicated, the Contractor shall test each foundation in the presence of the Engineer, by sinking not less than 3 holes, or more than 6 holes to a depth of between 6 and 10 ft. (1.8 and 3 m) in order to verify the apparent conditions of the foundations.

Should these test holes disclose unsatisfactory foundation conditions, the excavation shall be carried lower, as directed by the Engineer, and new tests made, until a satisfactory foundation is secured. The costs incurred in sinking test holes will not be paid for directly but shall be included in the price bid for other items of construction unless specified otherwise on the Contract drawings.

When rock is encountered in the excavation for the foundation, it shall be cleared off and the Engineer notified. Test holes shall then be drilled in the rock as shown on the Plans or directed by the Engineer to determine the lines of demarcation, the classification and the stability of the rock. The excavation shall then be continued to the elevation designated by the Engineer and test holes, if required by the Engineer, shall again be drilled and excavation continued until a foundation approved by the Engineer is secured.

Rock used as foundation shall be stripped and cleaned of all overlying materials. All loose, disintegrated, or light slabby portions of the rock shall be removed.

In rock foundations, when the rock is shattered below the foundation elevation, the shattered material shall be removed and the space so created rebuilt with the same type of

construction as the proposed overlying construction. The additional quantities thus made necessary shall not be included in the pay quantities for this item.

When the Plans indicate that piles shall be driven, or if after the foundation excavation has been completed it becomes necessary to reinforce the foundation by driving piles therein, any bulge of the foundation material, caused by the driving of the piles, shall be removed at the Contractor's expense, to the elevation indicated or directed and the foundation trued to an even surface over its entire area.

Unsatisfactory material in the foundation shall be removed and replaced with satisfactory material designated by the Engineer. This material shall be placed in layers not exceeding 6 in. (15 cm) in loose depth and compacted to 100 % of maximum density up to the foundation elevation.

Any pumping that may be permitted from the interior of any foundation enclosure shall be done in such a manner as to preclude the possibility of any portion of concrete material being carried away. Any pumping required during the placing of concrete, or for a period of at least 24 hours thereafter, shall be done from a suitable sump located outside the concrete forms. All dewatering of work areas must comply with the requirements of the TN Construction General Permit and shall not cause a water quality violation.

When conditions are encountered which render it impracticable to dewater the foundation before placing the footing, the Engineer may permit the construction of a concrete foundation seal of such dimensions as he may consider necessary and of such thickness as to resist any possible uplift. Before pouring the seal, the foundation shall be cleaned of all objectionable material by the use of sand pumps, spud bars or other means which will accomplish the purpose satisfactorily. The seals shall then be constructed in accordance with the provisions of **Subsection 604.19**. Pumping to dewater a sealed cofferdam shall not commence until the seal has set sufficiently to withstand the hydrostatic pressure. The foundation shall then be dewatered and the seal thoroughly cleaned of all laitance and generally prepared for further construction.

Measurement and payment for concrete foundation seal will be as provided for under **Subsections 604.31** and **604.32** except as provided for in 204.13.

(b) Pipe Culverts.

Bedding for pipe culverts shall conform to the requirements given below for Class A, B, or C bedding, whichever is shown on the Plans or in the special provisions. If the class of bedding is not shown, Class C bedding shall be placed.

Class A bedding for pipe culverts shall consist of a continuous concrete cradle constructed in conformity with the details shown on the Plans and the applicable requirements of **Section 604** (Concrete Structures).

Class B bedding shall be constructed by bedding the culvert pipe in a trench cut in natural ground or compacted embankment to a depth as shown on the Plans. The pipe shall be bedded on a 6 in. (15 cm) thickness of Class B Material and sufficient additional Class B material accurately shaped by a template to fit the lower part of the pipe exterior for at least 10% of its overall height. Class B material shall then be rammed and tamped in layers not over 6 in. (15 cm) in loose thickness around the pipe to a minimum depth of that shown on the Plans. The remaining depth of trench shall then be backfilled and compacted as outlined in **Subsection 204.11(b)**. When bell and spigot pipe is to be placed, recesses shall be dug in the bedding material of sufficient width and depth to

accommodate the bell without its resting on the bottom of the recess. The width of the recess shall not exceed the width of the bell by more than 2 in. (50 mm).

When plastic pipe is to be placed, the bedding and backfill shall be granular compactable Type "A" or Type "B" Aggregate, Grading D or E material meeting the requirements of **Subsection 903.05**. Open graded aggregates will not be allowed. A minimum of 6 inches of bedding compacted to a minimum 90% Standard Proctor Density shall be provided prior to placement of the pipe unless otherwise specified.

Class C bedding shall be constructed by bedding the culvert pipe in a shallow trench cut in natural ground or compacted embankment to a depth of not less than 10% of the outside vertical pipe diameter, and shall be shaped to fit the lower pipe exterior for the specified embedment. When bell and spigot pipe is to be placed, recesses shall be dug in the earth foundation of sufficient width and depth to accommodate the bell without its resting on the bottom of the recess. The width of the recess shall not exceed the width of the bell by more than 2 in. (50 mm).

When flowable fill is required by the plans, class B bedding shall be constructed by bedding the culvert pipe in a trench cut in natural ground or compacted embankment to a depth as shown on the Plans. The pipe shall be bedded on a 6 in.(15 cm) thickness of Class B Material and sufficient additional Class B material accurately shaped by a template to fit the lower part of the pipe exterior for at least 10 % of its overall height. Flowable fill shall then be placed around the pipe as specified in **Subsection 204.11(c)**.

Subsection 204.11 Backfilling, (b) Pipe culverts. Add The following as the third paragraph:

"When plastic pipe is to be placed, structural backfill must be worked into the haunch area and compacted by hand after placement of the pipe. Special compaction means may be necessary in the haunch area. Structural backfill may then be placed in layers not to exceed an 6 inch loose lift thickness and brought up evenly and simultaneously on both sides of the pipe to an elevation not less than one foot above the pipe. A minimum compaction level of 90% Standard Proctor Density per *AASHTO T99* shall be achieved by the use of a vibratory plate. Hydrohammer type compactors shall not be used over the pipe. All compaction equipment used shall be approved by the Engineer."

204.12-Method of Measurement. Add the following as the last paragraph:

"Payment for Type "A" or Type "B" backfill including bedding material will be included in the unit price of the pipe."

204.13-Basis of Payment, (h) Concrete for Class A Bedding. Remove paragraph and **replace** with the following:

"Payment for Type "A" bedding material will be included in the unit price of the pipe unless otherwise provided in the plans. If specified by the plans, concrete for Class A Bedding will be paid for at the contract unit price per cubic yard (m3) for Bedding Material (Pipe) Class A, complete in place."

204.13-Basis of Payment, (i) Material for Class B Bedding. Remove paragraph and **replace** with the following:

"Payment for Type "B" bedding material will be included in the unit price of the pipe unless otherwise provided in the plans." If specified by the plans, material for Class B Bedding will be

paid for at the contract unit price per cubic yard (cubic meter) for Bedding Material (Pipe) Class B, complete in place.

204.13-Basis of Payment, (I) Backfill Material (Flowable Fill). Add the following as the last paragraph:

“Payment for “Flowable Fill” as backfill material for pipe shall be included in the unit price of the pipe unless otherwise provided in the plans.”

Subsection 205.01 Description. Revise the entire subsection to the following:

205.01-Description. This work shall consist of constructing roadway embankments, including preparation of the area upon which they are to be placed; the construction of dikes within or outside the rights-of-way; the placing and compacting of approved material within roadway areas where unsuitable material has been removed; and the placing and compacting of embankment material in holes, pits, and other depressions within the roadway area all in accordance with these Specifications and in reasonably close conformity with the lines, grades, and typical cross sections shown on the Plans or established by the Engineer. Only approved materials shall be used in the construction of embankments and backfills. These materials shall consist of Road and Drainage Excavation, Channel Excavation, and Borrow Excavation material described in **Section 203**, or excess material as described in **Section 204**.

The Contractor must identify both natural and created steep slope areas as defined in the TN Construction General Permit. These slopes must be marked in the SWPPP. Maintenance and stabilization of steep slopes must comply with the TN Construction General Permit and any other applicable environmental permits.

Subsection 205.04 Insert the following, between the fifth and sixth paragraph:

“Where the contract includes the placement of base stone or other components of a pavement structure upon the subgrade, the top 6 in. (150 mm) in both cut and fill sections shall be compacted to a density equal to 100 percent of the maximum density in accordance with the provisions of **Subsection 207.04**.”

Subsectin 206.03-Method and Scope of Work. Revise the entire subsection to the following:

206.03-Method and Scope of Work. Final Dressing shall be performed by hand work and machines to produce a uniform satisfactory finish to all parts of the roadway and other components of the project. The roadbed, shoulders, ditches and slopes shall be shaped within reasonably close conformity to the specified lines, grades and cross sections. Spoil banks, borrow areas, waste areas, etc. shall be dressed in a satisfactory manner in accordance with the Procedures for Providing Offsite Waste and Borrow on TDOT Construction Projects Manual. Rock cuts shall be scaled of all loose fragments and left in a neat, safe and workmanlike condition.

The entire rights-of-way shall be cleaned of all weeds, briars and brushes unless otherwise specified on the Plans. All structures, both old and new, shall be cleared and cleaned of all brush, drifts, heavy vegetation, sediment, rubbish, obstructions and other objectionable material. Final dressing shall be performed prior to sodding and seeding operations when these construction items are included in the Contract.

Tracked machines used in the dressing of slopes shall be run up and down slopes as opposed to longitudinally.

Section 209, Revise Section title to the following:

**SECTION 209-PROJECT EROSION PEVENTION
AND SEDIMENT CONTROL**

Subsection 209.01, Revise entire Subsection to the following:

209.01-Description. This work shall consist of temporary and permanent best management practices to prevent erosion and control sediment through the use of structural and non-structural controls.

Erosion prevention and sediment control (EPSC) measures shall be implemented during all phases of construction, including all approved waste and borrow areas. EPSC measures shown on the Stormwater Pollution Prevention Plan (SWPPP) must be in place before any soil disturbing activities begin.

The Contractor must identify both natural and created steep slope areas as defined in the TN Construction General Permit. These slopes must be marked in the SWPPP. Management and stabilization of steep slopes must comply with the TN Construction General Permit and any other applicable environmental permits.

In addition to installing the EPSC measures included in the SWPPP, the Contractor is responsible for compliance with all other provisions of the SWPPP. Additional EPSC measures beyond those shown in the SWPPP may be required to maintain compliance with permits

Subsection 209.02, Revise Subsection to the following:

209.02-Classification. Structural and Non-Structural best management practices will be classified in accordance with manual for Management of Storm Water Discharges Associated with Construction Activities. Best management practices are structural and non-structural controls required for the project and shall be implemented in accordance with the TN Construction General Permit, Manual for Management of Storm Water Discharges Associated with Construction Activities, the project Stormwater Pollution Prevention Plan, and Roadway Standard Drawings, whichever is more restrictive.

Subsection 209.04, Revise entire Subsection to the following:

209.04-Project Review. Prior to the preconstruction conference the Contractor shall meet with the Engineer to discuss potential problems with erosion prevention and sediment control due to construction activities and actions to be taken to prevent such problems. Should the Contractor's operations and construction staging differ significantly from the SWPPP prepared for the project, the Contractor shall prepare a comprehensive SWPPP in accordance with **Subsection 209.05** below that does not conflict with the requirements of the TN Construction General Permit, the conditions of any ARAP for the project, or other environmental permits. The SWPPP shall be continuously implemented to effectively control erosion and protect streams, wetlands, and adjoining properties during the term of the contract.

If it is determined that a waste or borrow area is needed, the Contractor shall prepare a waste and borrow plan in accordance with the Procedures for Providing Offsite Waste and Borrow on TDOT Construction Projects Manual.

Subsection 209.05, Revise entire Subsection to the following:

209.05-Preconstruction Conferences. Each project will have a preconstruction conference. In addition to the preconstruction conference, for sites that have environmental permits, an environmental preconstruction conference will be held. These conferences can be held jointly or separately, as determined by the Project Supervisor.

At the preconstruction conference the Contractor shall submit for acceptance his plan for the staging of his operations. If the staging plan requires additional erosion prevention and sediment control measures or causes the existing SWPPP for the project to be modified, the Contractor shall submit these modifications to the project Supervisor and discuss the modifications during the preconstruction conference. The staging plan must address: (1) All areas within the rights-of-way as are applicable for clearing and grubbing, grading, bridges and other structures at water courses, paving and incidental construction (2) Areas outside the rights-of-way that will be disturbed by the construction such as waste and borrow areas (which must have an approved waste and borrow plan and be properly permitted), haul roads, utilities, and staging areas, and utility work in general. The Contractor's modified SWPPP shall incorporate and supplement, as applicable, the basic control devices shown in the plans to provide acceptable temporary and permanent erosion prevention and sediment controls during all stages of construction as well as to comply with all applicable environmental permit conditions. The Contractor's modified SWPPP shall include controls for managing and stabilizing natural and created steep slope areas as defined in the TN Construction General Permit. No work shall be started until the erosion prevention and sediment control plan, including the staging of temporary and permanent erosion control measures, has been accepted by the Engineer. Rejection of all or part of the plan shall not constitute a basis for an extension of contract time.

The Project Supervisor and Contractor will discuss how utilities are to be managed on the project, specifically if the utilities are within the Construction contract or are separate from the Construction contract. The Prime Contractor will coordinate a start date for utilities with the Project Supervisor if utility work will begin before the project start date. Unless approved in advance by the Project Supervisor, utilities that are within the Construction contract cannot begin construction on the project until the Project Supervisor has approved the work.

The erosion prevention and sediment control plan shall be updated as work progresses to show changes due to revisions in work schedules or sequence of construction, or when directed by the Engineer. Additional measures shall be installed in the field as needed to manage erosion and sediment and to prevent pollutants from discharging into waters of the state or off the project.

An environmental preconstruction conference will also be held prior to beginning construction on sites that have environmental permits. The environmental preconstruction conference will include a review of the project's environmental permits and any additional environmental commitments required for the project. This meeting will discuss the required marking of clearing limits and the marking of sensitive environmental areas per any applicable environmental permits. The Contractor will discuss potential problems with implementing the requirements of any environmental permits due to construction activities. The Contractor shall also discuss actions to be taken to prevent conflicts between environmental permits and construction activities.

Subsection 209.06, Revise entire Subsection to the following:

209.06-Construction Requirements. Disturbed area limits and environmental boundaries shall be marked in the field prior to construction in each section or portion of the project. Prior to or simultaneously with the clearing and grubbing operations, the Contractor shall install erosion prevention and sediment control devices in accordance with the approved SWPPP. Such work may involve the construction of temporary berms, dams, silt fences, sediment basins, lined channels, permanent cut-off ditches, slope drains or other control devices as necessary to prevent and control erosion. Water from cofferdams or other dewatering activities is not to be pumped directly into streams, but is to be pumped into sediment basins, traps, or filter bags or otherwise adequately treated prior to discharging. No grading shall be performed until the erosion prevention and sediment control devices are in place to the satisfaction of the Engineer. Areas to be graded may be cleared and grubbed prior to beginning grading operations in accordance with the TN Construction General Permit, provided adequate controls are in place. Stockpiled topsoil or fill material is to be protected so the sediment runoff will not contaminate surrounding areas or enter nearby streams. In order to reduce sediment in runoff, erosion prevention and sediment control structures shall be installed promptly during all construction phases and maintained until the areas they are serving have been permanently stabilized.

The Contractor must identify both natural and created steep slope areas as defined in the TN Construction General Permit. These slopes must be marked in the SWPPP. Management and stabilization of steep slopes must comply with the TN Construction General Permit and any other applicable environmental permits.

The Contractor's operations shall be staged so that graded or otherwise disturbed erodible surfaces are protected as the work progresses. Once the Contractor begins grading for a roadway cut or embankment, he shall maintain a continuous, viable operation to complete the cut or embankment to subgrade elevation, unless otherwise approved in writing by the Engineer. Exposed erodible cut or embankment slopes shall be final dressed, topsoiled and protected with permanent seeding, sodding, matting or other acceptable erosion prevention and sediment control measures in vertical increments not exceeding 25 ft. (7.5 m) as the work progresses; and no portion of these slopes shall remain unprotected longer than allowed by the TN Construction General Permit unless the Engineer determines that weather conditions or other special circumstances preclude current placement of permanent control measures. Temporary erosion control measures shall be implemented as directed by the Engineer.

Seeding, sodding, matting or other acceptable erosion prevention and sediment control operations shall be initiated within 48 hours after any one of the following conditions occurs:

1. Each 25 ft. (7.5 m) vertical increment is graded or
2. Upon suspension or completion of grading operations in a specific area.

The above requirements for progressive erosion prevention and sediment control, as well as additional requirements, also apply to graded areas off the rights-of-way such as waste areas, borrow areas and haul roads. A borrow and waste site plan must be developed for any waste or borrow area selected according to Statewide Storm Water Management Plan – Procedures for Providing Offsite Waste and Borrow on TDOT Construction Projects.

The Contractor shall incorporate all permanent erosion prevention and sediment control practices into the project at the earliest practicable time and in accordance with the TN Construction General Permit requirements. Temporary erosion prevention and sediment control features shall be used to control erosive conditions that warrant protection prior to installation of

permanent control features or that are needed to temporarily control erosion that develops during construction but which is not associated with permanent control features on the project.

Temporary stabilization of disturbed areas shall be in accordance with the requirements of the TN Construction General Permit.

Where construction activities cross or border areas of depression (i.e. Sinkholes without openings or open throats), erosion prevention and sediment control measures shall be installed and maintained as shown in the plans and as required by the TN Construction General Permit and any other applicable environmental permits.. When construction activities encounter an open throated sinkhole (Class V Injection Well), the Engineer shall be notified immediately and applicable measures as described in the approved SWPPP shall be employed. The measures mentioned above shall encircle the sinkhole opening so as not to allow any silt or other potential pollutants to enter the opening.

In the event of conflict between these requirements and TN Construction General Permit, rules or regulations of other Federal or State or local agencies, the more restrictive laws, rules or regulations shall apply.

Subsection 209.07-Construction of Structures. Revise entire subsection to the following:

209.07-Construction of Structures Structural controls include, but are not limited to, bonded fiber matrix, riprap, inlet protection, check dams, silt fence, and sediment basins. Structural measures shall be installed and maintained in accordance with the Manual for Management of Storm Water Discharges Associated with Construction Activities, TN Construction General Permit, and the Roadway Standard Drawings.

Erosion prevention and sediment control measures shall be installed as indicated on the Roadway Standard Drawings, except as follows:

(a) Sediment Filter Bags.

The sediment bags may be utilized either on slope drains, pipe culverts, box bridges, or for pumping sediment from sediment traps and sediment basins. This activity shall be performed as shown on plans or as directed by the Engineer. The material shall be a non-woven geotextile fabric bag resistant to rot, mildew, puncture and tearing, with a minimum seam breaking strength of 200 lbs (90 kgs) the seams shall demonstrate less elongation and Deformation of the geotextile fabric. The Division of Materials and Test will certify the fabric for the Temporary Sediment Filter Bags and place them on the Department’s Qualified Products List. Temporary Sediment Filter Bags shall meet the following specifications.

GEOTEXTILE FABRIC SPECIFICATIONS

Properties		Test Method
Weight	10.0 oz/yd	ASTM D 3776
Tensile Strength	250 lbs.	ASTM D 4632
Tensile Elongation at Break	50%	ASTM D 4632
Puncture Strength	115 lbs.	ASTM D 4833
Trapezoidal Tear	100 lbs.	ASTM D 4533
Mullen Burst	350 lbs.	ASTM D 3786

Water, Flow Rate	80 gpm/ft.2	ASTM D 4491
Permittivity	1.2 sec.-1	ASTM D 4491
UV Resistance	70% str. Ret.	ASTM D 4355

Standard Bag Minimum Dimensions
 15 x 10 ft. and 15 x 15 ft.

Maximum Flow Rate
 15 x 10 ft. up to 1,500 gpm
 15 x 15 ft. up to 2,000 gpm

A manufacturer’s label designating the maximum allowable flow rate of the bag in gallons per minute shall be permanently attached to each bag. The flow into the filter bag shall not exceed the designated flow rate. Care shall be taken to correctly connect the filter bag to the pump hose, as recommended by the manufacturer. Upon project completion, the sediment filter bag shall be completely removed and the disturbed areas at the dewatering structure location shall be permanently stabilized. The bag and sediment contained in the bag shall be disposed as directed by the Engineer.

(b) Sandbag Berms and Temporary Plugs.

Sandbag berms and temporary plugs may be used for velocity control, runoff management, sediment control and separating streamflow from work areas. These sandbag measures should not be used for filtration. Sandbag berms and temporary plugs should not be used in high concentrated flow areas where the sand bags may be displaced by flow. Sandbags should not be used in areas where equipment and/or traffic may damage the bags. The ends of sandbags must be tightly abutted and overlapped to direct flow away from bag joints.

Sandbags for the sandbag berms and channel plugs shall be made of durable, weather resistant geotextile fabric. Use of burlap is not acceptable for sandbags used in sandbag berms and temporary plugs. The bag fabric pores must be tight enough to retain the bag filler material. Typical bags measure approximately 24 inches x 12 inches x 6 inches. The sandbag fill material shall be a clean non-cohesive sand material.

Where sandbags are used to construct sandbag berms or temporary plugs across a ditch or channel, the sandbags should be installed along a level contour. The sandbags at the ends of the measure should be turned upstream.

Sandbag berms may be installed in both unpaved and paved ditches and channels. The sandbag berm must be wider than the high water mark of the ditch or channel to prevent undercutting. The center of the sandbag berm must be lower than either of the edges. For multiple sandbag berms installed in ditches, the maximum spacing between the berms should be such that the toe of the upstream sandbag berm at the same elevation as the top of the downstream sandbag berm.

Sandbag temporary plugs are constructed to separate stream flow from work areas, especially for projects requiring temporary diversions. Sandbag temporary plugs shall be constructed as required for the temporary diversion. The temporary plugs should be constructed as appropriate to be free of leaks between the bags.

Sandbags shall be removed and replaced if bags become torn or damaged to prevent the bag filler material from becoming a stormwater pollutant. Remove any sediment accumulations at sandbags when the sediment accumulation has reached half the original height of the sandbags. Where the ends of sandbag structures are breached, place new bags in the breach and extend the ends of the berm to a higher elevation. If needed, repair the bank damage. Where sandbags are undermined, do not repair the sandbags in place as additional undermining may occur. Move the sandbags downstream of the damaged location.

Upon project completion, all sandbags shall be removed and any disturbed areas underlying the sandbags shall be permanently stabilized with measures such as permanent seed and mulch.

(c) Flocculants .

This work shall consist of furnishing and applying flocculant materials for controlling erosion on disturbed areas and for use with sediment control devices for the purpose of reducing turbidity from stormwater runoff. Flocculant materials shall be manufactured and applied in strict accordance with the Specifications herein.

Equipment

All equipment necessary for the satisfactory performance of this work shall be on the project and approved, before work will be permitted to begin.

If using a liquid application system, it may be necessary to pump a surfactant through the delivery system prior to liquid flocculant injection and afterwards in order to prevent clogging of pipes and valves.

After application of flocculant materials, all equipment used for application shall be cleaned per the flocculant manufacturer's recommendations in order to prevent the formation of dried residues that may impede future equipment performance.

Applications of dry flocculant materials shall be performed with a hand-held fertilizer spreader or a tractor-mounted spreader. If approved by the flocculant manufacturer, the mixing of certain dry flocculants with dry silica sand will aid in the spreading of flocculant material.

Limitations

Cationic PAM blends will not be approved for use and shall not be applied in any circumstance due to aquatic toxicity.

Flocculants shall never be applied directly to streams, wetlands, or other natural water resources. Flocculants shall never be applied directly to sediment ponds. Flocculants applied to any area of the construction site, including slopes, shall be applied in such a manner so that all flocculant-applied runoff flows into a sediment trap, sediment pond, or series of multiple sediment-control BMPs prior to discharge from the site. Flocculants shall not be applied to slopes that produce runoff directly into a stream, wetland, or other natural water resource. Flocculants for both erosion and sediment control shall always be used in conjunction with approved stormwater BMPs, as given in the TDOT Standard Drawings.

Dry flocculant applications must be applied in dry weather conditions with light winds. Anionic PAM shall not be applied during rainfall or onto saturated soils.

All flocculant applications shall be applied at least 60 feet from any stream, wetland, or other natural water resource located on or adjacent to the construction site.

Emulsion forms of coagulant/flocculants should never be applied directly to stormwater runoff or to streams, wetlands, or other water resources due to surfactant toxicity. Emulsions may only be used in the preparation of liquid flocculants specifically used for erosion control applications, i.e., soil binders and tackifiers.

Preparation of Treatment Areas

Prior to use of flocculants, site-specific soil samples must be obtained and tested to identify the optimum flocculant blends to use for effectiveness. The Contractor shall provide site specific soils from given construction site to select an appropriate and effective flocculant blend for dry, liquid, emulsion, and brick/log flocculant materials. Soil samples must be obtained from each soil horizon to be accessed during excavation.

Application Requirements

Flocculants shall be used in conjunction with other BMPs (with the bulk of structural sediment-control BMPs, including sediment ponds, positioned down slope of the flocculant-application areas) to increase flocculant performance. Stormwater runoff from flocculant-treated soils shall be directed to pass through a series of sediment control BMPs prior to discharge to surface waters, with flow passing through, at least, a minimum of 3 enhanced rock check dams and a silt trap. It is preferable that runoff from flocculant-treated areas be directed into a sediment pond.

Flocculant materials shall be stored in covered areas. Many flocculants demonstrate a decrease in effectiveness after exposure to sunlight and air. Anionic PAM loses its effectiveness within three months after exposure to sunlight and air. Anionic PAM as well as certain other flocculant materials, when combined with water, become very slippery and can produce a safety hazard. Care must be taken to prevent spills of flocculants, in liquid, emulsion, or powder form, onto paved surfaces.

Application of flocculants will be most effective when applied as follows:

- a) During rough grading operations;
- b) On stockpiles and borrow areas;
- c) Temporary haul roads before placement of crushed rock surface;
- d) Compacted soil road base;
- e) After final grading and before paving and/or final seeding;
- f) Along the interior surface area of ditches;

- g) Sites where work has been temporarily suspended (e.g., winter shutdown), and
- h) Areas that will be mulched.

Flocculants should not be applied over surfaces of pure sand or gravel with no fines and should not be applied over snow cover.

The use of a visible tracer or colorant to visibly track flocculant application is recommended.

Liquid applications of flocculants will require the use of source water for mixing with a low turbidity (20 NTUs or less).

For turbidity reduction within sediment ponds, apply flocculants to conveyance ditches above the pond that discharge into the pond. Flocculants shall not be applied directly to pooled water within sediment ponds.

For dewatering and suspended solids removal of turbid pooled water within pipe tranches, silt traps, or other areas, flocculants may be introduced, in either liquid or solid forms, into the turbid water during pumping/evacuation of the pooled water. The pumping will provide turbulence for optimum mixing, with the discharge either pumped through a filter bag or jute-lined treatment ditch prior to ultimate discharge. Application rates as given in this specification for turbidity reduction for anionic PAM (and as given by the manufacturers' requirements for other types of flocculants) shall be strictly followed during dewatering.

Application requirements for the two main classifications of flocculants are as given below:

I. Anionic Polyacrylamide

Prior to use of any flocculant, the flocculant manufacturer's written application, storage, and mixing requirements and specifications shall be supplied to both TDOT and the Contractor. Anionic PAM shall be stored, handled, mixed and applied in strict accordance with the flocculant manufacturer recommendations and in strict compliance with OSHA Material Safety Data Sheet requirements, complying with all applicable federal, state, and local regulations. Proper personal protective equipment shall be used when handling the flocculant per industry, manufacturer, state, and federal regulations.

SPECIAL CARE SHALL BE GIVEN TO THE APPLICATION RATES FOR ANIONIC PAM SPECIFIED HEREIN TO ENSURE THAT THE MAXIMUM APPLICATION RATES ARE NEVER EXCEEDED. ADDING ADDITIONAL PAM BEYOND THE RATES SPECIFIED WILL NOT IMPROVE THE EFFECTIVENESS OF PAM BUT COULD PRESENT TOXICITY ISSUES TO RECEIVING STREAMS DOWN GRADIENT OF THE PAM APPLICATION ZONE.

For erosion control applications on sloped areas:

- a) With hydroseeding applications, anionic PAM should be added as the last component to the hydroseeding mixture. When mixing, the Contractor shall never add water to anionic PAM. The Contractor shall add PAM at a slow rate to water. Mixing of anionic PAM for hydroseeding shall include agitation of the PAM/water mixture. The application method chosen must ensure uniform flocculant coverage to the target area.
- b) The Contractor shall never use anionic PAM as the sole erosion control method for slopes; slope applications of PAM shall be accompanied with mulching.
- c) For PAM tackifiers, dry PAM shall be dissolved with a known quantity of clean water in a container for several hours (preferably overnight.) PAM is to be applied at a rate in the range of 0.5 lb to 1.0 lb (maximum) per 1,000 gallons of water per acre application area via a hydro- mulch machine.
- d) For soil binder applications, the Contractor shall dissolve pre-measured dry PAM with a known quantity of clean water in a container for several hours (preferably overnight.) PAM is to be applied at a rate range between 2/3 lb to 1 lb (maximum) PAM per 1000 gallons water per acre of bare soil.
- e) Emulsion batches shall be mixed per the recommendations of the flocculant manufacturer to determine the proper product type and application rate to meet site-specific requirements. The chosen application method must ensure uniform coverage of the target application area.
- f) When using an emulsion form of anionic PAM to slopes, apply no greater than 1.5 gallons emulsion per acre per event. Solution mixtures shall be 1.5 gallons (maximum) anionic PAM emulsion per 3000 gallons of water. Note: Water volumes that are less than 3000 gallons of water shall not be used due to increased viscosity issues.
- g) The Contractor shall spray the anionic PAM/water mixture uniformly across the dry soil slope until completely wetted.
- h) For dry anionic PAM applications for erosion control, anionic PAM shall be applied as a powder at the following rates:
 - For slopes less than 25% - Apply at 10 lbs per acre (maximum)
 - For slopes greater than or equal to 25% - Apply at 20 lbs per acre (maximum)
- i) Liquid anionic PAM for erosion control shall be reapplied on actively worked areas after a 48-hour period.
- j) Liquid anionic PAM shall not be applied to the same slope area more than once in a 48-hour period and no more than 7 times in a 30-day period.

- k) For inactive slope areas where anionic PAM has been applied, a reapplication shall be required once every two months.
- l) **Note: Anionic PAM applications (dry or liquid) shall not exceed 200 lbs/acre per year.**

For turbidity reduction within ditches:

- a) It is highly recommended that flocculant application be applied as erosion control in the watershed above the treatment ditches in conjunction with the application of flocculants within treatment ditches for turbidity control.
- b) The surface area of stormwater ditches, as well as the surface area of ditch check dams, shall be lined with jute mesh.
- c) Dry powder anionic PAM shall be applied over the jute mesh at a rate of 0.25 lb to 0.5 lb per 1000 square feet of ditch surface area.
- d) Dry powder anionic PAM shall be re-applied to jute mesh in ditches every 3 to 5 storm events. **Dry anionic PAM application shall not exceed 4.6 lbs/1000 square feet per year.**
- e) Anionic PAM bricks/logs shall be of appropriate size, shape, and number to deliver the appropriate dosage to the water within the conveyance. The flocculant manufacturer shall be consulted to provide brick/log dissolution rates and dosages.
- f) Anionic PAM bricks/logs shall be located in a shaded, preferably moist, installation zone during application.
- g) Anionic PAM bricks/logs shall be placed near the main flow area of the ditch, and they shall be placed at an appropriate distance above sediment ponds or traps to maximize mixing and flocculation. The manufacturer shall be consulted to provide guidance for flocculant mixing time required and block/log spacing configurations.
- h) The Contractor shall install one anionic PAM brick/log for every 65 to 70 gpm of flow to be treated, unless otherwise specified by the flocculant manufacturer.
- i) Unless otherwise specified by the flocculant manufacturer, anionic PAM bricks/logs are estimated to treat, on average, 475,000 to 550,000 total gallons of flow volume.

- j) Stakes, mesh bags, cages, and other mechanisms to anchor bricks/logs in place shall be carefully installed to provide stability during flows and to maximize exposure of the brick/log surface area to flows.
- k) Anionic PAM bricks/logs shall be replaced at least every 3 - 4 months or earlier if bricks/logs have excessive sediment/debris deposition on the outer brick/log surface area or excessive degradation of brick/log mass.

II. Miscellaneous Coagulant/Flocculant Materials

Miscellaneous flocculant materials shall include all other flocculants that are not polyacrylamide blends and that have been pre-approved for use on TDOT projects through the TDOT Materials and Testing Division. Submittals of required information as given in the *Materials* and *Classifications* sections of this specification shall be strictly followed.

Prior to use of any flocculant, the manufacturer's written application, storage, and mixing requirements and specifications shall be supplied to both TDOT and the Contractor. Flocculants shall be stored, handled, mixed and applied in strict accordance with the flocculant manufacturer recommendations and in strict compliance with OSHA Material Safety Data Sheet requirements, complying with all applicable federal, state, and local regulations. Proper personal protective equipment shall be used when handling the flocculant per industry, manufacturer, state, and federal regulations.

Special care shall be given to the application rates for flocculants specified by the manufacturer to ensure that the maximum application rates are never exceeded.

For erosion and sediment control applications for sloped areas and ditches:

- a) The Contractor shall strictly follow the manufacturer's requirements for application mixtures and rates.
- b) With hydroseeding applications, flocculants shall be mixed in strict accordance with manufacturers written recommendations, as provided to TDOT and the Contractor.
- c) Flocculants shall not be used as the sole erosion control method for slopes; slope applications of flocculants shall be accompanied with mulching. Flocculant use for turbidity reduction in ditches shall be used in conjunction with other structural sediment-control BMPs.
- d) Re-application frequency and rates shall strictly follow manufacturer's written recommendations, as provided to TDOT and the Contractor.
- e) Storage of flocculants shall follow manufacturers written requirements, as provided to TDOT and the Contractor.

Documentation and Maintenance

Flocculants will enhance the deposition of soil solids in downstream ditches, pipes, and ponds. These hydraulic structures shall be inspected regularly with solids routinely removed from these structures to ensure optimization of performance.

The Contractor shall provide suitable means for storing and protecting flocculants against moisture and sunlight.

TDOT field personnel shall maintain records of all flocculant applications including the following information:

- a) Date, time, and specific location of application;
- b) Rates of application;
- c) Method of application;
- d) Weather conditions, and
- e) Type of flocculant applied including manufacturer name and product name.

Final Cleanup

The Contractor shall clean liquid or dry flocculant spills per the manufacturer's requirements. Flocculant mixing and application equipment shall be rinsed thoroughly with water to prevent the formation of residues. Unused flocculant mixtures should be minimized. Rinse residues can be applied to exposed slopes for erosion control. The Contractor shall dispose of excess flocculant material in compliance with federal, state, and local environmental regulations. Excess material shall not be disposed within stormwater conveyances, sewers, or streams.

The Contractor shall install and maintain all temporary erosion prevention and sediment control features and pollution prevention measures until no longer needed or permanent control measures are installed. Any materials removed shall become the property of the Contractor. In order to insure erosion prevention and sediment control structures work properly, it is imperative the sediment be removed and structural components of the measures maintained; therefore, inspection and maintenance of structures is to be performed on a regular basis. During sediment removal, the Contractor shall take care to insure that structural components of erosion prevention and sediment control structures are not damaged and thus made ineffective. If damage does occur, the Contractor shall repair the structures at his own expense. Upon complete removal of sediment traps, special ditches, etc., the area where they were constructed is to be topsoiled, seeded and mulched or otherwise stabilized.

In the event that temporary erosion prevention and sediment control measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as a part of work as scheduled, and are ordered by the Engineer, such work shall be performed by the Contractor at his own expense. (See special provisions 107FP if applicable)

Where temporary erosion prevention and sediment control or pollution prevention work is acceptably performed and failure of all or any part of the system occurs but is not attributed to the Contractor's negligence, carelessness, or failure to install permanent controls and falls within the specifications for a work item that has a contract price, the units of work will be paid for at the proper contract prices except as noted below. Should the temporary erosion prevention and sediment control or pollution prevention work not be comparable to the project work under the applicable contract items, the Contractor shall be ordered to perform the work on a force account basis, or by agreed unit prices in compliance with **Subsection 109.04**.

Except as noted below, payment also may be made for replacement of temporary erosion prevention and sediment control and pollution prevention devices installed according to the plans or as approved by the Engineer provided such devices are no longer effective because of deterioration or functional incapacity, except that no payment shall be made for replacement of erosion prevention and sediment control or pollution prevention devices ineffective due to improper installation, lack of reasonable maintenance or because of failure of the Contractor to pursue timely installation of permanent control devices in accordance with the Plans and Specifications or as directed by the Engineer.

Unless provided for on the plans, no direct payment will be made for temporary and permanent erosion prevention and sediment control or pollution prevention measures in disturbed areas outside the rights-of-way such as borrow areas, waste areas and haul roads unless the borrow areas or waste areas are provided for by the Department, and except for permanent Seeding (with Mulch) on borrow areas and waste areas within the limitations prescribed in **Subsection 203.04** and **Subsection 203.07**, respectively. Where the plans show separate quantities for erosion prevention and sediment control or pollution prevention items to be used outside the rights-of-way in connection with waste areas, borrow areas or other project related construction, payment will be made for these items used and accepted to the extent of these separately listed plans quantities; but the cost of any overruns in these items, or the cost of any additional items required for erosion prevention and sediment control or pollution prevention off the rights-of-way, shall be borne by the Contractor unless prior approval in writing is received from the Engineer.

In case of failure of the Contractor to control project related erosion or the discharge of pollutants, either on or off the rights-of-way, the Engineer may withhold payment of future progress estimates until the Contractor has satisfactorily performed the necessary corrective measures. If deemed necessary, the Engineer may employ outside assistance or use his own forces to provide the needed protective measures, with all incurred direct costs plus project engineering costs being charged to the Contractor by appropriate deductions from the Contractor's monthly progress estimate.

Subsection 209.08-Revise entire subsection to the following:

209.08-Method of Measurement. Erosion prevention and sediment control devices shall be measured in accordance with the appropriate Standard Drawing or as noted below.

Temporary seeding and mulching operations will be measured in accordance with the appropriate provisions of **Subsection 801.09**.

Seeding (without Mulch) and Crown vetch mixture (without Mulch) shall be measured per unit.

The accepted quantities of Road and Drainage Excavation will be measured in C.Y. (m³).

Sediment removal and disposal for maintaining erosion prevention and sediment control measures will be measured by the cubic yard (cubic meter).

For catch basin filter assemblies, structure maintenance including cleaning to prevent clogging is included in the price bid for the structure. Sediment removal and disposal for maintaining these assemblies is not to be measured and paid directly.

Sand bags will be measured by the square foot area of berm face.

Flocculants used for turbidity reduction will be measured and paid for by the actual weight in pounds of flocculant materials applied or, for brick or log forms of flocculant material, the brick/logs will be measured by the unit, per each. Such price and payment will be full compensation for all work covered by this section, including, but not limited to, furnishing all materials, labor, equipment and incidentals necessary to apply the flocculant materials. Flocculants used as either a soil binder or tackifier for erosion control applications shall be measured by the acre.

Subsection 209-09. Revise entire subsection to the following:

209.09-Basis of Payment. All Non-Structural Best Management Practices shall be included in the bid cost of the project.

Items used to install erosion prevention and sediment control devices include basis of payment information along with measurement information on the standard drawings. The standard drawing item numbers and measurement units shall be used for measurement and payment unless otherwise specified. All measures shall be constructed and accepted according to the applicable Standard Drawings and specifications prior to measurement and payment.

Additional information regarding basis of payment for erosion prevention and sediment control measures and components is listed below.

Unless otherwise stated on the corresponding Standard Drawings, payment for erosion prevention and sediment control measures shall include all materials and labor necessary for the measure's construction, maintenance and removal.

For catch basin filter assemblies, structure maintenance including cleaning to prevent clogging is included in the price bid for the structure. Sediment removal and disposal for maintaining these assemblies is not to be measured and paid directly.

Seeding (with Mulch), Seeding (without Mulch), Temporary Seeding (with Mulch) Crown vetch mixture (without Mulch) and Mulch items will be paid for in accordance with the appropriate provisions of **Subsection 801.10**.

The accepted quantities of Road and Drainage Excavation will be paid for at the contract unit price per C.Y. (m^3).

Sediment removal and disposal for maintaining erosion prevention and sediment control measures will be paid for at the unit price per C. Y. (m^3).

For catch basin filter assemblies, structure maintenance including cleaning to prevent clogging is included in the price bid for the structure. Sediment removal and disposal for maintaining these assemblies is not to be measured and paid directly.

Rock used for inlet and outlet control on erosion prevention and sediment control measures will be paid for at the contract unit price per ton (tonne).

Pipe used in the construction of erosion prevention and sediment control measures will be paid for in accordance with the appropriate provisions of **Subsection 607.13**.

Concrete used in the construction of spillways or other structures pertaining to sediment structures will be paid for in accordance with the appropriate provisions of **Section 703**.

200SS

200SS

Sheet 31 of 31

Water used in preparation of the seed bed and for maintenance will be paid for at the contract unit price per M.G. (1,000 gal.) (m^3) of water.

Sand bags will be counted per bag and will be paid for at the contract unit price per bag.

For flocculants, the accepted quantities, determined as provided above, will be paid for at the contract unit prices, which payment shall be full compensation for all equipment, materials, labor, and incidentals necessary to complete the work.

The Sediment Filter Bags will be paid for at the contract price bid per each for the size bag used which includes installation and/or replacement along with all materials, equipment, tools, labor, and incidentals to complete the work. Payment for removal and disposal of material from bag shall be made by the C.Y. (m^3) at contract price for sediment removal.

STATE**OF****TENNESSEE**

(Rev. 06-01-06)
(Rev. 02-01-07)
(Rev. 12-30-08)
(Rev. 01-05-10)

March 1, 2006

Supplemental Specifications - Section 300**of the****Standard Specifications for Road and Bridge Construction****March 1, 2006**

Subsection 303.08 (c) Second paragraph after (c), first sentence **Add** the word “exceeds” between the words “course” and “6 in. (150 mm)”

Subsection 303.13; Delete the second and third paragraphs and replace with the following:

The weight of total moisture, as determined by dry weights, of the base material at the time of weighing in excess of 3 percentage points of optimum moisture content, will be deducted. When mixing is performed in a stationary plant, no direct payment for water will be made. When road mixing is performed, water added to the material during mixing at the direction of the Engineer will be made for payment.

SECTION 304-SOIL-CEMENT BASE Insert the following in the Table of Contents section of 304

“304.11-Thickness and Surface Tolerances.”

Subsection 304.04 Last paragraph, add the word “be” in this section of the paragraph

“the entire section shall be reconstructed...”

Subsection 307.03b Composition of Mixtures, Revise entire subsection b to the following:

(b) Recycled Asphalt Pavement.

The Contractor may utilize asphaltic concrete removed from a Department project or other State Highway Agency project by an approved method and stored in a TDOT approved stockpile. Recycled Asphalt Pavement (RAP) combined with the appropriate aggregate, asphalt cement, and anti-strip additive when required shall produce a mixture that will otherwise meet all the requirements of Subsection 903.06 and the requirements herein Section 307. RAP shall be allowed in each mix listed in the following table:

Mix Type	%RAP (Non-processed)	Maximum %RAP (Processed)	Maximum % RAP Processed and Fractionated	Maximum Particle size
307ACRL	0	00	-	-
307AS	0	00	-	-
307A	15	20	35	1 ½ in. (38 mm)
307B	15	30	35	1 ½ in. (38 mm)
307BM	15	30	35	¾ in. (19 mm)
307BM2	15	30	35	¾ in. (19 mm)
307C	15	30	35	3/8 in. (9.5 mm)
307CW	15	30	35	½ in. (13 mm)
307CS	0	15	25	5/16 in. (8 mm)

RAP that has been crushed and screened or otherwise sized such that the maximum recycled material particle size is less than that listed in the table above prior to entering the dryer drum, shall qualify as "Processed". "Non processed" RAP shall be similar material that has not been crushed and screened or otherwise sized previous to its use. When RAP is processed over more than one screen, producing sources of various maximum particle size (i.e. - ¾" to ½", ½" to #4, etc.), it will be referred to as "fractionated", and larger percentages will be allowed as noted above. These increased percentages will only be allowed provided the individual fractions are introduced into the plant as separate material sources for increased control.

All mixes shall contain at least 65% virgin asphalt.

The Contractor shall obtain a representative sample from the recycled material stockpile and establish a gradation and asphalt cement content as required. The Contractor shall determine the gradation and asphalt content of the recycled material at the beginning of a project and every 2,000 tons(2,000 metric tons) thereafter. The stockpile asphalt cement content for all recycled material shall not vary by more than 0.8%. The stockpile gradation tolerance for all recycled material on each sieve is listed below.

3/8 in. (9.50 mm) sieve and larger± 10%
 No. 4(4.75 mm) sieve.....± 8%
 No. 8(2.36 mm) sieve.....± 6%
 No. 30(600 µm) sieve± 5%
 No. 200(75 µm) sieve± 4%

The mixture will be accepted for aggregate gradation and asphalt content based on extractions

A special design with asphalt content in the range of 5 to 7% shall be required where 307 C Mix is used as a surface on the shoulder.

The Contractor shall be responsible for his own sampling and testing of the planings as well as new materials for bid purposes, and for the submission of the job mix formula in accordance with Subsection 407.03. All additives shall be submitted to the Engineer for approval at the same time other materials are submitted for design verification.

If the Department has performed tests on the pavement to be cold planed, the results of all tests will be available at the Materials and Tests Division in Nashville, Tennessee during normal working hours. This information is advisory only and shall not be construed as necessarily complete nor accurate.

Where it is necessary to obtain a sample of the existing pavement for mix design, the Contractor shall mill the existing pavement to the full depth shown on the plans for pavement removal for a length of approximately 300 ft. (100 m) in an area approved by the Engineer. The removed pavement shall be replaced as specified on the plans or directed by the Engineer.

After mixing, the moisture content of the total mix shall be no more than 0.1% as determined by oven drying, and the provisions for lowering the temperature because of boiling or foaming shall not apply.

- (c) Anti-Strip Additive - Asphaltic concrete mixtures (Grading A, AS, ACRL, B, BM, BM2, C, CS and CW) shall be checked for stripping by the following methods:
1. The Ten Minute Boil test for dosage rate and the Root-Tunnecliff procedure (ASTM D 4867) for moisture susceptibility.
 2. For mixtures not requiring design - the Ten Minute Boil test for dosage rate and moisture susceptibility.
- * Root-Tunnecliff procedure (ASTM D 4867) shall not be used with the following mixtures: Grading A, AS, ACRL and B

If moisture susceptibility is indicated, then an approved anti-strip agent shall be mixed with the asphalt cement at the dosage recommended by the respective test and as specified in **Subsection 918.09(B)**.

Subsection 307.08 Method of Measurement, Revise entire subsection to the following:

307.08-Method of Measurement. Aggregate and Asphalt Cement for Bituminous Plant Mix Base (Hot Mix) will be measured by the ton (metric ton) in accordance with the provisions of **Subsection 407.19**. Materials for prime or tack coat, if specified, will be measured as prescribed in **Section 402** or **403**, respectively.

If recycled mix is permitted, the completed mix, including new mineral aggregate, planings, asphalt cement and additive, shall be measured by the ton (metric ton) in accordance with **Section 109**. For bidding purposes, the asphalt cement content of the specified mixes shall be used in the chart below:

Mix Type	Asphalt Content
307 A	4.0%
307 B	4.3%
307 BM	5.0%
307 BM2	5.0%
307 C	5.0%
307 CW	6.0%
307 CS	6.5%

In the event that the Engineer sets an asphalt content other than that stated above, a price adjustment will be made based on the asphalt content set by the Engineer and the Monthly Bituminous Index for the specific grade asphalt on the mix design. The price adjustment will be calculated according to the following formula:

$$PA = [MBI \times (DA - BA) \times T] / 100$$

Where:

PA = Price Adjustment

MBI = Monthly Bituminous Index

DA = Percent asphalt set on the mix design

BA = Percent asphalt specified above to be used for bidding

T = Total tons(metric tons) asphalt mix for price adjustment

The liquid anti-strip additive will be measured by the gallon(liter) and paid as outlined in **Subsection 307.09**. Hydrated Lime will be measured by the ton (metric ton) and paid as outlined in **Subsection 307.09**.

No direct payment will be made for polymer or latex additives and cost thereof shall be included in the price bid for the modified asphalt cement or modified mixture.

Subsection 309.13; Delete the second and third paragraphs and replace with the following:

The weight of total moisture, as determined by dry weights, of the base material at the time of weighing in excess of 3 percentage points of optimum moisture content, will be deducted. When mixing is performed in a stationary plant, no direct payment for water will be made. When road mixing is performed, water added to the material during mixing at the direction of the Engineer will be made for payment.

Subsection 312.08 Last sentence, Add the word "exceed"

"1 layer shall not exceed 8 in. (200 mm)."

Subsection 313.02-Materials, Add the following to the end of this section

Liquid Membrane – Forming Compounds

913.05

Subsection 313.05; section (a) 1. Add to the end of the paragraph

As an alternative to the steel wheel roller, the cement treated permeable base may be placed with a high-density screed with dual tamping bars.

Subsection 313.05; section (a) 2. Revise the first paragraph to read as follows

Curing; Immediately after spreading and compacting, the cement treated permeable base shall be cured by covering the entire surface and exposed edges with transparent or white polyethylene sheeting in accordance with **Subsection 501.18**, or a white pigmented wax base curing compound meeting the requirements of AASHTO M148. The polyethylene sheeting shall have a thickness of at least 4 mils (100 μm) and shall be held in place for a minimum of 7 days by a method approved by the Engineer. The surface of the cement treated permeable base shall be thoroughly wetted prior to placing the sheeting. The wax based curing compound shall be placed at a rate of 0.04 to 0.05 gallons per square yard (0.18 to 0.23 liter per square meter).

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T E N N E S S E E

March 1, 2006

(Rev. 02-09-09)
(Rev. 08-10-09)
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(Rev. 05-09-2011)
(Rev. 10-31-2011)
(Rev. 02-13-2012)
(Rev. 01-07-2013)
(Rev. 06-12-2013)

Supplemental Specifications - Section 400

of the

Standard Specifications for Road and Bridge Construction

March 1, 2006

Subsection 403.02. Revise entire Subsection to the following:

403.02-Bituminous Materials. Bituminous materials shall conform to the requirements of the following Subsections of these Specifications:

<u>Materials</u>	<u>Subsection</u>
Emulsified Asphalt, SS-1, SS-1h, CSS-1, CSS-1h, TST-1P, CQS 1h, CQS-1hp, TTT-1, TT1-2	904.03
Asphalt Cement, PG 64-22	904.01
Chemical Additive	918.09(B)

The ranges of application temperatures in degrees F(C) shall be as follows:

SS-1, SS-1h, CSS-1, TST-1P, CQS-1h,
and CSS-1h, 60-140° F (15-60° C)
PG 64-22, 70-22, 76-22, or 82-22 with Chemical
Additive 375-400° F(190-205° C)
TTT-1, 160-180°F (70-80°C)
TTT-2, 120-160°F (50-70°C)
CQS-1hp, 60-140°F (15-60°C)

When emulsified asphalt is used, water as approved by the Engineer may be added to the asphaltic emulsion and thoroughly mixed therewith in such proportion, not to exceed 30% by volume of added water, that the resulting mixture will give the desired cover of residual bitumen. The exact quantity of added water will be established by the Engineer.

Subsection 403.05. Revise entire Subsection to the following:

403.05-Application of Bituminous Material. Immediately after cleaning the surface, emulsified asphalt shall be applied with the pressure distributor at a rate directed by the Engineer, between 0.05 gal/yd² (0.23 L/m²) and 0.10 gal/yd² (0.46 L/m²) of applied emulsion. If the bituminous material is to be placed upon a milled surface, the rate of application shall be determined by the Engineer between 0.08 gal/yd² (0.36 L/m²) and 0.12 gal/yd² (0.54 L/m²) of applied emulsion.

The surfaces of trees and structures adjacent to the area being treated shall be protected in such a manner as to prevent their being splattered or marred.

The tacked surface shall be allowed to dry until it is in a proper condition to receive the next course. Tack coat shall be applied only so far in advance of the paving operations as is necessary to obtain this proper condition of tackiness. The Contractor shall protect the tack coat from damage until the next course is placed.

Proper application of tack coat shall be achieved through the use of equipment and methods demonstrated on a tack coat test strip. This test strip shall be demonstrated at the same time an initial roller pattern and density test strip is set up for the first layer of asphalt mixture. This test strip application rate shall be between 0.05 and 0.10 gallons of applied emulsion per square yard. If the bituminous material is placed upon a milled surface, the test strip rate of application of tack material shall be between 0.08 and 0.15 gallons of applied emulsion per square yard. In all cases the application will result in a minimum double overlap of the actual track spray as it lands on the surface. The adjustment of the spray-bar and the nozzles may be necessary to achieve this minimum double overlap. Under no circumstances will corn-rows or any other pattern which would result in less than double overlap coverage of the tack coat be acceptable for the tack application. The goal is a very thin but uniform coating of asphalt left on the surface when the emulsion has broken.

Once the test strip has been demonstrated and approved by the Engineer, then this same procedure and application rates shall be applicable for the entire project or until another design is proposed and accepted.

When bituminous material for fog sealing of shoulders is included in the contract it shall be accomplished with emulsified asphalt meeting the requirements of Subsection 403.02. The application rate of diluted emulsified asphalt shall be 0.10-0.15 gal./s.y.(0.45-0.68 liter/m²) based on a dilution rate of 1 part emulsified asphalt to 1 part water. This application may require 2 equal increments if run-off occurs.

Subsection 403.06. Revise entire Subsection to the following:

403.06-Method of Measurement. Bituminous Material for Tack Coat and Fog Sealing will be measured by the ton(metric ton), as delivered from the terminal, in accordance with the provisions of **Section 109**, Measurement and Payment. Water used for dilution of Asphalt Emulsions will not be measured for payment.

Subsection 403.07. Revise entire Subsection to the following:

403.07-Basis of Payment. The accepted quantities of Tack Coat will be paid for at the contract unit price per ton (metric ton) for Asphalt Emulsion or Asphalt Cement complete in place. The accepted quantities of Fog Seal will be paid for at the contract unit price per ton (metric ton) for Asphalt Emulsion complete in place.

The work required for preparing the designated surface as provided for under **Subsection 403.04** will be measured and paid for in accordance with the provisions of the applicable Section or Subsection under which the work is performed.

Subsection 407.02 Materials, Add the following at the end of this subsection:

When warm mix asphalt additive is used as described in subsection **918.09(B)**, it shall be added by approved blending equipment at the contractor's mixing plant, or it shall be pre-mixed and delivered with the asphalt cement.

Subsection 407.03 (C) Replace the first paragraph with the following:

At least 14 working days prior to the scheduled start of production of any asphaltic paving mixture, the Contractor shall submit in electronic form (e-mail or on a floppy disk) a proposed Job Mix Formula and Laboratory Design, where applicable, prepared in accordance with the Marshall Method of Mix Design (AASHTO R-12), as modified by TDOT, or by Gyrotory Compaction (AASHTO T 312, Preparing and Determining the Density of Hot Mix Asphalt (HMA) Specimens by means of the Superpave Gyrotory Compactor). Regardless of which method is used, trial blends with at least 4 different asphalt contents (at least 2 above the optimum and 2 below the optimum) shall be made. When the gyrotory method of compaction is utilized, the specimens shall be compacted to 65 gyrations with the optimum asphalt content and mixture volumetrics determined at that compaction level. If the specification requirements are not met, it will be necessary to make adjustments to the aggregate types and proportions. In addition the Contractor shall submit an asphalt barge certification with temperature-viscosity curve for each mixture to the Engineer for approval. A sample of each material to be used in the mix shall be delivered to the location designated by the Engineer.

Subsection 407.03 (D) 2 (c) Quality Control System: 8 d Insert as the second sentence

"The Contractor, at his risk, may continue to produce and place mixture after the first 500 tons without the test results complete, however all mixture subject to price adjustment or removal at the discretion of the Engineer if the test results do not comply with the specifications."

Subsection 407.03 (D), first paragraph, fourth sentence: Remove "on a random basis".

Subsection 407.03 (D) 2 (c) Quality control System, 6, last sentence: Remove "on a random basis".

Subsection 407.03 (D), Table 407-01, Replace "Required" with "Recommended" in the table heading.

Subsection 407.04a Bituminous Mixing Plant, Add the following to subsection "a" as the 12th bullet:

12. Warm Mix Asphalt process equipment.

Modifications may be made to plants to reduce production and placement temperatures in accordance with subsection 407.21. Plant modifications for warm mix

asphalt production temperatures shall be pre-approved by the department, and shall not detriment the plant's ability to maintain temperature control or mixture proportions.

Modifications made to the plant to reduce mixing temperatures must meet the requirements listed for warm mix asphalt additives in the department's QPL.

Subsection 407.06-Bituminous Pavers: replace second sentence with:

“All paver extensions shall be full assembly extensions, including activated and heated screeds, auger extensions, auger guards, and throw-back blades to place mix beneath the auger gearbox.”

Subsection 407.09 Replace subsection in its entirety with the following:

407.09 Weather Limitations. Bituminous plant mix may be placed on properly constructed and accepted sub-grade or previously applied layers provided the following conditions are met:

1. The sub-grade and the surface upon which the bituminous plant mix is placed shall be free of excessive moisture.
2. The bituminous plant mix shall be placed in accordance with the temperature limitations of the following table and only when weather conditions otherwise permit the pavement to be properly placed, compacted and finished.

TEMPERATURE LIMITATIONS

Compacted Thickness	Minimum Air or Surface Temperature	
	Unmodified mixes (PG 64, 67)	Modified mixes (PG 70, 76, 82)
1.5 in. (40 mm) or less	45° F (7° C)	55° F (13° C)
> 1.5 in. (40 mm) to < 3.0 in. (75 mm)	40° F (5° C)	50° F (10° C)
≥ 3.0 in. (75mm)	35° F (2° C)	45° F (7° C)

3. No bituminous plant mix, with a compacted thickness of 1.5 in. (40 mm) or less, shall be placed between November 30 and April 1; and further, no bituminous plant mix, with a compacted thickness greater than 1.5 in. (40 mm), shall be placed between December 15 and March 16.
4. The contractor may request for approval a variance from the above required temperature and seasonal limitations to pave at lower temperatures when there is a benefit to the public. The request shall be in writing, be submitted at least one week prior to the anticipated need, and must include a “Paving and Compaction Plan for Cold Weather” in accordance with the TDOT Procedure. The plan shall identify what practices and precautions the contractor intends to utilize to assure the mixture is placed and compacted to meet the specifications. The plan shall include compaction cooling curves estimating

the time available for compaction, the intended production, haul, and compaction rates with paver and roller speeds estimated. Practices that should be considered include the addition of rollers, reduced production and paving rates, insulated truck beds, and heating the existing surface.

If the Contractor cannot obtain the specified densities, then all paving operations shall cease and a new plan shall be developed. All mixture failing to meet specifications will be subject to price adjustments or removal and replacement at the Contractors expense.

Subsection 407.11 Preparation of Bituminous Material, Replace entire subsection with the following:

407.11-Preparation of Bituminous Material.

- A. **Hot Mix Asphalt (HMA).** The bituminous materials for hot mixes shall be heated to the required mixing temperature in accordance with the following **Table B**:

Table B

PG Binder Grade	Minimum Temp.	Maximum Temp.
PG 64-22, PG 67-22	270° F(132° C)	310° F(154° C)
PG 70-22	290° F(143° C)	330° F(166° C)
PG 76-22	290° F(143° C)	330° F(166° C)
PG82-22	290° F(143° C)	330° F(166° C)

The temperature for Grading AS and Grading ACRL mixtures shall be between 225 and 275° F(110 and 135° C), except when modified binders are used, and then the temperatures shall be between 275 and 330°F (135 and 166°C). Aggregate should be coated and no visible drain down should occur in storage silos or hauling equipment.”

- B. **Warm Mix Asphalt (WMA).** The produced mixture may be subjected to reduced production and placement temperatures by means of either the addition of a chemical warm mix additive in accordance with subsection **918.09(B)** or by use of plant modifications in accordance with subsection **407.04(a)**.

When either WMA technology is utilized, the maximum mixing temperature for any grade of asphalt cement shall be no more than 300°F (135°C). At the beginning of a day’s production, the producer may produce up to five truckloads at temperatures in accordance with Table B in order to pre-heat placement equipment (pavers, transfer devices) prior to producing WMA. The laboratory mixing and compaction temperatures shall be stated on the job mix formula during the mix design approval process. A tolerance of ±5.0°F (2.8°C) for each temperature will be allowed.

During test strip construction, the plant-produced WMA must exhibit the ability to meet test requirements for tensile strength ratio (TSR), conditioned tensile strength, Marshall Stability and flow, and boil test listed for HMA in specifications **307, 407, and 411**.

Subsection 407.15 Revise the entire subsection to the following:

407.15-Compaction. After the bituminous mixture has been spread, struck off, and surface irregularities adjusted, it shall be thoroughly compacted. The method employed must be

approved by the Engineer and be capable of compacting the mixture to the specified density while it is in a workable condition. When no density requirements are specified, a system of compaction for roadway pavements shall be employed which has previously produced required bituminous pavement densities. A control strip and random density samples may be employed to aid the Engineer in evaluating the system.

In general, compaction shall be accomplished by the use of a combination of the equipment designated in **Subsection 407.07**. The following are minimum roller requirements; however, the number of rollers shall be increased if the required results are not being obtained.

Except as noted below, each paving train shall consist of a minimum of 3 rollers as specified in **Section 407.07**. The intermediate roller in each train shall be a pneumatic type. If the surface course contains a latex or polymer additive, a steel wheel type roller for intermediate rolling may be used instead of a pneumatic type provided the surface course meets density requirements.

A minimum of 2 rollers will be required when placing 307 CS mix. Breakdown rolling shall be performed, as soon as possible and while the mixture is sufficiently hot, by a pneumatic tire roller having a minimum contact pressure of 85 psi (585 kPa). A combination roller may not be substituted for a pneumatic roller when placing CS mix. The paver speed shall be regulated so rollers can maintain proper compaction of the mixture as determined by the Engineer.

The minimum number of rollers listed above may, with the approval of the Engineer, be reduced to 1 roller of either the steel-wheel or vibratory type on the following types of construction; (a) On shoulder construction, (b) On incidental construction such as bridge approaches, driveways, etc., and (c) on projects containing less than 10,000 s.y. (9,000 m²) of bituminous pavement.

Unless otherwise directed, rolling shall begin at the low side and proceed longitudinally parallel to the road centerline. When paving in echelon or abutting a previously placed lane, the longitudinal joint shall be rolled first, followed by the regular rolling procedure. When paving in echelon, rollers shall not compact within 6 in. (150 mm) of an edge where an adjacent lane is to be placed. Rollers shall move in a slow uniform speed with the drive wheels nearer the paver and shall be kept as nearly as possible in continuous operation. Rolling shall continue until all roller marks are eliminated. Rollers shall not park on the bituminous pavement.

To prevent adhesion of the mixture to the rollers, the wheels shall be kept properly moistened with water or water mixed with very small quantities of detergent or other approved material. An excess of liquid shall not be used.

Rollers shall not be refueled on the bituminous pavements.

Density Requirements.

ADT 1,000 or less

MIX TYPE	% OF MAXIMUM THEORETICAL DENSITY (AVERAGE)	NO SINGLE TESTS LESS THAN, %
A	90	87
B, BM & BM2	90	87
C & CW	90	87

D	90	87
E	90	87

ADT 1,000 to 3,000

A	91	89
B, BM & BM2	91	89
C & CW	91	89
D	91	89
E	91	89

ADT 3,000 or greater

A	92	90
B, BM & BM2	92	90
C & CW	92	90
D	92	90
E	92	90

Any ADT

Shoulder Mix (B, BM, BM2, D or E)	88	85
A S and A-CRL	None*	None
CS	None*	None

* Density requirements shall be waived on Bituminous Plant Mix Base Grading ACRL, Grading AS and Bituminous Plant Mix Leveling Course, Grading CS; however, a system of compaction for roadway pavements shall be employed which has been approved by the Engineer. When placing Bituminous Plant Mix Base Grading ACRL and Grading AS, the intermediate roller (pneumatic tire) specified previously may be replaced by a steel wheel type if irreparable damage to the pavement is occurring.

The density (bulk specific gravity) determination for a compacted asphalt mixture shall be performed in accordance with AASHTO T-166, Method A only. All core samples shall be COMPLETELY DRY before testing. Air drying is permitted provided core samples are weighed at 2-hour intervals until dry in accordance with AASHTO T166, Section 6.1. Cores may also be dried in accordance with ASTM D7227.

Any base or surface course that tests below the minimum density shall be corrected until the density of the area is equal to or above minimum before it can be used to determine the average density of the lot. No successive layer, where applicable, shall be placed until the area has been corrected. When it is necessary to determine the classification of open graded or dense graded mixes and to measure segregation, ASSHTO T-269 or ASTM D-3203 shall be used.

For density testing purposes, the pavement shall be divided into lots of 10,000 s.y.(9,000 m²), except for 307 Gradings A, B and BM which shall be divided into lots of approximately 5,000 s.y.(4,500 m²). Five density tests shall be performed in each lot and the average results compared with the requirements listed above. At the beginning of the project or at any time it is deemed advisable, smaller lots may be considered in order to evaluate compaction methods or for other reasons which are approved and/or directed by the Engineer.

Acceptance test must be selected randomly and be representative of the lot or subplot. Additional compaction after the acceptance test is acceptable but the original test result must be used to determine lot density. TDOT may take information only samples to spot check compaction. These tests shall not be used as acceptance test.

Along forms, curbs, headers, walls and other places not accessible to the rollers, the mixture shall be compacted thoroughly with hot hand tampers, smoothing irons, or with mechanical tampers. On depressed areas, a trench roller may be used to compact the mix.

Any defective mixture shall be repaired or replaced to the satisfaction of the Engineer.

Test Strips.

Test Strips shall be required for all A, B, BM, C, CW, D, E and F mixes to establish rolling patterns, to calibrate nuclear gauges, to verify that the base course or surface course meets the density requirements of the specifications, and for mix design/ production verification as required.

Construction of the test strip shall be as follows:

1. The base course or other pavement course upon which a test strip is constructed shall have been approved by the Engineer prior to the construction of the test strip.
2. Equipment proposed for use in the compaction of test strips, shall meet the requirements set forth in this subsection and **Subsection 407.07**.

The test strip shall be constructed at the beginning of work on the pavement course. New test strips shall be required when:

1. a change in the job mix formula is necessary
2. a change in the source of materials occurs
3. a change in the material from the same source is observed
4. There is reason to believe that the test strip density is not representative of the bituminous mixture being placed.
5. a change in paving or compaction equipment occurs

With the approval of the Engineer, the Contractor may be permitted to construct additional test strips.

Each test strip shall be constructed with approved bituminous mixture and shall remain in place as a section of the completed work. Each test strip shall be 1 paver width wide and have an area of at least 400 s.y. (350 m²) and shall be of the depth specified for the pavement course concerned.

Compaction of the test strip shall commence immediately after placement of the bituminous mixture and be continuous and uniform over the entire test strip.

The compaction of the test strip shall be continued until no appreciable increase in density (1 lb/c.f. (15 kgs/m³)) as measured with the nuclear gauge can be obtained by additional roller coverage. The roller coverage necessary to obtain this maximum density shall be used as the rolling pattern for the remainder of the project. Cores shall be taken by the Contractor on the test strip at 10 randomly selected locations. Cores shall not be taken within 2 feet of the longitudinal edges for calibration. These cores shall be given to the State for use in calibrating the nuclear gauge and to verify that the average density of the test strip meets the density requirements of the

specifications. All densities will be reported using the corrected nuclear gauge readings. Correction factors shall be specific to the nuclear gauges utilized during test strip construction. In the event that a different nuclear gauge needs to be utilized for acceptance, new cores will need to be cut from the ongoing pavement construction to calibrate the new gauge.

In the event the density of the asphaltic concrete in the test strip does not meet specification requirements, the Contractor shall make whatever changes are necessary to obtain the specified density. Other sources and combinations of aggregates shall be used as required, subject to approval of the Engineer, to produce a mix meeting the required density.

Subsection 407.16 – Joints, Replace the entire subsection with the following:

407.16-Joints. Placing of the bituminous paving shall be as continuous as possible. Rollers shall not pass over the unprotected end of a freshly laid mixture unless authorized by the Engineer. Transverse joints shall be formed by cutting back on the previous run to expose the full depth of the course. A brush coat of bituminous material shall be used on contact surfaces of longitudinal and transverse joints just before additional mixture is placed against the previously rolled material.

Subsection 407.20 B 1, Remove and replace the Quantity/Sublot Table with the following:

<u>Quantity</u>	<u>Number of Sublots</u>
3001-4500 tons	4 tests
2001- 3000 tons	3 tests
501-2000 tons	2 tests
Less than 500 tons	1 test

Subsection 407.20 B 3 (b), Add the following as the first sentence:

Washed gradation of the residual aggregate shall be performed according to AASHTO T-30.

Subsection 407.20, Table 407-2, Revise table to the following:

The percents passing the sieves will be determined in accordance with AASHTO T-30.

TABLE 407-2

ACCEPTANCE SCHEDULE OF PAYMENT (Asphalt Plant Mix Characteristics)			
Characteristics	Pay Factor	Average Arithmetic Deviation of the Lot Acceptance Test from the Job Mix Formula	
		1 Test	2 Tests or more
Asphalt Cement	1.00	0.00-0.30	0.00-0.25
Content ***	0.95	0.31-0.35	0.26-0.30
(Extraction or ignition oven)	0.90	0.36-0.40	0.31-0.35
	0.80*	over 0.40	over 0.35
Gradation			

3/8 in. (9.5 mm),	1.00	0.00-6.50	0.00-5.70
Sieve and Larger	0.95	6.51-7.08	5.71-6.20
	0.90	7.09-7.66	6.21-6.69
	0.80*	over 7.66	over 6.69
Gradation			
No. 4 Sieve** (4.75 mm)	1.00	0.00-4.62	0.00-4.00
	0.95	4.63-5.20	4.01-4.50
	0.90	5.21-5.77	4.51-5.00
	0.80*	over 5.77	over 5.00
Gradation			
No. 8 16, 30 & 50 (2.36 mm, 600 µm & 300 µm,) Svs**	1.00	0.00-3.80	0.00-3.30
	0.95	3.81-4.46	3.31-3.91
	0.90	4.47-5.12	3.92-4.52
	0.80*	over 5.12	over 4.52
Gradation			
No. 100 & 200 (150 µm & 75 µm) Sieves**	1.00	0.00-1.80	0.00-1.60
	0.95	1.81-2.00	1.61-1.75
	0.90	2.01-2.20	1.76-1.90
	0.80*	over 2.20	over 1.90

*If approved by the Engineer, the Contractor may accept the indicated partial pay. The Department may require removal and replacement at no cost. The Contractor has the option to remove and replace at no cost to the Department at any time.

Subsection 411.03 Composition of Mixtures, Replace entire subsection with the following:

411.03-Composition of Mixtures.

- (a) General Composition of mixtures used in this construction shall meet all applicable requirements of Subsection 407.03.
- (b) The specified mineral aggregate and asphalt cement shall be combined in such proportions as to produce mixtures within the following master composition limits.

Proportions of Total Mixture, Per Cent by Weight

Surface Courses	Effective Combined Mineral Aggregate	Asphalt Cement
Grading D	93.0- 94.3	5.7-7.0*
Grading E**	93.0- 94.3	5.7-7.0*
Grading E (shoulders)	92.0-94.7	6.0-6.5*

*If the effective combined specific gravity of the aggregate exceeds 2.80, the above proportions may be adjusted as directed by the Engineer. The upper limit for Flow values shall not apply to mixes with modified asphalt liquids.

**The minimum allowable asphalt cement content for 411-e low volume mixtures shall be 5.3%.

Grading D

In addition to the other requirements of these specifications the composition of the mineral aggregate shall be such that when combined with the required amount of bitumen the resultant mixture shall have:

All Roads

Mix	Stabil. Min. lbft* (kN)	Flow 0.01 in. (mm) ***	Design Void content †%*	Production Void Content %*	Min. VM A%*	Dust-Asphalt Ratio*
411D	2,000 (9.0)	8-16 (2-4)	4.0±0.2	3-5.5	14	0.6-1.2

*Tested in accordance with AASHTO T 245 with 75 blows of the hammer on each side of the test specimen, using a Marshall Mechanical Compactor.

**The dust to asphalt ratio is the percent of the total aggregate sample that passes the 200 mesh (75 µm) sieve as determined by AASHTO T 11 divided by the percent asphalt in the total mix

***Flow will only be required when using a non-modified binder (PG 64-22 or 67-22)

****In order to identify critical mixes and make appropriate adjustments, the mix design shall have these required production properties for the bitumen content range of Optimum Asphalt Cement ±0.25%.

When limestone screenings or agricultural limestone are utilized, the maximum amount by weight of the mineral aggregate shall be 25% unless the material is shown to meet the same coarse surface aggregate requirements for limestone as listed in **Subsection 903.11 (c) Grade D (Types I, II, III, IV)**. In no case shall the combined aggregate blend consist of less than 75% non-skid material. When natural sand is used as fine aggregate, it shall be limited to a maximum amount of 25% by weight of the mineral aggregate. A maximum of 5% mineral filler meeting the requirements of **Subsection 903.16** may be substituted for an equal quantity of the limestone fines. If the mixture does not comply with the design criteria, another source of aggregate shall be required.

When gravel is used as the coarse aggregate for a 411 Grading D mix, a minimum of 20% by weight limestone screenings, agricultural limestone and/or mineral filler shall be required.

Grading E

In addition to the other requirements of these specifications where Grading E is used for the riding surface the composition of the mineral aggregate shall be such that when combined with the required amount of bitumen the resultant mixture shall have:

High Volume Roads (ADT over 1,000)

Mix	Stability	Flow 0.01i	Design Void	Production Void	Min. %
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	Min. lbft* (kN)	n. (mm) **	content %*	Content %*	VMA *
411 E	2,000 (9.0)	8-16 (2-4)	4.0±0.2	3-5.5	14

Low Volume Roads (ADT 1,000 and below)

Mix	Stability Min. lbft* (kN)	Flow 0.01in. (mm)**	Design Void content %*	Production Void Content %*
411 E	1,500 (6.75)	8-16 (2-4)	3.5±0.5	2-5

*Tested in accordance with AASHTO T 245 with 75 blows of the hammer on each side of the test specimen, using a Marshall Mechanical Compactor.

**Flow will only be required when using a non-modified binder (PG 64-22 or 67-22)

*** Minimum stability for shoulder mixes will be 1500 lb.ft. (kN) and optimum Asphalt Cement content for shoulder mixes shall be as directed by the Regional Materials Supervisor.

If the design criteria above cannot be obtained with the aggregate, submitted to the laboratory for design, another source of aggregate will be necessary.

(c) Recycled Asphalt Pavement

The Contractor may utilize asphalt pavement that has been removed from a Department project or other State Highway Agency project by an approved method and stored in a TDOT approved stockpile. Recycled Asphalt Pavement (RAP) combined with the appropriate aggregate, asphalt cement, and anti-strip additive when required shall produce a mixture that will otherwise meet all the requirements of **Subsection 903.11** and the requirements herein **Section 411**. RAP shall be allowed in each mix listed in the following table:

Mix Type	%RAP (Non-processed)	Maximum %RAP (Processed)	Maximum % RAP Processed and Fractionated	Maximum Particle size
411D(PG64-22, PG67-22)	0	15	20	½ in. (12.5 mm)
411D(PG70-22)	0	10	15	½ in. (12.5 mm)
411D(PG76-22, PG82-22)	0	10	15	½ in. (12.5 mm)
411E(Roadway)	0	15	20	½ in. (12.5 mm)
411E(Shoulder)	15	30	35	½ in. (12.5 mm)

RAP that has been crushed and screened or otherwise sized such that the maximum recycled material particle size is less than that listed in the table above prior to entering the dryer drum, shall qualify as "Processed". "Non processed" RAP shall be similar material that has not been crushed and screened or otherwise

sized previous to its use. When RAP is processed over more than one screen, producing sources of various maximum particle size (i.e. - 3/4" to 1/2", 1/2" to #4, etc.), it will be referred to as "fractionated", and larger percentages will be allowed as noted above. These increased percentages will only be allowed provided the individual fractions are introduced into the plant as separate material sources for increased control.

All mixes shall contain at least 80% virgin asphalt except for 411E Shoulder Mix which shall have at least 65% virgin asphalt.

The Contractor shall obtain a representative sample from the recycled material stockpile and establish a gradation and asphalt cement content as required. The Contractor shall determine the gradation and asphalt content of the recycled material at the beginning of a project and every 2,000 tons (2,000 metric tons) thereafter. The stockpile asphalt cement content for all recycled material shall not vary from the Job Mix Formula by more than ± 0.8 %. The stockpile gradation tolerance for all recycled material on each sieve is listed below.

3/8in. (9.50 mm) sieve and larger	± 10%
No. 4(4.75 mm) sieve.....	± 8%
No. 8(2.36 mm) sieve.....	± 6%
No. 30(600 µm) sieve.....	± 5%
No. 200(75 µm) sieve.....	± 4%

The Contractor will be responsible for his own sampling and testing of the RAP as well as new materials for bid purposes, and for the submission of the job mix formula in accordance with **Subsection 407.03**. After mixing, the moisture content of the total mix shall be no more than 0.1% as determined by oven drying, and the provisions for lowering the temperature because of boiling or foaming shall not apply.

The mixture will be accepted for aggregate gradation and asphalt content based on extractions or in accordance with AASHTO T 308.

(d) Anti-Strip Additive

Asphaltic concrete surface mixtures (Grading D & E) shall be checked for stripping by the Ten Minute Boil test for dosage rate and ASTM D 4867(Root-Tunnecliff procedure) for moisture susceptibility.

If moisture susceptibility is indicated, then an approved anti-strip agent shall be mixed with the asphalt cement at the dosage recommended by the respective test and as specified in **Subsection 918.09(B)**.

Subsection 411.09-Method of Measurement. Remove and replace the entire subsection with the following:

Subsection 411.09-Method of Measurement. Mineral Aggregate including Mineral Filler, when required, and Asphalt Cement for Asphaltic Concrete Surface (Hot Mix) will be measured as prescribed in Subsection 407.19. Mineral Filler when required will not be measured for payment separately, but will be included as mineral aggregate.

If recycled mix is permitted, the completed mix, including new mineral aggregate, planings, asphalt cement and additive, shall be measured by the ton (tonne) in accordance with Section

109. For bidding purposes, the asphalt cement content of the specified mix shall be used in the chart below:

Mix Type	Asphalt Content
411-D	5.9%
411-E Roadway	6.3%
411-E Shoulder	6.3%

In the event that the Engineer sets an asphalt content other than that stated above, a price adjustment will be made based on the asphalt content set by the Engineer and the Monthly Bituminous Index for the specific grade asphalt cement on the mix design. The price adjustment will be calculated according to the following formula:

$$PA = [MBI \times (DA-BA) \times T]/100$$

Where:

PA = Price Adjustment

MBI = Monthly Bituminous Index

DA = Percent asphalt set on the mix design

BA = Percent asphalt specified above to be used for bidding

T = Total tons (metric tons) asphalt mix for price adjustment

The liquid anti-strip additive will be measured by the gallon(liter) and paid as outlined in Subsection 411.10. Hydrated Lime will be measured by the ton(metric ton) and paid as outlined in Subsection 411.10.

No direct payment will be made for polymer or latex additives and cost thereof shall be included in the price bid for the modified asphalt cement or modified mixture.

Subsection 414.03, Revise entire section as follows:

414.03-Composition of Mixture. At least 2 weeks prior to beginning work the Contractor shall submit a signed original of a mix design covering the specific materials to be used on the project to the Materials and Tests Division for acceptance together with representative samples of each ingredient to be used in the mixture. The samples should contain information relative to sources, type of materials and project number.

This design must have been performed by a qualified laboratory. Once the materials are approved, no substitution will be permitted unless first tested and approved by the laboratory preparing the mix design. No work shall begin nor will any mixture be accepted until the Materials and Tests Division has evaluated and accepted the mix design.

The laboratory report will show the results of tests performed on individual materials, comparing their values to those required by this specification. Job aggregates will be used in all

laboratory design tests. Mixing tests must pass at the maximum expected air temperature in ISSA T113.

Slurry Seal. The laboratory report will provide the following information on the slurry seal mixture.

Quick-Set Emulsified Asphalt Slurry Seal

Mixing Time Test, seconds @ 77° F(25° C) (TB #113),	120 minimum
Mix Time @ (50° and 100° F) (10° and 37.7° C)	(informational)
Set Time Tests	
30-Minutes-Blotter Test (TB #102)	no brown stain
Displacement Test	no displacement
Water Resistance Test @ 30 minutes (TB #102)	no discoloration
Wet Stripping Test, % coating (TB #114)	90% minimum
System Compatibility (TB #115)	Pass
Set Time Tests: 30 minutes (TB #139)	12 kg-cm minimum
Early Rolling Traffic Time: 2 hours (TB #139)	20 kg-cm minimum
Wet Track Abrasion Test, loss in g/ft ² (g/m ²) (TB #100)	75(800) maximum 6 day soak

In addition to the tests specified above, the following test will be required on roadways having greater than 1500 ADT.

ISSA T #109	Test Method for Measurement of Excess Asphalt in Bituminous Mixtures by Use of a Loaded Wheel Tester and Sand Adhesion
1,500-3,000 ADT	Maximum 55grams/psf (590g/m ²) sand adhesion, 1,000 cycles @ 125 lbs. (57 kgs).
3,000+ ADT	Maximum 50grams/psf (540g/m ²) sand adhesion, 1,000 cycles @ 125 lbs.(57 kgs).

Slurry Seal Composition. Emulsified asphalt slurry seal shall be a uniform mixture of aggregate, emulsified asphalt, latex solids when specified on the Plans, mineral filler and water.

Compatibility of all ingredients (including the mix set additive) of the mix shall be certified by the emulsified asphalt manufacturer.

The percent of residual asphalt based on the weight of the dry aggregate shall be between 7.5 and 13.5 with a mixture control tolerance of $\pm 0.50\%$.

The aggregate gradation and percent residual asphalt, as provided in the slurry seal design accepted by the Engineer, shall be maintained within the mixture control tolerances stated herein.

Portland cement may be added to obtain the desired dispersion and working characteristics of the slurry. Such addition shall be stated on the slurry seal design, shall not exceed 3% of the weight of the aggregate, and shall have a mixture control tolerance of $\pm 0.25\%$.

Portland cement added for dispersion of the slurry seal shall be a commercial quality, non-air entraining cement and shall not be considered as mineral filler for the purpose of satisfying the gradation requirements of the aggregate.

The aggregate shall be prewetted with a minimum amount of water prior to blending with the emulsified asphalt to obtain a fluid, homogeneous slurry mixture of the proper consistency. No additional water above that quantity required by the slurry seal mix design shall be added to the slurry mix in order to obtain a more workable mixture.

Micro Surfacing. The laboratory report will provide the following information on the micro-surface mixture.

Mixing Time Test, secs @ 77° F (25° C), (T-102)	120 minimum
Mix Time @ 50 and 100° F (10° C and 37.7° C)	(informational)
Set Time Tests: 30 minutes (T-139)	12 kg-cm minimum
Early Rolling Traffic Time: 60 minutes (T-139)	20 kg-cm minimum
Wet Stripping Test, % coating (T-114)	90% minimum
Wet Track Abrasion Test, loss in $\frac{g}{ft^2}$ ($\frac{g}{m^2}$) (T-100)	75 (800) max 6 days 50 (538) max. 1 hour
Measurement of Excess Asphalt (T-109)	Max. 50 grams/ ft^2 (540 grams/ m^2) Sand Adhesion, 1,000 Cycles @ 125 lbs. (57 kgs).
Classification Compatibility (T-144)	11 pt. minimum
Loss on Ignition (LOI) Test, TDOT Spec. 40703 E	(informational)

Micro-Surface Composition. For the paving mixture, the design shall verify the functioning of the set regulating additives and shall present certified test results for the Engineer's approval. Aggregate in the mixture shall represent material to be used on the project.

The Engineer shall approve the design prior to use. Proportions for the design shall be within the following limits:

Modified Emulsified Asphalt Residue by Dry Wt. of Aggregates	5.0-9.0%
Mineral Additive by Dry Weight of Aggregate	0.5%-3.0%
Latex or Polymer Based Modifier provide the specified properties	3% minimum and as required to
Mix Set Additive	As required to provide the specified properties
Water	As required to produce consistency

Portland cement may be added to obtain the desired dispersion and working characteristics of the mix. Such addition shall be stated on the micro-surface design, shall not exceed 3% of the weight of the aggregate, and shall have a mixture control tolerance of $\pm 0.25\%$.

Portland cement added for dispersion shall be a commercial quality, non-air entraining cement and shall not be considered as mineral filler for the purpose of satisfying the gradation requirements of the aggregate.

The mixture shall also be proportioned such that the test strip requirements in **Subsection 414.06** are achieved.

Applicable Specifications. The following specifications and test methods form a part of this specification.

Title	Source
Mixing, Setting and Water Resistance Test to Identify "Quick-Set" Emulsified Asphalts	ISSA TB-102
Wet Track Abrasion of Micro Seals	ISSA TB-100
Measurement of Micro-Seal Consistency	ISSA TB-106
Test Method for Measurement of Excess Asphalt in Bituminous Mixtures by Use of a Loaded Wheel Tester	ISSA TB-109
Outline Guide Design Procedure for Slurry -Seal	ISSA TB-111
Method to Estimate Micro-Seal Spread Rates and to Measure Pavement Macrotecture	ISSA TB-112
Trial Mix Procedure for Slurry -Seal Design	ISSA TB-113
Wet Stripping Test for Cured Slurry-Seal Mixes	ISSA TB-114

Test Method to Classify Emulsified Asphalt/Aggregate Mixture Systems by Modified Cohesion Tester. Measurement of Set and Cure Characteristics	ISSA TB-139
Classification Compatibility	ISSA TB-144
Design, Testing and Construction of Micro-Seal	ASTM D 3910
Quantitative Extraction of Bitumen for Bituminous Paving Mixtures	ASTM D 2172

The blended asphalt mixture, when combined with aggregate and mineral filler, shall have the following characteristics:

1. Be capable of filling up to ½ in. (13 mm) wheel ruts in one pass.
2. Be capable of field regulation of the setting time.
3. Be suitable for nighttime placement.

Subsection 414.04, Revise subsection as follows:

414.04-Equipment. All equipment necessary for the satisfactory performance of this work shall be on hand and approved before the work is permitted to begin. All equipment, tools, and machines used in the performance of this work shall be maintained in satisfactory working condition. The Contractor shall have available at all times a device capable of determining aggregate moisture within 3 minutes.

All trucks shall be covered immediately after loading with a cover of canvas or other suitable material. The cover shall lap down along the sides and rear of the truck bed a minimum of 6 in. (150 mm) and be secured by tie downs at a maximum of 5 ft. (1.5 m) spacing along the sides and rear of the truck bed. All trucks must be equipped to meet the above requirements prior to commencing hauling operations.

Power brooms, power blowers, air compressors, water flushing equipment and hand brooms shall be capable of thoroughly cleaning all cracks and the old surface. Hand squeegees, hand brooms, shovels and other incidental equipment shall be provided as necessary to perform work.

Mixing Equipment. The mixing equipment shall be re-supplied with all materials while depositing the mixture on the roadway in order provide a continuous, non-stop surfacing operation. The paving mixture shall be produced in a self-propelled, front feed, continuous loading, mixing machine equipped with a positive, non-slipping aggregate delivery system and an interconnected, positive displacement water-jacketed gear pump to accurately proportion ingredients.

The mixing machine shall be equipped with an approved fines feeder that has an accurate metering device or method to introduce a predetermined amount of mineral filler into the mixer at the same time and location as the mineral aggregate. A spray bar shall be provided to completely wet the aggregate dropping down to the pug mill with additive and water. The twin-shafted multi-blade pug mill shall be a continuous flow type and a minimum of 50 in. (1.25 m) long. The emulsion shall be introduced above the third point of the mixer to ensure proper premixing of the aggregate, cement, additive and water when the modified emulsified asphalt is

added. Blade size and side clearances shall meet the equipment manufacturer's recommendations.

Mixing shall be done in a manner that does not cause premature breaking of the emulsified asphalt. The mixing unit of the mixing chamber shall be capable of thoroughly blending all ingredients.

The mixer shall be equipped with a remote forward speed control at the back mixing platform so the back operator can control forward speed and level of mixture in paving or rut box. Effective April 1, 2006, the Contractor shall provide a computerized material monitoring system with integrated material control devices that are readily accessible and positioned so the amount of each material used can be determined at any time. The mixer shall be equipped with a back-up electronic materials counter that is capable of recording running count totals for each material being monitored. The mixer shall be equipped with a radar ground measuring device. Each material control device shall be calibrated prior to each mix application and as often thereafter as deemed necessary by the Engineer. The computer system shall have the capability to record, display and print the following information:

- Individual sensor counts for emulsion, aggregate, cement, water and additive
- Aggregate, emulsion, and cement output in lbs.(kgs) per minute
- Ground travel distance. The mixer shall be equipped with a Radar Ground metering device
- Spread rate in lbs./s.y.(kgs/m²)
- Percentages of emulsion, cement, water and additive
- Cumulative totals of aggregate, emulsion, cement, water and additive
- Scale factor for all materials

The computer system shall be functional at the beginning of work, and must be functional during each calibration.

The mixing machine shall be equipped with a water pressure system and fog type spray bar, adequate for complete fogging of the surface preceding spreading equipment of the mixture.

The mixing machine shall include controls for proportioning and calibrating the aggregate feed. The aggregate feed device shall be equipped with a revolution counter so that the amount of aggregate used may be determined at any time and shall have a positive locking feed gate.

The emulsion pump shall be of the positive displacement type and shall be equipped with a device so that the amount of emulsion used may be determined at any time. The emulsion pump, meter and piping shall be arranged to afford a means to calibrate the meter by weighing a metered volume. The pump shall deliver the emulsion to the mixer box at a uniform rate which shall not vary more than 2% from the required quantity.

The water pump shall be equipped with a minimum of 2 valves. One valve shall establish the required water flow. The other valve shall be a quick acting valve to start and stop the water flow.

The mixing machine shall have sight gauges located at the material storage tanks for the asphalt emulsion and water.

The mixing machine shall be equipped with approved metering devices so that it can be accurately calibrated and the quantities of materials used during any 1 period can be closely estimated. In the event that the metering devices stop working properly, the mixing machine shall no longer be used until necessary repairs have been made.

Satisfactory means shall be provided to afford positive interlocking control between the flow of aggregate from the bins and the flow of emulsion from the pump. Each mixing unit shall be calibrated in the presence of the Engineer prior to construction. The documentation shall include an individual calibration of each material at various settings, which can be related to the machine's metering devices. When calibrating the emulsion system, a minimum of 3 tests shall be run, with each test run being a minimum of 40 gal. (150 liters). Calibration of the aggregate delivery system shall require tests at 3 different gate settings with 2 test runs at each gate setting and a minimum of 425 lbs. (193 kgs) per test run. Calibration of the filler(cement) delivery system shall require 3 tests at a minimum of 25 lbs. (11 kgs) per test. The scales used shall be certified. No machine will be allowed to work on the project until the calibration has been completed and accepted. Additional calibrations may be required during the process of the work as directed by the Engineer.

Spreading Equipment. Attached to the machine shall be hydraulically adjustable(adjustable while applying mixture) type spreader box with a positive screed adjustment for yield control and a positive adjustment for the joint matcher. The box shall be attached to the mixer, equipped with ribbon flights mounted on an adjustable shaft to continually agitate and distribute the materials throughout the box. The box shall be equipped with curb bumpers and replaceable runners with a minimum of 5 ft. (1.5 m) long end runners. The box shall be equipped with a sufficient walkway to provide access to either side of the spreader box without walking through the freshly laid material. The spreader box shall be heavy duty with crossbracing for rigidity and a manufacturer's weight not less than 1,400 lbs. (635 kgs) at a width of 12 ft. (3.6 m). The box must be capable of laying mix to a width of 14 ft. (4.3 m). The equipment shall provide sufficient turbulence to prevent the mix from setting in the box or causing excessive side build-up or lumps. To prevent the loss of the mixture from the box, the Contractor shall attach flexible seals, front and rear, in contact with the road. The full width application box shall be equipped with a secondary strike-off located approximately 2 to 3 ft. (0.5 to 1.0 m) behind the primary strike-off to minimize transverse corrugations. The secondary strike-off shall have elevation and width adjustments similar to the primary strike-off. It shall have a pivot point where it can be tilted for texturing or raised completely off the surface. Rut filling shall require a steel or high density strike-off on the spreading equipment (as approved by the engineer) or the use of a rut box. A rut box shall be used for filling ruts in excess of 3/8 in. (10 mm) unless otherwise specified on the plans. The Contractor shall operate the spreading equipment in such a manner to prevent the loss of the mixture on super-elevated curves. Mixture shall be spread to fill cracks and minor surface irregularities and achieve a uniform skid-resistant surface without causing skips, lumps or tears in the finished mat.

For slurry seals, the use of burlap drags or other drags necessary to obtain the desired finish, shall require approval by the Engineer. Drags having excessive build-up shall be replaced. Drags shall be kept in a completely flexible condition at all times. No drags shall be used on Micro-surfacing.

Subsection 414.06, Revise subsection as follows:

414.06-Application. Prior to the placement of the mixture, a tack coat of SS-1h, CQS-1h or CQS-1hp emulsion shall be applied with an asphalt distributor. The tack coat shall consist of 1 part emulsion and 3 parts water. The application rate shall be 0.10 to 0.15 gal./s.y.(0.5 to 0.7

L/m²) of the diluted emulsion. The actual application rate shall be determined by the Engineer. The method of application of the tack coat shall be in accordance with **Section 403**.

The emulsified asphalt slurry seal shall be applied at a rate of 16 ±2 lbs./s.y. (of 8.75 ±1 kgs/m²) based on dry aggregate weight unless otherwise specified on the Plans. The rate of application shall be varied within the range specified above as required by the condition of the pavement to obtain a minimum thickness of 1/8 in. (3 mm) above the high points of the milled areas and ¼ in. (6 mm) thickness on unmilled areas.

Micro-surface shall be applied as follows:

- **Rutfill Course.** If a rut fill course is specified, apply enough material to fill the wheel paths without excess crowning (overfilling). An excess crown is defined as 1/8 in. (3 mm) after 24 hours of traffic compaction. Apply rut fill courses in widths from 5 to 6 ft. (1.5 to 1.8 m) for each wheel path. Provide a smooth, neat seam where 2 rut fill passes meet. Take care to restore the designed profile of the pavement cross-section. Feather the edges of the rut fill course to minimize the use of excess material.
- **Leveling Course.** If a leveling course is specified, apply at a rate of 14 ±2 lbs./s.y. (7.6 ±1.1 kgs/m²) based on dry aggregate.
- **Surface Course.** If a surface course is specified and it is placed over a leveling course, apply at a rate of 18 ±1 lbs./s.y. (8.7 ±0.6 kgs/m²) based on dry aggregate. If a surface course is specified and it is not placed upon another micro-surfacing course, apply the paving mixture at a minimum rate of 22 lbs./s.y. (11.9 kgs/m²) based on dry aggregate.

Micro-surface shall be applied at the rates as specified on the plans for leveling and surface courses.

The mixture shall be applied based on dry aggregate weight as specified on the plans.

The maximum allowable speed of the machine shall be 130 ft. (40 m) per minute. When rut filling, the maximum allowable speed shall be determined by the Engineer. The final surface seal shall be placed uniformly across the width of the traffic lane unless otherwise specified or directed. The action of the squeegee shall permit the mix to flow freely leaving a smooth, uniformly textured surface.

Unless otherwise directed by the Engineer, the surface shall be pre-wetted with water by fogging ahead of the spreader box. Pre-wetting shall be closely controlled to prevent accumulation of water to the point of running off or puddling.

As the aggregate and emulsion are being loaded into the aggregate/emulsion support trucks or mixing machine, the aggregate shall be given a final screening by sieving it through screening equipment capable of removing any random oversize material.

The mixture shall be of the desired consistency when deposited on the surface after which no additional elements shall be added. A sufficient amount of mixture will be carried in all parts of the spreader at all times so the complete coverage is obtained. No lumping, balling or unmixed aggregate shall be permitted. No segregation of the emulsion and aggregate fines from the coarse aggregate will be permitted. If the coarse aggregate settles to the bottom of the mix, the mix will be removed from the pavement. The mixture shall have proper consistency so that excessive splattering and excessive free water is avoided. The spraying of water into the spreader box during lay down operations will not be permitted. Hand tools, lutes and squeegees shall be used to spread mix on areas not accessible to the machine spreading equipment. Rolling

with a pneumatic-tired roller shall be required after proper curing for sections of pavement not to be exposed to traffic. The roller shall be equipped with tires with a pressure of 40-60 psi(275 to 425 kPa).

Quality Control: The Contractor shall produce a mixture that will be in compliance with the mix design and the quality control tolerances. The Slurry Seal or Micro-Surface shall be applied at the rates as specified on the plans. The methods described in this section shall be used by the Contractor to measure compliance. Contractor shall maintain all quality control documentation and make available to the Engineer or Project Inspector upon request or at completion of work.

- a. Asphalt Content – The Contractor shall calculate the % asphalt content of the mixture from the equipment computer display readings randomly, a minimum of 3 times a day. The quality control tolerances from the mix design is $\pm 0.5\%$.
- b. Application Rate – The Contractor shall calculate the yield of the course being placed from the equipment computer display readings randomly, a minimum of 3 times a day. The quality control tolerance from the specified application rate is ± 2 lbs/s.y. (± 1 kg/m²).
- c. Documentation – The Contractor shall maintain a daily report and a lot sheet as follows:
 1. Daily Report – The daily report shall include the following information:
 - Aggregate used, ton(metric ton) (dry)
 - Slurry or Micro-Surfacing emulsion used, ton(metric ton)
 - Bituminous Materials for Tack Coat and for Fog Seal, ton (metric ton)
 - Cement used, ton(metric ton)
 - Water used in mixture, gallons(liters)
 - Additive used in mixture, gallons(liters)
- d. Test Strip Construction - Prior to production application, the Contractor shall place a 1,000 \pm 50 ft. (300 \pm 15 m) test section to verify a quick traffic system is being used. The test strip shall be placed at the same time as paving is to take place, night or day, and under the same ambient conditions. The test strip shall be able to carry normal traffic within 60 minutes. If normal traffic cannot be carried, the emulsion or mixture must be adjusted and another test strip will be required.

Lot Sheet - The project shall be segmented into lots with any 1 lot not to exceed 20,000 s.y.(16,700 m²). For each lot the Contractor shall maintain a lot sheet, providing the following information:

- Control Section, Job Number, Route, Engineer (Project Inspector)
- Date, Air Temperature
- Control Settings, Calibration Values, Unit Weight of Emulsion (lbs per gallon) (kgs per liter), Percent residue in Emulsion.
- Beginning and Ending Intervals
- Computer display readings for material usage (Beginning, and Ending, and Total)
- Length, Width, Total Area (s.y.) (m²), (lbs.) (kg) of Aggregate, lbs. (kg) of Emulsion, lbs. (kg) of Cement.

- Percent of each Material, Percent of Asphalt Cement, Application Rate, Combined Application Rate (lbs./yd²) (kgs/m²)
- Mix Design (Percent Portland Cement, Percent Emulsion, Percent Asphalt Cement)
- Contractors Authorized Signature
- Calibration Forms

Subsection 414.08. Revise entire subsection to the following:

414.08-Fog Seal Application. Fog sealing of shoulders shall meet the requirements of Subsection 403.05.

Subsection 414.09, Revise subsection as follows:

414.09-Weather Limitations. Micro-surface and slurry seal shall be placed only when the pavement surface temperature and the ambient air temperature are a minimum 50° F(10° C) and rising. These applications will not be placed during foggy or rainy conditions. Placement shall be limited to the period from April 1 to October 31.

Subsection 414.11, Revise the first and second paragraphs to as follows:

414.11-Method of Measurement. Emulsified Asphalt Slurry Seal will be measured by the square yards(meters) in place as completed and accepted. The quantity of aggregate for Micro Surfacing, including mineral filler, shall be measured by the ton(metric ton) (dry), based on the calibrated metering devices affixed to the micro-surface mixing machine. The quantity of latex or polymer modified emulsion used in the accepted portion of the Micro- surfacing shall be measured by ton(metric ton) of material based on the calibrated metering device affixed to the micro-surface mixing machine. Bituminous Materials for Tack Coat and for Fog Seal, will be measured and paid for by the ton (metric ton) of undiluted emulsion. The quantity for "Bituminous Material for Tack Coat", Item No. 403.01, should be ¼ of the estimated application rate. No direct payment will be made for the latex or polymer additives when used and the cost thereof shall be included in the price bid for the respective items.

For bidding purposes, the emulsified asphalt content on the slurry mix design shall be 15% and for micro-surfacing design the asphalt content shall be 12%. In the event that the Engineer sets an emulsified asphalt content for slurry seal other than that stated above, a price adjustment will be made based on the emulsified asphalt content set by the Engineer and the invoice price of the emulsified asphalt F.O.B. the project delivery point. The price adjustment will be calculated according to the following formula:

Subsection 415.02, (Delete the third paragraph) "When milling the Interstate..."

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March 1, 2006

Supplemental Specifications - Section 500
of the
Standard Specifications for Road and Bridge Construction
March 1, 2006

Subsection 501.03, Remove and Replace the entire subsection with the following:

501.03-Proportioning and Quality Assurance of Concrete.

A. Proportioning :

The Contractor shall submit the proposed concrete design to the Engineer for approval. The design shall be determined using saturated surface dry aggregate weights and shall be verified by the use of trial batches meeting the requirements of these specifications. The concrete design shall be prepared by a TDOT certified Class 3 concrete plant technician, or by an approved independent testing laboratory under the direction of a registered professional civil Engineer, licensed by the State of Tennessee. The concrete plant technician or the Civil Engineer shall certify that the information contained on the design is correct and is the result of information gained from the trial batches. Trial batches for design, including admixtures in the proper proportion, shall be built no more than 90 days prior to the design submittal. All cost of concrete design, preparation and submittal shall be the responsibility of the Contractor.

The concrete design shall be air entrained and produce a workable concrete mix meeting the following design and production parameters:

CLASS CP - PAVING CONCRETE

28 day Compressive strength, min. (PSI)	Minimum cementitious content (pounds per CY)	Maximum Water/cement ratio (lb/lb)	Air Content (%)	(inch)
3000	526 ¹ 545 ²	0.49	5% design 3-8 % production	0-2.0 ³ 3±1 ⁴

¹-526 lbs required when the coarse aggregate is crushed stone

²-545 lbs required when the coarse aggregate is gravel

³-Allowable slump for slipform paving

⁴-Allowable slump for other than slipform paving

Chemical Admixtures shall be included in the concrete mixture as specified in the following table based on the ambient air temperature and expected weather conditions.

Class of Concrete	Temperature less than 85° F(30 ° C) and falling	Temperature 85° F(30° C) or greater and rising
CP	Type A or Type F	Type D or Type G

Admixtures to be incorporated into the concrete shall all be from the same manufacturer, shall be incorporated into the concrete in accordance with the manufacturer's recommendations, subject to approval by the Engineer.

The proposed concrete design submittal shall contain as a minimum the following information:

- Source of all aggregate
- Brand and type of cement
- Source and class of fly ash (if used)
- Source and grade of ground granulated blast furnace slag (if used)
- Specific gravity of cement
- Specific gravity of fly ash (if used)
- Specific gravity of ground granulated blast furnace slag (if used)
- Admixtures (if used)
- Gradation of aggregates
- Specific gravities of aggregates (saturated surface dry)
- Air content (if air entrainment is used)
- Percentage of fine aggregate of the total aggregate (by volume)
- Slump
- Weight per cubic yard(m3)
- Yield
- Temperature of plastic concrete
- Water/cement ratio lb./lb.(kg/kg)
- 7 day compressive strength [minimum of 3 x 6-in. x12in. (150mm x 300mm) cylinders]
- 14 day compressive strength [minimum of 3 x-6in. x12in.(150 x 300 mm) cylinders]
- 28 day compressive strength [minimum of 3 x-6in. x12in.(150mm x 300mm) cylinders]
- Weight of each material required to produce a yd3(m3) of concrete

In lieu of the above mix design submittal, the Contractor may submit for approval to use an existing design (Contractor or Department prepared) approved by the Department within the current calendar year. The approval of this concrete design submittal will not relieve the Contractor of the responsibility of providing concrete meeting the requirements of these specifications. A temporary mix design may be issued if the 7 day compressive strengths exceed the required 28 day strengths.

If materials from sources other than those shown on the approved concrete design are to be used, the Contractor must submit and obtain approval of a concrete design showing these sources. No concrete shall be accepted with materials that are not shown on an approved concrete design.

In addition to the option to use Type I-SM cement, the contractor may have the option to replace a portion of Type I cement in Portland cement concrete, up to a maximum specified herein, with fly ash and/or ground granulated blast furnace slag. It is the Contractors responsibility, if he chooses to use fly ash and/or ground granulated blast furnace slag as a partial cement replacement, to provide Portland cement concrete of the design strengths specified in all applicable special provisions, on the plans, or in the standard specifications. Type I-SM cement or Type I cement with fly ash or ground granulated blast furnace slag as a partial cement replacement will not be used in concrete when high early strength is specified. When the Contractor elects to replace a portion of Type I cement with fly ash and/or ground granulated blast furnace slag, the following requirements must be verified prior to producing any Portland cement concrete:

1. Fly ash or ground granulated blast furnace slag shall be stored in silos separate from each other and separate from the Type I cement.
2. The fly ash or ground granulated blast furnace slag is to be added to the concrete by methods and equipment approved by the Engineer, capable of uniformly distributing the materials throughout the mix.
3. The fly ash or ground granulated blast furnace slag may be weighed cumulatively in the weigh hopper with the cement, provided the cement is added first. The temperature of the fly ash or the ground granulated blast furnace slag is not to exceed 160° F(71° C) at the time of introduction to the mix.
4. The mix shall be closely monitored to maintain a consistent air content between 3%and 8%.

Additional testing may be required to verify desired properties of Portland cement concrete with fly ash or ground granulated blast furnace slag. Additional compensation for the expense and/or lost production due to the additional testing will not be allowed the Contractor. The following are examples of additional testing that may be required:

1. Additional air test as felt necessary by the Engineer to monitor the entrained air due to fluctuations in LOI and fineness of the fly ash or ground granulated blast furnace slag material.
2. Additional compressive test specimens may be needed to determine strengths for form removal due to the slowed strength development inherent with fly ash or ground granulated blast furnace slag concrete.

Design of Portland cement concrete with Type I cement modified by the addition of fly ash or ground granulated blast furnace slag. The following table indicates that maximum cement replacement rates (by weight) and minimum substitution ratios(by weight) for the type of modifier specified:

Modifier	Cement Replacement Rate(Maximum)% (by weight)	Minimum Cement Substitution Rates (by weight)
Ground Granulated Blast Furnace Slag(GGBFS) (grade 100 or 120)	35.0	1:1
Class "F" Fly Ash	20.0	1:1
Class "C" Fly Ash	25.0	1:1

Ternary cementitious mixtures (mixtures with portland cement, GGBFS, and fly ash) will be allowed for Class CP Concrete provided that the minimum portland cement content is 50%. The maximum amount of fly ash substitution in a ternary blend will be 20%. Substitution rates will be at a 1:1 ratio.

Any request for a change in source of materials or admixtures from the original mix design must be made in writing to the Regional Materials and Tests Engineer explaining the necessity for the change and must be accompanied by a new mix design in accordance with the above provisions. No concrete shall be placed until the new design is approved.

When requested by the Contractor and approved by the Engineer, Class A Concrete for structures, as provided for under **Section 604** and herein modified, will be permitted for use in variable width sections, ramps, and on projects containing 10,000 yd²(m²) of concrete pavement or less. The slump shall be modified to be a maximum of 3 in.(75 mm) and the compressive strength of cylindrical specimens molded, cured and tested in an approved laboratory shall be not less than 3,000 psi(20.7 MPa) in 28 days. No additional payment will be made to the Contractor for increased costs due to the use of the above mixture.

The mix proportions approved by the Department shall govern during the progress of the work, except the Contractor shall make the following adjustments with the approval of the Engineer:

- (a) If the cement content of the concrete varies by more than 2% from the designated value, as determined by AASHTO T 121, the proportions will be so adjusted as to maintain a cement content which does not vary more than 2% from the designated value.
- (b) If it is found impossible to obtain concrete of the desired plasticity and workability with the proportions originally designed, changes will be made in aggregate weights as required, provided that in no case shall the cement content originally designated be changed except as provided in paragraphs (c), (d) and (e).
- (c) If it is found impossible to produce concrete having the required consistency without exceeding the maximum allowable water-cement ratio specified, the cement content shall be increased so that the maximum allowable water-cement ratio will not be exceeded.

- (d) If for any reason the concrete must be placed by hand methods and the water-cement ratio established for the vibrated concrete cannot be maintained, the mix proportions shall be adjusted for placement by hand methods and the cement proportion increased by 38 lbs per cubic yard(22 kgs per m³), or more if necessary in order to maintain the water-cement ratio established for the vibrated concrete. No additional payment will be made to the Contractor for the cost of the additional cement.
- (e) Change the mix proportions because of a change in the character or source of materials.
- (f) Change the mix proportions or mixing procedure in order to maintain the air content within the specified limits.
- (g) Change the mix proportions made necessary by the use of retarders or other chemical additives that may be required or approved.

B. Quality Control and Acceptance of Concrete:

It shall be the responsibility of the Contractor to determine and measure the batch quantities of all ingredients (including all water and any specified or approved admixtures) for all concrete produced for the project and to mix, deliver and place the concrete so that the concrete meets the requirements of these specifications. The minimum size of a batch shall be 2.5 cubic yards(2.0 m³). Sampling, testing and inspection for process control of the concrete at the concrete plant shall be performed by a TDOT Class 2 or higher concrete plant technician certified by the Department. This technician must be present at the concrete plant during all batching operations for the project and his primary responsibility during production shall be process control. Sampling, testing and inspection for process control of the concrete at the placement site shall be performed by a concrete technician that holds a TDOT Class 1, ACI Class 1, or higher certification. A technician shall be present at each placement site during all concrete placement. All necessary equipment required for process control shall be furnished by the Contractor and shall be at the plant and at the placement site at all times during concrete placement. Process control shall include, but not be limited to, the following tests and inspections:

1. Test to determine aggregate gradations (AASHTO T 27 with AASHTO T 11 when required).
2. Frequent inspections of the stockpile to ascertain that stockpiles are being maintained in an uncontaminated and unsegregated manner. A current aggregate quality report shall be kept at the plant.
3. Calibration of weighing systems, water meters and admixture dispensing systems prior to starting production.
4. Assurance of accurate weighing of the aggregates and cement, the proper metering of water and admixtures and the quality of water.
5. Assurance that mixing equipment is in proper working condition and the proper mixing speeds and revolutions are controlled as required by the specifications and the Materials and Tests Circular Letter File book.
6. Adjustment of mix proportions due to moisture content of both coarse and fine aggregates (moisture determination to be in accordance with AASHTO T 255).
7. Slump (AASHTO T 119) and Air Test (AASHTO T 152).

8. Yield test (AASHTO T 121) (When yield varies more than $\pm 2\%$ from that shown on the design. All batching operations shall cease until the problem has been identified and corrected or a new concrete design has been obtained.
9. Quality control cylinders and early break cylinders (7-14 day, etc), for compression tests in accordance with AASHTO T 22.
10. Tests for concrete and ambient air temperatures.
11. A report furnished daily to the Engineer showing all pertinent information (Date, Contract and Project, Item number(s), batch weights, moisture corrections, admixtures, slump, air content, temperatures, etc.). A sample daily report will be given to the Contractor as an example.
12. A concrete delivery ticket must accompany each load to the placement site. The ticket shall at a minimum include the following:

Date
Contract number
County
Class of concrete
Concrete design number
Number of cubic yards
Load number
Truck number
Maximum water allowed by design
Total water added at the plant
Maximum water allowed to be added on the project
Actual water added on project
Number of revolutions at mixing speed at plant
Number of revolutions at mixing speed at project
Time loaded
Time discharged
Actual and target batch weights of each component including each aggregate, chemical admixture and mineral admixture used.

The Contractor shall develop for approval of the Engineer and maintain at the plant written procedures for sampling, testing and inspection of the concrete. The Contractor shall keep a record of all tests and inspections performed at the plant site and placement site, and this documentation, together with a certification by the Contractor that the concrete incorporated in the work meets the requirements of the specifications, shall be delivered to the Engineer upon completion of the project for inclusion in the project records. Records shall be kept current and shall be made available to the Engineer for review at any time.

It shall be the responsibility of the Contractor to properly make, cure and transport all early break cylinders (7-14 day, etc.) in accordance with AASHTO T 23 and delivered to the Regional laboratory or other established satellite laboratories for tests.

The Department or their representative shall be responsible for performing all acceptance tests. A TDOT Level 1 Certified or ACI Certified Technician shall sample, test air content and slump, and prepare 28 day cylinders for acceptance. The Department shall also be responsible for properly curing and transporting all acceptance cylinders in accordance with AASHTO T 23.

All independent assurance sampling and testing shall be performed by the Department. All sampling and testing for acceptance and independent assurance shall be at the frequencies established in TDOT Procedures. The time and location for obtaining all acceptance and assurance samples will be determined by the Department.

It shall be the responsibility of the Contractor to provide cylinder molds, a wheelbarrow, and provide a level site to perform testing and for initial curing. The Contractor shall also provide a secure storage shed/building for temporary storage of concrete acceptance cylinders in accordance with **Subsection 722.09** of these Specifications.

A TDOT certified class 2 or higher concrete technician, whose duty is process control, shall be at the ready-mix plant during all batching operations. A TDOT or ACI certified class 1 or higher technician is not required to be at the placement site during all small quantity placing operations but is required to perform one complete set of tests during the life of the project. A delivery ticket must accompany each load delivered to the job site.

Batch weights shall be corrected to compensate for any surface moisture on the aggregate at the time of use. The Contractor may elect to withhold some of the water from the mix at the plant provided the delivery ticket indicates the amount of water withheld. If a portion of the water is withheld at the plant, additional water may be added at the work site provided the design water/cement ratio of the mix is not exceeded.

Subsection 501.09, Revise the fifth paragraph to the following:

The tolerance of the individual quantity of each cementitious material shall be no less than 1% nor no more than 4% of the required weight. Aggregates shall be weighed within a tolerance of 1.5% of the required weight.

Subsection 501.17, 2nd full paragraph on page 321, Change the first sentence from "When the pavement being constructed abuts an adjacent pavement" TO:

When the pavement being constructed longitudinally abuts an adjacent pavement

STATE

OF

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(Rev. 03-23-09)
(Rev. 02-08-10)
(Rev. 12-13-10)
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March 1, 2006

Supplemental Specifications - Section 600

of the

Standard Specifications for Road and Bridge Construction

March 1, 2006

Subsection 602.05 (d) Paragraph one, **Change** 1125°F to 1100°F, **Change** 600°C to 593°C, **Change** the acronym, ASSHTO to AASHTO

Subsection 602.05 (d) Paragraph one, eighth sentence, and in the table below paragraph one, **Delete** the following:

Grades 70W, 100 and 100W, and **Replace** with Grades HPS70W, and HPS100W

Subsection 602.05 (d) Paragraph one, eighth sentence **Delete** “only under rigidly controlled procedures” and **Replace** with the following:

“as set forth in the AASHTO Guide Specification for Highway Bridge Fabrication with High Performance Steel”, current edition and the AASHTO “Bridge Welding Code”, current edition.

Subsection 602.05 (d) Paragraph two, first sentence, **Add** “or either”

“temperature indicating crayons, liquids, or either contact or non-contact...”

Subsection 602.05 (e) 3 First paragraph, **Delete** the first sentence and **Replace** with the following

“The heat-curving operation shall be conducted in such a manner that the temperature of the steel does not exceed 1200°F (649°C) for Grades 36, 50, 50W and HPS50W; and 1100°F (593°C) for Grades HPS70W and HPS100W as measured by temperature-indicating crayons or other suitable means.”

Section 602.17 **Delete** all references to AASHTO M 253 (ASTM A 490) bolts unless otherwise noted on the plans.

Subsection 602.17 (D) **Delete** the first sentence and replace with the following

“The following provisions apply when high strength bolts are installed in the field or shop.”

**Table 602.17 A-BOLT TENSION, page 352 Delete the table conversion values for kilograms
Replace with (Newton) values**

TABLE 602.17A-BOLT TENSION Minimum Bolt Tension (1) in Pounds (Newton)		
Bolt Size in inches(mm)	AASHTO M 164 (ASTM A 325) Bolts	AASHTO M 253 (ASTM A 490) Bolts
1/2(13 mm)	12,000(53,379)	15,000(66,723)
5/8(16 mm)	19,000(84,516)	24,000(106,757)
3/4(19 mm)	28,000(124,550)	35,000(155,688)
7/8(22 mm)	39,000(173,481)	49,000(217,963)
1(25 mm)	51,000(226,859)	64,000(284,686)
1-1/8(28 mm)	56,000(249,100)	80,000(355,858)
1-1/4(32 mm)	71,000(315,824)	102,000(453,719)
1-3/8(35 mm)	85,000(378,099)	121,000(538,235)
1-1/2(38 mm)	103,000(458,167)	148,000(658,337)

Subsection 602.17(E) 1 b7 Change “bolt diameter”, and “(kips) number”, in the table

“(in) 1-1/6 to 1-1/2”, “(kips) 42 to 45”

Subsection 602.17(E) 2(a) 2. Change “16mm” to “1.6mm”

Subsection 602.17(E) 2 (b) 5. Change some information in table

1/2 rotation: **Change** “≥ 8 x” to, “≤ 8 x bolt dia.”

2/3 rotation: **Change** “≥ 8 x” to, “> 8 x but < 12 x bolt dia.”

Subsection 602.17(E) 2 (b) 6. (Change some information in table)

Bolt Length (measured in Step 1)	4 x bolt dia. or less	> 4 bolt ≤ 8 x bolt dia.	> 8 x bolt dia.
Required Rotation	2/3	1	1-1/3

Subsection 602.19-Welds. Include the following as revisions to the AASHTO/AWS “Bridge Welding Code”

Delete 6.1.3.4(1) and 6.1.3.4(2)

Subsection 602.19-Welds. First paragraph, page 363; Add the word “joint”;

“Complete joint penetration groove welds...”

Subsection 602.26 (b); Replace the “THICKNESS IN INCHES (MILLIMETERS)” Table with the following

MINIMUM COLD-BENDING RADII				
Thickness Inches (t)	Up to 3/4	Over 3/4 to 1, incl.	Over 1 to 2, incl.	Over 2
36	1.5t	1.5t	1.5t	2.0t
50	1.5t	1.5t	2.0t	2.5t
50W	1.5t	1.5t	2.0t	2.5t
HPS70W	1.5t	1.5t	2.5t	3.0t
100	1.75t	2.25t	4.5t	5.5t
100W	1.75t	2.25t	4.5t	5.5t

Subsection 602.26 (b) Second paragraph, after the Table, **Change** “HPS100W” to “HPS70W” and **Change** “1125°F” to “1100°C”, and “607°C” to “593°C”

Subsection 602.29 First paragraph, last sentence, **Change** “56°C” to “38°C”

Subsection 602.29 Third paragraph, last sentence, **Change** the last sentence to read as follows

“The holding temperature for stress relieving ASTM A709 Grade HPS70W HPS100W steels shall not exceed 1100°F (593°C).”

Subsection 602.29 Fourth paragraph, first sentence, **Delete** “Section 4.4” after the wording; and **Replace** with “paragraph 3.9”, **Delete** AWS D1.1 and **Replace** with AASHTO/AWS D1.5 “Bridge Welding Codes”

Subsection 602.35 Fifth paragraph, **Delete** reference to “Table 602.35”

Subsection 602.35 (b), Delete this section

Section 602.39- Add the following as the last paragraph

Shear Stud Connectors - After the beams have been erected, the contractor shall be required to attach the shear stud connectors in compliance with OSHA standards. The studs shall be installed in the locations shown in the plans. The contractor will be required to install and test shear studs in accordance with the latest version of AASHTO/AWS D1.5M/D1.5, Chapter 7 Stud Welding. The surface receiving the studs shall be cleaned by shot blasting or grinding to a bright metal surface immediately prior to welding. All studs shall be welded using automatically timed stud welding equipment only. At the beginning of each day or shift each individual welder/operator and equipment must complete the Production Control/ Pre-production testing as stated in section 7.7.1. Only individuals who repeatedly demonstrate satisfactory installation shall be allowed to install the shear studs. The contractor is responsible for the quality of all welds.

The Department shall inspect and randomly test the welds before any reinforcing steel is placed.

Subsection 602.41 Last sentence, Add the wording “Plans and”

“in accordance with **Subsection 105.02**, Plans and Working Drawings.”

602.41 Replace entire subsection with the following:

602.41-Temporary Supports. Temporary supports for steel beam erection shall be properly designed, constructed and maintained to support the loads to which they will be subjected. The Contractor shall prepare and submit to the Engineer construction drawings for temporary supports and working drawings for changes in any existing structure necessary for safely maintaining traffic, in accordance with Subsection 105.02, Plans and Working Drawings.

Subsection 602.42 Add “ and stamped” after “prepared” in the first sentence.

Subsection 602.43 (a) Change the third sentence to read as follows:

“In no case shall the maximum temperature of the ASTM A 709 Grade HPS100W, and the HPS70Wsteels exceed 1100°F (593°C).”

Subsection 602.43 (a) Add the following to the end of the first paragraph;

“or infrared thermometers (conductor or non-conductor)

Subsection 602.43 (b) Add the wording “HPS70W, and HPS100W,” after the word “Grade”

Subsection 602.47 (d) Delete the second sentence of the second paragraph, and replace with the following;

“When the contractor has approval to drill holes for setting anchor bolts, the bolts shall be set accurately, and fixed by completely filling the holes with grout meeting the requirements of **Subsection 918.21.**”

Subsection 602.49 (d) Add metric equivalents in (kg)

Weight per 100 Bolts, pounds (kg)
19.7 (8.9)
31.7 (14.4)
52.4 (23.8)
80.4 (36.5)
116.7 (52.9)
165.1 (74.9)
212.0 (96.2)
280.0 (127.0)
340.0 (154.2)

(e) Add metric equivalents in (kg/m)

Pounds per Linear
Foot (kg/m)
0.20 (0.30)
0.25 (0.37)
0.35 (0.52)
0.55 (0.82)
0.80 (1.19)
1.10 (1.64)
1.50 (2.23)
2.00 (2.98)

Subsection 602.50 (a) Change the name of section (a) to read as follows

(a) Structural Steel – Per Pound (Kilogram)

Section 603, Second paragraph, **Revise** the first sentence by adding the following:

“Effective Lettings after January 01, 2007,” All contractors or subcontractors...

Subsection 604.02 **Revise** entire subsection as follows:

604.02-Materials. Materials used in this construction shall meet the requirements of the following sections or Subsections of Division III, Materials, of these Specifications.

<u>Material</u>	<u>Section or Subsection</u>
Water	918.01
Hydraulic cement ¹	901.01
Fine Aggregate, (all Classes of concrete)	903.01
Coarse Aggregate	
For Class A Concrete: Size No. 57	903.03
For Class D Concrete: Size No. 57	903.03
For Class L Concrete	903.19
Fly Ash	918.31
Ground Granulated Blast Furnace Slag	918.32
Cement Concrete Curing Materials	913
Air-Entraining Admixtures	918.09
Steel Bar Reinforcement	907.01
Welded Steel Wire Fabric	907.03
Waterstops	918.11
Joint Filler, Preformed Type	905.01
Structural Steel	908.01

¹Type I, Type I-SM or Type I cement with either fly ash and/or ground granulated blast furnace slag as a partial cement replacement shall be used unless otherwise specified or permitted. When Type I cement with either fly ash and/or ground granulated blast furnace slag as a partial cement replacement is used, the requirements of **Subsection 604.03** shall apply.

Applied Texture Finish	918.30
Steel Castings	908.05
Elastomeric Bearing Pads	908.12
Bronze Bearing Plates, Plain	908.09
Bronze Bearing Plates, Self-Lubricating	908.10
Paints	910
Chemical Additives for Concrete	918.09
Gray Iron Castings	908.07
Permanent Steel Bridge Deck Forms	908.03
Precast Prestressed Bridge Deck Panels	918.29
Precast Concrete Box Culverts	914.08

Fly ash or ground granulated blast furnace slag of different classes or sources used as partial replacement for Portland cement in concrete mixes will not be permitted. FlyAsh or Ground Granulated Blast Furnace Slag shall only be permitted as a partial cement replacement in Type I Portland Cement. A maximum of 20% fly ash shall be permitted as a partial hydraulic cement replacement in Type I-SM cement only in Class A concrete.

Concrete with fly ash as a partial cement replacement shall not be produced until the concrete supplier furnishes the following information to the Engineer:

1. Copies of the results of all tests performed by the fly ash producer within the previous 30 days, on shipments to the concrete supplier showing:

Fineness (percent retained on the No. 325(45 μ m) sieve)
 LOI (loss on ignition)
 Specific gravity
 Soundness (autoclave expansion)
 Moisture content
 Pozzuolanic activity, 7 day cement

2. A notarized certification from the fly ash producer stating that the fly ash meets the Departments specifications.

Concrete with ground granulated blast furnace slag as a partial cement replacement shall not be produced until the concrete supplier furnishes the following information to the Engineer:

1. Copies of the results of all tests performed by the ground granulated blast furnace slag producer within the previous 30 days on shipments to the concrete supplier showing:

Fineness (percent retained on the No. 325(45 μ m) sieve.
 Air content of slag mortar
 Individual sample slag activity index (percent)
 Specific gravity
 Sulfide sulfur(s) (percent)
 Sulfate ion reported as SO₃ (percent)
 Total alkalis (Na₂O+0.658K₂O)
 Compressive strength (28 day)

2. A notarized certification from the ground granulated blast furnace slag producer stating that the slag meets the Departments specifications.

Unless otherwise indicated on the plans, the Contractor may substitute precast reinforced box sections meeting the requirements of Subsection 914.08, AASHTO specifications for all fill heights for cast in place concrete box sections. The Contractor is only required to notify the project engineer and the Division of Structures that he intends to utilize sections fabricated to the appropriate AASHTO Materials Specifications or the other pre-approved sections contained in the Division of Structures Standard Drawings for Precast Boxes. Should he elect to construct precast boxes of a different design, the Contractor shall submit shop drawings of the proposed precast box section and design calculations to the Structures Division for approval prior to construction. As a minimum, the shop drawings shall include a plan and elevation view of the box culvert showing all precast sections, a typical precast box section showing dimensions and reinforcing, and notes and details required for construction. After securing the necessary approval, the Contractor shall furnish the Structures Division a permanent, 100 μ m(4 mil) mylar reproducible of the design for their file. The Contractor will be paid for the precast box based on the price bid for the quantity of the items in the cast in place structure it replaces. The precast reinforced box sections shall be manufactured in accordance with Departmental procedures

Subsection 604.03 Remove and Replace entire subsection with the following:

604.03-Classification Proportioning and Quality Assurance of Concrete.

(a) Classification and Proportioning and Quality Assurance

Min. 28 Day Comp.Strength PSI (MPa)	Min. lbs. (kg) Cement per C.Y. (C.M.)	Maximum Water/Cem. lb/lb (kg/kg)	Air Content % (Design± production tolerance)	Slump in. (mm)
CLASS A CONCRETE				
3,000 (20.7)	564 (335)	0.45	6 ± 2	3 ± 1 ¹ (75 ± 25)
CLASS D CONCRETE ^{2&3}				
4,000 (27.6)	620 (368)	0.40	7 ³	8 max ⁴ (200 max.)
CLASS L CONCRETE ^{5&3}				
4,000 (27.6)	620 (368)	0.40	7 ³	8 max ⁴ (200 max.)
CLASS S (SEAL) CONCRETE ⁶				
3,000 (20.7)	682 (405)	0.47	6 ± 2	6±2 (150 ± 50)

The proportioning of the concrete shall be based on a predetermined minimum cement content, and the water-cement ratio shall not exceed the maximum shown in the above table. Below this limit, the quantity of water shall be adjusted to meet the slump requirements. The fine aggregate shall not exceed 44% by volume calculation of the total aggregate with the exception of slip formed Class A concrete incorporated into parapets and median barriers. For slip formed parapet and median barriers exclusively, the percentages of fine and coarse aggregate in an approved concrete mix design may be adjusted ± 2%, such that the maximum percent by volume of fine aggregate does not exceed 46%. Mixture adjustments shall be documented in the field book and daily concrete report. Adjusted mix shall comply with all performance criteria specified in **Section 604**.

¹ For slip forming, the slump shall range from 0 to 3 inches.

² Class D concrete shall be used in all bridge decks except box and slab type structures unless otherwise noted on the plans.

³ Class D and Class L concrete shall be designed at 7% air content, acceptance range for pumping and other methods of placement is 5.5-8.5%. Sampling will be at the truck chute.

⁴ Water reducing admixtures are acceptable, however, the maximum water/cement ratio shall not be exceeded in order to achieve the required slump.

⁵ The unit weight of air dried Class L Concrete (lightweight concrete) shall not exceed 115 lbs./c.f. (185 kgs/0.1 m³) as determined by ASTM C 567.

⁶ The Use of Fly Ash as a cement replacement will be allowed in Class S (Seal) concrete.

Chemical Admixtures shall be included in the concrete mixture as specified in the following table based on the ambient air temperature and expected weather conditions.

Class of Concrete	Temperature less than 85°F (30°C) and falling	Temperature 85°F (30°C) or greater and rising
A	Type A or F	Type D or G or A and B
D	Type A or F	Type A or F and B or G
L	Type F	Type F and B or G
S	Type D or G or A and B	Type D or G or A and B

If a Type A, F, or G water reducer is used, then the allowable slump shall be maximum of 8 in. (200 mm).

Admixtures to be incorporated into the concrete shall all be from the same manufacturer, shall be compatible, and shall be incorporated into the concrete in accordance with the manufacturer's recommendations.

The fine aggregate in all Class L Concrete shall be natural sand conforming to the requirements of **Subsection 903.01**.

Fine aggregate manufactured from limestone or other polishing aggregates will not be permitted in concrete to be used as a riding surface in traffic lanes.

The Contractor shall submit the proposed concrete design to the Engineer for approval. The design shall be determined using saturated surface dry aggregate weights and shall be determined by the use of trial batches meeting the requirements of these specifications. The concrete design shall be prepared by a TDOT certified Class 3 concrete technician or approved independent testing laboratory under the direction of a registered civil Engineer licensed by the STATE OF TENNESSEE. The concrete plant technician or the civil Engineer shall certify that the information contained on the design is correct and is the result of information gained from the trial batches. The concrete design shall produce an average compressive strength to indicate that the specified 28 day strength can be obtained in the field. All strength determinations shall be made on equipment meeting the requirements of and in the manner prescribed by AASHTO T 22. It is the contractor's responsibility to provide concrete of the design strength specified in all applicable special provisions, plans, and/or standard specifications. Trial batches for design shall be built no more than 90 days prior to the design submittal. All cost of concrete design, preparation and submittal shall be the responsibility of the Contractor.

The proposed concrete design submittal shall contain as a minimum, the following:

- Source of all aggregates
- Brand and type of cement
- Source and class of fly ash (if used)
- Source and grade of ground granulated blast furnace slag (if used)
- Specific gravity of cement

Specific gravity of the fly ash (if used)
 Specific gravity of the ground granulated blast furnace slag (if used)
 Admixtures (if used)
 Gradations of aggregates
 Specific gravity of aggregates (saturated surface dry)
 Air content (if air entrainment is used)
 Percentage of fine aggregate of the total aggregate (by volume)
 Slump
 Weight per c.y. (m³)
 Yield
 Temperature of plastic concrete
 Water/cement ratio lb/lb (kg/kg)
 7 day compressive strength [minimum of 3 x 6-in. x12in. (150mm x 300mm) cylinders]
 14 day compressive strength (minimum of 3-6 in.x 12 in. (150 mm x 300 mm) cylinders)
 28 day compressive strength (minimum of 3-6 in.x 12 in. (150mm x 300mm) cylinders)
 Weight of each material required to produce a c.y. (m³) of concrete

In lieu of the above mix design submittal, the Contractor may submit for approval an existing design approved by the Department within the current calendar year. The approval of this concrete design submittal will not relieve the Contractor of the responsibility of providing concrete meeting the requirements of these specifications. A temporary mix design may be issued if the 7 day compressive strengths exceed the required 28 day strengths.

Any request for a change in source of materials or admixtures from the original mix design must be made in writing to the Regional Materials and Tests Engineer explaining the necessity for the change and must be accompanied by a new mix design in accordance with the above provisions. The Contractor shall place no concrete until the new design is approved.

Concrete with fly ash or ground granulated blast furnace slag as a partial cement replacement will not be used in concrete when high early strength is specified. When the Contractor elects to replace a portion of hydraulic cement with fly ash or ground granulated blast furnace slag, the following requirements must be verified prior to producing any concrete:

1. Fly ash or ground granulated blast furnace slag shall be stored in silos separate from each other and separate from the hydraulic cement.
2. The fly ash or ground granulated blast furnace slag is to be added to the concrete by methods and equipment approved by the Engineer, capable of uniformly distributing the materials throughout the mix.
3. The fly ash or ground granulated blast furnace slag may be weighed cumulatively in the weigh hopper with the cement, provided the cement is added first. The temperature of the fly ash or the ground granulated blast furnace slag is not to exceed 160° F(71° C) at the time of introduction to the mix.

Design of Portland cement concrete with Type I cement modified by the addition of fly ash and/or ground granulated blast furnace slag. The following table indicates the maximum cement replacement rates(by weight) and minimum substitution ratios(by weight) for the type of modifier specified:

<u>Modifier</u>	<u>Cement Replacement Rate</u> (Maximum)% (by weight)	<u>Minimum</u> <u>Modifier Cement</u> <u>Substitution</u> <u>Ratio</u> (by weight)
Ground Granulated Blast Furnace Slag (grade 100 or 120)	35.0	1:1
Class F Fly Ash	20.0	1:1
Class C Fly Ash	25.0	1:1

Ternary cementitious mixtures (mixtures with Portland cement, ground granulated blast furnace slag, and fly ash) will be allowed for Class A Concrete provided that the minimum Portland cement content is 50%. The maximum amount of fly ash substitution in a ternary cementitious mixture will be 20%. Type I-SM cement will be allowed with ternary cementitious mixtures. When a Type I-SM cement is used, no additional slag shall be used as a partial replacement for the hydraulic cement.

(b) Quality Control and Acceptance of Concrete

It shall be the responsibility of the Contractor to determine and measure the batch quantities of all ingredients (including all water and any specified or approved admixtures) for all concrete produced for the project and to mix, deliver and place the concrete so that the concrete meets the requirements of these specifications. The minimum size of a batch shall be 2.5 c.y. (2.0 m³). The Contractor shall have a TDOT Class 2 or higher certified technician at the concrete plant during all batching operations with the primary responsibility of process control, which includes all sampling, testing and inspection of the aggregate and concrete.

The Contractor shall have a TDOT or ACI certified Class 1 or higher technician for all sampling, testing and inspection for process control of the concrete at the placement site. A technician shall be present at each placement site during all concrete placement. The technician at both the plant and job site shall be authorized to promptly correct any deficiencies in quality control within approved design parameters. All necessary equipment required for process control shall be furnished by the Contractor and shall be at the plant and at the placement site at all times during concrete and placement.

Process control shall include, but not be limited to, the following test and inspections:

1. Test to determine aggregate gradations (AASHTO T 27 with AASHTO T 11 when required).
2. Frequent inspections of the stockpile to ascertain that stockpiles are being maintained in an uncontaminated and un-segregated manner. A current aggregate quality report shall be kept at the plant.
3. Calibration of weighing systems, water meters and admixture dispensing systems prior to starting production.
4. Assurance of accurate weighing of the aggregates and cement, the proper metering of water and admixtures and the quality of water.

5. Assurance that mixing equipment is in proper working condition and the proper mixing speeds and revolutions are controlled as required by the specifications and the Materials and Tests Circular Letter File book.
6. Adjustment of mix proportions due to moisture content of both coarse and fine aggregates (moisture determination to be in accordance with AASHTO T 255).
7. Slump (AASHTO T 119) and Air Test (AASHTO T 152 - AASHTO T 196 required for concrete containing light weight aggregate).
8. Yield test (AASHTO T 121) (When yield varies more than $\pm 2\%$ from that shown on the design. All batching operations shall cease until the problem has been identified and corrected or a new concrete design has been obtained.
9. Quality control cylinders and early break cylinders (7-14 day, etc) for compression tests in accordance with AASHTO T 22.
10. Tests for concrete and ambient air temperatures.
11. A report furnished daily to the Engineer showing all pertinent information (Date, Contract and Project, Item number(s), batch weights, moisture corrections, admixtures, slump, air content, temperatures, etc.). A sample daily report will be given to the Contractor as an example.
12. A concrete delivery ticket must accompany each load to the placement site. The ticket shall at a minimum include the following:

Date
Contract number
County
Class of concrete
Concrete design number
Number of cubic yards
Load number
Truck number
Maximum water allowed by design
Total water added at the plant
Maximum water allowed to be added on the project
Actual water added on project
Number of revolutions at mixing speed at plant
Number of revolutions at mixing speed at project
Time loaded
Time discharged
Actual and target batch weights of each component including each aggregate, chemical admixture, and cementitious material used.

The Contractor shall develop for approval of the Engineer and maintain at the plant written procedures for sampling, testing and inspection of the concrete. The Contractor shall keep a record of all tests and inspections performed at the plant site and placement site and this documentation, together with a certification by the Contractor that the concrete incorporated in the work meets the requirements of the specifications, shall be delivered to the Engineer upon completion of the project for inclusion in the project records. Records shall be kept current and shall be made available to the Engineer for review at any time.

It shall be the responsibility of the Contractor to properly make, cure and transport all early break cylinders (7-14 day, etc.) in accordance with AASHTO T 23 and delivered to the Regional laboratory or other established satellite laboratories for tests.

The Department or their representative shall be responsible for performing all acceptance tests. A TDOT Level 1 Certified or ACI Certified Technician shall sample, test air content and slump, and prepare 28 day cylinders for acceptance. The Department shall also be responsible for properly curing and transporting all acceptance cylinders in accordance with AASHTO T 23.

All independent assurance sampling and testing shall be performed by the Department. All sampling and testing for acceptance and independent assurance shall be at the frequencies established in TDOT Procedures. The time and location for obtaining all acceptance and assurance samples will be determined by the Department.

It shall be the responsibility of the Contractor to provide cylinder molds, a wheelbarrow, and provide a level site to perform testing and for initial curing. The Contractor shall also provide a secure storage shed/building for temporary storage of concrete acceptance cylinders in accordance with **Subsection 722.09** of these Specifications.

An approved concrete design is required for non-critical items involving small quantities of concrete but these non-critical items may be accepted at a reduced testing frequency in accordance with TDOT Procedures. This is to be used for sidewalks, curbs and gutters, building foundations, slope paving, ditch paving, guardrail anchorages, small culvert headwalls 30 in. (750 mm) diameter or less, fence posts, catch basins, manhole bases and inlets, small sign bases and steel strain pole footings.

A qualified plant technician shall be at the ready-mix plant during all batching operations. A field technician is not required to be at the placement site during all small quantity placing operations but is required to perform one complete set of tests during the life of the project. A delivery ticket must accompany each load delivered to the job site.

Pre-approved, pre-packaged concrete mixtures may be used for the applications listed above provided the quantity does not exceed 2 c.y.(1.5 m³) per day. No design will be required.

Batch weights shall be corrected to compensate for any surface moisture on the aggregate at the time of use. The Contractor may elect to withhold some of the water from the mix at the plant. If a portion of the water is withheld at the plant, additional water may be added at the work site provided the design water/cement ratio of the mix is not exceeded. Water added at the placement site for Class D and Class L concrete shall not exceed one (1) gallon per cubic yard. The total amount of water in the mix shall not exceed the maximum in the approved mix design. Any additional slump shall be achieved using a water reducing admixture. When the addition of water to the mix is made in the field, 30 additional revolutions at mixing speed are required.

(c) High Early Strength

When high early strength concrete is required, in the plans for structural or pavement repairs, or other type work, the use of Type I or Type III cement will be optional with the Contractor. If Type I cement is used, a minimum cement content of 714 lbs/c.y. (424 kgs/m³) will be required. If Type III cement is used, a minimum cement content of 620 lbs./c.y.(368 kgs/m³) will be required. High early strength concrete, meeting these requirements, may be substituted at the option of the Contractor for Class A concrete when approved in writing by the Engineer.

When the Contractor elects to use high early strength concrete, the source and gradation of fine and coarse aggregates shall be the same as that specified for the concrete for which the high

early strength concrete is substituted. No additional compensation will be made if the Contractor elects to substitute high early strength concrete for Class A concrete. The unit price for the class of concrete for which the substitution is made shall be full compensation for the concrete.

Subsection 604.04 Page 404, Last paragraph, last sentence

The fogger will be designed to provide a maximum VMD (volume mean diameter) of 15 (microns), and a throw distance of 60 ft. (18m).

Subsection 604.08 (4) Third sentence, Change “35mm” to, “#36”

Subsection 604.08 page 412 Fifth paragraph, third sentence, Change the word “Uncoated” to “Coated”

Section 604, All sections, after Subsection 604.11 referencing 604 Subsections are off by one subsection. Therefore **change** them by one, see the example below.

Example: **Change “Subsection 614.12(b)” to “Subsection 604.11(b)”**

“Subsection 604.23” to “Subsection 604.22”

Subsection 604.13 Revise entire subsection to the following:

The requirements for mixing concrete shall be as prescribed in **Subsection 501.10** for major structures. However, when the concrete is mixed and transported in truck mixers, the time elapsing from when the water is added to the mix until the concrete is deposited in place at the site of the work shall not exceed 90 minutes. When the ambient air temperature exceeds 90° F(32° C), the elapsed time above shall be reduced to 60 minutes for concrete placed in bridge decks. Retempering concrete by adding water or by other means will not be permitted; however, a portion of the mixing water or chemical admixtures may be withheld from transit mixers and added at the work site if all requirements of the approved mix design are met. Water added at the placement site for Class D and Class L concrete shall not exceed one (1) gallon per cubic yard. The total amount of water in the mix shall not exceed the maximum in the approved mix design. Any additional slump shall be achieved using a water reducing admixture. In the event water or chemical admixtures are added at the placement site, the concrete shall be mixed a minimum of 30 revolutions at mixing speed after additions are made. Concrete that is not within the specified slump limits, air content limits, temperature limits or time limits at time of placement shall not be used.

For items of construction specified in **Subsection 604.11(b)**, concrete mixing may be performed by mobile volumetric measuring and mixing equipment as prescribed in **Subsection 604.04** of these Specifications.

When concrete placed in the items of construction specified in **Subsection 604.11(b)** does not exceed 25 c.y.(20 m³) per day, it may be accepted on the basis of field testing for air, slump, and occasional strength tests with only random plant inspections as deemed necessary by the Engineer for control.

When this basis of acceptance is used, the ready-mix plant furnishing the concrete shall have been inspected and approved for use as provided in **Subsection 604.04**. In addition, the delivery ticket accompanying each load of concrete shall show the class of concrete, the quantity of

cement, aggregates, water, and additives used in the batch, and the time of batching. Materials used in the concrete shall be tested and approved.

Subsection 604.15 Delete the seventh paragraph, "If the acceptance cylinders..."

Subsection 604.16 (a) Delete the twelfth paragraph of this section, "If data collected during..."

Subsection 604.16 page 420 Second and third paragraph, **Replace** with the following:

In hot weather mitigation it will be necessary to apply a certified dry fog with a maximum VMD of 15 (microns) with a throw distance of 60 (ft.) above the concrete surface during the placement and finishing operations. The contractor shall furnish a certification to the project supervisor verifying the VMD.

In addition, immediately before the concrete is placed, the forms and reinforcing steel shall be cooled to 90° F (32° C) or less by using a fine spray of water, leaving no puddles or pockets of water. Trucks shall be sprinkled or kept in the shade when not being unloaded so as to contribute to reducing the temperature of the concrete.

Subsection 604.16 (d) Last sentence, **Change** "m³" to "8m³"

Subsection 604.16 (e) Second paragraph, second sentence, **change** "8 m" to "6 m",

Subsection 604.19. Add the following as the last sentence:

"Refer also to Article 107.02 regarding restrictions on loading during bridge construction"

Subsection 604.21 (d) **Remove and Replace** entire subsection with the following:

(d) Applied Texture Finish.

Surface preparation prior to the textured finish shall include a Class 1 Ordinary Surface Finish in accordance with Subsection 604.22(a). The concrete shall be in place a minimum of 28 days to allow for ample cure time and weathering of curing compounds prior to application of the textured finish. All surfaces shall be pressure washed just prior to application. Surfaces to be coated shall be free from efflorescence, flaking, coating, rust, dirt, oil and other foreign substances. Coatings shall be applied only to surfaces that are free of surface moisture as determined by sight and touch. Surfaces that are not to receive a Coated Finish are to be shielded and masked. Cracks over 1/8 in.(3 mm) wide are to be veed out and filled with an approved product from the TDOT QPL 13-Section B.5.Structural Materials and Components. The surface preparation shall be approved by the Engineer immediately prior to the beginning of the work.

The textured finish shall be applied in the number of coats as recommended by the manufacturer and as posted on the Departments Qualified Products List to achieve a total application rate of one (1) gallon per 45 (±5) s.f. (0.9 ± 0.1 liter per m²). If a two coat system is used, the base coat shall be similar in color to mountain gray, **Federal Specification No. 36440**, when the final coat is White, **Federal Specification No. 37886**. When the final coat is similar in color to mountain gray, **Federal Specification No. 36440** a base coat of white, **Federal Specification No. 37886** shall be used. The contractor/subcontractor shall give advance notice to the Engineer of the date(s) and time(s) the texture coating is to be applied. The textured finish shall be applied with rollers or brushes so as to provide a consistent and uniform coverage. As an alternative, the Contractor may elect to spray the textured finish if he furnishes a containment system meeting the approval of the Engineer. Regardless of the method of application, drippings

and/or overspray from the texturing process shall be prohibited or otherwise contained in a manner that will not contaminate the environment.

The contractor/subcontractor shall submit to the Engineer certification of the following:

Brand name,
Production batch or lot number,
Qualified Products List Evaluation Number
Manufacturers recommended rate of application,
Materials Safety Data Sheet,
Materials Data Sheet,
Shipping date.

A color sample shall be submitted to the Engineer for approval.

Subsection 604.21 Third paragraph, sentence next to last, **Change “Federal Color Standard 594b”, to “Federal Color Standard 595b”**

Subsection 604.27, Revise the first sentence under the Pavement Roughness Index Table to the following:

“In addition, all areas of pavement roughness index using a 0.1 in. (2.5 mm) blanking band represented by high points having deviations in excess of 0.4 in (10 mm) for any 25 ft. (7.6 m) section per each wheel path shall be corrected.”

604.28-Loading and Opening to Traffic. Add the following as the last sentence:

“Refer also to Article 107.02 regarding restrictions on loading during bridge construction”

Subsection 604.31-Basis of Payment. Revise entire subsection to the following:

604.31-Basis of Payment. The accepted quantities will be paid for at the respective contract unit price per c.y.(m³) for Class A Concrete, Class D Concrete, Class L Concrete and Class S Concrete; per lb.(kg) for Steel Bar Reinforcement and Epoxy Coated Reinforcing Steel; and per s.y.(m²) for Scarifying bridge deck surface and Applied Texture Finish; complete in place.

The concrete fillet above fabricated bridge girders will be paid as bridge deck concrete with the quantities based on the fillet required for a conventional deck forming system. Increases in the aforementioned fillet depth to solely accommodate the Contractor's chosen deck forming system (e.g. precast deck panels) will not to be measured and paid for directly. All costs of this increase will be included in other items bid.

The accepted quantities of leveling concrete shall be paid for at 40% of the price bid for the concrete that is to go into the footing.

Any deduction in monies due to the Contractor for failure to comply with the surface rideability requirements set forth in **Subsection 604.28** shall be make on a lump sum basis.

When field conditions result in the construction of a different type of box culvert or box bridge from that established on the Plans (box type to slab type or vice versa) the respective bid price per c.y.(m²) for Class A concrete shall be increased by 15% for constructing a slab type in lieu of box type and decreased by 13% for constructing box type in lieu of slab type. No adjustment of Steel Bar Reinforcement unit bid price is to be made for the change in box culvert or box bridge type.

Where concrete does not meet the specified strength but is allowed to be included in the permanent construction as set out in Subsection 604.20, Defective Concrete, or tardy acceptance cylinders and/or cores fail to meet the strengths specified in Subsection 604.15, the following equation shall be used to determine percent payment of contract bid price.

$$PP = 100 - (3 * D_s)$$

PP = Percent Payment

D_s = Percent Below Specified Strength

$$D_s = [(Specified\ Strength - Actual\ Strength) / Specified\ Strength] * 100$$

Defective concrete greater than 25 percent below specified strength may remain in place at no cost to the Department if approved by the Department of Structures or the contractor may remove and replace.

*Payment to be based on unit price of item as bid, i.e., volume [c.y.(m³)], length [ft.(m)], each, or other designated bid units. Payment of the above listed percentages includes cost of incidental items such as reinforcing steel when included in the price bid for the Item.

Subsection 606.04 (c) First sentence, **Change** “3(1)” to “1(3)”

Subsection 606.21 Second sentence, **Change** “one” to “one”

Subsection 607.02-Materials. **Remove and Replace** entire subsection with the following:

607.02-Materials. Materials used in this work shall meet the following requirements:

<u>Material</u>	<u>Subsection</u>
Concrete Pipe, Reinforced	914.02
Corrugated Metal Pipe Culverts, Pipe Arches and Underdrains	915.02
Joint Mortar	905.02
Rubber Gaskets	905.03
Polyvinyl Chloride Pipe (PVC)	914.09
High Density Polyethylene Plastic Pipe	914.10

Where Pipe Culverts (Cross Drains & Median Drains) are specified they shall be in accordance with the following:

- (a) Pipe Culverts (Cross Drains & Median Drains) 15 through 36 in. (375 through 900 mm) shall be one of the following:
 - (1) Class III, IV, or V Concrete pipe meeting the requirements of either **Subsection 914.02** or AASHTO M 86.
 - (2) Metal pipe meeting the requirements of **Subsection 915.02**.
 - (3) High Density Polyethylene pipe meeting the requirements of **Subsection 914.10**.

- (4) Polyvinyl Chloride pipe meeting the requirements of **Subsection 914.09**.
- (b) Pipe Culverts (Cross Drains & Median Drains) larger than 36 in. through 48 in. (900 through 1200 mm) shall be one of the following:
 - (1) Class III, IV, or V Concrete pipe meeting the requirements of either **Subsection 914.02**.
 - (2) Metal pipe meeting the requirements of **Subsection 915.02**.
 - (3) High Density Polyethylene pipe meeting the requirements of **Subsection 914.10**.
- (c) Pipe Culverts (Cross Drains & Median Drains) larger than 48 in. (1200 mm) shall be one of the following:
 - (1) Class III, IV, or V Concrete pipe meeting the requirements of Subsection 914.02.
 - (2) Metal pipe meeting the requirements of **Subsection 915.02**.

Where Pipe Culverts (Side Drains) are specified they shall be in accordance with the following:

- (a) Pipe Culverts(Side Drains) 15 through 36 in.(375 through 900 mm) shall be one of the following:
 - 1. Class III, IV, or V Concrete pipe meeting the requirements of either Subsection 914.02 or AASHTO M 86.
 - 2. Metal pipe meeting the requirements of Subsection 915.02.
 - 3. High Density Polyethylene pipe meeting the requirements of Subsection 914.10.
 - 4. PVC pipe meeting the requirements of **Subsection 914.09**
- (b) Pipe Culverts(Side Drains) larger than 36 in.(900 mm) shall be one of the following:
 - (1) Class III, IV, or V Concrete pipe meeting the requirements of **Subsection 914.02**.
 - (2) Metal pipe meeting the requirements of **Subsection 915.02**.

Where Pipe Culverts (Storm Drains) are specified they shall be in accordance with the following:

- (a) Pipe Culverts (Storm Drains) 15 through 36 in. (375 through 900 mm) shall be one of the following:
 - (1) Class III, IV, or V Concrete pipe meeting the requirements of either **Subsection 914.02** or AASHTO M 86.
 - (2) High Density Polyethylene pipe meeting the requirements of **Subsection 914.10**.
 - (3) PVC pipe meeting the requirements of **Subsection 914.09**.

- (b) Pipe Culverts (Storm Drains) larger than 36 in. through 48 in. (900 through 1200 mm) shall be one of the following:
- (1) Class III, IV, or V Concrete pipe meeting the requirements of either **Subsection 914.02**.
 - (2) High Density Polyethylene pipe meeting the requirements of **Subsection 914.10**.
- (c) Pipe Culverts (Storm Drains) larger than 48 in. (1200 mm) shall be Class III, IV, or V Concrete pipe meeting the requirements of **Subsection 914.02**.

Where Slope Drains are specified, they shall be in accordance with one of the following:

- (a) Metal pipe meeting the requirements of **Subsection 915.02**.
- (b) High Density Polyethylene pipe meeting the requirements of **Subsection 914.10**.
- (c) Polyvinyl Chloride pipe meeting the requirements of **Subsection 914.09**.

Materials for special end connections to other pipes or structures, required to complete the work as indicated on the Plans or directed by the Engineer shall conform to the requirements of **Section 914** and **Section 915** of the Standard Specifications, unless otherwise specified.

Reinforced concrete pipe shall be flat base, round, or oval, as shown on the Plans.

The sizes of pipe shall be identified by the nominal inside diameter. The pipe shall be of the sizes and classes or gauges stipulated in the Contract, shown on the Plans, or established by the Engineer.

Steel and aluminum pipe are considered as optional for corrugated metal pipe, pipe arches, and underdrains by the Department. The Contractor may use either option he prefers, however, in no case shall different metals or corrugations be mixed in a single line of pipe.

When paved or coated corrugated metal pipe and pipe arches are specified, either aluminum coating or bituminous coating may be used. The aluminum or bituminous coated pipe shall conform to the requirements of AASHTO M 274 or AASHTO M 190 respectively.

When precoated corrugated metal pipe and pipe arches are specified, polymer coating shall be used in accordance with **Subsection 915.03**. Coupling bands and all hardware except nuts, bolts and washers shall be of the same material and coating as the pipe.

When corrugated metal pipe arches are specified as "size equivalent round" the dimensions shall be as shown in the Plans.

Subsection 607.07-Joining Pipe. Remove and Replace entire subsection with the following:

607.07-Joining Pipe. Rigid pipe may be of bell and spigot or tongue and groove design, unless one type is specified. The method of joining pipe sections shall be such that the ends are fully entered and the inner surfaces are reasonably flush and even.

Joints for rigid pipe shall be made with: (a) portland cement mortar; (b) rubber gaskets; or (c) other types of joints recommended by the pipe manufacturer and approved by the Engineer may be permitted.

For mortar joints, the pipe ends shall be thoroughly cleaned and wetted with water before the joint is made. Stiff mortar shall then be placed in the lower half of the bell or groove of the pipe section already laid and on the upper half of the spigot or tongue of the section to be laid. The 2 pipe sections shall then be tightly joined with their inner surfaces flush and even. The inside of

the joint shall then be finished smooth and any surplus material removed from the pipe. The completed mortar joints shall be protected against rapid drying by suitable covering material.

Rubber ring gaskets shall be installed so as to form a flexible watertight seal. When other type joints are permitted, they shall be installed or constructed in accordance with the recommendations of the manufacturer.

Metal pipe shall be firmly joined by approved coupling bands.

High Density Polyethylene and Polyvinyl Chloride pipe shall meet the performance requirement for soiltightness, unless watertightness is specified. Joints shall be installed so that the connection of pipe sections, for a continuous line, will be free from irregularities in the flow line.

Pipe shall be inspected before any backfill is placed. Any pipe found to be out of alignment, unduly settled, or damaged shall be taken up and relaid or replaced.

Subsection 607.09-Backfilling. Remove and replace entire subsection with the following:

607.09-Backfilling. After the pipe is installed, the trench shall be backfilled in accordance with the provisions of Section 204 and the standard drawings. All pipes shall undergo visual inspection during and after installation to insure conformance to these specifications. Final visual inspections for all pipes shall be conducted no sooner than 30 days after completion of installation and final fill. Final visual inspections shall be conducted from the inlet and outlet ends of all pipe with sufficient hand held lighting to observe any defects. In addition to visual inspection, the following test shall be performed not less than 30 days following completion of pipe installation and final fill placement. All post installation inspections and test shall be observed by Department personnel.

High Density Polyethylene Pipe (HDPE Pipe) , Polyvinyl Chloride Pipe (PVC), and Corrugated Metal Pipe (CMP): The contractor shall be responsible for conducting a deflection test, (mandrel, laser, or manual), on at least 10 percent of the total number of pipe runs representing a minimum 10 percent of the total project footage including a minimum of one run of each pipe size. The Engineer shall randomly select installations to be tested to determine whether the internal diameter of the barrel has been reduced more than 5 percent. If any installation is determined to have deflected more than 5 percent, all pipe installations shall be evaluated for deflection. Documentation of station, pipe size, and deflection results shall be provided to the Engineer.

Reinforced Concrete Pipe (RCP): All RCP shall be visually inspected for deflection, alignment, cracking, and joint construction during and after installation. Any installations where visual inspections detect poor construction techniques shall be further evaluated as directed by the Engineer.

All Pipes with deflections greater than 5 percent of the nominal pipe diameter, undue misalignment, or poor joint construction shall be replaced by the Contractor at his expense. Any excavation or additional work including, but not limited to, base stone or asphalt removal and replacement, required to replace a pipe installation due to poor construction techniques shall be at the Contractor's expense. As visual and deflection test dictate, the Engineer may request additional inspections at the contractors expense.

Subsection 607.12-Method of Measurement. Remove and Replace entire subsection with the following:

607.12-Method of Measurement. Concrete pipe culverts and concrete storm sewers of the different classes, shapes, and sizes specified, will be measured by the linear foot(meter) of pipe installed and accepted. The quantity of pipe cut off, not to exceed 2 ft.(600 mm), will be paid for at the contract bid price for pipe in place.

Corrugated metal pipe, and corrugated metal structural plate pipe will be measured by the linear foot (meter) of pipe installed and accepted. Measurements will be made as follows:

- (a) Metal pipe and metal structural plate pipe, with square and vertical ends or with skewed and vertical ends will be measured, in place, end to end of the metal on the centerline of the structure.
- (b) Metal pipe and metal structural plate pipe, with square ends beveled, and with ends skewed and beveled, except arch pipe, will be measured, in place, by averaging the end to end distances at the top and bottom of the pipe, measured parallel to the centerline of the structure.
- (c) Metal arch pipe and metal structural plate arch pipe with square ends beveled, and with ends skewed and beveled, will be measured, in place, end to end of the metal along the invert of the structure.

High Density Polyethylene pipe will be measured by the linear foot(meter) of pipe installed and accepted. The quantity of pipe cut off, not to exceed 2 ft.(600 mm), will be paid for at the contract bid price for pipe in place.

Polyvinyl Chloride pipe will be measured by the linear foot(meter) of pipe installed and accepted. The quantity of pipe cut off, not to exceed 2 ft.(600 mm), will be paid for at the contract bid price for pipe in place.

Slope Drains will be measured in the same manner as specified for corrugated metal pipe.

Pipe Culverts(Side Drains) of the different sizes specified will be measured by the linear foot(meter) along the centerline of the installed pipe, except that no measurement for payment will be made in excess of the ordered length of the pipe. Pipe Culverts (Side Drains) will be ordered in increments of 2 ft.(600 mm).

Unless otherwise indicated on the Plans, no measurement of structure excavation will be made; and the costs involved shall be included in the unit prices bid for other items of construction. When the Plans provide for direct payment for structure excavation, measurement and payment will be in accordance with **Section 204**.

No payment will be made for labor and materials used in making branch connections. The length of pipe in the branch connection will be measured and included in the quantity of pipe installed in the branch line.

Strutting of corrugated metal pipe and corrugated metal structural plate pipe will not be paid for separately, but the costs thereof shall be included in the unit price bid per linear foot(meter) of pipe.

Subsection 607.13-Basis of Payment. Revise to include bedding and back fill as shown below:

The accepted quantities of pipe culverts and storm sewers, measured as provided for above, will be paid for at the contract unit price per linear foot(meter) for each type, class, shape, and size constructed, complete in place, including placing and compacting bedding and backfill, which price shall be full compensation for labor and materials used in making joints, and

connections to other structures; for strutting, when required, and for completing all incidentals necessary to complete the item.

Subsection 614.04 First sentence of the second paragraph. Shall read as follows:

The precast concrete deck units shall be cast in a Precast/Prestressed Concrete Institute, Category B-3 certified precast plant under plant control conditions, and in accordance with the TDOT procedure for the Manufacture and Acceptance of pre-cast concrete drainage structures, noise wall panels, and retaining wall panels.

The precast concrete deck units shall be cast in a certified precast plant under plant control conditions, and in accordance with the TDOT procedure for the Manufacture and Acceptance of pre-cast concrete drainage structures, noise wall panels, and retaining wall panels.

Subsection 615.01, Replace the second paragraph, first sentence with the following:

“The fabrication of these items shall be accomplished in plants that have been certified by the Precast/Prestressed Concrete Institute, Plant Certified Inspector (PCI).”

Subsection 615.02, Replace the third paragraph, first sentence with the following:

“The fabrication of precast/prestressed concrete members shall be in a Precast/Prestressed Concrete Institute category B-3 certified plant and have at each fabrication site a technician skilled in the approved pre-stressing method.”

Subsection 615.05, Replace the second paragraph with the following:

“The panels shall be fabricated in a plant certified by the Precast/Prestressed Concrete Institute (PCI) category B-3.”

Subsection 615.07 First paragraph, fourth sentence, **Change** “4 months” to “6 months”

Subsection 616.05 Revise the last paragraph to the following:

“Tendons shall be placed in rigid ducts after concrete placement is completed. Ducts shall be as specified on plans and in conformance with Subsection 616.07.”

Subsection 619.14 Add as the second paragraph

PMC Variable Depth shall be measured by the cubic yard complete in place. The number of cubic yards will be determined by deducting the theoretical volume of Bridge Deck Overlay (PMC) from the total volume of PMC required to obtain the finished grade shown on the Plans or established by the Engineer.

Subsection 621.01 Add “and temporary shoring” after “temporary structures” in the first sentence.

Subsection 621.02 Add the following as the last paragraph:

Temporary shoring shall be used to retain the earth during grading operations and bridge construction to maintain traffic. Temporary shoring shall be installed at the locations shown on the plans or as directed by the engineer. Payment for this item will not be made when used for the installation of drainage structures, utilities, to meet OSHA regulations, or for the convenience of the contractor, unless these locations are specifically shown on the plans. The contractor shall design the temporary shoring for the specific locations and in-situ soil types. The submittal shall be in accordance with **Subsection 105.02**, shall be stamped by a Professional Engineer, and shall include detailed drawings, design calculations, and shoring material requirements. Temporary shoring may be sheet piling, piling/lagging walls, tie back walls, etc...

Subsection 621.03 Add the following as the last paragraph:

Temporary shoring will be measured and paid for by the square foot (square meter) of exposed vertical face area. The bottom of shoring for payment will be where the exposed face intersects the existing or specified grade. The top of shoring for payment will be the actual shoring top, but not more than one (1) foot above where the back of shoring intersects the existing or specified grade.

Subsection 621.04 Add the following as the last paragraph:

Payment for temporary shoring shall be full compensation for all designs, submittals, labor, tools, equipment, materials, and all other incidentals for proper installation and removal of the shoring.

Subsection 623.02 B. 2. First sentence, **Add** after “grade 50” “50S, HPS50W,”

Subsection 623.02 C. 2. Last part of the paragraph, **Add** after “Category I” “Simple Steel Bridges”, SBR-1B.