

DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA

PROPOSAL

DO NOT UNSTAPLE THIS BOOKLET....ENTER ALL REQUIRED INFORMATION  
----- EITHER BY HAND OR BY STAMP.

DATE OF OPENING : April 20, 2007

CALL ORDER : 001

CONTRACT ID : B12829-07-000-0

PCN	PROJECTS AND CONTRACT NO.
----- 0008232010000	----- CSNHS-0008-00(232) 01

COUNTY : TROUP

CODE \_\_\_\_\_ ISSUED TO:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

PART 1 OF 2

THE CONTRACTOR WILL RETURN ALL PARTS OF THE PROPOSAL  
WITH HIS BID UNLESS BIDDING ELECTRONICALLY

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CONTRACT ID : B12829-07-000-0  
INTERCHANGE CONSTRUCTION ON I-85/SR 403 AT CR 98  
(GABBETTVILLE RD) UTILIZING THE DESIGN/BUILD PROJECT METHOD.  
(FOS)

PROPOSAL GUARANTY : 5%

DBE GOAL : 10.00 %

SITE	COMPLETION DATE	CONTRACT TIME	LIQUIDATED DAMAGES
00	12/31/08	COMPLETION DATE	
COMPLETE CONTRACT			
01		AVAILABLE DAYS	
EARLY COMPLETION OF THE WORK - SEE SPEC PROV SEC 108			
02		180 CALENDAR DAYS	
FAIL TO COMP ALL WORK (I-85 NB) - SEE SPEC PROV SEC 108			
03		180 CALENDAR DAYS	
FAIL TO COMP ALL WORK (I-85 SB) - SEE SPEC PROV SEC 108			
04		AVAILABLE DAYS	
FAIL TO REOPEN LANES - SEE SPEC PROV SEC 108			
05		365 CALENDAR DAYS	
FAIL TO REOPEN TWO WAY ACCESS - SEE SPEC PROV SEC 108			
06		270 CALENDAR DAYS	
FAIL TO COMP WORK (I-85 NB & SB) - SEE SPEC PROV SEC 108			
07	12/31/07		
FAIL TO REOPEN ACCESS KIA BLVD - SEE SPEC PROV SEC 108			

NOTICE TO BIDDERS

If a DBE goal is specified, the bidder shall submit with this bid proposal a list of all proposed DBE participants. A form for this purpose is provided in this proposal. Please refer to the following specifications:

102.07 Rejection of Proposals  
Disadvantaged Business Enterprise Program (Special Provision)

BIDDERS SHALL ENTER ALL UNIT PRICES, MAKE ALL EXTENSIONS AND TOTAL THE BID.

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SCHEDULE OF ITEMS

PAGE: 1  
DATE: 03/08/07

CONTRACT ID: B12829-07-000-0  
PROJECT(S) : 0008232010000 CSNHS-0008-00(232) 01

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
SECTION 0001 ROADWAY						
0005	150-9011 TRAFFIC CONTROL - WORKZONE LAW ENFORCEMENT (CONTRACTOR BIDS)	HR 2,500.000	.		.	
0010	158-1000 TRAINING HOURS	HR 15,000.000	0.80000		12,000.00	
0015	999-2010 DESIGN COMPLETE	LUMP	LUMP		.	
0020	999-2015 CONSTRUCTION COMPLETE	LUMP	LUMP		.	
	SECTION 0001 TOTAL				.	
	TOTAL BID		ENTER BID TOTAL ON NEXT PAGE.			

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## INSTRUCTIONS FOR LIST OF DBE PARTICIPANTS

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If a DBE Goal is indicated, you must propose to achieve a goal that is equal or greater than the percentage required. If no goal is indicated, you may propose your own goal.

The DBE Firms to be utilized as counting toward the proposed goal must be listed on this form, along with their addresses, type of work and the amount to be paid to each of the minority firms. The amount entered will not necessarily be the contract amount, but must be the actual amount that will be paid to the DBE firm. In the case of a DBE supplier, the amount paid and 60% of that amount both will be entered; and only the 60% figure should be added to the total. An example of this is shown in the example chart:

Vendor Number	Company Name And Address (City and State)	Type of Work	* Work Code	Race Neutral	Race Conscious	Amount
	ABC Oil Company Atlanta, GA	Diesel Fuel Supplier				\$80,000.00 (60% = \$48,000.00)

\* For Departmental use ONLY. Do not fill in Work Codes.

The Contractor shall indicate for each DBE and Type of Work whether the DBE Participant is Race Neutral or Race Conscious by placing a checkmark in the appropriate column.

**PLEASE NOTE:** For 60% of the amount paid to a DBE supplier to be eligible to count toward fulfilling the DBE goal, the supplier must be an established “regular dealer” in the product involved, and not just a broker. A “regular dealer” would normally sell the product to several customers and would usually have product inventory on hand.

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**FEDERAL AID CERTIFICATION**  
(English Project)

August 23, 2001

First Use Date 2001 Specifications: November 1, 2002

Failure to complete appropriate certification requirements identified below or submission of a false certification shall render the bid non-responsive.

**EQUAL EMPLOYMENT OPPORTUNITY**

I further certify that I have \_\_\_/have not \_\_\_ participated in a previous contract or subcontract subject to the equal opportunity clause, as required by Executive Orders 10925, 11114, or 11246, and that I have \_\_\_ / have not \_\_\_ filed with the Joint Reporting Committee, the Director of the *Office of Federal Contract Compliance*, a Federal Government contracting or administering agency, or the former *President's Committee on Equal Employment Opportunity*, all reports due under the applicable filing requirements.

I understand that if I have participated in a previous Contract or Subcontract subject to the Executive Orders above and have not filed the required reports that 41 CFR 60-1.7(b)(1) prevents the award of this Contract unless I submit a report governing the delinquent period or such other period specified by the Federal Highway Administration or by the Director, Office of Federal Contract Compliance, U. S. Department of Labor.

Reports and notifications required under 41 CFR 604, including reporting subcontract awards in excess of \$10,000.00 should be addressed to:

Ms. Carol Gaudin  
Regional Director, U. S. Department of Labor  
Office of Federal Contract Compliance Programs, Region 4  
Rm. 7B75  
61 Forsyth St. SW  
Atlanta GA 30303

**EXAMINATION OF PLANS AND SPECIFICATIONS**

I acknowledge that this Project will be constructed in English units.

I certify that I have carefully examined the Plans for this Project and the Standard Specifications, 2001 Edition, and the Supplemental Specifications and Special Provisions included in and made a part of this Proposal, and have also personally examined the site of the work. On the basis of the said Specifications and Plans, I propose to furnish all necessary machinery, tools, apparatus and other means of construction, and do all the work and furnish all the materials in the manner specified.

I understand the quantities mentioned are approximate only and are subject to either increase or decrease and hereby propose to perform any increased or decreased quantities of work or extra work on the basis provided for in the Specifications.

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I also hereby agree that the State, or the Department of Transportation, would suffer damages in a sum equal to at least the amount of the enclosed Proposal Guaranty, in the event my Proposal should be accepted and a Contract tendered me thereunder and I should refuse to execute same and furnish bond as herein required, in consideration of which I hereby agree that, in the event of such failure on my part to execute said Contract and furnish bond within fifteen (15) days after the date of the letter transmitting the Contract to me, the amount of said Proposal Guaranty shall be and is hereby, forfeited to the State, or to the Department of Transportation, as liquidated damages as the result of such failure on my part.

I further propose to execute the Contract agreement described in the Specifications as soon as the work is awarded to me, and to begin and complete the work within the time limit provided. I also propose to furnish a Contract Bond, approved by the State Transportation Board, as required by the laws of the State of Georgia. This bond shall not only serve to guarantee the completion of the work on my part, but also to guarantee the excellence of both workmanship and materials until the work is finally accepted, as well as to fully comply with all the laws of the State of Georgia.

**CONFLICT OF INTEREST**

By signing and submitting this Contract I hereby certify that employees of this company or employee of any company supplying material or subcontracting to do work on this Contract will not engage in business ventures with employees of the Georgia Department of Transportation (GA D.O.T.) nor shall they provide gifts, gratuities, favors, entertainment, loans or other items of value to employees of this department.

Also, by signing and submitting this Contract I hereby certify that I will notify the Georgia Department of Transportation through its District Engineer of any business ventures entered into between employees of this company or employees of any company supplying material or subcontracting to do work on this Contract with a family member of GA D.O.T. employees.

**DRUG FREE WORKPLACE**

The undersigned certifies that the provisions of Code Sections 50-24-1 through 50-24-6 of the Official Code of Georgia Annotated, relating to the "Drug-free Workplace Act", have been complied with in full. The undersigned further certifies that:

- (1) A drug-free workplace will be provided for the Contractor's employees during the performance of the Contract; and
- (2) Each Contractor who hires a Subcontractor to work in a drug-free workplace shall secure from that Subcontractor the following written certification:

"As part of the subcontracting agreement with \_\_\_\_\_ (Contractor's name) \_\_\_\_\_, \_\_\_\_\_ (Subcontractor's name) \_\_\_\_\_ certifies to the Contractor that a drug free workplace will be provided for the Subcontractor's employees during the performance of this Contract pursuant to paragraph (7) of subsection (b) of Code Section 50-24-3."

Also, the undersigned further certifies that he will not engage in the unlawful manufacture, sale distribution, dispensation, possession, or use of a controlled substance or marijuana during the performance of the Contract.

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**NON-COLLUSION CERTIFICATION**

I hereby certify that I have not, nor has any member of the firm(s) or corporation(s), either directly or indirectly entered into any agreement, participated in any collusion, nor otherwise taken any action in restraint of free competitive bidding in connection with this submitted bid.

It is understood and agreed that this Proposal is one of several competitive bids made to the Department of Transportation, and in consideration of mutual agreements of the bidders, similar hereto, and in consideration of the sum of One Dollar cash in hand paid, receipt whereof is hereby acknowledged, the undersigned agrees that this Proposal shall be an option, which is hereby given by the undersigned to the Department of Transportation to accept or reject this Proposal at any time within thirty (30) calendar days from the date on which this sealed proposal is opened and read, unless a longer period is specified in the Proposal or the successful bidder agrees in writing to a longer period of time for the award, and in consideration of the premises, it is expressly covenanted and agreed that this Proposal is not subject to withdrawal by the Proposer or Bidder, during the term of said option.

I hereby acknowledge receipt of the following checked amendments of the Proposal, Plans, Specifications and/or other documents pertaining to the Contract.

Amendment Nos.: 1\_\_\_2\_\_\_3\_\_\_4\_\_\_5\_\_\_. I understand that failure to confirm the receipt of amendments is cause for rejection of bids.

Witness my hand and seal this the \_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

The bidder(s) whose signature(s) appear on this document, having personally appeared before me, and being duly sworn, deposes and says that the above statements are true and correct.

Sworn to and subscribed before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

\_\_\_\_\_  
(Notary Public)

My Commission expires the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

\_\_\_\_\_  
(Federal ID No./IRS No.)

\_\_\_\_\_  
(Print Company Name)

By \_\_\_\_\_ (Seal)  
Corporate President/Vice President or  
Individual Owner or Partner (Strike  
through all except the one which applies.)

Joint Bidder:

\_\_\_\_\_  
(Print Company Name)

By \_\_\_\_\_ (Seal)  
Corporate President/Vice President or  
Individual Owner or Partner (Strike  
through all except the one which applies.)

Joint Bidder:

\_\_\_\_\_  
(Print Company Name)

By \_\_\_\_\_ (Seal)  
Corporate President/Vice President or  
or Individual Owner or Partner (Strike  
through all except the one which applies.)

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**PROPOSAL INDEX**

Call Order Number: 1

Let Date: April 20, 2007

Project No.: CSNHS-0008-00(232) Troup

**Modifications and additions to the 2001 Standard Specifications contained in this proposal are listed below:**

DBE Requirements	Sec. 819 - Fiber Stabilizing Additives
Federal Aid Requirements	Sec. 820 - Asphalt Cement
Certification/Drug Free Workplace	Sec. 828 - Hot Mix Asphaltic Concrete Mixtures
Signature Page	Sec. 841 - Iron Pipe
Proposal Index	Sec. 843 - Concrete Pipe
Notice to All Bidders	Sec. 846 - Polyvinyl Chloride (PVC) Drain Pipe
Federal Labor Provisions (FHWA 1273)	Sec. 854 - Castings and Forgings
Wage Rates	Sec. 861 - Piling and Round Timber
Standard EEO Specifications	Sec. 866 - Precast Concrete Catch Basin, Drop Inlet, and Manhole Units
Notice of Affirmative Action	Sec. 868 - Bituminous Adhesive For raised Pavement Markers
Disadvantaged Business Enterprise Program	Sec. 881 - Fabrics
Prompt Payment	Sec. 882 - Lime
Buy America	Sec. 893 - Miscellaneous Planting Materials
Errata Corrections	Sec. 894 - Fencing
Utility Conflicts	Sec. 895 - Polyacrylamide (Pam)
Sec. 102 - Bidding Requirements and Conditions (2)	Sec. 911 - Sign Post
Sec. 107 - Legal Regulation and Responsibility to the Public (2)	Sec. 913 - Reflectoring Materials
Sec. 149 - Construction Layout (2)	Sec. 917 - Reflectors and Nonreflective Characters
Sec. 150 - Traffic Control	Sec. 925 - Traffic Signal Equipment
Sec. 153 - Field Engineers Office	Sec. 941 - Macro-Synthetic Fibers for Concrete Reinforcement
Sec. 163 - Miscellaneous Erosion Control	
Sec. 165 - Maintenance of Temporary Erosion and sedimentation Control Devices	Construction Activity Schedule
Sec. 167 - Water Quality Monitoring	Memorandum of Understanding (8)
Sec. 170 - Silt Retention Barrier	Escrow Bid Documentation
Sec. 171 - Silt Fence	Sec. 103 - Award and Execution of Contract (50 Day Clause)
Sec. 201 - Clearing and Grubbing Right of Way	Sec. 107 - Legal Regulations and Responsibilities to the Public
Sec. 208 - Embankments	Sec. 108 - Prosecution and Progress (Temporary Suspension of Work)
Sec. 209 - Subgrade Construction	Sec. 108 - Prosecution and Progress (Failure or Delay in Completing work on Time)
Sec. 210 - Grading Complete	Sec. 150 - Traffic Control (Special Conditions)
Sec. 400 - Hot Mix Asphaltic Concrete Construction	Sec. 161 - Control of Soil Erosion and Sedimentation
Sec. 402 - Hot Mix Recycled Asphaltic Concrete	Sec. 205 - Roadway Excavation
Sec. 432 - Mill Asphaltic Concrete Pavement	Sec. 206 - Borrow Excavation
Sec. 433 - Reinforced Concrete Approach Slabs	Sec. 207 - Excavation and Backfill for Minor Structures
Sec. 441 - Miscellaneous Concrete (Wheel Chair Ramps)	Sec. 310 - Graded Aggregate Construction
Sec. 446 - Placement of Pavement Reinforcement Fabric	Sec. 413 - Bituminous Tack Coat
Sec. 500 - Concrete Structures	Sec. 430 - Portland Cement Concrete Pavement
Sec. 501 - Steel Structures	Sec. 436 - Asphaltic Concrete Curb
Sec. 507 - Prestressed Concrete Bridge	Sec. 439 - Plain Portland Cement Concrete Pavement
Sec. 509 - Prestressing Concrete by Post Tensioning	Sec. 442 - Roller Compacted Concrete Pavement
Sec. 550 - Storm Drain Pipe, Pipe-Arch Culverts and Side Drain Pipe	Sec. 511 - Reinforcement Steel
Sec. 600 - Controlled Low Strength Flowable Fill	Sec. 524 - Drilled Caisson Foundation
Sec. 620 - Temporary Barrier	Sec. 603 - Rip Rap
Sec. 636 - Highway Signs	Sec. 615 - Jacking or Boring Pipe
Sec. 638 - Structural Support For Overhead Signs	Sec. 621 - Concrete Barrier
Sec. 647 - Traffic Signal Installation	Sec. 634 - Monuments and Road Markers
Sec. 648 - Traffic Impact Attenuator	Sec. 639 - Strain Poles for Overhead Sign and Signal Assemblies
Sec. 652 - Painting Traffic Stripe (Polyurea)	Sec. 641 - Guardrail
Sec. 653 - Thermoplastic Traffic Stripe	Sec. 643 - Fence
Sec. 657 - Wet Reflective Preformed Pavement Markings	Sec. 654 - Raised Pavement Markers
Sec. 700 - Grassing	Sec. 655 - Paement Arrow and Raised Reflectors
Sec. 702 - Vine, Shrubs, And Tree Planting	Sec. 668 - Miscellaneous Drainage Structures
Sec. 710 - Permanent Soil Reinforcing Mat	Sec. 681 - Lighting Standards and Luminaires
Sec. 800 - Coarse Aggregate	Sec. 682 - Electrical Wire, Cable and Conduct
Sec. 801 - Fine Aggregate	Sec. 683 - High Level Lighting System
Sec. 802 - Aggregates for Asphaltic Concrete	Sec. 715 - Bituminous Treated Roving
Sec. 803 - Stabilizer Aggregate	Sec. 716 - Erosion Control Mats (Slopes)
Sec. 810 - Roadway Materials	Sec. 851 - Structural Steel
Sec. 812 - Backfill Materials	Sec. 861 - Piling and Round Timber
Sec. 814 - Soil Base Materials	Sec. 865 - Manufacture of Prestressed Concrete Bridge Memebers
Sec. 815 - Graded Aggregate	Sec. 999 - Design Build

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# NOTICE TO ALL BIDDERS

To report bid rigging activities call:

**1-800-424-9071**

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The U.S. Department of Transportation (DOT) operates the above toll-free “hotline” Monday through Friday, 8:00 AM to 5:00 PM, Eastern Time. Anyone with the 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.

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## Required Contract Provisions Federal-Aid Construction Contracts

- I. [General](#)
- II. [Nondiscrimination](#)
- III. [Nonsegregated Facilities](#)
- IV. [Payment of Predetermined Minimum Wage](#)
- V. [Statements and Payrolls](#)
- VI. [Record of Materials, Supplies, and Labor](#)
- VII. [Subletting or Assigning the Contract](#)
- VIII. [Safety: Accident Prevention](#)
- IX. [False Statements Concerning Highway Projects](#)
- X. [Implementation of Clean Air Act and Federal Water Pollution Control Act](#)
- XI. [Certification Regarding Debarment, Suspension Ineligibility, and Voluntary Exclusion](#)
- XII. [Certification Regarding Use of Contract Funds for Lobbying](#)

### Attachments

- A. [Employment Preference for Appalachian Contracts \(included in Appalachian contracts only\)](#)

#### I. GENERAL

1. These contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.
2. Except as otherwise provided for in each section, the contractor shall insert in each subcontract all of the stipulations contained in these Required Contract Provisions, and further require their inclusion in any lower tier subcontract or purchase order that may in turn be made. The Required Contract Provisions shall not be incorporated by reference in any case. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with these Required Contract Provisions.
3. A breach of any of the stipulations contained in these Required Contract Provisions shall be sufficient grounds for termination of the contract.
4. A breach of the following clauses of the Required Contract Provisions may also be grounds for debarment as provided in 29 CFR 5.12:

Section I, paragraph 2;

Section IV, paragraphs 1, 2, 3, 4, and 7;

Section V, paragraphs 1 and 2a through 2g.

5. Disputes arising out of the labor standards provisions of Section IV (except paragraph 5) and Section V of these Required Contract Provisions shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the U.S. Department of Labor (DOL) as set forth in 29 CFR 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the DOL, or the contractor's employees or their representatives.
6. **Selection of Labor:** During the performance of this contract, the contractor shall not:

- a. discriminate against labor from any other State, possession, or territory of the United States (except for employment preference for Appalachian contracts, when applicable, as specified in Attachment A), or
- b. employ convict labor for any purpose within the limits of the project unless it is labor performed by convicts who are on parole, supervised release, or probation.

## II. NONDISCRIMINATION

(Applicable to all Federal-aid construction contracts and to all related subcontracts of \$10,000 or more.)

1. **Equal Employment Opportunity:** Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630 and 41 CFR 60) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The Equal Opportunity Construction Contract Specifications set forth under 41 CFR 60-4.3 and the provisions of the American Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:
  - a. The contractor will work with the State highway agency (SHA) and the Federal Government in carrying out EEO obligations and in their review of his/her activities under the contract.
  - b. The contractor will accept as his operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."
2. **EEO Officer:** The contractor will designate and make known to the SHA contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active contractor program of EEO and who must be assigned adequate authority and responsibility to do so.
3. **Dissemination of Policy:** All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:
  - a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once

- every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.
- b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.
  - c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minority group employees.
  - d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.
  - e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.
4. **Recruitment:** When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minority groups in the area from which the project work force would normally be derived.
- a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minority group applicants. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority group applicants may be referred to the contractor for employment consideration.
  - b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, he is expected to observe the provisions of that agreement to the extent that the system permits the contractor's compliance with EEO contract provisions. (The DOL has held that where implementation of such agreements have the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Executive Order 11246, as amended.)
  - c. The contractor will encourage his present employees to refer minority group applicants for employment. Information and procedures with regard to referring minority group applicants will be discussed with employees.
5. **Personnel Actions:** Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:
- a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.
  - b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

- c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.
  - d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with his obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of his avenues of appeal.
6. **Training and Promotion:**
- a. The contractor will assist in locating, qualifying, and increasing the skills of minority group and women employees, and applicants for employment.
  - b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision.
  - c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.
  - d. The contractor will periodically review the training and promotion potential of minority group and women employees and will encourage eligible employees to apply for such training and promotion.
7. **Unions:** If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use his/her best efforts to obtain the cooperation of such unions to increase opportunities for minority groups and women within the unions, and to effect referrals by such unions of minority and female employees. Actions by the contractor either directly or through a contractor's association acting as agent will include the procedures set forth below:
- a. The contractor will use best efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minority group members and women for membership in the unions and increasing the skills of minority group employees and women so that they may qualify for higher paying employment.
  - b. The contractor will use best efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.
  - c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the SHA and shall set forth what efforts have been made to obtain such information.

- d. In the event the union is unable to provide the contractor with a reasonable flow of minority and women referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minority group persons and women. (The DOL has held that it shall be no excuse that the union with which the contractor has a collective bargaining agreement providing for exclusive referral failed to refer minority employees.) In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the SHA.
8. **Selection of Subcontractors, Procurement of Materials and Leasing of Equipment:** The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment.
- a. The contractor shall notify all potential subcontractors and suppliers of his/her EEO obligations under this contract.
  - b. Disadvantaged business enterprises (DBE), as defined in 49 CFR 23, shall have equal opportunity to compete for and perform subcontracts which the contractor enters into pursuant to this contract. The contractor will use his best efforts to solicit bids from and to utilize DBE subcontractors or subcontractors with meaningful minority group and female representation among their employees. Contractors shall obtain lists of DBE construction firms from SHA personnel.
  - c. The contractor will use his best efforts to ensure subcontractor compliance with their EEO obligations.
9. **Records and Reports:** The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the SHA and the FHWA.
- a. The records kept by the contractor shall document the following:
    - 1. The number of minority and non-minority group members and women employed in each work classification on the project;
    - 2. The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women;
    - 3. The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minority and female employees; and
    - 4. The progress and efforts being made in securing the services of DBE subcontractors or subcontractors with meaningful minority and female representation among their employees.
  - b. The contractors will submit an annual report to the SHA each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data.

### III. **NONSEGREGATED FACILITIES**

(Applicable to all Federal-aid construction contracts and to all related subcontracts of \$10,000 or more.)

- a. By submission of this bid, the execution of this contract or subcontract, or the consummation of this material supply agreement or purchase order, as appropriate, the bidder, Federal-aid construction contractor, subcontractor, material supplier, or vendor, as appropriate, certifies that the firm does not maintain or provide for its employees any segregated facilities at any of its establishments, and that the firm does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The firm agrees that a breach of this certification is a violation of the EEO provisions of this contract. The firm further certifies that no employee will be denied access to adequate facilities on the basis of sex or disability.
- b. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, timeclocks, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive, or are, in fact, segregated on the basis of race, color, religion, national origin, age or disability, because of habit, local custom, or otherwise. The only exception will be for the disabled when the demands for accessibility override (e.g. disabled parking).
- c. The contractor agrees that it has obtained or will obtain identical certification from proposed subcontractors or material suppliers prior to award of subcontracts or consummation of material supply agreements of \$10,000 or more and that it will retain such certifications in its files.

### IV. **PAYMENT OF PREDETERMINED MINIMUM WAGE**

(Applicable to all Federal-aid construction contracts exceeding \$2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural minor collectors, which are exempt.)

#### 1. **General:**

- a. All mechanics and laborers employed or working upon the site of the work will be paid unconditionally and not less often than once a week and without subsequent deduction or rebate on any account [except such payroll deductions as are permitted by regulations (29 CFR 3) issued by the Secretary of Labor under the Copeland Act (40 U.S.C. 276c)] the full amounts of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment. The payment shall be computed at wage rates not less than those contained in the wage determination of the Secretary of Labor (hereinafter "the wage determination") which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor or its subcontractors and such laborers and mechanics.



The wage determination (including any additional classifications and wage rates conformed under paragraph 2 of this Section IV and the DOL poster (WH-1321) or Form FHWA-1495) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers. For the purpose of this Section, contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act (40 U.S.C. 276a) on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of Section IV, paragraph 3b, hereof. Also, for the purpose of this Section, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in paragraphs 4 and 5 of this Section IV.

- b. Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein, provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed.
- c. All rulings and interpretations of the Davis-Bacon Act and related acts contained in 29 CFR 1, 3, and 5 are herein incorporated by reference in this contract.

## **2. Classification:**

- a. The SHA contracting officer shall require that any class of laborers or mechanics employed under the contract, which is not listed in the wage determination, shall be classified in conformance with the wage determination.
- b. The contracting officer shall approve an additional classification, wage rate and fringe benefits only when the following criteria have been met:
  - 1. the work to be performed by the additional classification requested is not performed by a classification in the wage determination;
  - 2. the additional classification is utilized in the area by the construction industry;
  - 3. the proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination; and
  - 4. with respect to helpers, when such a classification prevails in the area in which the work is performed.
- c. If the contractor or subcontractors, as appropriate, the laborers and mechanics (if known) to be employed in the additional classification or

their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the DOL, Administrator of the Wage and Hour Division, Employment Standards Administration, Washington, D.C. 20210. The Wage and Hour Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

- d. In the event the contractor or subcontractors, as appropriate, the laborers or mechanics to be employed in the additional classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. Said Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary
- e. The wage rate (including fringe benefits where appropriate) determined pursuant to paragraph 2c or 2d of this Section IV shall be paid to all workers performing work in the additional classification from the first day on which work is performed in the classification.

**3. Payment of Fringe Benefits:**

- a. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor or subcontractors, as appropriate, shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly case equivalent thereof.
- b. If the contractor or subcontractor, as appropriate, does not make payments to a trustee or other third person, he/she may consider as a part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, provided, that the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

**4. Apprentices and Trainees (Programs of the U.S. DOL) and Helpers:**

- a. Apprentices:
  - A. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the DOL, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau, or if a person is employed in his/her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the

program, but who has been certified by the Bureau of Apprenticeship and Training or a State apprenticeship agency (where appropriate) to be eligible for probationary employment as an apprentice.

- B. The allowable ratio of apprentices to journeyman-level employees on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any employee listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate listed in the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor or subcontractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman-level hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.
  - C. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator for the Wage and Hour Division determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.
  - D. In the event the Bureau of Apprenticeship and Training, or a State apprenticeship agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor or subcontractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the comparable work performed by regular employees until an acceptable program is approved.
- b. Trainees:
- A. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the DOL, Employment and Training Administration.
  - B. The ratio of trainees to journeyman-level employees on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and

Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

- C. Every trainee must be paid at not less than the rate specified in the approved program for his/her level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman-level wage rate on the wage determination which provides for less than full fringe benefits for apprentices, in which case such trainees shall receive the same fringe benefits as apprentices.
- D. In the event the Employment and Training Administration withdraws approval of a training program, the contractor or subcontractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. **Helpers:**

Helpers will be permitted to work on a project if the helper classification is specified and defined on the applicable wage determination or is approved pursuant to the conformance procedure set forth in Section IV.2. Any worker listed on a payroll at a helper wage rate, who is not a helper under a approved definition, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed.

**5. Apprentices and Trainees (Programs of the U.S. DOT):**

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

**6. Withholding:**

The SHA shall upon its own action or upon written request of an authorized representative of the DOL withhold, or cause to be withheld, from the contractor or subcontractor under this contract or any other Federal contract with the same

prime contractor, or any other Federally-assisted contract subject to Davis-Bacon prevailing wage requirements which is held by the same prime contractor, as much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the SHA contracting officer may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

**7. Overtime Requirements:**

No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers, mechanics, watchmen, or guards (including apprentices, trainees, and helpers described in paragraphs 4 and 5 above) shall require or permit any laborer, mechanic, watchman, or guard in any workweek in which he/she is employed on such work, to work in excess of 40 hours in such workweek unless such laborer, mechanic, watchman, or guard receives compensation at a rate not less than one-and-one-half times his/her basic rate of pay for all hours worked in excess of 40 hours in such workweek.

**8. Violation:**

Liability for Unpaid Wages; Liquidated Damages: In the event of any violation of the clause set forth in paragraph 7 above, the contractor and any subcontractor responsible thereof shall be liable to the affected employee for his/her unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory) for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer, mechanic, watchman, or guard employed in violation of the clause set forth in paragraph 7, in the sum of \$10 for each calendar day on which such employee was required or permitted to work in excess of the standard work week of 40 hours without payment of the overtime wages required by the clause set forth in paragraph 7.

**9. Withholding for Unpaid Wages and Liquidated Damages:**

The SHA shall upon its own action or upon written request of any authorized representative of the DOL withhold, or cause to be withheld, from any monies payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other Federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph 8 above.

## V. STATEMENTS AND PAYROLLS

(Applicable to all Federal-aid construction contracts exceeding \$2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural collectors, which are exempt.)

### 1. **Compliance with Copeland Regulations (29 CFR 3):**

The contractor shall comply with the Copeland Regulations of the Secretary of Labor which are herein incorporated by reference.

### 2. **Payrolls and Payroll Records:**

- a. Payrolls and basic records relating thereto shall be maintained by the contractor and each subcontractor during the course of the work and preserved for a period of 3 years from the date of completion of the contract for all laborers, mechanics, apprentices, trainees, watchmen, helpers, and guards working at the site of the work.
- b. The payroll records shall contain the name, social security number, and address of each such employee; his or her correct classification; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalent thereof the types described in Section 1(b)(2)(B) of the Davis Bacon Act); daily and weekly number of hours worked; deductions made; and actual wages paid. In addition, for Appalachian contracts, the payroll records shall contain a notation indicating whether the employee does, or does not, normally reside in the labor area as defined in Attachment A, paragraph 1. Whenever the Secretary of Labor, pursuant to Section IV, paragraph 3b, has found that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis Bacon Act, the contractor and each subcontractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, that the plan or program has been communicated in writing to the laborers or mechanics affected, and show the cost anticipated or the actual cost incurred in providing benefits. Contractors or subcontractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprentices and trainees, and ratios and wage rates prescribed in the applicable programs.
- c. Each contractor and subcontractor shall furnish, each week in which any contract work is performed, to the SHA resident engineer a payroll of wages paid each of its employees (including apprentices, trainees, and helpers, described in Section IV, paragraphs 4 and 5, and watchmen and guards engaged on work during the preceding weekly payroll period). The payroll submitted shall set out accurately and completely all of the information required to be maintained under paragraph 2b of this Section V. This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal stock number 029-005-0014-1), U.S. Government Printing Office, Washington, D.C. 20402.

The prime contractor is responsible for the submission of copies of payrolls by all subcontractors.

- d. Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his/her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:
  - 1. that the payroll for the payroll period contains the information required to be maintained under paragraph 2b of this Section V and that such information is correct and complete;
  - 2. that such laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in the Regulations, 29 CFR 3;
  - 3. that each laborer or mechanic has been paid not less than the applicable wage rate and fringe benefits or cash equivalent for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.
- e. The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 2d of this Section V.
- f. The falsification of any of the above certifications may subject the contractor to civil or criminal prosecution under 18 U.S.C. 1001 and 31 U.S.C. 231.
- g. The contractor or subcontractor shall make the records required under paragraph 2b of this Section V available for inspection, copying, or transcription by authorized representatives of the SHA, the FHWA, or the DOL, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the SHA, the FHWA, the DOL, or all may, after written notice to the contractor, sponsor, applicant, or owner, take such actions as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

## VI. **RECORD OF MATERIALS, SUPPLIES, AND LABOR**

- 1. On all Federal-aid contracts on the National Highway System, except those which provide solely for the installation of protective devices at railroad grade crossings, those which are constructed on a force account or direct labor basis, highway beautification contracts, and contracts for which the total final construction cost for roadway and bridge is less than \$1,000,000 (23 CFR 635) the contractor shall:

- a. Become familiar with the list of specific materials and supplies contained in Form FHWA-47, "Statement of Materials and Labor Used by Contractor of Highway Construction Involving Federal Funds," prior to the commencement of work under this contract.
  - b. Maintain a record of the total cost of all materials and supplies purchased for and incorporated in the work, and also of the quantities of those specific materials and supplies listed on Form FHWA-47, and in the units shown on Form FHWA-47.
  - c. Furnish, upon the completion of the contract, to the SHA resident engineer on Form FHWA-47 together with the data required in paragraph 1b relative to materials and supplies, a final labor summary of all contract work indicating the total hours worked and the total amount earned.
2. At the prime contractor's option, either a single report covering all contract work or separate reports for the contractor and for each subcontract shall be submitted.

## VII. SUBLETTING OR ASSIGNING THE CONTRACT

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the State. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635).

- a. "Its own organization" shall be construed to include only workers employed and paid directly by the prime contractor and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor, assignee, or agent of the prime contractor.
- b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid on the contract as a whole and in general are to be limited to minor components of the overall contract.
- c. The contract amount upon which the requirements set forth in paragraph 1 of Section VII is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.
- d. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the SHA contracting officer determines is necessary to assure the performance of the contract.
- e. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the SHA contracting officer, or authorized representative, and such consent when given shall



not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the SHA has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

**VIII. SAFETY: ACCIDENT PREVENTION**

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the SHA contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.
2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 333).
3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 333).

**IX. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS**

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, the following notice shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

**NOTICE TO ALL PERSONNEL ENGAGED ON FEDERAL-AID HIGHWAY PROJECTS**

18 U.S.C. 1020 reads as follows:

*"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or*

*Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or*

*Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;*

*Shall be fined not more than \$10,000 or imprisoned not more than 5 years or both."*

**X. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT**

(Applicable to all Federal-aid construction contracts and to all related subcontracts of \$100,000 or more.)

By submission of this bid or the execution of this contract, or subcontract, as appropriate, the bidder, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any facility that is or will be utilized in the performance of this contract, unless such contract is exempt under the Clean Air Act, as amended (42 U.S.C. 1857 et seq., as amended by Pub.L. 91-604), and under the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq., as amended by Pub.L. 92-500), Executive Order 11738, and regulations in implementation thereof (40 CFR 15) is not listed, on the date of contract award, on the U.S. Environmental Protection Agency (EPA) List of Violating Facilities pursuant to 40 CFR 15.20.
2. That the firm agrees to comply and remain in compliance with all the requirements of Section 114 of the Clean Air Act and Section 308 of the Federal Water Pollution Control Act and all regulations and guidelines listed there under.
3. That the firm shall promptly notify the SHA of the receipt of any communication from the Director, Office of Federal Activities, EPA, indicating that a facility that is or will be utilized for the contract is under consideration to be listed on the EPA List of Violating Facilities.
4. That the firm agrees to include or cause to be included the requirements of paragraph 1 through 4 of this Section X in every nonexempt subcontract, and further agrees to take such action as the government may direct as a means of enforcing such requirements.

**XI. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION**

**1. Instructions for Certification - Primary Covered Transactions:**

(Applicable to all Federal-aid contracts - 49 CFR 29)

- a. By signing and submitting this proposal, the prospective primary participant is providing the certification set out below.
- b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction.

The prospective participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective primary participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

- c. The certification in this clause is a material representation of fact upon which reliance was placed when the department or agency determined to enter into this transaction. If it is later determined that the prospective primary participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause of default.
- d. The prospective primary participant shall provide immediate written notice to the department or agency to whom this proposal is submitted if any time the prospective primary participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
- e. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the department or agency to which this proposal is submitted for assistance in obtaining a copy of those regulations.
- f. The prospective primary participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.
- g. The prospective primary participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," provided by the department or agency entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.
- h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the nonprocurement portion of the "Lists of Parties Excluded From Federal Procurement or Nonprocurement Programs" (Nonprocurement List) which is compiled by the General Services Administration.
- i. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause.

The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

- j. Except for transactions authorized under paragraph f of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

\* \* \* \* \*

**Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Primary Covered Transactions**

1. The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:
  - a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
  - b. Have not within a 3-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
  - c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph 1b of this certification; and
  - d. Have not within a 3-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.
2. Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

\* \* \* \* \*

**1. Instructions for Certification - Lower Tier Covered Transactions:**

(Applicable to all subcontracts, purchase orders and other lower tier transactions of \$25,000 or more - 49 CFR 29)

- a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

- b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.
- c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.
- d. The terms "covered transaction," "debarred," "suspended," "ineligible," "primary covered transaction," "participant," "person," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.
- e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.
- f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.
- g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.
- h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
- i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

\* \* \* \* \*

**Certification Regarding Debarment, Suspension, Ineligibility and Voluntary  
Exclusion--Lower Tier Covered Transactions:**

0. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.
1. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

\* \* \* \* \*

**VII. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING**

(Applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000 - 49 CFR 20)

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:
  - a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
  - b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.
2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.
3. The prospective participant also agrees by submitting his or her bid or proposal that he or she shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.



United States Department of Transportation - Federal Highway Administration - Infrastructure

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

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U. S. Department of Labor

**GENERAL WAGE DECISION NO. GA20070009**

Superseded General Wage Decision No. GA20030009

State: GEORGIA

County(ies): BUTTS, CHEROKEE, CLAYTON, COBB, COWETA, DEKALB,  
DOUGLAS, FAYETTE, FORSYTH, FULTON, GWINNETT, HENRY,  
NEWTON, PAULDING ROCKDALE, SPALDING AND WALTON

Construction Type: Highway

Construction

Description: HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects, and railroad construction; bascule, suspension, and spandrel arch bridges; bridges designed for commercial navigation; bridges involving marine construction; other major bridges).

SUGA 1990-008 05/01/1990

	RATES	FRINGES
ASPHALT RAKER .....	8.00	
CARPENTER.....	9.03	
CONCRETE FINISHER .....	8.65	
ELECTRICIAN.....	17.01	
FLAGGER.....	7.19	
FORM SETTER (Road).....	7.73	
GUARDRAIL ERECTOR .....	8.95	
IRONWORKER (Reinforcing) .....	11.21	
IRONWORKER (Structural).....	11.01	
LABORER .....	6.74	
MASON (Structures).....	9.11	
PAINTER .....	9.65	
PILEDRIVER LEAD PERSON.....	10.14	
PIPELAYER .....	8.18	
<b>POWER EQUIPMENT OPERATOR:</b>		
Asphalt Distributor .....	8.79	
Asphalt Paver .....	8.91	
Backhoe .....	9.39	
Bulldozer .....	8.97	
Concrete Paver .....	8.92	
Crane .....	10.67	
Dragline .....	10.07	
Drill Operator .....	10.95	
Loader.....	9.30	

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

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Traffic Controller (Barricades, Traffic Lines and Detours).....	7.28
Grade Checker.....	6.86
Hydro Seeder.....	8.00
Mechanic.....	10.51
Milling Machine.....	11.97
Motor Grader Operator.....	10.27
Motor Grade Operator (fine grade).....	9.60
Oiler - greaser.....	10.07
Scrapers.....	8.27
Pavement striping operator.....	6.20
Roller.....	8.09
Roller operator (finish).....	8.58
Screed - asphalt.....	8.46
Sweeper.....	9.25
Shovel.....	9.19
Tractor operator (utility).....	8.00
<b>TRUCK DRIVERS:</b>	
Single rear axle.....	6.70
Multi rear axle.....	7.50
Heavy duty.....	9.05
<b>WELDER.....</b>	<b>10.87</b>

**GENERAL WAGE DECISION NO. GA20070010**

Superseded General Wage Decision No. GA20030010

State: GEORGIA

County(ies): BANKS, BARTOW, CHATTOOGA, DAWSON, ELBERT, FANNIN, FLOYD, FRANKLIN, GILMER, GORDON, HABERSHAM, HALL, HARALSON, HART, LUMPKIN, MURRAY, PICKENS, POLK, RABUN, STEPHENS, TOWNS, UNION, WHITE, WHITFIELD

Construction Type: Highway

Construction

Description: HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects, and railroad construction; bascule, suspension, and spandrel arch bridges; bridges designed for commercial navigation; bridges involving marine construction; and other major bridges).

SUGA 1990-003 05/01/1990

	RATES	FRINGES
ASPHALT RAKER.....	7.51	
CARPENTER.....	8.38	
CONCRETE FINISHER.....	8.05	
FLAGGER.....	5.58	
FORM SETTER (ROAD).....	7.10	
GUARDRAIL ERECTOR.....	9.13	
IRONWORKER, REINFORCING.....	11.35	
LABORER.....	6.42	



**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

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MASON (STRUCTURES).....	7.74
PIPELAYER.....	7.17
<b>POWER EQUIPMENT OPERATORS:</b>	
Asphalt distributor.....	8.18
Asphalt paver.....	8.39
Backhoe.....	8.85
Bulldozer.....	8.48
Crane.....	9.44
Dragline.....	9.91
Drill Operator.....	7.48
Loader.....	7.89
Mechanic.....	9.31
Milling machine.....	8.75
Motor grader (fine grade).....	9.40
Motor grader operator.....	9.07
Oiler - greaser.....	8.09
Power tool operator.....	7.55
Scraper.....	8.05
Screed - asphalt.....	7.71
Striping Machine.....	6.23
Sweeper.....	6.10
Roller.....	7.10
Roller operator (finish).....	8.44
Tractor (utility).....	8.00
<b>TRUCK DRIVERS:</b>	
Single Rear Axle.....	6.55
Multi Rear Axle.....	7.08
Heavy Duty.....	9.50
WELDER.....	10.12

**GENERAL WAGE DECISION NO. GA20070011**

Supersedes General Wage Decision No. GA20030011

State:           GEORGIA

County(ies):   APPLING, ATKINSON, BACON, BAKER, BALDWIN, BEN HILL, BERRIEN,  
BLECKLEY, BRANTLEY, BROOKS, BRYAN, BULLOCH, BURKE, CALHOUN,  
CAMDEN, CANDLER, CARROLL, CHARLTON, CLAY, CLINCH, COFFEE,  
COLQUITT, COOK, CRAWFORD, CRISP, DECATUR, DODGE, DOOLY, EARLY,  
ECHOLS, EMANUEL, EVANS, GLASCOCK, GLYNN, GRADY, GREENE,  
HANCOCK, HARRIS, HEARD, IRWIN, JASPER, JEFF DAVIS, JEFFERSON,  
JENKINS, JOHNSON, LAMAR, LANIER, LAURENS, LIBERTY, LINCOLN, LONG  
LOWNDES, MACON, MARION, MCINTOSH, MERIWETHER, MILLER,  
MITCHELL, MONROE, MONTGOMERY, MORGAN, OGLETHORPE, PIERCE,  
PIKE, PULASKI, PUTNAM, QUITMAN, RANDOLPH, SCHLEY, SCREVEN,  
SEMINOLE, STEWART, SUMTER, TALBOT, TALIAFERRO, TATTNALL,  
TAYLOR, TELFAIR, TERRELL, THOMAS, TIFT, TOOMBS, TREUTLEN, TROUP,  
TURNER, TWIGGS, UPSON, WARE, WARREN, WASHINGTON, WAYNE,  
WEBSTER, WHEELER, WILCOX, WILKES, WILKINSON, WORTH

Construction Type: Highway

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

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Construction

Description: HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects, and railroad construction; bascule, suspension, and spandrel arch bridges; bridges designed for commercial navigation; bridges involving marine construction; and other major bridges).

SUGA 1990-004 05/01/1990

	RATES	FRINGES
ASPHALT RAKER .....	6.25	
CARPENTER .....	8.46	
MASON (STRUCTURES) .....	8.54	
CONCRETE FINISHER .....	7.45	
FORM SETTER (ROAD) .....	6.66	
FLAGGER .....	5.22	
GUARDRAIL ERECTOR .....	10.71	
GRADE CHECKER .....	6.08	
IRONWORKER (REINFORCING) .....	10.54	
LABORERS:		
General laborer .....	5.50	
Pipelayer .....	6.02	
POWER EQUIPMENT OPERATORS:		
Asphalt distributor .....	6.73	
Asphalt paver .....	6.83	
Backhoe .....	8.11	
Bulldozer .....	7.66	
Concrete Curb Machine .....	6.60	
Concrete Paver .....	8.36	
Crane .....	9.46	
Dragline .....	8.80	
Loader .....	7.31	
Mechanic .....	8.92	
Milling Machine .....	8.49	
Mixer Box Operator .....	6.00	
Motor grade (fine grade) .....	8.55	
Motor grader .....	8.64	
Scraper .....	7.16	
Pavement striping operator .....	6.57	
Oiler - greaser .....	6.00	
Roller .....	6.03	
Roller (finish) .....	6.32	
Screed - asphalt .....	7.42	
Shovel .....	9.26	
Sign erector .....	6.00	
Sweeper/broom .....	6.26	
Stone spreader .....	6.55	
Tractor (utility) .....	6.12	
POWER TOOL OPERATOR .....	6.00	
TRAFFIC SIGNAL INSTALLER .....	6.20	
TRAFFIC CONTROLLER (Barricades, traffic lines and detours) .....	6.97	

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

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**TRUCK DRIVERS:**

Single/multi rear axle.....	5.80
Heavy duty .....	5.98

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

**GENERAL WAGE DECISION NO. GA20070012**

Superseded General Wage Decision No. GA20030012

State:            GEORGIA

Construction type: Highway

County(ies):    CHATHAM, EFFINGHAM

**Construction**

Description:    HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects, and railroad construction; bascule, suspension, and spandrel arch bridges; bridges designed for commercial navigation; bridges involving marine construction; and other major bridges).

SUGA 1990-005    05/01/1990

	RATES	FRINGES
ASPHALT RAKER .....	6.92	
CARPENTER.....	10.83	
CONCRETE FINISHER .....	8.61	
ELECTRICIAN.....	14.95	
IRONWORKER, REINFORCING .....	13.60	
LABORER .....	6.20	
PAINTER .....	12.00	
PILEDRIVER.....	10.19	
<b>POWER EQUIPMENT OPERATORS:</b>		
Asphalt distributor.....	7.88	
Asphalt Paver .....	8.23	
Backhoe operator.....	10.03	
Bulldozer operator .....	9.44	
Crane .....	13.36	
Loader.....	9.99	
Mechanic .....	10.66	
Motor grade operator (fine grade).....	10.70	
Striping machine operator .....	6.18	
Roller.....	7.98	
Screed - asphalt .....	7.69	
<b>TRUCK DRIVERS:</b>		
Single-rear axle.....	6.39	
Multi-rear axle.....	7.69	
WELDER .....	10.00	

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

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**GENERAL WAGE DECISION No. GA20070024**

Superseded General Wage Decision No. GA20030024

State: GEORGIA

Construction type: Highway

County(ies): BIBB, HOUSTON, JONES, PEACH

Construction

Description: HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects, and railroad construction; bascule, suspension, and spandrel arch bridges; bridges designed for commercial navigation; other major bridges).

SUGA 1990-006 05/01/1990

	RATES	FRINGES
ASPHALT RAKER .....	5.80	
CARPENTER .....	8.48	
CONCRETE FINISHER .....	7.68	
FLAGGER.....	5.15	
FORM SETTER (ROAD).....	6.67	
LABORER .....	5.52	
PIPELAYER .....	6.82	
<b>POWER EQUIPMENT OPERATORS:</b>		
Asphalt Distributor .....	6.77	
Asphalt Paver .....	7.22	
Backhoe .....	8.24	
Bulldozer .....	7.73	
Crane .....	10.00	
Loader.....	6.93	
Mechanic .....	9.15	
Motor Grade Operator .....	9.09	
Oiler - Greaser .....	6.68	
Striping Machine Operator .....	6.05	
Rollers .....	6.31	
Tractors (Utility).....	6.34	
TRAFFIC CONTROLLER .....	5.35	
<b>TRUCK DRIVERS</b>		
Single rear axle.....	6.12	
Multi rear axle .....	6.23	
WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.		

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

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**GENERAL WAGE DECISION NO. GA20070025**

Superseded General Wage Decision No. GA20030025

State: GEORGIA

Construction type: Highway

County(ies): CATOOSA, DADE, WALKER

Construction

Description: HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects, and railroad construction; bascule, suspension, and spandrel arch bridges; bridges designed for commercial navigation; bridges involving marine construction; other major bridges).

SUGA1990-007      05/01/1990

	RATES
	FRINGES
ASPHALT RAKER .....	7.66
CARPENTER.....	9.75
CONCRETE FINISHER .....	7.42
LABORER .....	6.21
POWER EQUIPMENT OPERATORS:	
Asphalt distributor.....	7.81
Asphalt paver.....	8.18
Backhoe.....	9.12
Bulldozer .....	8.87
Crane .....	9.00
Loader.....	7.82
Mechanic .....	11.18
Motor grade operator (fine grade).....	10.52
Roller.....	6.67
TRUCK DRIVERS:	
Single-rear axle.....	6.65
Multi-rear axle.....	7.38

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

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**GENERAL WAGE DECISION NO. GA20070027**

Superseded General Wage Decision No. GA20030027

State: GEORGIA

Construction type: Highway

County(ies): CHATTAHOOCHEE, MUSCOGEE

Construction

Description: HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects, and railroad construction; bascule, suspension, and spandrel arch bridges; bridges designed for commercial navigation; bridges involving marine construction; other major bridges).

SUGA 1990-009 05/01/1990

	RATES	FRINGES
ASPHALT RAKER .....	6.39	
CARPENTER.....	8.35	
MASON (STRUCTURES) .....	8.07	
CONCRETE FINISHER .....	7.48	
FLAGGER.....	5.15	
FORM SETTER (ROAD).....	7.56	
IRONWORKER (REINFORCING) .....	9.52	
LABORER .....	5.78	
PIPELAYER .....	5.96	
<b>POWER EQUIPMENT OPERATORS:</b>		
Asphalt distributor.....	6.78	
Asphalt paver.....	6.59	
Backhoe.....	8.37	
Bulldozer .....	8.42	
Crane .....	9.88	
Loader.....	7.52	
Mechanic .....	9.12	
Motor grader operator .....	8.65	
Oiler - greaser.....	6.68	
Striping machine operator .....	6.09	
Roller.....	6.02	
Scraper.....	8.30	
Screed - asphalt .....	5.90	
Sweeper .....	6.95	
Tractors (utility) .....	6.84	
<b>TRUCK DRIVERS:</b>		
Single/multi rear axle .....	6.08	
Heavy duty .....	6.75	

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

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**GENERAL WAGE DECISION NO. GA20070028**

Superseded General Wage Decision No. GA20030028

State: GEORGIA

Construction Type: Highway

County(ies): BARROW, CLARKE, JACKSON, MADISON, OCONEE

Construction description: HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects, and railroad construction; bascule, suspension, and spandrel arch bridges; bridges designed for commercial navigation; bridges involving marine construction; other major bridges).

SUGA 1990-010 05/01/1990

	RATES
	FRINGES
CARPENTER.....	8.95
CONCRETE FINISHER.....	8.61
FLAGGER.....	6.25
FORM SETTER (ROAD).....	7.15
IRONWORKER (REINFORCING).....	11.79
LABORER.....	6.78
MASON (STRUCTURES).....	8.44
POWER EQUIPMENT OPERATORS:	
Asphalt distributor.....	8.79
Asphalt paver.....	8.77
Backhoe.....	9.50
Bulldozer.....	8.87
Dragline.....	10.00
Mechanic.....	11.00
Motor grader operator (fine grade).....	9.73
Motor grader operator.....	9.61
Oiler/greaser.....	7.87
Scraper.....	8.50
Roller.....	7.89
Rollers - finish.....	8.31
Striping machine.....	6.44
Tractor (utility).....	8.00
TRUCK DRIVERS:	
Single-rear axle.....	6.00
Multi-rear axle.....	7.90

WELDERS: Receive rate prescribed for craft performing operation to which welding is incidental.

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

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**GENERAL WAGE DECISION NO. GA20070029**

Superseded General Wage Decision No. GA20030027

State: GEORGIA

Construction type: Highway

County(ies): COLUMBIA, MCDUFFIE, RICHMOND

Construction

Description: HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects, and railroad construction; bascule, suspension, and spandrel arch bridges; bridges designed for commercial navigation; bridges involving marine construction; other major bridges).

SUGA1990-011 05/01/1990

	RATES	FRINGES
ASPHALT RAKER .....	6.08	
CARPENTER .....	8.72	
CONCRETE FINISHER .....	7.43	
FLAGGER .....	5.15	
IRONWORKER, REINFORCING.....	10.83	
LABORER.....	5.84	
PILEDRIVER .....	14.99	
POWER EQUIPMENT OPERATORS:		
Asphalt distributor.....	7.07	
Asphalt paver.....	7.64	
Backhoe.....	8.35	
Bulldozer .....	8.40	
Crane .....	10.00	
Loader.....	7.62	
Milling machine .....	12.18	
Motor grader operator .....	8.56	
Scraper.....	8.00	
Roller.....	6.36	
Striping machine operator .....	6.26	
Tractor (utility).....	5.65	
TRUCK DRIVERS:		
Single rear Axle.....	5.67	
Multi rear Axle .....	6.58	
WELDER .....	11.23	



**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

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**GENERAL WAGE DECISION NO. GA20070030**

Superseded General Wage Decision No. GA20030030

State: GEORGIA

Construction Type: Highway

County(ies): DOUGHERTY, LEE

Construction

Description: HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects, and railroad construction; bascule, suspension, and spandrel arch bridges; bridges designed for commercial navigation; bridges involving marine construction; other major bridges).

SUGA1990-012 05/01/1990

	RATES	FRINGE
ASPHALT RAKER.....	6.09	
MASON (STRUCTURES) .....	6.97	
CONCRETE FINISHER .....	7.00	
LABORER .....	5.44	
POWER EQUIPMENT OPERATORS:		
Asphalt paver.....	6.26	
Loader.....	7.13	
Motor grader operator .....	8.39	
Roller.....	5.57	
Scraper.....	7.11	
Tractor (utility).....	6.39	
Striping machine.....	5.93	
TRUCK DRIVERS		
(Multi rear axle).....	5.25	
(Heavy duty).....	5.94	
WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.		

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR, 5.5 (a)(1)(v)).

In the listings above, the "SU" designation means that rates listed under that identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

**FEDERAL REGISTER / VOL. 45, NO. 194 / FRIDAY, OCTOBER 3, 1980 / NOTICES**

**NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO ENSURE EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE ORDER 11246) (43 FR 14895)**

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.
2. The goals and timetables for minority and female participation expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered areas, are as follows:

**GOALS FOR FEMALE PARTICIPATION**

**APPENDIX A  
(43 FR 19473)**

The following goals and timetables for female utilization shall be included in all Federal and federally assisted construction contracts and subcontracts in excess of \$10,000. The goals are applicable to the contractor's aggregate on-site construction workforce whether or not part of that workforce is performing work on a Federal or federally-assisted construction contract or subcontract. Area covered: Goals for Women apply nationwide.

**Goals and timetables**

<b>Timetable</b>	<b>Goals (percent)</b>
4-1-78 to 3-31-79	3.1
4-1-79 to 3-31-80	5.0
4-1-80 Until Further Notice	6.9

**GOALS FOR  
MINORITY PARTICIPATION**

**Appendix B-80**

Until further notice, the following goals for minority utilization in each construction craft and trade shall be included in all Federal or federally assisted construction contracts and subcontracts in excess of \$10,000 to be performed in the respective geographical areas. The goals are applicable to each nonexempt contractor's total onsite construction workforce, regardless of whether or not part of that workforce is performing work on a Federal, federally assisted or non-federally related project, contract or subcontract.

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Construction contractors which are participating in an approved Hometown Plan (see 41 CFR 60-4-5) are required to comply with the goals of the Hometown Plan with regard to construction work they perform in the areas covered by the Hometown Plan. With regard to all their other covered construction work, such contractors are required to comply with the applicable SMSA or EA goal contained in this appendix B-80.

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State	Goal (percent)
Georgia:	
035 Augusta, GA:	
SMSA Counties:	
0600 Augusta, GA-SC . . . . .	27.2
GA Columbia; GA Richmond, SC Aiken;	
Non-SMSA Counties . . . . . 32.-8	
GA Burke; GA Emanuel; GA Glascock; GA Jefferson;	
GA Jenkins; GA Lincoln; GA McDuffie, GA Talferro;	
GA Warren; GA Wilkes; SC Allendale; SC Bamberg;	
SC Barnwell; SC Edgefield; SC McCormick;	
036 Atlanta, GA:	
SMSA Counties:	
0520 Atlanta, GA . . . . .	21.2
GA Butts; GA Cherokee; GA Clayton; GA	
Cobb; GA DeKalb; GA Douglas; GA Fayette, GA	
Forsyth; GA Fulton; GA Gwinnett; GA Henry; GA	
Newton; GA Paulding; GA Rockdale; GA Walton	
Non-SMSA Counties . . . . . 19.5	
GA Banks; GA Barrow; GA Carroll; GA Clarke;	
GA Coweta; GA Dawson; GA Elbert; GA Fannin;	
GA Floyd; GA Franklin; GA Gilmer; GA Gordon;	
GA Greene; GA Habersham; GA Hall; GA	
Haralson; GA Hart; GA Heard; GA Jackson; GA	
Jasper; GA Lamar; GA Lampkin; GA Madison;	
GA Morgan; GA Oconee, GA Oglethorpe; GA	
Pickins, GA Pike; GA Polk; GA Rabun; GA	
Spalding; GA Stephens; GA Towns; GA Upson; GA	
White	
037 Columbus, GA:	
SMSA Counties:	
1800 Columbus, GA – AL . . . . .	29.6
Al Russell; GA Chattahoochee; GA Columbus	

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Non-SMSA Counties .....	36.1
Al Chambers; AJ Lee; GA Harris; GA Marion; GA Meriwether; GA Quitman; GA Schley; GA Stewart; GA Sumter; GA Talbot; GA Troup; GA Webster	
038 Macon, GA:	
SMSA Counties:	
4680 Macon, GA .....	27.5
GA Bibb; GA Houston; GA Jones; GA Twiggs	
Non-SMSA Counties .....	31.7
GA Baldwin; GA Bleckley; Crawford; GA Crisp; GA Dodge; GA Dooly; GA Hancock; GA Johnson; GA Laurens; GA Macon; GA Monroe; GA Peach; GA Pulaski; GA Putman; GA Taylor; GA Telfair; GA Treutlan; GA Washington; GA Wheeler; GA Wilcox; GA Wilkinson	
039 Savannah, GA:	
SMSA Counties:	
7520 Savannah, GA .....	30.6
GA Bryan; GA Chatham; GA Effingham	
Non-SMSA Counties .....	29.8
GA Appling; GA Atkinson; GA Bacon, GA Bulloch; GA Candler; GA Coffee; GA Evans; GA Jeff Davis; GA Liberty; GA Long; GA McIntosh; GA Montgomery; GA Screven; GA Tattnall; GA Toombs; GA Wayne; SC Beaufort; SC Hampton; SC Jasper	
040 Albany, GA:	
SMSA Counties:	
0120 Albany, GA .....	32.1
GA Dougherty; GA Lee	
Non-SMSA Counties .....	31.1
GA Baker; GA Ben Hill; GA Berrien; GA Brooks; GA Calhoun; GA Clay; GA Clinch; GA Colquitt; GA Cook; GA Decatur; GA Early; GA Echols; GA Grady; GA Irwin; GA Lanier; GA Lowndes; GA Miller; GA Mitchell; GA Randolph; GA Seminole; GA Terrell; GA Thomas; GA Tift; GA Turner; GA Worth	

**DEPARTMENT OF TRANSPORTATION  
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**STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION  
CONTRACT SPECIFICATIONS (EXECUTIVE ORDER 11246) (43 FR 14895)**

1. As used in these specifications:
  - a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;
  - b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegated authority;
  - c. "Employer Identification Number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.
  - d. "Minority" includes:
    - (i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
    - (ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);
    - (iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
    - (iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).
2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.
3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.
4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. The Contractor is expected to make substantially uniform progress toward its goals in each craft during the period specified.

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5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, nor the regulations promulgated pursuant thereto.
6. In order for the non-working training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.
7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:
  - a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.
  - b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organization's responses.
  - c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefore, along with whatever additional actions the Contractor may have taken.
  - d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
  - e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minority and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.
  - f. Disseminate the Contractor's EEO policy by providing the notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year, and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

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- g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with onsite supervisory personnel such as Superintendents, General Foremen, etc. prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.
  - h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.
  - i. Direct its recruitment efforts, both oral and written, to minority, female and community organization, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the-openings, screening procedures, and test to be used in the selection process.
  - j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's workforce.
  - k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.
  - l. Conduct, at least annually, an inventory and evaluation of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc. such opportunities.
  - m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensue that the EEO policy and the Contractor's obligations under these specifications are being carried out.
  - n. Ensure that all facilities and company activities are non-segregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.
  - o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.
  - p. Conduct a review, at least annually of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.
8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these Specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete

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benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).
10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.
11. The Contractor shall not enter into any subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.
12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Programs. Any contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.
13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.
14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.
15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).



**DEPARTMENT OF TRANSPORTATION**  
**STATE OF GEORGIA**  
**DISADVANTAGED BUSINESS ENTERPRISE PROGRAM**  
**CRITERIA FOR ACCEPTABILITY**

The purpose of this special provision is to establish criteria for acceptability of DBE firms for work performed on this contract. The intent is to ensure that all participation counted toward fulfillment of the DBE goals is (1) real and substantial, (2) actually performed by viable, independent DBE owned firms, and (3) in accordance with the spirit of the applicable laws and regulations.

It is the policy of the Georgia Department of Transportation to ensure compliance with Title VI of the Civil Rights Act of 1964, 49 Code of Federal Register, Part 26 and related statutes and regulations in all program activities.

To this end the Georgia Department of Transportation shall not discriminate on the basis of race, color, sex or national origin in the award, administration and performance of any Georgia Department of Transportation assisted contract or in the administration of its Disadvantaged Business Enterprise Program. The Georgia Department of Transportation shall take all necessary and reasonable steps to ensure nondiscrimination.

DBE payments and commitments for Federal-aid projects shall be separate and distinct and cannot be transferred or combined in any matter.

**DBE PROCEDURES:** The Contractor shall develop techniques to facilitate DBE participation in Subcontracting activities. These techniques include:

- (A) Arranging solicitations, time for the presentation of quotes, quantities, specifications, and delivery schedules so as to facilitate the participation of DBEs.

- (B) Providing assistance to DBEs in overcoming barriers such as the inability to obtain bonding, financing, or technical assistance.

**DBE DIRECTORY:** The Department has available a directory or source list to facilitate identifying DBEs with capabilities relevant to general contracting requirements and to particular solicitations. The Department will make the directory available to bidders and proposers in their efforts to meet the DBE requirements. It includes firms which the Department has certified to be eligible DBEs in accordance with 49 CFR Part 26.

**GOAL FOR PARTICIPATION:** If a percentage goal for DBE participation in this contract is set forth elsewhere in this proposal, the Contractor shall complete the DBE GOALS Form included in the proposal. The Contractor is encouraged to make every effort to achieve the goal set by the Department. However, if the Contractor cannot find sufficient DBE participants to meet the goal established by the Department, the Department will consider for award a proposal with less participation than the established goal if:

- (A) The bidder can demonstrate that no greater participation could be obtained. This should be well documented by demonstrating the Contractor's actions through good faith efforts.

The following is a list of types of actions which the Department will consider as part of the Contractor's good faith efforts to obtain DBE participation. It is not intended to be a mandatory checklist, nor is it intended to be exclusive or exhaustive. Other factors or types of efforts may be relevant in appropriate cases.

- (1) Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising and/or written notices) the interest of all certified DBEs who have the capability to perform the work of the contract. The Contractor must solicit this interest within sufficient time to allow the DBEs to respond to the solicitation. The Contractor must determine with certainty

if the DBEs are interested by taking appropriate steps to follow up initial solicitations.

- (2) Selecting portions of the work to be performed by DBEs in order to increase the likelihood that the DBE goals will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation, even when the Contractor might otherwise prefer to perform these work items with its own forces.
- (3) Providing interested DBEs with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist in responding to a solicitation.
- (4)
  - (a) Negotiating in good faith with interested DBEs. It is the Contractor's responsibility to make a portion of the work available to DBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DBE subcontractors and suppliers, so as to facilitate DBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of DBEs that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for DBEs to perform the work.
  - (b) A Contractor using good business judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using DBEs is not in itself sufficient reason for a bidder's failure to meet the contract DBE goal, as long as such costs are reasonable. Also, the ability or desire of a Contractor to perform the work of a contract with its own organization does not relieve the Contractor of the

responsibility to make good faith efforts. Contractors are not, however, required to accept higher quotes from DBEs if the price difference is excessive or unreasonable.

- (5) Not rejecting DBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The Contractor's standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations (for example union vs. nonunion employee status) are not legitimate causes for the rejection or nonsolicitation of bids in the Contractor's efforts to meet the project goal.
- (6) Making efforts to assist interested DBEs in obtaining bonding, lines of credit, or insurance as required by the contractor.
- (7) Making efforts to assist interested DBEs in obtaining necessary equipment, supplies, materials, or related assistance or services.
- (8) Effectively using the services of available minority/women community organizations; minority/women Contractors' groups; local, state, and Federal minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of DBE's.

- (B) The participation proposed by the low bidder is not substantially less than the participation proposed by the other bidders on the same contract.

If no percentage goal is set forth in the proposal, the contractor may enter a proposed DBE participation. This voluntary DBE participation will count as race neutral DBE participation.

To be eligible for award of this contract,

All bidders will be required to submit the following information to the Department by the close of business on the 3<sup>rd</sup> working day following opening of the bid as a matter of bidder responsibility.

- (1) The names and addresses of DBE firms that will participate in the Contract;

- (2) A description of the work that each DBE will perform;
- (3) The dollar amount of the participation of each DBE firm participating;
- (4) Written documentation of the bidder's commitment to use a DBE subcontractor whose participation it submits to meet a contract goal;
- (5) Written confirmation from the DBE that is participating in the contract, as provided in the prime contractor's commitment.
- (6) If the contract goal is not met, evidence of good faith efforts must be provided.

Failure by a bidder to furnish the above information may subject the bid to disqualification. Also failure by the bidder to submit satisfactory evidence of good faith efforts may subject the bid to disqualification.

Award of a contract by the Department to a Prime Contractor who has listed DBE participants with the bid may not constitute final approval by the Department of the listed DBE. The Department reserves the right to approve or disapprove a Disadvantaged firm after a review of the Disadvantaged firm's proposal participation. Payment to the Contractor under the contract may be withheld until final approval of the listed DBEs is granted by the Department.

If the Contractor desires to substitute a DBE in lieu of those listed in the proposal, a letter of concurrence shall be required from the listed DBE prior to approval of the substitution, unless this requirement is waived by the Department.

Agreements between bidder and a DBE in which promises not to provide Subcontracting quotations to other bidders are prohibited.

**DEFINITION:** For the purposes of this provision, the following definitions will apply:

Disadvantaged Business Enterprise or DBE means a for-profit small business concern –

- (1) That is at least 51 percent owned by one or more individuals who are both socially and economically disadvantaged or, in the case of a corporation, in which 51 percent of the stock is owned by one or more such individuals; and
- (2) Whose management and daily business operations are controlled by one or more of the socially and economically disadvantaged individuals who own it.

Good Faith Efforts means efforts to achieve a DBE goal or other requirement of this part which, by their scope, intensity, and appropriateness to the objective, can reasonably be expected to fulfill the program requirement.

Joint Venture means an association of a DBE firm and one or more other firms to carry out a single, for-profit business enterprise, for which the parties combine their property, capital, efforts, skills and knowledge, and in which the DBE is responsible for a distinct, clearly defined portion of the work of the contract and whose share in the capital contribution, control, management, risks, and profits of the joint venture are commensurate with its ownership interest.

Socially and Economically Disadvantaged Individual means any individual who is a citizen (or lawfully admitted permanent resident) of the United States and who is –

- (1) Any individual who the Department finds to be a socially and economically disadvantaged individual on a case-by-case basis.
- (2) Any individual in the following groups, members of which are rebuttably presumed to be socially and economically disadvantaged.
  - (i) “Black Americans,” which includes persons having origins, in any of the Black racial groups of Africa;
  - (ii) “Hispanic Americans,” which includes persons of Mexican, Puerto Rican, Cuban, Dominican, Central or South American, or other Spanish or Portuguese culture or origin, regardless of race;
  - (iii) “Native Americans,” which includes persons who are American Indians, Eskimos, Aleuts, or Native Hawaiians;
  - (iv) “Asian-Pacific Americans,” which includes persons whose origins are from Japan, China, Taiwan, Korea, Burma (Myanmar), Vietnam, Laos, Cambodia (Kampuchea), Thailand, Malaysia, Indonesia, the Philippines, Brunei, Samoa, Guam, the U.S. Trust Territories of the Pacific Islands (Republic of Palau), the Commonwealth of the Northern Marianas Islands, Macao, Fiji, Tonga, Kiribati, Juvalu, Nauru, Federated States of Micronesia, or Hong Kong;
  - (v) “Subcontinent Asian Americans,” which includes persons whose

origins are from India, Pakistan, Bangladesh, Bhutan, the Maldives Islands, Nepal or Sri Lanka;

(vi) Women

(vii) Any additional groups whose members are designated as socially and economically disadvantaged by the SBA, at such time as the SBA designation becomes effective.

(3) GDOT will presume that such persons are socially and economically disadvantaged only to the extent permitted by applicable federal law.

Race-conscious measure is one that is -focused specifically on assisting only DBEs, including women-owned DBEs.

Race-neutral measure is one that is, or can be, used to assist all small businesses. For the purposes of this part, race-neutral includes gender-neutrality.

**DISCRIMINATION PROHIBITED:** No person shall be excluded from participation in, denied the benefits of, or otherwise discriminated against in connection with the award and performance of this contract on the grounds of race, color, sex or national origin.

The following assurance becomes a part of this contract and must be included in and made a part of each subcontract the prim contractor enters into with their subcontractors.

“The contractor, and/or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT – assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract which may result in the termination of this contract or such other remedy as the Department deems appropriate.

**Failure to Achieve Requirements:** Periodic reviews shall be made by the Department to determine the extent of compliance with the requirements set forth in this provision. The Contractor is found to be in noncompliance, it shall constitute a breach of contract

and further payments for any work performed may be withheld until corrective action is taken. If corrective action is not taken, it may result in termination of this contract.

Participation will be counted toward fulfillment of the DBE goal as follows:

- (A) When a DBE participates in a contract, you count only the value of the work actually performed by the DBE toward DBE goals.
  - (1) Count the entire amount of that portion of a construction contract (or other contract not covered by paragraph (A) (2) of this section) that is performed by the DBE's own forces. Include the cost of supplies and materials obtained by the DBE for the work of the contract, including supplies purchased or equipment leased by the DBE (except supplies and equipment the DBE subcontractor purchases or leases from the prime contractor or its affiliate).
  - (2) Count the entire amount of fees or commissions charged by a DBE firm for providing a bona fide service, such as professional, technical consultant, or managerial services, or for providing bonds or insurance specifically required for the performance of a DOT-assisted contract, toward DBE goals, provided it is determined that the fee is reasonable and not excessive as compared with fees customarily allowed for similar services.
  - (3) When a DBE subcontracts part of the work of its contract to another firm, the value of the subcontracted work may be counted toward DBE goals only if the DBE's subcontractor is itself a DBE. Work that a DBE subcontracts to a non-DBE firm does not count toward DBE goals.
- (B) When a DBE performs as a participant in a joint venture, count a portion of the total dollar value of the contract equal to the distinct, clearly defined portion of the work of the contract that the DBE performs with



its own forces toward DBE goals.

- (C) Count expenditures to a DBE contractor toward DBE goals only if the DBE is performing a commercially useful function on that contract.
  - (1) A DBE performs a commercially useful function when it is responsible for execution of the work of the contract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. To perform a commercially useful function, the DBE must also be responsible, with respect to materials and supplies used on the contract, for negotiating price, determining quality and quantity, ordering the material, and installing (where applicable) and paying for the material itself.
  - (2) A DBE does not perform a commercially useful function if its role is limited to that of an extra participant in a transaction, contract, or project through which funds are passed in order to obtain the appearance of DBE participation.
  - (3) If a DBE does not perform or exercise responsibility for at least 30 percent of the total cost of its contract with its own work force, or the DBE subcontracts a greater portion of the work of a contract than would be expected on the basis of normal industry practice for the type of work involved, the Department will presume that it is not performing a commercially useful function.
  - (4) When a DBE is presumed not to be performing a commercially useful function as provided in paragraph © (3) of this section, the DBE may present evidence to rebut this presumption.
  - (5) The Departments decisions on commercially useful function matters are subject to review by the US DOT, but are administratively appealable to the US DOT.
  
- (D) The following factors are to be used in determining whether a DBE trucking company is performing a commercially useful function:
  - (1) The DBE must be responsible for the management and

Supervision of the entire trucking operation for which it is responsible on a particular contract, and there cannot be a contrived arrangement for the purpose of meting DBE goals.

- (2) The DBE must itself own and operate at least one fully licensed, insured, and operational truck used on the contract.
- (3) The DBE receives credit for the total value of the transportation services it provides on the contract using trucks it owns, insures, and operates using drivers it employs.
- (4) The DBE may lease trucks from another BE firm, including an owner-operator who is certified as a DBE. The DBE who leases trucks from another DBE received credit for the total value of the transportation services the lessee DBE provided on the contract.
- (5) The DBE may also lease trucks from a non-DBE and is entitled to credit only for the fee or commission it receives as a result of the lease arrangement. The DBE does not receive credit for the total value of the transportation services provided by the lessee, since these services are not provided by a DBE.
- (6) For purposes of this paragraph (D), a lease must indicate that the DBE has exclusive use of and control over the truck. This does not preclude the leased truck from working for others during the term of the lease with the consent of the DBE, so long as the lease gives the DBE absolute priority for use of the leased truck. Leased trucks must display the name and identification number of the DBE.

(E) Count expenditures with DBEs for materials or supplies toward DBE goals as provided in the following:

- (1) If the materials or supplies are obtained from a DBE manufacturer, count 100 percent of the cost of the materials or supplies toward DBE goals.

For purposes of this paragraph, a manufacturer is a firm that operates or maintains a factory or establishment that produces, on the premises, the materials, supplies, articles, or equipment required under the contract and of the general character

described by the specifications.

- (2) If the materials or supplies are obtained from a DBE regular dealer, count 60 percent of the cost of the materials or supplies toward DBE goals.

For purposes of this section, a regular dealer is a firm that owns, operates, or maintains a store, warehouse, or other establishment in which the materials, supplies, articles or equipment of the general character described by the specifications and required under the contract are bought, kept in stock, and regularly sold or leased to the public in the usual course of business.

- (a) To be a regular dealer, the firm must be established, regular business that engages, as its principal business and under its own name, in the purchase and sale or lease of the products in question.
- (b) A person may be a regular dealer in such bulk items as petroleum products, steel, cement, gravel, stone, or asphalt without owning, operating, or maintaining a place of business as provided in this paragraph (E) (2) (b) if the person both owns and operates distribution equipment for the products. Any supplementing of regular dealers' own distribution equipment shall be by a long-term lease agreement and not on an ad hoc or contract-by-contract basis.
- (c) Packagers, brokers, manufacturers' representatives, or other persons who arrange or expedite transactions are not regular dealers within the meaning of this paragraph (E) (2).

- (3) With respect to materials or supplies purchased from a BE which is neither a manufacturer nor a regular dealer, count the entire amount of fees or commissions charged for assistance in the procurement of the materials and supplies, or fees or transportation charges for the delivery of materials or supplies required on a job sit, toward DBE goals, provided you determine the fees to be reasonable and not

excessive as compared with fees customarily allowed for similar services. Do not count any portion of the cost of the materials and supplies themselves toward DBE goals, however.

- (4) Do not count the participation of a DBE subcontractor toward the prime contractor's DBE achievements until the amount being counted toward the goal has been paid to the DBE.
- (5) No participation will be counted that is not in compliance with Special Provision entitled "Criteria for Acceptability" which is a part of this contract or with any provisions included in 49 CFR Part 26.
- (6) If the contract amount overruns, the contractor will not be required to increase the dollar amount of DBE participation. If the contract amount underruns, the contractor will not be allowed to underrun the dollar amount of DBE participation except when the DBE subcontracted items themselves underrun.

## **REPORTS**

A: The contractor shall submit a "DBE Participation Report" on this contract quarterly which shall include the following:

1. The name of each DBE participating in the contract.
2. A Description of the work to be performed, materials, supplies, and services provided by each DBE.
3. Whether each DBE is a supplier, subcontractor, owner/operator, or other.
4. The dollar value of each DBE subcontract or supply agreement.
5. The actual payment to date of each DBE participating in the contract.
6. The report shall be updated by the Prime Contractor whenever the approved DBE has performed a portion of the work that has been designated for the contract. Copies of this report should be transmitted promptly to the Engineer. Failure to submit the report with 30 calendar days following the end of the quarter may cause payment to the contractor to be withheld.
7. In addition to the aforementioned report, the Prime Contractor shall notify the Project Engineer at least 24 hours prior to the time the DBE commences working on the project. The DBE must furnish

supervision of the DBE portion of the work, and the person responsible for this supervision must report to the Project Engineer when they begin work on the project. They must also inform the project engineer when their forces will be doing work on the project.

B: In order to comply with 49CFR 26.11 the Department may periodically request that certain information be supplied by the Contractor. Failure to respond within the time allowed in the request will be grounds for withholding all payments on all Contracts.

**SUBSTITUTION OF DBEs:** The Contractor shall make a reasonable effort to replace a DBE Subcontractor that is unable to perform for any reason with another DBE. The Department shall approve all substitutions of Subcontractors in order to ensure that the substitute firms are eligible DBEs.

**CERTIFICATION OF DBEs:** To ensure that the DBE Program benefits only firms owned and controlled by Disadvantaged Individuals, the Department shall certify the eligibility of DBEs and joint ventures involving DBEs that are named by bidders.

Questions concerning DBE Certification should be directed to the EEO Office at (404) 656-5323.

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

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First Use 2001 Specifications: November 01, 2002  
Revised: November 19, 2006

**SPECIAL PROVISION**

**PROMPT PAYMENT:**

Prime Contractors, who sublet a portion of their work, shall pay their subcontractors for satisfactory performance of their contracts no later than 10 calendar days from receipt of each payment made to them.

Any delay or postponement of payment among the parties may take place only for good cause with prior written approval from the Department.

If the contractor is found to be in noncompliance with these provisions, it shall constitute a breach of contract and further payments for any work performed may be withheld until corrective action is taken. If corrective action is not taken, it may result in termination of the contract.

All subcontract agreements shall contain this requirement.

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

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**REQUIRED CONTRACT PROVISIONS FOR FEDERAL-AID CONTRACTS**

**BUY AMERICA**

Revised: March 25, 1992

Revised: January 7, 1994

Revised: June 9, 1995

First Use 2001 Specifications: November 1, 2002

All manufacturing processes for steel and iron materials and steel and iron coatings permanently incorporated into this project must occur in the United States of America. However, pig iron and processed, pelletized, or reduced iron ore used in the production of these products may be manufactured outside the United States.

This requirement, however, does not prevent a minimal use of foreign materials and coatings, provided the cost of materials and coatings used does not exceed one-tenth of one percent (0.1 percent) of the total contract cost or \$2,500.00, whichever is greater.

NOTE: Coatings include: epoxy coating, galvanizing, painting and any other coating that protects or enhances the value of the material.

**CONVICT PRODUCED MATERIALS**

March 25, 1992

Revised: September 6, 1993

First Use 2001 Specifications: November 1, 2002

Materials produced by convict labor after July 1, 1991, may not be used for Federal-Aid highway construction projects unless it meets the following criteria:

1. The materials must be produced by convicts who are on parole, supervised release or probation from a prison; or,
2. If produced in a qualified prison facility, the amount of such materials produced in any 12-month period shall not exceed the amount produced in such facility for such construction during the 12-month period ending July 1, 1987. A qualified prison is defined as one producing convict made materials prior to July 1, 1987.

Date: November 22, 2002  
 First Use Date: December 1, 2002  
 Revised: January 28, 2003  
 Revised: December 8, 2003  
 Revised: December 7, 2004  
 Revised: April 8, 2005  
 Revised: July 27, 2005  
 Revised: September 13, 2005  
 Revised: May 2, 2006

**DEPARTMENT OF TRANSPORTATION  
 STATE OF GEORGIA**

**SPECIAL PROVISION**

**2001 Standard Specifications Editorial and Errata Corrections**

<b>Page</b>	<b>Section</b>	<b>Correction</b>
37	<a href="#">107.14.C.7</a>	In Figure 1, Tandem Axle Trucks, change the maximum acceptable gross weight from "24,947 kg to 27,679 kg."
313	<a href="#">432.1.02.B</a>	Change GDT 93 to GDT 126.
599	<a href="#">551.5</a>	
938	<a href="#">800.2.01.C</a>	
971	<a href="#">815.2.02.A.1.d</a>	In the table under "Carbonate content (magnesium or calcium)" – Delete "At least 90%" and add "At least 80%."
972	<a href="#">815.2.03.A.3</a>	In the first sentence under Gradation – Delete ", except that the aggregate will be recycled concrete." And add ", except that the minimum required to pass the No. 200 (75 micron) sieve shall be 2%."
990	<a href="#">828.1.02.B</a> <a href="#">828.2.A</a>	Change the word "pipe" to "pile".
1119	<a href="#">883.1.01.B</a>	In the table under the test for "Reactivity" – Delete "ASTM C 227, C 289 and C 586" and add "AASHTO T 303"
1162	<a href="#">919.2.A.2</a>	In the Table, change the description of Type 1 rpm from "One-way, one-color, 4x2 in (100mm x 400mm), reflective" to "Two-way, one-color, 4x2 in (100mm x 400mm), reflective"
1162	<a href="#">919.2.A.2</a>	In the Table, change the description of Type 2 rpm from "Two-way, one-color, 4x2 in (100mm x 400mm), reflective" to "One-way, one-color, 4x2 in (100mm x 400mm), reflective"
950	<a href="#">805.2.02.A.1</a>	Change "Type 1" to "Type A".
950	<a href="#">805.2.02.A.2</a>	Change "Type 2" to "Type B".
951	<a href="#">805.2.02.A.2.h</a>	Change "Type 2" to "Type B".
707	<a href="#">627.5.G</a>	In the payment for Item No. 627 Traffic barrier, V, wall No., change the measurement from "Per cubic yard (meter)" to Per linear foot (meter)".
1116	<a href="#">881.2.07.A.2</a>	In the Table, change the minimum fabric width (metric value) for Type A from 900 mm to 914 mm.
1116	<a href="#">881.2.07.A.2</a>	In the Table, change the minimum fabric width (metric value) for Type B from 550 mm to 559 mm.
1116	<a href="#">881.2.07.A.2</a>	In the Table, change the minimum fabric width (metric value) for Type C from 900 mm to 914 mm.



**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SPECIAL PROVISION**

**Utility Conflicts**

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Utility companies having known facilities that conflict with the construction of this project will be directed by the Department to adjust or relocate their facilities and will be notified of the contract award.

Conform to all the requirements of the Specifications as they relate to cooperation with utility owners and the protection of utility installations that exist on the project. Refer to the requirements of Section 107, Legal Regulations and Responsibility to the Public, with particular attention to Subsection 107.21.

Coordinate The Work with any work to be performed by others in any right of way clearance and arrange a schedule of operations that will allow for completion of the Project within the specified contract time. Where stage construction is required, notify the utility owner when each stage of work is completed and the site is available for utility work to proceed.

Information concerning utility facilities known to exist within the project limits, including the list of owners, is shown on the plans.

Under Georgia Code Section 32-6-171, utilities are required to remove or relocate their facilities. The Department is required to give the utility at least 60 days written notice directing the removal and relocation, and the utility is required to begin removal within a reasonable time thereafter.

Utility Owners that are under agreement with the Department, as listed on the Office of Utilities website at <http://www.dot.state.ga.us/dot/operations/utilities/index.shtml>, are liable to the Contractor for his cost for delays to construction that are due to the utilities' failure to clear conflicts within the time submitted by the Utility Owner in the Utility Adjustment Schedule as approved by the Department. Any modifications to the approved Utility Adjustment Schedule shall require review and approval by the Department, the Utility Owner, and the Contractor. Utility facilities originally permitted within State Rights of Way are similarly liable to the Department and Contractor for extraordinary costs or damages. The Contractor may bill the utility company directly for any costs or delays as described in the agreement between the Department and the utility company. Such bill shall be sufficiently detailed to allow the utility company to verify that the charges are accurate and properly attributable to delays in relocation of their facilities. Upon request, copies of all agreements with utility companies having facilities on this project will be made available for examination by the Contractor at the

Department's District Office. Utility Adjustment Schedules, when submitted to the Department by the utilities, will be made available to the Contractor upon request at the Department's District Office unless furnished by Contracts Administration at the Plans Sales window or may be included with the Utility Special Provision in the Contract Proposal on select projects.

In accordance with Subsection 105.06 of the Specifications, the Department is not liable for payment of any claims due to utility delays, inconvenience or damage sustained by the Contractor due to interference of any utilities or appurtenances, or the operation of moving them. In accordance with Subsection 107.21.G delays by utilities will continue to be considered by the Department in charging Contract Time. For purposes of applying provisions of this paragraph, railroads and the Metropolitan Atlanta Rapid Transit Authority (MARTA) are considered utilities.

## **Georgia Department of Transportation**

### **State of Georgia**

### **Special Provision**

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

## **Section 102—Bidding Requirements and Conditions**

*Delete Subsection 102.01 and Substitute the following:*

### **102.01 Prequalification of Bidders**

Before submitting a bid in excess of \$2,000,000, the Bidder shall have been prequalified with the Department and received a Certificate of Qualification in accordance with the Rules and Regulations approved and adopted by the State Transportation Board. Bidders submitting bids of \$2,000,000 or less may be exempt from prequalification requirements. In addition, the aggregate total amount a Non-prequalified Bidder may have under contract shall not exceed \$4,000,000.

Bidders intending to consistently submit Proposals shall prequalify at least once a year. However, qualifications may be changed during that period upon the submission of additional favorable reports or upon unsatisfactory performance. In addition, the Department reserves the right at any time to require the Contractor to furnish a current financial and experience statement.

*Delete Subsection 102.03 and Substitute the following:*

### **102.03 Contents of Proposal Forms**

Upon request, the Department will furnish the prospective Bidder with a Proposal Form. This form will state the location and description of the contemplated construction and will show the approximate estimate of the various quantities and kinds of work to be performed or materials to be furnished, and will have a schedule of Items for which Unit Bid prices are invited. The Proposal Form will state the time in which The Work must be completed, the amount of the Proposal Guaranty, and the date of the opening of Proposals. The Form will also include any Special Provisions or requirements that vary from or are not contained in the *Standard Specifications*. Also included with each Proposal Form will be a Non-Collusion Certificate. All papers bound with or attached to the Proposal Form are considered a part thereof and must not be detached or altered when the Proposal is submitted. The Plans, Specifications, and other documents designated in the Proposal Form will be considered a part of the Proposal whether attached or not. The prospective Bidder will be required to pay the Department the sum stated in the Notice to Contractors for each copy of the Proposal Form and each set of Plans.

*Delete Subsection 102.06 and Substitute the following:*

## **102.06 Preparation of Proposal**

The Bidder shall submit its Proposal on the form furnished by the Department (GADOT). The blank spaces on the Proposal shall be filled in correctly for each Pay Item (except alternate items) and the Bidder shall write in ink the Unit Price or a Lump Sum Price as called for in the Proposal for each Pay Item listed therein. In addition, the Bidder shall also show the products of the respective Unit Prices and quantities and the total amount of the Bid by adding the amounts of all Bid Items. In the event of a discrepancy in any of the figures, the Unit Price will govern and the Bid will be recalculated.

In addition, the Bidder shall submit a technical proposal which shall include, but is not limited to, the design build firm's detailed project schedule (including those submittals and estimated review periods shown in Table 999-1 of the attached Special Provision 999, and in others areas of Special Provision 999 where due dates are mentioned), total contract time, mobilization assumptions, construction staging assumptions, as well as, a detailed estimate with all material quantities and price assumptions used to form the basis of the bid. The technical proposal shall also include a cost basis for all items described in Section 999.1.03, subsection I, titled 'Highways for Life' in Special Provision 999. **The Bidder shall clearly document all assumptions in this technical proposal.** There are no page limit restrictions for the technical proposal.

In the case of Alternate items, Unit Prices shall be entered for only one alternate.

The Non-Collusion Certificate on the Department's standard form included in the Proposal shall be executed.

The Certificate of Current Capacity shall be executed under oath and substantiated by the report of Status of Contracts on Hand.

The Bidder shall purchase from the GADOT Office of Contract Administration, a Proposal Form for each Letting Call Order Number in which the Bidder intends to submit a bid.

If the Proposal is made by an individual, its name and post office address shall be shown; if by a partnership, the name and post office address of one member of the partnership shall be shown; if by a corporation, the Proposal shall show the name, title and business address of the officer signing the Proposal. The Bidder's Proposal shall be signed in ink or by Digital Signature by the individual, by one or more members of a partnership, or by one or more of the officers of a corporation, whichever is applicable. In the event of a joint venture, the Proposal shall be signed in ink or by Digital Signature by each individual involved, by each partnership through one or more of its members, or by each corporation through one or more officers of the corporation, whichever is applicable. Proposals not properly signed may be disqualified and rejected.

All bids in excess of \$500,000 shall be submitted using the GADOT/AASHTO (American Association of State Highway and Transportation Officials) Electronic Bidding System (Expedite). When submitting a bid electronically, the Bidder's Proposal shall consist of the Bid pages generated by the Expedite software including the Cover page, Bid Item pages, Disadvantaged Business Enterprise (DBE) pages (if applicable), Miscellaneous Data pages and the Signature page. By submitting a bid electronically, the Bidder acknowledges that all requirements included in the hard copy proposal, amendments, plans, Standard Specifications, and Supplemental Specifications are a part of the Bid and Contract.

The electronic bid shall be submitted by one of the following methods:

**A. Hand delivery of the electronic bid to the Department at the place specified in the Notice To Contractors.**

The bid shall include the 3 ½ inch (90 mm) electronic diskette and the Bid pages described in paragraph eight, above.

**B. Electronic Bid Submission via the Internet and Bid Express™.**

(Note: The Bidder shall secure an account and a valid Digital Signature from Bid Express™ ([www.bidx.com](http://www.bidx.com)) in order to use this method.

Instructions for preparing and submitting bids by these two methods are as follows:

**A. Hand Delivery of Bid to the Department**

1. Access to the electronic bidding information is available on Bid Express™ at [www.bidx.com](http://www.bidx.com) and the GADOT Contract Administration Internet Web Site at [www.dot.state.ga.us/dot/construction/contractsadm/index.shtml](http://www.dot.state.ga.us/dot/construction/contractsadm/index.shtml).
2. Electronic bids shall be prepared through the use of a computer controlled printer.

3. The Bidder shall sign the electronic bid in the appropriate areas.
4. When installing the Bid program the Bidder shall enter the vendor code in the following format: 2DO900. Before running the electronic bidding programs, the Bidder shall read the on-line help documentation for the Expedite software.
5. **Zero (0) is considered to be a valid bid. The Bidder shall not enter 0 in any Unit Price field unless zero is the intended bid for that item.**
6. All addenda shall be included in the electronic bid submitted.
7. For “Joint Bids” the Bidder shall select **tools** from the Windows Expedite menu and mark the electronic bid as **“Joint Bid”**.
8. The Bidder shall select **tools** and then **check bid** to check the bid and assure there are no errors prior to printing the electronic bid. After final printing, the Bidder may make changes to the electronic bid by indicating the changes in ink and initialing prior to submitting the bid.
9. Once the Bidder has completed the bid and made all desired changes, the diskette, a printout of the Cover sheet, Bid Item pages, DBE pages (if applicable), Miscellaneous Data pages, and Signature page shall be submitted to the Department. In case of a discrepancy between the diskette and the hard copy of the Bid Item pages, the hard copy will govern.
10. Electronic Bid pages shall be 8 ½ inch (216 mm) horizontal by 11 inches (279 mm) vertical. Bid information shall be placed across the horizontal width on each page.
11. The paper used for an electronic bid shall be of sufficient quality and durability to maintain clear and concise images and to withstand frequent handling.
12. If originally printed on continuous roll paper, electronic bids shall be separated before submitting the Bid to the Department.
13. All computer printed characters shall be legible. The Electronic Bid pages shall be submitted in the bid envelope provided.
14. The diskette shall be submitted in a separate sealed envelope from the Bid pages. The Bidder shall submit all electronic bids on one diskette. The envelope containing the diskette shall include the Bidders name and the Letting Call Order Numbers for which electronic bids are submitted.

**B. Electronic Bid Submission Via The Internet And Bid Express™**

1. Access to the electronic bidding information is available on Bid Express™ at [www.bidx.com](http://www.bidx.com) and the GADOT Contract Administration Internet Web Site at [www.dot.state.ga.us/dot/construction/contractsadm/index.shtml](http://www.dot.state.ga.us/dot/construction/contractsadm/index.shtml).
2. When installing the Bid program the Bidder shall enter the vendor code in the following format: 2DO900. Before running the electronic bidding programs, the Bidder shall read the on-line help documentation for the Expedite software.
3. **Zero (0) is considered to be a valid bid. The Bidder shall not enter 0 in any Unit Price field unless zero is the intended bid for that item.**
4. All addenda shall be included in the electronic bid submitted.
5. **“Joint Bids” are allowed with Electronic Bid Submission via the Internet and Bid Express™**
6. The Bidder shall select **tools** and then **check bid** from the Windows Expedite menu to check the bid and assure there are no errors prior to submitting the electronic bid. The electronic bid may be changed and resubmitted electronically to Bid Express™ as many times as desired prior to the advertised cutoff time specified in the Notice To Contractors. The last bid submitted for a given Letting Call Order Number prior to the cutoff time will be the Bid.
7. The Bidder shall make no claim against the Department in the event it is unable to submit its bid to Bid Express™ and/or Bid Express™ is unable to submit the bid(s) to the Department. The Department reserves the right to postpone the public reading of bids in the event of technical difficulties.
8. A fully executed Proposal Guaranty and Power of Attorney for each Letting Call Order Number bid shall be submitted by one of the following methods:
  - A. Delivery to the GADOT Office of Contract Administration, Room 223, in a sealed envelope by 12:00 noon on the day prior to the Bid Opening. Each Proposal Guaranty shall be clearly and legibly marked with the Letting Call Order Number.

- B. Electronic submission via the Internet and Bid Express™ by the time and date set in the Notice To Contractors for submission of Proposals.

The Proposal Guaranty for a “Joint Bid” shall include the names of all Joint Venture parties involved in the bid.

*Delete Subsection 102.07 and Substitute the following:*

## **102.07 Rejection of Proposals**

Proposals may be rejected as irregular if their consideration is conditioned upon the acceptance or rejection of other Proposals submitted by the same Bidder, if the Certificate of Current Capacity is not executed under Oath and substantiated, if a Unit Price is not shown for each Pay Item, or if they fail to comply with the EBS bidding requirements. In the case of alternate items, Unit Prices shall be entered for only one alternate. The Department reserves the right to disqualify and reject any Proposal that is not properly signed in accordance with the requisite of [Subsection 102.06](#).

### **A. Collusion**

Any and all Proposals will be rejected if the Department believes that collusion exists among the Bidders and no participant in such collusion may submit future Proposals for the same work. The Department reserves the right to review and to refuse to consider any Proposal if the Bidder fails to execute the Non-Collusion Certificate.

### **B. Single Proposals**

Only one Proposal from any person, partnership, or corporation under the same or different names shall be submitted on any Project.

### **C. Unbalanced Bids**

Proposals may be rejected if any of the Unit Prices are obviously unbalanced. The Department will decide whether any Unit Prices are unbalanced either excessively above or below a reasonable cost analysis value determined by the Engineer, particularly if these unbalanced amounts are substantial and contrary to the interest of the Department.

### **D. Omissions and Alterations**

Proposals may be rejected as irregular if they show any omissions, alterations of form, additions or conditions not called for, unauthorized alternate bids, erasures or changes not initialed, or other irregularities.

### **E. Debts**

The Department reserves the right to reject Proposals from Bidders who have not paid or satisfactorily settled all legal debts due on other Contracts at the time Proposals are received.

### **F. Technicalities**

The Department reserves the right to reject any and all Proposals and to waive technicalities at any time before the Contract has been signed by the Department.

### **G. Non-Prequalified Bidders**

Proposals submitted in excess of \$2,000,000 by non-prequalified contractors under Rule 672-5 of the Department’s Rules and Regulations Governing the Prequalification of Prospective Bidders will be disqualified and rejected.

### **H. Failure to List Disadvantaged Business Enterprise (DBE) Participants**

If the contract has an established DBE goal, the Department reserves the right to reject and disqualify any proposal if the bidder has failed to list bona fide DBE participants with sufficient participation to achieve at least the established goal. The Department may consider for award a proposal with less participation than the established goal if both:

- The bidder can demonstrate that no greater participation could be obtained and;
- The participation proposed by the low bidder is not substantially less than the participation proposed by the other bidders on the same contract.

### **I. Pavement Alternate Selection Declaration**

The Proposal will be rejected if the Bidder fails to submit or properly complete the Pavement Alternate Selection

Declaration.

#### **J. Non-responsive technical proposal**

A proposal will only be considered non-responsive if it does not contain the information noted in paragraph 2 of section 102.06, and any other information necessary to clearly demonstrate those assumptions used to form the basis of the bid.

*Delete Subsection 102.09 and Substitute the following:*

#### **102.09 Delivery of Proposals**

**Six (6) copies of the Bidder's technical proposal**, together with the Proposal Guaranty, shall be submitted in a sealed envelope so marked as to identify its contents without being opened. Proposal forms are not transferable. Proposals will be received until the time and date set in the Notice To Contractors and shall be in the hands of the officials indicated by that time. Proposals received after the advertised cutoff time established for submission of Proposals will be returned unopened to the Bidder.

*Delete Subsection 102.10 and Substitute the following:*

#### **102.10 Withdrawal or Revision of Proposals**

Any Bidder may withdraw his Proposal by submitting, by telegram, letter, or facsimile transmission received prior to the advertised cutoff time specified in the Notice To Contractors and verified by the Department, a DEPARTMENT OF TRANSPORTATION BID PROPOSAL WITHDRAWAL FORM, completed by an authorized officer of the company, whose signature is legally binding upon said company.

Any Bidder may submit a Bid change, by telegram, letter, or facsimile transmission received prior to the advertised cutoff time specified in the Notice To Contractors and verified by the Department, completed by an authorized officer of the company, whose signature is legally binding upon said company. In which case, the Department will change the Bid at the time of opening and at such time will announce that a change was received.

*Add the following:*

#### **102.15 Submittal of "Certificate of Current Capacity" and "Status of Contracts on Hand"**

The apparent low Bidder for each Letting Call Number shall submit the executed "Certificate of Current Capacity" and the "Status of Contracts on Hand" to the GADOT Office of Contract Administration, Room 223, in a sealed envelope by 12:00 noon on the first working day after the Bid Opening.

If the "Certificate of Current Capacity" and the "Status of Contracts on Hand" are not delivered to the GADOT Office of Contract Administration, Room 223, in a sealed envelope by 12:00 noon on the first working day after the Bid Opening, the Bid may be subject to disqualification.

First Use Date: January 14, 2005  
Revised February 28, 2007

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SPECIAL PROVISION**

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

**SECTION 102-Bidding Requirements and Conditions**

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*The use of the Electronic Bid Bond Form in Expedite will be accepted by the Department for compliance with the Notice To Contractors requirement to utilize the "Bid Bond Form DOT 564-Rev. Dec. 13, 2004".*



## Georgia Department of Transportation

### State of Georgia

#### Supplemental Specification

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

### Section 107—Legal Regulations and Responsibility to the Public

*Delete Subsection 107.23 and Substitute the following:*

#### **107.23 Environmental Considerations**

##### **A. Construction**

Erosion control measures shall be installed, to the greatest practical extent, prior to clearing and grubbing. Particular care shall be exercised along stream banks, wetlands and other sensitive areas to insure that these areas are not adversely affected.

Construction equipment shall not cross streams, rivers, or other waterways except at temporary stream crossing structures approved by the Engineer.

Construction activities within wetland areas are prohibited except for those within the construction limits as shown on the Plans and as specified in Subsection 107.23.E.

All sediment control devices (except sediment basins) installed on a project shall, as a minimum, be cleaned of sediment when one half the capacity, by height, depth or volume, has been reached. Sediment basins shall be cleaned of sediment when one-third the capacity by volume has been reached.

##### **B. Bridge Construction Over Waterways**

Construction waste or debris, from bridge construction or demolition, shall be prevented from being allowed to fall or be placed into wetlands, streams, rivers or lakes.

Excavation, dewatering, and cleaning of cofferdams shall be performed in such a manner as to prevent siltation.

Pumping from cofferdams to a settling basin or a containment unit will be required if deemed necessary by the Engineer.

Operations required within rivers or streams, i.e. jetting or spudding, shall be performed within silt containment areas, cofferdams, silt fence, sediment barriers or other devices to minimize migration of silt off the project.

##### **C. Borrow and Excess Material Pits**

Specific written environmental clearance from the Engineer will be required for any sites not included in the Plans as excess material or borrow areas. No work other than testing shall be started at any potential excess material or borrow site not shown on the plans prior to receiving said environmental clearance from the Engineer.

The Engineer will require a written notice from the Contractor requesting environmental clearance studies and written permission from the property owner at least six weeks prior to intended use of the site. The Department will not begin studies on such sites before a Notice to Proceed is issued.

The Engineer will inform the Contractor in writing as to the granting or denial of environmental clearance. If denied, the Contractor may, at no expense to the Department, seek to obtain permits or pursue other remedies that might otherwise render the site(s) acceptable.

Sites included in the Plans have environmental clearance and shall be used only for the purpose(s) specified in the Plans or other contract documents. Should the Contractor wish to expand or utilize said sites for any purpose other than that provided for in the Plans or other contract documents, specific written environmental clearance as noted above shall be obtained.

#### **D. Control of Pollutants**

Pollutants or potentially hazardous materials, such as fuels, lubricants, lead paint, chemicals or batteries, shall be transported, stored, and used in a manner to prevent leakage or spillage into the environment. The Contractor shall also be responsible for proper and legal disposal of all such materials.

Equipment, especially concrete or asphalt trucks, shall not be washed or cleaned-out on the Project except in areas where unused product contaminants can be prevented from entering waterways.

#### **E. Temporary Work in Wetlands Outside of the Construction Limits within the Right-of-Way and Easement Areas**

Temporary work in wetlands (that are not Environmentally Sensitive Areas) in order to facilitate construction will be subject to the following requirements:

1. Temporary work in wetlands shall be accomplished by using temporary structures, timber, concrete, soil with geotextile fabric, or other suitable matting. The area shall not be grubbed.
2. Soil matting shall be protected from erosion in accordance with the Specifications.
3. Whenever temporary work is required in Saltwater Marsh Wetlands, all temporary structures and/or matting shall be removed in their entirety prior to Final Acceptance of the Project. Matted and compressed soils shall be backfilled to their original ground elevation with material meeting the requirements of [Section 212 – Granular Embankment](#).
4. Whenever temporary work is required in Freshwater Wetlands, all temporary structures and/or matting (exclusive of soil matting to be retained in the final roadway section) shall be removed in their entirety prior to Final Acceptance of the Project.

Once the temporary materials have been removed, the area shall be covered by Excelsior or Straw blankets according to [Section 713](#) of the Specifications. The grassing and ground preparation referenced in [Subsection 713.3.03, "Preparation"](#), will not be applicable to this Work.

5. The Engineer shall be notified so that a field inspection may be conducted to certify that the temporary materials were properly removed and that the area was properly restored. The Contractor shall be responsible for any corrective action required to complete this Work.
6. There will be no separate measurement or payment for this Work. The cost associated with this work shall be included in the overall Bid submitted.

#### **F. Environmentally Sensitive Areas**

Some archaeological sites, historic sites, wetlands, streams, and protected animal and plant species habitats may be specially designated as ENVIRONMENTALLY SENSITIVE AREAS (ESAs). These areas are shown on the Plan sheets and labeled "ESA". Also, all archaeological sites, historic sites, wetlands, and streams beyond the Right-of-Way and easement areas are ENVIRONMENTALLY SENSITIVE AREAS.

The Contractor shall not perform any construction related activities, including but not limited to, borrowing, wasting, grading, filling, staging, parking, sediment basins, equipment storage within ENVIRONMENTALLY SENSITIVE AREAS unless specifically stated in the Plans (e.g., landscaping within a historic boundary).

All ESAs within the Project Right-of-Way and easement areas shall be marked with orange plastic barrier fence placed around the perimeter of the areas as directed by the Engineer.

As part of the Programmatic Agreement between the USACE, SHPO, and GDED, the following items will be completed for Site 9TP990 ESA:

- No clearing, grubbing, or other earth-disturbing activities shall be permitted within the boundaries of the site.
- No construction staging or other construction related activities shall be allowed on the site.
- Orange plastic barrier fencing along with signs noting "off limits" shall be placed outside of the site (a minimum of 25-feet from the surveyed boundary of the site), and silt fencing shall be installed at the limits of all proposed construction which

would be adjacent to the construction fencing in order to prevent soil from adjacent construction activities from migrating onto the site. The placement of the orange fencing shall be supervised by a professional archaeologist.

-Fencing will be inspected twice weekly (once at the beginning of the work week and once at the end of the work week) to insure protection of the site. These inspections can be completed by a construction inspector.

-If any damage or encroachment to the site is identified by the construction inspector, the professional archaeologist shall assess the situation to determine any damage and define the needs for any corrective action.

As per the 25-foot Vegetative Buffer variance granted by the Georgia Department of Natural Resources on September 26, the following requirements shall be met at all stream crossings:

- :
- All graded slopes 3:1 or greater must be hydroseeded and covered with DOT approved wheat straw, wood fiber matting or coconut fiber matting. If not hydroseeded, the DOT approved matting. All slopes must be properly protected until a permanent vegetative stand is established;
- The amount of land cleared during construction must be kept to a minimum;
- All disturbed areas must be seeded, fertilized, and mulched as soon as the final grade is achieved. Also, these disturbed areas must be protected until permanent vegetation is established;
- DOT type "C" silt fencing must be installed where silt fencing is required on the entire site and a double row must be installed between the land disturbing activities and State waters;
- Buffer variance conditions must be incorporated into any Land Disturbing Activity Permit which may be issued by Troup County for this project: and,
- This project must be conducted in strict adherence to the approved erosion and sedimentation control plan and any other Land Disturbing Activity Permit that may be issued by Troup County for this project.

Any stream crossing that does not meet the standard GDOT exemption of 50-feet on either side of a culvert or 100-feet on either side of a bridge would be required to place orange plastic barrier fencing a minimum of 25-feet from the point that the natural vegetation is wrested by the stream to ensure that no construction or clearing is completed within that 25-foot buffer area.

All barrier fence shall remain in place until such time that the Engineer directs that it shall be removed. The cost of this work shall be included in the overall Bid.

## **Georgia Department of Transportation**

### **State of Georgia**

#### **Supplemental Specification**

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

### **Section 107—Legal Regulations and Responsibility to the Public**

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*Delete Subsection 107.12 and substitute the following:*

#### **107.12 Use of Explosives**

When the use of explosives is necessary for the prosecution of The Work, the Contractor shall exercise the utmost care not to endanger life or property, and shall obey all State, Federal and other Governmental regulations applying to transportation, storage, use, and control of such explosives. The Contractor shall be completely responsible for any and all damage resulting from the transportation, storage, use, and control of explosives in the prosecution of The Work by the Contractor, the Contractor's agents, or employees; and shall hold the Department harmless from all claims of damages resulting in any manner therefrom.

The Contractor shall notify each public utility owner having structures or other installations, above or below ground, near the site of The Work of his intention to use explosives. Such notice shall be given sufficiently in advance to enable the utility owners to take such steps as they may deem necessary to protect their property from injury. Such notice shall not relieve the Contractor of responsibility for all damages resulting from his blasting operations.

All explosives shall be stored securely in compliance with all laws and ordinances, and all such storage places shall be clearly marked DANGEROUS EXPLOSIVES. Explosives and detonators shall be stored in separate storage facilities in separate areas. Where no laws or ordinances apply, locked storage shall be provided satisfactory to the Engineer, never closer than 1,000 ft (300 m) from any travel-road, building, or camping area.

In all cases where the transport, storage, or use of explosives is undertaken, such activities shall be controlled and directed by fully qualified representatives of the Contractor.

Whenever electric detonators are used, all radio transmitters shall be turned off within a radius of 500 ft (150 m). No blasting supplies shall be transported in vehicles with two-way radio unless the transmitter is turned off, or extra shielding precautions are taken. Appropriate signs shall be placed so as to give ample warning to anyone driving a vehicle equipped with two-way radio. Electrical detonators will not be used within 500 ft (150 m) of a railroad.

Submit a blasting plan to the Engineer a minimum of five working days prior to the use of explosives, that provides details of the proposed blasting plan, including, but not limited to, the type and amount of explosives, the shot sequence, the description of and distance to the closest inhabitable structure, and other information as requested by the Engineer. Do not begin blasting until the blasting plan has been reviewed and approved in writing by the Engineer. Such approval does not relieve the contractor of the responsibility for the adequate and safe performance of the blasting.

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**Supplemental Specification**

**Section 149 – Construction Layout**

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*Delete Section 149 and substitute the following:*

**149.1 General Description**

Perform construction layout to guide and control performance of items of the work according to this Specification.

This work includes:

- Placing, replacing (if necessary), and maintaining construction layout points.
- Preparing construction layout drawings, sketches, and computations.
- Recording data in field books such as alignment, slope stake, blue top, drainage layout, bridge, and other books used for layout for this Project.

**149.1.01 Definitions**

General Provisions 101 through 150

**149.1.02 Related References**

**A. Standard Specifications**

General Provisions 101 through 150

**B. Referenced Documents**

General Provisions 101 through 150

**149.1.03 Submittals**

Submit the following documentation to the Department:

**A. Project Construction Records**

These records detail information that the Department uses to determine the template line for the as-built cross sections, which defines the computation line for unclassified excavation. These records include:

- Survey records
- Bound field notebooks
- Computer printouts that record the Project's construction

Prepare the records as directed by the Engineer.

**B. Survey Documents**

Furnish the Engineer with a copy of survey documents that relate to construction layout. Provide these documents when the Engineer requests or as they are completed. The Engineer may check the documents for accuracy and may require revisions where necessary. The documents become Department property and will be included in the permanent Project records.

### **C. Drainage Structure Sketches**

Profile both inlet and outlet ends of proposed drainage structures for at least 100 ft (30 m) in the existing ditch line or stream bed. Adjust flowline elevations, if necessary, to enhance the hydraulics and to reduce silting, scouring, or backwater.

Calculate the length of each structure and provide sketches of the structure to the Engineer for review and approval at least 24 hours before beginning the work.

### **D. Bridge Layout Sketch**

Furnish a layout sketch before staking on bridges. After staking, submit a revised sketch for the Engineer's review and approval before beginning construction. Include in the layout sketch relevant stations, angles, dimensions, and redundant checks including exterior beam dimensions in each span. Also include all horizontal and vertical clearances with calculations that verify the clearances shown.

Submit for the Engineer's review and approval survey data and calculations with the layout sketch and information required for bent construction.

Verify the Plan elevations for all bridge bearing seats on the substructure.

### **E. Wall Layout Sketches**

Submit sketches and other data verifying either that the wall will fit the final field conditions, or indicate where revisions are necessary. Submit these sketches well before the wall construction begins so the Engineer can make any necessary structural design changes.

## **149.2 Materials**

General Provisions 101 through 150

### **149.2.01 Delivery, Storage, and Handling**

General Provisions 101 through 150

## **149.3 Construction Requirements**

General Provisions 101 through 150

### **149.3.01 Personnel**

Furnish personnel capable of establishing line and grade points necessary to complete the work. Establish these points within the generally accepted surveying tolerances, and ensure that they are acceptable for the work being performed.

### **149.3.02 Equipment**

Furnish surveying equipment, stakes, and all materials necessary to perform the work, subject to the Engineer's approval.

### **149.3.03 Preparation**

#### **A. General Pre-Construction**

Before beginning construction:

1. Ensure that plan dimensions, alignment, and elevations are compatible with existing field conditions. Make adjustments where necessary.
2. Ensure alignment tie-ins by coordinating construction layout with that of other Contractors whose work abuts any portion of the work. All adjustments are subject to the Engineer's approval.

#### **B. Widening and Reconstruction**

Before beginning construction where existing pavement is to be retained either for widening or for reconstruction:

1. Take three-point levels of the pavement throughout the length to be retained.  
Normally, the three-point levels will be required at 50 ft (15 m) intervals. However, the Engineer may adjust these intervals according to existing field conditions.

3. From the three-point levels, prepare a graphic grade plot that “best fits” the existing pavement to minimize the leveling requirements (if any) of the existing roadway. Cross slopes may be varied within the ranges shown on the Plans or adjusted by the Engineer to produce the “best fit.”
4. On passing lane or widening Projects where existing pavement is not to be overlaid:
  - a. Profile and plot the outside edge of the existing pavement to obtain a smooth profile grade.
  - b. Transfer this grade to the new edge of paving using the proper cross slope.
5. Furnish data to the Engineer for approval before beginning widening and reconstruction.
6. On widening, reconstruction, or passing lane projects, obtain the Engineer’s approval of the “best fit” profile. Ensure that grade stakes are set to control the construction of any required widening based upon the “best fit” profile and cross slope. Construct proposed widening flush with the existing edge of paving. Provide positive drainage in all cases.

**C. Existing Bridge Widening or Modification**

To widen or modify existing bridges, do the following before ordering materials or beginning construction:

1. Verify existing elevations and dimensions as well as confirm or determine required new cap elevations.
2. Profile the removal line and cross section the existing deck.
3. Use this profile information to determine a “best fit” finished grade for the widened portion.
4. Compute the new cap elevations based on this “best fit” information.
5. Furnish survey data, layout sketch, and calculations to the Engineer for approval.

**D. Retaining Wall Construction Layout**

Set stakes, take necessary cross sections, and perform necessary calculations at each wall before beginning wall construction to ensure that the geometric design of the retaining wall conforms to actual conditions.

**149.3.04 Fabrication**

General Provisions 101 through 150

**149.3.05 Construction**

**A. Verify Plan Elevations**

Verify plan elevations for all bridge bearing seats on the substructure.

**B. Verify Bent Layout**

After bent construction has begun, verify bent layout at each major phase of the construction to ensure that the bent is properly positioned in relation to adjacent bents.

**C. Establish the Centerline**

Establish the centerline as follows:

1. Establish or reestablish the centerline from the monuments and/or reference points the Department will provide.
2. On widening or reconstruction Projects, establish the horizontal and vertical alignment of the existing roadway and bridges.
3. Modify the Plan horizontal and vertical alignment to conform to the existing alignment as necessary.

**D. Verify the Accuracy of the Bench Mark(s)**

The Department will furnish at least one bench mark that the Contractor shall preserve, and if necessary, relocate as follows:

1. Verify the accuracy of the bench mark(s) and report discrepancies to the Engineer.
2. Establish additional benchmarks needed for construction.
3. Maintain the bench marks for necessary Department checks.

**E. Flag In-Place Survey Control Monuments**

Flag and protect in-place survey control monuments and reference points, including Right-of-Way/property line intersections, as follows:

1. Pay for and replace destroyed or disturbed stakes or monuments.
2. When included as Pay Items, stake Right-of-Way markers.

#### **F. Line, Grades, and Stakes**

Set other line and grade stakes needed to construct the job, including stakes needed to relocate utilities. Stake the Right-of-Way and maintain throughout the life of the project. Restake flattened slopes, minor grade or alignment changes, and other incidentals.

#### **G. Stake Centerline Control Alignments**

Stake centerline control alignments shown on the Plans or adjusted as described above when the Department needs accurate measurement of quantities for payment. Stake these control alignments as follows:

1. Stake the alignments to an accuracy of 1:5000.
2. Stake the alignments just before the Department takes aerial photography or field cross sections for both original and final cross sections.
3. Provide the Department with elevations of positions staked for the Department's quantity measurements. Ensure that these elevations are of third order accuracy, or better. Determine them using the differential leveling method.
4. Take intermediate cross sections required because of stage construction, detours, or other reasons.

#### **H. Provide Graphic Sketches**

Prepare and use graphic sketches of superelevation runout on curves on multi-lane roadways and of tie-ins of ramps to mainline on freeways and expressways to help provide positive drainage, adequate superelevation, and a pleasing appearance. Prepare and use similar sketches for street or roadway intersections.

#### **I. Maintain the Stakes**

After construction has begun in any segment of the Project, maintain the stakes that identify construction station numbers and locations as follows:

1. Ensure that stakes are placed at intervals not to exceed 200 ft (60 m) and use even, 100 ft (30 m) stations. Mark and flag stakes so that they are visible to DOT Project personnel in that segment of the Project until construction is complete.
2. During grading activities in fills or cuts over 20 ft (6 m), extend slope stakes up or down the slopes in intervals of 10 ft (3 m) or less to achieve an accurate cross section.

#### **J. Traffic Markings**

When traffic markings are to be placed by either the Contractor or others, furnish the layout and clean and preline the surface to allow the placement of permanent pavement markings on the Project.

When traffic markings are not included in the Project plans, the Department will provide striping plans and/or standard drawings for the Contractor's use.

#### **K. Provide Bridge Construction Layout**

Provide alignment control, grade control, and calculations to set these controls for bridge construction.

For new bridges, the Department will furnish the necessary input data forms for the Department's "Bridge Geometry" computer program upon the Contractor's request. The Department will process the data to help the Contractor obtain finished deck elevations.

Data processing is available only as an alternate service to determine elevations. If this service is elected for use, prepare the input data and the Department will furnish the output data. The following limitations apply:

- The Department will not assume liability for the accuracy of either input or output data.
- The Department will limit this service to two programs per bridge.
- This service is not available for existing bridges that are to be widened. Finished deck elevations for bridges that are to be widened will not be furnished.



### **149.3.06 Quality Acceptance**

The Engineer's acceptance of all or any part of the Contractor's layout shall not relieve the Contractor of responsibility to secure proper dimensions for the completed work. Correct at the Contractor's expense work incorrectly located due to layout error.

### **149.3.07 Contractor Warranty and Maintenance**

General Provisions 101 through 150

## **149.4 Measurement**

This item is not measured for payment.

### **149.4.01 Limits**

General Provisions 101 through 150

## **149.5 Payment**

This work is not paid for separately. The costs for performing layout work as described in this Specification are included in the bid for the items of work to which the layout is incidental.

Any unnecessary work, overruns, costs, etc., resulting from inaccurate data submitted by the Contractor will be deducted from Contractor payments.

### **149.5.01 Adjustments**

General Provisions 101 through 150

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SPECIAL PROVISION**

Project Number: CSNHS-0008-00(232)

P.I. Number: 0008232

Troup County

**SECTION 149 – CONSTRUCTION LAYOUT**

*Retain Sub-Section 149.3.05.I as written and add the following:*

3. Denote the offset distance to the construction centerline on the station number stakes, when the station number is maintained in a location other than on the construction centerline.

Rev. July 1, 2003  
April 15, 2004  
October 11, 2005  
October 25, 2005  
February 10, 2006  
April 20, 2006  
March 1, 2007

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SPECIAL PROVISION**

**Section 150—Traffic Control**

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Add the following:

**150.01 GENERAL**

This section as supplemented by the Plans Package (or Contractor Plans accepted during construction), Specifications, and Manual on Uniform Traffic Control Devices (MUTCD) shall be considered the Traffic Control Plan. Activities shall consist of furnishing, installing, maintaining, and removing necessary traffic signs, barricades, lights, signals, cones, pavement markings and other traffic control devices and shall include flagging and other means for guidance and protection of and vehicular pedestrian traffic through the Work Zone. This Work shall include both maintaining existing devices and installing additional devices as necessary in construction work zones.

When any provisions of this Specification or the Plans do not meet the minimum requirements of the MUTCD, the MUTCD shall control. The 2003 Edition of the MUTCD shall be in effect for the duration of the project.

The Worksite Traffic Control Supervisor (WTCS) shall have a copy of Part VI of the MUTCD on the job site. Copies of the current MUTCD may be obtained from the FHWA web page at <http://mutcd.fhwa.dot.gov>.

**A. WORKSITE TRAFFIC CONTROL SUPERVISOR**

ALL HIGHWAYS (ADDITIONAL REQUIREMENTS BELOW FOR INTERSTATES): The Contractor shall designate a qualified individual as the Worksite Traffic Control Supervisor (WTCS) who shall be responsible for selecting, installing and maintaining all traffic control devices in accordance with the Plans, Specifications, Special Provisions and the MUTCD. A written resume documenting the experience and credentials of the WTCS shall be submitted and accepted by the Engineer prior to beginning any work that involves traffic control. The WTCS shall be available on a twenty-four (24) hour basis to perform his duties. If the work requires traffic control activities to be performed during the daylight and nighttime hours it may be necessary for the Contractor to designate an alternate WTCS. An alternate WTCS must meet the same requirements and qualifications as the primary WTCS and be accepted by the Engineer prior to beginning any traffic control

duties. The Worksite Traffic Control Supervisor's traffic control responsibilities shall have priority over all other assigned duties.

As the representative of the Contractor, the WTCS shall have full authority to act on behalf of the Contractor in administering the Traffic Control Plan. The WTCS shall have appropriate training in safe traffic control practices in accordance with Part VI of the MUTCD. In addition to the WTCS all other individuals making decisions regarding traffic control shall meet the training requirements of the Part VI of the MUTCD. The WTCS shall supervise the initial installation of traffic control devices. The Engineer prior to the beginning of construction will review the initial installation. Modifications to traffic control devices as required by sequence of operations or staged construction shall be reviewed by the WTCS.

The WTCS shall be available on a full-time basis to maintain traffic control devices with access to all personnel, materials, and equipment necessary to respond effectively to an emergency situation within forty-five (45) minutes of notification of the emergency.

The WTCS shall regularly perform inspections to ensure that traffic control is maintained. Unless modified by the special conditions or by the Engineer, routine deficiencies shall be corrected within a twenty-four (24) hour period. Failure to comply with these provisions shall be grounds for dismissal from the duties of WTCS and/or removal of the WTCS from the project. Failure of the WTCS to execute his duties shall be considered as non-performance under [Subsection 150.08](#).

The Engineer will periodically review the work for compliance with the requirements of the traffic control plan.

On projects where traffic control duties will not require full time supervision, the Engineer may allow the Contractor's Project Superintendent to serve as the WTCS as long as satisfactory results are obtained.

#### **CERTIFIED WORKSITE TRAFFIC CONTROL SUPERVISOR**

**ADDITIONAL REQUIREMENTS FOR INTERSTATE AND LIMITED ACCESS HIGHWAYS:** In addition to the requirements above, the WTCS shall have a minimum of one year's experience directly related to work site traffic control in a supervisory or responsible capacity. The WTCS shall be currently certified by the American Traffic Safety Services Association (ATSSA) Work Site Traffic Supervisor Certification program, the National Safety Council Certification program or an equal approved by the Department.

Any work performed on the interstate or limited access highway right-of-way that requires traffic control shall be supervised by the Certified Worksite Traffic Control Supervisor. No work requiring traffic control shall be performed unless the certified WTCS is on the worksite. Failure to maintain a Certified Worksite Traffic Control Supervisor on the work will be considered as non-performance under [Subsection 150.08](#).

The WTCS shall perform, as a minimum, weekly traffic control inspections on all interstate and limited access highways. The inspection shall be reported to the Engineer on a TC-1 report. The Engineer will furnish a blank copy of the TC-1 report to the Contractor prior to the beginning of any work on the interstate or limited access right-of-way.

### **B. TRAFFIC CONTROL DEVICES**

All traffic control devices used during the construction of a project shall meet the Standards utilized in the MUTCD, and shall comply with the requirements of these Specifications, Project Plans, and Special Provisions. All devices shall be tested at NCHRP Test Level III. Reference is made to [Subsections 104.05](#), [107.07](#), and [107.09](#).

### **C. REFLECTORIZATION REQUIREMENTS**

All rigid fluorescent orange construction warning signs (black on fluorescent orange) shall meet the reflectorization and color requirements of ASTM Type VII, VIII, IX or X regardless of the mounting height.

Portable signs which have flexible sign blanks shall meet the reflectorization and color requirements of ASTM Type VI.

Warning signs (W3-1a) for stop conditions that have rumble strips located in the travelway shall be reflectorized with ASTM Type IX fluorescent yellow sheeting.

All other signs shall meet the requirements of ASTM Type III or IV except for "Pass With Care" and "Do Not Pass" signs which may be ASTM Type I unless otherwise specified.

CHANNELIZATION DEVICES: Channelization devices shall meet the requirements of ASTM Type III or IV high intensity sheeting.

### **D. IMPLEMENTATION REQUIREMENTS**

No work shall be started on any project phase until the appropriate traffic control devices have been placed in accordance with the Project requirements. Changes to traffic flow shall not commence unless all labor, materials, and equipment necessary to make the changes are available on the Project.

When any shift or change is made to the location of traffic or to the flow patterns of traffic, the permanent safety features shall be installed and fully operational before making the change. If staging or site conditions prevent the installation of permanent features then the equivalent interim devices shall be utilized.

Any section of the work that is on new location shall have all permanent safety features installed and fully operational before the work is opened to traffic. Safety features shall include but are not limited to the following items:

1. Guardrail including anchors and delineation
2. Impact attenuators
3. Traffic signals
4. Warning devices
5. Pavement markings including words, symbols, stop bars, and crosswalks
6. Roadway signs including regulatory, warning, and guide

Outdoor lighting shall be considered as a safety feature for welcome centers, rest areas, and weigh station projects. For typical roadway type projects new street lighting is not considered a safety feature unless specifically noted in the plans or in the special conditions.

**E. MAINTENANCE OF TRAFFIC CONTROL DEVICES**

Traffic control devices shall be in acceptable condition when first erected on the project and shall be maintained in accordance with [Subsection 104.05](#) throughout the construction period. All unacceptable traffic control devices shall be replaced within 24 hours. When not in use, all traffic control devices shall be removed, placed or covered so as not to be visible to traffic. All construction warning signs shall be removed within seven calendar days after time charges are stopped or pay items are complete. If traffic control devices are left in place for more than ten days after completion of the Work, the Department shall have the right to remove such devices, claim possession thereof, and deduct the cost of such removal from any monies due, or which may become due, the Contractor.

**F. TRAFFIC INTERRUPTION RESTRICTIONS:**

The Department reserves the right to restrict construction operations when, in the opinion of the Engineer, the continuance of the Work would seriously hinder traffic flow, be needlessly disruptive or unnecessarily inconvenience the traveling public. The Contractor shall suspend and/or reschedule any work when the Engineer deems that conditions are unfavorable for continuing the Work.

Advanced notification requirements to the Contractor to suspend work will be according to the events and the time restrictions outlined below:

Incident management	No advanced notice required
Threatening/Inclement weather	24 hours
Holidays, sporting events, unfavorable conditions	Three (3) calendar days

If the work is suspended, the Contractor may submit a request for additional contract time as allowed under Section 108. The Department will review the request and may grant additional contract time as justified by the impact to the Contractor's schedule. Compensation for loss of productivity, rescheduling of crews, rental of equipment or delays to the Contractor's schedule will not be considered for payment. Additional contract time will be the only consideration granted to the Contractor.

**G. SEQUENCE OF OPERATIONS**

Any Sequence of Operations provided in this Contract in conjunction with any staging details which may be shown in the plans, is a suggested sequence for performing the Work. It is intended as a general staging plan for the orderly execution of the work while minimizing the impact on the mainline, cross-streets and side streets. The Contractor shall develop detailed staging and traffic control plans for performing specific areas of the Work including but not limited to all traffic shifts, detours, bridge widenings, paces, or other activities that disrupt traffic flow. The Engineer may require detailed staging and traffic

control plans for lane closures. These plans shall be submitted for approval at least two weeks prior to the scheduled date of the activity. Activities that have not been approved at least seven (7) days prior to the scheduled date shall be rescheduled.

Where traffic is permitted through the work area under stage construction, the Contractor may choose to construct, at no additional expense to the Department, temporary on-site bypasses or detours in order to expedite the work. Plans for such temporary bypasses or detours shall be submitted to the Engineer for review and approval 30 calendar days prior to the proposed construction. Such bypasses or detours shall be removed promptly when in the opinion of the Engineer, they are not longer necessary for the satisfactory progress of the Work. Bypasses and detours shall meet the minimum requirements of [Subsection 150.02.B.4.](#)

As an option to the Sequence of Operations in the Contract, the Contractor may submit an alternative Sequence of Operations for review and approval. A twenty calendar day lead time for the Department's review shall be given to this submission so that a decision on its acceptability can be made and presented at the Preconstruction Conference. Insufficient lead time or no submission by the Contractor shall be construed as acceptance of the Sequence of Operations outlined in the Contract and the willingness of the Contractor to execute this as-bid plan.

The Department will not pay, or in any way reimburse the Contractor for claims arising from the Contractor's inability to perform the Work in accordance with the Sequence of Operations provided in the Contract or from an approved Contractor alternate.

The Contractor shall secure the Engineer's approval of the Contractor's proposed plan of operation, sequence of work and methods of providing for the safe passage of vehicular and pedestrian traffic before it is placed in operation. The proposed plan of operation shall supplement the approved traffic control plan. Any major changes to the approved traffic control plan, proposed by the Contractor, shall be submitted to the Department for approval.

Some additional traffic control details will be required prior to any major shifts or changes in traffic. The traffic control details shall include, but not be limited to, the following:

1. A detailed drawing showing traffic locations and laneage for each step of the change.
2. The location, size, and message of all signs required by the MUTCD, Plan, Special Provisions, and other signs as required to fit conditions. Any portable changeable message signs used shall be included in the details.
3. The method to be used in, and the limits of, the obliteration of conflicting lines and markings.
4. Type, location, and extent of new lines and markings.
5. Horizontal and vertical alignment and superelevation rates for detours, including cross-section and profile grades along each edge of existing pavement.
6. Drainage details for temporary and permanent alignments.

7. Location, length, and/or spacing of channelization and protective devices (temporary barrier, guardrail, barricades, etc.)
8. Starting time, duration and date of planned change.
9. For each traffic shift, a paving plan, erection plan, or work site plan, as appropriate, detailing workforce, materials, and equipment necessary to accomplish the proposed work. This will be the minimum resource allocation required in order to start the work.

A minimum of three copies of the above details shall be submitted to the Engineer for approval at least 14 days prior to the anticipated traffic shift. The Contractor shall have traffic control details for a traffic shift which has been approved by the Engineer prior to commencement of the physical shift. All preparatory work relative to the traffic shift, which does not interfere with traffic, shall be accomplished prior to the designated starting time. The Engineer and the Contractor's representative will verify that all conditions have been met prior to the Contractor obtaining materials for the actual traffic shift.

**H. COMPLIANCE DATES FOR PROVISIONS OF THE MUTCD:**

Federal law requires that traffic control devices (temporary or permanent) installed on new highway or bikeway construction or reconstruction shall be compliant with the latest version of the MUTCD before the road is opened to the public for unrestricted travel. The latest version of the MUTCD is the 2003 Edition, which the Georgia Department of Transportation has adopted. However, the FHWA, in the introduction to the MUTCD has established alternate compliance dates for some of the new provisions of the 2003 MUTCD. Below is a list of those compliance dates. The Department may decide to require contractors to implement some or all of these provisions at an earlier date than the compliance dates noted below. However notice will be given in advance of the letting date if these provisions are to be implemented prior to the compliance dates. The contractor may also decide to implement the new provisions in the 2003 MUTCD earlier than required by the compliance dates below.

The target dates established by the FHWA shall be as follows:

- Section 6D.01 Pedestrian Considerations – all new provisions for pedestrian accessibility – 5 years from the effective date of the Final Rule for the 2003 MUTCD.
- Section 6D.02 Accessibility Considerations – 5 years from the effective date of the Final Rule for the 2003 MUTCD.
- Section 6D.03 Worker Safety Considerations – high-visibility apparel requirements – 3 years from the effective date of the Final Rule for the 2003 MUTCD.
- Section 6E.02 High-Visibility Safety Apparel – high-visibility apparel requirements for flaggers – 3 years from the effective date of the Final Rule for the 2003 MUTCD.

The effective date of the Final Rule for the 2003 MUTCD is December 22, 2003.

**150.02 TEMPORARY TRAFFIC CONTROL ZONES:**

**A. DEVICES AND MATERIALS:**



In addition to the other provisions contained herein, work zone traffic control shall be accomplished using the following means and materials:

**1. Portable Advance Warning Signs**

Portable advance warning signs shall be utilized as per the requirements of the traffic control plans. All signs shall meet the requirements of the MUTCD and shall be NCHRP 350 crashworthy compliant.

**2. Arrow Panels**

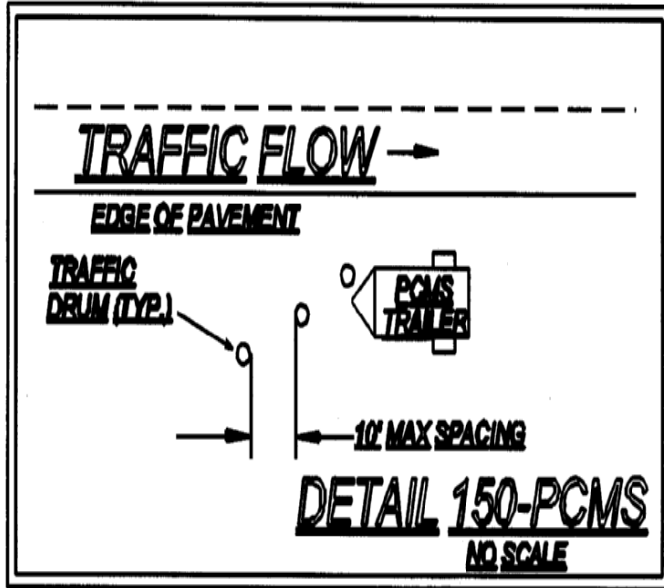
Portable sequential or flashing arrow panels as shown in the Plans or Specifications for use on Interstate or multi-lane highway lane closure only, shall be a minimum size of 48" high by 96" wide with not less than 15 lamps used for the arrow. The arrow shall occupy virtually the entire size of the arrow panel and shall have a minimum legibility distance of one mile. The minimum legibility distance is that distance at which the arrow panel can be comprehended by an observer on a sunny day, or clear night. Arrow panels shall be equipped with automatic dimming features for use during hours of darkness. The arrow panels shall also meet the requirements for a Type C panel as shown in the MUTCD. The sequential or flashing arrow panels shall not be used for lane closure on two-lane, two-way highways when traffic is restricted to one-lane operations in which case, appropriate signing, flaggers and when required, pilot vehicles will be deemed sufficient.

The sequential or flashing arrow panels shall be placed on the shoulder at or near the point where the lane closing transition begins. The panels shall be mounted on a vehicle, trailer, or other suitable support. Vehicle mounted panels shall be provided with remote controls. Minimum mounting height shall be seven feet above the roadway to the bottom of the panel, except on vehicle mounted panels which should be as high as practical.

For emergency situations, arrow display panels that meet the MUTCD requirements for Type A or Type B panels may be used until Type C panels can be located and placed at the site. The use of Type A and Type B panels shall be held to the minimum length of time possible before having the Type C panel(s) in operation. The Engineer shall determine when conditions and circumstances are considered to be emergencies. The Contractor shall notify the Engineer, in writing, when any non-specification arrow display panel(s) is being used in the work.

**3. Portable Changeable Message Signs**

Portable changeable message signs meeting the requirements of [Section 632](#) and the MUTCD. Any PCMS in use that is not protected by positive barrier protection shall be delineated by a minimum of three drums that meet the requirement of Subsection 150.05.A.1. The drum spacing shall not exceed a maximum of ten (10') feet as shown in [Detail 150-PCMS](#). When the PCMS is within twenty (20') feet of the opposing traffic flow, the trailing end of the PCMS shall be delineated with a minimum of three drums spaced in the same manner as the approach side of the PCMS.



When not in use the PCMS shall be removed from the roadway unless protected by positive barrier protection. If the PCMS is protected by positive barrier protection the sign panel shall be turned away from traffic when not in use.

**4. Channelization Devices**

Channelization devices shall meet the standards of the MUTCD and [Subsection 150.05](#).

**5. Temporary Barrier**

Temporary barrier shall meet the requirements of [Sections 620](#).

**6. Temporary Traffic Signals**

Temporary traffic signals shall meet the requirements of [Section 647](#) and the MUTCD.

**7. Pavement Marking**

Pavement marking incorporated into the work shall comply with [Subsections 150.04.A](#) and [150.04.B](#).

**8. Portable Temporary Traffic Control Signals**

The use off Portable Temporary Traffic Control Signals shall meet the following minimum requirements:

Only two-lane two-way roadways will be allowed to utilize Portable Temporary Traffic Control Signals.

All portable traffic control signals shall meet the physical display and operational requirements of conventional traffic signals described in the MUTCD.

Each signal face shall have at least three lenses. The lenses shall be red, yellow, or green in color and shall give a circular type of indication. All lenses shall be twelve (12") inches nominal in diameter.

A minimum of two signal faces shall face each direction of traffic. A minimum of one signal head shall be suspended over the roadway travel lane in a manner that will allow the bottom of the signal head housing to be not less than seventeen (17') feet above and not more than nineteen (19') feet above the pavement grade at the center of the travel lane. The second signal head may be located over the travel lane with the same height requirements or the second signal head may be located on the shoulder. When the signal head is located on the shoulder the bottom of the signal head housing shall be at least eight (8') feet but not more than (15') feet above the pavement grade at the center of highway.

Advance warning signage and appropriate pavement markings shall be installed as part of the temporary signal operation.

The signals shall be operated in a manner consistent with traffic requirements. The signals may be operated in timed-mode or in a vehicle-actuated mode. The signals shall be interconnected in a manner to ensure that conflicting movements can not occur. To assure that the appropriate operating pattern including timing is displayed to the traveling public, regular inspections including the use of accurate timing devices shall be made by the Worksite Traffic Control Supervisor. If at any time any part of the system fails to operate within these requirements then the use of the signal shall be suspended and the appropriate flagging operation shall begin immediately.

The Worksite Traffic Control Supervisor (WTCS) shall continuously monitor the portable traffic control signal to insure compliance with the requirements for maintenance under the MUTCD. The signal shall be maintained in a manner consistent with the intention of the MUTCD, with emphasis on cleaning of the optical system. Timing changes shall be made only by the WTCS. The WTCS shall keep a written record of all timing changes.

The portable temporary signal shall have two power sources and shall be capable of running for seven calendar days continuously.

The Contractor shall have an alternate traffic control plan in the event of failure of the signal.

## **9. RUMBLE STRIPS**

Rumble strips incorporated into the work shall meet the requirements of [Section 429](#) and the MUTCD. Existing rumble strips that are positioned in the traveled way to warn traffic of a stop condition shall be reinstalled based on the following requirements:

**INTERMEDIATE SURFACES:** Intermediate surfaces that will be in use for more than forty-five (45) calendar days shall have rumble strips reinstalled on the traveled way in the area of a stop condition. Non-refundable deductions in accordance with [Subsection 150.08](#) will be assessed for any intermediate surface in place for greater than 45 days without rumble strips.

**FINAL SURFACES:** Rumble strips shall be installed on the final surface within fourteen (14) calendar days of the placement of the final surface in the area of the stop condition. Failure to install within fourteen (14) calendar days will result in assessment of non-refundable deductions in accordance with Subsection 150.08.

Prior to the removal of any rumble strips located in the travelway, stop ahead (W3-1a) warning signs shall be double indicated ahead of the stop condition. These warning signs shall be a minimum of 48 inches by 48 inches. The reflectorization of the warning signs shall be as required by [Subsection 150.01.C](#). These warning signs shall remain in place until the rumble strips have been reinstalled on the traveled way. Any existing warning signs for the stop ahead condition shall be removed or covered while the 48" X 48" (W3-1a) signs are in place. When the rumble strips have been reinstalled these warning signs should be promptly removed and any existing signage placed back in service.

- 10. GUARDRAIL:** When the removal and installation of guardrail is required as a part of the work the following time restrictions shall apply unless modified by the special conditions:

**MULTI-LANE HIGHWAYS:** From the time that the existing guardrail or temporary positive barrier protection is removed the Contractor has fourteen (14) calendar days to install the new guardrail and anchors. During the interim, the location without guardrail shall be protected with drums spaced at a maximum spacing of twenty (20') feet. The maximum length of rail that can be removed at any time without being replaced with positive barrier protection is a total of 2000 linear feet of existing rail or the total length of one run of existing rail, whichever is greater.

**ALL OTHER HIGHWAYS:** From the time that the existing guardrail is removed or from the time that temporary positive barrier protection is removed the Contractor has thirty (30) calendar days to install the new guardrail and anchors. During the interim, the location without guardrail shall be protected with drums spaced at a maximum spacing of twenty (20') feet. The maximum length of rail that can be removed at any time without being replaced with positive barrier protection is a total of 1000 linear feet of existing rail or the total length of one run of existing rail, whichever is greater.

Based on existing field conditions, the Engineer may review the work and require that the guardrail be installed earlier than the maximum time allowed above by giving written notification to the Contractor via the TC-1 traffic control report.

Failure to comply with the above time and quantity restrictions shall be considered as non-compliance under Subsection 150.08.

- 11. STOP SIGN REGULATED INTERSECTIONS:** For intersections that utilize stop sign(s) to control the flow of traffic and to restrict the movement of vehicles, the stop sign(s) shall be maintained for the duration of the work or until such time that the stop condition is eliminated or until an interim or permanent traffic signal can be installed to provide proper traffic control. The traffic signal shall be installed and properly functioning before the removal of the existing stop sign(s) is permitted. If the existing intersection is enhanced traffic control features such as stop bars, double indicated stop signs, oversized signs, advanced warning stop ahead signs, rumble strips on the approaches or flashing beacons located overhead or on the shoulders then these features shall be maintained for the duration of the project or until the permanent traffic control plan has been implemented.

Whenever the staging of the work requires that the traveled-way be relocated or realigned the Contractor shall reinstall all enhanced traffic control features noted above

on the newly constructed sections of the work. The cost of relocating the stop bars, stop signs, advanced warning signs, the rumble strips and the flashing beacons shall be included in the price bid for Lump-Sum-Traffic Control unless individual pay items are included in the contract for rumble strips and/or flashing beacons. When pay items are included in the contract for rumble strips or flashing beacons then these items will be paid per each.

When staging requires the relocation or realignment of an existing stop condition it may be necessary to consider the addition of enhanced traffic control features even though none existed at the original location. As a guide for enhanced traffic control features that may be considered, the Engineer or the WTCS may refer to the Department's guidelines for "Opening of New Roadways to Traffic" (Document #6635-2). Horizontal and vertical alignment changes at a new location may have decreased or restricted sight distance or the stop condition may occur sooner than in the previous alignment. If these conditions occur then the Engineer and/or the WTCS should consider additional measures to enhance the motorist's awareness of the changes even though the staging plans may not address enhanced features. Stop signs should be a minimum of 36 inches for interim situations. The use of 48 inch stop signs may be warranted under project specific conditions. Flags may be used on interim/permanent stop signs that are mounted at seven (7') feet in height for a short duration in order to direct additional attention to a new or relocated stop sign(s). Flags should not be used for durations exceeding two weeks unless unusual or site specific conditions warrant a longer period of time. The use of Type "A" flashing red light(s) attached to the stop sign(s) may be appropriate during the same period that the flags are in use to increase attention.

The use of rumble strips and/or portable changeable message signs may be considered. The use of new rumble strips, where none previously existed, shall have the prior approval of District Traffic Operations before being included as part of the traffic control plan. The message(s) displayed on any PCMS shall have the prior approval of the Engineer and the message(s) shall be included as part of the traffic control plan for the interim staging.

The placement of any additional interim ground-mounted signs and posts or stop bars shall be considered as incidental to the price bid for Lump Sum-Traffic Control. The installation of rumble strips, flashing beacons or the use of Portable Changeable Message Signs (PCMS) shall be considered as Extra Work unless pay items are included in the contract.

## **B. WORK ZONE RESTRICTIONS:**

### **1. Interstate**

The Contractor shall not simultaneously perform work on both the inside shoulder and outside shoulder on either direction of traffic flow when the Work is within 12 feet of the travel-way, unless such areas are separated by at least one-half mile of distance.

### **2. Non-Interstate Divided Highways**

The Contractor shall not simultaneously perform work on both the inside shoulder and outside shoulder on either direction of traffic flow when the Work is within 12 feet of

the travel-way, unless such areas are separated by at least one-half mile distance in rural areas or at least 500 feet of distance in urban areas.

### **3. Non-Divided Highways**

- a. The Contractor shall not simultaneously perform work on opposite sides of the roadway when the work is within 12 feet of the travel-way, unless such areas are separated by at least one-half mile of distance in rural areas or at least 500 feet of distance in urban areas.
- b. On two-lane projects where full width sections of the existing subgrade, base or surfacing are to be removed, and new base, subgrade, or surfacing are to be constructed, the Contractor shall maintain one-lane traffic through the construction area by removing and replacing the undesirable material for half the width of the existing roadway at a time. Replacement shall be made such that paving is completed to the level of the existing pavement in the adjacent lane by the end of the workday or before opening all the roadway to traffic.

### **4. All Highways:**

- a. There shall be no reduction in the total number of available traffic lanes that existed prior to construction except as specifically allowed by the Contract and as approved by the Engineer.
- b. Travelway Clearances: All portions of the work shall maintain the following minimum requirements:

Horizontal: The combined dimensions of the paved shoulder and the roadway surface remaining outside the Work Zone shall be no less than sixteen (16) feet in width at any location.

Vertical: The overhead clearance shall not be reduced to less than fifteen (15) feet at any location.

The restrictions above apply to all shifts, lane closures, on-site detours and off site detours whether shown in the contract or proposed by the Contractor. It shall be the responsibility of the Contractor to verify that these minimum requirements have been met before proceeding with any phase of the Work.

Two-lane two-way roadways may have temporary horizontal restrictions of less than sixteen (16) feet provided a flagger operation for one-way traffic is utilized to restrict access to the work area by over-width loads. The minimum horizontal clearance shall be restored before the flagging operation is removed.

- c. Highway Work Zone: All sections or segments of the roadway under construction or reconstruction shall be signed as a Highway Work Zone except non-state highway two-lane two-way resurfacing projects. Two conditions can be applied to a Highway Work Zone. Condition 1 is when no reduction in the existing speed limit is required. Condition 2 is when worksite conditions require a reduction of the speed limit through the designated Work Zone. Properly marking a Highway Work Zone shall include the following minimum requirements:

1. NO REDUCTION IN THE EXISTING POSTED SPEED LIMIT IN HIGHWAY WORK ZONE:

- a) Signage ([Detail 150-HWZ-2](#)) shall be posted at the beginning point of the Highway Work Zone warning the traveling public that increased penalties for speeding violations are in effect. The [HWZ-2](#) sign shall be placed a minimum of six hundred (600') feet in advance of the Highway Work Zone and shall not be placed more than one thousand (1000') feet in advance of the Work Zone. If no speed reduction is required it is recommended that the [HWZ-2](#) be placed at 750 feet from the work area between the ROAD WORK 500 FT. and the ROAD WORK 1000 FT. signs.

[HWZ-2](#) signs shall be placed at intervals not to exceed one mile for the length of the project. [HWZ-2](#) signs should be placed on the mainline after all major intersections except State Routes. State Routes shall be signed as per the requirements for intersecting roadways below.

- b) The existing speed limit shall be posted at the beginning of the Work Zone. Existing Speed Limit signs (R2-1) shall be maintained.
- c) INTERSECTING ROADWAYS: Intersecting state routes shall be signed in advance of each intersection with the Work Zone with a [HWZ-2](#) sign to warn motorists that increased fines are in effect. All other intersecting roadways that enter into a designated Highway Work Zone may be signed in advance of each intersection with the Work Zone. When construction equipment and personnel are present in the intersection on the mainline of a multi-lane roadway, the intersecting side roads shall be signed in advance with [HWZ-2](#) signs. As soon as the work operation clears the intersection the signage may be removed.
- d) Signage ([Detail 150-HWZ-3](#)) shall be posted at the end of the Highway Work Zone indicating the end of the zone and indicating that increased penalties for speeding violations are no longer in effect.
- e) When a designated Highway Work Zone is no longer necessary all signs shall be removed immediately.

2. REDUCING THE SPEED LIMIT IN A HIGHWAY WORK ZONE:

Highway Work Zone signs shall be posted as required in Condition 1 above.

For limited access (interstate) highways and controlled access multi-lane divided highways the posted speed limit shall be reduced as required below.

Speed Limit signage (R2-1) for the reduced speed limit shall be erected at the beginning of the work zone. Additional signs shall be placed to ensure that the maximum spacing of the reduced speed limit signs shall be no greater than one (1) mile apart. Existing speed limit signs shall be covered or removed. On multi-lane divided highways the speed limit signs shall be double indicated when the reduced speed is in use.

When any one or more of the following conditions exist and the existing speed limit is 65 mph or 70 mph, the speed limit shall be reduced by 10 mph. If the existing speed limit is 60 mph, the speed limit should be reduced by 5 mph. If the existing speed limit is 55 mph or less, the Contractor can only reduce the speed limit with the prior approval of the Engineer. The reduction in the speed limit shall be no greater than 10 mph:

- a) Lane closure(s) of any type and any duration.
- b) The difference in elevation exceeds two inches adjacent to a travel lane as shown in [Subsection 150.06](#), [Detail 150-B](#), [150-C](#).
- c) Any areas where equipment or workers are within ten feet of a travel lane.
- d) Temporary portable concrete barriers located less than two (2') feet from the traveled way.
- e) As directed by the Engineer for conditions distinctive to this project.

When the above conditions are not present the speed limit shall be immediately returned to the existing posted speed limit. A speed reduction shall not be put in place for the entire length of the project unless conditions warranting the speed reduction are present for the entire project length. All existing speed limit signs within the temporary speed reduction zone shall be covered or removed while the temporary reduction in the speed limit is in effect. All signs shall be erected to comply with the minimum requirements of the MUTCD.

As a minimum the following records shall be kept by the WTCS:

- a) Identify the need for the reduction.
- b) Record the time of the installation and removal of the temporary reduction.
- c) Fully describe the location and limits of the reduced speed zone.
- d) Document any accident that occurs during the time of the reduction.

A copy of the weekly records for reduced speed zones shall be submitted to the Engineer.

Reduced speed zones shall, as a minimum, be signed as per [Detail 150-HWZ-1](#). Interim signs shall meet the requirements of Subsection 150.03.D. Additional signs may be necessary to adjust for actual field conditions.

When a pilot vehicle is used on a two-lane two-way roadway the speed limit should not be reduced. For special conditions specific to the work, on two-lane two-way roadways or multi-lane highways, the contractor may reduce the posted speed limit with the prior approval of the Engineer.

#### **5. MILLED SURFACE RESTRICTIONS:**

Unless modified by the special conditions, a milled surface on any asphaltic concrete surface shall not be allowed to remain open to traffic for a period of time that exceeds thirty (30) calendar days.

#### **6. INSTALLATION/REMOVAL OF WORK AREA SIGNAGE:**

No payment will be made for Traffic Control-Lump Sum until the Work has actually started on the project. The installation of traffic control signage does not qualify as



the start of work. Advanced warning signs shall not be installed until the actual beginning of work activities. Any permanent mount height signs installed as the work is preparing to start shall be covered until all signs are installed unless all signs are installed within seven (7) calendar days after beginning installation.

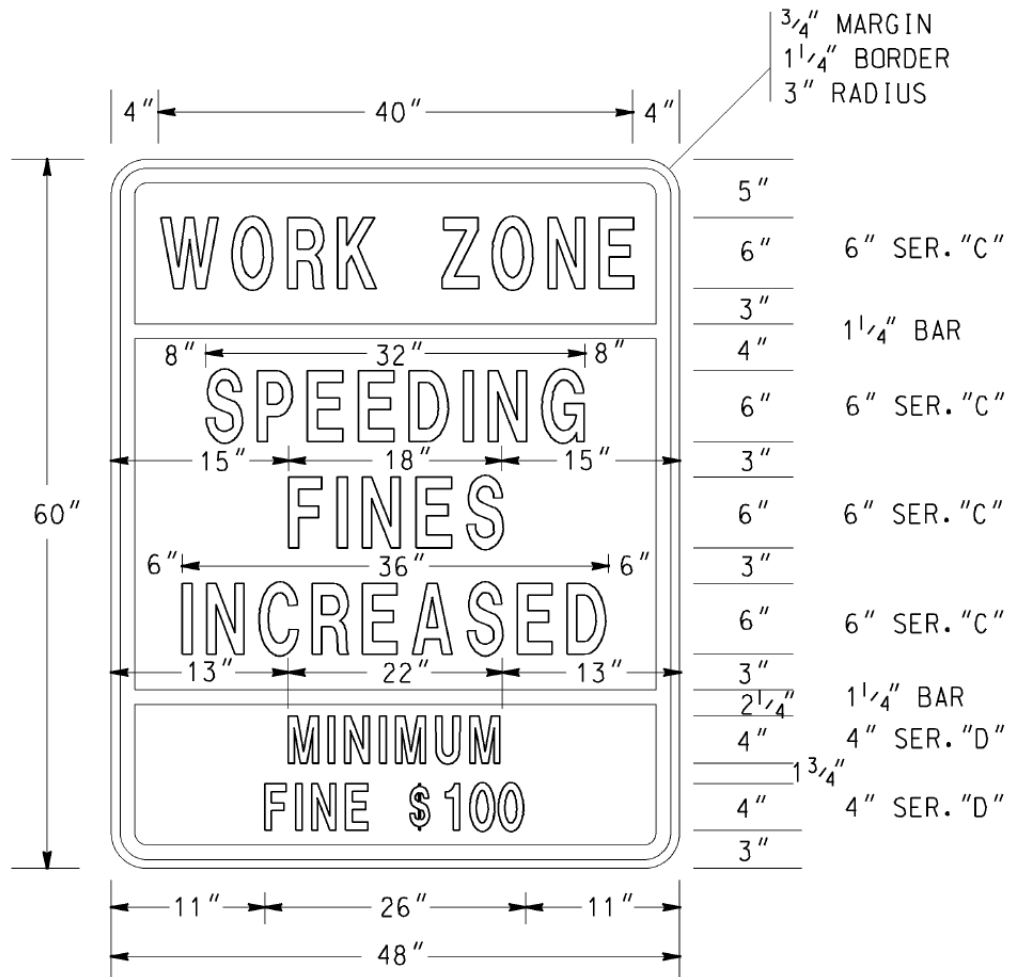
All temporary traffic control devices shall be removed as soon as practical when these devices are no longer needed. When work is suspended for short periods of time, temporary traffic control devices that are no longer appropriate shall be removed or covered.

All construction warning signs shall be removed within seven (7) calendar days after time charges are stopped or pay items are complete. If traffic control devices are left in place for more than ten (10) calendar days after completion of the Work, the Department shall have the right to remove such devices, claim possession thereof, and deduct the cost of such removal from any monies due, or which may become due, the Contractor.

**PUNCHLIST WORK:** Portable signs shall be utilized to accomplish the completion of all punchlist items. The portable signs shall be removed daily. All permanent mount height signs shall be removed prior to the beginning of the punchlist work except "Low/Soft Shoulder" signs and any signs that have the prior written approval of the Engineer to remain in place while the punchlist work is in progress.

Failure to promptly remove the construction warning signs within the seven (7) calendar days after the completion of the Work or failure to remove or cover signs when work is suspended for short periods of time shall be considered as non-performance under Subsection 150.08.





HWZ-2

COLORS

TOP PANEL

LEGEND & BORDER - BLACK (NON-REFL)

BACKGROUND - FLUORESENT ORANGE

(ASTM TYPE VII, VIII, IX or X)

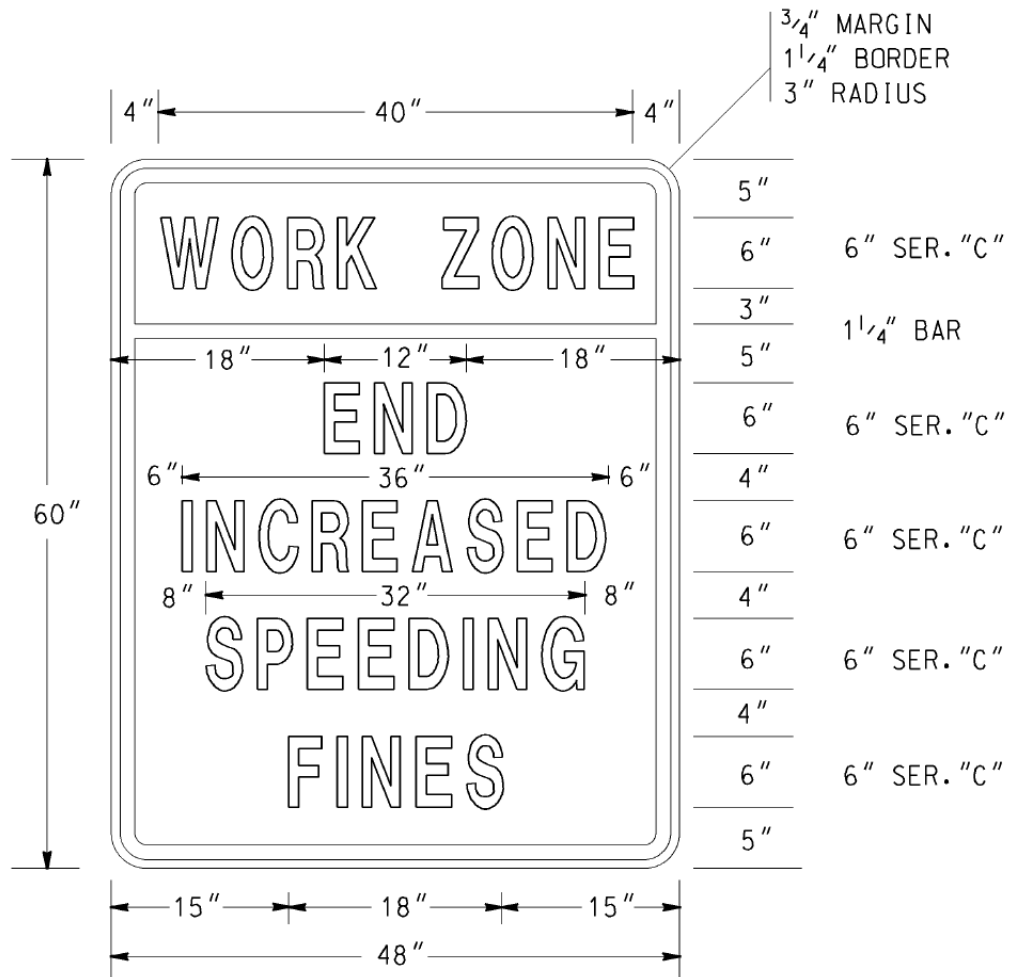
MIDDLE & BOTTOM PANELS

LEGEND & BORDER - BLACK (NON-REFL)

BACKGROUND - WHITE (ASTM TYPE III OR IV REFL SHEETING)

NOTES:

1. ALL HWZ-2 SIGN PANELS SHALL BE RIGID.
2. THE SIZE OF THE HWZ-2 SIGN SHALL NOT BE REDUCED FOR USE ON TWO-LANE ROADWAYS.



HWZ-3

COLORS

TOP PANEL

LEGEND & BORDER - BLACK (NON-REFL)

BACKGROUND - FLUORESENT ORANGE

(ASTM TYPE VII, VIII, IX or X)

BOTTOM PANEL

LEGEND & BORDER - BLACK (NON-REFL)

BACKGROUND - WHITE (ASTM TYPE III OR IV REFL SHEETING)

NOTES:

1. ALL HWZ-3 SIGN PANELS SHALL BE RIGID.
2. THE SIZE OF THE HWZ-3 SIGN SHALL NOT BE REDUCED FOR USE ON TWO-LANE ROADWAYS.

## **C. LANE CLOSURES:**

### **1. Approval/Restrictions**

All lane closures of any type or duration shall have the prior approval of the Engineer.

- a. The length of a lane closure shall not exceed two (2) miles in length excluding the length of the tapers unless the prior approval of the Engineer has been obtained. The Engineer may extend the length of a lane closure based upon field conditions however the length of a workzone should be held to the minimum length required to accomplish the Work. Lane closures shall not be spaced closer than one mile. The advanced warning signs for the project should not overlap with the advanced warning signs for lane shifts, lane closures, etc.
- b. Lane closures that require same direction traffic to be split around the Work Area will not be approved for roadways with posted speeds of 35 mph or greater, excluding turn lanes.

### **2. Removal Of Lane Closures**

To provide the greatest possible convenience to the public in accordance with [Subsection 107.07](#), the Contractor shall remove all signs, lane closure markings, and devices immediately when lane closure work is completed or temporarily suspended for any length of time or as directed by the Engineer. All portable signs and portable sign mounting devices shall be removed from the roadway to an area which will not allow the sign to be visible and will not allow the sign or sign mounting device to be impacted by traffic.

### **3. Exit And Entrance Ramps**

On multilane highways where traffic has been shifted to the inside lanes, the exit and entrance ramps shall have channelization devices placed on both sides of the ramp. The temporary ramp taper length shall be greater than, or equal to, the existing taper length. Interim EXIT gore signs shall be placed at the ramp divergence. The "EXIT OPEN" sign shown in Figure TA-42 of the MUTCD shall be utilized. Channelization device spacing shall be 10 feet for 200 feet in advance of the temporary gore, and 10 feet for the first 100 feet of the temporary gore.

### **4. Lane Drop/Lane Closure**

The first seven (7) calendar days of any lane closure shall be signed and marked as per Standard 9106 or 9107. However, lane closures that exist for a duration longer than seven (7) calendar days may be signed and marked as per the details in Standard 9121, provided the prior approval of the Engineer is obtained. The approved lane drop shall utilize only the signs and markings shown for the termination end of the lane drop in Standard 9121. All warning signs in the lane drop sequence shall be used. Drums may be substituted for the Type I Crystal Delineators at the same spacing.

### **5. Termination Area**

The transition to normal or full width highway at the end of a lane closure shall be a maximum of 150 feet.

#### **D. TRAFFIC PACING METHOD:**

##### **1. Pacing Of Traffic**

With prior approval from the Engineer, traffic may be paced allowing the Contractor up to ten (10) minutes maximum to work in or above all lanes of traffic for the following purposes:

- a. Placing bridge members or other bridge work.
- b. Placing overhead sign structures.
- c. Other work items requiring interruption of traffic.

The Contractor shall provide a uniformed police officer with patrol vehicle and blue flashing light for each direction of pacing. The police officer, Engineer, and flaggers at ramps shall be provided with a radio which will provide continuous contact with the Contractor.

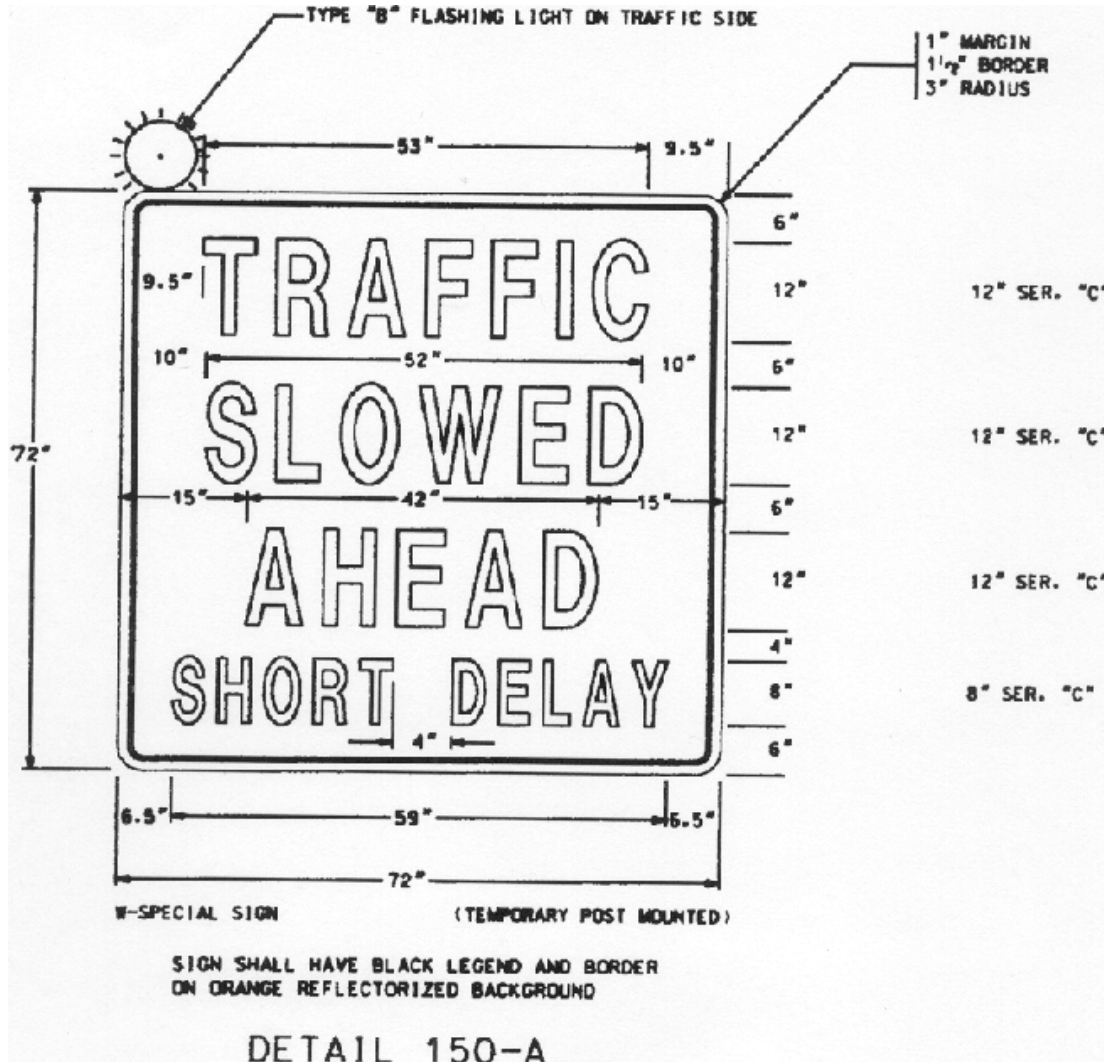
When ready to start the work activity, the police vehicle will act as a pilot vehicle slowing the traffic thereby providing a gap in traffic allowing the Contractor to perform the Work. Any on-ramps between the pace and the work area shall be blocked during pacing of traffic, with a flagger properly dressed and equipped with a Stop/Slow paddle. Each ramp should be opened after the police vehicle has passed.

Pilot vehicles shall travel at a safe pace speed, desirably not less than 20 mph interstate and 10 mph non-interstate. The Contractor shall provide a vehicle to proceed in front of the police vehicle and behind the other traffic in order to inform the Contractor's work force when all vehicles have cleared the area.

Traffic will not be permitted to stop during pacing except in extreme cases as approved by the Engineer.

##### **2. Methods Of Signing For Traffic Pacing**

At a point not less than 1,000 feet in advance of the beginning point of the pace, the Contractor shall erect and cover a W-special sign (72 inch x 72 inch) with a Type "B" flashing light, with the legend "TRAFFIC SLOWED AHEAD SHORT DELAY" (See [Detail 150-A](#)). A portable changeable message sign may be used in lieu of the W-special sign. On divided highways this sign shall be double indicated. A worker with a two-way radio shall be posted at the sign, and upon notice that the traffic is to be paced shall turn on the flashing light and reveal the sign. When traffic is not being paced, the flashing light shall be turned off and the sign covered or removed. W-special signs are reflectorized black on orange, Series "C" letter and border of the size specified.



**E. CONSTRUCTION VEHICLE TRAFFIC**

The Contractor's vehicles shall travel in the direction of normal roadway traffic and shall not reverse direction except at intersections, interchanges, or approved temporary crossings. The Contractor may submit a plan requesting that construction traffic be allowed to travel in the opposite direction of normal traffic when it would be desirable to modify traffic patterns to accommodate specific construction activities.

Prior approval of the Engineer shall be obtained before any construction traffic is allowed to travel in a reverse direction. If the Contractor's submittal is approved the construction traffic shall be separated from normal traffic by appropriate traffic control devices.

**F. ENVIRONMENTAL IMPACTS TO THE TRAFFIC CONTROL PLAN**

The Contractor shall ensure that dust, mud, and other debris from construction activities do not interfere with normal traffic operations or adjacent properties. All outfall ditches, special ditches, critical storm drain structures, erosion control structures, retention basins,

etc. shall be constructed, where possible, prior to the beginning of grading operations so that the best possible drainage and erosion control will be in effect during the grading operations, thereby keeping the roadway areas as dry as possible.

Areas within the limits of the project which are determined by the Engineer to be disturbed or damaged due either directly or indirectly from the progress or the lack of progress of the work shall be cleaned up, redressed, and regrassed. All surplus materials shall be removed and disposed of as required. Surplus materials shall be disposed of in accordance with [Subsection 201.02.E.3](#) of the Specifications.

#### **G. EXISTING STREET LIGHTS**

Existing street lighting shall remain lighted as long as practical and until removal is approved by the Engineer.

#### **H. NIGHTWORK**

Adequate temporary lighting shall be provided at all nighttime work sites where workers will be immediately adjacent to traffic. For their own protection, workers in or adjacent to traffic during nighttime operation shall wear reflectorized vests that meet the requirements of the MUTCD.

#### **I. CONSTRUCTION VEHICLES IN THE WORKZONE**

The parking of Contractor's and/or workers personal vehicles within the work area or adjacent to traffic is prohibited. It shall be the responsibility of the Worksite Traffic Control Supervisor to ensure that any vehicle present at the worksite is necessary for the completion of the work.

#### **J. ENCROACHMENTS ON THE TRAVELED-WAY**

The Worksite Traffic Control Supervisor (WTCS) shall monitor the work to ensure that all the rocks, boulders, construction debris, stockpiled materials, equipment, tools and other potential hazards are kept clear of the travelway. These items shall be stored in a location, in so far as practical, where they will not be subject to a vehicle running off the road and striking them.

#### **K. PEDESTRIAN ACCESS TO THE WORK**

All existing pedestrian walkways shall be maintained. Whenever changes to the worksite necessitate changes to existing walkways, temporary walkways shall be provided and maintained, with appropriate signs as necessary, to allow safe passage of pedestrian traffic.

#### **L. TRAFFIC SIGNALS**

If the sequence of operations, staging, or the traffic control plan requires the relocation or shifting of any components of an existing traffic signal system then any work on these traffic signals will be considered as part of Lump Sum- Traffic Control. The contractor becomes responsible for the maintenance of these traffic signals from the time that the system is modified until final acceptance. The maintenance of traffic signals that are not a



part of the work and are not in conflict with any portion of the work shall not be the responsibility of the contractor.

When construction operations necessitate an existing traffic signal to be out of service, the Contractor shall furnish off-duty police officers to regulate and maintain traffic control at the site.

#### **M. REMOVAL/REINSTALLATION OF MISCELLANEOUS ITEMS**

In the prosecution of the Work, if it becomes necessary to remove any existing signs, markers, guardrail, etc. not covered by specific pay item, they shall be removed, stored and reinstalled, when directed by the Engineer, to line and grade, and in the same condition as when removed.

### **150.03 SIGNS:**

#### **A. SIGNING REQUIREMENTS OF THE TRAFFIC CONTROL PLAN**

When existing regulatory, warning or guide signs are required for proper traffic control the Contractor shall maintain these signs in accordance with the traffic control plan. The Contractor shall review the status of all existing signs, interim signs added to the work, and permanent sign installations that are part of the work to eliminate any conflicting or non-applicable signage in the Traffic Control Plan. The Contractor's review of all signs in the Traffic Control Plan shall establish compliance with the requirements of the MUTCD and Section 150. Any conflicts shall be reported to the Engineer immediately and the WTCS shall take the necessary measures to eliminate the conflict.

The Contractor shall make every effort to eliminate the use of interim signs as soon as the Work allows for the installation of permanent signs.

All existing illuminated signs shall remain lighted and be maintained by the Contractor.

Existing street name signs shall be maintained at street intersections.

#### **B. CONFLICTING OR NON-APPLICABLE SIGNS**

Any sign(s) or portions of a sign(s) that are not applicable to the traffic control plan shall be covered so as not to be visible to traffic or shall be removed from the roadway when not in use. The WTCS shall review all traffic shifts and changes in the traffic patterns to ensure that all conflicting signs have been removed. The review shall confirm that the highest priority signs have been installed and that signs of lesser significance are not interfering with the visibility of the high priority signs. High priority signs include signs for road closures, shifts, detours, lane closures and curves. Any signs, such as speed zones and speed limits, passing zones, littering fines and litter pick up, that reference activities that are not applicable due to the presence of the Work shall be removed, stored and reinstalled when the Work is completed.

Failure to promptly eliminate conflicting or non-applicable signs shall be considered as non-performance under [Subsection 150.08](#).

### **C. REMOVAL OF EXISTING SIGNS AND SUPPORTS**

The Contractor shall not remove any existing signs and supports without prior approval from the Engineer. All existing signs and supports which are to be removed shall be stored and protected if this material will be required later in the work as part of the traffic control plan. If the signs are not to be utilized in the work then the signs will become the property of the Contractor unless otherwise specified in the contract documents.

### **D. INTERIM GUIDE, WARNING AND REGULATORY SIGNS**

Interim guide, warning, or regulatory signs required to direct traffic shall be furnished, installed, reused, and maintained by the Contractor in accordance with the MUTCD, the Plans, Special Provisions, Special Conditions, or as directed by the Engineer. These signs shall remain the property of the Contractor. The bottom of all interim signs shall be mounted at least seven (7') feet above the level of the pavement edge when the signs are used for long-term stationary operations as defined by Section 6G.02 of the MUTCD. Special Conditions under Subsection 150.11 may modify this requirement.

Portable signs may be used when the duration of the work is less than three (3) days or as allowed by the special conditions in Subsection 150.11. Portable signs shall be used for all punchlist work. All portable signs and sign mounting devices utilized in work shall be NCHRP 350 compliant. Portable interim signs shall be mounted a minimum of one (1') foot above the level of the pavement edge for directional traffic of two (2) lanes or less and a minimum of seven (7') feet for directional traffic of three (3) or more lanes. Signs shall be mounted at the height recommended by the manufacturer's crashworthy testing requirements. Portable interim signs which are mounted at less than seven (7') feet in height may have two 18 inch x 18 inch fluorescent red-orange or orange-red warning flags mounted on each sign.

All regulatory sign blanks shall be rigid whether the sign is mounted as a portable sign, on a Type III barricade or as a permanent mount height sign.

Any permanent mount height interim sign that is designed to fold in half to cover a non-applicable message on the sign shall have reflectorized material on the folded over portion of the sign. The reflectorized material shall be orange in color with a minimum of ASTM Type I engineering grade sheeting with a minimum area of six inches by six inches (6" x 6") facing the direction of traffic at all times when the sign is folded.

Interim signs may be either English or metric dimensions.

### **E. EXISTING SPECIAL GUIDE SIGNS**

Existing special guide signs on the Project shall be maintained until conditions require a change in location or legend content. When change is required, existing signs shall be modified and continued in use if the required modification can be made within existing sign borders using design requirements (legend, letter size, spacing, border, etc.) equal to that of the existing signs, or of [Sub-Section 150.03.E.2](#). Differing legend designs shall not be mixed in the same sign.

#### **1. Special Guide Signs**

Special guide signs are those expressway or freeway guide signs that are designed with a message content (legend) that applies to a particular roadway location. When

an existing special guide sign is in conflict with work to be performed, the Contractor shall remove the conflicting sign and reset it in a new, non-conflicting location which has been approved by the Engineer.

## **2. Interim Special Guide Signs**

When it is not possible to utilize existing signs, either in place or relocated, the Contractor shall furnish, erect, maintain, modify, relocate, and remove new interim special guide signs in accordance with the Plans or as directed by the Engineer. Interim special guide signs that may be required in addition to, or a replacement for, existing expressway and freeway (interstate) signs shall be designed and fabricated in compliance with the minimum requirements for guide signing contained in Part 2E "Guide Signs Expressway" and Part 2F "Guide Signs Freeways" of the MUTCD, except that the minimum size of all letters and numerals in the names and places, streets and highways on all signs shall be 16 inches Series "E" initial upper-case and 12 inches lower-case. All interstate shields on these signs shall be 48 inches and 60 inches for two-numeral and three-numeral routes, respectively.

The road name of the exit or route shield shall be placed on the exit gore sign.

## **3. Interim Overhead Guide Sign Structures**

Interim overhead special guide sign structures are not required to be lighted unless specifically required by the Plans. If lighting is required the sign shall be lighted as soon as erected and shall remain lighted, during the hours of darkness, until the interim sign is no longer required. The Contractor shall notify the Power Company at least thirty (30) days prior to desired connection to the power source.

## **4. Permanent Special Guide Signs**

The installation of new permanent special guide signs and the permanent modification or resetting of existing special guide signs, when included in the contract, shall be accomplished as soon as practical to minimize the use of interim special guide signs. If lighting is required by the Plans, all new permanent overhead special guide signs shall be lighted as soon as erected.

# **F. MATERIALS- INTERIM SIGNS:**

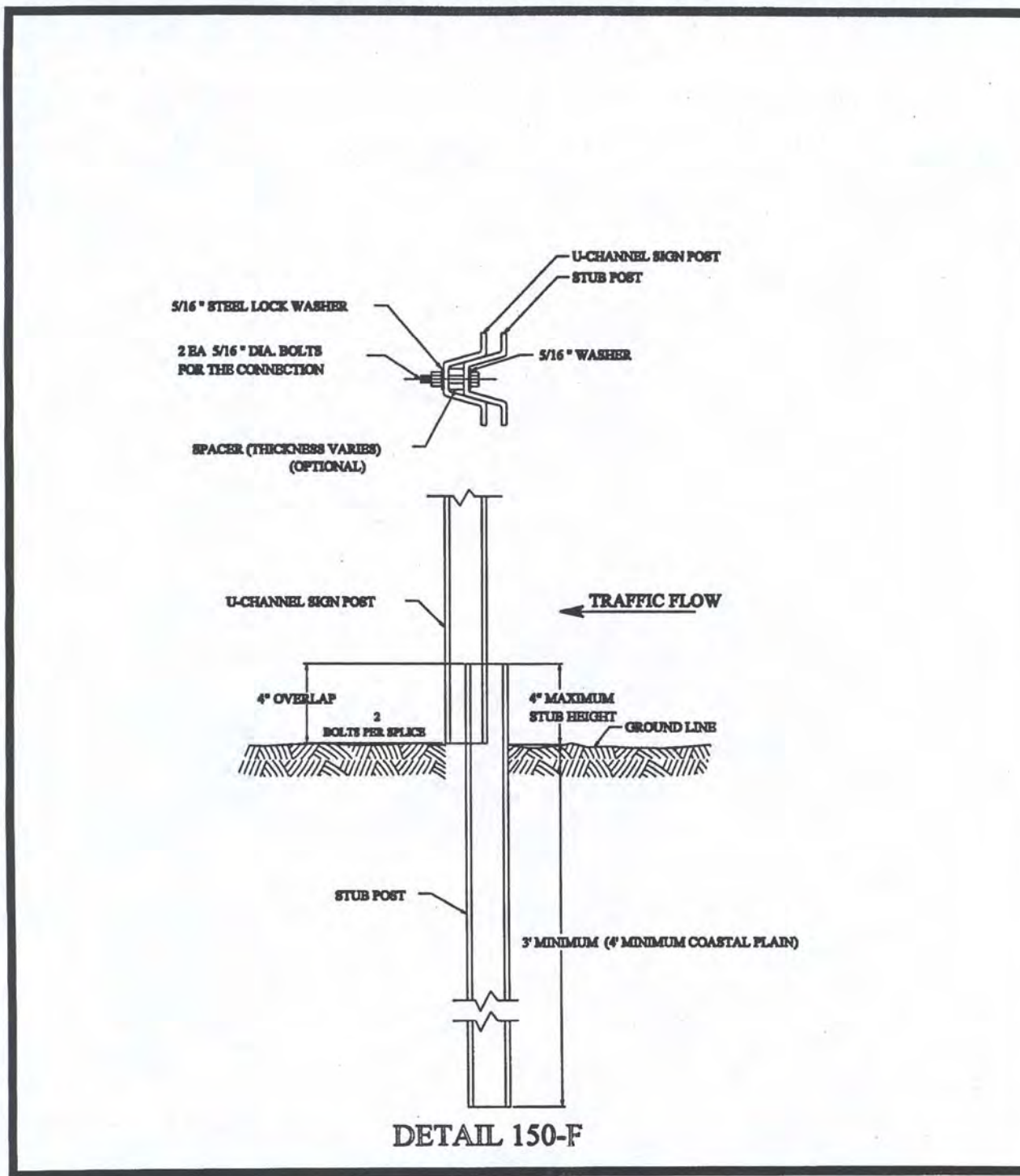
## **1. Posts**

Permanent mounting height of seven (7') feet- Posts for all interim signs shall meet the requirements of Section 911 except that green or silver paint may be used in lieu of galvanization for steel posts or structural shape posts. Within the limits of a single project, all metal posts shall be the same color. Wood posts are not required to be pressure treated.

Interim posts may be either metric or English in dimensions.

Posts for all interim signs shall be constructed to yield upon impact unless the posts are protected by guardrail, portable barrier, impact attenuator or other type of positive barrier protection. Unprotected posts shall meet the breakaway requirements of the "1994 AASHTO Standard Specifications for Structural Support for Highway Signs, Luminaries and Traffic Signals". Unprotected interim posts shall be spliced as shown in [Detail 150-F](#) unless full length unspliced posts are used.

Unprotected post splices will not be permitted any higher than four inches above the ground line to lessen the possibility of affecting the undercarriage of a vehicle. Installation of posts may require establishment of openings in existing pavements, islands, shoulders etc.



2. Sign Blanks And Panels- Permanent mounting height of seven (7') feet-

All sign blanks and panels shall conform to [Section 912](#) of the Specifications except that blanks and panels may be ferrous based or other metal alloys. Type 1 and Type 2 sign blanks shall have a minimum thickness of 0.08 inches regardless of the sign type used. Alternative sign blank materials (composites, poly carbonates, fiberglass reinforced plastics, recycled plastics, etc.) shall have a letter of approval from the Office of Materials and Research for use as interim construction signs before these materials are allowed to be incorporated into the work unless these rigid sign blanks are currently approved as a crashworthy sign blank material under QPL 34. The back side of sign panels shall be painted orange to prevent rust if other metals are used in lieu of aluminum. Plywood blanks or panels will not be permitted. The use of flexible signs will not be permitted for permanent mount height signs.

Interim blanks and panels may be either metric or English in dimensions.

### **3. Portable Sign Mounting Devices, Portable Sign Blanks-**

All portable sign mounting devices and sign blanks utilized in the work shall be NCHRP 350 Test Level III compliant. All portable sign mounting devices and sign blanks shall be from the Qualified Products List. Any sign or sign mounting device shall have an identifying decal, logo, or manufacturer's stamping that clearly identifies the device as NCHRP 350 compliant. The Contractor may be required to provide certification from the Manufacturer as proof of NCHRP 350 compliance. All portable signs shall be mounted according to height requirements of [Subsection 150.03.D](#).

## **G. SIGN VISIBILITY AND OFFSETS**

All existing, interim and new permanent signs shall be installed so as to be completely visible for an advance distance in compliance with the MUTCD. Any clearing required for maintaining the line of sight to existing, interim or permanent signs shall be done as part of the requirements of the traffic control plan. The clearing shall include any advance warning signs, both interim and permanent, that are installed as a part of the work including advance warning signs that are installed outside the limits of the project. Any sign installed behind W-beam or T-beam guardrail with non-breakaway posts shall be installed with the leading edge of the sign a minimum of four feet and three inches (4'3") behind the face of the guardrail with five feet (5') of clearance being desirable. Limbs, brush, construction equipment and materials shall be kept clear of the driver's line of sight to all signs that are part of the traffic control plan.

## **H. ADVANCE WARNING SIGNS:**

### **1. All Type Of Highways**

Advance warning signs shall be placed ahead of the work area in accordance with Part VI of the MUTCD and shall include a series of at least three advance road work (W20-1) signs placed at the termini of the project. The series shall have the legend ROAD WORK (1500 FEET, 1000 FEET, AND 500 FEET).

At grade intersecting roadways and on-ramps shall be signed with a minimum of one ROAD WORK AHEAD sign.

When work terminates at a "T" intersection, a minimum of one "ROAD WORK AHEAD" sign shall be placed in advance of the intersection and one "END ROAD WORK" sign shall be placed at the termination end of the intersection. Field conditions may require the use of additional warning signage.

Advanced Warning Signs on State Routes shall be a minimum dimension of 48 inches x 48 inches. When a State Route intersects a project which consists of adding travel lanes, reconstructing an existing roadway or new location work, the State Route approaches shall have a minimum of three (W20-1) advanced warning signs (1500 ft., 1000 ft., 500 ft.). The termination end of an intersecting State Route shall have END ROAD WORK signage.

The W20-1 signs shall be placed at the termini of the project or sufficiently in advance of the termini to allow for lane shifts, lane closures and other activities which may also require advanced warning signs. The advanced warning signs for the project should not overlap with the advanced warning signs for lane shifts, lane closures, etc.

The length of a workzone should be held to the minimum length required to accomplish the work. If a project has multiple individual worksites within the overall limits of the project, each site should be signed individually if the advance warning signs for each site can be installed without overlapping an adjacent worksite. As soon as the work is completed at any individual site the warning signs shall be removed from that site. Clean-up work and punchlist work shall be performed with portable signage.

Project mileage indicated on the G20-1 sign shall be the actual project mileage rounded up to the nearest whole mile. Projects less than two (2) miles in length or individual worksites that are part of a multiple worksite project may delete this sign. The G20-1 sign shall be 60" X 36" and the G20-2 sign shall be 48" X 24".

## **2. Interstate, Limited Access And Multilane Divided Highways**

In addition to the W20-1 signs required at 500 ft., 1000 ft. and 1500 ft., multi-lane divided highways shall also have additional advanced warning signs installed with the legend "ROAD WORK (2 MILES, 1 MILE and 1/2 MILE). All construction warning signs on divided highways shall be double indicated (i.e., on the left and right sides of the roadway.) If the use of the ½ mile, 1 mile and 2 mile advanced warning signs cause an overlap with other work or do not benefit field conditions then the Engineer may review the use of these signs and eliminate their installation. When the posted speed limit is 50 MPH or less, the ½ mile, 1 mile and 2 mile signs should be eliminated especially in urban areas.

The W20-1 advance warning signs for ROAD WORK 500 FEET; 1000 FEET; and 1500 FEET shall be temporarily covered when work involving the advanced warning signs for lane shifts and lane closures overlap these signs. The ROAD WORK ½ MILE, ROAD WORK 1 MILE, and ROAD WORK 2 MILES shall be in place when the 500, 1000 and 1500 feet signs are temporarily covered.

When the temporary traffic control zone already has advanced warning (W20-1) signs installed the W20-1 signs required for lane closures under Standard 9106 should be eliminated.

**RAMP WORK ON LIMITED ACCESS HIGHWAYS:** The workzone shall not be signed for the entire length of the mainline of a limited access highway when only short individual worksites, interchange or ramp work is being performed.

When work is restricted to ramp reconstruction or widening activities, the advance warning signs on the mainline section of the limited access highway shall be limited to

the use of portable advance warning signs. These portable advance warning signs shall only be utilized when work activity is within the gore point of the ramp and the mainline traveled way or work is active in the accel/decel lane adjacent to the mainline traveled way. Portable advance warning signs (W20-1; 1500ft./1000 ft./500ft.) shall be installed on the traveled way of the limited access highway when the above conditions are present. The advance warning signs shall be installed only in one direction where work is active. All portable signs shall be double indicated. When work is not active, the ramp work shall be advanced warned by the use of a single 48 inch X 48 inch "RAMP WORK AHEAD" sign along the right shoulder of the mainline traveled way prior to the beginning of the taper for the decel lane. The "RAMP WORK AHEAD" sign shall be mounted at seven (7') feet in height. Differences in elevation shall be in compliance with the requirements of [Subsection 150.06](#) prior to the removal of the portable (W20-1) advanced warning signs from the mainline.

The G20-1 sign shall be eliminated on limited access highways when the work involves only ramp work, bridge reconstruction, bridge painting, bridge joint repairs, guardrail and anchor replacement or other site specific work which is confined to a short section of limited access highway.

**I. PORTABLE CHANGEABLE MESSAGE SIGN**

Unless specified as a paid item in the contract the use of a portable changeable message sign will not be required. When specified, a portable changeable message sign (PCMS) shall meet the minimum requirements of [Section 632](#) and the MUTCD. The maximum amount of messages allowed to be flashed on one PCMS is two phases (flashes). The language and the timing of the messages shall comply with the MUTCD and Section 632. When used as an advanced device the PCMS should typically be placed ahead of the construction activities. If the PCMS is used as a substitute for another device then the requirements for the other device apply.

**J. FLASHING BEACON**

The flashing beacon assembly, when specified, shall be used in conjunction with construction warning signs, regulatory, or guide signs to inform traffic of special road conditions which require additional driver attention. The flashing beacon assembly shall be installed in accordance with the requirements of [Section 647](#).

**K. RUMBLE STRIP SIGNAGE**

Signage for rumble strips located in the travelway shall be as required in [Subsection 150.01.C](#) and [Subsection 150.02.A.9](#).

**L. LOW/SOFT SHOULDER SIGNAGE**

Low or soft shoulder signs shall be utilized in accordance with the following conditions:

**CONSTRUCTION/RECONSTRUCTION PROJECTS:**

"LOW/SOFT SHOULDER" signs shall be erected when a difference in elevation exceeds one (1") inch but does not exceed three (3") inches between the travelway and any type of shoulder unless the difference in elevation is four (4') feet or greater from the edge of the traveled way.



The spacing of the signs shall not exceed one (1) mile and the signs shall be placed immediately past each crossroad intersection. The "Low/Soft" signs shall remain in place until the difference in elevation is eliminated and the shoulder has been dressed and permanently grassed for a minimum of thirty (30) calendar days. These signs shall be furnished, installed, maintained and removed by the Contractor as part of Traffic Control-Lump Sum. These signs shall be orange with black borders and meet the reflectorization requirements of [Subsection 150.01.C](#).

"SHOULDER DROP-OFF" (W8-9a) signs shall be used when a difference in elevation, less than four (4') feet from the traveled way, exceeds three (3") inches and is not protected by positive barrier protection. These warning signs shall be placed in advance of the drop-off. For a continuous drop-off condition, the W8-9a) signs shall, as a minimum, be spaced in accordance with the above requirements for "Low/soft shoulder" signs.

#### **PROJECTS CONSISTING PRIMARILY OF ASPHALTIC CONCRETE RESURFACING ITEMS:**

"LOW/SOFT SHOULDER" signs shall be erected when a difference in elevation exceeds one (1") inch but does not exceed three (3") inches between the travelway and any type of shoulder unless the difference in elevation is four (4') feet or greater from the edge of the traveled way.

SHOULDER BUILDING INCLUDED IN THE CONTRACT: "Low/Soft Shoulder" signs shall be erected as per the requirement of Standards 9102, 9106, and 9107. "Shoulder Drop-off" signs (W8-9a) shall be erected as per the requirements of the MUTCD. These signs shall be maintained until the conditions requiring their installation have been eliminated. The Contractor shall remove all interim warning signs before final acceptance.

SHOULDER BUILDING NOT INCLUDED IN THE CONTRACT: The Department will furnish the "Low/Soft Shoulder" signs, "Shoulder Drop-off" signs and the posts. The signs shall be erected to meet the minimum requirements of [Subsection 150.03](#). The Contractor shall include the cost of furnishing installation hardware (bolts, nuts, and washers), erection and maintenance of the signs in the bid price for Traffic Control- Lump Sum. The Contractor shall maintain the signs until final acceptance. The Department will remove the signs.

LAU/LAR PROJECTS SHOULDER BUILDING NOT INCLUDED IN THE CONTRACT: The Contractor will furnish, install and maintain LOW/SOFT SHOULDER signs (yellow with black borders, ASTM Type III or IV) at the appropriate spacing, until Final Acceptance of the project by the Department. After Final Acceptance by the Department the signs will become the property and responsibility of the local government.

#### **M. BUMP SIGNAGE:**

MULTI-LANE DIVIDED HIGHWAYS: A bump sign (W8-1) shall be utilized when a transverse joint in the pavement structure has a vertical difference in elevation of three quarters (3/4") of an inch or greater in depth with no horizontal taper to ramp the traffic from one elevation to the other. This condition typically occurs at approach slabs during pavement milling operations and at transverse joints in asphaltic pavement lifts.

TWO-LANE TWO-WAY HIGHWAYS: A bump sign (W8-1) shall be utilized when a transverse joint in the pavement structure has a vertical difference in elevation that



exceeds one and three quarters (1-3/4") inches in depth with no horizontal taper to ramp the traffic from one elevation to the other. This includes utility and storm drainage repairs that require concrete placement for patching and/or steel plating.

The (W8-1) sign shall be placed sufficiently in advance to warn the motorist of the condition.

## **150.04 PAVEMENT MARKINGS**

### **A. GENERAL**

Full pattern pavement markings in accordance with [Section 652](#) and in conformance with Section 3A and 3B, except 3B.02, of the MUTCD are required on all courses before the roadway is opened to traffic. No passing zones shall be marked to conform to [Subsection 150.04.E](#). During construction and maintenance activities on all highways open to traffic, both existing markings and markings applied under this Section shall be fully maintained until Final Acceptance. If the pavement markings are, or become, unsatisfactory in the judgement of the Engineer due to wear, weathering, or construction activities, they shall be restored immediately.

#### **1. Resurfacing Projects**

Pavement markings shall be provided on all surfaces that are placed over existing markings. Interim and final markings shall conform in type and location to the markings that existed prior to resurfacing unless changes or additions are noted in the Contract. The replacement of parking spaces will not be required unless a specific item or note has been included in the Contract. Any work to make additions to the markings that existed prior to resurfacing is to be considered as extra work.

#### **2. Widening And Reconstruction Projects**

If the lane configuration is altered from the preconstruction layout then pavement markings will be as required by the plans or the Engineer.

#### **3. New Location Construction Projects**

Pavement marking plans will be provided.

### **B. MATERIALS**

All traffic striping applied under this Section shall be a minimum four inches in width or as shown in plans and shall conform to the requirements of [Section 652](#), except as modified herein. Raised pavement markers (RPMs) shall meet the requirements of [Section 654](#). Markings on the final surface course, which must be removed, shall be a removable type. The Contractor will be permitted to use paint, thermoplastic, or tape on pavement which is to be overlaid as part of the project, unless otherwise directed by the Engineer. Partial (skip) reflectorization (i.e. reflectorizing only a portion of a stripe) will not be allowed.

### **C. INSTALLATION AND REMOVAL OF PAVEMENT MARKINGS:**

INSTALLATION: All pavement markings, both interim and permanent, shall be applied to a clean surface. The Contractor shall furnish the layout and preline the roadway surface for the placement of pavement markings applied as part of the traffic control plan. All interim

marking tape and RPM's on the final surface shall be removed prior to the placement of the final markings.

The Contractor shall sequence the work in such a manner as to allow the installation of markings in the final lane configuration at the earliest possible stage of the work.

REMOVAL: Markings no longer applicable shall be removed in accordance with [Subsection 656.2](#).

THE ELIMINATION OF CONFLICTING PAVEMENT MARKINGS BY OVERPAINTING WITH PAINT OR LIQUID ASPHALT IS NOT ACCEPTABLE.

INTERMEDIATE SURFACE: Interim markings shall be removed by methods that will cause minimal damage to the pavement surface while also ensuring that traveling public will not be confused or misdirected by any residual markings remaining on the intermediate surface. The use of approved black-out tape and black-out paint may be permitted on some interim surfaces, provided the results are satisfactory to the Engineer.

FINAL SURFACE: No interim paint or thermoplastic markings will be permitted on any final surface unless the interim markings are in alignment with the location of the permanent markings and the interim marking will not interfere or adversely affect placement of the permanent markings. The proposed method of removal for layout errors that require markings to be removed from the final surface shall have the prior approval of the Engineer. Any damage to the final pavement surface caused by the pavement marking removal process shall be repaired at the Contractor's expense by methods acceptable and approved by the Engineer. [Subsection 400.3.06.C](#) shall apply when corrective measures are required. The use of black-out tape or black-out paint will not be permitted to correct layout errors on any final surface.

Traffic shifts that are done on the final surface shall be accomplished using interim traffic marking tape that can be removed without any blemishing of the final surface. Interim traffic marking tape shall be used on any of the following final surfaces; asphaltic concrete, Portland cement concrete, and bridge deck surfaces. Exceptions to the requirements for interim traffic marking tape shall have the written prior approval of the Engineer before the application of any other method is permitted.

PAY FACTOR REDUCTION FOR ASPHALTIC CONCRETE FINAL SURFACES: When the correction of an error in the layout of the final pavement markings requires the final surface to be grounded, blemished, scarred, or polished the pay factor shall be reduced to 0.95 for the entire surface area of the final topping that has a blemish, polished or a scarred surface. The reduced pay factor shall not be confined to only the width and length of the stripe or the dimensions of the blemished areas, the whole roadway surface shall have the reduced pay factor applied. The area of the reduced pay factor shall be determined by the total length and the total width of the roadway affected. If the affected area is not corrected, the reduction in pay shall be deducted from the final payment for the topping layer of asphaltic concrete. The Engineer shall make the final determination whether correction or a reduced pay factor is acceptable.

The eradication of pavement markings on intermediate and final concrete surfaces shall be accomplished by a method that does not grind, polish, or blemish the surface of the concrete. The method used for the removal of the interim markings shall not spall chip the joints in the concrete and shall not damage the sealant in the joints. Any joint or sealant

repairs shall be included in the bid price for Traffic Control-Lump Sum. The proposed method of removal shall have the prior approval of the Engineer.

Failure to promptly remove conflicting or non-applicable pavement markings shall be considered as non-performance under [Subsection 150.08](#).

**PREPARATION AND PLANNING FOR TRAFFIC SHIFTS:** When shifting of traffic necessitates removal of centerline, lane lines, or edge lines, all such lines shall be removed prior to, during, or immediately after any change so as to present the least interference with traffic. Interim traffic marking tape shall be used as a temporary substitute for the traffic markings being removed.

Before any change in traffic lane(s) alignment, marking removal equipment shall be present on the project for immediate use. If marking removal equipment failures occur, the equipment shall be repaired or replaced (including leasing equipment if necessary), so that the removal can be accomplished without delay.

Except for the final surface, markings on asphaltic concrete may be obliterated by an overlay course, when approved by the Engineer. When an asphaltic concrete overlay is placed for the sole purpose of eliminating conflicting markings and the in place asphaltic concrete section will allow, said overlay will be eligible for payment only if designated in the Plans. Overlays to obliterate lines will be paid for only once and further traffic shifts in the same area shall be accomplished with removable markings. Only the minimum asphaltic concrete thickness required to cover lines will be allowed. Excessive build-up will not be permitted. When an overlay for the sole purpose of eliminating conflicting markings is not allowed, the markings no longer applicable shall be removed in accordance with [Subsection 656.2](#).

#### **D. RAISED PAVEMENT MARKERS**

Raised pavement markers (RPMs) are required as listed below for all asphaltic concrete pavements before the roadway is open to traffic. On the final surface, RPM's shall be placed according to the timeframes specified in Subsection 150.04 E. for full pattern pavement markings except Interstate Highways where RPM's shall be placed and/or maintained when the roadway is open to traffic. When Portland Cement Concrete is an intermediate or final surface and is open to traffic, one calendar day is allowed for cleaning and drying before the installation of RPMs is required.

Raised pavement markers are not allowed on the right edge lines under any situation.

##### **1. Interstate Highways**

Retro-reflective raised pavement markers (RPM's) shall be placed and/or maintained on intermediate pavements surfaces on all interstate highways that are open to traffic. This includes all resurfacing projects along with widening and reconstruction projects. The spacing and placement shall be as required for MULTI-LANE DIVIDED HIGHWAYS.

##### **2. Multi-Lane Divided Highways**

Retro-reflective raised pavement markers (RPMs) shall be placed and/or maintained on intermediate pavement surfaces on all multi-lane divided highways that are opened to traffic when these roadways are being widened or reconstructed. Two lane-two way roadways that are being widened to a multi-lane facility, whether divided or undivided, are included in this provision. Projects consisting primarily of asphalt resurfacing items

or shoulder widening items are excluded from this requirement. The RPMs shall be placed as follows:

a. SUPPLEMENTING LANE LINES

80 foot center on skip lines with curvature less than three degrees. (Includes tangents)

40 foot centers on solid lines and all lines with curvature between three degrees and six degrees.

20 foot centers on curves over six degrees.

20 foot centers on lane transitions or shifts.

b. SUPPLEMENTING RAMP GORE LINES

20 foot centers, two each, placed side by side.

c. OTHER LINES

As shown on the plans or directed by the Engineer.

**3. Other Highways**

On other highways under construction RPMs shall be used and/or maintained on intermediate pavement surfaces as follows:

a. SUPPLEMENTING LANE LINES AND SOLID LINES

40 foot centers except on lane shifts. (When required in the Plans or Contract.)

20 foot centers on lane shifts. (Required in all cases.)

b. SUPPLEMENTING DOUBLE SOLID LINES

40 foot centers (one each beside each line) except on lane shifts. (When required in the Plans or Contract.)

20 foot centers on lane shifts. (Required in all cases.)

**E. EXCEPTIONS FOR INTERIM MARKINGS**

Some exceptions to the time of placement and pattern of markings are permitted as noted below, however, full pattern pavement markings are required for the completed project.

**1. Two-Lane, Two-Way Roadways**

a. SKIP LINES

All interim skip (broken) stripe shall conform to [Section 652](#) except that stripes shall be at least two feet long with a maximum gap of 38 feet. On curves greater than six degrees, a one-foot stripe with a maximum gap of 19 feet shall be used. In lane shift areas solid lines will be required. Interim skip lines shall be replaced with markings in full compliance with [Section 652](#) prior to expiration of the 14 calendar day period.

Interim raised pavement markers may be substituted for the interim skip (broken) stripes. If raised pavement markers are substituted for the two foot interim skip stripe, three markers spaced at equal intervals over a two foot distance will be required. No separate payment will be made if the interim raised pavement markers are substituted for interim skip lines.

Interim raised pavement markers shall be retro-reflective, shall be the same color as the pavement markers for which they are substituted, and shall be visible during daytime.

The type of interim marker and method of attachment to the pavement shall be approved by the Office of Materials and Research but in no case will the markers be attached by the use of nails. Flexible reflective markers, Type 14 or Type 15, may be used for a maximum of fourteen (14) calendar days as an interim marker. Any flexible reflective markers in use shall be from the qualified products list (QPL).

The interim raised pavement markers shall be maintained until the full pattern pavement markings are applied. At the time full pattern markings are applied the interim raised markers shall be removed in a manner that will not interfere with application of the full pattern pavement markings.

b. NO PASSING ZONES-TWO-LANE, TWO-WAY ROADWAYS

Passing zones shall be re-established in the locations existing prior to resurfacing. No changes to the location of passing zones shall be done without the written approval of the Engineer. For periods not to exceed three calendar days where interim skip centerlines are in place, no-passing zones shall be identified by using post or portable mounted DO NOT PASS regulatory signs (R4-1 24" x 30") at the beginning and at intervals not to exceed ½ mile within each no-passing zone. A post or portable mounted PASS WITH CARE regulatory sign (R4-1 24" x 30") shall be placed at the end of each no-passing zone. Post mounted signs shall be placed in accordance with the MUTCD. Portable signs shall conform to the requirements of the MUTCD and shall be NCHRP 350 compliant. Portable signs shall be secured in such a manner to prevent misalignment and minimize the possibility of being blown over by weather conditions or traffic.

On new location projects and on projects where either horizontal or vertical alignments has been modified, the location of No-Passing Zones will be identified by the Engineer.

c. EDGELINES

1) Bituminous Surface Treatment Paving

Edgelines will not be required on intermediate surfaces (including asphaltic concrete leveling for bituminous surface treatment paving) that are in use for a period of less than 60 calendar days except at bridge approaches, on lane

transitions, lane shifts, and in such other areas as determined by the Engineer. On the final surface, edgelines shall be placed within 30 calendar days of the time that the final surface was placed.

2) All Other Types of Pavement

Edgelines will not be required on intermediate surfaces that are in use for a period of less than 30 calendar days except at bridge approaches, on lane transitions, lane shifts, and in such other areas as determined by the Engineer. On the final surface, edgelines shall be placed within 14 calendar days of the time that the surface was placed.

**2. Multi-Lane Highways – With No Paved Shoulder(S) Or Paved Shoulder(S) Four Feet Or Less**

a. UNDIVIDED HIGHWAYS (INCLUDES PAVED CENTER TURN LANE)

- 1) Centerlines and No-Passing Barrier-Full Pattern centerlines and no-passing barriers shall be restored before opening to traffic.
- 2) Lanelines- Interim skip (broken) stripe as described in [Subsection 150.04E.1.a](#). may be used for periods not to exceed three calendar days. Skiplines are not permitted in lane shift areas. Solid lines shall be used.
- 3) Edgelines- Edgelines shall be placed on intermediate and final surfaces within three calendar days of obliteration.

b. DIVIDED HIGHWAYS (GRASS OR RAISED MEDIAN)

- 1) Lanelines- Full pattern skip stripe shall be restored before opening to traffic. Skip lines are not permitted in lane shift areas. Solid lines shall be required.
- 2) Centerline/Edgeline- Solid lines shall be placed on intermediate and final surfaces within three calendar days of obliteration.

**3. Limited Access Roadways And Roadways With Paved Shoulders Greater Than Four Feet**

a. Same as [Subsection 150.04.E.2](#) except as noted in (b) below.

b. EDGELINES-

- 1) Asphaltic Concrete Pavement- Edgelines shall be placed on intermediate and final surfaces prior to opening to traffic.
- 2) Portland Cement Concrete Pavement- Edgelines shall be placed on any surface open to traffic no later than one calendar day after work is completed on a section of roadway. All water and residue shall be removed prior to daily striping.

**4. Ramps For Multi-Lane Divided Highways**

A minimum of one solid line edge stripe shall be placed on any intermediate surface of a ramp prior to opening the ramp to traffic. The other edge stripe may be omitted for a maximum period of three (3) calendar days on an intermediate surface.

Appropriate channelization devices shall be spaced at a maximum of twenty-five (25') feet intervals until the other stripe has been installed.

The final surface shall have both stripes placed prior to opening the ramp to traffic.

## **5. MISCELLANEOUS PAVEMENT MARKINGS:**

**FINAL SURFACE:** School zones, railroads, stop bars, symbols, words and other similar markings shall be placed on final surfaces conforming to [Section 652](#) within fourteen (14) calendar days of completion of the final surface. Final markings shall conform to the type of pay item in the plans. When no pay item exists in the plans the final markings shall conform to Section 652 for painted markings.

**INTERMEDIATE SURFACE:** Intermediate surfaces that will be in use for more than forty-five (45) calendar days shall have the miscellaneous pavement markings installed to conform to the requirement of [Section 652](#). Under Subsection 150.11, Special Conditions, or as directed by the Engineer these markings may be eliminated.

## **F. MOBILE OPERATIONS**

When pavement markings (centerlines, lane lines, and edgelines) are applied in a continuous operation by moving vehicles and equipment, the following minimum equipment and warning devices shall be required. These devices and equipment are in addition to the minimum requirements of the MUTCD.

### **1. All Roadways**

All vehicles shall be equipped with the official slow moving vehicle symbol sign. All vehicles shall have a minimum of two flashing or rotating beacons visible in all directions. All protection vehicles shall have an arrow panel mounted on the rear. All vehicles requiring an arrow panel shall have, as a minimum, a Type B panel. All vehicle mounted signs shall be mounted with the bottom of the sign a minimum height of forty-eight inches (48") above the pavement. All sign legends shall be covered or removed from view when work is not in progress.

### **2. Two-Lane Two-Way Roadways**

#### **a. Lead Vehicles**

The lead vehicle may be a separate vehicle or the work vehicle applying the pavement markings may be used as the lead vehicle. The lead vehicle shall have an arrow panel mounted so that the panel is easily visible to oncoming (approaching) traffic. The arrow panel should typically operate in the caution mode.

#### **b. Work Vehicles**

The work vehicle(s) applying markings shall have an arrow panel mounted on the rear. The arrow panel should typically operate in the caution mode. The work vehicle placing cones shall follow directly behind the work vehicle applying the markings.

#### **c. Protection Vehicles**

A protection vehicle may follow the cone work vehicle when the cones are being placed and may follow when the cones are being removed.

### **3. MULTI-LANE ROADWAYS**

A lead vehicle may be used but is not required. The work vehicle placing cones shall follow directly behind the work vehicle applying the markings. A protection vehicle that does not function as a work vehicle should follow the cone work vehicle when traffic cones are being placed. A protection vehicle should follow the cone work vehicle when the cones are being removed from the roadway. Protection vehicles shall display a sign on the rear of the vehicle with the legend PASS ON LEFT(RIGHT).

INTERSTATES AND LIMITED ACCESS ROADWAYS: A protection vehicle shall follow the last work vehicle at all times and shall be equipped with a truck mounted attenuator (TMA) that is certified for impacts not less than 62 mph in accordance with NCHRP350 Test Level Three (3).

## **150.05 CHANNELIZATION**

### **A. GENERAL**

Channelization shall clearly delineate the travelway through the work zone and alert drivers and pedestrians to conditions created by work activities in or near the travelway. Channelization shall be done in accordance with the plans and specifications, the MUTCD, and the following requirements.

All Channelization Devices utilized on any project shall be NCHRP 350 compliant. Any device used on the Work shall be from the Qualified Products List. All devices utilized on the work shall have a decal, logo, or manufacturer's stamping that clearly identifies the device as NCHRP 350 compliant. The Contractor may be required to furnish certification from the Manufacturer for any device to prove NCHRP 350 compliance.

#### **1. Types of Devices Permitted for Channelization in Construction Work Zones:**

##### **a. DRUMS:**

- 1) DESIGN: Drums shall meet the minimum requirement of the MUTCD and shall be reflectorized as required in [Subsection 150.01.C](#). The upper edge of the top reflectorized stripe on the drum shall be located a minimum of 33 inches above the surface of the roadway. A minimum drum diameter of 18 inches shall be maintained for a minimum of 34 inches above the roadway.
- 2) APPLICATION: Drums shall be used as the required channelizing device to delineate the full length of a lane closure, shift, or encroachment, except as modified by this Subsection.
- 3) TRANSITION TAPERS FOR LANE CLOSURES: Drums shall be used on all transition tapers. The minimum length for a merging taper for a lane closure on the travelway shall be as shown in Table 150-1:



**TABLE 150-1**

Posted Speed Limit, MPH	Lane Width 9 Feet	Lane Width 10 Feet	Lane Width 11 Feet	Lane Width 12 Feet	Maximum Drum Spacing in Tapers, (Feet)
	Minimum Taper Length (L) in Feet				
20	60	70	75	80	20
25	95	105	115	125	25
30	135	150	165	180	30
35	185	205	225	245	35
40	240	270	295	320	40
45	405	450	495	540	45
50	450	500	550	600	50
55	495	550	605	660	55
60	540	600	660	720	60
65	585	650	715	780	65
70	630	700	770	840	70
75	675	750	825	900	75

If site conditions require a longer taper then the taper shall be lengthened to fit particular individual situations.

The length of shifting tapers should be at least  $\frac{1}{2}$  L.

The length of a closed lane or lanes, excluding the transition taper(s), shall be limited to a total of two (2) miles. Prior approval must be obtained from the Engineer before this length can be increased.

Night time conditions: When a merge taper exists into the night all drums located in the taper shall have, for the length of the taper only, a six (6") inch fluorescent orange (ASTM Type VII, VIII, IX or X) reflectorized top stripe on each drum. The top six-inch stripe may be temporarily attached to the drum while in use in a taper. All drums that have the six-inch top stripe permanently attached shall not be used for any other conditions.

Multiple Lane Closures:

- (a) A maximum of one lane at a time shall be closed with each merge taper.
  - (b) A minimum tangent length of 2 L shall be installed between each individual lane closure taper.
- 4) LONGITUDINAL CHANNELIZATION: Drums shall be spaced as listed below for various roadside work conditions except as modified by [Subsection 150.06](#). Spacing shall be used for situations meeting any of the conditions listed as follows:
- (a) 40 FOOT SPACING MAXIMUM
    - (1) For difference in elevation exceeding two inches.

(2) For heeled sections no steeper than 4:1 as shown in [Subsection 150.06](#), [Detail 150-E](#).

(b) 80 FOOT SPACING MAXIMUM

(1) For difference in elevation of two inches or less.

(2) Flush areas where equipment or workers are within ten feet of the travel lane.

(c) 200 FOOT SPACING MAXIMUM: Where equipment or workers are more than ten feet from travel lane. Lateral offset clearance to be four feet from the travel lane.

(1) For paved areas eight feet or greater in width that are paved flush with a standard width travel lane.

(2) For disturbed shoulder areas not completed to typical section that are flush to the travel lane and considered a usable shoulder.

REMOVAL OF DRUMS: Drums may be removed after shoulders are completed to typical section and grassed. Guardrail and other safety devices shall be installed and appropriate signs advising of conditions such as soft or low shoulder shall be posted before the drums are removed.

b. VERTICAL PANELS

1) DESIGN: All vertical panels shall meet the minimum requirements of the MUTCD. All vertical panels shall have a minimum of 270 square inches of retro-reflective area facing the traffic and shall be mounted with the top of the reflective panel a minimum of 36" above the roadway.

2) APPLICATION: Lane encroachment by the drum on the travelway should permit a remaining lane width of ten feet. When encroachment reduces the travelway to less than ten feet, vertical panels shall be used to restore the travelway to ten feet or greater. No other application of vertical panels will be permitted.

c. CONES

1) DESIGN: All cones shall be a minimum of 28 inches in height regardless of application and shall meet the requirement of the MUTCD. Reflectorization may be deleted from all cones.

2) APPLICATION: For longitudinal channelizing only, cones will be permitted for daylight closures or minor shifts. (Drums are required for all tapers.) The use of cones for nighttime work will not be permitted. Cones shall not be stored or allowed to be visible on the worksite during nighttime hours.

d. BARRICADES

DESIGN: Type III barricades shall meet the minimum requirements of the MUTCD and shall be reflectorized as required in [Subsection 150.01.C](#).

The Contractor has the option of choosing Type III barricades from the Qualified Products List or the Contractor may utilize generic barricades that are approved by the Federal Highway Administration (FHWA). When barricades have been specifically crash tested with signs attached, the contractor has the responsibility to attach the signs as per the manufacturer's recommendations to ensure crashworthiness. If signs are attached to generic barricades or to barricades from the Qualified Products List (QPL) that have not been crash tested with signs attached then the responsibility for crashworthiness and the liability for mounting these signs to the barricades are assumed by the Contractor and the Contractor shall certify that the barricades are crashworthy under FHWA workzone guidelines for NCHRP 350 crashworthy compliance. Any generic barricades used in the work shall be stamped or stenciled to show compliance with NCHRP 350. The use of Type I and Type II barricades will not be permitted.

- 1) APPLICATION: Type III barricades shall be placed as required by the plans, the Standards, and as directed by the Engineer. All signs mounted on barricades shall be mounted to comply with the requirements of the MUTCD and NCHRP 350 Test Level III. NCHRP 350 crashworthy compliance may require that rigid signs be mounted separate from the Type III barricade.

When a barricade is placed so that it is subject to side impact from a vehicle, a drum shall be placed at the side of the barricade to add target value to the barricade.

e. WARNING LIGHTS:

- 1) DESIGN: All warning lights shall meet the requirements of the MUTCD.
- 2) APPLICATION
  - (a) Type A low-intensity flashing lights shall be used as shown in the Plans, the Standards, and as directed by the Engineer. Flashing lights are not required for advance warning signs in [Subsection 150.03.H](#).
  - (b) Type C Steady-Burn lights shall be used as shown in the Plans, the Standards, and as directed by the Engineer. Steady-burn lights are not required on drums for merging tapers that exist into the night.

f. TEMPORARY BARRIERS

- 1) DESIGN: Temporary barriers shall meet the requirements of Sections 620.
- 2) APPLICATION: Temporary barriers shall be placed as required by the plans, standards, and as directed by the Engineer. When Temporary barrier is located 20 feet or less from a travel lane, yellow reflectors shall be fixed to the top of the barrier at intervals not greater than 40 feet in the longitudinal section and 20 feet in the taper section and shall be mounted approximately two inches above the barrier. If both lanes of a two-lane two-way roadway are within 20 feet or less of the barrier then the reflectors shall be installed for both directions of traffic.

The reflectors shall be 100 square inches (ASTM Type VII or VIII) reflective sheeting mounted on flat-sheet blanks. The reflectors shall be mounted approximately two inches above the top of the barrier. The reflectors shall be attached to the barrier with adhesive or by a drilled-in anchor type device. The reflectors shall not be attached to a post or board that is placed between the gap in the barrier sections.

Approach end of Temporary barrier shall be flared or protected by an impact attenuator (crash cushion) or other approved treatment in accordance with Georgia Standard 4960, Construction Details and Standard Specifications.

On interstate or other controlled access highways where lane shifts or crossovers cause opposing traffic to be separated by less than 40 ft., portable barrier shall be used as a separator.

## **B. PORTABLE IMPACT ATTENUATORS:**

### **1. DESCRIPTION**

This work consists of the furnishing (including spare parts), installation, maintenance, relocation, reuse as required, and removal of Portable Impact Attenuator Unit/Arrays.

### **2. MATERIALS**

Materials used in the Attenuator/Array shall meet the requirements of [Section 648](#) for Portable Impact Attenuators.

### **3. CONSTRUCTION**

Portable Impact Attenuator Unit/Array installation shall conform to the requirements of [Section 648](#), Manufacturer's recommendations, and/or Georgia Standards 4960 & 4962 and shall be installed at locations designated by the Engineer, and/or as shown on the plans.

## **C. TEMPORARY GUARDRAIL ANCHORAGE- Type 12:**

### **1. DESCRIPTION**

This work consists of the furnishing, installation, maintenance and removal or Temporary Guardrail Anchorage- Type 12 used for Portable Barrier or temporary guardrail end treatment.

### **2. MATERIALS**

Materials used in the Temporary Guardrail Anchorage- Type 12 shall meet the requirements of [Subsection 641.2](#) of the Specifications and current Georgia Standards and may be new or used. Materials salvaged from the Project which meet the requirements of Standards may be utilized if available. The use of any salvaged materials will require prior approval of the Engineer.

### **3. CONSTRUCTION**

Installation of the Temporary Guardrail Anchorage- Type 12 shall conform to the requirements of the Plans, current Georgia Standards and [Subsection 641.3](#) of the Specifications. Installation shall also include sufficient additional guardrail and appurtenances to effect the transition and connection to Temporary Concrete Barrier as required by the details in Georgia Standard 4960.

**150.06 DIFFERENCES IN ELEVATION BETWEEN TRAVEL LANES AND SHOULDERS (SEE [SUBSECTION 150.06.G](#) FOR PROJECTS CONSISTING PRIMARILY OF ASPHALTIC CONCRETE RESURFACING ITEMS)**

Any type of work such as paving, grinding, trenching, or excavation that creates a difference in elevation between travel lanes or between the travelway and the shoulder shall not begin until the Contractor is prepared and able to continuously place the required typical section to within two inches (2") of the existing pavement elevation. For any areas that the two inches minimum difference in elevation cannot be accomplished the section shall be healed as shown in [Detail 150-E](#). If crushed stone materials are used to provide a healed section no separate payment will be made for the material used to heal any section. The Contractor may submit a plan to utilize existing pay items for crushed stone provided the plan clearly demonstrates that the materials used to heal an area will be incorporated into the work with minimal waste. Handling and hauling of any crushed stone used to heal shall be kept to a minimum. The Engineer shall determine if the crushed stone used to heal meets the specifications for gradation and quality when the material is placed in the final location.

A maximum of sixty (60) calendar days shall be allowed for conditions to exist that require any section or segment of the roadway or ramp to continue to require a healed section as described by [Detail 150-E](#). Failure to meet this requirement shall be considered as non-performance of Work under [Subsection 150.08](#).

When trenching or excavation for minor roadway or shoulder widening is required, all operations at one site shall be completed to the level of the existing pavement in the same work day.

Any channelization devices utilized in the work shall conform to the requirements of [Subsection 150.05](#) and to the placement and spacing requirements in [Details 150-B](#), [150-C](#), [150-D](#), and [150-E](#) shown in this section.

Any construction activity that reduces the width of a travel lane shall require the use of a W-20 sign with the legend "LEFT/RIGHT LANE NARROWS". Two 24" x 24" red or red/orange flags may be mounted above the W-20 sign. The W-20 sign shall be located on the side of the travelway that has been reduced in width just off the travelway edge of pavement. The W-20 sign shall be a minimum of 500 feet in advance of any channelization devices that encroach on the surface of travelway. A portable changeable message sign may be used in lieu of the W-20 sign.

**GENERAL/TIME RESTRICTIONS:**

**A. STONE BASES, SOIL AGGREGATE BASE AND SOIL BASES**

**1. All Highways**

Differences in elevation of more than two inches between surfaces carrying or adjacent to traffic will not be allowed for more than a 24-hour period. A single length of excavated area that does not exceed 1000 feet in total length may be left open as a start up area for periods not to exceed 48 hours provided the Contractor can demonstrate the ability to continuously excavate and backfill in a proficient manner. Prior approval of the Engineer shall be obtained before any startup area may be allowed.

**2. LIMITED ACCESS HIGHWAY RAMPS (INTERSTATES):**

On projects that include ramp rehabilitation work, one ramp at a time may be excavated for the entire length of the ramp from the gore point of the ramp with the interstate

mainline to the intersection with the crossing highway. This single ramp may remain excavated with a vertical difference in elevation greater than two (2") inches for a maximum of fourteen (14) calendar days with drums spaced at twenty (20') feet intervals as shown in Detail 150-B and a buffer space accepted under Section 150.06.F. After fourteen (14) calendar days the section shall be healed as required for all other highways. This area will be allowed in addition to the 1000 feet allowed for all other highways.

## **B. ASPHALT BASES, BINDERS AND TOPPING**

### **1. DIFFERENCES IN ELEVATION BETWEEN THE SURFACES OF ADJACENT TRAVELWAYS**

Travel lanes shall be paved with a plan that minimizes any difference in elevation between adjacent travel lanes. The following limitations will be required on all work:

- a. Differences of two inches (2") or less may remain for a maximum period of fourteen (14) calendar days.
- b. Differences of greater than two inches (2") shall be permitted for continuous operations only.

EMERGENCY SITUATIONS: Inclement weather, traffic accidents, and other events beyond the control of the Contractor may prevent the work from being completed as required above. The Contractor shall notify the Engineer in writing stating the conditions and reasons that have prevented the Contractor from complying with the time limitations. The Contractor shall also outline a plan detailing immediate steps to complete the work. Failure to correct these conditions on the first calendar day that conditions will allow corrective work shall be considered as non-performance of Work under [Subsection 150.08](#).

### **2. Differences in Elevation Between Asphalt Travelway and Paved Shoulders**

Differences in elevation between the asphalt travelway and asphalt paved shoulders shall not be allowed to exist beyond the maximum durations outlined below for the conditions shown in [Details 150-B](#), [150-C](#), [150-D](#), and [150-E](#):

Detail 150-B conditions shall not be allowed for more than 24 hours. A single length that does not exceed 1000 feet in total length may be left open for periods not to exceed 48 hours provided the Contractor can demonstrate the ability to continuously pave in a proficient manner. Prior approval of the Engineer shall be obtained before any section is allowed to exceed 24 hours. Any other disturbed shoulder areas shall be healed as in [Detail 150-E](#).

[Detail 150-C](#) conditions will not be allowed for more than 48 hours.

[Detail 150-D](#) conditions will not be allowed for more than 30 calendar days.

[Detail 150-E](#) conditions will not be allowed for more than 60 calendar days.

Failure to meet these requirements shall be considered as non-performance of Work under [Subsection 150.08](#).

## **C. PORTLAND CEMENT CONCRETE**

Work adjacent to a Portland Cement Concrete traveled way which involves the following types of base and shoulders shall be accomplished according to the time restrictions outlined for each type of base or shoulder. Traffic control devices shall be in accordance with [Subsection 150.05](#).

**1. Cement Stabilized Base**

Work adjacent to the traveled way shall be healed as per [Detail 150-E](#) within forty-eight (48) hours after the seven (7) calendar day curing period is complete for each section placed. During the placement and curing period, traffic control shall be in accordance [Detail 150-B](#).

**3. Asphaltic Concrete Base**

When an asphaltic concrete base is utilized in lieu of a cement stabilized base the asphaltic concrete base shall be healed as per [Detail 150-E](#) within forty-eight (48) hours after the placement of each section of asphaltic concrete base. For the first forty eight hours traffic control shall be in compliance with [Detail 150-B](#).

**3. Concrete Paved Shoulders**

Concrete paved shoulders shall be placed within sixty (60) calendar days after the removal of each section of existing shoulder regardless of the type of base materials being placed on the shoulders. During the placement period, traffic control devices shall be in accordance with the appropriate detail based on the depth of the change in elevation.

**4. Asphaltic Concrete Shoulders**

A difference in elevation that meets the requirements of [Detail 150-B](#) shall not be allowed to exist for a period greater than forty-eight (48) hours. After the removal of the existing shoulder the section or segment of travelway may be healed with stone as per [Detail 150-E](#) for a maximum of fourteen (14) calendar days. Asphaltic concrete shoulders shall be placed within two (2") inches or less of the traveled way surface within fourteen (14) calendar days after the removal of the stone healed section or the removal of each section of the existing shoulder. The two (2") inches or less difference in elevation shall not remain in existence for a period that exceeds thirty (30) calendar days unless the paved shoulder is utilized as a detour for the traveled way. During the placement period, traffic control shall be in accordance with the appropriate detail based on the depth of the change in elevation.

The Contractor may propose an alternate plan based on [Subsection 150.06.F](#). Failure to meet the above requirements and time restrictions shall be considered as non-performance of Work under [Subsection 150.08](#).

**D. MISCELLANEOUS ELEVATION DIFFERENTIALS FOR EXCAVATIONS ADJACENT TO THE TRAVELWAY**

Drainage structures, utility facilities, or any other work which results in a difference in elevation adjacent to the travelway shall be planned and coordinated to be performed in such a manner to minimize the time traffic is exposed to this condition. The excavation should be back filled to the minimum requirements of [Detail 150-E](#) as soon as practical. Stage construction such as plating or backfilling the incomplete work may be required. The difference in elevation shall not be allowed to exist for more than



five (5) calendar days under any circumstances. Failure to correct this condition shall be considered as non-performance of Work under [Subsection 150.08](#).

#### **E. CONDUIT INSTALLATION IN PAVED AND DIRT SHOULDERS**

The installation of conduit and conduit systems along the shoulders of a traveled way shall be planned and installed in a manner to minimize the length of time that traffic is exposed to a difference in elevation condition. The following restrictions and limitations shall apply:

##### **1. Differences in Elevation of Two (2") Inches or Less**

The shoulder may remain open when workers are not present. When workers are present the shoulder shall be closed and the channelization devices shall meet the requirements of [Subsection 150.05](#). The difference in elevation on the shoulder shall remain for a maximum period of fourteen (14) calendar days.

##### **2. Differences in Elevation Greater Than Two (2") Inches**

The shoulder shall be closed. The shoulder closure shall not exceed twenty-four (24) hours in duration unless the Special Conditions in Subsection 150.11 modifies this restriction or the Engineer allows the work to be considered as a continuous operation.

Failure to meet these requirements shall be considered as non-performance of Work under [Subsection 150.08](#).

#### **F. MODIFICATIONS TO [DETAILS 150-B](#), [150-C](#), [150-D](#) AND [150-E](#)**

The Contractor may propose any alternate traffic control plan that utilizes a portion of the travel lane as a "buffer space". This buffer space may allow for an enhanced work area that will allow for the placement of materials to proceed at a pace that could not be achieved with the time restriction requirements outlined in [Section 150.06.A](#), [150.06.B](#), and [150.06.C](#). The Contractor may propose modified time restrictions based on the use of the buffer space. Any proposed modifications in the time duration allowed for the differences in elevations to exist shall be reviewed by the Engineer as a component of the overall traffic control plan. No modifications shall be made until the proposed plan is accepted by the Engineer. The Engineer shall have no obligation to consider any proposal which results in an increase in cost to the Department.

For the travel lane described in each of the [details 150-B](#), [150-C](#), [150-D](#) and [150-E](#) it is presumed that the pavement marking edgeline (yellow or white solid stripe) is located at the very edge of the travel lane surface. A buffer space (temporary paved shoulder) that utilizes a portion of the travel lane should be six (6') feet in width desirable but shall not be less than four (4') feet in width. Any remaining travel lane(s) shall not be less than ten (10') feet in width.

If the proposed shifting of the traffic to obtain a buffer space and maintain a minimum travel lane(s) of ten (10') feet requires the use of any existing paved shoulders then the cost of maintenance and repair of the existing paved shoulder(s) shall be the responsibility of the Contractor. The Contractor is responsible for the costs of maintenance and repairs even if the existing paved shoulder(s) is to be removed in a later stage of the work. Existing shoulders that have rumble strips shall have the rumble strips removed before the shoulder can be utilized as part of the travel lane. The cost of the removal of the rumble



strips shall be done at no cost to the Department even if the shoulder is to be removed in a later stage of the work.

Any modifications to the staging and time restrictions that are approved as part of the traffic control plan shall be agreed to in writing. Failure to meet these modifications shall be considered as non-performance of the Work under [Subsection 150.08](#).

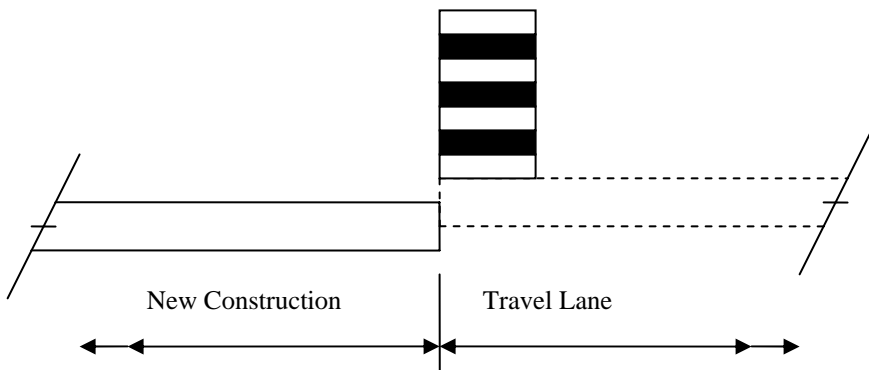
**G. ASPHALTIC CONCRETE RESURFACING PROJECTS**

SHOULDER CONSTRUCTION INCLUDED AS A PART OF THE CONTRACT: When the placement of asphaltic concrete materials creates a difference in elevation greater than two (2") inches between the earth shoulder (grassed or un-grassed) and the edge of travelway or between the earth shoulder and a paved shoulder that is less than four (4') feet in width, the Contractor shall place and maintain drums in accordance with the requirements of [Subsection 150.05A.1.a.4](#)). When the edge of the paved surface is tapered with a 30-45 degree wedge, drums may be spaced at 2.0 times the speed limit in MPH. Drums shall remain in place and be maintained until the difference in elevation has been eliminated by the placement of the appropriate shoulder materials.

SHOULDER CONSTRUCTION NOT INCLUDED AS A PART OF THE CONTRACT: When the placement of asphaltic concrete materials creates a difference in elevation greater than two (2") inches between the earth shoulder (grassed or un-grassed) and the edge of travelway or between the earth shoulder and a paved shoulder that is less than four (4') feet in width, the Contractor shall notify the Engineer, in writing, when the resurfacing work including all punchlist items has been completed.

See [Subsection 150.03.L](#) for the requirements for "LOW/SOFT SHOULDERS" and "SHOULDER DROP-OFF" signage.

<p>Location of drums when Elevation Difference exceeds 4 inches. Drums spaced at 20 foot intervals.  <b>Note:</b> If the travel way width is reduced to less than 10 feet by the use of drums, vertical panels shall be used in lieu of drums.</p>	
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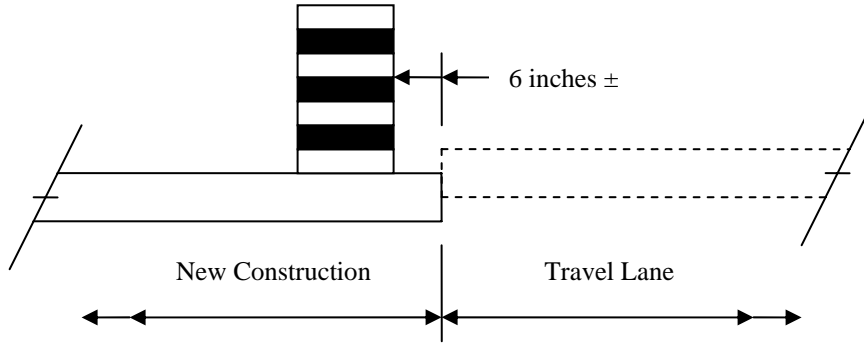


ELEVATION DIFFERENCE GREATER THAN 4 INCHES

DETAIL 150-B

Drums spaced at 40 foot intervals.

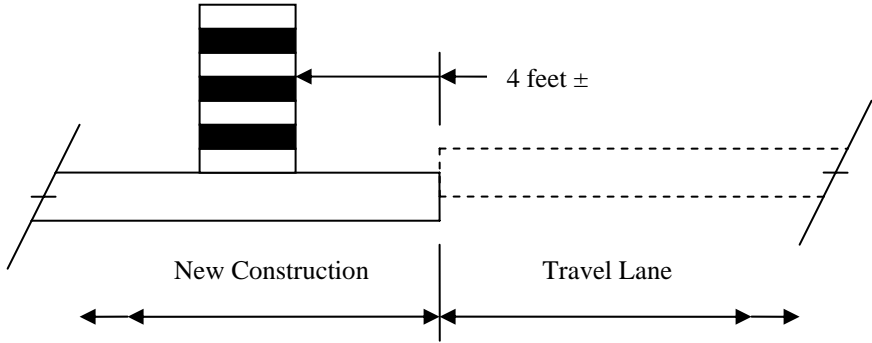
Location of drums when Elevation Difference is 2+ inches to 4 inches.



ELEVATION DIFFERENCE 2+ to 4 inches

DETAIL 150-C

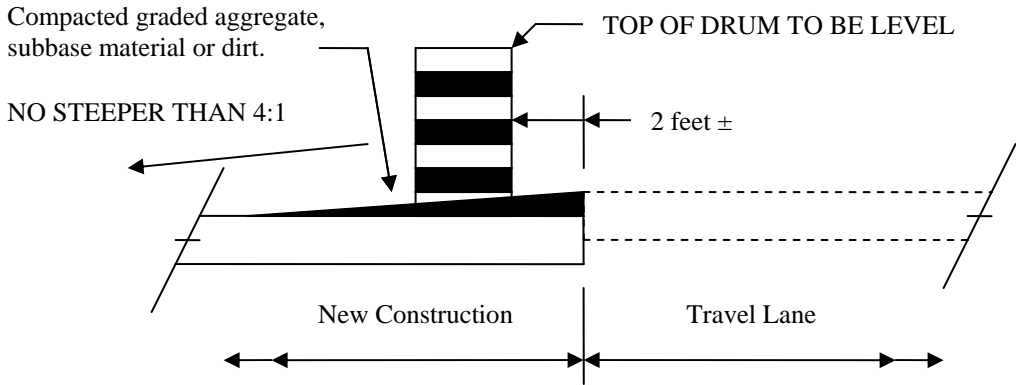
Drums spaced at 80 foot intervals.	Location of drums when Elevation Difference is 2 inches or less.
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ELEVATION DIFFERENCE OF 2 INCHES OR LESS

DETAIL 150-D

	Location of drums immediately after completion of heeled sections spaced at 40 foot intervals.
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HEALED SECTION

DETAIL 150-E

## **150.07 FLAGGING AND PILOT CARS:**

### **A. FLAGGERS**

Flaggers shall be provided as required to handle traffic, as specified in the Plans or Special Provisions, and as required by the Engineer.

### **B. FLAGGER CERTIFICATION**

All flaggers shall meet the requirements of the MUTCD and shall have received training and a certificate upon completion of the training from a Department approved training program. Failure to provide certified flaggers as required above shall be reason for the Engineer suspending work involving the flagger(s) until the Contractor provides the certified flagger(s). Flaggers shall have proof of certification and valid identification (photo I.D.) available any time they are performing flagger duties.

### **C. FLAGGER APPEARANCE AND EQUIPMENT**

Flaggers shall wear high-visibility clothing in compliance with the MUTCD and shall use a Stop/Slow paddle meeting the requirements of the MUTCD for controlling traffic. The Stop/Slow paddles shall have a shaft length of seven (7) feet minimum. The Stop/Slow paddle shall be retro-reflectorized for both day and night usage. In addition to the Stop/Slow paddle, a flagger may use a flag as an additional device to attract attention. This flag shall meet the minimum requirements of the MUTCD. The flag shall, as a minimum, be 24" inches square and red or red/orange in color. For night work, the vest shall have reflectorized stripes which meet the requirements of the MUTCD.

### **D. FLAGGER WARNING SIGNS**

Signs for flagger traffic control shall be placed in advance of the flagging operation in accordance with the MUTCD. In addition to the signs required by the MUTCD, signs at regular intervals, warning of the presence of the flagger shall be placed beyond the point where traffic can reasonably be expected to stop under the most severe conditions for that day's work.

### **E. PILOT VEHICLE REQUIREMENTS**

Pilot vehicles will be required during placement of bituminous surface treatment or asphaltic concrete on two-lane roadways unless otherwise specified. Pilot vehicles shall meet the requirements of the MUTCD.

### **F. PORTABLE TEMPORARY TRAFFIC CONTROL SIGNALS**

The Contractor may request, in writing, the substitution of portable temporary traffic control signals for flaggers on two-lane two-way roadways provided the temporary signals meets the requirements of the MUTCD, [Section 647](#), and [Subsection 150.02.A.8](#). As a part of this request, the Contractor shall also submit an alternate traffic control plan in the event of a failure of the signals. Any alternate plan that requires the use of flaggers shall include the use of certified flaggers. The Contractor shall obtain the approval of the Engineer before the use of any portable temporary traffic control signals will be permitted.

**150.08 ENFORCEMENT**

The safe passage of pedestrians and traffic through and around the temporary traffic control zone, while minimizing confusion and disruption to traffic flow, shall have priority over all other Contractor activities. Continued failure of the Contractor to comply with the requirements of Section 150 (TRAFFIC CONTROL) will result in non-refundable deductions of monies from the Contract as shown in this Subsection for non-performance of Work.

Failure of the Contractor to comply with this Specification shall be reason for the Engineer suspending all other work on the Project, except erosion control and traffic control, taking corrective action as specified in [Subsection 105.15](#), and/or withholding payment of monies due to the Contractor for any work on the Project until traffic control deficiencies are corrected. These other actions shall be in addition to the deductions for non-performance of traffic control.

SCHEDULE OF DEDUCTIONS FOR EACH CALENDAR DAY OF DEFICIENCIES OF TRAFFIC CONTROL INSTALLATION AND/OR MAINTENANCE		
ORIGINAL TOTAL CONTRACT AMOUNT		
From More Than	To and Including	Daily Charge
\$0	\$100,000	\$200
\$100,000	\$1,000,000	\$500
\$1,000,000	\$5,000,000	\$1,000
\$5,000,000	\$20,000,000	\$1,500
\$20,000,000	\$40,000,000	\$2,000
\$40,000,000	\$-----	\$3,000

**150.09 MEASUREMENT**

**A. TRAFFIC CONTROL**

When listed as a pay item in the Proposal, payment will be made at the Lump Sum price bid, which will include all traffic control not paid for separately, and will be paid as follows:

The Contractor’s Schedule of Payment shall include no more than 25 (twenty-five) percent of the assigned value for Traffic Control with the first Construction Report. For each progress payment thereafter, the total of the Project percent complete shown on the last pay statement plus 25 (twenty-five) percent will be paid (less previous payments), not to exceed one hundred (100) percent.

All of the requirements of Section 150 and the Traffic Control Plan shall be in full force and effect for the life of this project. The cost of complying with these requirements will not be paid for separately, but shall be included in the overall bid submittal.

## **B. SIGNS**

All other Interim special guide signs, regulatory, warning, and guide signs, as required by the Contract, shall be included in the overall bid submitted. Included will be:

1. Interim ground mounted or interim overhead special guide signs include furnishing the signs, including supports as required, erecting, illuminating overhead signs, maintaining, removing, re-erecting, and final removal from the Project. Payment will be made only one time regardless of the number of moves required.
2. Removal and resetting of existing special guide signs, ground mount or overhead, complete, in place, shall not be measured separately. Payment will be made only one time regardless of the number of moves required.
3. Modification of special guide signs, ground mount or overhead, shall not be measured separately. Payment shall include materials, removal from posts or supports when necessary, and remounting as required.

## **C. TEMPORARY BARRIER**

Temporary Barrier shall not be measured separately.

## **D. CHANGEABLE MESSAGE SIGN, PORTABLE**

Changeable Message Sign, Portable shall not be measured separately.

## **E. TEMPORARY GUARDRAIL ANCHORAGE, Type 12**

Temporary Guardrail Anchorage- Type 12 shall not be measured separately. Included shall be all assembly, complete in place and accepted according to the details shown in the Contractor's accepted plans, which shall also include the additional guardrail and appurtenances necessary for transition and connection to Temporary Concrete Barrier. Materials, equipment, labor, site preparation, maintenance and removal is included.

## **F. TRAFFIC SIGNAL INSTALLATION- TEMPORARY**

Traffic Signal Installation- Temporary shall not be measured separately.

## **G. FLASHING BEACON ASSEMBLY**

Flashing Beacon Assemblies shall not be measured separately.

## **H. PORTABLE IMPACT ATTENUATORS**

Each Portable Impact Attenuator shall not be measured separately. Each unit/array shall include all material components, hardware, incidentals, labor, site preparation, and maintenance, including spare parts recommended by the manufacturer for repairing accident damage. Each unit will be measured only once in the Schedule of Payment regardless of the number of locations installed, moves required, or number of repairs necessary because of traffic damage. Upon completion of the project, the units shall be removed and retained by the Contractor.

**I. PAVEMENT MARKINGS**

Pavement markings shall not be measured separately.

**150.10 PAYMENT:**

All items described in the specification shall be paid for under CONSTRUCTION COMPLETE with the exception of Work Zone Law Enforcement. This will be paid for under:

Item No. 150. Traffic Control, Workzone Law Enforcement .....per hour.

The Contractor shall include 2500 hours in the estimate and a rate of \$50/hour shall be used.

First Use Date: August 1, 2003  
June 10, 2005  
May 5, 2006  
February 28, 2007

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SPECIAL PROVISION**

**PROJECT: CSNHS-0008-00(232), TROUP COUNTY**

**P.I. NO. 0008232**

**Section 153 – Field Engineer’s Office**

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*Delete Subsection 153.3.05 B.7 and substitute the following:*

7. Worktable: Provide a minimum of three (3) standard dimension desks. They shall be provided with a minimum of 1 1/8" (28mm) wood grain laminated tops with 23" (575mm) deep files and heavy-duty steel ball bearing drawers and locking center drawer. Provide one (1) 5' X 3' (1500mmX900mm) adjustable from 0 to 45 degree and 38" (950mm) high drafting table.

*Delete Subsection 153.3.05 B.8 and substitute the following:*

8. Stools: Provide one (2) posture stool with supportive backrest, waterfall edge seat and instant height lever (26" to 30")(650mm to 750mm). Provide a minimum of five (5) fully braced stackable full 2" (50mm) thick 16"X15" (400mmX375mm) seats with armrests and chrome frames. Provide a minimum of four (6) swivel chairs with arms and a 19"X19" (475mmX475mm) foam cushion and upholstered seat adjustable from 16 1/2" to 20" (415mm to 500mm) high.

*Retain Subsection 153.3.05 B.11 and add the following:*

Process and pay the monthly bills for all utility services.

*Delete Subsection 153.3.05 B.12 and substitute the following:*

12. Electric Service: Provide 120/240 volt electric service that meets code.

*Delete Subsection 153.3.05 B.15 and substitute the following:*

15. Telephone: Provide in each Type 3 building, four telephones. Provide two voice lines, with rollover capabilities, connected to two handsets (located on either end of the office). Provide separate telephone lines for the computer and the fax machine, as directed by the Engineer. Install and maintain these lines for the life of the Project. Provide telephone access to Local and Long Distance Telephone Service for incoming and outgoing calls and fax.



Provide with the telephone, an automatic answering system that can give a greeting message, record incoming messages, and activate remotely.

*Delete Subsection 153.3.05 C.6 and substitute the following:*

6. Outside Electrical Receptacle – Provide a weather-proof, exterior 220-volt electrical receptacle attached to a power source.

*Delete Subsection 153.3.05 C.7 and substitute the following:*

7. Chain Link Fence – Provide a minimum of 500 feet (150m) of 6 ft. (1.8 m) high chain link fence with an extension arm and barbed wire as specified in Section 643. Equip the fence with matching gates and meeting the requirements of Section 643 and consisting of a double 7 ft. (2.1m) by 6 ft. (1.8 m) and a single 4 ft.(1.2 m) by 6 ft. (1.8 m) gate. Include a positive-type locking devices, padlock and a minimum of two keys for each gate. Ensure the fence encompasses the entire compound.

*Delete Subsection 153.3.05 C.8 and substitute the following:*

8. Security Light – Provide two 150-watt high-pressure sodium security lights with photoelectric controls. Place as directed by the Engineer.

*Delete Subsection 153.3.05 C.9 and substitute the following:*

9. Copying Machine – The Contractor shall furnish the Field Office with one copying machine installed and maintained for the life of the Project. The copying machine shall have the capability of making letter-size copies (8 ½” x 11”), legal-size copies (8 ½”x 14”), two-sided copies, at least thirty copies per minute, and possess an auto-feed feature. Furnish all consumable and non-consumable supplies for the life of the Project. The copying machine shall also have the capability to scan documents to an adobe .pdf format, and then automatically email the file to specific email accounts.

*Add the following to Subsection 153.3.05 C:*

10. Place and spread 200 tons (181 Mg) of aggregate surface course on the Office grounds where indicated by the Engineer to facilitate parking. Remove aggregate and grass the area upon completion of the Project.
11. Ensure that the Office is supported with concrete blocks with mortar joints and anchored with ten storm-tie-down anchors. Enclose the area between the ground and the bottom of the Office with a vinyl skirting that matches the Office’s siding.
12. Install an alarm system that includes the following items and maintain in good operating condition:
  - SRN-2000 Enforced Bionic with NAPCO Magnum Alert 850 – control box or Honeywell Vista-10P Master Control Panel with Honeywell 6150RF keypad or equivalent.
  - All doors and windows with wired contacts.
  - Outside sirens with wired contacts.
  - Tamper-proof box with wired contacts.
  - Inside sirens with wired contacts.
  - Two smoke and heat detectors.

Tie all of the above equipment to a 24 hour control monitoring system (BRK –2812TH or equivalent). Use a wired keyboard system. Do not use a remote system.

Process and pay the monthly bills for the alarm system and monitoring.

13. Furnish the fax machine in good operating condition and maintain it throughout the life of the Contract. Furnish all consumable and non-consumable supplies for the life of the Project.
14. Provide two (2) additional 4 drawer locking fireproof file cabinets.
15. Provide one Desktop Computer and Accessories meeting the following minimum requirements
  - A. Hardware:
    - 1.7 GHz Processor or better
    - 512 MB RAM
    - 80 GB Hard Drive or larger
    - 40X Max, CD-RW
    - 3.5" (90 mm) Floppy Drive
    - 64 MB Video memory
    - V.90 PCI DataFax Modem w/Voice
    - 17" (431 mm) Color Monitor
    - Human Input Device (Mouse)
    - Standard Windows Keyboard
  - B. Software:
    - MS Windows XP **Professional**
    - MS Office XP **Professional**
    - MS Outlook (Most Recent Version)
    - WinZip
    - WS-FTP
    - A restore CD
  - C. Printers:
    - Hewlett-Packard Laser Jet 1020 or Brother HL-5140 or Approved Equal
  - D. Uninterruptible Power Supply:
    - American Power Conversion Corporation Back-UPS ES 650 or Newpoint 750 VA Battery Backup or Equal (minimum 5 Receptacles)
  - E. DSL or Cable Broadband Internet Service
    - Provide DSL Internet Service with static IP address or provide Cable Broadband Internet Service as directed by the Engineer.
16. Concrete Cylinder Curing Box – The Contractor shall furnish a Concrete Curing Box for any project that requires the placement of concrete. The curing box and its components shall be constructed of non-corroding materials and shall be capable of storing a minimum of 22 test cylinders, 6 inch x 12 inch (150 mm x 300 mm) stored vertically with the lid closed. Additional capacity may be required on large projects at the direction of the Engineer. The curing box shall be equipped with heating/cooling capabilities, automatic temperature control, and a maximum/minimum (high/low) temperature readout.

The curing box shall be capable of meeting the moisture and temperature requirements of AASHTO T 23.

17. For the life of the project, the Contractor shall provide a digital camera and a video camera. The actual equipment will be determined by the Engineer. Price of equipment, and associated hardware/software necessary to view files, shall not exceed \$1000.

*Add the following to Subsection 153.3.07:*

Retain possession of all items that are required as part of the Field Office when the Engineer determines that these items are no longer needed.

*Delete Subsection 153.4 and 153.5:*

*Add the following Subsection 153.4:*

### **Measurement and Payment:**

No separate measurement will be made for the Field Engineer's Office. The Contractor shall provide a Type 3 Field Engineer's Office. All costs associated with the Field Engineer's Office Type 3 shall be included in the price bid for CONSTRUCTION COMPLETE. Costs included, but not limited to, are the following: providing a location, all materials, design, construction, furnishings, maintenance, fuel, water, sewage disposal, electricity and telephone service, movements, moving from the project, transformers, and any costs incurred for carrying electricity to the Field Engineer's Office.

Office of Construction

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SPECIAL PROVISION**

**PROJECT: CSNHS-0008-00(232), TROUP COUNTY**

**P.I. NO. 0008232**

**Section 163—Miscellaneous Erosion Control Items**

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**163.1 General Description**

This work includes constructing and removing:

- Silt control gates
- Temporary erosion control slope drains shown on the Plans or as directed
- Sediment basins
- Baled straw erosion checks
- Other temporary erosion control structures shown on the Plans or directed by the Engineer

This work also includes applying mulch (straw or hay, erosion control compost), and temporary grass.

Note: Any reference to “Plan” shall mean the current plan proposed in the Plans Package, or accepted Contractor’s plans as specified in Special Provision 999 Design-Build.

**163.1.01 Related References**

**A. Standard Specifications**

[Section 109—Measurement and Payment](#)

[Section 161—Control of Soil Erosion and Sedimentation](#)

[Section 171—Temporary Silt Fence](#)

[Section 500—Concrete Structures](#)

[Section 603—Rip Rap](#)

[Section 700—Grassing](#)

[Section 715—Bituminous Treated Roving](#)

[Section 720 – Triangular Silt Barrier](#)

[Section 822—Emulsified Asphalt](#)

[Section 860—Lumber and Timber](#)

[Section 863—Preservative Treatment of Timber Products](#)

[Section 890—Seed and Sod](#)

[Section 893—Miscellaneous Planting Materials](#)

**B. Referenced Documents**

AASHTO M252

AASHTO M294

**163.1.02 Submittals**

Provide written documentation to the Engineer as to the average weight of the bales of mulch.

**163.2 Materials**

Provide materials shown on the Plans, such as pipe, spillways, wood baffles, and other accessories including an anti-seep collar, when necessary. The materials shall remain the Contractor's property after removal, unless otherwise shown on the Plans.

Materials may be new or used; however, the Engineer shall approve previously used materials before use.

Materials shall meet the requirements of the following Specifications:

<b>Material</b>	<b>Section</b>
Mulch	<a href="#">893.2.02</a>
Temporary Silt Fence	<a href="#">171</a>
Concrete Aprons and Footings shall be Class A	<a href="#">500</a>
Rip Rap	<a href="#">603</a>
Temporary Grass	<a href="#">700</a>
Bituminous Treated Roving	<a href="#">715</a>
Triangular Silt Barrier	<a href="#">720</a>
Lumber and Timber	<a href="#">860.2.01</a>
Preservative Treatment of Timber Products	<a href="#">863.1</a>
Corrugated Polyethylene Temporary Slope Drain Pipe	AASHTO M252 or M294

**163.2.01 Delivery, Storage, and Handling**

General Provisions 101 through 150.

**163.3 Construction Requirements**

**163.3.01 Personnel**

General Provisions 101 through 150.

**163.3.02 Equipment**

General Provisions 101 through 150.

**163.3.03 Preparation**

General Provisions 101 through 150.

**163.3.04 Fabrication**

General Provisions 101 through 150.

### **163.3.05 Construction**

#### **A. Silt Control Gates**

If silt control gates are required or are directed by the Engineer, follow these guidelines to construct them:

1. Clear and grade only that portion of the roadway within the affected drainage area where the drainage structure will be constructed.
2. Construct or install the drainage structure and backfill as required for stability.
3. Install the silt control gate at the inlet of the structure. Use the type indicated on the Plans.
4. Vary the height of the gate as required or as shown on the Plans.
5. Finish grading the roadway in the affected drainage area. Grass and mulch slopes and ditches that will not be paved. Construct the ditch paving required in the affected area.
6. Keep the gate in place until the work in the affected drainage area is complete and the erodible earth is stabilized.
7. Remove the silt gate assembly by sawing off the wood posts flush with the concrete apron. Leave the concrete apron between the gate and the structure inlet in place. The gate shall remain the property of the Contractor.

#### **B. Temporary Slope Drains**

If temporary slope drains are required, conduct the roadway grading operation according to [Section 161](#) and follow these guidelines:

1. Place temporary pipe slope drains with inlets and velocity dissipaters (straw bales, silt fence, or aprons) according to the Plans.
2. Securely anchor the inlet into the slope to provide a watertight connection to the earth berm. Ensure that all connections in the pipe are leak proof.
3. Place temporary slope drains at a spacing of 350 ft (105 m) maximum on a 0% to 2% grade and at a spacing of 200 ft (60m) maximum on steeper grades, or more frequently as directed by the Engineer. Keep the slope drains in place until the permanent grass has grown enough to control erosion.
4. Remove the slope drains and grass the disturbed area with permanent grass. However, the temporary slope drains may remain in place to help establish permanent grass if approved by the Engineer.

#### **C. Sediment Basins**

Construct sediment basins according to the Plans at the required location, or as modified by the Engineer.

1. Construct the unit complete as shown, including:
  - Grading
  - Drainage
  - Rip rap
  - Spillways
  - Anti-seep collar
  - Temporary mulching and grassing on external slopes
  - Accessories to complete the basin
2. When the sediment basin is no longer needed, remove and dispose of the remaining sediment.
3. Remove the sediment basin. Grade to drain and restore the area to blend with the adjacent landscape.
4. Mulch and permanently grass the disturbed areas according to [Section 700](#).

#### **D. Baled Straw Erosion Checks**

Construct baled straw erosion checks according to the Plan details. Use rectangular, standard size baled straw in mechanically produced bales.

The following items may be substituted for baled straw erosion checks at the Contractor's option with the Engineer's approval:

1. Type B Silt Fence.
2. Triangular Silt Barrier.
3. Synthetic Fiber: Use synthetic fiber bales of circular cross section at least 18 in (450 mm) in diameter. Use synthetic bales of 3 ft or 6 ft (0.9 m or 1.8 m) in length that are capable of being linked together to form a continuous roll of the desired total length. Use bales that are enclosed in a geotextile fabric and that contain a pre-made stake hole for anchoring.
4. Coir: Use coir fiber bales of circular cross section at least 16" (400mm) in diameter. Use coir bales of 10 ft, 15 ft, or 20 ft (3 m, 4.5 m, or 6 m) in length. Use coir baled with coir twine netting with 2 in X 2 in (50 mm X 50 mm) openings. Use coir bales with a dry density of at least 7 lb/ft<sup>3</sup> (112 kg/m<sup>3</sup>). Anchor in place with 2 in X 4 in (50 mm X 100 mm) wooden wedges with a 6 in (150 mm) nail at the top. Place wedges no more than 36 in (900 mm) apart.
5. Excelsior: Use curled aspen excelsior fiber with barbed edges in circular bales of at least 18 in (450 mm) in diameter and nominally 10 ft (3 m) in length. Use excelsior baled with polyester netting with 1 in X 1 in (25 mm by 25 mm) triangular openings. Use excelsior bales with a dry density of at least 1.4 lb/ft<sup>3</sup> (22 kg/m<sup>3</sup>). Anchor in place with 1 in (25 mm) diameter wooden stakes driven through the netting at intervals of no more than 2 ft (600 mm).
6. Compost Filter Sock: Use general use compost (see [Subsection 893.2.02.A.5.b](#)) in circular bales at least 18 in in diameter. Use compost baled with photo-degradable plastic mesh 3 mils thick with a maximum 0.25 in X 0.25 in (6 mm X 6 mm) openings. Anchor in place with 1 in (25 mm) diameter wooden stakes driven through the netting at intervals of no more than 2 ft (600 mm). The sock shall be dispersed on site when no longer required, as determined by the Engineer. Do not use Compost Filter Socks in areas where the use of fertilizer is restricted.
7. Compost Filter Berm: Use erosion control compost (see [Subsection 893.2.02](#)) to construct an uncompacted 1.5 ft to 2 ft (450 mm to 600 mm) high trapezoidal berm which is approximately 2 ft to 3 ft (600 mm to 1 m) wide at the top and minimum 4 ft (1.2 m) wide at the base. Do not use Compost Filter Berms in areas where the use of fertilizer is restricted.

The construction of the compost filter berm includes the following:

- a. Keeping the berm in a functional condition.
- b. Installing additional berm material when necessary.
- c. Removing the berm when no longer required, as determined by the Engineer. At the Engineer's discretion, berm material may be left to decompose naturally, or distributed over the adjacent area.

#### **E. Other Temporary Structures**

When special conditions occur during the design stage, the Plans may show other temporary structures for erosion control with required materials and construction methods.

#### **F. Temporary Grass**

Use a quick growing species of temporary grass such as rye grass, millet, or a cereal grass suitable to the area and season.

Use temporary grass in the following situations:

- When required by the Specifications or directed by the Engineer to control erosion where permanent grassing cannot be planted.

- To protect an area for longer than mulch is expected to last (60 calendar days).

Plant temporary grass as follows:

1. Use seeds that conform to [Subsection 890.2.01, "Seed."](#) Perform seeding according to [Section 700](#); except use the minimum ground preparation necessary to provide a seed bed if further grading is required.
2. Prepare areas that require no further grading according to [Subsection 700.3.05.A, "Ground Preparation."](#) Omit the lime unless the area will be planted with permanent grass without further grading. In this case, apply the lime according to [Section 700](#).
3. Apply mixed grade fertilizer at 400 lbs/acre (450 kg/ha). Omit the nitrogen. Mulch (with straw or hay) temporary grass according to [Section 700](#). (Erosion control compost Mulch will not be allowed with grassing.)
4. Before planting permanent grass, thoroughly plow and prepare areas where temporary grass has been planted according to [Subsection 700.3.05.A, "Ground Preparation"](#).
5. Apply Polyacrylamide (PAM) to all areas that receive temporary grassing.
6. Apply Pam (powder) before grassing or PAM (emulsion) to the hydroseeding operation.
7. Apply PAM according to manufacturer specifications.
8. Use only anionic PAM.

For projects that consist of shoulder reconstruction and/or shoulder widening refer to Section 161.3.05H for Wood Fiber Blanket requirements.

## G. Mulch

When stage construction or other conditions prevent completing a roadway section continuously, apply mulch (straw or hay or erosion control compost) to control erosion. Mulch may be used without temporary grassing for 60 calendar days or less. Areas stabilized with only mulch (straw/hay) shall be planted with temporary grass after 60 calendar days.

Apply mulch as follows:

1. Mulch (Hay or Straw)
  - a. Uniformly spread the mulch over the designated areas from 2 in to 4 in (50 mm to 100 mm) thick.
  - b. After spreading the mulch, walk in the mulch by using a tracked vehicle (preferred method), empty sheep foot roller, light discing, or other means that preserves the finished cross section of the prepared areas. The Engineer will approve of the method.
  - c. Place temporary mulch on slopes as steep as 2:1 by using a tracked vehicle to imbed the mulch into the slope. Where specified, use bituminous treated mulch (straw or hay) according to [Subsection 700.3.05.G.1, "Mulch with Binder"](#).
  - d. When grassing operations begin, leave the mulch in place and plow the mulch into the soil during seed bed preparation. The mulch will become beneficial plant food for the newly planted grass.
2. Apply mulch (erosion control compost) as follows:
  - a. Uniformly spread the mulch (erosion control compost) over the designated areas 2 in (50 mm) thick.
  - b. When rolling is necessary, or directed by the Engineer, use a light corrugated drum roller.
  - c. When grassing operations begin, leave the mulch in place and plow the mulch into the soil during seed bed preparation. The mulch will become beneficial plant food for the newly planted grass.
  - d. Plant temporary grass on area stabilized with mulch (erosion control compost) after 60 calendar days.



- e. Do not use Erosion Control Compost in areas where the use of fertilizer is restricted.

#### **H. Miscellaneous Erosion Control Not Shown on the Plans**

When conditions develop during construction that were unforeseen in the design stage, the Engineer may direct the Contractor to construct temporary devices such as but not limited to:

- Bulkheads
- Wooden ditch checks
- Sump holes
- Half round pipe for use as ditch liners
- U-V resistant plastic sheets to cover critical cut slopes

The Engineer and the Contractor will determine the placement to ensure erosion control in the affected area.

#### **I. Diversion Channels**

When constructing a culvert or other drainage structure in a live stream requires diverting a stream, construct a diversion channel. Protect the bottom and sides of the channel with plastic sheeting, rip rap (either stone or sandbag), geotextile fabric, or other materials approved by the Engineer. Cement may be omitted in sandbag rip rap used to line diversion channels.

#### **J. Temporary Ditch Checks**

Temporary ditch checks shall be constructed of the material selected as shown on the approved erosion and sediment control plan. Item installation shall be constructed and placed according to approved Plan details. Temporary ditch checks may be constructed of stone plain rip rap according to [Section 603](#) or of sand bags as in [Section 603](#) without Portland cement, Type A or Type C silt fence.

Place plastic filter fabric on ditch section before placing rip rap.

Temporary ditch checks shall remain in place until the permanent ditch protection is in place or being installed and the removal is approved by the Engineer.

#### **K. Construction Exits**

Locate construction exits at any point where vehicles will be leaving the project onto a public roadway. Install construction exits at the locations shown in the plans and in accordance with plan details.

#### **L. Retrofit**

Add any required retrofit device to existing permanent outlet structures as shown on the Plan details or as required in the Contractor's accepted design. Detention ponds exist at along the Frontage Road (KIA Pkwy) at the north and south end.

When all land disturbing activities that would contribute sediment-laden runoff to the basin are complete, clean the basin of sediment and stabilize the basin area with vegetation.

When the basin is stabilized, remove the retrofit device from the permanent outlet structure of the detention pond as approved by the Engineer.

#### **M. Inlet Sediment Trap**

Inlet sediment traps consist of a temporary device placed around a storm drain inlet to trap sediment. An excavated area adjacent to the sediment trap will provide additional sediment storage.

Inlet sediment traps may be constructed of Type C silt fence, plastic frame and filter, hay bales, baffle box, or other filtering materials approved by the Engineer.

Construct inlet sediment traps according to the appropriate specification for the material selected for the trap.

Place inlet sediment traps as shown on the Plans or as directed by the Engineer.

#### **163.3.06 Quality Acceptance**

General Provisions 101 through 150.

#### **163.3.07 Contractor Warranty and Maintenance**

General Provisions 101 through 150.

### **163.4 Measurement**

**A. Silt Control Gates** – No separate measurement will be made.

**B. Temporary Slope Drains** – No separate measurement will be made.

When required, the inlet spillway and outlet apron and/or other dissipation devices are incidental and not measured separately.

**C. Sediment Basins** – No separate measurement will be made.

Schedule of Payment shall consider the entire structure complete, including construction, maintenance, and removal. Included shall be:

- Earthwork
- Drainage
- Spillways
- Baffles
- Rip rap
- Final cleaning to remove the basin
- Permanent and temporary grassing

**D. Diversion Channels** – No separate measurement will be made.

Costs for the entire structure complete, including materials, construction (including earthwork), and removal is included in the price bid for the project.

**E. Temporary Grass** – No separate measurement will be made.

Temporary grass includes lime, mulch and fertilizer.

**F. Mulch** – No separate measurement will be made.

Mulch includes straw or hay, or erosion control compost.

**G. Baled Straw Erosion Checks** – No separate measurement will be made.

**H. Temporary Ditch Checks** – No separate measurement will be made.

**I. Construction Exits** – No separate measurement will be made.

Construction exits include all work necessary to construct the exit including the required geotextile fabric placed beneath the aggregate.

**J. Retrofit** – No separate measurement will be made.

The construction or reconstruction of any detention pond(s) and permanent outlet structure will not be measured separately under the appropriate items.

**K. Inlet Sediment Trap** – No separate measurement will be made.

Inlet sediment traps includes all work necessary to construct the trap including any incidentals and providing the excavated area for sediment storage.

### **163.4.01 Limits**

General Provisions 101 through 150.

### **163.5 Payment**

**A. Silt Control Gates** – To be paid for under CONSTRUCTION COMPLETE.

Includes:

- Furnishing the material and labor
- Constructing the concrete apron as shown on the Plans
- Excavating and backfilling to place the apron
- Removing the gate

**B. Temporary Slope Drains** – To be paid for under CONSTRUCTION COMPLETE.

Includes materials, construction, removal (if required), inlet spillways, velocity dissipaters, and outlet aprons.

Removed temporary drain inlets and pipe slope drains remain the Contractor's property and may be reused or removed from the Project as the Contractor desires.

**C. Sediment Basin** – To be paid for under CONSTRUCTION COMPLETE.

Includes supervision to construct, and remove the sediment basin, including final clean-up.

**D. Diversion Channel** – To be paid for under CONSTRUCTION COMPLETE.

**E. Temporary Grass** – To be paid for under CONSTRUCTION COMPLETE.

Includes all equipment, labor, ground preparation, materials, wood fiber mulch, polyacrylamide, and other incidentals, lime, mulch and fertilizer.

**F. Mulch** – To be paid for under CONSTRUCTION COMPLETE.

Includes all materials, labor, maintenance, equipment and other incidentals.

**G. Baled Straw Erosion Checks** – To be paid for under CONSTRUCTION COMPLETE.

Includes constructing, and removing (when directed) the straw checks.

**H. Temporary Ditch Checks** – To be paid for under CONSTRUCTION COMPLETE.

Includes all materials, construction, and removal and any required filter fabric under rip rap ditch checks.

**I. Construction Exits** – To be paid for under CONSTRUCTION COMPLETE.

Includes all materials including the required geotextile, construction, and removal.

**J. Retrofit** – To be paid for under CONSTRUCTION COMPLETE.

Includes all work, supervision, materials (including the stone filter), labor and equipment necessary to construct, reconstruct, and/or remove the retrofit device from an existing or proposed detention pond outlet structure.

**K. Inlet Sediment Trap** – To be paid for under CONSTRUCTION COMPLETE.

Includes all materials, construction, and removal

Temporary devices may be left in place at the Engineer's discretion at no change in cost

### **163.5.01 Adjustments**

General Provisions 101 through 150.

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SUPPLEMENTAL SPECIFICATION**

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

**Section 165—Maintenance of Temporary Erosion and Sedimentation Control  
Devices**

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*Addition to the Standard Specifications:*

**165.1 General Description**

This work consists of providing maintenance on temporary erosion and sediment control devices, including but not limited to the following:

- Silt fence
- Sediment basins
- Silt control gates
- Check dams
- Silt retention barriers

It also consists of removing sediment that has accumulated at the temporary erosion and sediment control devices.

**165.1.01 Definitions**

General Provisions 101 through 150.

**165.1.02 Related References**

**A. Standard Specifications**

General Provisions 101 through 150.

**B. Referenced Documents**

General Provisions 101 through 150.

**165.1.03 Submittals**

General Provisions 101 through 150

**165.2 Materials**

General Provisions 101 through 150.

### **165.2.01 Delivery, Storage, and Handling**

General Provisions 101 through 150.

## **165.3 Construction Requirements**

### **165.3.01 Personnel**

General Provisions 101 through 150.

### **165.3.02 Equipment**

General Provisions 101 through 150.

### **165.3.03 Preparation**

General Provisions 101 through 150.

### **165.3.04 Fabrication**

General Provisions 101 through 150.

### **165.3.05 Construction**

#### **A. General**

As a minimum, clean the sediment from all temporary erosion control devices (except sediment basins) installed on the project when one half the capacity, by height, depth or volume has been reached. Clean the sediment from all temporary sediment basins installed on a project when one third the capacity of the storage volume has been filled.

Handle sediment excavated from any erosion or sediment control device in one of the following ways:

- Remove sediment from the immediate area and immediately stabilize it to prevent the material from refilling any erosion or sediment control device
- Place and mix it in the roadway embankment, or
- Waste it in an area approved by the Engineer.

Repair or replace at no cost to the Department, any erosion or sediment control devices that are not functioning properly or are damaged due to negligence or abuse.

#### **B. Temporary Silt Fence**

Maintenance of Temporary Silt Fence consists of furnishing all labor, tools, materials, equipment and necessary incidentals to remove and dispose of accumulated sediment down to the original ground line (0 % filled). Also included is the removal of sediment accumulations on the fabric by tapping the fabric on the downstream side.

#### **C. Silt Control Gates**

Maintenance of Temporary Silt Control Gates consists of all labor, tools, materials, equipment and necessary incidentals to remove and dispose of accumulated sediment down to the original ground line (0% filled). When applicable, this item will include the removal of sediment accumulations on the fabric by tapping the fabric on the downstream side.

#### **D. Erosion Control Checkdams**

Maintenance of Temporary Erosion Control Checkdams or Ditch Checks shall consist of all labor, tools, materials, equipment and necessary incidentals to remove and dispose of accumulated sediment down to the original ground line (0% filled). This item also includes the removal of any material deposited in sump holes. When applicable, this item will include the removal of sediment accumulations on the fabric by tapping the fabric on the downstream side.

#### **E. Silt Retention Barrier**

Maintenance of Temporary Silt Retention Barrier consists of all labor, tools, materials, equipment and necessary incidentals to remove and dispose of accumulated sediment down to the original ground line (0% filled).

**F. Temporary Sediment Basins**

Maintenance of Temporary Sediment Basins consists of all labor, tools, materials, equipment and necessary incidentals to remove and dispose of accumulated sediment down to the original bottom of the basin. This also includes removing accumulated sediment from the rock filter and restoring the rock filter to its original specified condition and any work necessary to restore all other components to the pre-maintenance conditions.

**G. Baled Straw Erosion Check**

Maintenance of Temporary Baled Straw Erosion Check consists of all labor, tools, materials, equipment and necessary incidentals to remove and dispose of accumulated sediment down to the original ground line (0% filled).

**H. Triangular Silt Barrier**

Maintenance of Triangular Silt Barrier consists of all labor, tools, materials, equipment and necessary incidentals to remove and dispose of accumulated sediment down to the original ground line (0% filled).

**I. Retrofit:**

Maintenance of the retrofit device consists of all labor, tools, materials, equipment and necessary incidentals to remove and properly dispose of accumulated sediment in the permanent detention pond being utilized as a temporary sediment basin. This item also includes any maintenance that is required to ensure the retrofit device is maintained per Plan details and any maintenance of the stone filter to maintain its filtering ability, including cleaning and replacement.

**J. Construction Exit:**

Maintenance of the construction exit consists of all labor, tools, materials, equipment and incidentals, including additional stone and geotextile fabric as required to prevent the tracking or flow of soil onto public roadways. This includes, scarifying existing stone, cleaning existing stone, or placement of additional stone.

Cleaning of the construction exit by scraping and/or brooming only will not be measured for payment.

**K. Inlet Sediment Trap**

Maintenance of inlet sediment traps consists of all labor, tools, materials, equipment and necessary incidentals to remove and properly dispose of accumulated sediment in the trap and/or the excavated area adjacent to the trap. It also includes any maintenance that is required on the material selected to construct the inlet sediment trap.

**165.3.06 Quality Acceptance**

General Provisions 101 through 150.

**165.3.07 Contractor Warranty and Maintenance**

General Provisions 101 through 150.

## **165.4 Measurement**

These items will not be measured separately.

- A. Temporary Silt Fence:**
- B. Silt Control Gates:**
- C. Erosion Control Checkdams:**
- D. Silt Retention Barrier:**
- E. Temporary Sediment Basins:**
- F. Baled Straw Erosion Check:**
- G. Triangular Silt Barrier:**
- H. Retrofit:**
- I. Construction Exit:**
- J. Inlet Sediment Trap**

### **165.4.01 Limits**

General Provisions 101 through 150.

## **165.5 Payment**

These items will be paid for under CONSTRUCTION COMPLETE

- A. Temporary Silt Fence:**
- B. Silt Control Gates:**
- C. Erosion Control Checkdams:**
- D. Silt Retention Barrier:**
- E. Temporary Sediment Basins:**
- F. Baled Straw Erosion Check:**
- G. Triangular Silt Barrier:**
- H. Retrofit:**
- I. Construction Exit:**
- J. Inlet Sediment Trap**

### **165.5.01 Adjustments**

General Provisions 101 through 150.

Date: August 26, 2002  
First Use Date 2001 Specifications: November 1, 2002  
Revised: January 16, 2003  
Revised: August 1, 2003  
Revised: February 1, 2004  
Revised October 15, 2005  
Revised February 28, 2007

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SPECIAL PROVISION**

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

**Section 167—Water Quality Monitoring**

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*Add the following:*

**167.1 General Description**

This Specification establishes the Contractor's responsibility to meet the requirements of the National Pollutant Discharge Elimination System (NPDES) Infrastructure Permit No. GAR 100002 as it pertains to Part IV. Erosion, Sedimentation and Pollution Control Plan.

**167.1.01 Definitions**

Certified Personnel— certified personnel are defined as persons who have successfully completed the Georgia Soil and Water Conservation Commission Course Level IA, possess a current certification card from the Commission, and have attended the Department's WECS seminar.

**167.1.02 Related References**

**A. Standard Specifications**

[Section 161—Control of Soil Erosion and Sedimentation](#)

**B. Referenced Documents**

NPDES Infrastructure Permit No. GAR 100002, Part IV

GDOT WECS seminar.

Environmental Protection Divisions Rules and Regulations (Chapter 391-3-26)

Georgia Soil and Water Conservation Commission Certification Level IA course.

OCGA 12-7



## Section 167—Water Quality Monitoring

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### 167.1.03 Submittals

General Provisions 101 through 150

### 167.2 Materials

General Provisions 101 through 150.

#### 167.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

### 167.3 Construction Requirements

#### 167.3.01 Personnel

Use certified personnel to perform all monitoring, sampling, inspections, and rainfall data collection.

Use the Contractor designated WECS or select a prequalified consultant from the Qualified Consultant List (QCL) to perform water quality monitoring.

Ensure that monitoring consultants' employees who perform monitoring, sampling, inspections, and rainfall data collection are GASWCC Certified.

#### 167.3.02 Equipment

Provide equipment necessary to complete the Work or as directed.

#### 167.3.03 Preparation

General Provisions 101 through 150.

#### 167.3.04 Fabrication

General Provisions 101 through 150.

#### 167.3.05 Construction

##### A. General

Perform inspections, rainfall data collection, testing of samples, and reporting the test results on the project according to the requirements in Part IV of the NPDES Infrastructure permit and this Specification.

Take samples manually or with the use of automatic samplers, according to the permit. Analyze all according to the permit, regardless of the method used to collect the samples.

If samples are analyzed in the field using portable turbidimeters, the monitoring results shall state that they are being used and a digital readout of NTUs is what is provided.

Submit bench sheets, work sheets, etc., when using portable turbidimeters. There are no exceptions to this requirement.

Perform required inspections and submit all reports required by this Specification within the time frames specified.

Failure to perform the inspections or submit the required reports within the time specified will result in the cessation of all construction activities with the exception of traffic control and erosion control. Continued failure to perform inspections or submit the required reports within the times specified will result in non-refundable deductions as specified in [Subsection 161.5.01.B](#).

##### B. Inspections

Have the Engineer inspect the installation and condition of each erosion control device required by the erosion control plan within seven days after initial installation. Have this inspection performed for each stage of construction when new devices are installed. Correct all deficiencies reported by the Engineer within two business days.

Ensure inspections are conducted by certified personnel on the areas and at the frequencies listed below. Document all inspections on form DOT-EC-1.

1. Daily:

## Section 167—Water Quality Monitoring

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- a. Petroleum product storage, usage and handling areas
  - b. All locations where vehicles enter/exit the site
2. Weekly and after Rainfall Events:
- Conduct inspections on these areas every seven calendar days and within twenty-four hours after the end of a rainfall event that is 0.5 in (13 mm) or greater:
- a. Disturbed areas not permanently stabilized
  - b. Material storage areas
  - c. Structural control measures, Best Management Practices (BMPs)
  - d. Water quality monitoring locations and equipment

3. Monthly:

Once per month, inspect all areas where final stabilization has been completed. Look for evidence of sediments or pollutants entering the drainage system and or receiving waters. Inspect all erosion control devices that remain in place to verify the maintenance status and that the devices are functioning properly.

Continue these inspections until the Notice of Termination is submitted.

### C. Reports:

1. Inspection Reports:

Summarize the results of inspections noted above in writing on form DOT-EC-1. Include the following information:

- Date(s) of inspection
- Name of personnel making inspection
- Status of devices
- Observations
- Action taken
- Signature of personnel making the inspection
- Any incidents of non-compliance

The EC-1 form shall be signed by the project WECS.

Submit all inspection reports to the Engineer within twenty-four hours of the inspection.

The Engineer will review the reports, inspect the project for compliance, and issue concurrence with the submitted reports provided the inspection reports are satisfactory.

The Engineer will notify the certified personnel of any additional items that should be added to the inspection report.

Correct any items listed in the inspection report requiring routine maintenance or correction within twenty-four hours of notification.

Assume responsibility for all costs associated with additional sampling as specified in Part IV.D.5.d.3.(c) and Part IV.D.5.d.3.(c), of the NPDES GAR 100002 permit if either of these conditions arise:

- BMPs shown in the Plans are not properly installed and maintained, or
- BMPs designed by the Contractor are not properly designed, installed and maintained.

2. Monitoring Reports

- a. Report Requirements

## Section 167—Water Quality Monitoring

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Include in all reports, the following certification statement, signed by the WECS or consultant providing monitoring on the project:

“I certify under penalty of law that this document and all attachments were prepared under my direct supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.”

When a rainfall event requires a sample to be taken, submit a report of the monitoring results to the Engineer within seven working days of the date the sample was obtained. Include the following information:

- 1) Date of sampling
- 2) Rainfall amount on sample date (sample date only)
- 3) NTU of sample & analysis method
- 4) Location where sample was taken (station number, etc.)
- 5) Receiving water or outfall sample
- 6) Project number and county
- 7) Whether the sample was taken by automatic sampler or manually (grab sample)

b. Report Requirements With No Qualifying Rainfall Events

When no qualifying rainfall event occurs during item 1. or 2. (whichever comes first): Submit a report that states “No qualifying rainfall event occurred and no samples were taken.”

- 1) Clearing and Grubbing is complete and 90 days have passed without a qualifying rainfall event occurring in the drainage area selected as the representative sampling location.
- 2) Clearing and Grubbing is complete and the mass grading has been completed without a qualifying rainfall event occurring in the drainage area selected as the representative sampling location.

Submit this summary to the Engineer within 7 working days after the mass grading is complete or within 97 days of the completion of clearing and grubbing (whichever applies).

c. Test Results

Provide monitoring test results to the Engineer within 48 hours of the samples being analyzed. This notification may be verbal or written. This notification does not replace the monitoring summary.

3. Rainfall Data Reports

Record the measurement of rainfall once each twenty-four hour period. Measure rainfall data at the active phase of construction on the site.

Project rain gauges and those used to trigger the automatic samplers are to be emptied after every rainfall event. This will prevent a cumulative effect and prevent automatic samplers from taking samples even though the rainfall event was not a qualifying event.

Submit a written weekly report, signed by the WECS, to the Engineer showing the rainfall data for each day. The daily rainfall data supplied by the WECS to the Engineer will be the official rainfall data for the project.

### 167.3.06 Quality Acceptance

General Provisions 101 through 150.

## **Section 167—Water Quality Monitoring**

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### **167.3.07 Contractor Warranty and Maintenance**

General Provisions 101 through 150.

### **167.4 Measurement**

This item will not be measured separately for payment. Water Quality Inspections in accordance with the inspection and reports sub-sections shall take place up to the time the Notice of Termination is submitted or Contract Time expires.

#### **167.4.01 Limits**

General Provisions 101 through 150. Submit the report to the Engineer within 7 working days

### **167.5 Payment**

This item will be paid for under CONSTRUCTION COMPLETE.:

Includes meeting the requirements of the monitoring sections of the NPDES permit and this Specification, obtaining samples, analyzing samples, any and all necessary incidentals, and providing results of turbidity tests to the Engineer, within the time frame required by the NPDES Infrastructure permit, and this Specification.

This item is based on the rainfall events that require sampling as described in Part IV.D.5 of the permit.

Also includes performing the requirements of the inspection section of the NPDES permit and this Specification, any and all necessary incidentals, and providing results of inspections to the Engineer, within the time frame required by the NPDES Infrastructure permit, and this Specification.

#### **167.5.01 Adjustments**

General Provisions 101 through 150.

**DEPARTMENT OF TRANSPORTATION**  
**STATE OF GEORGIA**

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**SUPPLEMENTAL SPECIFICATION**

**Project Number: CSNHS-0008-00(232)**  
**P.I. Number: 0008232**  
**Troup County**

**Section 170—Silt Retention Barrier**

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*Delete Subsection 170.3 and substitute the following:*

**170.3 Construction Requirements**

**170.3.01 Personnel**

General Provisions 101 through 150.

**170.3.02 Equipment**

General Provisions 101 through 150.

**170.3.03 Preparation**

General Provisions 101 through 150.

**170.3.04 Fabrication**

General Provisions 101 through 150.

**170.3.05 Construction**

Install a silt retention barrier as follows: Barriers shall be either staked or floating depending upon current, tides, water depth, and other variables, or as shown in the plans and contract.

A. Floating Silt Retention Barrier

1. Confine dredged materials to ponding areas or settlement basins using standpipes or weirs.
2. Place the barrier approximately 25 ft (7.5 m) outside the affected construction area, and at a depth within 5 ft (1.5 m) of the bottom.
3. If the body of water has a significant current, place the barrier parallel to the water flow. Ensure that the fabric is permeable or impermeable.
4. Vary the dimensions and methods to suit the conditions and to meet the requirements of other local and State water control agencies to ensure that silt dispersion is effectively controlled.
5. Provide a fabric that is weighted to prevent the bottom of the barrier from floating.

B. Staked Silt Retention Barrier

1. Where a staked barrier is used to protect a stream or inundated area, ensure the fabric:
  - a. Extends to the bottom of the stream or inundated area and is weighted to prevent it from floating
  - b. Is permeable or impermeable and not trenched in at the bottom

- c. Extends 1 foot (300 mm) above normal water elevation
2. Posts:
- a. Options: 2 inch (50 mm) x 4 inch (100 mm) wood; or 2 ½ inch (62.5 mm) min. diameter wood; or steel at a minimum of 1.33 pounds per foot (1.980 kg/m)
  - b. Space posts at a minimum spacing of 4 feet (1.2 m)
  - c. Ensure posts are a minimum of 5 feet (1.5 m) in length
  - d. Extend post a minimum of 18 inches (450 mm) into the soil

**170.3.06 Quality Acceptance**

General Provisions 101 through 150.

**170.3.07 Contractor Warranty and Maintenance**

General Provisions 101 through 150.

*Delete Subsection 170.4 and 170.5.*

*Add Subsection 170.4*

**Measurement and Payment:**

No separate measurement or payment will be made for this item. This item will be included in price bid for CONSTRUCTION COMPLETE. Includes furnishing materials, erecting the barrier, removing, and disposing of the barrier when no longer required.

Adjustments will be as shown in General Provisions 101 to 150.

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**Supplemental Specification**

**Project Number: CSNHS-0008-00(232)  
P.I. Number: 0008232  
Troup County**

**Section 171—Silt Fence**

---

*Delete Section 171 and substitute the following:*

**171.1 General Description**

This work includes furnishing, installing, and removing a water permeable filter fabric fence to remove suspended particles from drainage water.

**171.1.01 Definitions**

General Provisions 101 through 150.

**171.1.02 Related References**

**A. Standard Specifications**

[Section 163—Miscellaneous Erosion Control Items](#)

[Section 700—Grassing](#)

[Section 862—Wood Posts and Bracing](#)

[Section 881—Fabrics](#)

[Section 894—Fencing](#)

**B. Referenced Documents**

ASTM D 3786

ASTM D 4355

ASTM D 4632

ASTM D 4751

[GDT 87](#)

[QPL 36](#)

**171.1.03 Submittals**

General Provisions 101 through 150.

**171.2 Materials**

Materials shall meet the requirements of the following Specifications:

<b>Material</b>	<b>Section</b>
Filter Fabrics	<a href="#">881</a>
Fencing	<a href="#">894</a>

Conditions during Project construction will affect the quantity of the silt fence to be installed.

The Engineer may increase, decrease, or eliminate the quantity at his or her direction. Variations in quantity are not changes in details of construction or in the character of the work.

For Type A, B, and C fences, use fabric as specified in [Subsection 881.2.07, "Silt Fence Filter Fabric."](#)

#### **171.2.01 Delivery, Storage, and Handling**

During shipment and storage, wrap the fabric in a heavy-duty covering that will protect the cloth from sunlight, mud, dust, dirt, and debris. Do not expose the fabric to temperatures greater than 140 °F (60 °C).

When installed, the Engineer will reject the fabric if it has defects, rips, holes, flaws, deterioration, or damage incurred during manufacture, transportation, or storage.

### **171.3 Construction Requirements**

#### **171.3.01 Personnel**

General Provisions 101 through 150.

#### **171.3.02 Equipment**

General Provisions 101 through 150.

#### **171.3.03 Preparation**

General Provisions 101 through 150.

#### **171.3.04 Fabrication**

General Provisions 101 through 150.

#### **171.3.05 Construction**

Install the silt fence according to this Specification, as shown on the Plans, or as directed by the Engineer.

##### **A. Install Silt Fence**

1. Install silt fence by either of the following methods:
  - a. **Excavated Trench Method**  
Excavate a trench 4 to 6 in (100 to 150 mm) deep using equipment such as a trenching machine or motor grader. If equipment cannot be operated on the site, excavate the trench by hand.
  - b. **Soil Slicing Method**  
Create a mechanical slice in the soil 8 to 12 in (200 to 300 mm) deep to receive the silt fence. Ensure that the width of the slice is not more than 3 in (75 mm). Mechanically insert the silt fence fabric into the slice in a simultaneous operation with the slicing that ensures consistent depth and placement.
2. Install the first post at the center of the low point (if applicable). Space the remaining posts a maximum of 6 ft (1.8 m) apart for Types A and B fence and 4 ft (1.2 m) apart for Type C fence.
3. Bury the posts at least 18 in (450 mm) into the ground. If this depth cannot be attained, secure the posts enough to prevent the fence from overturning from sediment loading.
4. Attach the filter fabric to the post using wire, cord, staples, nails, pockets, or other acceptable means.
  - a. **Staples and Nails (Wood Posts):** Evenly space staples or nails with at least five per post for Type A fence and four per post for Type B fence. Staple fabric to the smallest side of post.
  - b. **Pockets:** If using pockets, and they are not closed at the top, attach the fabric to a wood post using at least one additional staple or nail, or to a steel post using wire.  
Ensure that the additional attachment is within the top 6 in (150 mm) of the fabric.



- c. Install the filter fabric so that 6 to 8 in (150 to 200 mm) of fabric is left at the bottom to be buried. Provide a minimum overlap of 18 in (450 mm) at all splice joints.
- d. For Type C fences, attach the filter fabric to the top of a woven wire support fence at the midpoint between posts.
5. Install the fabric in the trench so that 4 to 6 in (100 to 150 mm) of fabric is against the side of the trench with 2 to 4 in (50 to 100 mm) of fabric across the bottom in the upstream direction.
6. Backfill and compact the trench to ensure that flow cannot pass under the barrier. When the slice method is used, compact the soil disturbed by the slice on the upstream side of the silt fence first, and then compact the downstream side.

#### **B. Remove the Silt Fence**

1. Keep the silt fence in place unless the Engineer directs. A removed silt fence may be used at other locations if the Engineer approves of its condition.
2. After removing the silt fence, return the area to a pleasing appearance. Seed and mulch the area according to [Section 700](#).
3. When installing a silt fence across a waterway that produces significant runoff, place a settling basin in front of the fence to handle the sediment load, if required. Construct a suitable sump hole or storage area according to [Section 163](#).

#### **171.3.06 Quality Acceptance**

Approved silt fence is listed in [QPL 36](#). Approved fabrics must consistently exceed the minimum requirements of this Specification as verified by the Office of Materials and Research. The Office of Materials and Research will remove fabric that fails to meet the minimum requirements of this specification from the QPL until the products' acceptability has been reestablished to the Department's satisfaction.

At the time of installation, the Engineer will reject the fabric if it has defects, rips, holes, flaws, deterioration, or damage incurred during manufacture, transportation, or storage.

#### **171.3.07 Contractor Warranty and Maintenance**

Maintain the silt fence until the Project is accepted or until the fence is removed. Also, remove and dispose of the silt accumulations at the silt fence.

Remove and replace any deteriorated filter fabric that reduces the effectiveness of the silt fence.

Repair or replace any undermined silt fence at no additional cost to the Department.

# GEORGIA DEPARTMENT OF TRANSPORTATION

## STATE OF GEORGIA

### SUPPLEMENTAL SPECIFICATION

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

## Section 201—Clearing and Grubbing Right of Way

---

*Delete Section 201 and Substitute the following:*

### 201.1 General Description

This work includes clearing, grubbing, removing and disposing of vegetation, buildings and debris within the entire Right-of-Way and easement areas adjacent to the Right-of-Way or as designated by the Engineer. Except, do not remove objects designated to remain or removed according to other sections of these Specifications. This work also includes preserving (from injury and defacement) vegetation and objects designated to remain in place.

#### 201.1.01 Definitions

**Clearing:** Removing and disposing trees, brush, stumps, logs, grass, weeds, roots, decayed vegetable matter, poles, stubs, rubbish, refuse dumps, sawdust piles, and loose boulders of 1 yd<sup>3</sup> (1 m<sup>3</sup>) or less existing outside of the construction limits, debris resting on or protruding through the ground surface, or appearing on the Right-of-Way before final acceptance of the work.

Clearing also includes removing and disposing of obstructions, such as fences, bridges, buildings, and other incidental structures within the Right-of-Way unless the work or a portion of the work is:

- Removed as excavation
- Shown in the Proposal as a separate Pay Item
- Performed by others

**Grubbing:** Removal from the Right-of-Way and proper disposal of all objectionable matter defined above under clearing, which is embedded in the underlying soil.

Grubbing also includes removing and properly disposing of parking lots, abandoned pavements, sidewalks, driveways, catch basins, drop inlets, pipes, manholes, curbing, retaining walls, utilities, foundations, paved floors, underground tanks (for removal of underground tanks see [Section 217](#)), and other structures within the Right-of-Way unless the work or portions of the work are:

- Obstructions removed as one of the excavation items
- Shown in the Proposal as separate Pay Items
- Removed by others
- To be incorporated in the project.

**Objectionable Roots:** Any of the following types of roots:

## Section 201—Clearing and Grubbing Right of Way

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- Matted trees and brush roots (regardless of the size of the roots)
- Individual roots more than 0.75 in (20 mm) diameter
- Individual roots more than 3 ft (1 m) long regardless of size
- Large quantities of smaller roots present in the top 1 ft (300 mm) of the finished subgrade or road surface when detrimental to the work as determined by the Engineer.

**Stumps:** The butt of a tree with a diameter of 4 in (100 mm) or more. Measure the stump 6 in (150 mm) above the ground line.

### 201.1.02 Related References

#### A. Standard Specifications

[Section 107—Legal Regulations and Responsibility to the Public](#)

[Section 109—Measurement and Payment](#)

[Section 160—Reclamation of Material Pits and Waste Areas](#)

[Section 161—Control of Erosion and Sedimentation](#)

[Section 208—Embankments](#)

[Section 215 – Removal of Solid Waste](#)

[Section 217—Removal of Underground Storage Tanks](#)

#### B. Referenced Documents

General Provisions 101 through 150.

### 201.1.03 Submittals

General Provisions 101 through 150.

## 201.2 Materials

General Provisions 101 through 150.

### 201.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

## 201.3 Construction Requirements

### 201.3.01 Personnel

General Provisions 101 through 150.

### 201.3.02 Equipment

General Provisions 101 through 150.

### 201.3.03 Preparation

General Provisions 101 through 150.

### 201.3.04 Fabrication

General Provisions 101 through 150.

## Section 201—Clearing and Grubbing Right of Way

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### 201.3.05 Construction

#### A. General

Establish Right-of-Way and construction lines. The Engineer will designate which trees, shrubs, and plants will remain in the ground. Preserve things designated to remain.

Apply the requirements of [Subsection 107.22](#), [Subsection 107.23](#), and [Section 161](#) to clearing and grubbing operations.

Strip grass immediately ahead of grading.

To prevent the spread of “Introduced Invasive Pest Species”, do the following:

1. Adhere to the restrictions of [Section 155.3.05.A](#) for moving soil, mulch, sod or plants, stump wood or timber with soil attached.
2. Adhere to the requirements of [Section 155.3.05.B](#) for cleaning of equipment, except that the USDA inspection will not be required for vegetative matter.
3. Dispose of vegetative parts of plants that may reproduce (roots and aboveground parts that bear fruit) by burning on site (where permitted) or bury with a minimum cover of 3 feet (1 meter) at an approved site. Obtain the Engineer’s approval for any other methods of disposal.

#### B. Clearing

Clear objects within the Right-of-Way and easement areas as follows:

1. Choose a method of clearing that prevents damage to property, trees, or retained shrubbery in or outside of the Right-of-Way.
2. Remove stumps that are part of the clearing operations as specified under [Subsection 201.3.05.C, “Grubbing”](#).
3. Cut the stumps not grubbed as specified in this section.
4. Dispose of cleared materials as specified in [Subsection 201.3.05.E](#).

#### C. Grubbing

Grubbing consists of removing and disposing objectionable matter embedded in the underlying soil (defined in [Subsection 201.3.05.B, “Clearing”](#)) from the Right-of-Way and easement areas.

##### 1. Grubbing Operations

When grubbing, remove abandoned obstructions referenced in [Subsection 201.1.01 “Definitions”](#) to the following depths:

- a. Under Pavements: Remove to a depth of at least 3 ft (1 m) below the finished subgrade.
  - b. Underneath Other Structures: Remove to at least 3 ft (1 m) below the foundations of any proposed structure, including installations such as guard rail posts and utility poles.
  - c. Elsewhere in the Right-of-Way and easement areas: Remove as follows:
    - 1) Remove to at least 3 ft (1 m) below the finished surface of slopes and shoulders and 1 ft (300 mm) below natural ground outside construction lines.
    - 2) Thoroughly crack or break abandoned structures that may impound water. These structures include concrete floors, basements, and catch basins within 10 ft (3 m) of finished grade.
    - 3) Break floors so that no section greater than 10 ft<sup>2</sup> (1 m<sup>2</sup>) remains intact.
2. Except as modified under [Subsection 201.3.05.D](#), use the following procedure to perform grubbing:
    - a. Remove stumps and other matter that cannot be removed by a root rake. Remove stumps to a minimum depth of 2 ft (600 mm) below the ground line.
    - b. Rake areas containing objectionable roots to a depth of at least 6 in (150 mm) below the surface.
    - c. Remove remaining objectionable matter by hand or other suitable means. When necessary, remove small roots (see [Subsection 201.1.01 “Objectionable Roots”](#)) detrimental to the work.
    - d. Backfill stump holes and compact backfill to the approximate density of the surrounding soil.
    - e. Harrow the area with a heavy-duty disc harrow that penetrates and turns the ground to at least 6 in (150 m) deep.

## Section 201—Clearing and Grubbing Right of Way

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- f. Remove objectionable matter exposed by the harrowing.
- g. Level the harrowed areas with blading equipment. Leave the grubbed areas smooth enough for a power mower.

### D. Modifications of Clearing and Grubbing

Modify clearing and grubbing as follows:

#### 1. In Excavation Areas

Modify clearing and grubbing in excavation areas as follows:

- a. Harrowing and leveling may be omitted.
- b. Do not fill stump holes except when the bottom of any stump hole extends below the elevation of the finished subgrade. In this case, fill the portion of each hole below subgrade elevation with suitable material compacted to at least the density of the surrounding soil.

#### 2. In Embankment Areas

Modify clearing and grubbing in embankment areas as follows:

- a. Under 4.5 ft (1.4 m)  
Clear and grub areas without modification where the original ground and finished grade differ in elevation 4.5 ft (1.4 m) or less.
- b. Over 4.5 ft (1.4 m)  
Clear, but do not grub areas covered by embankments exceeding the 4.5 ft (1.4 m) elevation difference specified in step (a) above. Except the removal of unsound or decayed stumps.  
Remove and backfill stumps according to [Subsection 201.3.05.C.2](#). When leaving sound stumps in place, cut them off to no more than 6 in (150 mm) above the original ground line.
- c. Embankment Areas Over Old Roads  
Clear and grub without modification ditches and slopes of old roads to a depth that removes all objectionable matter to provide a firm foundation.

#### 3. Areas Outside of Roadway

Except as specified in this section, clear and grub the entire Right-of-Way and easement areas outside construction limits and leave it smooth and free from loose boulders and debris that would interfere with power mowers.

Exceptions to the above requirements are as follows:

- a. Selective Clearing  
When the Engineer directs to preserve certain trees and plants, protect them from injury. Trees to be removed shall be felled to prevent injury to standing trees, plants, and improvements to be preserved.  
Cut off tree branches overhanging the roadway within 20 ft (6 m) of the finished grade close to the boles. Also, remove other branches to create a balanced appearance. Treat scars from branch removal with a heavy coat of asphaltic tree paint. Grub areas adjacent to selected trees and shrubs without damage to living roots of the selected trees or shrubs.
- b. Special Treatment Areas  
Clear special treatment areas according to the Plan notes.
- c. Steep Slopes  
Clear or selectively clear slopes that are too steep for power mowers (slopes steeper than 3 horizontal to 1 vertical) and clear or selectively clear slopes that are subject to excessive erosion. Do not grub in these areas.
- d. Grassed Areas  
Do not grub (if the Engineer approves) reasonably large areas outside construction limits covered with grasses and smooth enough for power mowers. Remove stumps, trees, and other objectionable matter.

#### 4. Bridge Sites

Modify clearing and grubbing at bridge sites as follows:

- a. Stream Bridges

## Section 201—Clearing and Grubbing Right of Way

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Clear the Right-of-Way for stream bridges for the full length of the proposed structure. Cut stumps and brush flush with the ground line.

The Engineer will require a second cutting if high water prevents cutting stumps flush with the ground. If the Engineer requires more than two cuttings, see [Subsection 201.5](#) for payment.

Remove drift and stumps where necessary to permit installation of rip rap, piling, piers, abutments, wing walls, and bents. Properly backfill the holes.

Preserve stump and brush root systems at river and stream banks when they have been cut flush with the ground line.

### b. Other Bridges

Clear and grub bridges (other than stream bridges) as specified within this specification for roadway areas and areas outside of the roadway.

## E. Removal and Disposal of Materials

### 1. Merchantable Timber and Buildings

The Department may dispose of merchantable timber and buildings, or may allow a property owner to remove them from the land granted for Right-of-Way before the Contractor begins operation. Therefore, the Department does not guarantee that merchantable timber or buildings will be on the Right-of-Way when the work begins.

Material salvaged from removing timber or buildings becomes the property of the Contractor.

Demolish, remove, and dispose of all building structures within the right of way and easement areas including concrete slabs, footings, foundations, etc. except building structures designated to remain in place. Grade to drain all disturbed ground to a reasonably smooth and pleasing appearance, free from loose boulders and other debris that would interfere with the use of power mowers. Grass all disturbed areas.

Prior to demolition or removal:

- a. Inspect all building structures for the presence of asbestos. The inspection shall be done by an EPA Asbestos Hazard Emergency Response Act (AHERA) accredited inspector whose certification is current.
- b. Provide a copy of all inspection reports including the inspector's credentials to the Engineer.
- c. Provide written notice of intent to demolish to the Georgia Environmental Protection Division (EPD) of the Georgia Department of Natural Resources in accordance with EPD regulations with a copy to the engineer. This notice is required even if there is no asbestos present.

If there is asbestos present, its removal shall be done by a contractor licensed with the EPD in accordance with the Rules of Georgia Department of Natural Resource Environmental Protection Division chapter 391-3-14-04. All asbestos removal and disposal shall be done in accordance with EPD regulations. All asbestos removal shall be considered as Extra Work and payment will be made in accordance with [Subsection 109.05](#).

### 2. Combustible Material

Abide by Federal, State, and local codes when the Right-of-Way (or any portion of the Right-of-Way) lies within an area where burning is restricted. All combustible material except sawdust piles may be burned on the Right-of-Way except where prohibited by Federal, State, or local air pollution control regulations.

- a. Prevent fire from spreading to adjacent areas and damaging living trees and shrubs designated to remain on the Right-of-Way and easement areas.
- b. Prevent damage to public and private installations either within or adjacent to the Right-of-Way and prevent damage to traveling public.
- c. Obtain suitable areas for burning the combustible material when necessary (at the Contractor's expense). Burning area are subject to the approval of the Engineer.
- d. Dispose of unburned combustible material according to [Subsection 201.3.05.E.3](#). If the disposal area is located on private property, present written authority to the Engineer (signed by the property owner) granting the Contractor and the Department permission to use the area for the purpose intended. Reclaim the disposal area according to [Section 160](#) except that the reclamation is at the Contractor's expense.
- e. Completely remove sawdust within the construction limits. Haul the sawdust to approved disposal areas, or deposit it on the Right-of-Way in a layer less than 3 in (75 mm) deep. Immediately mix the sawdust with the underlying soil by discing and harrowing. Leave the harrowed surface smooth.

## Section 201—Clearing and Grubbing Right of Way

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### 3. Solid Waste Material

Place solid waste material either in the embankment (provided the material is satisfactory for embankment construction) or in a Department-approved solid waste disposal site.

The classification of non-regulated and regulated solid waste materials are defined by the Environmental Protection Division (EPD) of the Georgia Department of Natural Resources (GDNR) rules and regulations. Dispose of these materials using the following procedures.

#### a. Non-regulated Solid Waste Material

- 1) Excess material such as soil, rock, brick, concrete (with and without reinforcement), and cured asphalt may be placed within the Right-of-Way, provided there is available room. Place these materials according to [Section 208](#) and as directed by the Engineer.
- 2) Common fill such as soil, rock, brick, and concrete (with and without reinforcement) may be placed outside the Right-of-Way. Place the material in uniform layers 3 ft (1 m) thick or less and distributed to avoid pockets. Fill voids with finer material. Cover the last layer of fill with at least 2 ft (600 mm) of soil. Construct the fill according to [Section 208](#), except compact it to at least 90 percent of the maximum laboratory dry density.
- 3) Materials that may be recycled or reused such as asphaltic concrete, Portland cement concrete, plastic, metal, and materials that qualify under EPD regulations for sale or use may be reclaimed by the Contractor.

#### b. Regulated Material

- 1) Obtain an inert landfill permit according to GDNR/EPD rules for the following material deposited off the R/W: Inert waste items listed in Subsection 201.3.05.E.3.a if not properly layered and compacted, and organic debris such as stumps, limbs and leaves, cured asphalt. Or, take the material to a permitted solid waste landfill.
- 2) Take other regulated construction/demolition and non-hazardous solid waste, such as forms, barrels, plastic, and other by-products of construction to a construction/demolition landfill or to a municipal solid waste landfill.
- 3) Dispose of oils, solvents, fuels, untreated lead paint residue, and other solid hazardous waste through a properly licensed hazardous waste disposal facility.

Remove municipal solid waste discovered during construction or shown on the Plans according to [Section 215](#).

### 201.3.06 Quality Acceptance

General Provisions 101 through 150.

### 201.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

## 201.4 Measurement

The Department does not measure clearing and grubbing separately for payment. The area is considered the full Right-of-Way width for the length of the Project including slope and construction easement areas shown on the Plans.

### 201.4.01 Limits

General Provisions 101 through 150.

## 201.5 Payment

Payment for this Item, completed and accepted, will be made under CONSTRUCTION COMPLETE. Includes all work specified in this Section including final cleanup as required.

The Contractor is responsible for all cuttings to clear the Right-of-Way for stream bridges (according to [Subsection 201.3.05.D.4.a](#)).

## Section 201—Clearing and Grubbing Right of Way

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### 201.5.01 Adjustments

General Provisions 101 through 150.



**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SUPPLEMENTAL SPECIFICATION**

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

**Section 208—Embankments**

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*Delete Section 208 and substitute the following:*

**208.1 General Description**

This work includes placing embankments, backfilling structures, and constructing earth berms and surcharges with suitable material excavated under [Section 204](#), [Section 205](#), [Section 206](#), and [Section 207](#).

Complete the work according to the lines, grades, and typical cross- sections shown on the Plans or established by the Engineer.

The work also includes preparing areas by backfilling stump holes and correcting surface irregularities where the embankment is to be constructed. This includes forming, compacting, and maintaining the embankment and placing and compacting approved material where unsuitable material has been removed.

Payment for this work is included in other appropriate Pay Items unless a specific Pay Item is set up in the Contract.

Apply all provisions of [Section 161](#) to the work in this Section.

Perform Shoulder Construction according to [Section 216](#).

**208.1.01 Definitions**

General Provisions 101 through 150.

**208.1.02 Related References**

**A. Standard Specifications**

[Section 161—Control of Soil Erosion and Sedimentation](#)

[Section 201—Clearing and Grubbing Right-of-Way](#)

[Section 204—Channel Excavation](#)

[Section 205—Roadway Excavation](#)

[Section 206—Borrow Excavation](#)

[Section 207—Excavation and Backfill for Minor Structures](#)

[Section 209—Subgrade Construction](#)

[Section 216—Unpaved Shoulders](#)

[Section 810—Roadway Materials](#)

[Section 811—Rock Embankment](#)

[Section 813—Pond Sand](#)

**B. Referenced Documents**

[GDT 7](#)

[GDT 20](#)

[GDT 21](#)

[GDT 24a](#)

[GDT 24b](#)

[GDT 59](#)

[GDT 67](#)

**208.1.03 Submittals**

General Provisions 101 through 150.

**208.2 Materials**

Embankment material classes are defined in [Section 810](#), [Section 811](#), and [Section 813](#). The material incorporated into the roadway will be subject to the following limitations:

**A. Embankment Material**

Use embankment material classified as Class I, II, III, V, or VI except as noted below:

1. Inundated Embankments

A Special Provision in the Proposal will contain required gradation and other characteristics of materials for constructing embankments through reservoirs.

2. Intermittently Inundated Embankments

Build intermittently inundated embankments using any material suitable for embankment.

3. Embankments at Structures

Embankment materials placed within 10 ft (3 m) of any bridge structure shall be classified as Class I or II. Ensure that materials do not contain rock larger than 3 in (75 mm) for any dimensions.

**B. Rock Embankment**

Ensure that rock embankment placed as indicated on the Plans meets the requirements of [Section 811](#) unless specified otherwise in the Plans or in the Special Provisions.

**C. In-Place Embankment**

Construct in-place embankment with Class I, II, III, V, or VI material.

**D. Backfill Material**

Backfill material furnished and stockpiled shall be Class I or Class II as defined in [Subsection 810.2.01.A](#).

**E. Pond Sand Embankment**

Use pond sand that meets the requirements of [Section 813](#) as embankment material. Material is subject to the following approval limitations:

1. Pond sand will be approved on a stockpile basis only.

2. Pond Sand will not be approved for Type I or normal backfill materials or for backfill for mechanically stabilized walls.

3. Pond sand shall be encapsulated, when used as fill, with 2 ft (600 mm) of soil on the slopes and 3 ft (1 m) of soil on top.

4. Pond sand shall not be used on sidehill fills or fill widenings where any of the following conditions exist:
  - a. The proposed fill slope is steeper than 2:1.
  - b. The thickness of the proposed fill at its thinnest point, as measured perpendicularly from the new fill line to the existing ground slope/fill slope, is less than 7 ft (2.1 m), including 2 ft (600 mm) of soil cover.
  - c. The fill height exceeds 30 ft (9 m).

#### **208.2.01 Delivery, Storage, and Handling**

General Provisions 101 through 150.

### **208.3 Construction Requirements**

#### **208.3.01 Personnel**

General Provisions 101 through 150.

#### **208.3.02 Equipment**

General Provisions 101 through 150.

#### **208.3.03 Preparation**

General Provisions 101 through 150.

#### **208.3.04 Fabrication**

General Provisions 101 through 150.

#### **208.3.05 Construction**

##### **A. Benching Excavation for Embankment**

This work includes excavating material forming benches in the existing ground beneath proposed embankments. Form benches to increase the bond between the existing ground and the proposed embankment.

This work is required where embankments are placed on hillsides or against existing embankments, which will be indicated on the Plans.

Construct the benches approximately 12 ft (3.7 m) wide unless otherwise shown on the Plans. Use material removed in the excavation in the embankments. The Department will make no additional payment for this work.

##### **B. Embankments**

Follow these requirements when constructing embankments:

###### **1. Preparation for Embankments**

Before starting embankment construction, clear and grub the embankment area according to [Section 201](#) and install Drainage Structures according to [Section 550](#).

###### **a. Depressions and Undercut Areas**

Fill depressions below the ground surface and undercut areas with suitable material. Remove unsuitable or unstable material and compact according to [Subsection 208.3.05.B.1.c](#) before beginning embankment construction.

###### **b. Scarification and Other Preparation**

Plow and scarify the entire area upon which the embankment is to be placed (except inundated areas) at least 6 in (150 mm) deep.

Before placing the embankment, recompact loosened soil to the approximate density of the underlying soil. Cut benches as specified in [Subsection 208.3.05.A](#).

###### **c. Compaction Under Shallow Fills**

When the depth of fill and surfacing is 3 ft (1 m) or less, compact the original ground compact at least 1 ft (300 mm) deep to at least 95 percent of the maximum laboratory dry density as determined from representative samples of the compacted material using, [GDT 7](#), [GDT 24a](#), [GDT 24b](#), or [GDT 67](#) whichever applies.

The in-place density of the compacted fill will be determined according to [GDT 20](#), [GDT 21](#), or [GDT 59](#), whichever applies.

d. Embankments Over Existing Roads, Parking Areas, and Floors

Thoroughly plow or scarify all portions of existing unpaved roads and flexible pavements. Destroy cleavage planes before placing the embankment.

- 1) Remove the old pavement with rigid surfaces if the new embankment is not more than 3 ft (1 m) high.
- 2) Break remaining rigid pavements that are within 10 ft (3 m) of the finished grade so that no section larger than 10 ft<sup>2</sup> (1 m<sup>2</sup>) remains intact.

2. Embankment Formation

Use the following requirements when constructing the embankment formation:

a. Layer Construction

Except as noted in [Subsection 208.3.05.B.2.d](#), construct the embankments in parallel layers. Deposit the material and spread in horizontal layers not more than 8 in (200 mm) thick, loose measurement, for the full width of the cross-section. Use motor graders, bulldozers, or other approved equipment to keep layers uniform. Compact the layers using a sheepsfoot roller. The Engineer may permit the use of vibratory rollers whenever the embankment soils consist of Class IA1, IA2, or IA3 materials.

b. Moisture Content

Compact each layer within the range of optimum moisture content to achieve the compaction specified below. Do not construct successive layers on previous layers that exhibit excessive pumping under construction equipment regardless of compaction.

Dry material if it contains too much moisture. Ensure the moisture content is sufficient for stability and compaction.

Add water if the material is too dry and uniformly mix it with the soil for stability and compaction. The Department will not measure water added to the material under this requirement for payment. It is considered incidental to the satisfactory completion of the work.

c. Degree of Compaction

Compact the embankment at bridge structures to at least 100 percent of the maximum laboratory dry density. Compact for the full depth of the embankment, beginning at the toe of the slope and extending 100 ft (30 m) from the end of the bridge.

Compact embankment other than at bridge structures to at least 95 percent of the maximum laboratory dry density to within 1 ft (300 mm) of the top of the embankment. Compact the top 1 ft (300 mm) of the embankment to at least 100 percent of the maximum laboratory dry density.

If grading and paving are let in separate contracts, the paving Contractor shall recompact the top 6 in (150 mm) to at least 100 percent of the maximum laboratory density.

The maximum laboratory dry density will be determined from representative samples of the compacted material using [GDT 7](#), [GDT 24a](#), [GDT 24b](#), or [GDT 67](#), whichever applies. The in-place density of the compacted fill will be determined according to [GDT 20](#), [GDT 21](#), or [GDT 59](#), whichever is applicable.

d. Special Conditions

Follow these special requirements:

- 1) Build layers as parallel as possible. In certain cases the Engineer may permit steeper slopes at ends of the embankments.
- 2) In swamp or inundated areas that will not support the equipment, build the lower part of the fill by dumping successive loads in layers no thicker than necessary to support the hauling equipment.
- 3) Build and compact the remainder of fills in layers as specified above.

e. Embankments at Structures

Use Class I or II material when constructing embankments over and around pipes, culverts, arches, and bridges according to [Subsection 810.2.01.A.1.](#)

- 1) Compact the material as specified in [Subsection 208.3.05.B.2.c.](#)
- 2) Place the specified material on both sides of bridge structures for a distance of at least 10 ft (3 m).

**NOTE: Do not place rock larger than 4 in (100 mm) diameter within 2 ft (600 mm) of any drainage structure.**

Before any traffic is allowed over any structure, provide a sufficient depth of material over and around the structure to protect it from damage or displacement.

f. Method of Handling Classes of Soils

Handle the different classes of soils using the following methods:

1) Class IIB3 and Better Soils

Distribute and compact these soils in 8 in (200 mm) uniform layers over the entire width of the embankment. Use these soils (when available in sufficient quantities) in the top 1 ft (300 mm) of the roadbed. Reserve these soils for this purpose when directed by the Engineer.

2) Class IIB4 Soils

Distribute and compact these soils in 8 in (200 mm) layers over the entire width of the embankment.

3) Class III Soils

Do not use these soils in embankments except when directed in the Plans or ordered by the Engineer. If directed, place them in the same manner as Class IIB4 soils.

Class IIIC4, chert clay soils in District 6 with less than 55 percent passing the No. 10 (2 mm) sieve may be used for subgrade.

4) Class IV Soils

Do not use these soils in embankments. Waste these soils or (when designated in the Plans or directed by the Engineer) stockpile them and use them for blanketing fill slopes.

5) Class V Soils

Place these soils in the same manner as Class IIB4 soils. Pulverize large particles to obtain the proper compaction.

6) Class VI Rock

Place rock in uniform layers not over 3 ft (1 m) thick and distribute it over the embankments to avoid pockets. Fill voids with finer material.

Do not place rock larger than 6 in (150 mm) in diameter within 3 ft (1 m) of the finished surface of the embankment.

Do not place rock larger than 6 in (150 mm) in diameter within 2 ft (600 mm) of the outer limits of proposed posts or utility poles.

Do not place rock at bridge end bents within 10 ft (3 m) of pile locations.

7) All Classes

Place mixtures of the above classes together with random material such as rock, gravel, sand, cinders, slag, and broken-up pavement so that coarse particles are dumped near the outer slopes and finer particles near the center of the roadway.

Produce a gradual transition from the center to the outside. If material is too large to place in 8 in (200 mm) layers, treat it as rock or break it down and place it in 8 in (200 mm) layers.

3. Embankment Consolidation at Bridge Ends

When consolidating embankments at bridge ends, use the following specifications:

- a. When a waiting period is required in the Plans or by Special Provision, place end fills at bridges in time for consolidation readings to indicate that both the fill and the natural ground have reached the desired degree of stability.

- b. Delay constructing bridge portions during the period of consolidation as shown on the Plans or as required by a Special Provision.

The Plans or the Special Provisions will indicate the estimated time required to reach consolidation.

The Engineer may extend or shorten this waiting period based on settlement readings taken on points placed in the fills. The longer or shorter waiting period will not constitute a valid claim for additional compensation.

Follow these specifications when extending a waiting period:

- 1) Extending an estimated waiting period may lead to increasing the Contract time. If the Contract is on a calendar day or completion date basis, the Department may increase the calendar days equal to the maximum number of calendar days involved in the extension.
- 2) When a time extension causes additional delay due to seasonal changes, the Engineer may recompute the time extension on an available day basis.

When the Contract is on an available day basis, the time increase will be equal to the greatest number of available days involved in the extension.

- 3) When time charges on separate Bridge Contracts are controlled by Special Provisions that set forth the availability of bridge sites, extending an estimated waiting period controls the availability of that bridge site only; time charges will be adjusted according to the Special Provision.
- c. Construct the embankment at bridge ends full-depth to the subgrade template (except for the stage construction providing a bench for the end bent) unless otherwise stated in the Plans and compact thoroughly before driving a piling at bridge ends.

The minimum acceptable length of completed full-depth embankment is equal to the maximum width of fill between slope stakes at the end of the bridge. The Department will measure the minimum length of full-depth embankment along the roadway centerline away from the end-of-bridge Station.

### C. In-Place Embankment

Construct embankments designated on the Plans and in the Proposal as “In-Place Embankment” using either a hydraulic or conventional dry land construction method and using materials obtained from within the construction limits of the Right-of -Way or from borrow pits, whichever is appropriate.

Regardless of the method of construction, the Department will measure the entire embankment for payment as in-place embankment.

#### 1. Construction

- Build embankments according to this Section when hydraulic or conventional dry land construction methods are used.
- Furnish equipment suitable for the method chosen to complete the work. Equipment is subject to the Engineer’s approval.
- When using a hydraulic method is used, conform to these additional requirements:
  - a. Using baffles for construction is permitted as long as the embankment slopes are not steeper than indicated on the Plans.
  - b. Use of excess material placed outside the prescribed slopes to raise the fill is permitted.
  - c. Leave openings in the embankments at the bridge site as indicated on the Plans.

Dredge material that invades the openings or existing channels at no additional expense to the Department. Provide the same depth of channel at mean low water as existed before the construction of the embankment.
  - d. Do not excavate or dredge material within 500 ft (150 m) of the toe of the embankment or existing structures, unless otherwise shown on the Plans.
  - e. Place in-place embankment in areas previously excavated below the ground line in a uniform mass beginning at one end of the excavated area and continuing to the other end of the operation. Avoid forming of muck cores in the embankment.
  - f. Construct the embankment at the farthest points along the roadway from the bridge ends and progress to the end of the excavation area beyond the toe of the slope of endrolls at bridge ends.

- g. Remove timber used for temporary bulkheads or baffles from the embankment.
  - h. Fill and thoroughly compact the holes.
2. Maintenance
- a. Maintain the embankment at grade until it has been completed and accepted. Assume responsibility for slides, washouts, settlement, subsidence, or mishaps to the work while under construction.
  - b. Keep constructed embankment stable and replace displaced portions before Final Acceptance of the entire Contract.
  - c. Remove and dispose of excess materials, including fill, detours, and erosion deposits placed outside the prescribed slopes in wetland areas.
3. Permits
- Obtain (at no additional expense to the Department) necessary permits or licenses from the appropriate authorities to operate dredges and other floating equipment in waters under their jurisdiction, unless otherwise provided for in the Contract.
4. Erosion Control
- In addition to the provisions of [Section 161](#), follow additional erosion, siltation, and pollution control measures specified in the Plans or Special Provisions.

#### **D. Rock Embankment**

This work includes furnishing materials either from the roadway excavation or other sources and hauling and the placing of rock embankment. Use materials that meet the requirements of [Subsection 208.2.B](#), as shown on the Plans or directed by the Engineer.

- 1. Place the rock in uniform layers not over 3 ft (1 m) thick. Distribute rock over the embankment to avoid pockets.
- 2. Fill voids with rock fines. Do not use rock larger than 6 in (150 mm) for any diameter within 3 ft (1 m) of the finished grade of the embankment, or within 2 ft (600 m) of any structure.
- 3. Do not place rock at bridge end bents within 10 ft (3 m) of pile locations. Construct rock embankment and adjoining earth embankment concurrently. Ensure that neither is larger than 4 ft (1.2 m) higher than the other at any time.

#### **E. Final Finishing**

After constructing the entire embankment, shape the surface of the roadbed and the slopes to reasonably true grade and cross-sections as shown on the Plans or established by the Engineer.

Open ditches, channels, and drainage structures (both existing and those constructed or extended) to effectively drain the roadway. Maintain the embankment areas until Final Acceptance of the Project.

#### **208.3.06 Quality Acceptance**

General Provisions 101 through 150.

#### **208.3.07 Contractor Warranty and Maintenance**

General Provisions 101 through 150.

#### **208.4 Measurement**

This item shall not be measured separately.

Includes any in-place embankment necessary for the construction of temporary detours and any excavating of unstable materials below the ground line.

#### **208.4.01 Limits**

General Provisions 101 through 150.

#### **208.5 Payment**

This item included under CONSTRUCTION COMPLETE.

Includes placing embankments, backfilling structures, and constructing earth berms, including surcharges, furnishing suitable material, hauling, placing, compacting, finishing, and dressing according to these Specifications or as directed by the Engineer.

**208.5.01 Adjustments**

General Provisions 101 through 150.



**Department of Transportation**  
**State of Georgia**  
**Supplemental Specification**

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

**Section 209—Subgrade Construction**

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*Delete Subsection 209.3.05.A and substitute the following:*

**A. Subgrade Construction**

Construct subgrade as follows:

1. Plow, harrow, and mix the entire surface of the in-place subgrade to a depth of at least 6 in (150 mm).
2. After thoroughly mixing the material, bring the subgrade to Plan line and grade and compact it to 100 percent of the maximum laboratory dry density.
3. If the subgrade needs to be stabilized, or if a subsequent contract provides for base construction, do not apply density requirement at this stage.  
If a subsequent Contract provides for base construction, eliminate mixing and compact the in-place subgrade to 95 percent of the laboratory maximum dry density.
4. Ensure that the subgrade can firmly support construction equipment before placing subsequent layers of base and paving materials. The subgrade must support construction equipment without excessive movement regardless of compaction.
5. Rework unstable areas of subgrade to a moisture content that will provide stability and compaction. The Engineer may direct the Contractor to proof roll the subgrade with a loaded dump truck.
6. Compact the subgrade using a sheepsfoot roller.  
The Engineer may permit the use of vibratory rollers whenever the subgrade soils consist of Class IA1, IA2, or IA3 materials.
7. Ensure that subgrade material used underneath soil-cement base meets the requirements of [Subsection 301.3.03.A](#).

*Delete Subsection 209.4 and substitute the following:*

**209.4 Measurement**

These items will not be measured separately.

- A. Subgrade Construction and Finishing Subgrade**
- B. Subgrade Stabilization**
- C. Select Material Subgrade**
- D. Shoulder Stabilization**

**209.4.01 Limits**

General Provisions 101 through 150.

*Delete Subsection 209.5 and substitute the following:*

**209.5 Payment**

These items will be paid under CONSTRUCTION COMPLETE.

**A. Subgrade Construction****B. Subgrade Stabilization**

Includes for furnishing the materials, hauling, placing, mixing, compacting, and finishing the stabilized subgrade.

**C. Select Material Subgrade**

Includes furnishing the material where required, hauling, placing, mixing, compacting and finishing the select material subgrade.

**D. Shoulder Stabilization**

Includes furnishing and applying bituminous prime.

**209.5.01 Adjustments**

General Provisions 101 through 150.

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**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SPECIAL PROVISION**

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

**Section 210—Grading Complete**

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*Delete Subsection 210.4 and substitute the following:*

**210.4 Measurement**

This item will not be measured separately.

**A. Grading Complete**

The Work under this Item is not measured separately for payment.

**B. Undercut Excavation**

Replacement material for undercut excavation is not measured for payment. There will be no separate payment for undercut excavation.

**210.4.01 Limits**

General Provisions 101 through 150.

*Delete Subsection 210.5 and substitute the following:*

**210.5 Payment**

This item paid under CONSTRUCTION COMPLETE.

Includes:

**A. Grading Complete**

Included work and materials.

**B. Grading Per Mile (Kilometer)**

Includes furnishing the materials and performing the work specified in this Section.

**C. Undercut Excavation**

Includes excavating and disposing of undesirable material and supplying, placing, and compacting replacement material.

**210.5.01 Adjustments**

General Provisions 101 through 150.

*Office of Construction*

## Georgia Department of Transportation

### State of Georgia

#### CSNHS-0008-00(232), TROUP COUNTY

P.I. NO. 0008232

### Special Provision

## Section 400—Hot Mix Asphaltic Concrete Construction

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*Delete Section 400 and Substitute the following:*

### 400.1 General Description

This work includes constructing one or more courses of bituminous plant mixture on the prepared foundation or existing roadway surface. The mixture shall conform with lines, grades, thicknesses, and typical cross sections shown on the Plans or established by the Engineer.

This section includes the requirements for all bituminous plant mixtures regardless of the gradation of the aggregates, type and amount of bituminous material, or pavement use.

Acceptance of work is on a lot-to-lot basis according to the requirements of this Section and [Section 106](#).

#### 400.1.01 Definitions

**Segregated Mixture:** Mixture lacking homogeneity in HMA constituents of such a magnitude that there is a reasonable expectation of accelerated pavement distress or performance problems. May be quantified by measurable changes in temperature, gradation, asphalt content, air voids, or surface texture.

**New Construction:** A roadway section more than 0.5 mile (800 m) long that is not longitudinally adjacent to the existing roadway. If more than one lane is added, and if any of the lanes are longitudinally adjacent to the existing lane, the lanes shall be tested under the criteria for a resurfacing project.

**Trench Widening:** Widening no more than 4 ft. (1.2 m) in width.

**Comparison sample:** Opposite quarter of material sampled by the Contractor.

**Quality assurance sample:** Independent sample taken by the Department.

**Referee sample:** A sample of the material remaining after quartering which is used for evaluation if a comparison of Contractor and Departmental test results is outside allowable tolerances.

#### 400.1.02 Related References

##### A. Standard Specifications

[Section 106—Control of Materials](#)

[Section 109—Measurement and Payment](#)

[Section 152—Field Laboratory Building](#)

## Section 400—Hot Mix Asphaltic Concrete Construction

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[Section 413—Bituminous Tack Coat](#)

[Section 424—Bituminous Surface Treatment](#)

[Section 802—Coarse Aggregate for Asphaltic Concrete](#)

[Section 828—Hot Mix Asphaltic Concrete Mixtures](#)

### B. Referenced Documents

AASHTO T 209

AASHTO T 202

AASHTO T 49

Laboratory Standard Operating Procedure (SOP) 27, “Quality Assurance for Hot Mix Asphaltic Concrete Plants in Georgia”

Department of Transportation Standard Operating Procedure (SOP) 15

[GDT 38](#)

[GDT 73](#)

[GDT 78](#)

[GDT 83](#)

[GDT 93](#)

[GDT 119](#)

[GDT 125](#)

[GDT 134](#)

[GSP 15](#)

[GSP 21](#)

[QPL 1](#)

[QPL 2](#)

[QPL 7](#)

[QPL 26](#)

[QPL 30](#)

[QPL 39](#)

[QPL 41](#)

[QPL 45](#)

[QPL 65](#)

[QPL 67](#)

[QPL 70](#)

[QPL 77](#)

### 400.1.03 Submittals

#### A. Invoices

When the Department requests, furnish formal written invoices from a supplier for all materials used in production of HMA. Show the following on the Bill of Lading:

- Date shipped

## Section 400—Hot Mix Asphaltic Concrete Construction

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- Quantity in tons (megagrams)
- Included with or without additives (for asphalt cement)

Purchase asphaltic cement from a supplier who will provide copies of Bill of Lading upon the Department's request.

### B. Paving Plan

Before starting asphaltic concrete construction, submit a written paving plan to the Engineer for approval. Include the following on the paving plan:

- Proposed starting date
- Location of plant(s)
- Rate of production
- Average haul distance(s)
- Number of haul trucks
- Paver speed feet (meter)/minute for each placement operation
- Mat width for each placement operation
- Number and type of rollers for each placement operation
- Sketch of the typical section showing the paving sequence for each placement operation
- Electronic controls used for each placement operation
- Temporary pavement marking plan

If staged construction is designated in the Plans or contract, provide a paving plan for each construction stage.

If segregation is detected, submit a written plan of measures and actions to prevent segregation. Work will not continue until the plan is submitted to and approved by the Department.

### C. Job Mix Formula

After the Contract has been awarded, submit to the Engineer a written job mix formula proposed for each mixture type to be used based on an approved mix design. Furnish the following information for each mix:

- Specific project for which the mixture will be used
- Source and description of the materials to be used
- Mixture I.D. Number
- Proportions of the raw materials to be combined in the paving mixture
- Single percentage of the combined mineral aggregates passing each specified sieve
- Single percentage of asphalt by weight of the total mix to be incorporated in the completed mixture
- Single temperature at which to discharge the mixture from the plant
- Theoretical specific gravity of the mixture at the designated asphalt content
- Name of the person or agency responsible for quality control of the mixture during production

Do the following to have the formulas approved and to ensure their quality:

1. Submit proposed job mix formulas for review at least two weeks before beginning the mixing operations.
2. Do not start hot mix asphaltic concrete work until the Engineer has approved a job mix formula for the mixture to be used. No mixture will be accepted until the Engineer has given approval.
3. Provide mix designs for all Superpave and 4.75 mm mixes to be used. The Department will provide mix design results for other mixes to be used.
4. After a job mix formula has been approved, assume responsibility for the quality control of the mixtures supplied to the Department according to [Subsection 106.01, "Source of Supply and Quantity of Materials."](#)

### D. Quality Control Program

Submit a Quality Control Plan to the Office of Materials and Research for approval. The Quality Control Program will be included as part of the certification in the annual plant inspection report.

## Section 400—Hot Mix Asphaltic Concrete Construction

### 400.2 Materials

Ensure that materials comply with the specifications listed in Table 1.

**Table 1—Materials Specifications**

Material	Subsection
Asphalt Cement, Grade Specified	<a href="#">820.2</a>
Coarse Aggregates for Asphaltic Concrete	<a href="#">802.2.02</a>
Fine Aggregates for Asphaltic Concrete	<a href="#">802.2.01</a>
Mineral Filler	<a href="#">883.1</a>
Heat Stable Anti-Stripping Additive	<a href="#">831.2.04</a>
Hydrated Lime	<a href="#">882.2.03</a>
Silicone Fluid	<a href="#">831.2.05</a>
Bituminous Tack Coat: PG 58-22, PG 64-22, PG 67-22	<a href="#">820.2</a>
Hot Mix Asphaltic Concrete Mixtures	<a href="#">828</a>
Fiber Stabilizing Additives	<a href="#">819</a>

When required, provide Uintaite material, hereafter referred to by the common trade name Gilsonite, as a reinforcing agent for bituminous mixtures. Supply a manufacturer's certification that the Gilsonite is a granular solid which meets the following requirements:

Softening Point (AASHTO: T-53)	300-350 °F (150-175 °C)
Specific Gravity, 77 °F (25 °C) (AASHTO: T-228)	1.04 ± 0.02
Flash Point, COC (AASHTO: T-48)	550 °F (290 °C) Min.
Ash Content (AASHTO: T-111)	1.0% Max.
Penetration, 77 °F (25 °C), 100 gm., 5 sec. (AASHTO: T-49)	0

#### 400.2.01 Delivery, Storage, and Handling

Storage of material is allowed in a properly sealed and insulated system for up to 24 hours except that Stone Matrix Asphalt (SMA), Open-Graded Friction Course (OGFC), or Porous European Mix (PEM) mixtures shall not be stored more than 12 hours. Mixtures other than SMA, OGFC, or PEM may be stored up to 72 hours in a sealed and insulated system, equipped with an auxiliary inert gas system, with the Engineer's approval. Segregation, lumpiness, drain-down, or stiffness of stored mixture is cause for rejection of the mixture. The Engineer will not approve using a storage or surge bin if the mixture segregates, loses excessive heat, or oxidizes during storage.

The Engineer may obtain mixture samples or recover asphalt cement according to [GDT 119](#). AASHTO T 202 and T 49 will be used to perform viscosity and penetration tests to determine how much asphalt hardening has occurred.

#### A. Vehicles for Transporting and Delivering Mixtures

Ensure that trucks used for hauling bituminous mixtures have tight, clean, smooth beds.

Follow these guidelines when preparing vehicles to transport bituminous mixtures:

1. Use an approved releasing agent from [QPL 39](#) in the transporting vehicle beds, if necessary, to prevent the mixture from sticking to the bed. Ensure that the releasing agent is not detrimental to the mixture. When applying the agent, drain the excess agent from the bed before loading. Remove from the project any transporting vehicles determined to contain unapproved releasing agents.
2. Protect the mixture with a waterproof cover large enough to extend over the sides and ends of the bed. Securely fasten the waterproof cover before the vehicle begins moving.

## Section 400—Hot Mix Asphaltic Concrete Construction

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3. Insulate the front end and sides of each bed with an insulating material with the following specifications:
  - Consists of builders insulating board or equivalent
  - Has a minimum “R” value of 4.0
  - Can withstand approximately 400 °F (200 °C) temperatures

Install the insulating material so it is protected from loss and contamination. A “Heat Dump Body” may be used in lieu of insulation of the bed. “Heat Dump Body” refers to any approved transport vehicle that is capable of diverting engine exhaust and transmitting heat evenly throughout the dump body to keep asphalt at required temperature. Mark the “Heat Dump Body” clearly with “OPEN” and “CLOSE” position at the exhaust diverter. Install a padlock and lock it in the “OPEN” position when the “Heat Dump Body” is used to transport bituminous mixtures.

4. Mark each transporting vehicle with a clearly visible identification number.
5. Create a hole in each side of the bed so that the temperature of the loaded mixture can be checked. The placement of these holes shall be located to assure that the thermometer is being placed in the hot mix asphaltic concrete.

Ensure that the mixture is delivered to the roadway at a temperature within  $\pm 20$  °F ( $\pm 11$  °C) of the temperature on the job mix formula.

If the Engineer determines that a truck may be hazardous to the Project or adversely affect the quality of the work, remove the truck from the project.

### **B. Containers for Transporting, Conveying, and Storing Bituminous Material**

To transport, convey, and store bituminous material, use containers free of foreign material and equipped with sample valves. Bituminous material will not be accepted from conveying vehicles if material has leaked or spilled from the containers.

## **400.3 Construction Requirements**

### **400.3.01 Personnel**

General Provisions 101 through 150.

### **400.3.02 Equipment**

Hot mix asphaltic concrete plants that produce mix for Department use are governed by Quality Assurance for Hot Mix Asphaltic Concrete Plants in Georgia, Laboratory Standard Operating Procedure No. 27.

The Engineer will approve the equipment used to transport and construct hot mix asphaltic concrete. Ensure that the equipment is in satisfactory mechanical condition and can function properly during production and placement operations. Place the following equipment at the plant or project site:

#### **A. Field Laboratory**

Provide a field laboratory according to [Section 152](#).

#### **B. Plant Equipment**

##### 1. Scales

Provide scales as follows:

- a. Furnish (at the Contractor’s expense) scales to weigh bituminous plant mixtures, regardless of the measurement method for payment.
- b. Ensure that the weight measuring devices that provide documentation comply with [Subsection 109.01, “Measurement and Quantities.”](#)
- c. When not using platform scales, provide weight devices that record the mixture net weights delivered to the truck. A net weight system will include, but is not limited to:
  - Hopper or batcher-type weight systems that deliver asphaltic mixture directly to the truck
  - Fully automatic batching equipment with a digital recording device
- d. Use a net weight printing system only with automatic batching and mixing systems approved by the Engineer.



## Section 400—Hot Mix Asphaltic Concrete Construction

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- e. Ensure that the net weight scale mechanism or device manufacturer, installation, performance, and operation meets the requirements in [Subsection 109.01, “Measurement and Quantities”](#)
  - f. Provide information on the Project tickets according to Department of Transportation SOP-15.
2. Time-Locking Devices  
Furnish batch type asphalt plants with automatic time-locking devices that control the mixing time automatically. Construct these devices so that the operator cannot shorten or eliminate any portion of the mixing cycle.
  3. Surge- and Storage-Systems  
Provide surge and storage bins as follows:
    - a. Ensure that bins for mixture storage are insulated and have a working seal, top and bottom, to prevent outside air infiltration and to maintain an inert atmosphere during storage. Bins not intended as storage bins may be used as surge bins to hold hot mixtures for part of the working day. However, empty these surge bins completely at the end of the working day.
    - b. Ensure that surge and storage bins can retain a predetermined minimum level of mixture in the bin when the trucks are loaded.
    - c. Ensure that surge and storage systems do not contribute to mix segregation, lumpiness, drain-down, or stiffness.
  4. Controls for Dust Collector Fines  
Control dust collection as follows:
    - a. When collecting airborne aggregate particles and returning them to the mixture, have the return system meter all or part of the collected dust uniformly into the aggregate mixture and waste the excess. The collected dust percentage returned to the mixture is subject to the Engineer’s approval.
    - b. When the collected dust is returned directly to the hot aggregate flow, interlock the dust feeder with the hot aggregate flow and meter the flow to maintain a flow that is constant, proportioned, and uniform.
  5. Mineral Filler Supply System  
When mineral filler is required as a mixture ingredient:
    - a. Use a separate bin and feed system to store and proportion the required quantity into the mixture with uniform distribution.
    - b. Control the feeder system with a proportioning device that meets these specifications:
      - Is accurate to within  $\pm 10$  percent of the filler required
      - Has a convenient and accurate means of calibration
      - Interlocks with the aggregate feed or weigh system to maintain the correct proportions for all rates of production and batch sizes
    - c. Provide flow indicators or sensing devices for the mineral filler system and interlock them with the plant controls to interrupt the mixture production if mineral filler introduction fails to meet the required target value after no longer than 60 seconds.
    - d. Add mineral filler to the mixture as follows, according to the plant type:
      - Batch Type Asphalt Plant. Add mineral filler to the mixture in the weigh hopper.
      - Continuous Plant Using Pugmill Mixers. Feed the mineral filler into the hot aggregate before it is introduced into the mixer so that dry mixing is accomplished before the bituminous material is added.
      - Continuous Plants Using the Drier-Drum Mixers. Add the mineral filler so that dry mixing is accomplished before the bituminous material is added and ensure that the filler does not become entrained into the air stream of the drier.
  6. Hydrated Lime Treatment System  
When hydrated lime is required as a mixture ingredient:
    - a. Use a separate bin and feed system to store and proportion the required quantity into the mixture.

## Section 400—Hot Mix Asphaltic Concrete Construction

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- b. Ensure that the aggregate is uniformly coated with hydrated lime aggregate before adding the bituminous material to the mixture. Add the hydrated lime so that it will not become entrained in the exhaust system of the drier or plant.
  - c. Control the feeder system with a proportioning device that meets these specifications:
    - Is accurate to within  $\pm 10$  percent of the amount required
    - Has a convenient and accurate means of calibration
    - Interlocks with the aggregate feed or weigh system to maintain the correct proportions for all rates of production and batch sizes and to ensure that mixture produced is properly treated with lime
  - d. Provide flow indicators or sensing devices for the hydrated lime system and interlock them with the plant controls to interrupt mixture production if hydrated lime introduction fails to meet the required target value after no longer than 60 seconds.
7. Net Weight Weighing Mechanisms

Certify the accuracy of the net weight weighing mechanisms by an approved registered scale serviceperson at least once every 6 months. Check the accuracy of net weight weighing mechanisms at the beginning of Project production and thereafter as directed by the Engineer. Check mechanism accuracy as follows:

- a. Weigh a load on a set of certified commercial truck scales. Ensure that the difference between the printed total net weight and that obtained from the commercial scales is no greater than 4 lbs/1,000 lbs (4 kg/Mg) of load.

Check the accuracy of the bitumen scales as follows:

- Use standard test weights.
  - If the checks indicate that printed weights are out of tolerance, have a registered scale serviceperson check the batch scales and certify the accuracy of the printer.
  - While the printer system is out of tolerance and before its adjustment, continue production only if using a set of certified truck scales to determine the truck weights.
- b. Have plants that use batch scales maintain ten 50 lb (25 kg) standard test weights at the plant site to check batching scale accuracy.

Ensure that plant scales that are used only to proportion mixture ingredients, not to determine pay quantities, are within two percent throughout the range.

### 8. Fiber Supply System

When stabilizing fiber is required as a mixture ingredient:

- a. Use a separate feed system to store and proportion by weight the required quantity into the mixture with uniform distribution.
- b. Control the feeder system with a proportioning device that meets these Specifications:
  - Is accurate to within  $\pm 10$  percent of the amount required. Automatically adjusts the feed rate to maintain the material within this tolerance at all times
  - Has a convenient and accurate means of calibration
  - Provide in-process monitoring, consisting of either a digital display of output or a printout of feed rate, in pounds (kg) per minute, to verify feed rate
  - Interlocks with the aggregate feed or weigh system to maintain the correct proportions for all rates of production and batch sizes
- c. Provide flow indicators or sensing devices for the fiber system and interlock them with the plant controls to interrupt the mixture production if fiber introduction fails or if the output rate is not within the tolerances given above.
- d. Introduce the fiber as follows:
  - When a batch type plant is used, add the fiber to the aggregate in the weigh hopper. Increase the batch dry mixing time by 8 to 12 seconds from the time the aggregate is completely emptied into the mixer to ensure the fibers are uniformly distributed prior to the injection of asphalt cement into the mixer.
  - When a continuous or drier-drum type plant is used, add the fiber to the aggregate and uniformly disperse prior to the injection of asphalt cement. Ensure the fibers will not become entrained in the exhaust system of the drier or plant.

## Section 400—Hot Mix Asphaltic Concrete Construction

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### C. Equipment at Project Site

#### 1. Cleaning Equipment

Provide sufficient hand tools and power equipment to clean the roadway surface before placing the bituminous tack coat. Use power equipment that complies with [Subsection 424.3.02.F, “Power Broom and Power Blower.”](#)

#### 2. Pressure Distributor

To apply the bituminous tack coat, use a pressure distributor that complies with [Subsection 424.3.02.B, “Pressure Distributor.”](#)

#### 3. Bituminous Pavers

To place hot mix asphaltic concrete, use bituminous pavers that can spread and finish courses that are:

- As wide and deep as indicated on the Plans
  - True to line, grade, and cross section
  - Smooth
  - Uniform in density and texture
- a. Continuous Line and Grade Reference Control. Furnish, place, and maintain the supports, wires, devices, and materials required to provide continuous line and grade reference control to the automatic paver control system.
  - b. Automatic Screed Control System. Equip the bituminous pavers with an automatic screed control system actuated from sensor-directed mechanisms or devices that will maintain the paver screed at a pre-determined transverse slope and elevation to obtain the required surface.
  - c. Transverse Slope Controller. Use a transverse slope controller capable of maintaining the screed at the desired slope within  $\pm 0.1$  percent. Do not use continuous paving set-ups that result in unbalanced screed widths or off-center breaks in the main screed cross section unless approved by the Engineer.
  - d. Screed Control. Equip the paver to permit the following four modes of screed control. The method used shall be approved by the Engineer.
    - Automatic grade sensing and slope control
    - Automatic dual grade sensing
    - Combination automatic and manual control
    - Total manual control

Ensure that the controls are referenced with a taut string or wire set to grade, or with a ski-type device or mobile reference at least 30 ft (9 m) long when using a conventional ski. A non-contacting laser or sonar-type ski with at least four referencing mobile stations may be used with a reference at least 24 ft. (7.3 m) long. Under limited conditions, a short ski or shoe may be substituted for a long ski on the second paver operating in tandem, or when the reference plane is a newly placed adjacent lane.

Automatic screed control is required on all Projects; however, when the Engineer determines that Project conditions prohibit the use of such controls, the Engineer may waive the grade control, or slope control requirements, or both.

- e. Paver Screed Extension. When the laydown width requires a paver screed extension, use bolt-on screed extensions to extend the screeds, or use an approved mechanical screed extension device. When the screed is extended, add auger extensions to assure a length of no more than 18 inches from the auger to the end gate of the paver. Auger extensions may be omitted when paving variable widths. Ensure the paver is equipped with tunnel extensions when the screed and augers are extended.
- f. 30 - 45 Degree Wedge. When shown on/required by the plans, equip the paver to ensure a 30 degree minimum up to a 45 degree maximum wedge along the outside edge of the roadway (measured from the horizontal plane) is in place after final compaction on the final surface course. Use an approved mechanical device that will:
  - Apply compactive effort to the asphalt mixture to eliminate objectionable voids as the mixture passes through the wedge device
  - Produce a wedge with a uniform texture, shape, and density while automatically adjusting to varying heights encountered along the roadway shoulder.

**NOTE: Do not use extendible strike-off devices instead of approved screed extensions. Only use a strike-off device in areas that would normally be luted in by hand labor.**

4. Compaction Equipment

Ensure that the compaction equipment is in good mechanical condition and can compact the mixture to the required density. The compaction equipment number, type, size, operation, and condition is subject to the Engineer's approval

5. Materials Transfer Vehicle (MTV)

a. Use a Materials Transfer Vehicle (MTV) when placing asphaltic concrete mixtures on Projects on the state route system with the following conditions. If a project fails to meet any one of the following conditions, the MTV's use is not required.

1) When to use:

- The ADT is equal to or greater than 6000,
- The project length is equal to or greater than 3000 linear feet (915 linear meters),
- The total tonnage (megagrams) of all asphaltic concrete mixtures is greater than 2000 tons (1815 Mg).

2) Where to use:

- Mainline of the traveled way
- Collector/distributor (C/D) lanes on Interstates and limited access roadways
- Leveling courses at the Engineer's discretion

3) Do not use the MTV for the following conditions:

- A resurfacing project that only 9.5 mm mix is required.
- A project with lane width that is equal or less than 11 feet.
- A passing lane only project.
- When noted on the plans.

b. Ensure the MTV and conventional paving equipment meet the following requirements:

1) MTV

- Has a truck unloading system which receives mixture from the hauling equipment and independently deliver mixtures from the hauling equipment to the paving equipment.
- Has mixture remixing capability by either a storage bin in the MTV with a minimum capacity of 14 tons (13 megagrams) of mixture and a remixing system in the bottom of MTV storage bin, or a dual pugmill system located in the paver hopper insert with two full length transversely mounted paddle mixers to continuously blend the mixture as it discharges to a conveyor system.
- Provides to the paver a homogeneous, non-segregated mixture of uniform temperature with no more than 20 °F(18 °C) difference between the highest and lowest temperatures when measured transversely across the width of the mat in a straight line at a distance of one foot to three feet from the screed while the paver is operating. Ensure that the MTV is capable of providing the paver a consistent material flow that is sufficient to prevent the paver from stopping between truck exchanges.

2) Conventional Paving Equipment

## Section 400—Hot Mix Asphaltic Concrete Construction

- Has a paver hopper insert with a minimum capacity of 14 tons (13 Mg) installed in the hopper of conventional paving equipment when an MTV is used.
- c. If the MTV malfunctions during spreading operations, discontinue placement of hot mix asphaltic concrete after there is sufficient hot mix placed to maintain traffic in a safe manner. However, placement of hot mix asphaltic concrete in a lift not exceeding 2 in. (50 mm) may continue until any additional hot mix in transit at the time of the malfunction has been placed. Cease spreading operations thereafter until the MTV is operational.
- d. Ensure the MTV is empty when crossing a bridge and is moved across without any other Contractor vehicles or equipment on the bridge. Move the MTV across a bridge in a travel lane and not on the shoulder. Ensure the speed of the MTV is no greater than 5 mph (8 kph) without any acceleration or deceleration while crossing a bridge.

### 400.3.03 Preparation

#### A. Prepare Existing Surface

Prepare the existing surface as follows:

1. Clean the Existing Surface. Before applying hot mix asphaltic concrete pavement, clean the existing surface to the Engineer's satisfaction.
2. Patch and Repair Minor Defects  
Before placing leveling course:
  - a. Correct potholes and broken areas that require patching in the existing surface and base as directed by the Engineer.
  - b. Cut out, trim to vertical sides, and remove loose material from the areas to be patched.
  - c. Prime or tack coat the area after it has been cleaned. Compact patches to the Engineer's satisfaction. Material for patches does not require a job mix formula, but shall meet the gradation range shown in [Section 828](#). The Engineer must approve the asphalt content to be used.
3. Apply Bituminous Tack Coat  
Apply the tack coat according to [Section 413](#). The Engineer will determine the application rate, which must be within the limitations Table 2.

**Table 2—Application Rates for Bituminous Tack, gal/yd<sup>2</sup> (L/m<sup>2</sup>)**

	Minimum	Maximum
Under OGFC and PEM Mixes	0.06 (0.270)	0.08 (0.360)
All Other Mixes	0.04 (0.180)	0.06(0.270)

\*On thin leveling courses and freshly placed asphaltic concrete mixes, reduce the application rate to 0.02 to 0.04 gal/yd<sup>2</sup> (0.09 to 0.18 L/m<sup>2</sup>).

#### B. Place Patching and Leveling Course

1. When the existing surface is irregular, bring it to the proper cross section and grade with a leveling course of hot mix asphaltic concrete materials.
2. Place leveling at the locations and in the amounts directed by the Engineer.
3. Use leveling course mixtures that meet the requirements of the job mix formulas defined in:
  - [Subsection 400.3.05.A, “Observe Composition of Mixtures”](#)
  - [Section 828](#)
  - Leveling acceptance schedules in [Subsection 400.3.06.A, “Acceptance Plans for Gradation and Asphalt Cement Content”](#)
4. If the leveling and patching mix type is undesignated, determine the mix type by the thickness or spread rate according to Table 3, but do not use 4.75 mm mix on interstate projects.

**Table 3—Leveling and Patching Mix Types**

<b>Thickness</b>	<b>Rate of Spread</b>	<b>Type of Mix</b>
Up to 0.75 in (19 mm)	Up to 85 lbs/yd <sup>2</sup> (45 kg/m <sup>2</sup> )	4.75 mm Mix or 9.5 mm Superpave Type 1
0.75 to 1.5 in (19 to 38 mm)	85 to 165 lbs/yd <sup>2</sup> (45 to 90 kg/m <sup>2</sup> )	9.5 mm Superpave Type 2
1.5 to 2 in (38 to 50 mm)	165 to 220 lbs/yd <sup>2</sup> (90 to 120 kg/m <sup>2</sup> )	12.5 mm Superpave *
2 to 2.5 in (50 to 64 mm)	220 to 275 lbs/yd <sup>2</sup> (120 to 150 kg/m <sup>2</sup> )	19 mm Superpave *
Over 2.5 in (64 mm)	Over 275 lbs/yd <sup>2</sup> (150 kg/m <sup>2</sup> )	25 mm Superpave

\* These mixtures may be used for isolated patches no more than 6 in. (150 mm) deep and no more than 4 ft. (1.2 m) in diameter or length.

**400.3.04 Fabrication**

General Provisions 101 through 150.

**400.3.05 Construction**

Provide the Engineer at least one day’s notice prior to beginning construction, or prior to resuming production if operations have been temporarily suspended.

**A. Observe Composition of Mixtures**

1. Calibration of plant equipment

If the material changes, or if a component affecting the ingredient proportions has been repaired, replaced, or adjusted, check and recalibrate the proportions.

Calibrate as follows:

- a. Before producing mixture for the Project, calibrate by scale weight the electronic sensors or settings for proportioning mixture ingredients.
- b. Calibrate ingredient proportioning for all rates of production.

2. Mixture control

Compose hot mix asphaltic concrete from a uniform mixture of aggregates, bituminous material, and if required, hydrated lime, mineral filler, or other approved additive.

Make the constituents proportional to produce mixtures that meet the requirements in [Section 828](#). The general composition limits prescribed are extreme ranges within which the job mix formula must be established. Base mixtures on a design analysis that meets the requirements of [Section 828](#). Ensure that the field performance of the in-place mixtures meet the requirements of [Section 828.2.B](#)

If control test results show that the characteristic tested does not conform to the job mix formula control tolerances given in [Section 828](#), take immediate action to ensure that the quality control methods are effective.

Control the materials to ensure that extreme variations do not occur. Maintain the gradation within the composition limits in [Section 828](#).

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### B. Prepare Bituminous Material

Uniformly heat the bituminous material to the temperature specified in the job mix formula with a tolerance of  $\pm 20$  °F ( $\pm 10$  °C).

### C. Prepare the Aggregate

Prepare the aggregate as follows:

1. Heat the aggregate for the mixture, and ensure a mix temperature within the limits of the job mix formula.
2. Do not contaminate the aggregate with fuel during heating.
3. Reduce the absorbed moisture in the aggregate until the asphalt does not separate from the aggregate in the prepared mixture. If this problem occurs, the Engineer will establish a maximum limit for moisture content in the aggregates. When this limit is established, maintain the moisture content below this limit.

### D. Prepare the Mixture

Proportion the mixture ingredients as necessary to meet the required job mix formula. Mix until a homogenous mixture is produced.

#### 1. Add Mineral Filler

When mineral filler is used, introduce it in the proper proportions and as specified in [Subsection 400.3.02.B.5, “Mineral Filler Supply System.”](#)

#### 2. Add Hydrated Lime

When hydrated lime is included in the mixture, add it at a rate specified in [Section 828](#) and the job mix formula. Use methods and equipment for adding hydrated lime according to [Subsection 400.3.02.B.6, “Hydrated Lime Treatment System.”](#)

Add hydrated lime to the aggregate by using Method A or B as follows:

Method A—Dry Form—Add hydrated lime in its dry form to the mixture as follows, according to the type of plant:

- a. Batch Type Asphalt Plant: Add hydrated lime to the mixture in the weigh hopper or as approved and directed by the Engineer.
- b. Continuous Plant Using Pugmill Mixer: Feed hydrated lime into the hot aggregate before it is introduced into the mixer so that dry mixing is complete before the bituminous material is added.
- c. Continuous Plant Using Drier-Drum Mixer: Add hydrated lime so that the lime will not become entrained into the air stream of the drier and so that thorough dry mixing will be complete before the bituminous material is added.

Method B—Lime/Water Slurry—Add the required quantity of hydrated lime (based on dry weight) in lime/water slurry form to the aggregate. This solution consists of lime and water in concentrations as directed by the Engineer.

Equip the plant to blend and maintain the hydrated lime in suspension and to mix it with the aggregates uniformly in the proportions specified.

#### 3. Add Stabilizing Fiber

When stabilizing fiber is included in the mixture, add it at a rate specified in [Section 819](#) and the Job Mix Formula. Introduce it as specified in [Subsection 400.3.02.B.8, “Fiber Supply System.”](#)

#### 4. Add Gilsonite Modifier

When required, add the Gilsonite modifier to the mixture at a rate such that eight percent by weight of the asphalt cement is replaced by Gilsonite. Use either PG 64-22 or PG 67-22 asphalt cement as specified in [Subsection 820.2.01](#). Provide suitable means to calibrate and check the rate of Gilsonite being added. Introduce Gilsonite modifier by either of the following methods.

- a. For batch type plants, incorporate Gilsonite into the pugmill at the beginning of the dry mixing cycle. Increase the dry mix cycle by a minimum of 10 seconds after the Gilsonite is added and prior to introduction of the asphalt cement. For this method, supply Gilsonite in plastic bags to protect the material during shipment and handling and store the modifier in a waterproof environment. The bags shall be capable of being completely melted and uniformly blended into the combined mixture.

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Gilsonite may also be added through a mineral filler supply system as described in [Subsection 400.3.02.B.5, “Mineral Filler Supply System.”](#) The system shall be capable of injecting the modifier into the weigh hopper near the center of the aggregate batching cycle so the material can be accurately weighed.

- b. For drum drier plants, add Gilsonite through the recycle ring or through an acceptable means which will introduce the Gilsonite prior to the asphalt cement injection point. The modifier shall be proportionately fed into the drum mixer at the required rate by a proportioning device which shall be accurate within  $\pm 10$  percent of the amount required. The entry point shall be away from flames and ensure the Gilsonite will not be caught up in the air stream and exhaust system.

### 5. Materials from Different Sources

Do not use mixtures prepared from aggregates from different sources intermittently. This will cause the color of the finished pavement to vary.

## E. Observe Weather Limitations

Do not mix and place asphaltic concrete if the existing surface is wet or frozen. Do not lay asphaltic concrete OGFC mix or PEM at air temperatures below 60 °F (16 °C). When using a MTV, OGFC mix or PEM may be placed at 55 °F (13 °C) when approved by the Engineer. For other courses, follow the temperature guidelines in the following table:

**Table 4—Lift Thickness Table**

Lift Thickness	Minimum Temperature
1 in (25 mm) or less	55 °F (13 °C)
1.1 to 2 in (26 mm to 50 mm)	45 °F (8 °C)
2.1 to 3 in (51 mm to 75 mm)	40 °F (4 °C)
3.1 to 4 in (76 mm to 100 mm)	35 °F (2 °C)
4.1 to 8 in (101 mm to 200 mm)	32 °F (0 °C) and rising. Base Material must not be frozen.

## F. Perform Spreading and Finishing

Spread and finish the course as follows:

1. Determine the course’s maximum compacted layer thickness by the type mix being used according to Table 5.

**Table 5—Maximum Layer Thickness**

Mix Type	Minimum Layer Thickness	Maximum Layer Thickness	Maximum Total Thickness
25 mm Superpave	2 1/2 in (64 mm)	4 in (100 mm) *	—
19 mm Superpave	1 3/4 in (44 mm)	3 in (75 mm) *	—
12.5 mm Superpave	1 3/8 in (35 mm)	2 1/2 in (64 mm)*	8 in (200 mm)
9.5 mm Superpave Type 2	1 1/8 in.(28 mm)	1 1/2 in (38 mm)	4 in (100 mm)
9.5 mm Superpave Type 1	7/8 in (22 mm)	1 1/4 in (32 mm)	4 in (100 mm)
4.75 mm Mix	3/4 in (19 mm)	1 1/8 in (28 mm)	2 in (50 mm)
9.5 mm OGFC	55 lbs/yd <sup>2</sup> (30 kg/m <sup>2</sup> )	65 lbs/yd <sup>2</sup> (36 kg/m <sup>2</sup> )	—
12.5 mm OGFC	85 lbs/yd <sup>2</sup> (47 kg/m <sup>2</sup> )	95 lbs/yd <sup>2</sup> (53 kg/m <sup>2</sup> )	—
12.5 mm PEM	110 lbs/yd <sup>2</sup> (80 kg/m <sup>2</sup> )	165 lbs/yd <sup>2</sup> (90 kg/m <sup>2</sup> )	—
9.5 mm SMA	1 1/8 in (28 mm)	1 1/2 in (38 mm)	4 in (100 mm)
12.5 mm SMA	1 1/4 in (32 mm)	3 in (75 mm)	6 in (150 mm)
19 mm SMA	1 3/4 in (44 mm)	3 in (75 mm)	—



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Mix Type	Minimum Layer Thickness	Maximum Layer Thickness	Maximum Total Thickness
* Allow up to 6 in (150 mm) per lift on trench widening. Place 9.5 mm Superpave and 12.5 mm Superpave up to 4 in (100 mm) thick for driveway and side road transition.			

2. Unload the mixture into the paver hopper or into a device designed to receive the mixture from delivery vehicles.
3. Except for leveling courses, spread the mixture to the loose depth for the compacted thickness or the spread rate. Use a mechanical spreader true to the line, grade, and cross section specified.
4. For leveling courses, use a motor grader equipped with a spreader box and smooth tires to spread the material or use a mechanical spreader meeting the requirements in [Subsection 400.3.02.C, "Equipment at Project Site."](#)
5. Obtain the Engineer's approval for the sequence of paving operations, including paving the adjoining lanes. Minimize tracking tack onto surrounding surfaces.
6. Ensure that the outside edges of the pavement being laid are aligned and parallel to the roadway center line.
7. For New Construction or Resurfacing Contracts that contain multiple lifts or courses, arrange the width of the individual lifts so that the longitudinal joints of each successive lift are offset from the previous lift at least 1 ft (300 mm). This requirement does not apply to the lift immediately over thin lift leveling courses.

Ensure that the longitudinal joint(s) in the surface course and the mix immediately underneath asphaltic concrete OGFC or PEM are at the lane line(s).

**NOTE: Perform night work with artificial light provided by the Contractor and approved by the Engineer.**

8. Where mechanical equipment cannot be used, spread and rake the mixture by hand. Obtain the Engineer's approval of the operation sequence, including compactive methods, in these areas.
9. Keep small hand raking tools clean and free from asphalt build up. Do not use fuel oil or other harmful solvents to clean tools during the work.
10. Do not use mixture with any of these characteristics:
  - Segregated
  - Nonconforming temperature
  - Deficient or excessive asphalt cement content
  - Otherwise unsuitable to place on the roadway in the work
11. Remove and replace mixture placed on the roadway that the Engineer determines has unacceptable blemish levels from segregation, streaking, pulling and tearing, or other characteristics. Replace with acceptable mixture at the Contractor's expense. Do not continually place mixtures with deficiencies.
 

Do not place subsequent course lifts over another lift or courses placed on the same day while the temperature of the previously placed mix is 140 °F (60 °C) or greater.
12. Obtain the Engineer's approval of the material compaction equipment. Perform the rolling as follows:
  - a. Begin the rolling as close behind the spreader as possible without causing excessive distortion of the asphaltic concrete surface.
  - b. Continue rolling until roller marks are no longer visible.
  - c. Use pneumatic-tired rollers with breakdown rollers on all courses except asphaltic concrete OGFC, PEM and SMA or other mixes designated by the Engineer.
13. If applicable, taper or "feather" asphaltic concrete from full depth to a depth no greater than 0.5 in (13 mm) along curbs, gutters, raised pavement edges, and areas where drainage characteristics of the road must be retained. The Engineer will determine the location and extent of tapering.

### G. Maintain Continuity of Operations

Coordinate plant production, transportation, and paving operations to maintain a continuous operation. If the spreading operations are interrupted, construct a transverse joint if the mixture immediately behind the paver screed cools to less than 250 °F (120 °C).

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### H. Construct the Joints

1. Construct Transverse Joints
  - a. Construct transverse joints to facilitate full depth exposure of the course before resuming placement of the affected course.
  - b. Properly clean and tack the vertical face of the transverse joint before placing additional material.

**NOTE: Never burn or heat the joint by applying fuel oil or other volatile materials.**

- c. Straightedge transverse joints immediately after forming the joint.
  - d. Immediately correct any irregularity that exceeds 3/16 in. in 10 ft (5 mm in 3 m).
2. Construct Longitudinal Joints

Clean and tack the vertical face of the longitudinal joint before placing adjoining material. Construct longitudinal joints so that the joint is smooth, well sealed, and bonded.

### 3. Construction Joint Detail for OGFC and PEM Mixtures

In addition to meeting joint requirements described above, construct joints and transition areas for 12.5 mm OGFC and 12.5 mm PEM mixtures as follows:

- a. For projects which do not have milling included as a pay item:
  - 1) Place OGFC mixture meeting gradation requirements of 9.5 mm OGFC as specified in [Section 828](#) on entrance and exit ramp gore areas and end of project construction joints.
    - Taper mixture from 3/8 in (10 mm) at end of project to full plan depth within maximum distance of spread for one load of mixture
    - Taper mixture placed on gore areas from thickness of the edge of the mainline to 3/8 in (10 mm) at the point of the ramp transverse joint.
  - 2) Construct the ramp transverse joint at the point specified in the plans or as directed by the Engineer.
  - 3) Mixture placed in the transition and gore areas will be paid for at the contract unit price for 12.5 mm OGFC or 12.5 mm PEM as applicable.
- b. For projects which have milling included as a pay item:
  - 1) Taper milling for a distance of no less than 50 ft (15 m) to a depth of 2 1/4 in (59 mm) at the point of the transverse joint
  - 2) Taper thickness, if needed, of the dense-graded surface mix within the 50 ft (15 m) distance to 1 1/2 in (40 mm) at the point of the transverse joint
  - 3) Taper thickness of the 12.5 mm OGFC or 12.5 mm PEM to 3/4 in (19 mm) so that it ties in at grade level with the existing surface at the point of the transverse joint

### I. Protect the Pavement

Protect sections of the newly finished pavement from traffic until the traffic will not mar the surface or alter the surface texture. If directed by the Engineer, use artificial methods to cool the newly finished pavement to open the pavement to traffic more quickly.

### J. Modify the Job Mix Formula

If the Engineer determines that undesirable mixture or mat characteristics are being obtained, the job mix formula may require immediate adjustment.

## 400.3.06 Quality Acceptance

### A. Acceptance Plans for Gradation and Asphalt Cement Content

The Contractor will randomly sample and test mixtures for acceptance on a lot basis. The Department will monitor the Contractor testing program and perform comparison and quality assurance testing.

#### 1. Determine Lot Amount

A lot consists of the tons (megagrams) of asphaltic concrete produced and placed each production day. If this production is less than 500 tons (500 Mg), or its square yard (meter) equivalent, production may be incorporated

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into the next working day. The Engineer may terminate a lot when a pay adjustment is imminent if a plant or materials adjustment resulting in a probable correction has been made. Terminate all open lots at the end of the month, except for materials produced and placed during the adjustment period. The lot will be terminated as described in [Subsection 400.5.01, "Adjustments"](#).

If the final day's production does not constitute a lot, the production may be included in the lot for the previous day's run; or, the Engineer may treat the production as a separate lot with a corresponding lower number of tests.

### 2. Determine Lot Acceptance

Determine lot acceptance as found in [Subsection 400.5.01, "Adjustments."](#)

The Department will perform the following task:

Determine the pay factor by using the mean of the deviations from the job mix formula of the tests in each lot and apply it to Table 9—Mixture Acceptance Schedule for Surface Mixes or Table 10—Mixture Acceptance Schedule for Subsurface Mixes, whichever is appropriate. This mean will be determined by averaging the actual numeric value of the individual deviations from the job mix formula, disregarding whether the deviations are positive or negative amounts. Do not calculate lot acceptance using test results for materials not used in the Work. Determine the pay factor for each lot by multiplying the contract unit price by the appropriate pay factor from the Mixture Acceptance Schedule - Table 9 or Table 10. When two or more pay factors for a specific lot are less than 1.0, determine the adjusted payment by multiplying the contract unit price by the lowest pay factor.

If the mean of the deviations from the job mix formula of the lot acceptance tests for a control sieve or for asphalt cement content exceeds the tolerances established in the appropriate Mixture Acceptance Schedule, and if the Engineer determines that the material need not be removed and replaced, the lot may be accepted at an adjusted unit price as determined by the Engineer. If the Engineer determines that the material is not acceptable to leave in place, the materials shall be removed and replaced at the Contractor's expense.

### 3. Provide Quality Control Program

Provide a Quality Control Program as established in SOP 27 which includes:

- Assignment of quality control responsibilities to specifically named individuals who have been certified by the Office of Materials and Research
- Provisions for prompt implementation of control and corrective measures
- Provisions for communication with Project Manager, Bituminous Technical Services Engineer, and Testing Management Operations Supervisor at all times
- Provisions for reporting all test results daily through the Office of Materials and Research computerized Field Data Collection System; other checks, calibrations and records will be reported on a form developed by the Contractor and will be included as part of the project records
- Notification in writing of any change in quality control personnel

#### a. Certification Requirements:

- Use laboratory and testing equipment certified by the Department. (Laboratories which participate in and maintain AASHTO accreditation for testing asphaltic concrete mixtures will be acceptable in lieu of Departmental certification.)
- Provide certified quality control personnel to perform the sampling and testing. A Quality Control Technician (QCT) may be certified at three levels:
  - 1) Temporary Certification – must be a technician trainee who shall be given direct oversight by a certified Level 1 or Level 2 QCT while performing acceptance testing duties during the first 5 days of training. The trainee must complete qualification requirements within 30 production days after being granted temporary certification. A trainee who does not become qualified within 30 production days will not be re-eligible for temporary certification. A certified Level 1 or Level 2 QCT shall be at the plant at all times during production and shipment of mixture to monitor work of the temporarily certified technician.
  - 2) Level 1 – must demonstrate they are competent in performing the process control and acceptance tests and procedures related to hot mix asphalt production and successfully pass a written exam.
  - 3) Level 2 – must meet Level 1 requirements and must be capable of and responsible for making process control adjustments, and successfully pass a written exam.

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- Technician certification is valid for 3 years from the date on the technician’s certificate unless revoked or suspended. Eligible technicians may become certified through special training and testing approved by the Office of Materials and Research. Technicians who lose their certification due to falsification of test data will not be eligible for recertification in the future unless approved by the State Materials and Research Engineer.
- b. Quality Control Management
- 1) Designate at least one Level 2 QCT as manager of the quality control operation. The Quality Control Manager shall meet the following requirements:
    - Be accountable for actions of other QCT personnel
    - Ensure that all applicable sampling requirements and frequencies, test procedures, and Standard Operating Procedures are adhered to
    - Ensure that all reports, charts, and other documentation is completed as required
  - 2) Provide QCT personnel at the plant as follows:
    - If daily production for all mix types is to be greater than 250 tons (megagrams), have a QCT person at the plant at all times during production and shipment of mixture until all required acceptance tests have been completed
    - If daily production for all mix types will not be greater than 250 tons (megagrams) a QCT may be responsible for conducting tests at up to two plants, subject to random number sample selection
    - Have available at the plant or within immediate contact by phone or radio a Level 2 QCT responsible for making prompt process control adjustments as necessary to correct the mix
  - 3) Sampling, Testing, and Inspection Requirements.

Provide all sample containers, extractants, forms, diaries, and other supplies subject to approval of the Engineer.

Perform daily sampling, testing, and inspection of mixture production that meets the following requirements:

    - (a) Randomly sample mixtures according to [GSP 15](#), and [GDT 73 \(Method C\)](#) and test on a lot basis. In the event less than the specified number of samples are taken, obtain representative 6 in (150 mm) cores from the roadway at a location where the load not sampled was placed. Take enough cores to ensure minimum sample size requirements are met for each sample needed.
    - (b) Maintain a printed copy of the computer generated random sampling data as a part of the project records.
    - (c) Perform sampling, testing, and inspection duties of [GSP 21](#).
    - (d) Perform extraction or ignition test ([GDT 83](#) or [GDT 125](#)) and extraction analysis ([GDT 38](#)). If the ignition oven is used, a printout of sample data including weights shall become a part of the project records. For asphalt cement content only, digital printouts of liquid asphalt cement weights may be substituted in lieu of an extraction test for plants with digital recorders. Calculate the asphalt content from the ticket representing the mixture tested for gradation.
    - (e) Save extracted aggregate, opposite quarters, and remaining material (for possible referee testing) of each sample as follows:
      - Store in properly labeled, suitable containers
      - Secure in a protected environment
      - Store for three working days. If not obtained by the Department, within three days they may be discarded.
    - (f) Add the following information on load tickets from which a sample or temperature check is taken:
      - Mixture temperature
      - Signature of the QCT person performing the testing
    - (g) Calibrate the lime system when hydrated lime is included in the mixture:
      - Perform a minimum of twice weekly during production

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- Post results at the plant for review
  - Provide records of materials invoices upon request (including asphalt cement, aggregate, hydrated lime, etc.)
- (h) Take action if acceptance test results are outside Mixture Control Tolerances of [Section 828](#).
- One sample out of tolerance
    - (1) Contact Level 2 - QCT to determine if a plant adjustment is needed
    - (2) Immediately run a process control sample. Make immediate plant adjustments if this sample is also out of tolerance

**NOTE: Determine mixture temperature at least once per hour of production for OGFC and PEM mixes.**

- (3) Test additional process control samples as needed to ensure corrective action taken appropriately controls the mixture
  - Two consecutive acceptance samples of the same mix type out of tolerance regardless of Lot or mix design level, or three consecutive acceptance samples out of tolerance regardless of mix type
    - (1) Stop plant production immediately
    - (2) Reject any mixture already in storage that:
      - Deviates more than 10 percent in gradation from the job mix formula based on the acceptance sample
      - Deviates more than 0.7 percent in asphalt content from the job mix formula based on the acceptance sample
    - (3) Make a plant correction to any mix type out of tolerance prior to resuming production
      - Do not send any mixture to the project before test results of a process control sample meets Mixture Control Tolerances
      - Reject any mixture produced at initial restarting that does not meet Mixture Control Tolerances
- 4) Comparison Testing and Quality Assurance Program

Periodic comparison testing by the Department will be required of each QCT to monitor consistency of equipment and test procedures. The Department will take independent samples to monitor the Contractor's quality control program.

a) Comparison Sampling and Testing

Retain samples for comparison testing and referee testing if needed as described in [Subsection 400.3.06.A.3.b.3](#). Discard these samples only if the Contractor's acceptance test results meet a 1.00 pay factor and the Department does not procure the samples within three working days.

The Department will test comparison samples on a random basis. Results will be compared to the respective contractor acceptance tests and the maximum difference shall be as follows:

**Table 6—Allowable Percent Difference Between Department and Contractor Acceptance Tests**

<u>SIEVE SIZE</u>	<u>SURFACE</u>	<u>SUB-SURFACE</u>
1/2 in. (12.5 mm)		4.0%
3/8 in. (9.5 mm)	3.5%	4.0%
No. 4 (4.75 mm)	3.5%	3.5%
No. 8 (2.36 mm)	2.5%	3.0%

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No. 200 (75 $\mu$ m)	2.0%	2.0%
A.C.	0.4%	0.5%

**NOTE: Pavement courses to be overlaid with OGFC or PEM mixes are considered surface mixes.**

- (1) If test comparisons are within these tolerances:
    - Continue production
    - Use the Contractor's tests for acceptance of the lot
  - (2) If test comparisons are not within these tolerances:
    - Another Departmental technician will test the corresponding referee sample
    - Results of the referee sample will be compared to the respective contractor and Departmental tests using the tolerance for comparison samples given above.
      - (a) If referee test results are within the above tolerances when compared to the Contractor acceptance test, use the Contractor's test for acceptance of the effected lot.
      - (b) If referee test results are not within the above tolerances when compared to the Contractor acceptance test, the Department will review the Contractor's quality control methods and determine if a thorough investigation is needed.
- b) Quality Assurance Sampling and Testing
- (1) Randomly take a minimum of two quality assurance samples from the lesser of five days or five lots of production regardless of mix type or number of projects.
  - (2) Compare test deviation from job mix formula to Mixture Control Tolerances in [Section 828](#). If results are outside these tolerances, another sample from the respective mix may be taken.

**NOTE: For leveling courses less than 110 lb/yd<sup>2</sup> (60 kg/m<sup>2</sup>) that have quality assurance test results outside the Mixture Control Tolerances of [Section 828](#), use the Department's test results only and applicable pay factors will apply.**

If test results of the additional sample are not within Mixture Control Tolerances, the Department will take the following action:

- Take random samples from throughout the lot as in [Subsection 400.3.06.A.3.b.3](#) and use these test results for acceptance and in calculations for the monthly plant rating. Applicable pay factors will apply and the contractor QCT test results will not be included in pay factor calculations nor in the monthly plant rating.
- Determine if the Contractor's quality control program is satisfactory and require prompt corrective action by the Contractor if specification requirements are not being met.
- Determine if the QCT has not followed Departmental procedures or has provided erroneous information.
- Take samples of any in-place mixture represented by unacceptable QCT tests and use the additional sample results for acceptance and in calculations for the monthly plant rating and apply applicable pay factors. The Contractor QCT tests will not be included in the pay factor calculations nor in the monthly plant rating.

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### B. Compaction

Determine the mixture compaction using either [GDT 39](#) or [GDT 59](#). The compaction is accepted in lots defined in [Subsection 400.3.06. A “Acceptance Plans for Gradation and Asphalt Cement Content”](#) and is within the same lot boundaries as the mixture acceptance.

#### 1. Calculate Pavement Mean Air Voids

The Department will calculate the pavement air voids placed within each lot as follows:

- a. One test per sub-lot.
- b. Average the results of all tests run on randomly selected sites in that lot.
- c. Select the random sites using [GDT 73](#).

Density tests are not required for asphaltic concrete placed at 90 lbs/yd<sup>2</sup> (50 kg/m<sup>2</sup>) or less, 4.75 mm mix, and asphaltic concrete OGFC, PEM and mixes placed as variable depth or width leveling. Compact these courses to the Engineer’s satisfaction. Density tests will not be performed on turn-outs and driveways.

The targeted maximum Pavement Mean Air Void content for all Superpave and Stone Matrix Asphalt mixtures is 5.0 percent. Ensure that the maximum Pavement Mean Air Voids for all Superpave and Stone Matrix Asphalt mixtures does not exceed 7.0 percent. The maximum Pavement Mean Air Voids for 2 foot shoulder widening is 9.0 percent. The adjustment period for density shall be four lots or four production days, whichever is less, in order for the contractor to ensure maximum compactive effort has been achieved which will yield no more than the specified maximum allowed Mean Air Voids. If the contractor needs to adjust the mixture to improve density results, a change in the job mix formula may be requested for approval during the adjustment period so long as the following values are not exceeded:

- Coarse pay sieve           ± 4%
- No. 8 (2.36 mm) sieve    ± 2%
- No. 200 (75 µm) sieve    ± 1%
- Asphalt Content            ± 0.2%
- All value changes must still be within specification limits

If the Office of Materials and Research is satisfied that the contractor has exerted the maximum compactive effort and is not able to maintain Pavement Mean Air Voids at no more than 7.0%, the Engineer may establish a maximum target for Pavement Mean Air Voids.

Mixture placed during the adjustment period for density shall meet the requirements for a 0.90 pay factor in Table 12 of [Subsection 400.5.01.C. “Calculate Mean Pavement Air Voids.”](#) Mixture which does not meet these density requirements shall be paid for using the applicable pay factor.

If the mean air voids of the pavement placed within a lot exceeds 100% of the maximum target air voids, if established and the Engineer determines that the material need not be removed and replaced, the lot may be accepted at an adjusted unit price as determined by the Engineer.

#### 2. Obtain Uniform Compaction

For a lot to receive a pay factor of 1.00 for compaction acceptance, the air void range cannot exceed 4 percent for new construction or 5 percent for resurfacing projects. The range is the difference between the highest and lowest acceptance test results within the affected lot. If the air void range exceeds these tolerances, apply a Pay Factor of 95%.

The 5% reduced pay factor for the compaction range does not apply in these instances:

- The mixture is placed during the adjustment period as defined in [Subsection 400.5.01.A. “Materials Produced and Placed During the Adjustment Period.”](#)
- All air void results within a given lot are less than 7.0%.
- A lot containing two subplot or less.
- On two foot trench widening.

### C. Surface Tolerance

In this Specification, pavement courses to be overlaid with an Open-Graded Friction Course or PEM are considered surface courses. All Open-Graded Friction Courses or PEM are to be evaluated after the roadway has been opened to



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traffic for a minimum of 5 days and a maximum of 15 days. Other asphalt paving is subject to straightedge and visual inspection and irregularity correction as shown below:

### 1. Visual and Straightedge Inspection

Paving is subject to visual and straightedge inspection during and after construction operations until Final Acceptance. Locate surface irregularities as follows:

- a. Keep a 10 ft (3 m) straightedge near the paving operation to measure surface irregularities on courses. Provide the straightedge and the labor for its use.
- b. Inspect the base, intermediate, and surface course surfaces with the straightedge to detect irregularities.
- c. Correct irregularities that exceed 3/16 in. in 10 ft (5 mm in 3 m) for base and intermediate courses, and 1/8 in. in 10 ft (3 mm in 3 m) for surface courses.

Mixture or operating techniques will be stopped if irregularities such as rippling, tearing, or pulling occur and the Engineer suspects a continuing equipment problem. Stop the paving operation and correct the problem. Correct surface course evaluations on individual Laser Road Profiler test sections, normally 1 mile (1 km) long.

### 2. Target Surface Smoothness

The Department will use the Laser Road Profiler method to conduct acceptance testing for surface course tolerance according to [GDT 126](#). This testing will be performed only on:

- Surface courses on Projects with mainline traveled way measuring a minimum distance of 1 mile
- Ramps more than 0.5 mile (800 m) long

Achieve the smoothest possible ride during construction. Do not exceed the target Laser Road Profiler smoothness index as shown below:

**Table 7—Pavement Smoothness Requirements—New Construction**

Construction Description	Smoothness Index
Asphaltic concrete OGFC and PEM on interstates and asphaltic concrete OGFC and PEM on new construction on state routes	750
Asphaltic Concrete SMA and other resurfacing on interstates, asphaltic concrete OGFC and PEM resurfacing on state routes, and new construction	825
All other resurfacing on state routes (excluding LARP, PR, airports, etc.)	900

If the target values are not achieved, immediately adjust the operations to meet the target values.

Corrective work is required if the surface smoothness exceeds the Laser Road Profiler smoothness index shown below:

**Table 8—Pavement Smoothness Requirements—Corrective Work**

Construction Description	Smoothness Index
Asphaltic concrete OGFC and PEM on interstates and asphaltic concrete OGFC and PEM on new construction on state routes	825
Asphaltic Concrete SMA and other resurfacing on interstates, asphaltic concrete OGFC and PEM resurfacing on state routes, and new construction	900
All other resurfacing on state routes (excluding LARP, PR, airports, etc.)	1025

If surface tolerance deficiencies need correction, obtain the Engineer's approval of the methods and type mix used.

### 3. Bridge Approach Ride Quality



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The following are subject to a ride quality test by the Department for 100 ft. (30 m) of roadway approaching each end of a bridge using the Lightweight Profiler:

- A state road with 4 lanes or more
- A 2-lane state road with a current traffic count of 2,000 vpd or more
- Locations designated on the Plans

All other bridge approaches shall meet the 1/8 in. in 10 ft (3 mm in 3 m) straightedge requirement. Test ride quality as follows:

- a. The Department will determine a profile index value according to test method [GDT 134](#).
- b. The Department will average the profile index value from the right and left wheelpath for each 100 ft (30 m) section for each lane. Keep the profile index value under 30 in/mile (475 mm/km).
- c. Meet the profile index value for the 100 ft (30 m) section of roadway up to the joint with the approach slab.
- d. Schedule the ride quality testing 5 days before needed by contacting the Office of Materials and Research. Clean and clear obstructions from the test area.
- e. Correct the sections that do not meet the ride quality criteria of this Specification. After correction, these sections are subject to retesting with the Lightweight Profiler. The Engineer shall direct the type of correction method, which may include:
  - Milling
  - Grinding
  - Removing and replacing the roadway

No additional compensation will be made.

The Department will perform ride quality testing up to two times on the bridge approaches at no cost to the Contractor. Additional profilograph testing will cost the Contractor \$500 per test.

### D. Reevaluation of Lots

When lots are reevaluated as shown in [Subsection 106.03, “Samples, Tests, Cited Specifications,”](#) sampling and testing is according to [GDT 73](#). Request for reevaluation shall be made within 5 working days of notification of the lot results. The following procedures apply:

#### 1. Mixture Acceptance

The Department will take the same number of new tests on cores taken at a location where the load sampled was placed and will use only those core results for acceptance.

The Department will use the mean of the deviations from the job mix formula for these tests to determine acceptance based on the appropriate column in the Asphalt Cement Content and Aggregate Gradation of Asphalt Concrete [Mixture Acceptance Schedule—Table 9 or 10](#).

#### 2. Compaction Acceptance

The Department will reevaluate the lot through additional testing by cutting the same number of cores originally obtained and averaging these results with the results from the original density tests. The Department will use the average to determine acceptance according to the Compaction Acceptance Schedule in [Subsection 400.5.01.C, “Calculate Pavement Mean Air Voids”](#).

**Table 9—Mixture Acceptance Schedule—Surface Mixes**

Mixture Characteristics	Pay Factor	Mean of the Deviations from the Job Mix Formula							
		1 Test	2 Tests	3 Tests	4 Tests	5 Tests	6 Tests	7 Tests	8 Tests
Asphalt Cement Content (Extraction, Ignition)	1.00	0.00 - 0.70	0.00 - 0.54	0.00 - 0.46	0.00 - 0.41	0.00 - 0.38	0.00 - 0.35	0.00 - 0.32	0.00 - 0.30
	0.95	0.71 - 0.80	0.55 - 0.61	0.47 - 0.52	0.42 - 0.46	0.39 - 0.43	0.36 - 0.39	0.33 - 0.36	0.31 - 0.34
	0.90	0.81 - 0.90	0.62 - 0.68	0.53 - 0.58	0.47 - 0.51	0.44 - 0.47	0.40 - 0.45	0.37 - 0.40	0.35 - 0.37
	0.80	0.91 - 1.00	0.69 - 0.75	0.59 - 0.64	0.52 - 0.56	0.48 - 0.52	0.44 - 0.47	0.41 - 0.44	0.38 - 0.41
	0.70	1.01 - 1.19	0.76 - 0.82	0.65 - 0.69	0.57 - 0.61	0.53 - 0.56	0.48 - 0.51	0.45 - 0.47	0.42 - 0.44
3/8 in. (9.5 mm) Sieve	0.50	1.20 - 1.40	0.83 - 0.85	0.70 - 0.72	0.62 - 0.64	0.57 - 0.59	0.52 - 0.55	0.48 - 0.51	0.45 - 0.48
	1.00	0.00 - 0.9	0.00 - 6.6	0.00 - 5.6	0.00 - 5.0	0.00 - 4.6	0.00 - 4.2	0.00 - 3.9	0.00 - 3.6
	0.98	9.1 - 10.0	6.7 - 7.5	5.7 - 6.3	5.1 - 5.6	4.7 - 5.2	4.3 - 4.7	4.0 - 4.4	3.7 - 4.1
	0.95	10.1 - 11.9	7.6 - 8.4	6.4 - 7.0	5.7 - 6.3	5.3 - 5.8	4.8 - 5.3	4.5 - 5.0	4.2 - 4.6
	0.90	12.0 - 13.0	8.5 - 9.3	7.1 - 7.7	6.4 - 6.9	5.9 - 6.3	5.4 - 5.8	5.1 - 5.4	4.7 - 5.0
3/8 in. (9.5 mm) Sieve (12.5 mm OGFC, 12.5 mm PEM, 12.5 mm Superpave)	0.85	13.1 - 14.0	9.4 - 10.2	7.8 - 8.6	7.0 - 7.6	6.4 - 6.9	5.9 - 6.3	5.5 - 5.9	5.1 - 5.5
	0.80	14.1 - 14.5	10.3 - 10.5	8.7 - 8.9	7.7 - 8.0	7.0 - 7.5	6.4 - 6.8	6.0 - 6.4	5.6 - 6.0
	1.00	0.0 - 6.8	0.00 - 5.0	0.00 - 4.2	0.00 - 3.8	0.00 - 3.4	0.00 - 3.2	0.00 - 2.9	0.00 - 2.7
	0.98	6.9 - 7.5	5.1 - 5.6	4.6 - 4.7	3.9 - 4.2	3.5 - 3.9	3.3 - 3.5	3.0 - 3.3	2.8 - 3.1
	0.95	7.6 - 8.9	5.7 - 6.3	4.8 - 5.2	4.3 - 4.7	4.0 - 4.4	3.6 - 4.0	3.4 - 3.8	3.2 - 3.4
No. 4 (4.75 mm) Sieve	0.90	9.0 - 9.8	6.4 - 7.0	5.3 - 5.8	4.8 - 5.2	4.5 - 4.8	4.1 - 4.4	3.9 - 4.1	3.5 - 3.8
	0.85	9.9 - 10.5	7.1 - 7.6	5.9 - 6.4	5.3 - 5.7	4.9 - 5.2	4.5 - 4.7	4.2 - 4.4	3.9 - 4.1
	0.80	10.6 - 10.9	7.7 - 7.9	6.5 - 6.7	5.8 - 6.0	5.3 - 5.6	4.8 - 5.1	4.5 - 4.8	4.2 - 4.5
	1.00	0.00 - 9.0	0.00 - 6.7	0.00 - 5.7	0.00 - 5.2	0.00 - 4.8	0.00 - 4.4	0.00 - 4.1	0.00 - 3.8
	0.98	9.1 - 10.0	6.8 - 7.6	5.8 - 6.3	5.3 - 5.8	4.9 - 5.4	4.5 - 4.9	4.2 - 4.6	3.9 - 4.3
No. 4 (4.75 mm) Sieve (9.5 mm OGFC, 9.5 mm Superpave)	0.95	10.1 - 11.9	7.7 - 8.5	6.4 - 6.9	5.9 - 6.4	5.5 - 5.9	5.0 - 5.4	4.7 - 5.0	4.4 - 4.7
	0.90	12.0 - 13.0	8.6 - 9.4	7.0 - 7.5	6.5 - 7.0	6.0 - 6.5	5.5 - 5.9	5.1 - 5.5	4.8 - 5.1
	0.85	13.1 - 14.0	9.5 - 10.2	7.6 - 8.0	7.1 - 7.6	6.6 - 7.0	6.0 - 6.4	5.6 - 5.9	5.2 - 5.5
	0.80	14.1 - 14.5	10.3 - 10.5	8.1 - 8.3	7.7 - 8.0	7.1 - 7.5	6.5 - 6.9	6.0 - 6.4	5.6 - 5.9
	1.00	0.00 - 6.8	0.00 - 5.0	0.00 - 4.3	0.00 - 3.9	0.00 - 3.6	0.00 - 3.3	0.00 - 3.1	0.00 - 2.8

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Mixture Characteristics	Pay Factor	Mean of the Deviations from the Job Mix Formula							
		1 Test	2 Tests	3 Tests	4 Tests	5 Tests	6 Tests	7 Tests	8 Tests
(9.5 mm SMA)	0.98	6.9 - 7.5	5.1 - 5.7	4.4 - 4.7	4.0 - 4.4	3.7 - 4.0	3.4 - 3.7	3.2 - 3.4	2.9 - 3.2
	0.95	7.6 - 8.9	5.8 - 6.4	4.8 - 5.2	4.5 - 4.8	4.1 - 4.4	3.8 - 4.0	3.5 - 3.8	3.3 - 3.5
	0.90	9.0 - 9.8	6.5 - 7.0	5.3 - 5.6	4.9 - 5.2	4.5 - 4.9	4.1 - 4.4	3.9 - 4.1	3.6 - 3.8
	0.85	9.9 - 10.5	7.1 - 7.7	5.7 - 6.0	5.3 - 5.7	5.0 - 5.2	4.3 - 4.8	4.2 - 4.4	3.9 - 4.1
	0.80	10.6 - 10.9	7.8 - 7.9	6.1 - 6.2	5.8 - 6.0	5.3 - 5.6	4.9 - 5.2	4.5 - 4.8	4.2 - 4.4
	1.00	0.00 - 7.0	0.00 - 5.6	0.00 - 4.8	0.00 - 4.3	0.00 - 4.0	0.00 - 3.6	0.00 - 3.4	0.00 - 3.2
	0.98	7.1 - 8.0	5.7 - 6.3	4.9 - 5.4	4.4 - 4.8	4.1 - 4.5	3.7 - 4.1	3.5 - 3.8	3.3 - 3.6
	0.95	8.1 - 9.0	6.4 - 7.0	5.5 - 6.0	4.9 - 5.3	4.6 - 4.9	4.2 - 4.5	3.9 - 4.2	3.7 - 3.9
No. 8 (2.36 mm) Sieve (OGFC, PEM, Superpave and 4.75 mm mixes)	0.90	9.1 - 10.9	7.1 - 7.7	6.1 - 6.6	5.4 - 5.8	5.0 - 5.4	4.6 - 4.9	4.3 - 4.6	4.0 - 4.3
	0.85	11.0 - 12.0	7.8 - 8.5	6.7 - 7.2	5.9 - 6.4	5.5 - 5.8	5.0 - 5.3	4.7 - 5.0	4.4 - 4.6
	0.75	12.1 - 12.5	8.6 - 8.8	7.3 - 7.5	6.5 - 6.8	5.9 - 6.3	5.4 - 5.7	5.1 - 5.3	4.7 - 4.9
	1.00	0.00 - 5.3	0.00 - 4.2	0.00 - 3.6	0.00 - 3.2	0.00 - 3.0	0.00 - 2.7	0.00 - 2.6	0.00 - 2.4
	0.98	5.4 - 6.0	4.3 - 4.7	3.7 - 4.0	3.3 - 3.6	3.1 - 3.4	2.8 - 3.1	2.7 - 2.9	2.5 - 2.7
	0.95	6.1 - 6.8	4.8 - 5.3	4.1 - 4.5	3.7 - 4.0	3.5 - 3.7	3.2 - 3.4	3.0 - 3.2	2.8 - 2.9
	0.90	6.9 - 8.2	5.4 - 5.8	5.6 - 5.0	4.1 - 4.5	3.8 - 4.0	3.5 - 3.7	3.3 - 3.5	3.0 - 3.2
	0.85	8.3 - 9.0	5.9 - 6.4	5.1 - 5.4	4.6 - 4.8	4.1 - 4.4	3.8 - 4.0	3.6 - 3.8	3.3 - 3.4
No. 8 (2.36 mm) Sieve (12.5 mm SMA, 9.5 mm SMA)	0.75	9.1 - 9.4	6.5 - 6.6	5.5 - 5.0	4.9 - 5.1	4.5 - 4.7	4.1 - 4.3	3.9 - 4.0	3.5 - 3.7
	No. 8 (2.36 mm) Sieve for OGFC and PEM mixes: When the mean of the deviations from the Job Mix Formula for a particular lot exceeds the tolerance for a 1.00 pay factor in the appropriate column, the lot will be paid for at 0.50 of the Contract Price.								

**Table 10—Mixture Acceptance Schedule—Subsurface Mixes**

Mixture Characteristics	Pay Factor	Mean of the Deviations from the Job Mix Formula							
		1 Test	2 Tests	3 Tests	4 Tests	5 Tests	6 Tests	7 Tests	8 Tests
Asphalt Cement Content (Extraction, Ignition)	1.00	0.00 - 0.80	0.00 - 0.61	0.00 - 0.52	0.00 - 0.46	0.00 - 0.43	0.00 - 0.39	0.00 - 0.36	0.00 - 0.34
	0.95	0.81 - 0.90	0.62 - 0.68	0.53 - 0.58	0.47 - 0.51	0.44 - 0.47	0.40 - 0.43	0.37 - 0.40	0.35 - 0.37
	0.90	0.91 - 1.00	0.69 - 0.75	0.59 - 0.64	0.52 - 0.56	0.48 - 0.52	0.44 - 0.47	0.41 - 0.44	0.38 - 0.41
	0.80	1.01 - 1.19	0.76 - 0.82	0.65 - 0.69	0.57 - 0.61	0.53 - 0.56	0.48 - 0.51	0.45 - 0.47	0.42 - 0.44
	0.70	1.20 - 1.40	0.83 - 0.85	0.70 - 0.72	0.62 - 0.64	0.57 - 0.59	0.52 - 0.55	0.48 - 0.51	0.45 - 0.48
	0.50	1.41 - 1.60	0.86 - 0.88	0.73 - 0.75	0.65 - 0.67	0.60 - 0.63	0.56 - 0.60	0.52 - 0.56	0.49 - 0.52
1/2 in. (12.5 mm) Sieve (25 mm Superpave)	1.00	0.00 - 12.9	0.00 - 8.1	0.00 - 6.9	0.00 - 6.1	0.00 - 5.5	0.00 - 5.0	0.00 - 4.7	0.00 - 4.4
	0.98	13.0 - 14.0	8.2 - 9.1	7.0 - 7.7	6.2 - 6.8	5.6 - 6.1	5.1 - 5.6	4.8 - 5.2	4.5 - 4.9
	0.95	14.1 - 15.0	9.2 - 10.1	7.8 - 8.5	6.9 - 7.5	6.2 - 6.7	5.7 - 6.1	5.3 - 5.7	5.0 - 5.4
	0.90	15.1 - 16.0	10.2 - 11.1	8.6 - 9.3	7.6 - 8.2	6.8 - 7.4	6.2 - 6.7	5.8 - 6.3	5.5 - 5.9
	0.85	16.1 - 17.0	11.2 - 11.5	9.4 - 9.6	8.3 - 8.6	7.5 - 7.8	6.8 - 7.0	6.4 - 6.5	6.0 - 6.1
	0.80	17.1 - 18.0	11.6 - 11.9	9.7 - 9.9	8.7 - 9.0	7.9 - 8.1	7.1 - 7.3	6.6 - 6.8	6.2 - 6.4
1/2 in. (12.5 mm) Sieve (19 mm SMA)	1.00	0.00 - 9.7	0.00 - 6.0	0.00 - 5.2	0.00 - 4.6	0.00 - 4.1	0.00 - 3.8	0.00 - 3.5	0.00 - 3.3
	0.98	9.8 - 10.5	6.2 - 6.8	5.3 - 5.8	4.7 - 5.1	4.2 - 4.6	3.9 - 4.2	3.6 - 3.9	3.4 - 3.7
	0.95	10.6 - 11.2	6.9 - 7.8	5.9 - 6.4	5.2 - 5.6	4.7 - 5.0	4.3 - 4.6	4.0 - 4.3	3.8 - 4.0
	0.90	11.3 - 12.0	7.9 - 8.3	6.5 - 7.0	5.7 - 6.1	5.1 - 5.6	4.7 - 5.0	4.4 - 4.7	4.1 - 4.4
	0.85	12.1 - 12.8	8.4 - 8.6	7.1 - 7.2	6.2 - 6.5	5.7 - 5.9	5.1 - 5.3	4.8 - 4.9	4.5 - 5.6
	0.80	12.9 - 13.5	8.7 - 8.9	7.3 - 7.4	6.6 - 6.8	6.0 - 6.1	5.4 - 5.5	5.0 - 5.1	4.7 - 4.8
3/8 in. (9.5 mm) Sieve (19 mm Superpave, 12.5 mm Superpave)	1.00	0.00 - 10.0	0.00 - 7.5	0.00 - 6.3	0.00 - 5.6	0.00 - 5.2	0.00 - 4.7	0.00 - 4.4	0.00 - 4.1
	0.98	10.1 - 11.9	7.6 - 8.4	6.4 - 7.0	5.7 - 6.3	5.3 - 5.8	4.8 - 5.3	4.5 - 5.0	4.2 - 4.6
	0.95	12.0 - 13.0	8.5 - 9.3	7.1 - 7.7	6.4 - 6.9	5.9 - 6.3	5.4 - 5.8	5.1 - 5.4	4.7 - 5.0
	0.90	13.1 - 14.0	9.4 - 10.2	7.8 - 8.6	7.0 - 7.6	6.4 - 6.9	5.9 - 6.3	5.5 - 5.9	5.1 - 5.5
	0.85	14.1 - 14.5	10.3 - 10.5	8.7 - 8.9	7.7 - 8.0	7.0 - 7.5	6.4 - 6.8	6.0 - 6.4	5.6 - 6.0
	0.80	14.6 - 15.0	10.6 - 10.8	9.0 - 9.2	8.1 - 8.4	7.6 - 7.8	6.9 - 7.3	6.5 - 6.8	6.1 - 6.5
No. 4 (4.75 mm) Sieve	1.00	0.00 - 10.0	0.00 - 7.6	0.00 - 6.3	0.00 - 5.8	0.00 - 5.4	0.00 - 4.9	0.00 - 4.6	0.00 - 4.3

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Mixture Characteristics	Pay Factor	Mean of the Deviations from the Job Mix Formula							
		1 Test	2 Tests	3 Tests	4 Tests	5 Tests	6 Tests	7 Tests	8 Tests
(9.5 mm Superpave)	0.98	10.1 - 11.9	7.7 - 8.5	6.4 - 6.9	5.9 - 6.4	5.5 - 5.9	5.0 - 5.4	4.7 - 5.0	4.4 - 4.7
	0.95	12.0 - 13.0	8.6 - 9.4	7.0 - 7.5	6.5 - 7.0	6.0 - 6.5	5.5 - 5.9	5.1 - 5.5	4.8 - 5.1
	0.90	13.1 - 14.0	9.5 - 10.2	7.6 - 8.0	7.1 - 7.6	6.6 - 7.0	6.0 - 6.4	5.6 - 5.9	5.2 - 5.5
	0.85	14.1 - 14.5	10.3 - 10.5	8.1 - 8.3	7.7 - 8.0	7.1 - 7.5	6.5 - 6.9	6.0 - 6.4	5.6 - 5.9
	0.80	14.6 - 15.0	10.6 - 10.8	8.4 - 8.6	8.1 - 8.4	7.6 - 8.0	7.0 - 7.4	6.5 - 6.8	6.0 - 6.3
	1.00	0.00 - 8.0	0.00 - 6.3	0.00 - 5.4	0.00 - 4.8	0.00 - 4.5	0.00 - 4.1	0.00 - 3.8	0.00 - 3.6
No. 8 (2.36 mm) Sieve (All mixes except SMA)	0.98	8.1 - 9.0	6.4 - 7.0	5.5 - 6.0	4.9 - 5.3	4.6 - 4.9	4.2 - 4.5	3.9 - 4.2	3.7 - 3.9
	0.95	9.1 - 10.0	7.1 - 7.7	6.1 - 6.6	5.4 - 5.8	5.0 - 5.4	4.6 - 4.9	4.3 - 4.6	4.0 - 4.3
	0.90	10.1 - 11.9	7.8 - 8.5	6.7 - 7.2	5.9 - 6.4	5.5 - 5.8	5.0 - 5.3	4.7 - 5.0	4.4 - 4.6
	0.85	12.0 - 13.0	8.6 - 8.8	7.3 - 7.5	6.5 - 6.8	5.9 - 6.3	5.4 - 5.7	5.1 - 5.3	4.7 - 4.9
	0.75	13.1 - 14.0	8.9 - 9.1	7.6 - 7.8	6.9 - 7.2	6.4 - 6.6	5.8 - 6.1	5.4 - 5.7	5.0 - 5.3
	1.00	0.00 - 6.0	0.00 - 4.7	0.00 - 4.1	0.00 - 3.6	0.00 - 3.4	0.00 - 3.1	0.00 - 2.9	0.00 - 2.4
No. 8 (2.36 mm) Sieve (19 mm SMA)	0.98	6.1 - 6.8	4.8 - 5.2	4.2 - 4.5	3.7 - 4.0	3.5 - 3.7	3.2 - 3.4	3.0 - 3.2	2.8 - 2.9
	0.95	6.9 - 7.5	5.3 - 5.8	4.6 - 5.0	4.1 - 4.4	3.8 - 4.0	3.5 - 3.7	3.3 - 3.5	3.0 - 3.2
	0.90	7.6 - 8.9	5.9 - 6.4	5.1 - 5.4	4.5 - 4.8	4.1 - 4.4	3.8 - 4.0	3.6 - 3.8	3.3 - 3.5
	0.85	9.0 - 9.8	6.5 - 6.6	5.5 - 5.6	4.9 - 5.1	4.5 - 4.7	4.1 - 4.3	3.9 - 4.0	3.6 - 3.7
	0.75	9.9 - 10.5	6.7 - 6.8	5.7 - 5.9	5.2 - 5.4	4.8 - 5.0	4.4 - 4.6	4.1 - 4.3	3.8 - 4.0

## E. Segregated Mixture

Prevent mixture placement that yields a segregated mat by following production, storage, loading, placing, and handling procedures. Also, make needed plant modifications and provide necessary auxiliary equipment. (See [Subsection 400.1.01, "Definitions."](#))

If the mixture is segregated in the finished mat, the Department will take actions based on the degree of segregation. The actions are described below.

### 1. Unquestionably Unacceptable Segregation

When the Engineer determines that the segregation in the finished mat is unquestionably unacceptable, follow these measures:

- a. Suspend Work and require the Contractor to take positive corrective action. The Department will evaluate the segregated areas to determine the extent of the corrective work to the in-place mat as follows:
  - Perform extraction and gradation analysis by taking 6 in (150 mm) cores from typical, visually unacceptable segregated areas.
  - Determine the corrective work according to [Subsection 400.3.06.E.3](#).
- b. Require the Contractor to submit a written plan of measures and actions to prevent further segregation. Work will not continue until the plan is submitted to and approved by the Department.
- c. When work resumes, place a test section not to exceed 500 tons (500 Mg) of the affected mixture for the Department to evaluate. If a few loads show that corrective actions were not adequate, follow the measures above beginning with step 1.a. above. If the problem is solved, Work may continue.

### 2. Unacceptable Segregation Suspected

When the Engineer observes segregation in the finished mat and suspects that it may be unacceptable, follow these measures:

- a. Allow work to continue at Contractor's risk.
- b. Require Contractor to immediately and continually adjust operation until the visually apparent segregated areas are eliminated from the finished mat. The Department will immediately investigate to determine the severity of the apparent segregation as follows:
  - Take 6 in (150 mm) cores from typical areas of suspect segregation.
  - Test the cores for compliance with the mixture control tolerances in [Section 828](#).

When these tolerances are exceeded, suspend work for corrective action as outlined in [Subsection 400.3.06.E.3](#).

### 3. Corrective Work

- a. Remove and replace (at the Contractor's expense) any segregated area where the gradation on the control sieves is found to vary 10 percent or more from the approved job mix formula, the asphalt cement varies 1.0% or more from the approved job mix formula, or if in-place air voids exceed 13.5% based on [GDT 39](#). The control sieves for each mix type are shown in [Subsection 400.5.01.B "Determine Lot Acceptance."](#)
- b. Subsurface mixes. For subsurface mixes, limit removal and replacement to the full lane width and no less than 10 ft. (3 m) long and as approved by the Engineer.
- c. Surface Mixes. For surface mixes, ensure that removal and replacement is not less than the full width of the affected lane and no less than the length of the affected areas as determined by the Engineer.

Surface tolerance requirements apply to the corrected areas for both subsurface and surface mixes.

## 400.3.07 Contractor Warranty and Maintenance

### A. Contractor's Record

Maintain a dated, written record of the most recent plant calibration. Keep this record available for the Engineer's inspection at all times. Maintain records in the form of:

- Graphs
- Tables
- Charts

## Section 400—Hot Mix Asphaltic Concrete Construction

- Mechanically prepared data

### 400.4 Measurement

This item will not be measured separately.

Thickness and spread rate tolerances for the various mixtures are specified in [Subsection 400.4.A.2.b, Table 11, Thickness and Spread Rate Tolerance at Any Given Location](#). These tolerances are applied as outlined below:

#### A. Hot Mix Asphaltic Concrete

##### 2. Plans Designate a Spread Rate

- Thickness Determinations. Thickness determinations are not required when the Plans designate a spread rate per square yard (meter).

If the spread rate exceeds the upper limits outlined in the [Subsection 400.4.A.2.b, Table 11, “Thickness and Spread Rate Tolerance at Any Given Location”](#), the mix in excess will not be paid for.

If the rate of spread is less than the lower limit, correct the deficient course by overlaying the entire lot.

The mixture used for correcting deficient areas is paid for at the Contract Unit Price of the course being corrected and is subject to the [Mixture Acceptance Schedule—Table 9 or 10](#).

- Recalculate the Total Spread Rate. After the deficient hot mix course has been corrected, the total spread rate for that lot is recalculated, and mix in excess of the upper tolerance limit as outlined in the [Subsection 400.4.A.2.b, Table 11, “Thickness and Spread Rate Tolerance at Any Given Location”](#) is not paid for.

The quantity of material placed on irregular areas such as driveways, turnouts, intersections, feather edge section, etc., is deducted from the final spread determination for each lot.

##### 2. Plans Designate Thickness

If the average thickness exceeds the tolerances specified in the [Subsection 400.4.A.2.b, Table 11, “Thickness and Spread Rate Tolerance at Any Given Location”](#), the Engineer shall take cores to determine the area of excess thickness. Excess quantity will not be paid for.

If the average thickness is deficient by more than the tolerances specified in the Thickness and Spread Rate Tolerance at Any Given Location table below, the Engineer shall take additional cores to determine the area of deficient thickness. Correct areas with thickness deficiencies as follows:

- Overlay the deficient area with the same mixture type being corrected or with an approved surface mixture. The overlay shall extend for a minimum of 300 ft (90 m) for the full width of the course.
- Ensure that the corrected surface course complies with [Subsection 400.3.06.C.1, “Visual and Straightedge Inspection.”](#) The mixture required to correct a deficient area is paid for at the Contract Unit Price of the course being corrected.

The mixture is subject to the [Mixture Acceptance Schedule—Table 9 or 10](#). The quantity of the additional mixture shall not exceed the required calculated quantity used to increase the average thickness of the overlaid section to the maximum tolerance allowed under the following table.

**Table 11—Thickness and Spread Rate Tolerance at Any Given Location**

Course	Thickness Specified	Spread Rate Specified
Asphaltic concrete base course	± 0.5 in (±13 mm)	+40 lbs, -50 lbs (+20 kg, -30 kg)
Intermediate and/or wearing course	± 0.25 in (± 6 mm)	+20 lbs, -25 lbs (+10 kg, -15 kg)
Overall of any combination of 1 and 2	± 0.5 in (±13 mm)	+40 lbs, -50 lbs (+20 kg, -30 kg)

**Note 1: For asphaltic concrete 9.5 mm OGFC and 12.5 mm OGFC, control the spread rate per lot within 5 lbs/yd<sup>2</sup> (3 kg/m<sup>2</sup>) of the designated spread rate. For asphaltic concrete 12.5 mm PEM, control the spread rate per lot within 10 lbs/yd<sup>2</sup> (6 kg/m<sup>2</sup>) of the designated spread rate.**

**Note 2: Thickness and spread rate tolerances are provided to allow normal variations within a given lot. Do not continuously operate at a thickness of spread rate not specified.**

When the Plans specify a thickness, the Engineer may take as many cores as necessary to determine the average thickness of the intermediate or surface course. The Engineer shall take a minimum of one core per 1,000 ft (300 m) per two lanes of roadway. Thickness will be determined by average measurements of each core according to [GDT 42](#).

If the average exceeds the tolerances specified in the [Subsection 400.4.A.2.b, Table 11, “Thickness and Spread Rate Tolerance at Any Given Location”](#), additional cores will be taken to determine the area of excess thickness and excess tonnage will not be paid for.

**B. Hot Mix Asphaltic Concrete Paid for by Square Yard (Meter)**

3. The thickness of the base course or the intermediate or surface course will be determined by the Department by cutting cores and the thickness will be determined by averaging the measurements of each core.
2. If any measurement is deficient in thickness more than the tolerances given in the table above, additional cores will be taken by the Department to determine the area of thickness deficiency. Correct thickness deficiency areas as follows:
  - h. Overlay the deficient area with the same type mixtures being corrected or with surface mixture. Extend the overlay at least 300 ft (90 m) for the full width of the course.
  - i. Ensure that the corrected surface course complies with [Subsection 400.3.06.C.1, Visual and Straightedge Inspection](#) .
  - j. The mixture is subject to the [Mixture Acceptance Schedule—Table 9 or 10](#).
3. No extra payment is made for mixtures used for correction.
4. No extra payment is made for thickness in excess of that specified.

**NOTE: Thickness tolerances are provided to allow normal variations within a given lot. Do not continuously operate at a thickness not specified.**

**C. Asphaltic Concrete**

Hot mix asphaltic concrete, complete in place and accepted, is measured in tons (megagrams) or square yards (meters) as indicated in the Proposal. If payment is by the ton (megagram), the actual weight is determined by weighing each loaded vehicle on the required motor truck scale as the material is hauled to the roadway, or by using recorded weights if a digital recording device is used.

The weight measured includes all materials. No deductions are made for the weight of the individual ingredients. The actual weight is the pay weight except when the aggregates used have a combined bulk specific gravity greater than 2.75. In this case the pay weight is determined according to the following formula:

$$T1 = T \times \left\{ \frac{\% AC + \left( \frac{\% Aggregate \times 2.75}{combined\ bulk\ Specific\ Gravity} \right) + \% Y}{100} \right\}$$

Where:

T1	Pay weight, tonnage (Mg)
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## Section 400—Hot Mix Asphaltic Concrete Construction

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T=	Actual weight
% AC=	Percent asphalt cement by weight of total mixture
% Aggregate =	Percent aggregate by weight of total mixture
Combined Bulk Sp. Gr.=	Calculated combined bulk specific gravity of various mineral aggregates used in the mixture
% Y=	Percent hydrated lime by weight of mineral aggregate

### D. Bituminous Material

Bituminous material is not measured for separate payment.

### E. Hydrated Lime

When hydrated lime is used as an anti-stripping additive, it is not measured for separate payment.

### F. Field Laboratory

The field laboratory required in this Specification is not measured for separate payment.

### G. Asphaltic Concrete Leveling

Hot mix asphaltic concrete leveling will not be measured separately, regardless of the type mix. Includes furnishing materials, bituminous materials, and hydrated lime (when required) for patching and repair of minor defects, surface preparation, cleaning, hauling, mixing, spreading, and rolling.

Mixture for leveling courses is subject to the acceptance schedule as stated in [Subsection 400.3.06.A](#) and [Subsection 400.3.06.B](#).

### H. Asphaltic Concrete Patching

Hot mix asphaltic concrete patching will not be measured separately, regardless of the type mix. Includes:

- Furnishing materials such as bituminous material and hydrated lime (when required)
- Preparing surface to be patched
- Cutting areas to be patched, trimmed, and cleaned
- Hauling, mixing, placing, and compacting the materials

#### 400.4.01 Limits

When the asphaltic concrete is paid for by the square yard (meter) and multiple lifts are used, the number and thickness of the lifts are subject to the Engineer's approval and are used to prorate the pay factor for the affected roadway section.

### 400.5 Payment

This item will be paid for under CONSTRUCTION COMPLETE.

Where "Contract Price" or "Contract Unit Price" are mentioned in this specification, the "Assumed Contract Unit Price" (see below) will be used. When materials or construction are not within the tolerances in this Specification, the "Assumed Contract Unit Price" (see below) will be used and adjustments will be made according to [Subsection 106.03, "Samples, Tests, Cited Specifications"](#) and [Subsection 400.3.06, "Quality Acceptance."](#)

Includes furnishing and placing materials including asphalt cement, hydrated lime when required, approved additives, and for cleaning and repairing, preparing surfaces, hauling, mixing, spreading, rolling, and performing other operations to complete the Contract Item.

## Section 400—Hot Mix Asphaltic Concrete Construction

### 400.5.01 Adjustments

#### A. Materials Produced and Placed During the Adjustment Period

An adjustment period is allowed at the start of mixing operations for each type of mix placed on the Contract except for Asphaltic Concrete OGFC or PEM. The adjustment period is provided to adjust or correct the mix and to establish the construction procedures and sequence of operations.

The adjustment period consists of the tons (megagrams) of the affected mix produced and placed on the first day of operation. If this quantity is less than 500 tons (500 Mg), the Engineer may combine the tons (megagrams) produced and placed on the first day of operation with the tons (megagrams) produced and placed on the next production day of the affected mix for the adjustment period.

The material produced and placed during the mixture adjustment period is one lot. If the mix is adjusted during this period, a new lot may be necessary, but a new adjustment period will not be permitted.

This material shall be paid for at 100 percent of the Contract Unit Price provided it meets the minimum requirements for a 1.00 pay factor for asphalt cement content and a 0.90 pay factor for gradation in the [Mixture Acceptance Schedule—Table 9 or 10](#).

If the material placed during the adjustment period fails to meet the above requirements, it will be paid for using the applicable acceptance schedule. However, when mixture used for leveling at a spread rate of 90 lbs/yd<sup>2</sup> (50 kg/m<sup>2</sup>) or less is also used for the surface mix at a spread rate greater than 90 lbs/yd<sup>2</sup> (50 kg/m<sup>2</sup>), an additional adjustment period will be allowed for compaction only. This material will be paid for at a 1.00 pay factor provided it:

- Meets the minimum requirements for a 1.00 pay factor in the Mixture Acceptance Schedule—Table 9 or 10 for both asphalt content and gradation.
- Meets the minimum requirements for a 0.90 pay factor in Table 12 of [Subsection 400.5.01C, “Calculate Mean Pavement Air Voids.”](#)

Mixture which does not meet these requirements shall be paid for using the applicable acceptance schedule.

#### B. Determine Lot Acceptance

Pay factor adjustments are based on control sieves and asphalt cement content. The control sieves used in the mixture acceptance schedule for the various types of mix are indicated below:

Control Sieves Used in the Mixture Acceptance Schedule	
Asphaltic concrete 25 mm Superpave	1/2 in., No. 8 (12.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 19 mm SMA	1/2 in., No. 8 (12.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 19 mm Superpave	3/8 in., No. 8 (9.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 12.5 mm Superpave	3/8 in., No. 8 (9.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 12.5 mm SMA	3/8 in., No. 8 (9.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 12.5 mm PEM	3/8 in., No. 8 (9.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 12.5 mm OGFC	3/8 in., No. 8 (9.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 9.5 mm Superpave	No. 4, No. 8 (4.75 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 9.5 mm SMA	No. 4, No. 8 (4.75 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 9.5 mm OGFC	No. 4, No. 8 (4.75 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 4.75 mm Mix	No. 8 (2.36 mm) sieve and asphalt cement

For projects which do not have milling quantities established as a Pay Item, the Department will pay for 12.5 mm OGFC and PEM placed on ramps and end of project transitions under the appropriate mixture pay item, but the mix shall be subject to the same gradation and control sieve requirements as asphaltic concrete 9.5 mm OGFC. Add polymer-modified bituminous material, hydrated lime, and stabilizing fiber to this mix.

## Section 400—Hot Mix Asphaltic Concrete Construction

The Department will perform the following tasks:

4. Using the [Mixture Acceptance Schedule—Table 9 or 10](#), determine the mean of the deviations from the job mix formula per test results per lot.
2. Determine this mean by averaging the actual numeric value of the individual deviations from the job mix formula; disregard whether the deviations are positive or negative amounts.
3. Use the Asphalt Cement Content and Aggregate Gradation of Asphalt Concrete [Mixture Acceptance Schedule—Table 9](#) to determine acceptance of surface mixes and the [Mixture Acceptance Schedule—Table 10](#) to determine acceptance of subsurface mixes.

On Contracts involving 1,000 tons (1000 Mg) or less of asphaltic concrete, the mixture is accepted for 100 percent payment of the asphaltic concrete Unit Price provided it meets the following:

5. Minimum requirements for a 1.00 pay factor for asphalt cement content and a 0.90 pay factor for gradation in the applicable [Mixture Acceptance Schedule—Table 9 or 10](#).
6. Minimum requirements for a 0.90 pay factor in Table 12 of [Subsection 400.5.01C, “Calculate Pavement Mean Air Voids](#).

If the material placed on Contracts involving 1,000 tons (1000 Mg) or less of asphaltic concrete does not meet the above requirements, the material will be paid for using the applicable acceptance schedule.

### C. Calculate Pavement Mean Air Voids

The Department will determine the percent of maximum air voids for each lot by dividing the pavement mean air voids by the maximum pavement mean air voids acceptable.

The Department will determine the payment for each lot by multiplying the Contract Unit Price by the adjusted pay factor shown in the following Air Voids Acceptance schedule:

**Table 12 - Air Voids Acceptance Schedule**

Pay Factor	Percent of Maximum Air Voids (Lot Average of Tests)	Percent of Maximum Air Voids (Lot Average all Tests) (for Reevaluations)
1.00	≤100	≤100
0.97	100.1 — 105	100.1 — 104
0.95	105.1 — 112	104.1 — 109
0.90	112.1 — 124	109.1 — 118
0.80	124.1 — 149	118.1 — 136
0.70	149.1 — 172	136.1 — 153
0.50	172.1 — 191	153.1 — 166

When the range tolerance is exceeded, the Department will apply a pay factor of 0.95 as described in [Subsection 400.3.06.B.2](#).

### D. Asphaltic Concrete For Temporary Detours

Hot mix asphaltic concrete placed on temporary detours that will not remain in place as part of the permanent pavement does not require hydrated lime. Hot mix used for this purpose is paid for at an adjusted Contract Price.

Where the Contract Price of the asphaltic concrete for permanent pavement is let by the ton (megagram), the Contract Price for the asphaltic concrete placed on temporary detours is adjusted by subtracting \$0.75/ton (\$0.85/mg) of mix used.

Where the Contract price of the mix in the permanent pavement is based on the square yard (meter), obtain the adjusted price for the same mix used on the temporary detour by subtracting \$0.04/yd<sup>2</sup> (\$0.05/ m<sup>2</sup>) per 1-in (25-mm) plan depth.

Further price adjustments required in [Subsection 400.3.06, “Quality Acceptance.”](#) are based on the appropriate adjusted Contract Price for mix used in the temporary detour work.

## Section 400—Hot Mix Asphaltic Concrete Construction

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### E. Determine Lot Payment

Determine the lot payment as follows:

7. When one of the pay factors for a specific acceptance lot is less than 1.0, determine the payment for the lot by multiplying the Contract Unit Price by the adjusted pay factor.
2. When two or more pay factors for a specific acceptance lot are less than 1.0, determine the adjusted payment by multiplying the Contract Unit Price by the lowest pay factor.

If the mean of the deviations from the job mix formula of the tests for a sieve or asphalt cement content exceeds the tolerances established in the [Mixture Acceptance Schedule—Table 9 or 10](#) and if the Engineer determines that the material need not be removed and replaced, the lot may be accepted at an adjusted unit price as determined by the Engineer. If the pavement mean air voids exceed the tolerances established in the [Air Voids Acceptance Schedule – Table 12](#), remove and replace the materials at the Contractor’s expense.

If the Engineer determines that the material is not acceptable to leave in place, remove and replace the materials at the Contractor’s expense.

### F. Asphalt Cement Price Adjustment

1. **Formula:** The Asphalt Cement Price Adjustment will be computed on a *monthly* basis in accordance with the following:

PA = Price Adjustment.

APM= the “Monthly Asphalt Cement Price” for the month the hot mix asphalt is placed.

APL = the “Monthly Asphalt Cement Price” for the month which the project was let.

TMT = Total Monthly Tonnage of asphalt cement computed by the Engineer based on the Hot Mix Asphaltic Concrete of the various types per ton (megagram) certified for payment.

- a. If the asphalt cement price for the month is *greater* than the asphalt cement price for the month in which the project was let:

$$PA = [((APM-APL)/APL) - 0.05] \times TMT \times APL$$

- b. If the asphalt cement price for the month is *less* than the asphalt cement price for the month in which the project was let:

$$PA = [((APM-APL)/APL) + 0.05] \times TMT \times APL$$

2. **Price Adjustment “Triggers”:** No price adjustment shall be made on any hot mix asphalt placed on projects with an original Contract Time of less than 366 Calendar Days. A price adjustment shall not be made until the APM is greater than 5% above or below the APL.
3. **“Monthly Asphalt Cement Price”:** The Department will determine and publish a “Monthly Asphalt Cement Price” based on the following formulas:

$$\text{Monthly Asphalt Cement Price} = (50\% \times \text{NBAP}) + (50\% \times \text{LBAP});$$

Where;

NBAP = “National Base Asphalt Price”, (in dollars/ton) is calculated based on arithmetic average of the previous four weeks “Posted Prices Asphalt Cement” for the “East Coast Market – GA/FL” as listed in the “ASPHALT WEEKLY MONITOR®” published by “Poten and Partners” or at [www.poten.com](http://www.poten.com).

LBAP = “Local Base Asphalt Price”, (in dollars/ton) is based on the arithmetic average posted price of PG asphalt cement as specified in Section 820, from the Department’s monthly survey obtained from approved asphalt cement suppliers of bituminous materials to the Department projects F.O.B. the suppliers terminal. However, the highest price and the lowest price are excluded from the calculation of average price, LBAP.

**Section 400—Hot Mix Asphaltic Concrete Construction**

4. **“Asphalt Cement Quantity Calculation”**: The calculation of asphalt cement quantity for each mix type will be based on the asphalt cement content (AC %) of the approved Job Mix Formula (JMF) as specified in Subsection 400.1.03.C. The following calculation formula will be used to determine asphalt cement quantity:

Asphalt Cement Quantity = Hot Mix Asphaltic Concrete monthly total in tons (megagrams) per mix type certified for the payment x AC (%)

The Total Monthly Tonnage (TMT) of asphalt cement computed by the Engineer will be calculated as follows:

TMT = Sum of all asphalt cement quantities, including polymer modified asphalt binder and non-modified asphalt cement, based on the Hot Mix Asphaltic Concrete of the various mix types per ton (megagram) certified for payment.

Asphalt Cement Price for the Month (APM) will be adjusted monthly. Price adjustments (PA) will be made monthly and all calculations for Price Adjustments shall be performed by the Engineer as specified in SOP-39 “Determination of Asphalt Cement Index and Asphalt Cement Price Adjustment”.

5. **“Other Restrictions”**:
- a. No asphalt cement price adjustment will be made for cut-back, tack-coat or emulsified asphalt.
  - b. No asphalt cement price adjustment will be made for asphalt cement for surface-treatment projects.
  - c. There is a cap of 75% above the APL for any price adjustment.
  - d. Unless specifically provided for by Supplemental Agreement or Contract Amendment, no further asphalt cement price adjustment will be made after *the original Contract Time has expired*. Irrespective of any other provision in the contract, for purposes of this specification, “Contract Time” does not include any time extensions or Supplemental Agreements which affect the completion of the Contract. The Asphalt Cement Price Adjustment for any hot mix asphalt placed after the original Contract Time expires will be computed based on the Monthly Asphalt Cement Price at the time the Contract Time has expired, or the Monthly Asphalt Cement Price at the time the Contract was let, *whichever is less*.

**G. Assumed Contract Unit Price.**

The following prices shall be used in adjustment calculations where a Contract Unit Price is referenced.

Material	Assumed Unit Price/Ton
Asphaltic Concrete Leveling	\$75.00
OGFC	\$86.00
Asphaltic Concrete 12.5 mm Superpave	\$71.00
Asphaltic Concrete 19 mm Superpave	\$80.00
Asphaltic Concrete 25 mm Superpave	\$83.00

First Use Date 2001 Specification: November 18, 2005

Revised: August 9, 2006

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Revised: March 5, 2007

## DEPARTMENT OF TRANSPORTATION

### STATE OF GEORGIA

#### Special Provision

#### Section 402—Hot Mix Recycled Asphaltic Concrete

*Delete Subsection 402.4 and 402.5 and substitute the following:*

#### **402.4 Measurement and Payment**

The work performed and the materials furnished as described in this Specification will not be measured separately.

Where “Contract Price” or “Contract Unit Price” are mentioned in this specification, the “Assumed Contract Unit Price” (see below) will be used.

Work and materials will be paid for under CONSTRUCTION COMPLETE. Includes providing materials, hauling and necessary crushing, processing, placing, rolling and finishing the recycled mixture, and providing labor, tools, equipment, and incidentals necessary to complete the work, including hauling and stockpiling RAP or RAS material.

Asphalt Cement Price Adjustment payment or deductions will be made under:

Item No. 402	Asphalt Cement Price Adjustment	\$ (+/-)
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#### **402.5.01 Adjustments**

##### **A. Materials Produced and Placed During the Adjustment Period**

An adjustment period is allowed at the start of mixing operations for each type of mix placed on the Contract. The adjustment period is provided to adjust or correct the mix and to establish the construction procedures and sequence of operations.

The adjustment period consists of the tons (megagrams) of the affected mix produced and placed on the first day of operation. If this quantity is less than 500 tons (500 Mg), the Engineer may combine the tons (megagrams) produced and placed on the first day of operation with the tons (megagrams) produced and placed on the next production day of the affected mix for the adjustment period.

The material produced and placed during the mixture adjustment period is one lot. If the mix is adjusted during this period, a new lot may be necessary, but a new adjustment period will not be permitted.

This material shall be paid for at 100 percent of the Contract Unit Price provided it meets the minimum requirements for a 1.00 pay factor for asphalt cement content and a 0.90 pay factor for gradation in the Mixture Acceptance Schedule—Table 9 or 10 of Subsection 400.3.06.

If the material placed during the adjustment period fails to meet the above requirements, it will be paid for using the applicable acceptance schedule. However, when mixture used for leveling at a spread rate of 90 lbs/yd<sup>2</sup> (50 kg/m<sup>2</sup>) or less is also used for the surface mix at a spread rate greater than 90 lbs/yd<sup>2</sup> (50 kg/m<sup>2</sup>), an additional adjustment period will be allowed for compaction only. This material will be paid for at a 1.00 pay factor provided it:

- Meets the minimum requirements for a 1.00 pay factor in the Mixture Acceptance Schedule—Table 9 or 10 of Subsection 400.3.06 for both asphalt content and gradation.
- Meets the minimum requirements for a 0.90 pay factor in Table 12 of Subsection 402.5.01.C, "Calculate Mean Pavement Air Voids".

Mixture which does not meet these requirements shall be paid for using the applicable acceptance schedule.

**B. Determine Lot Acceptance**

Pay factor adjustments are based on control sieves and asphalt cement content. The control sieves used in the mixture acceptance schedule for the various types of mix are indicated below:

<b>Control Sieves Used in the Mixture Acceptance Schedule</b>	
Asphaltic concrete 25 mm Superpave	1/2 in., No. 8 (12.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 19 mm Superpave	3/8 in., No. 8 (9.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 12.5 mm Superpave	3/8 in., No. 8 (9.5 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 9.5 mm Superpave	No. 4, No. 8 (4.75 mm, 2.36 mm) sieves and asphalt cement
Asphaltic concrete 4.75 mm Mix	No. 8 (2.36 mm) sieve and asphalt cement

The Department will perform the following tasks:

1. Using the Mixture Acceptance Schedule—Table 9 or 10, of Subsection 400.3.06 to determine the mean of the deviations from the job mix formula per test results per lot.
2. Determine this mean by averaging the actual numeric value of the individual deviations from the job mix formula; disregard whether the deviations are positive or negative amounts.
3. Use the Asphalt Cement Content and Aggregate Gradation of Asphalt Concrete Mixture Acceptance Schedule—Table 9 of Subsection 400.3.06 to determine acceptance of surface mixes and the Mixture Acceptance Schedule—Table 10 of Subsection 400.3.06 to determine acceptance of subsurface mixes.

On Contracts involving 1,000 tons (1000 Mg) or less of asphaltic concrete, the mixture is accepted for 100 percent payment of the asphaltic concrete Unit Price provided it meets the following:

1. Minimum requirements for a 1.00 pay factor for asphalt cement content and a 0.90 pay factor for gradation in the applicable Mixture Acceptance Schedule—Table 9 or 10 of Subsection 400.3.06.
2. Minimum requirements for a 0.90 pay factor in Table 12 of Subsection 402.5.01.C, "Calculate Pavement Mean Air Voids".

If the material placed on Contracts involving 1,000 tons (1000 Mg) or less of asphaltic concrete does not meet the above requirements, the material will be paid for using the applicable acceptance schedule.

**C. Calculate Pavement Mean Air Voids**

The Department will determine the percent of maximum air voids for each lot by dividing the pavement mean air voids by the maximum pavement mean air voids acceptable.

The Department will determine the payment for each lot by multiplying the Contract Unit Price by the adjusted pay factor shown in the following Air Voids Acceptance schedule:

**Table 12 - Air Voids Acceptance Schedule**

Pay Factor	Percent of Maximum Air Voids (Lot Average of Tests)	Percent of Maximum Air Voids (Lot Average all Tests) (for Reevaluations)
1.00	≤100	≤100
0.97	100.1 — 105	100.1 — 104
0.95	105.1 — 112	104.1 — 109
0.90	112.1 — 124	109.1 — 118
0.80	124.1 — 149	118.1 — 136
0.70	149.1 — 172	136.1 — 153
0.50	172.1 — 191	153.1 — 166

When the range tolerance is exceeded, the Department will apply a pay factor of 0.95 as described in Subsection 400.3.06.B.2.

**D. Asphaltic Concrete For Temporary Detours**

Hot mix asphaltic concrete placed on temporary detours that will not remain in place as part of the permanent pavement does not require hydrated lime. Hot mix used for this purpose is paid for at an adjusted Contract Price.

Where the Contract Price of the asphaltic concrete for permanent pavement is let by the ton (megagram), the Contract Price for the asphaltic concrete placed on temporary detours is adjusted by subtracting \$0.75/ton (\$0.85/mg) of mix used.

Where the Contract price of the mix in the permanent pavement is based on the square yard (meter), obtain the adjusted price for the same mix used on the temporary detour by subtracting \$0.04/yd<sup>2</sup> (\$0.05/ m<sup>2</sup>) per 1-in (25-mm) plan depth.

Further price adjustments required in Subsection 400.3.06, "Quality Acceptance." are based on the appropriate adjusted Contract Price for mix used in the temporary detour work.

**E. Determine Lot Payment**

Determine the lot payment as follows:

1. When one of the pay factors for a specific acceptance lot is less than 1.0, determine the payment for the lot by multiplying the Contract Unit Price by the adjusted pay factor.
2. When two or more pay factors for a specific acceptance lot are less than 1.0, determine the adjusted payment by multiplying the Contract Unit Price by the lowest pay factor.

If the mean of the deviations from the job mix formula of the tests for a sieve or asphalt cement content exceeds the tolerances established in the Mixture Acceptance Schedule—Table 9 or 10 of Subsection 400.3.06 and if the Engineer determines that the material need not be removed and replaced, the lot may be accepted at an adjusted unit price as determined by the Engineer. If the pavement mean air voids exceed the tolerances established in the Air Voids Acceptance Schedule – Table 12 Subsection 402.5.01.C, remove and replace the materials at the Contractor's expense.

If the Engineer determines that the material is not acceptable to leave in place, remove and replace the materials at the Contractor's expense.



**F. Asphalt Cement Price Adjustment**

1. **Formula:** The Asphalt Cement Price Adjustment will be computed on a *monthly* basis in accordance with the following:

PA = Price Adjustment.

APM= the “Monthly Asphalt Cement Price” for the month the hot mix asphalt is placed.

APL = the “Monthly Asphalt Cement Price” for the month which the project was let.

TMT = Total Monthly Tonnage of asphalt cement computed by the Engineer based on the Hot Mix Asphaltic Concrete of the various types per ton (megagram) certified for payment.

- a. If the asphalt cement price for the month is *greater* than the asphalt cement price for the month in which the project was let:

$$PA = [((APM-APL)/APL) - 0.05] \times TMT \times APL$$

- b. If the asphalt cement price for the month is *less* than the asphalt cement price for the month in which the project was let:

$$PA = [((APM-APL)/APL) + 0.05] \times TMT \times APL$$

2. **Price Adjustment Triggers:** No price adjustment shall be made on any hot mix asphalt placed on projects with less than 366 calendar days from the Contract Letting Date to the specified Completion Date. If the Original Contract contains 366 calendar days or more the Price Adjustment Trigger shall be made for any hot mix asphalt placed from the Contract Letting Date to the specified Completion Date. A price adjustment shall not be made until the APM is greater than 5% above or below the APL.

3. **“Monthly Asphalt Cement Price”:** The Department will determine and publish a “Monthly Asphalt Cement Price” based on the following formulas:

$$\text{Monthly Asphalt Cement Price} = (50\% \times \text{NBAP}) + (50\% \times \text{LBAP});$$

Where;

NBAP = “National Base Asphalt Price”, (in dollars/ton) is calculated based on arithmetic average of the previous four weeks “Posted Prices Asphalt Cement” for the “East Coast Market – GA/FL” as listed in the “ASPHALT WEEKLY MONITOR®” published by “Poten and Partners” or at [www.poten.com](http://www.poten.com).

LBAP = “Local Base Asphalt Price”, (in dollars/ton) is based on the arithmetic average posted price of PG asphalt cement as specified in Section 820, from the Department’s monthly survey obtained from approved asphalt cement suppliers of bituminous materials to the Department projects F.O.B. the suppliers terminal. However, the highest price and the lowest price are excluded from the calculation of average price, LBAP.

4. **“Asphalt Cement Quantity Calculation”:** The calculation of asphalt cement quantity for each mix type will be based on the asphalt cement content (*AC %*) of the approved Job Mix Formula (JMF) as specified in Subsection 400.1.03.C. The following calculation formula will be used to determine asphalt cement quantity:

$$\text{Asphalt Cement Quantity} = \text{Hot Mix Asphaltic Concrete monthly total in tons (megagrams) per mix type certified for the payment} \times \text{AC } (\%)$$

The Total Monthly Tonnage (TMT) of asphalt cement computed by the Engineer will be calculated as follows:

TMT = Sum of all asphalt cement quantities, including polymer modified asphalt binder and non-modified asphalt cement, based on the Hot Mix Asphaltic Concrete of the various mix types per ton (megagram) certified for payment.

Asphalt Cement Price for the Month (APM) will be adjusted monthly. Price adjustments (PA) will be made monthly and all calculations for Price Adjustments shall be performed by the Engineer as specified in SOP-39 "Determination of Asphalt Cement Index and Asphalt Cement Price Adjustment".

5. **"Other Restrictions":**
  - a. No asphalt cement price adjustment will be made for cut-back, tack-coat or emulsified asphalt.
  - b. No asphalt cement price adjustment will be made for asphalt cement contained in surface-treatment (Pay Item-424).
  - c. There is a cap of 125% above the APL for any price adjustment.
  - d. Unless specifically provided for by Supplemental Agreement or Contract Amendment, no further asphalt cement price adjustment will be made after *the original Contract Time has expired*. Irrespective of any other provision in the contract, for purposes of this specification, "Contract Time" does not include any time extensions or Supplemental Agreements which affect the completion of the Contract. The Asphalt Cement Price Adjustment for any hot mix asphalt placed after the original Contract Time expires will be computed based on the Monthly Asphalt Cement Price at the time the Contract Time has expired, or the Monthly Asphalt Cement Price at the time the Contract was let, *whichever is less*.

**G. Assumed Contract Unit Price.**

The following prices shall be used in adjustment calculations where a Contract Unit Price is referenced.

Material	Assumed Unit Price/Ton
Asphaltic Concrete Leveling	\$75.00
OGFC	\$86.00
Asphaltic Concrete 12.5 mm Superpave	\$71.00
Asphaltic Concrete 19 mm Superpave	\$80.00
Asphaltic Concrete 25 mm Superpave	\$83.00

Office of Materials and Research

**Georgia Department of Transportation**

**State of Georgia**

**SUPPLEMENTAL SPECIFICATION**

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

**Section 432—Mill Asphaltic Concrete Pavement**

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*Delete Subsection 432.4 and Substitute the following:*

**432.4 Measurement**

This item will not be measured separately. Terms and definitions described in Subsection 109.01 “Measurement and Quantities” will be used.

**432.4.01 Limits**

General Provisions 101 through 150.

*Delete Subsection 432.5 and Substitute the following:*

**432.5 Payment**

This item will be paid under CONSTRUCTION COMPLETE. Included is any credit value of all Reclaimed Asphalt Pavement (RAP) recovered, and no adjustment will be considered for variations in the amount of RAP actually recovered.

Includes furnishing equipment, milling, hauling, stockpiling milled material, and satisfactorily performing the work.

**432.5.01 Adjustments**

General Provisions 101 through 150.

## GEORGIA DEPARTMENT OF TRANSPORTATION

### STATE OF GEORGIA

#### SUPPLEMENTAL SPECIFICATION

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

### Section 433—Reinforced Concrete Approach Slabs

---

*Delete Subsection 433.3 and substitute the following:*

#### **433.3 Construction Requirements**

##### **433.3.01 Personnel**

General Provisions 101 through 150.

##### **433.3.02 Equipment**

General Provisions 101 through 150.

##### **433.3.03 Preparation**

General Provisions 101 through 150.

##### **433.3.04 Fabrication**

General Provisions 101 through 150.

##### **433.3.05 Construction**

Construct the approach slab before placing the adjacent roadway paving, unless otherwise specified in the Plans.

##### **A. Approach Slabs**

Finish, cure, and protect the approach slabs as specified in [Subsection 500.3.05.Q](#), “Place Concrete” and [Subsection 500.3.05.Z.3](#), “Bridge Deck Curing.”

##### **B. Curbs**

Construct curbs of the dimensions required monolithic with the approach slab, when specified on the Plans. Place, finish, and cure the curb as specified in [Section 441](#).

##### **C. Barriers**

Construct and finish the barriers according to [Section 500](#), [Section 621](#) and Plan details. Use concrete that is Class A or better and proportioned and mixed according to [Section 500](#).

##### **D. Final Finish**

When the concrete has hardened and standing water and moisture sheen have disappeared, give the concrete a final finish, manually or mechanically, according to requirements in [Section 500](#) for bridge decks.

### **433.3.06 Quality Acceptance**

The riding quality of approach slabs will be tested with the Lightweight Profiler as part of the bridge deck according to [Subsection 500.3.06.E, "Ride Quality Test"](#).

### **433.3.07 Contractor Warranty and Maintenance**

General Provisions 101 through 150.

*Delete Subsection 433.4 and substitute the following:*

### **433.4 Measurement**

This item will not be measured separately. No deductions for areas with end posts and expansion joints.

#### **433.4.01 Limits**

Curbs, barriers, and reinforcing steel are not measured for payment, but their cost is included in the price bid for the CONSTRUCTION COMPLETE.

*Delete Subsection 433.5 and substitute the following:*

### **433.5 Payment**

This item will be paid for under CONSTRUCTION COMPLETE.

#### **433.5.01 Adjustments**

General Provisions 101 through 150.

## GEORGIA DEPARTMENT OF TRANSPORTATION

### STATE OF GEORGIA

#### SUPPLEMENTAL SPECIFICATION

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

#### Section 441—Miscellaneous Concrete

---

*Delete Subsection 441.3 and Substitute the following:*

#### **441.3 Construction Requirements**

##### **441.3.01 Personnel**

General Provisions 101 through 150.

##### **441.3.02 Equipment**

###### **A. Forms**

Forms are subject to the Engineer's approval. Use forms that are:

- Wood or metal that is readily available
- Straight and oiled before each use

Use metal divider plates and templates.

Use the slip form placement method when applicable. If the slip form method does not produce a product with the proper quality, shape, grade, or alignment, the Engineer may require using fixed forms.

###### **B. Weep Holes**

Provide weep hole drain pockets filled with coarse aggregate to use with weep hole drain pipe or formed openings according to the Plan details.

##### **441.3.03 Preparation**

Before placing the concrete, excavate for toe walls, edge walls, and weep hole drain pockets; place coarse aggregate in weep hole drain pockets; and grade, finish, and compact the subgrade surface. Use mechanical tamps for compaction if necessary.

##### **441.3.04 Fabrication**

General Provisions 101 through 150.

##### **441.3.05 Construction**

###### **A. Extent and Thickness of Pavement**

See the Plans to determine the areas to be paved and the dimensions.

Thicknesses are subject to a minus tolerance of 0.5 in (13 mm). Do not perform overlay pours.

## B. Preparation of Subgrade

Finish the subgrade for miscellaneous concrete to the line and grade on the Plans and the following:

1. Compact the subgrade to the same degree as the roadway on which it is placed. Compact the subgrade according to [Section 209](#).
2. If a Contract involves a Roadway and a Bridge Contractor, the Roadway Contractor shall complete the grading for the slope paving.  
The Bridge Contractor shall complete final grading, compacting, dressing, placing, and maintenance to the structures until completion.
3. When placing paving on the front slopes of ditches and shoulders, place any required special materials during the roadway construction.
4. Do not excavate for velocity dissipators, spillways, and slope drains below the foundation elevation. Do not excavate wider than necessary to provide working space or to remove soft, unsuitable material. Backfill with selected material.
5. When fitting spillways to concrete pavement, set the specified dowel bars into the pavement when it is laid. Use metal parting strips to hold the ends of dowels bent into the grooves.

## C. Concrete

### 1. Mixing

Mix Class B concrete as specified in [Section 500](#) with the following exceptions:

- a. Use of small capacity job-site batchers and one-bag mixers is allowed. The rate of concrete placement in [Subsection 500.3.05.P](#), "Meet the Minimum Placement Rates" is waived for miscellaneous concrete.
- b. Proportion concrete ingredients volumetrically if the Engineer has approved equipment calibration and operation and the operator is certified by the Office of Materials and Research.

### 2. Placing and Finishing

Place and finish concrete as follows:

- a. Deposit concrete within forms or against other pavements on a compacted and wetted subgrade to the depth to produce the specified thickness.

<b>NOTE: Do not place concrete on a muddy or frozen surface.</b>
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- b. Vibrate the headwalls.
- c. Strike off the concrete to a plane surface and finish it with a Type IV or Type V finish as defined in [Subsection 500.3.05.AB](#), "Finish Concrete" and complete the following:
  - 1) **Concrete Slope Paving.** Give a final finish with a stiff-bristle broom. With the Engineer's approval, mechanically convey the concrete to the forms.
  - 2) **Concrete Sidewalks.** Give a Type V finish unless otherwise noted on the Plans. Test the surface with a 10 ft (3 m) straightedge laid parallel to the center line. Eliminate irregularities greater than 0.25 in (6 mm) per 10 ft (3 m) while the concrete is still plastic.  
Ensure that concrete sidewalk constructed as curb cut (wheelchair) ramps has a rough or textured finish.
  - 3) **Concrete Paved Ditches.** Ensure that the surface of the bottom and sides of paved ditches are uniform and true to grade and cross section.  
Ensure that straight-grade tangents do not deviate more than 1 in (25 mm) within 10 ft (3 m) when tested with a 10 ft (3 m) straightedge. Do not allow deviation if it reduces the ditch paving thickness, causes water to pond, or alters the direction of flow.  
Finish the ditch paving by floating with wood or metal floats to bring mortar to the surface to cover the coarse aggregate.  
Use reinforcing that conforms to Plan details if required.

- 4) **Concrete Curbs, Gutters, and Median.** Finish according to [Subsection 441.3.05.C.2, “Placing and Finishing.”](#) Remove face forms as soon as possible and finish the exposed surfaces with a wood float. Use a straightedge to test the edge of the gutter and top of the curb and median to conform to the requirements for the adjacent pavement. Irregularities shall not exceed 0.25 in (6 mm) in 10 ft (3 m). Place the curb and gutter using a machine as long as the results are satisfactory.
- 5) **Curb Cut Wheel chair Ramps.** Construct a Type A, B, C, or D ramp according to the Special Details in the Plans. Tie ramps into adjacent paved or unpaved sidewalk and use a rough or textured finish.

### 3. Joints

Follow these procedures to construct joints on slopes, ditches, sidewalks, and curbs, gutters, and medians.

#### a. Slope Paving

Place paving on slopes in horizontal or vertical courses, but not a mixture of both.

- 1) Construct horizontal courses approximately level and at least 3 ft (1m) but no more than 6 ft (1.8 m) wide measured along the slope.  
When needed, construct trapezoidal courses at the top and bottom to accommodate sloping berm and ditch line conditions.
- 2) Edge the paving at construction joints between courses with a 0.25 in (6 mm) radius tool.
- 3) Provide vertical contraction or construction joints spaced along the horizontal course at right angles to the horizontal construction joints at approximately 40 ft (12 m) intervals, in line not staggered.

No other vertical lines will be required in horizontal courses.

When using vertical contraction joints, cut them with a tool one-third the depth of the paving during the finishing operation. Edge the contraction joints the same as construction joints.

Vertical courses approximately equal and at least 3 ft (1 m) but no more than 5 ft (1.5 m) wide across the plane of the slope. The desired width is 4 ft (1.2 m). Horizontal lines are not required in vertical courses.

Separate slope paving from the masonry of structures, sidewalks, curbs, and rigid-type roadway pavements of preformed joint filler that are 0.5 in (13 mm) thick.

#### b. Concrete Paved Ditches

Form joints in concrete paved ditches as follows:

- 1) Space contraction joints at 30 ft (9 m) intervals.
- 2) Place expansion joints only where the paved ditch joins the roadway pavement or some other structure.
- 3) Do not use joint sealers for expansion or contraction joints.

#### c. Concrete Sidewalk

Form transverse contraction joints using a tool designed to form a groove one-third the depth of the sidewalk at intervals shown on the Plans.

Where sidewalks abut the curb and gutter, ensure that alternate joints coincide. Round the edges with a 0.25 in (6 mm) edger. Make expansion joints according to the materials, dimensions, and locations specified on the Plans.

#### d. Concrete Curbs, Gutters, and Medians

Form contraction joints or expansion joints on curbs, gutters, and medians.

- 1) **Contraction Joints.** Ensure that joints in curb, gutters, and medians are spaced the same as the joints in paving. Form joints by using metal divider plates or sawing them as in [Section 430](#).

Form joints at least one-fifth but not greater than one-fourth the depth of the concrete. Except for sawed joints, finish the joints with a 0.25 in (6 mm) edging tool.

For curbs, gutters, and medians adjacent to pavement other than concrete, contraction joints shall be as follows:

- For header curb and combination curb and gutter, install contraction joints spaced no more than 20 ft (6 m) apart.
- For gutter median, install a contraction joints spaced no more than 20 ft (6 m) apart.



- 2) **Expansion Joints.** Form expansion joints according to the Plan details or as directed. Ensure that they coincide with the expansion joints in the adjoining pavement or gutter.

Cut the joint fillers to the same cross section as the construction. Trim flush the material that protrudes after the concrete is finished.

When miscellaneous concrete items are not adjacent to concrete construction, provide expansion joints at an interval of at least 500 ft (150 m).

- e. **Curb Cut Wheelchair Ramps**

Locate and form expansion joints for curb cut wheelchair ramps according to the Special Details in the Plans for ramp Type A, B, C, or D.

4. **Curing**

Use curing methods specified in [Subsection 430.3.05.L](#), "Cure the Concrete." Ensure that the membrane curing compound is Type 2, if used. Pack honeycombed areas immediately after removing the forms.

#### **D. Backfilling**

Backfill the areas as soon as possible without damaging the work.

#### **E. Clean-Up**

When concrete work is complete, clean each surface. Protect the work from stains or other damage until Final Acceptance.

### **441.3.06 Quality Acceptance**

General Provisions 101 through 150.

### **441.3.07 Contractor Warranty and Maintenance**

General Provisions 101 through 150.

## **441.4 Measurement**

No separate measurement will be made for this item.

### **A. Concrete Slope Paving**

Includes concrete in toe or edge walls, excavation, backfill, weep holes, and aggregates.

### **B. Concrete Sidewalks**

Includes excavation and backfill.

### **C. Concrete Paved Ditches**

Includes reinforcing steel, excavation, preparation of subgrade including Type I backfill, forms, and concrete in toe or edge walls and Type II backfill.

### **D. Concrete Curbs, Gutter, Median, Pavement, and Combination Curb and Gutter**

Concrete doweled integral curb includes dowels.

### **E. Concrete Headwalls**

Includes headwalls and filler concrete.

**F. Concrete Spillways**

**G. Concrete Slope Drains**

**H. Velocity Dissipators**

**I. Concrete Driveways**

**J. Curb Cut Wheelchair Ramps**

Includes ramps and transitioned curb in front of ramps. No additional payment will be made for sawing existing sidewalk and removal and disposal of removed material for new ramp construction.

**441.4.01 Limits**

General Provisions 101 through 150.

**441.5 Payment**

This item will be paid under CONSTRUCTION COMPLETE.

**441.5.01 Adjustments**

General Provisions 101 through 150.

## GEORGIA DEPARTMENT OF TRANSPORTATION

### STATE OF GEORGIA

#### SUPPLEMENTAL SPECIFICATION

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

### Section 446—Placement of Pavement Reinforcement Fabric

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*Delete Section 446 and substitute the following:*

#### **446.1 General Description**

This work includes installing Type II pavement reinforcement fabric and high strength pavement reinforcement fabric over cracks, joints, and patches in existing pavement. Install the fabric in strips or full width before placing an overlay where shown on the Plans or as directed by the Engineer. Install high strength pavement reinforcement fabric on interstate projects.

##### **446.1.01 Definitions**

General Provisions 101 through 150.

##### **446.1.02 Related References**

###### **A. Standard Specifications**

[Section 150—Traffic Control](#)

[Section 400—Hot Mix Asphaltic Concrete Construction](#)

[Section 413—Bituminous Tack Coat](#)

[Section 881—Fabrics](#)

###### **B. Referenced Documents**

General Provisions 101 through 150.

##### **446.1.03 Submittals**

General Provisions 101 through 150.

#### **446.2 Materials**

Use the reinforcement fabric that meets the requirements of [Subsection 881.2.06](#).

Bituminous binder materials, when required, shall meet the requirements of [Section 413, “Bituminous Tack Coat”](#).

##### **446.2.01 Delivery, Storage, and Handling**

General Provisions 101 through 150.

### 446.3 Construction Requirements

#### 446.3.01 Personnel

General Provisions 101 through 150.

#### 446.3.02 Equipment

##### A. Template

When using fabric strips, use a template or other method satisfactory to the Engineer to apply the bituminous tack coat uniformly.

##### B. Mechanical Device

Use a mechanical device approved by the Engineer when placing the fabric full width on the pavement to ensure the fabric is placed smooth, free of wrinkles, and with no uplifted edges.

##### C. Roller

Place the fabric in total contact with the underlying pavement. Roll the fabric with a static drum or pneumatic roller to ensure adequate adhesion to the pavement surface.

#### 446.3.03 Preparation

Before an existing pavement surface is milled, mark the location of joints and cracks with an offset reference so that they can be located after milling has been completed.

##### A. Cleaning the Pavement

Immediately before applying the bituminous tack coat, clean the pavement surface to remove rocks, dirt, debris, and other materials that may prevent a clean bonding surface.

##### B. Repairing Potholes, Spalls, or Cracks

Before placing the fabric, repair potholes, spalls, or cracks greater than 3/16 in (5 mm) wide. Repair spalls and potholes using asphaltic concrete that meets the requirements of [Section 400](#) or other materials such as cold mixes approved by the Engineer.

Fill cracks with PG 64-22 asphalt cement or other materials approved by the Engineer.

#### 446.3.04 Fabrication

General Provisions 101 through 150.

#### 446.3.05 Construction

Do not install reinforcement fabric when ambient temperatures are less than 45 °F (7 °C).

Use a bituminous tack coat when temperatures are between 45°F (7 °C) and 70°F (21°C) for all reinforcement fabric types.

When ambient temperatures are a minimum of 70 °F (21 °C) and rising, reinforcement fabric with a self-adhesive backing may be installed at the Contractor's option without applying a bituminous tack coat except when the fabric is placed on a milled surface.

Use a bituminous tack coat when fabric is placed on a milled surface regardless of the temperature.

##### A. Applying Bituminous Binder

Use a bituminous tack coat to bond self-adhesive fabric to the pavement and apply the bituminous tack coat at a rate of 0.10 gal/yd<sup>2</sup> (0.45 L/m<sup>2</sup>) over non-milled surfaces and 0.20 gal/yd<sup>2</sup> (0.90 L/m<sup>2</sup>) over milled surfaces. Heat the bituminous tack coat and apply within a temperature range of 350 °F to 375 °F (175 °C to 190 °C).

Use bituminous tack coat to bond non-self-adhesive fabric to the pavement and apply at a rate of 0.10 gal/yd<sup>2</sup> (0.45 L/m<sup>2</sup>) over non-milled surfaces and 0.25 gal/yd<sup>2</sup> (1.13 L/m<sup>2</sup>) over milled surfaces. Heat the bituminous tack coat and apply within a temperature range of 350 °F to 375 °F (175 °C to 190 °C).

## Section 446—Placement of Pavement Reinforcement Fabric

---

Where using fabric strips, use a template or other method satisfactory to the Engineer to apply bituminous tack coat uniformly.

Do not allow the width of the bituminous tack coat applied to exceed the width of the fabric by more than 1 in (25 mm) on each side.

### B. Placing the Fabric

For self-adhesive reinforcement fabric, remove the release liner of the fabric and place the adhesive side to the pavement. Place self-adhesive reinforcement fabric no more than 24 hours in advance of the paving operation to ensure proper adhesion of the fabric to the pavement.

Place non-self-adhesive reinforcement fabric at least 1 hour but no more than 24 hours in advance of the paving operation to ensure proper adhesion of the fabric to the pavement. Place fabric on the pavement immediately after the bituminous tack coat has been applied to the pavement. Place the non-woven polyester side of the fabric on the pavement.

Install the fabric so that it is smooth, free of wrinkles with no uplifted edges. Provide a minimum of 5 in (125 mm) overlap on all sides of the repair area. Center the material over the repair area within a 2 in (50 mm) tolerance. When placed full width, use a mechanical device approved by the engineer to place the fabric on the pavement.

Immediately after the fabric is placed on the pavement, ensure that the fabric is in total contact with the underlying pavement. Roll the material with a static drum or pneumatic roller to ensure adequate adhesion to the pavement surface.

Any fabric with loose edges, corners or other improperly bonded areas shall be replaced at the expense of the Contractor prior to placement of the overlay or opening the fabric section to traffic.

### C. Overlapping Fabric.

If more than one strip of fabric is required to cover the repair area, the seams that are created shall be butt or lapped seams. When waterproofing is required, use lap seams with a minimum 2 in (50 mm) overlap. Make all lapped seams in the direction of the paving operation to prevent pickup by the paving train. The width of the fabric strips shall be shown on the plans.

Make joint overlaps to prevent pickup by the paving train that places the asphaltic concrete.

### D. Protecting Fabric

When full width fabric is used, schedule work so that the fabric will be covered with asphaltic concrete prior to reopening the section to traffic. Do not allow traffic, other than necessary construction equipment or emergency vehicles, on unprotected fabric. If approved by the Engineer, traffic will be allowed to use a section with applied fabric strips for a maximum of 7 days. Coordinate all activities to conform to this restriction. Replace any damaged fabric prior to paving at the Contractor's expense. When short-term pavement markings are required, the markings shall meet the requirements of [Section 150](#).

When in-place fabric is exposed to moisture prior to application of the overlay, make sure the fabric is completely dry before the overlay is placed.

If the fabric sticks to tires of trucks or paving equipment during the construction overlays, hot mix asphalt may be broadcast over the fabric for protection.

### E. Placing Overlay

Use an asphaltic concrete overlay that meets the requirements of [Section 400](#).

Prior to placement of the overlay, apply a bituminous tack coat over the fabric at a rate determined by the Engineer as described in [Subsection 400.3.03.A.3](#).

The minimum thickness of asphaltic concrete over the strip shall be 2 in (50 mm). Milling may be required to provide the minimum thickness.

When using a vibratory roller for compaction, avoid the use of excessive amplitude. The use of excessive amplitude during the compaction process may result in an undesirable riding surface.

## **Section 446—Placement of Pavement Reinforcement Fabric**

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### **446.3.06 Quality Acceptance**

General Provisions 101 through 150.

### **446.3.07 Contractor Warranty and Maintenance**

General Provisions 101 through 150.

## **446.4 Measurement**

This item shall not be measured separately. No allowance will be made for laps.

### **446.4.01 Limits**

General Provisions 101 through 150.

## **446.5 Payment**

Payment will be made under CONSTRUCTION COMPLETE

Includes cleaning the surface and furnishing and placing the pavement reinforcement fabric, all milling required to place the fabric and required traffic control.

### **446.5.01 Adjustments**

General Provisions 101 through 150.

**Georgia Department of Transportation**

**State of Georgia**

**Special Provision**

**PROJECT NO.: CSNHS-0008-00(232), TROUP COUNTY**

**P.I. NO.: 0008232**

**Section 500—Concrete Structures**

---

*Delete Subsection 500.1 and substitute the following:*

This work consists of manufacturing and using High Performance Portland cement concrete to construct precast-prestressed concrete bridge members as shown in the plans and using normal weight Portland cement concrete to construct structures as shown in the Plans.

*Add the following to Subsection 500.1.02.A:*

Section 831—Admixtures

*Add the following to Subsection 500.1.02.B:*

AASHTO T 277

*Add the following to Subsection 500.1.03.A:*

**High Performance Concrete Mix Designs**

The Fabricator is responsible for all concrete mix designs. Ensure that concrete mixes contain enough cement to produce workability within the water-cement ratio specified in Table 1A—High Performance Concrete Mix Table, below.

Submit a mix design for approval to the Office of Materials and Research. Include the sources and actual quantity of each ingredient and laboratory results that demonstrate the ability of the design to attain both the required compressive strength and chloride permeability at 56 days.

Include laboratory compressive strength test results of at least eight test cylinders prepared and cured according to AASHTO T 126. Ensure these test cylinders are made from two or more separate batches with an equal number of cylinders made from each batch.

Also include laboratory chloride permeability test results of at least two test specimens prepared and tested according to AASHTO T 277. Ensure these test specimens are made from two or more separate batches with an equal number of specimens made from each batch.

**Table 1A—High Performance Concrete Mix Table**

English									
Class of Concrete	Coarse Aggregate Size No.	(1) Minimum Cement Factor (lbs/yd <sup>3</sup> )	Maximum Water/Cement ratio (lbs/lbs)	(2) Slump Acceptance Limits (in) Lower-Upper		Entrained Air Acceptance Limits (%) Lower-Upper		(3) Minimum Compressive Strength at 56 days (psi)	Maximum Chloride Permeability at 56 days (Coulombs)
"AAA HPC"	67	650	.330	2	7	3.5	6.5	Beams – As shown on the Plans Piling – 5000	Beams – 3,000 Piling – 2,000
Metric									
Class of Concrete	Coarse Aggregate Size No.	(1) Minimum Cement Factor (kg/m <sup>3</sup> )	Maximum Water/Cement ratio (kg/kg)	(2) Slump acceptance Limits (mm) Lower-Upper		Entrained Air Acceptance Limits (%) Lower-Upper		(3) Minimum Compressive Strength at 56 days (MPa)	Maximum Chloride Permeability At 56 days (Coulombs)
"AAA HPC"	67	386	.330	50	180	3.5	6.5	Beams – As shown on the Plans Piling – 35	Beams – 3,000 Piling – 2,000

- Determine the slump acceptance after the addition of high-range water reducer.
- Determine the minimum compressive strength at 56 days using 4 in. diameter x 8 in. high (100 mm x 200 mm) cylinders.

Add the following to Subsection 500.2 Table 3:

Fly Ash	831.2.03.A.1
Silica Fume	831.2.03.A.4

Add the following note to Subsection 500.2 Table 3:

- Use Type I or III Portland cement in High Performance concrete. Do not use air-entraining cement.

Add the following to Subsection 500.3.04.D.4:

- For High Performance concrete, fly ash may be used as an additive at an addition rate not to exceed 15% of the cement by weight.

Add the following to Subsection 500.3.04.D:

- Silica Fume

Silica Fume may be used as an additive at an addition rate not to exceed 10% of the cement by weight.

Delete Subsection 500.5 and substitute with the following:

**500.5 Payment**

Payment will be made under CONSTRUCTION COMPLETE. Includes incidentals, and direct and indirect costs, to complete the Work.



## 500.5.01 Adjustments

### A. Contractor Costs

Assume the following costs:

1. Costs related to rejected concrete and removing rejected concrete
2. Costs of forming an approved construction joint, removing a partial pour, or completing other remedial measures requested by the Engineer unless the fault lies solely with the Department
3. Costs of repairing, removing, and replacing falsework as directed by the Engineer
4. Costs of repairing, removing, or replacing forms
5. Costs of air-blown mortar to repair honeycombed areas, if required by the Engineer
6. Costs of using a higher class of concrete to widen existing bases or bases and pavements

### B. Profilograph Testing

The Department will conduct profilograph testing of bridge decks and approach slabs only twice per bridge at no cost to the Contractor.

The Department will conduct additional profilograph testing at the cost of \$500 per test.

### C. Plastic Shrinkage Crack Repair

The Engineer will determine how to repair cracks caused by plastic shrinking. Repair cracks at no cost to the Department.

### D. Plan Quantities

For all bridges (except seal concrete), concrete culverts, headwalls, and retaining walls, the quantities shown on the Contract Plans, including Standard Plans, will be considered the Base Pay Quantity.

For seal concrete, the Plan quantities are approximate and are for estimating purposes only. The quantities will not be considered as Base Pay Quantities.

Calculated additions or deductions will be applied to the Base Pay Quantity when the Engineer makes authorized changes. Changes include, but are not limited to, authorized changes in the following:

- Footing dimensions
- Lengthening or shortening of concrete culverts
- Correcting Plan Quantities
- Dimension errors
- Multi-barrel culvert wall thicknesses
- Lengthening or shortening bridge columns
- Raising or lowering foundations

Calculations of the Base Pay Quantity and any changes will be made as follows:

7. No deductions will be made for the volume of concrete used by scorings, panels, and chamfers if the individual areas are less than 1 in<sup>2</sup> (625 mm<sup>2</sup>).  
The volume of concrete in fillets of the same area will be neglected.
8. The volume of structural steel and of steel and concrete piling encased in concrete will be deducted.
9. The volume of timber piling encased in concrete will be deducted on the basis of 0.8 ft<sup>3</sup>/linear foot (0.07 m<sup>3</sup>/linear meter) of pile.
10. No deduction will be made for the volume of concrete displaced by the following:
  - Steel reinforcement
  - Shear connectors
  - Floor drains (unless they are paid for as separate Pay Items)
  - Incidentals such as expansion material
  - Joint sealing compound
  - Utility thimbles and hangers

## Section 500—Concrete Structures

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### E. Filler Concrete

Filler concrete, measured as described in [Subsection 500.4.01.B.1, “Bridges, Concrete Culverts, Headwalls, and Retaining Walls.”](#) will be paid at 40 percent of the Contract Price per cubic meter for Class A Concrete or Class AA Concrete.

### F. Seal Concrete

If there is no Contract Price for seal concrete, payment will be per cubic yard (meter), measured as described in [Subsection 500.4.01.B.2, “Seals,”](#) and will be paid at 60 percent of the Contract Price per cubic yard (meter) for Class A concrete.

### G. Lump Sum Payment Adjustments

Adjust the payment as follows:

#### 11. Authorized Change Adjustments

When authorized changes are made as described in [Subsection 500.5.01.D, “Plan Quantities,”](#) the lump sum payment may be adjusted on a pro rata basis or according to [Section 104](#) and as determined by the Engineer.

The Plans show tabulated quantities as a service. This does not relieve any responsibility to conform to Plan details.

#### 12. Optional Plan Feature Adjustments

If exercising an optional Plan feature, the Base Pay Quantity will not be changed if it is the only quantity change involved.

However, if other changes are necessary, the quantity change resulting from the optional feature will be considered in the necessary quantity adjustments.

#### 13. Falsework for Post-Tensioned Box Girder Bridge Adjustments

When the falsework is completed for post-tensioned box girder bridges, 20 percent of the Lump Sum superstructure concrete price will be paid.

Additional payments made as the concrete is placed must be adjusted for the payment for falsework. In other words, payment for concrete placed will be based on 80 percent of the superstructure bid price.

#### 4. When Metal Deck Forms are used and have been placed, payment in the amount of 5% of the Lump Sum Superstructure Concrete price will be made. For Post-Tensioned Box Girder Bridges, this percentage (5%) will apply to that part of the superstructure concrete in the top slab of the box only.

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SUPPLEMENTAL SPECIFICATION**

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**Project Number: CSNHS-0008-00(232)  
P.I. Number: 0008232  
Troup County**

**Section 501—Steel Structures**

---

*Delete Subsection 501.1 and substitute the following:*

**501.1 General Description**

This work includes furnishing and building with structural steel and miscellaneous metals to the lines, grades, and dimensions shown on the Plans or established by the Engineer.

The work does not include bearing devices for prestressed concrete bridge members, utility installation hardware, or any metal covered under another Pay Item.

**501.1.01 Definitions**

HTS Bolts: High Tensile-Strength bolts.

**501.1.02 Related References**

**A. Standard Specifications**

[Section 109—Measurement and Payment](#)

[Section 500—Concrete Structures](#)

[Section 512—Shear Connectors](#)

[Section 535—Painting Structures](#)

[Section 851—Structural Steel](#)

[Section 852—Miscellaneous Steel Materials](#)

[Section 854—Castings and Forgings](#)

[Section 857—Bronze Bushings, Bearings, and Expansion Plates](#)

[Section 870—Paint](#)

[Section 881—Fabrics](#)

[Section 885—Elastomeric Bearing Pads](#)

**B. Referenced Documents**

ANSI/AASHTO/AWS D 1.5

AISC Manual of Steel Construction

ANSI B1.13 Class 2A

ANSI 2.5, 3.2, 6.3, 12.5, 25, 46, 46.1 Part 1, 50

ASTM A 6/A 6M

ASTM A153/A 153M

ASTM A 325 (A 325M)

ASTM A 490 (A490M)

ASTM A 919

ASTM F 568M Class 4.6

### 501.1.03 Submittals

#### A. Pre-Inspection Documentation

Furnish documentation required by the latest ANSI/AASHTO/AWS D 1.5 under radiographic, ultrasonic, and magnetic particle testing and reporting to the State's inspector before the quality assurance inspection.

#### B. Shop Drawings

Prepare Shop Drawings for structural steel and other metal materials to be fabricated. Show the details necessary for shop fabrication and field erection.

1. **Description.** Use the standard sheet size of the Department's Bridge Office. Submit at least two complete sets of preliminary prints marked "NOT FOR FIELD USE" to the Department's Bridge and Structural Design Engineer (the Bridge Engineer) for review before fabricating materials.

As an option, shop drawings may be submitted on plan sheet sizes of 12" x 18" (305 mm x 457 mm) or 11" x 17" (279 mm x 432 mm) for review and approval. Information contained on these sheets must be legible.

After shop drawings have been approved, submit an electronic file that is compatible with Bentley Microstation J (Version 7) Cadd operating system, or an electronic file in Adobe Acrobat Portable Document Format (.pdf) to the Engineer. For bridges carrying railroads only, after shop drawings have been approved, submit one full size set of reproducible drawings to the Department.

2. **Review Process.** After the preliminary prints have been reviewed and revisions have been made, submit 5 or more complete sets of the final drawings to the Bridge Engineer. The Bridge Engineer will mark each drawing with a conditional approval stamp and return one stamped set to the fabricator. Furnish the Bridge Engineer with as many additional sets of final prints as required.

The Bridge Engineer's review and conditional approval of Shop Drawings is a service for the Contractor. The Department assumes no responsibility for the accuracy of the drawings, and the Contractor will not be relieved of any responsibility for conforming to the Specifications and Plans.

3. **Railway Structures.** For structures carrying railway traffic and for other structures when specifically designated, furnish the Bridge Engineer a full set of permanent reproducibles of the final Shop Drawings.
4. **Welded Construction.** On Shop Drawings for welded construction, use the standard welding symbols of the American Welding Society. Explain special conditions in notes or details. Show the sequence and techniques for areas where shrinkage stress and distortion control is necessary.
5. **Changes and Substitutions.** Do not change a Shop Drawing after it has been conditionally approved unless the Bridge Engineer gives written consent. List and symbolize revisions on each drawing.  
Obtain written consent from the Bridge Engineer before substituting materials with dimensions and weights other than those shown on the Plans. Make changes associated with an approved substitution at no expense to the Department.
6. **Alternate Locations of Splices and Connections.** If splices or connections are desired at locations other than those shown on the Plans, submit a proposal and Shop Drawings to the Bridge Engineer to get written approval before proceeding.
7. **Steel Identification.** Upon request, furnish an affidavit certifying the identification of steel is maintained throughout fabrication.

On the Shop Drawings, show the grade of steel to be used and identify each piece. Give pieces made of different types or grades of steel different assembly or erection marks.

Maintain the identity of the mill test report number when assembly-marking individual pieces and when giving cutting instructions to the shop.

### **C. Fabrication Schedule**

Ensure that the fabricator submits a proposed fabrication schedule to the State Materials and Research Engineer that includes the following:

- Correct project number, including county
- Bridge number
- Starting date
- Estimated completion date

### **D. Quality Control Program**

Before fabrication begins, submit the fabricator's written Quality Control program to the Office of Materials and Research for approval. This program and its personnel will be subject to verification when the Department's Materials and Research Engineer deems necessary.

Even with a State inspection, continue to perform Quality Control (QC) on all nonfracture-critical and fracture-critical members and components.

### **E. Mill Orders and Shipping Statements**

Furnish the number of copies of mill orders and shipping statements covering fabricated materials and related miscellaneous materials the Engineer directs. Show the weights of individual members on the statements.

### **F. Mill Test Reports**

Furnish the Engineer two certified, legible copies of mill test reports that show the results of physical tests and complete ladle analyses for each heat and grade of steel ordered. Refer to the ASTM designation of tests used. Furnish mill test reports at no expense to the Department.

### **G. Welding Procedures**

Before structural steel fabrication begins, submit welding procedures to the Engineer for review and approval.

### **H. Electrode Testing**

Furnish a manufacturer's certification showing that the material requirements used for manufacturing the tested electrodes and furnished electrodes were the same for each lot of electrodes on the Project.

### **I. Falsework**

If required, prepare and submit falsework plans for the Engineer's review. Continue to assume the responsibility to produce safe falsework. When erection is completed, remove falsework to the Engineer's satisfaction.

### **J. Camber Diagram**

Furnish the Engineer a diagram showing the camber at each splice point for each girder. Base the diagram on measurements taken during shop assembly. In the case of partial shop assembly, base the camber diagram on theoretical calculated values.

*Delete Subsection 501.4 and substitute the following:*

#### **501.4 Measurement**

No separate measurement will be included for this item. Includes qualification tests and test sample preparation, ultrasonic or magnetic-particle testing as required under these Specifications

*Delete Subsection 501.5 and substitute the following:*

#### **501.5 Payment**

Payment will be made under CONSTRUCTION COMPLETE. Includes labor and equipment and the direct or incidental costs of furnishing easy access for inspection and testing.

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SUPPLEMENTAL SPECIFICATION**

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**Project Number: CSNHS-0008-00(232)  
P.I. Number: 0008232  
Troup County**

**Section 507—Prestressed Concrete Bridge Members**

---

*Delete Subsection 507.1 and substitute the following:*

**507.1 General Description**

This work consists of furnishing prestressed concrete bridge members, complete in place, except as noted for piling in this Specification. The work includes all items and work necessary to complete the erection according to the Plans and Specifications. All prestressed concrete bridge member nominal lengths shown on the plans are horizontal dimensions. The contractor will be responsible for adjusting the lengths, as necessary, to account for the final erected position of the member. Fabricate the ends of all members to be vertical in the final erected position. Slope bearing assemblies to accommodate the erected position of the member.

**507.1.01 Definitions**

PSC: Prestressed concrete. Prestressed concrete may be designated “PSC” in Specifications and on Plans and other documents.

**507.1.02 Related References**

**A. Standard Specifications**

[Section 109—Measurement and Payment](#)

[Section 500—Concrete Structures](#)

[Section 501—Steel Structures](#)

[Section 506—Expanded Mortar](#)

[Section 520—Piling](#)

[Section 865—Manufacture of Prestressed Concrete Bridge Members](#)

**B. Referenced Documents**

General Provisions 101 through 150.

**507.1.03 Submittals**

**A. Erection Drawings**

Furnish erection drawings to the Department only when the units are not interchangeable with respect to the following:

- Transverse placement within a span
- Longitudinal reversal within a span

The drawings shall cover superstructure unit placement, including bearing components.

## **B. Shop Drawings**

Submit shop drawings to the Department on standard Plan size 22 in x 36 in (550 mm x 900 mm) sheets showing complete beam details of the following:

- Nonprestressed reinforcement
- The method of retaining depressed strands in place
- Calculations for determining the strand elongation required to produce the specified pretensioning force
- Detensioning schedule
- Increased length of beam due to vertical alignment

As an option, shop drawings may be submitted on plan sheet sizes of 12" x 18" (305 mm x 457 mm) or 11" x 17" (279 mm x 432 mm) for review and approval. Information contained on these sheets must be legible.

After shop drawings have been approved, submit an electronic file that is compatible with Bentley Microstation J (Version 7) Cadd operating system, or an electronic file in Adobe Acrobat Portable Document Format (.pdf) to the Engineer. For bridges carrying railroads only, after shop drawings have been approved, submit one full size set of reproducible drawings to the Department.

*Delete Subsection 507.4 and substitute the following:*

### **507.4 Measurement**

No separate measurement will be included for this item.

#### **507.4.01 Limits**

No separate measurement will be made for any of the following:

- Painting, rubbing, anchor, and bearing components, as well as diaphragm bar assemblies on accepted PSC beams
- Individual deck units on which curb sections are located
- Material used in anchor components, shear key pours, and construction expansion joints
- Drifting components, anchor components, and asphalt-saturated felt for PSC caps
- Grouting between PSC box beams
- Furnishing and installation of diaphragm bar assemblies and anchor and bearing components

*Delete Subsection 507.5 and substitute the following:*

### **507.5 Payment**

Payment will be made under CONSTRUCTION COMPLETE.

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SPECIAL PROVISION**

**PROJECT NO. CSNHS-0008-00(232), TROUP  
P.I. NO. 0008232**

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**Section 509—Prestressing Concrete by Post Tensioning**

---

*Delete Subsection 509.1 and substitute the following:*

**509.1 General Description**

This work consists of prestressing concrete by post-tensioning cast-in-place concrete. The work includes furnishing, placing, and tensioning prestressing steel according to the Plan details and these Specifications.

**509.1.01 Definitions**

Working Force and Working Stress: The force and stress remaining in the prestressing steel after the following losses:

- Creep and shrinkage of concrete
- Elastic compression of concrete
- Creep of steel
- Loss in post-tensioned prestressing steel from the sequence of stressing
- Friction and anchor set (see [Subsection 509.3.05.J](#), “Post-Tension the Tendons,” steps 18 to 19)
- Other losses peculiar to the method, technique, or system of prestressing (see [Subsection 509.3.05.J](#), “Post-Tension the Tendons,” step 21)

**509.1.02 Related References**

**A. Standard Specifications**

[Section 501—Steel Structures](#)

[Section 535—Painting Structures](#)

**B. Referenced Documents**

AASHTO Specifications for Highway Bridge, Article 9.16.1

AASHTO Specifications for Highway Bridge, Article 9.16.2

ASTM C 109

ASTM A 416

ASTM A 722

ASTM C 939



**509.1.03 Submittals**

**A. Coupler Use and Location**

The use and location of couplers in bars entering into the prestressing work is subject to the Engineer's approval.

**B. Alternate Stressing or Anchorage Block Drawings and Calculations**

When using stressing or anchorage blocks not shown on the Plans, submit shop drawings and calculations for the blocks to Bridge and Structural Design when submitting the prestressing system calculations and shop drawings.

**C. Design Calculations**

Submit design calculations for the proposed post-tensioning system to Bridge and Structural Design for Department review and approval. Design calculations may be on letter size sheets.

Submit calculations for the size and spacing of the reinforcing around the ducts, as shown in [Figure 1 \(metric\)](#), to Bridge and Structural Design. Include the following in the calculations:

- Required jacking force and elongation of tendons during tensioning  
Using the initial jacking force, design the reinforcing to prevent ducts from pulling out because of the effects of web curvature and slope.
- Stresses in anchorages and distribution plates  
Ensure that the calculations account for reinforcing to prevent the peeling of anchorages from the top and bottom slab. See Figure 2 for minimum reinforcing requirements for tying ducts to the deck reinforcing.
- Stress-strain curves typical of the prestressing steel to be furnished
- Seating losses
- Temporary overstresses
- Reinforcing in the concrete to resist tensioning loads

Determine bearing offsets and expansion joint gaps and adjust for construction sequence, prestress shortening, and temperature.

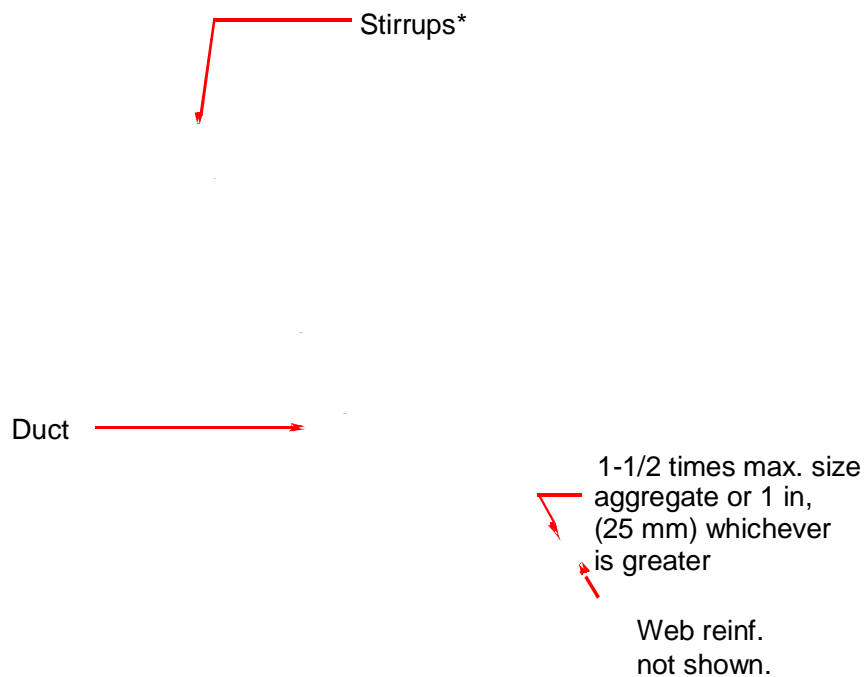
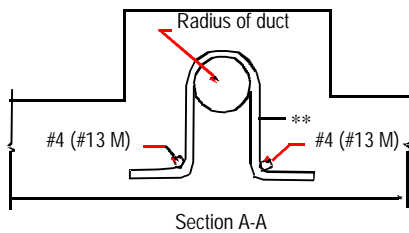
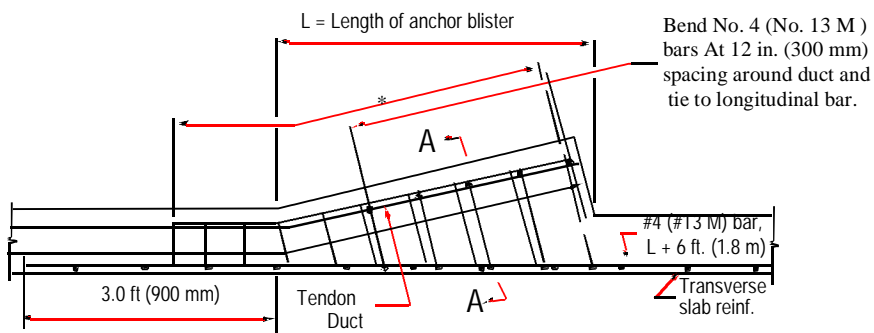


Figure 1



\* All necessary reinforcing may not be shown.  
 \*\* Bend #4 (#13) bars as closely as possible to radius of duct. Tie duct to bars.  
 NOTE: #4 (13 M) longitudinal bars and #4 (#13 M) bars around duct are not included in reinforcing bar schedule. Include cost of bars in cost of the reinforcing steel.  
 NOTE: Top slab blister similar. See plans for additional details.

Figure 2

**D. Certificates of Compliance**

The Department will accept certificates of compliance for cements to be used. The Department reserves the right, however, to sample and test the cement before its use and at any time during the progress of the work.

**E. Certified Mill Test Reports**

Submit certified mill test reports for high tensile prestressing steel to the Project Engineer.

## **F. Shop Drawings**

Submit Shop Drawings for review and approval according to [Subsection 501.1.03.B](#), “Shop Drawings.” Place a title block in the lower right-hand corner of the drawings that includes the following:

- Project number
- Sheet numbering for the Shop Drawings
- Structure name
- Contractor and fabricator names

Submit Shop Drawings on 23 in by 36 in (575 mm by 900 mm) sheets with a 1-1/2 in (38 mm) left margin and a 1/2 in (13 mm) top, bottom, and right margins.

The Shop Drawings shall include the following:

1. Fully dimensional views showing all projections, recesses, notches, openings, blockouts, and pertinent design details
2. Details of mild steel reinforcing showing size, spacing, and location, including special reinforcing required as determined by the design calculations but not shown on the Plans
3. Details of ducts for post-tensioning tendons showing size, type, and horizontal and vertical profiles
4. Details of duct supports, grout tubes, and vents showing size, type, and location
5. Details of the relative positions of reinforcing steel, ducts, and anchorages
6. Details of the anchorage systems for the proposed post-tensioning system
7. A table giving jacking sequence, jacking forces, and initial elongation of the tendons at each erection stage for post-tensioning
8. Details and a complete description of the post-tensioning system to be used for permanent tendons
9. Details of the prestressing, including:
  - Method, sequence, and procedure for prestressing and securing tendons
  - Procedure for releasing tendons
  - Equipment supplier and type
  - Tendon size and properties
  - Anchorage plates and assemblies
10. Working drawings and bar schedules for each prestressing system
11. Details of reinforcing or coil ties under anchorage plates
12. Details for usage of high-strength steel bar (furnished by the bar manufacturer)
13. Friction factors used in the prestressing system of deformed bars

As an option, shop drawings may be submitted on plan sheet sizes of 12” x 18” (305 mm x 457 mm) or 11” x 17” (279 mm x 432 mm) for review and approval. Information contained on these sheets must be legible.

After shop drawings have been approved, submit an electronic file that is compatible with Bentley Microstation J (Version 7) Cadd operating system, or an electronic file in Adobe Acrobat Portable Document Format (.pdf) to the Engineer. For bridges carrying railroads only, after shop drawings have been approved, submit one full size set of reproducible drawings to the Department.

## **G. Ram Calibration Charts**

Before using rams in the work, furnish the Engineer with a certified chart from the calibration for each ram.

## **H. Designs and Details of Distribution Reinforcing Steel**

The Department plans for anchorages show only a minimum amount of distribution reinforcing steel.

Design and detail the reinforcement needed to prevent bursting, peeling, and splitting. Submit the designs and details to the Engineer for review and approval.

**I. Gauge Readings and Elongations**

Keep a record of gauge pressures or readings and elongations at the end of each jacking operation and submit it to the Engineer for review and approval.

**J. Grouting Operations Plan**

Submit to the Engineer a grouting operations plan at least 6 weeks in advance of any scheduled grouting operations. The Engineer will forward the grouting operations plan to the Office of Materials and Research for approval. Written approval of the grouting operations plan by the Office of Materials and Research is required before any grouting of the permanent structure takes place.

At a minimum, the plan will address and provide procedures for the following:

1. Provide names and proof or experience/training for the grouting crew and the crew supervisor.
2. Type, quantity, and brand of materials used in grouting including all certifications required.
3. Type of equipment furnished, including capacity in relation to demand and working condition, as well as back-up equipment.
4. General grouting procedures.
5. Duct cleaning methods prior to grouting.
6. Mixing and pumping procedures.
7. Direction of grouting.
8. Sequence of use of the inlets and outlets pipes.
9. Procedures for handling blockages.
10. Procedures for possible post grouting repair.

*Delete Subsection 509.2 and substitute the following:*

**509.2 Materials**

Ensure that materials meet the requirements of the following Specifications:

Material	Section
Steel Wire Strand	853
Structural Steel for Anchorage Devices, Distribution Plates, and Incidental Parts Required to Be of Steel	501
Grout	509
Water	880

#### A. Steel

Do not use strands from more than one source within the same tensioning operation.

Strands that differ in size from ASTM A 416 are to be submitted for prior approval.

High strength steel bars shall meet ASTM A 722 Type II, and SI through S# supplemental requirements and have manufacturers details for their use.

Ensure all bars within any member are of same grade.

Bar couplers and locations are to be approved prior to use and shall have tensile strength not less than manufacturers minimum for strength of bar.

Allow the Department 60 calendar days before installing prestressing steel to test the steel and approve the materials furnished.

Use the anchor devices and distribution plates recommended by the manufacturer of the prestressing system.

#### B. Post-Tensioning Grouts

Use only post-tensioning grouts meeting the requirements of this subsection. Submit to the Engineer a written certification from the manufacturer that the product meets the requirements of this subsection. The Engineer may request that the manufacturer also submit certified test reports from an independent laboratory audited by the Cement Concrete Reference Laboratory (CCRL) which shows the material meets all the requirements specified herein.

1. The grout shall not contain aluminum or other components which produce hydrogen, carbon dioxide or oxygen gas.
2. The grout shall meet or exceed the specified physical properties stated as determined by the following standard and modified test methods. Conduct all grout tests with grout mixed to produce the minimum time of efflux. Establish the water content to produce the minimum and maximum time of efflux.

Property	Test Value	Test Method
Total Chloride Ions	Max. 0.08% by weight of cementitious material	ASTM C 1152
Volume Change	0.0% to +0.1% at 24 hours <+0.2% at 28 days	ASTM C 1090
Expansion	≤2.0% for up to 3 hours	ASTM C 940
Compressive Strength at 28 days	≥5000 psi (35 MPa)	ASTM C 942
Wet Density – Laboratory	Report maximum and minimum obtained test value lbs/ft <sup>3</sup>	ASTM C 185

Property	Test Value	Test Method
Initial Set	Min. 3 hours Max. 12 hours	ASTM C 953
Time of Efflux <sup>(1)</sup>		
(a) Immediately after mixing	Min. 20 seconds Max. 30 seconds	ASTM C 939
	or Min. 9 seconds Max. 20 seconds	ASTM C 939 <sup>(2)</sup>
(b) 30 minutes after mixing with remixing for 30 seconds	Max. 30 seconds	ASTM C 939
	or Max. 30 seconds	ASTM C 939 <sup>(2)</sup>
Bleeding @ 3 hours	Max. 0.0%	ASTM C 940 <sup>(3)</sup>
Permeability at 28 days	Max. 2,500 coulombs at 30 V for 6 hours	ASTM C 1202

- (1) Adjustment to flow rates will be achieved by strict compliance with the manufacturer's recommendations. The time of efflux is the time to fill a one liter container placed directly under the flow cone.
- (2) Modify ASTM C 939 test by filling the cone to the top instead of to the standard level.
- (3) ASTM C 940 modified per PTI Specification subsection 4.4.6.1, Wick Induced Bleed Test.

Have the Engineer approve grout for filling recesses or encasing anchoring devices. Use a type recommended by the manufacturer for highly stressed steel.

*Add the following to Subsection 509.2.01*

**D. Grout**

Grouts shall be prepackaged in moisture proof containers. Store grout in a location that is both dry and convenient to the work. Storage in the open must be on a raised platform and with adequate waterproof covering. Grout bags shall indicate the following:

1. Type of application
2. Date of manufacture
3. Lot number
4. Mixing instruction

Provide to the Engineer the manufacturer's Quality Control Data Sheet for each lot number and shipment sent to the job site. Materials with a total time from manufacture to usage in excess of six (6) months shall be retested and certified by the supplier before use or removed and replaced.

*Add the following to Subsection 509.3.01:*

**B. Grouting Supervisor**

Ensure the supervisor has verifiable documentation of three years of experience in construction of grouted post tensioned structures and has successfully completed training in a grouting technician certification program, such as, the American Segmental Bridge Institute's grouting certification program or an approved equal training program.

*Delete Subsection 509.3.02.C and substitute the following:*

### **C. Grouting Equipment**

Provide grouting equipment consisting of measuring devices for water, a high speed shear colloidal mixer, a storage hopper and a pump with all the necessary connecting hoses, valves, and pressure gauge.

Provide pumping equipment with sufficient capacity to ensure continuous grouting of the largest tendon on the Project in 20 minutes.

#### **1. Mixer and Storage Hopper**

Provide a high speed shear colloidal mixer capable of continuous mixing producing a homogeneous and stable grout free of lumps and undispersed cement. The grout machinery will have a charging tank for blending and a holding tank.

- The blending tank must be equipped with a high shear colloidal mixer.
- The holding tank must be kept agitated and at least partially full at all times during the pumping operation to prevent air from being drawn into the post-tensioning duct.

Add water during the initial mixing by use of a flow meter or calibrated water reservoir with measuring accuracy of  $\pm 1.0$  ounces (30 ml) or better.

#### **2. Grout Pumping Equipment**

Provide pumping equipment capable of continuous operation which will include a system for circulating the grout when actual grouting is not in progress.

- The equipment will be capable of maintaining pressure on completely grouted ducts and will be fitted with a valve that can be closed off without loss of pressure in the duct.
- Grout pumps will be positive displacement type, will provide a continuous flow of grout and will be able to maintain a discharge pressure of at least 145 psi (1 MPa).
- Pump seals adequate to prevent oil, air, or other foreign substances out of the grout and to prevent loss of grout or water.
- Pressure gauge with a maximum full scale reading of 300 psi (2 MPa) installed at some point in the grout line between the pump outlet and the duct inlet to establish grout pressure at the pump.
- Screen with 0.125 in (3 mm) maximum clear openings to screen the grout before it is introduced into the grout pump.

#### **3. Vacuum Grouting Equipment**

Provide vacuum grouting equipment at the jobsite concurrently with all pressure grouting operations.

- The equipment will be the volumetric measuring type with the ability to measure a void and supply a measured volume of grout to fill the void.

#### **4. Standby Equipment**

Provide flushing equipment capable of pumping 300 psi (2 MPa) gauge and flushing out partially-grouted ducts.

- A different power source for the flushing equipment than the grouting equipment.

*Delete Subsections 509.3.05.K, L and M, and substitute the following:*

**K. Mix the Grout**

Maximum grout temperature will not exceed 90 °F (32.2 °C). Use chilled water and/or pre-cooling of bagged material to maintain mixed grout temperature below the maximum allowed temperature.

Grouting operations are prohibited when the ambient temperature is below 40 °F (4 °C) or is 40 °F (4 °C) and falling. Remove any standing water from ducts using compressed air, if freezing temperatures are forecast.

Grout for use with prestressing concrete bridge members includes a mixture of prepackaged material and water, as follows:

- **Prepackaged material**—Use prepackaged material that meets the requirements of Subsection 509.2.01.D.  
The Department reserves the right to sample and test the prepackaged material before its use and at any time during the work.
- **Water**—Use potable water or other water that meets the requirements of Subsection 880.2.01.

Mix the prepackaged material and water in accordance with the manufacturer's recommendation and as follows:

1. Mix the grout with a metered amount of water.
2. When adding water, do not exceed the manufacturer's recommendations.
3. The materials will be mixed to produce a homogeneous grout.
4. Continuously agitate the grout until it is pumped.
5. Do not add water to increase grout flowability that has decreased because grout use is delayed.

The Engineer may determine grout pumpability according to ASTM C 939. When using this method, efflux time for the grout sample immediately after mixing will not be less than the efflux time as established in subsection 509.2.B.

**L. Prepare Ducts for Grouting**

Prepare the ducts for grouting by flushing the metal ducts with compressed air.

1. Clear ducts of water and debris at a pressure no greater than allowed for grouting the tendon.
2. Use oil-free compressed air to blow out ducts.

**M. Grout the Duct**

Bond prestressing steel to the concrete by filling the space between the duct and the tendon with grout. Grout tendons in accordance with the Grouting Operations Plan.

Grout the duct as follows:

1. Open the grout and vent openings.
2. Unless approved otherwise by the Engineer, pump grout at a rate of between 16 linear feet (5 m) and 50 linear feet (15 m) of duct per minute. Ensure that the pumping pressure at the grout inlet does not exceed 245 psi (1.7 MPa).
3. Allow the grout to flow from the first vent after the inlet pipe to remove any residual water or entrapped air.
4. Once water or air is removed, cap or otherwise close the vent. Close the remaining vents in sequence in the same manner.



5. If the grouting pressure exceeds 245 psi (1.7 MPa) gauge, inject grout at a vent that has been or is ready to be capped.
  - a. Maintain a one-way grout flow while injecting.
  - b. Fit the vent used for injection with a positive shutoff.
  - c. If a one-way flow of grout cannot be maintained, immediately flush the grout out of the duct with water.
6. Pump grout through the duct and waste it continuously at the outlet pipe until the following happens:
  - No visible slugs of water or air are ejected.
  - The measured grout efflux time will not be less than the efflux time measured at the pump or minimum acceptable efflux time as established in subsection 509.2.B.
7. To insure that the duct remains filled with grout:
  - a. Close the outlet.
  - b. Hold pumping pressure for an additional 1 minute and then close the inlet under pressure.
  - c. Do not remove or open plugs, caps, or valves used to close off the outlet or inlet until the grout has set.

*Add the following to Subsection 509.3.06.*

#### **D. Tendon Grouting**

At least 24 hours after completion of the grouting of tendon ducts, and no more than 7 days after grouting, investigate the ducts for voids, as follows:

1. After the grout has cured, open grout injection and exit ports by drilling through the ports into the duct cavity to probe for any void.
2. Sound all grout caps for voids. Unless grout caps are determined to have voids, do not remove or drill the cap.
3. If voids are found, completely fill the void with grout by secondary grouting of the duct with vacuum grouting process that determines the size of the void and measures filling of the void.
4. If no voids are found, clean and backfill the drilled hole with Type V epoxy selected from QPL 15—Epoxy Resin Adhesives. Use an injection tube to extend to the bottom of the drilled hole.

During drilling operations use equipment that will automatically cut-off when steel is encountered.

*Delete Subsection 509.5 and substitute the following:*

### **509.5 Payment**

Payment will be made under CONSTRUCTION COMPLETE.

#### **509.5.01 Adjustments**

General Provisions 101 through 150.

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**Supplemental Specification**

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

**Section 550—Storm Drain Pipe, Pipe-Arch Culverts, and Side Drain Pipe**

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*Delete Section 550 and Substitute the following:*

**550.1 General Description**

This work includes furnishing and installing the following:

- Storm drain pipe
- Pipe-arch culverts
- Side drain pipe flared end sections
- Tapered pipe inlets

Install structures according to the Specifications and the details shown on the Plans, or as directed by the Engineer.

**550.1.01 Definitions**

General Provisions 101 through 150.

**550.1.02 Related References**

**A. Standard Specifications**

[Section 205—Roadway Excavation](#)

[Section 207—Excavation and Backfill for Minor Structures](#)

[Section 208—Embankments](#)

[Section 645—Repair of Galvanized Coatings](#)

[Section 815—Graded Aggregate](#)

[Section 834—Masonry Materials](#)

[Section 840—Corrugated Aluminum Alloy Pipe](#)

[Section 841—Iron Pipe](#)

[Section 843—Concrete Pipe](#)

[Section 844—Steel Pipe](#)

[Section 845—Smooth Lined Corrugated Polyethylene \(PE\) Culvert Pipe](#)

[Section 846—Polyvinyl chloride \(PVC\) Drain Pipe](#)

[Section 847—Miscellaneous Pipe](#)

[Section 848—Pipe Appurtenances](#)

**B. Referenced Documents**

General Provisions 101 through 150.

**550.1.03 Submittals**

General Provisions 101 through 150.

**550.2 Materials**

Ensure that materials meet the requirements of the following Specifications:

<b>Material</b>	<b>Section</b>
Backfill Materials	<a href="#">207</a>
Graded Aggregate	<a href="#">815.2.01</a>
Reinforced Concrete Pipe	<a href="#">843.2.01</a>
Nonreinforced Concrete Pipe	<a href="#">843.2.02</a>
Mortar And Grout	<a href="#">834.2.03</a>
Bituminous Plastic Cement	<a href="#">848.2.05</a>
Rubber Type Gasket Joints (Concrete Pipe)	<a href="#">848.2.01</a>
Preformed Plastic Gaskets	<a href="#">848.2.06</a>
Corrugated Steel Pipe	<a href="#">844.2.01</a>
Bituminous Coated Corrugated Steel Pipe	<a href="#">844.2.02</a>
Corrugated Aluminum Alloy Pipe	<a href="#">840.2.01</a>
Bituminous Coated Corrugated Aluminum Pipe	<a href="#">840.2.03</a>
Aluminized Type 2 Corrugated Steel Pipe	<a href="#">844.2.06</a>
Ductile Iron Pipe, Fittings and Joints	<a href="#">841</a>
Precoated, Galvanized Steel Culverts	<a href="#">844.2.05</a>
Smooth Lined Corrugated Polyethylene Pipe	<a href="#">845.2.01</a>
Polyvinyl Chloride (PVC) Profile Wall Drain Pipe	<a href="#">846.2.01</a>
Polyvinyl Chloride (PVC) Corrugated Smooth Interior Drain Pipe	<a href="#">846.2.02</a>
Miscellaneous Pipe	<a href="#">847</a>

Use any of the following types of pipe:

- Reinforced concrete
- Nonreinforced concrete
- Corrugated steel or Aluminum
- Smooth-lined corrugated polyethylene
- Ductile iron
- Polyvinyl Chloride (PVC) Profile Wall Drain Pipe
- Polyvinyl Chloride (PVC) Corrugated Smooth Interior Drain Pipe

Use the type of pipe designated on the Plans, or acceptable alternate types when applicable.

### **550.2.01 Delivery, Storage, and Handling**

General Provisions 101 through 150.

## **550.3 Construction Requirements**

### **550.3.01 Personnel**

General Provisions 101 through 150.

### **550.3.02 Equipment**

General Provisions 101 through 150.

### **550.3.03 Preparation**

Before installing pipe and pipe-arches, shape the foundation material as shown on the Plans.

Prepare structure excavations and foundation according to [Section 207](#). Except, for smooth-lined corrugated polyethylene pipe, polyvinyl chloride (PVC) profile wall drain pipe and polyvinyl chloride (PVC) corrugated smooth interior drain pipe use the following requirements for backfill:

1. Cross drain applications use material that meets [Subsection 815.2.01](#).
2. Longitudinal and side drain applications use material according to [Section 207](#). Except, when Type I backfill material is required use Class II B2 soil or better.

### **550.3.04 Fabrication**

General Provisions 101 through 150.

### **550.3.05 Construction**

#### **A. Drainage**

Provide necessary temporary drainage. Periodically remove any debris or silt that constricts the pipe flow to maintain drainage throughout the life of the Contract.

#### **B. Damage**

Before allowing traffic over a culvert, protect the structure by providing sufficient depth and width of compacted backfill. Repair damage or displacement from traffic or erosion that occurs after installing and backfilling at no additional cost to the Department.

#### **C. Installation**

##### **1. Concrete Pipe**

Lay flat-bottom and circular sections in a prepared trench with the socket ends pointing upstream. To join sections, use any of the following joint types:

- Mortar
- Bituminous plastic cement
- Rubber-type gasket
- O-ringed gasket
- Preformed plastic gasket

If using mortar and bituminous plastic cement joints:

- a. Fill the annular space with the joint material and wipe the inside of each joint smooth.
- b. Construct mortar joints in the same manner, but thoroughly wet the annular space before filling it with joint material.
- c. After the initial set, protect the outside mortar from air and sun with thoroughly wet earth or burlap cover. Install rubber-type, O-ring, and preformed plastic gasket joints according to the manufacturer's recommendations.

2. Ductile Iron Pipe

Lay pipe sections in a prepared trench, with bells pointing upstream. Construct joints according to [Subsection 841.2.02.A](#).

3. Corrugated Aluminum or Steel Pipe and Pipe-Arches

Lay pipe sections in a prepared trench, with outside laps of circumferential joints pointing upstream and longitudinal joints at the sides. Join the sections with coupling bands, fastened by two or more bolts. Keep no more than 2 in (50 mm) of space between adjoining sections.

Before backfilling the structure:

- a. Repair exposed base metal in metal coating according to [Section 645](#).
- b. Recoat exposed base metal in bituminous coating with asphalt.

4. Smooth-Lined Corrugated Polyethylene Pipe

Install smooth-lined corrugated polyethylene pipe according to ASTM D 2321. Use fitting and couplings that comply with the joint performance criteria of AASHTO Standard Specifications for Highway Bridges, Division II. Ensure that all joints are “soiltight” as stated in the AASHTO bridge specifications.

5. Specials (Wyes, Tees, and Bends)

Install wyes, tees, and bends as shown on the Plans or as directed.

6. Tapered Pipe Inlets

Locate and install tapered pipe inlet end sections as shown on the Plans or as directed.

7. Elongation

Elongate metal pipe as shown on the Plans. Order the elongation of the vertical axis of the pipe to be done in the shop.

Have the manufacturer ship metal pipe with wire ties in the pipe ends. Remove wire-ties immediately after completing the fill.

8. Flared End Sections

Use flared end sections on the inlet, outlet, or on both ends of storm drain pipe, according to Plan details.

9. Polyvinyl Chloride (PVC) Drain Pipe

Install polyvinyl chloride (PVC) drain pipe according to ASTM D 2321. Use fittings and couplings that comply with the joint performance criteria of AASHTO Standard Specifications for Highway Bridges, Division II. Ensure that all joints are “soiltight” as stated in the AASHTO bridge specifications.

### 550.3.06 Quality Acceptance

Clean pipes and pipe-arch culverts before final acceptance of the Work.

The Department may conduct video surveillance on storm drain (cross drain and longitudinal drain) installations after all activities are complete that may damage the pipe, but before the placement of the base and paving when applicable. If video surveillance shows problems such as pipe deformation, cracking, or joint separation, the Contractor shall repair or replace these pipes at no cost to the Department.

Use a nine-point mandrel to test a minimum of 25% of the installed length of smooth-lined corrugated polyethylene or PVC drain pipe for deformation (pieces will be selected by the Engineer). Use a mandrel that has an effective diameter equal to 95% of the base inside diameter. Provide the Engineer with a proving ring to verify the mandrel size. Mandrel testing shall not be paid for separately.

Ensure that smooth-lined corrugated polyethylene or PVC drain pipe installations have a maximum of 5% deflection when checked after completing all construction activities that may damage the pipe, but before placing the base and paving when applicable. If mandrel testing reveals problems, the Engineer may require that up to 100% of the storm drain installations be checked for deformation. Remove and replace pipe with over 5% deflection at no cost to the Department.

### 550.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

#### **550.4 Measurement**

No measurement to be included for this item.

Excavation and normal backfill are not measured for payment.

#### **550.5 Payment**

Payment will be made under CONSTRUCTION COMPLETE. Includes backfill, pipe installations, excavating, furnishing, and hauling materials; installing, cutting pipe where necessary; repairing or replacing damaged sections; making necessary connections; strutting, elongating, providing temporary drainage; joining an extension to an existing structure where required; and removing, disposing of, or using excavated material as directed by the Engineer.

DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA

SUPPLEMENTAL SPECIFICATION

Project Number: CSNHS-0008-00(232)  
P.I. Number: 0008232  
Troup County

**Section 600—Controlled Low Strength Flowable Fill**

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*Delete Section 600 and substitute the following:*

**600.1 General Description**

This work consists of furnishing and placing ready-mixed or volumetric mixed Flowable Fill as an alternate to compacted soil as approved by the Engineer. Applications for this material include beddings, encasements, and closures for tanks and pipe, and general backfill for trenches and abutments.

**600.1.01 Definitions**

General Provisions 101 through 150.

**600.1.02 Related References**

**A. Standard Specifications**

[Section 500—Concrete Structures](#)

[Section 801—Fine Aggregate](#)

[Section 830—Portland Cement](#)

[Section 831—Admixtures](#)

[Section 880—Water](#)

**B. Referenced Documents**

SOP-10

General Provisions 101 through 150.

**600.1.03 Submittals**

Mix designs for flowable fill and other documentation listed in [Subsection 500.1.03](#).

**600.2 Materials**

All materials shall meet the requirements of the following Specifications:

Material	Section
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Material	Section
*Fine Aggregate	<a href="#">Subsection 801.2.02</a>
Portland Cement	<a href="#">Subsection 830.2.01</a>
**Fly Ash	<a href="#">Subsection 831.2.03</a>
***Air-Entraining Admixtures	<a href="#">Subsection 831.2.01</a>
Water	<a href="#">Subsection 880.2.01</a>

\*Note—Gradation requirement is waived.

\*\*Note—The requirements of [Subsection 831.2.03](#) will be waived for fly ash.

\*\*\*Note—High air generators or foaming agents may be used in lieu of conventional air entraining admixtures and may be added at the job site and mixed according to the manufacturer’s recommendation.

### 600.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

## 600.3 Construction Requirements

### 600.3.01 Personnel

General Provisions 101 through 150.

### 600.3.02 Equipment

General Provisions 101 through 150.

### 600.3.03 Preparation

#### A. Mix Design

Flowable fill can be batched by ready-mix or volumetrically mixed on site.

Ready-mixed flowable fill is a mixture of Portland cement, fly ash, fine aggregate, air entraining admixture, and water. Ready-mixed flowable fill contains a low cement content for reduced strength development.

Volumetric mixed flowable fill is a mixture of Class C fly ash or Portland cement, Class F fly ash, and water mixed on site.

1. Submit mix designs for flowable fill to the Engineer for approval by the Office of Materials and Research. The following table lists mix design proportion ranges for excavatable and non-excavatable flowable fill:

<b>*Table 1—Mix Designs for Flowable Fill</b>				
	<b>Ready-Mixed</b>		<b>Volumetric Mixed</b>	
	<b>Excavatable</b>	<b>Non-Excavatable</b>	<b>Excavatable</b>	<b>Non-Excavatable</b>
Cement, Type I	75-100 lbs/yd <sup>3</sup> (45-60 kg/m <sup>3</sup> )	75-150 lbs/yd <sup>3</sup> (45-90 kg/m <sup>3</sup> )	90 lbs/yd <sup>3</sup> (53 kg/m <sup>3</sup> )	150 lbs/yd <sup>3</sup> (90 kg/m <sup>3</sup> )
Class C Fly Ash	-	-	735-840 lbs/yd <sup>3</sup> (333-381 kg/m <sup>3</sup> )	841-1045 lbs/yd <sup>3</sup> (381-474 kg/m <sup>3</sup> )



Class F Fly Ash	-	150-600 lbs/yd <sup>3</sup> (90-355 kg/m <sup>3</sup> )	1250-2000 lbs/yd <sup>3</sup> (567-1186 kg/m <sup>3</sup> )	1045-1940 lbs/yd <sup>3</sup> (474-1150 kg/m <sup>3</sup> )
Water	**	**	**	**
***Air	15 to 35%	5-15%	NA	NA
***28-Day Compressive Strength	Maximum 100 psi (690 kPa)	Minimum 125 psi (860 kPa)	Maximum 100 psi (690 kPa)	Minimum 125 psi (860 kPa)
***Unit Weight (Wet)	90-100 lbs/ft <sup>3</sup> (1440-1600 kg/m <sup>3</sup> )	100-125 lbs/ft <sup>3</sup> (1600-2000 kg/m <sup>3</sup> )	90-100 lbs/ft <sup>3</sup> (1440-1600 kg/m <sup>3</sup> )	100-125 lbs/ft <sup>3</sup> (1600-2000 kg/m <sup>3</sup> )

\*Amounts singly or in combination to make the mix yield one cubic yard (meter).

\*\*Mix designs shall produce a consistency that will result in a flowable self-leveling product at time of placement.

\*\*\*The requirements for percent air, compressive strength, and unit weight are for laboratory designs only and are not intended for jobsite acceptance requirements.

### 600.3.04 Fabrication

#### A. Ready-Mixed

Ensure ready-mixed flowable fill is manufactured at plants that qualify as approved sources according to the Standard Operating Procedure for Quality Assurance for Ready-Mix Concrete Plants in Georgia (SOP-10). Mix and deliver according to [Subsection 500.2.01](#) of the Specifications or other methods approved by the Engineer. Revolution counter requirements are waived.

#### B. Volumetric Mixed

Ensure volumetric mixed flowable fill is manufactured through the use of volumetric mixers according to [Subsection 500.3.02](#) of the Specifications or other methods approved by the Engineer.

### 600.3.05 Construction

When using as backfill for pipe, where flotation or misalignment may occur, assure correct alignment of the pipe by using straps, soil anchors, or other approved means of restraint.

Protect flowable fill from freezing for 36 hours after placement.

### 600.3.06 Quality Acceptance

#### A. Jobsite Acceptance

Acceptance of flowable fill is based on documentation as outlined in [Subsection 500.1.03](#) of the Specifications and a minimum temperature of flowable fill at the point of delivery of 50 °F (10 °C).

### 600.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

## 600.4 Measurement

No measurement to be included for this item.

### 600.4.01 Limits

General Provisions 101 through 150.

## **600.5 Payment**

Payment will be made under CONSTRUCTION COMPLETE.

### **600.5.01 Adjustments**

General Provisions 101 through 150.

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SPECIAL PROVISION**

**Project Number: CSNHS-0008-00(232)  
P.I. Number: 0008232  
Troup County**

*Add the following:*

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**Section 620—Temporary Barrier**

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**620.1 General Description**

This work provides for Method 1 and Method 2 temporary barrier systems.

**620.1.01 Definitions**

Method 1- Method of furnishing, placing, maintaining, moving, and reusing where required, and removing temporary barrier of the length and at the locations shown on the Plans. Method 1 barrier is not suitable on bridges where the distance from the centerline of the barrier to the free edge of the bridge deck is less than or equal to 6'-0" (1.8 m) measured normal to the barrier.

Method 2- Method of furnishing, placing, maintaining, moving, and reusing where required, and removing manufactured barrier of the length, and at the locations shown on the Plans. Method 2 barrier is to be used on bridges and bridge approaches where the distance from the centerline of the barrier to the free edge of the bridge deck is less than or equal to 6'-0" (1.8 m) measured normal to the barrier.

**620.1.02 Related References**

**A. Standard Specifications**

- Section 500—Concrete Structures
- Section 501—Steel Structures
- Section 511—Reinforcement Steel

**B. Referenced Documents**

- General Provisions 101 through 150
- National Cooperative Highway Research Program (NCHRP) Report 350.

**620.1.03 Submittals**

Method 1- Submit certification from the manufacturer that the proposed barrier and its interconnecting hardware replicates an NCHRP-350 "Test Level 3" approved documented in an acceptance letter from FHWA or certification that the barrier meets the requirements of Ga. Std. 4961. Submit all certification documents to the engineer prior to delivery of the barrier to the project.

Method 2 — Submit certification from the manufacturer that the proposed barrier and its interconnecting hardware replicates an NCHRP 350 "Test Level 3" approved documented in an acceptance letter from FHWA and that the barrier does not deflect more than 1'-0" (300mm) under NCHRP test conditions. Attach the acceptance letter stating that the proposed is in compliance with NCHRP 350 "Test Level 3" and that the barrier meets the deflection criteria to the certification. Submit all certification documents to the engineer prior to delivery of the barrier to the project.

## 620.2 Materials

### A. Method 1

Supply a temporary barrier.

Ensure that materials are in accordance with the manufacturer's recommendations, specifications, and details or that the materials meet the requirements of the Standard Specifications and Ga. Std. 4961.

### B. Method 2

Supply a temporary barrier.

Ensure that materials used in the barrier are in accordance with the manufacture's recommendations, Specifications, and details.

## 620.2.01 Delivery, Storage, and Handling

### A. General

Deliver, store, and handle barrier in accordance with the manufacturer's recommendations.

Repair damage to the barrier and its connections in accordance with the manufacturer's recommendations at no additional cost to the Department prior to acceptance for use by the Department.

## 620.3 Construction Requirements

### 620.3.01 Personnel

General Provisions 101 through 150.

### 620.3.02 Equipment

General Provisions 101 through 150.

### 620.3.03 Preparation

General Provisions 101 through 150

### 620.3.04 Fabrication

#### A. Method 1

Perform barrier fabrication as detailed on Ga. Std. 4961 or in accordance with the manufacturer's recommendations.

#### B. Method 2

Perform barrier fabrication in accordance with the manufacturer's recommendations.

### 620.3.05 Construction

#### A. General

Handle and transport units to prevent damage and/or as recommended by the manufacturer. When required, use units at one or more sites on the same project.

Ensure that the units are complete and in acceptable condition and located where designated on the Plans or directed by the Engineer before acceptance by the Department.

Use the Plan quantity of barrier effectively to complete The Work within the Contract time. If scheduling The Work requires additional barrier, furnish it at no additional expense to the Department.

Use only one section shape, length, and connection type in a single run of interconnected barrier.

## **Section 620 – Temporary Barrier**

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### **B. Method 2**

Rigidly attach the barrier to the bridge deck and extend it off the bridge a transition distance indicated in the Standard Plans.

Interconnect all barrier sections within each single run of barrier.

Use non-shrink grout to fill all holes remaining in permanent bridge decks after barrier is removed.

#### **620.3.06 Quality Assurance**

General Provisions 101 through 150.

#### **620.3.07 Contractor Warranty and Maintenance**

General Provisions 101 through 150.

### **620.4 Measurement**

No measurement to be included for this item.

#### **620.4.01 Limits**

**General Provisions 101 through 150.**

### **620.5 Payment**

Payment will be made under CONSTRUCTION COMPLETE. Includes fabrication, use, moving, reuse, and removal of the units.

No separate payment will be made for moving and/or reusing units during the work or for using additional units beyond the Plan quantity to facilitate the construction schedule.

No separate payment will be made for filling holes used to bolt Method 2 barrier to bridge decks.

#### **620.5.01 Adjustments**

General Provisions 101 through 150.

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**Special Provision**

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

**Section 636—Highway Signs**

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*Delete Subsection 636.3.05.E and substitute the following:*

**E. Legends and Borders**

Place legends and borders according to [Subsection 917.2.01, “Demountable Characters”](#), with Type IX reflective sheeting.

*Delete Subsection 636.4 and substitute the following:*

**636.4 Measurement**

No separate measurement will be included for this item.

**A. Type-1 or Type-2 Highway Signs**

Includes providing the message and furnishing and placing signs complete and accepted.

**B. Extruded Aluminum Panels**

Includes legend components, border material, fittings, nuts, washers, clamps, molding, etc., furnished, erected, completed, and accepted.

**C. Galvanized Steel Posts**

Includes number of pounds (kilograms) furnished, erected, and accepted as well as base plates, connections, anchors, stub post, etc.

**D. Delineators**

Includes posts, rivets, and spacers, that are furnished, placed, and completed and accepted.

**E. Mast Arm Assemblies**

Includes actual number furnished and erected and concrete footing, sign, and post, completed and accepted.

**F. Special Roadside Signs**

No deductions are made for the volume of concrete displaced by steel piling, anchor bolts, or posts.

**G. Portland Cement**

Portland cement stabilized material used for backfilling holes is not measured for payment.

## Section 636—Highway Signs

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### H. Steel H—Piling

No separate measurement will be included for this item.

#### 636.4.01 Limits

General Provisions 101 through 150.

*Delete Subsection 636.5 and substitute the following:*

#### 636.5 Payment

Payment will be made under CONSTRUCTION COMPLETE.

Office of Materials and Research

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SUPPLEMENTAL SPECIFICATION**

**Project Number: CSNHS-0008-00(232)  
P.I. Number: 0008232  
Troup County**

**Section 638—Structural Supports for Overhead Signs**

*Delete Subsection 638.1.01 and substitute the following:*

**638.1.01 Definitions**

Structural supports for overhead signs are defined generally as follows:

Type	Description
I	A SIGN BRIDGE type structure that spans the roadway with more than two horizontal chords supported by two columns, one at each end. Each column shall have at least two braced vertical members.
II	A CANTILEVER type structure with two or more horizontal chords supported by a single column at one end.
III	A BUTTERFLY type structure with two or more horizontal chords extending an equal distance in opposite directions from a single column.
IV	A COMBINATION (Bridge-Cantilever) type structure with more than two horizontal chords supported by two columns, only one at one end and one at an intermediate point. Each column shall have at least two braced vertical members.
V	A CANTILEVER type structure with a maximum of two horizontal chords supported by a single column at one end.
VI	A SIGN BRIDGE type structure that spans the roadway with a maximum of two horizontal chords supported by two columns, one at each end.
VII	A BRIDGE MOUNTED (attached to a highway bridge) structural frame.
VIII	A BUTTERFLY type structure with a maximum of two horizontal chords extending an equal distance in opposite directions from a single column.

Type II and V structures' maximum horizontal dimension shall be 32 ft (9.75 m). The horizontal dimension is measured from the column's centerline to the furthest point of the structure or sign.

Type III and VIII structures' maximum horizontal dimension shall be 25 ft (7.6 m). The horizontal dimension is measured from the furthest point of the structure or sign on one side to the furthest point of the structure or sign on the other side. Place the sign(s) on the structure to create a slightly unbalanced condition about the column's centerline during wind loads.

Types V, VI, and VIII structural supports shall be used with flat sheet aluminum signs. If the vertical dimension of the largest sign is 42 in (1050 mm) or less, one horizontal chord may be used.

A walkway is required only when called for on the signing plans.



*Delete the introductory paragraphs under Subsection 638.1.03, Submittals, and substitute the following:*

Submit to the Engineer 6 sets of shop drawings [(12 in x 18 in (305 x 457 mm)] half size plan sheets) and 2 sets of design calculations [8.5 in x 11 in (216 x 297 mm)] sheets, neatly bound and indexed] for the Structural Supports, anchor bolt assemblies, and foundations for review and approval. Also send a copy of your transmittal letter to the State Traffic Safety & Design Engineer.

Detail the shop drawings to permit replacement of all members and include all dimensions, construction tolerances, elevations at top and bottom of foundations, and sizes of members. The shop drawings shall include the material designations of the structure and of the hardware for attaching the sign, the lane delineation of the roadway under the structure, and the walkway (when required by the signing plans). See [Figure 1](#), [Figure 2](#), and [Figure 3](#).

*Delete Subsection 638.1.03.B and substitute the following:*

**B. Walkways**

When walkways are required by the signing plans, place walkways in front of the signs and extend them at least 1 ft (300 mm) outside of the edge of all overhead signs and at least 2 ft (600 mm) outside of the right edge of paving, or as directed by the Engineer. Provide walkways in front of the lower front chord, and do not locate a portion higher than the lowest part of any sign. Make the walkway continuous from end to end with a railing along the front side that can be folded down flush with the walkway when not in use.

*Delete Subsection 638.2.D and substitute the following:*

**D. Concrete Foundations**

Class A concrete shall comply with [Section 500](#).

Reinforcement steel shall comply with [Section 853](#), Grade 60 (420).

*Delete Subsection 638.4 and substitute the following:*

**638.4 Measurement**

No measurement to be included for this item. Includes design, fabrication, and construction of structural supports including anchor bolt assemblies, foundations, excavation, backfill, redressing, and regrassing; but exclusive of signs.

**638.4.01 Limits**

General Provisions 101 through 150.

*Delete Subsection 638.4 and substitute the following:*

**638.5 Payment**

Payment will be made under CONSTRUCTION COMPLETE.

**638.5.01 Adjustments**

General Provisions 101 through 150.

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA  
SPECIAL PROVISION  
PROJECT NO. CSNHS-0008-00(232)  
P.I. NO. 0008232**

**Section 647—Traffic Signal Installation**

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*Delete Section 647 and substitute the following:*

**647.1 General Description**

This work consists of furnishing materials and erecting a traffic signal installation including all traffic signal equipment, poles, bases, wires and miscellaneous materials required for completion of the installation. Ramp Meters are defined as a form of traffic signalization and all general provisions for traffic signalization are applicable unless otherwise noted in the Plans and Specifications.

It also includes all test periods, warranties and guarantees as designated in subsequent sections, and response to maintenance and operational issues as described in subsequent sections.

Apply for, obtain and pay for all utility services, communications services to, and pole attachment permits required by all utility owners that are necessary for the signal installation and operation required in the Plans. The Contractor will be responsible for establishing utility services and ongoing monthly costs related to utility services until final acceptance of the signal project.

Upon completion of a successful “burn in” or operational testing period for the signal installation, the Contractor will be responsible for an orderly and uninterrupted transfer of these services and permits to the local government or other jurisdiction that will be responsible for subsequent maintenance and operation.

**647.1.01 Definitions**

General Provisions 101 through 150.

**647.1.02 Related References**

**A. Standard Specifications**

[Section 106—Control of Materials](#)

[Section 107—Legal Regulations and Responsibility to the Public](#)

[Section 108 —Prosecution and Progress](#)

[Section 150 —Traffic Control](#)

[Section 500—Concrete Structures](#)[Section 501—Steel Structures](#)

[Section 535—Painting Structures](#)

[Section 615—Jacking or Boring Pipe](#)

[Section 631—Changeable Message Signs](#)

[Section 636 – Highway Signs](#)

[Section 639—Strain Poles for Overhead Sign and Signal Assemblies](#)

[Section 645—Repair of Galvanized Coatings](#)

[Section 680—Highway Lighting](#)

[Section 681—Lighting Standards and Luminaires](#)

[Section 682—Electrical Wire, Cable, and Conduit](#)  
[Section 700—Grassing](#)  
[Section 755—Electrical Work](#)  
[Section 800—Coarse Aggregate](#)  
[Section 801—Fine Aggregate](#)  
[Section 832—Curing Agents](#)  
[Section 833—Joint Fillers and Sealers](#)  
[Section 850—Aluminum Alloy Materials](#)  
[Section 852—Miscellaneous Steel Materials](#)  
[Section 853—Reinforcement and Tensioning Steel](#)  
[Section 854—Castings and Forgings](#)  
[Section 861—Piling and Round Timber](#)  
[Section 870—Paint](#)  
[Section 886—Epoxy Resin Adhesives](#)  
[Section 910—Sign Fabrication](#)  
[Section 911—Steel Sign Posts](#)  
[Section 912—Sign Blanks and Panels](#)  
[Section 913—Reflectorizing Materials](#)  
[Section 915—Mast Arm Assemblies](#)  
[Section 922—Electrical Wire and Cable](#)  
[Section 923—Electrical Conduit](#)  
[Section 924—Miscellaneous Electrical Materials](#)  
[Section 925—Traffic Signal Equipment](#)  
[Section 935—Fiber Optic System](#)  
[Section 936—CCTV System](#)  
[Section 937—Video Detection System](#)  
[Section 938—Detection](#)  
[Section 939—Communications & Electronic Equipment](#)  
[Section 940—Navigator Integration](#)

## **B. Referenced Documents**

National Electrical Manufacturers Association (NEMA) Traffic Control Systems Standards No. TS 1  
NEMA Traffic Control Systems Standards No. TS 2  
AASHTO Roadside Design Guide  
The Manual on Uniform Traffic Control Devices (MUTCD), current edition  
National Electrical Code  
National Electrical Safety Code (NESC)  
[GDT 7 Determining Maximum Density of Soils](#)  
[GDT 24a Determining the Theoretical Minimum Dry Density of Soils or Soil Aggregates containing > 45% Retained on the No. 10 Sieve](#)  
[GDT 24b Determining the Theoretical Minimum Dry Density of Soils or Soil Aggregates containing > 5% Retained on 2-Inch Sieve using a 5.5 Pound Rammer and a 12 Inch Drop](#)  
[GDT 67 Family of Curves Method for Determining Maximum Density of Soils](#)

### **647.1.03 Submittals**

The Contractor will submit to the Engineer, signal material specifications and technical data information on all materials proposed for use on the project.

Written approval is required from the State Traffic Safety and Design Engineer prior to beginning any work on the traffic signal installation and /or installing the proposed on the work site.

#### **A. Review**

For all traffic signal, and Intersection Video Detection System (IVDS) material submittals, the State Traffic Safety and Design Engineer's review of the material should be completed within thirty (30) days from the date of receipt of the submission unless otherwise specified. The State Traffic Safety and Design Engineer will advise in writing, as to the acceptability of the material submitted.

The State Traffic Safety and Design Engineer may determine that submitted equipment is approved, in which no further action is required. Or the item(s) may be partially or totally rejected due to specification compliance. In the event materials submitted for use are rejected the Contractor is required to re-submit materials, within fifteen (15) days of notification of material failure or rejection. Resubmittal of subsequent materials for review will be considered the start point of a new approval cycle as described.

All material submittals for fiber optic communications equipment system components; CCTV, VDS cameras, LED Changeable Message Signs (CMS) and other materials and equipment proposed for use on the project will be reviewed by the Department's Traffic Signal Electrical Facility (TSEF). The material review for ITS items will be completed as defined in [Section 935—Fiber Optic System](#), [Section 936—CCTV System](#), [Section 937—Video Detection System](#), [Section 938—Detection and Section 939—Communications & Electronic Equipment](#)) unless otherwise specified. The State Traffic Safety and Design Engineer will advise in writing as to acceptability of materials to be used on the project.

The Department reserves the right to be reimbursed by the Contractor for reviewing any equipment and/or component submittals after a second submittal of equipment proposed for use on the project.

#### **B. Submittal Costs**

No separate measurement or payment will be made for submittal costs. All costs associated with reproduction of submittal material documents, samples and mailing expensed will be the responsibility of the Contractor and are not subject to reimbursement by the Department. All material, including equipment data sheets, samples or related equipment information become the property of the Department and will not be returned to the Contractor.

#### **C. Steel Strain Pole, Concrete Strain Pole or Steel Pole Certification**

Instruct the supplier or manufacturer of the strain poles or steel poles with traffic signal mast arms to submit a certification, including mill certificates to:

Department of Transportation  
Office of Materials and Research  
15 Kennedy Drive  
Forest Park, Georgia 30297

Include the following in the certification:

- A statement that the items were manufactured according to the Specifications, including the Specification Subsection number
- Project number and P.I. number

Instruct the supplier or manufacturer to send copies of the transmittal letter to the Engineer.

Prepare Shop Drawings and related signal strain pole design calculations. Provide "bending moment at yield" to determine the foundation size according to the signal strain pole foundation drawings. Submit all Shop Drawings and related signal strain pole design calculations to the Engineer to be forwarded to the State Bridge and Structural Design Engineer for review and approval. Obtain written approval prior to pole fabrication and installation. Upon acceptance of the pole certification provide one copy of the design calculations and shop drawings to the agency responsible for maintaining the traffic signal installation.

Show all dimensions and material designations of the designs on the Drawings. See [Section 501.1.03](#) for the certification procedure for poles and anchor bolts.

#### **D. Signal Item Certification**

Submit eight (8) copies of material catalog product numbers and descriptions to the Engineer. One copy of all submittals is to be provided to the maintaining agency. Reference the project number, P.I. number and Specification Subsection number for the following traffic signal items:

- Signal heads

- LED Signal Modules
- Mounting hardware
- Controllers
- Cabinet assemblies
- Battery Backup System (BBS)
- Detectors
- Monitors
- Cable
- Load switches
- Blank-out signs
- Lane use signals
- Preformed cabinet bases
- Other related signal equipment (including but not limited to Conduit, Pull boxes, Ground Rods, Enforcement Indications, etc.)

Submit the material organized in a three ring binder with sections labeled as bulleted above. Provide eight separate binders each one identical.

- For ITS items (including but not limited to Dialup Modems Fiber Cable, Fiber Optic Modems, Ethernet switches, Intersection Video Detection System) provide a separate binder organized by sections that includes all ITS items. Refer to the submittal requirements in the appropriate GDOT Specification (including but not limited to [Section 935—Fiber Optic System](#), [Section 936—CCTV System](#), [Section 937—Video Detection System](#), [Section 938—Detection and Section 939—Communications & Electronic Equipment](#)).

#### **E. Test Results Submittal**

Submit the results of the testing of the following items to the Engineer. A copy of the test result submittals shall be provided to the maintaining agency.

- Loop Detector Testing
- Signal Cable Testing
- Interconnect Cable Testing
- Pre-emption Testing
- Controller and Cabinet Testing
- Any other operational testing required by the Engineer

#### **F. Mast Arm Pole Chart**

For locations with mast arm pole installations, submit a “Mast Arm Pole Chart” for review and approval by the State Bridge and Structural Design Engineer. The “Mast Arm Pole Chart” shall also include a sketch on an 8 ½ inch x 11 inch (216 mm x 279 mm) sheet of paper showing the following:

- Curb lines
- Location of mast arm pole based on utility information and field location verified by Contractor. (Final location of mast arm pole must meet the criteria for setback from the road as specified in the Roadside Design Guide by AASHTO and in the Standard Detail Drawings.
- Distance from both adjacent curbs to mast arm pole
- Distance along mast arm from pole to curb and from curb to each proposed signal head
- Directional arrow
- Street names
- Position of Luminaries

Label the sketched distances. Once this pole chart is approved, the Contractor shall use the distances measured to the proposed signal head locations when ordering the mast arm to ensure that the mast arm is fabricated with holes for signal head wiring in the correct locations.

## 647.2 Materials

### 647.2.01 Delivery, Storage, and Handling

#### A. State-supplied Equipment

For projects where traffic signal equipment is to be supplied by the Georgia Department of Transportation, obtain State-supplied traffic signal equipment from the Traffic Signal Electrical Facility (TSEF):

1. Contact the Engineer by phone or correspondence within one week after receiving the Notice to Proceed and arrange for a date, time and location to pick up the signal equipment and materials from the Traffic Signal and Electrical Facilities (TSEF) .
2. Sign GDOT's Warehouse Issue Request Form 592 to accept delivery of the State-supplied equipment from GDOT's Traffic Signal Equipment Warehouse. Initial Form 592 if equipment is received from a GDOT District Field Office.
3. Inspect the equipment to ensure that it is operating properly and perform any operational tests within ten (10) calendar days after receiving the equipment.
4. Before installation, and within ten (10) calendar days, certify to the Engineer in writing that the State-supplied equipment was received in good condition.
5. Notify the Engineer in writing if the State-supplied equipment is defective. The State Signal Engineer will replace the defective State-supplied equipment.
6. If no written dissent is received after ten (10) calendar days or if equipment is installed in the field, the Engineer will consider this equipment to be satisfactory and accepted.
7. The Contractor shall supply new equipment to replace State-supplied equipment that is damaged by the Contractor.

#### B. Signal Equipment

See [Section 925](#) for signal equipment specifications.

The signal equipment, components, supplies, or materials used in traffic signal installation may be sampled and tested if not previously approved by the Department.

Test according to the Specifications and the Sampling, Testing, and Inspection Manual using one or more of the following methods:

- Have the Department use their own facilities.
- Have the supplier or manufacturer use their facilities with an authorized Department representative to witness the testing.
- Provide independent laboratory test results indicating compliance with Department Specifications referenced in [Subsection 647.1.02, "Related References"](#), of this document.
- When testing by the Department is required, supply the item to the Department. Acceptance of materials tested does not exclude further testing or waive warranties and guarantees required by the Specifications.

#### C. Cable

Use cable conforming to [Section 680](#), [Section 922](#), and [Section 925](#) and the appropriate IMSA, NEMA, or UL Specifications for the wire or cable.

Obtain pole attachment permits required by local utility companies or pole owners to allow joint use for signal cable, hardware, or other auxiliary devices.

#### D. Interconnect Communications Cable

The interconnect cable (communication cable) links the master controller, the field controllers, and sensors. Communications cable (fiber communications cable) may also connect multiple devices such as CCTV's, CMS signs and other devices specified by the project. Interconnect communications cable may also consist of multiple strand fiber optic communication cable and /or "drop" cable assemblies used to provide continuous communications between system components. Follow these guidelines:

1. Use fiber optic interconnect cable for all new interconnected signal systems. See [Section 935](#) for fiber optic cable information, specifications, marking and installation and testing techniques.
2. Use copper cable only as directed by the Engineer or where specifically shown in the Plans. Refer to [Section 647.3.05, "Construction"](#), of this document for installation.

## **E. Messenger Cable**

Use cable conforming to ASTM A 475 Siemens-Martin grade or better with Class A coating. The messenger is used to support signal cable indicated in the Plans as overhead cable. Use devices such as wire ties or lashings to attach the cable.

- Before erecting the messenger strand, determine the suspension strand length to span the distance between the poles.
- Run the messenger strand from structure to structure without splicing.
- The maximum allowable sag is two and one-half percent (2.5%) of the longest diagonal distance between the signal poles.
- Calculate attachment points for the messenger strand at the signal pole according to the Plan Detail Sheet.

## **F. Conduit on Structures**

Use rigid metallic materials for all exposed conduit for cabling. Use metallic conduit on the exterior of signal poles and other structures and to house signal conductors for the entire length from the weather head on the pole to the interior of the cabinet or to the pull box (see [Subsection 647.3.05W](#)).

## **647.3 Construction Requirements**

Refer to [Subsection 107.07](#) of the Specifications regarding proper conduct of The Work.

### **647.3.01 Personnel**

For the definition of a qualified electrician, see [Subsection 755.1.01](#).

### **647.3.02 Equipment**

Use machinery such as trucks, derricks, bucket vehicles, saws, trenchers, and other equipment necessary for the work and approved by the Engineer prior to installation operations.

### **647.3.03 Preparation**

Utility Permits

#### **A. Application**

Apply for, obtain, and pay for utility services and pole attachment permits for signal operation, traffic signal communications including standard telephone service and DSL communications as required in the Plans.

#### **B. Maintenance**

The Contractor will be responsible for establishing utility services and ongoing monthly costs related to utility services until Final Acceptance of the signal(s) installation, or in the event of multiple installations, the Contractor will be responsible for utility costs until overall project acceptance. After Final Acceptance, the Contractor will provide an orderly transfer these services and permits to the local government or jurisdiction responsible for maintenance and operation. Ensure that the transfer does not interrupt service.

#### **C. Utility Location**

##### **1. Adjustment**

Prior to ordering signal poles, locate utilities and adjust the location of poles, where necessary, to minimize utility conflicts. Obtain approval from the District Traffic Engineer for any deviation from the Plans.

Determine the final length of mast arms based on any field adjusted pole locations. Final location shall be approved by the District Traffic Engineer.

##### **2. Clearance**

When installing aerial cable of any type, it is the Contractor's responsibility to ensure that overhead clearance and separation requirements conform to local utility company standards, the NEC and the NESC. Refer to the Standard Details Drawings for further information on utility clearances.



3. Pre-emption

When traffic signal pre-emption is used, coordinate with the railroad, fire department or any other agency that uses pre-emption to obtain pre-emption output and route output cable to the signal controller operating the intersection to be pre-empted. It is the Contractor's responsibility to obtain all permits and approval for crossing at grade or grade separated railroad facilities.

#### **647.3.04 Fabrication**

General Provisions 101 through 150.

#### **647.3.05 Construction**

##### **A. Acquiring and Disposing of Equipment**

Do not modify the signal equipment, design, and operation without the District Traffic Operations Engineer's written approval.

All traffic signal equipment removed or replaced shall be returned to District Traffic Signal Shops unless otherwise noted in the Plans or as directed by the Engineer or District Signal Engineer. All materials not returned to the District Signal shop shall be the responsibility of the Contractor to remove and dispose.

##### **B. Traffic Signal Equipment Modification and Removal**

Upon the Department issuance of Notice to Proceed any existing traffic signal equipment, responsibilities for maintenance, operations and response to traffic signal malfunction become the responsibility of the Contractor and provisions of Section 647.3.07, "Contractor Warranty and Maintenance", apply.

1. Remove existing signal equipment that is not used in the final installation when the new signal equipment is operational.

Carefully remove equipment to minimize damage and retain it in its original form. This equipment may include:

- Strain poles including the foundation down to 2 feet (600 mm) below ground level finished grade
- Timber poles
- Traffic signal cabinets including contents, cabinet base and work pads
- Original signal heads including span wire support
- Other equipment not retained in the final installation

Ensure that unused equipment is disposed of in accordance with all Environmental Protection Agency regulations.

2. If the Plans specify delivery of salvaged equipment to a Department facility, provide an inventory list and arrange a mutually agreeable delivery time with the District Signal Engineer twenty-four (24) hours in advance.
3. Replace traffic signal equipment that the District Signal Engineer determines has been damaged or destroyed during installation or modification of the traffic signal, at no expense to the Department. Replace with new material.
4. If the Engineer finds that the existing material shown in the Plans to be relocated is unsatisfactory, replace with new material. The costs will be paid for as Extra Work. Include the removal costs of all equipment, including salvaged equipment, in the cost of the overall bid price submitted.
5. Remove old signal heads by the end of the day that the new signal equipment is placed in operation. Remove all other signal equipment within seven (7) days after operations of the newly installed equipment.

##### **C. Auxiliary Cabinet Equipment**

Provide auxiliary cabinet equipment or special purpose equipment with connecting harnesses, if necessary, or as shown in the Plans or Standard Detail Drawings.

1. Install the equipment in its associated cabinet. Extraneous wiring may be necessary to install the equipment. Additional cabling shall be enclosed in rigid, galvanized conduit and neatly secured.
2. Connect the auxiliary equipment to its cable harness, or insert it in premounted racks or sockets.

##### **D. Signal Controllers**

Furnish and install approved microprocessor controllers at the locations shown in the Plans or as directed by the Engineer. All equipment furnished shall comply with [Section 925, "Traffic Signal Equipment"](#).



1. Identify the controller and other auxiliary equipment by serial number and model. These numbers shall agree with previously approved catalog submittals.
2. Assemble the controller, cabinet, and auxiliary equipment to provide the operational sequence shown in the Plans and future operations specified. Ensure the controller functions as a unit with the cabinet assembly.
3. Ensure controller and auxiliary equipment are provided AC power from receptacles marked for controller power.
4. The Department will provide controller firmware. The Contractor shall provide the controller to the Department. The Department will load the firmware into the controller and notify the Contractor that the controller is ready to be picked up. If the controller is purchased with applications firmware, ensure that the firmware provided is the current Department licensed version of firmware including “boot code”. Current firmware version shall be at the date of application ” turn on” .
5. Unless otherwise specified in the Plans or directed by the Engineer, the Contractor shall deliver the controllers to and pick up the controller from the District Signal Engineer. The Department shall have 10 work days to load the controller firmware starting from the date the Contractor delivered the controllers to the Department.
6. For 2070 signal controllers used for Ramp Metering ensure the Watchdog Timer “Muzzle Jumper” is selected on the field input/output module. This is required for operating with a 208 monitor.

## **E. Cabinet Assembly**

### **1. Location**

The cabinet should be located in accordance with the Plan location, however if the cabinet location needs to be moved, choose a location that:

- a. Protects maintenance personnel from vehicles when servicing the equipment
- b. Allows the front panel door of the controller to open away from the intersection for view of signal indications while servicing or performing cabinet work.
- c. Does not block a sidewalk or passageway and complies with Federal regulations for Americans with Disabilities Act (ADA) clearance requirements.
- d. Is located away from the roadway or curb line to prevent vehicular damage to the cabinet.
- e. Is not located within drainage areas or installed in areas likely to collect and hold surface water.

Relocate the cabinet to avoid conflicts from proposed reconstruction projects, commercial driveways, etc. within the right-of-way at the Engineer’s discretion.

### **2. Erection**

Install and level traffic signal controller cabinets at locations shown in the Plans and/or as directed by the Engineer.

- a. Install cabinets to conform to the Standard Detail Drawings. Install pole or base-mounted as indicated in the Plans.
- b. Seal base-mounted cabinets to their base using silicone based sealer. Pliable sealant used shall not melt or run at temperatures as high as 212 °F (100 °C).
- c. Use prefabricated bases and work pads
- d. Install technician pad in front and rear of the controller cabinet door. See Standard Details for pad information.
- e. Close all unused conduit in the controller base with a PVC cap sized appropriately. Do not permanently affix the conduit cap to the conduit. Seal those conduits used for signal cable with a pliable sealant to prevent moisture and insects from entering the cabinet via the conduit.

### **3. Field Cabinet Wiring**

All wiring shall be neat and secured and comply with NEC, NEMA, and [Table 647-1](#), [Table 647-2](#), [Table 647-3](#) [Table 647-4](#), [Table 647-5](#) and [Table 647-6](#) of this Specification.

- a. Cut field cabinet wiring to the proper length and organize it in the cabinet. Wire lengths should be slack allowing for future modifications.
  - Use at least No. 6 AWG wire on conductors between service terminals and the “AC+” terminals to signal light relays, and buss terminals.
  - Use at least No. 6 AWG wire on terminal connections to light neutral.
- b. Do not mount electrical meter to the cabinet. Submit ”power pedestal” or other method of providing location for mounting to the Engineer.
- c. Label all field terminals and conductors so as to identify the specific field input.

- d. Crimp terminal connections to conductors with a ratchet-type crimping tool that will not release until the crimping operation is completed.
- e. Do not use splices inside the controller cabinet, base, or conduit.
- f. Do not use solid wire, except grounding wire.
- g. Supply the cabinets with cabinet wiring diagrams, schematic drawings, pin assignment charts, and manuals for circuits and components. Store these documents in the cabinet in a resealable, weatherproof container.
- h. Ramp Metering requirements. The typical Ramp Meter layout is shown below:

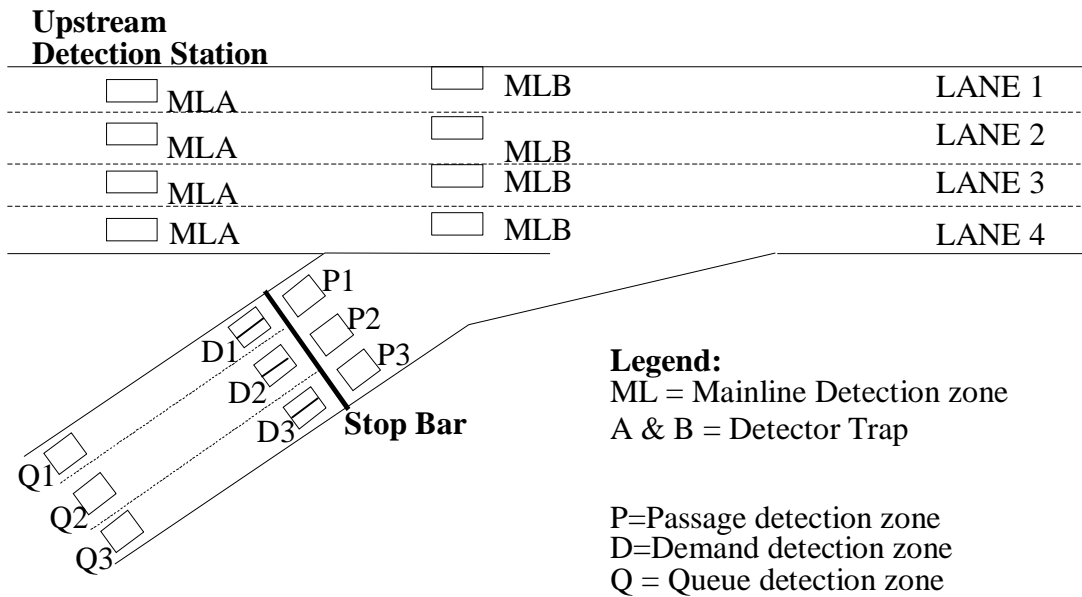


Figure 647-1 Typical Ramp Metering Layout

#### F. Signal Monitors

Furnish signal monitor equipment as follows,

1. Mount signal monitors in a rack with appropriate connectors to attach to the wiring harness.
2. Program the monitor according to the signal operation indicated in the Signal Plans before placing the installation in flash or stop-and-go operation. Provide any signal monitoring programming tools required to program the monitor to the maintaining agency.
3. Configure and equip the signal monitor to monitor all red signal indications. Ensure that the red output for unused or vacant load bays or output slots is jumpered to 120 V AC+.
4. For ITS Cabinets configure the CMU and AMU.
5. For Ramp Metering Cabinets mount model 208 monitor in rack and provide the necessary programming required for the Ramp Meter operation as shown in the Plans.

#### G. Power Disconnect

Install a power disconnect box at each intersection as shown in the Standard Detail Sheets. Ensure the power disconnect is installed at the top of the cabinet pole. Install service cables from disconnect box and terminate as specified on the controller cabinet-wiring diagram.

## H. Flashing Beacon

Furnish and install the flashing beacon controller at the locations shown in the Plans and/or as directed by the Engineer. Install it as a complete unit (solid state flasher and cabinet with time clock, if applicable) and ensure that it conforms to this Specification.

## I. Loop Detector Systems

Install and test loop detector systems according to NEMA Standards Publication TS 1-1983, Section 15, Inductive Loop Detectors, subsequent revisions (except as shown in the Plans), Details, notes, and this Specification.

Ensure that loop detectors are complete and fully operational before placing the signal in stop-and-go operation.

### 1. General Installation Requirements

Each loop must consist of at least two turns of conductor, unless otherwise shown in the Plans or this Specification. Do not place a portion of the loop within 3 feet (1 m) of a conductive material in the pavement such as manhole covers, water valves, grates, etc.

- a. Install pull boxes, condulets, and conduits before beginning loop installation.
- b. Ensure that the ambient pavement surface temperature in the shade is at least 40 °F (5 °C) before placing sealant into saw cuts.

### 2. Loop Saw Cuts

- a. Outline the loop on the pavement to conform to the specified configuration.
- b. Ensure each loop has a separate saw cut with a minimum distance between saw cuts of 12 inches.
- c. Install the detector loop in a sawed slot in the roadway surface deep enough to provide at least 3 inches (76 mm) of sealant cover.
- d. Ensure that the slot is at least 0.25 inches (6 mm) wide for stranded No. 14 AWG loop wire, THHN, THWN, XHHN, or XLPE, and at least 0.31 inches (7 mm) wide for polyethylene or PVC encased No. 14 AWG loop wire.
  - 1.) At the intersection of the slots, drill a 1.25 inch (31 mm) diameter hole or make miter saw cuts in the pavement. Overlap miter saw cuts at the intersection of saw cuts so that the slots have a full-depth and smooth bottom.
  - 2.) Prevent the wire from bending sharply.
  - 3.) Do not install detector loop wire unless sawed slots are completely dry and free of debris. Pressure wash the slot to guarantee adhesion of the loop sealant. Use compressed air to thoroughly dry the sawed slot.
  - 4.) Install the loop wire starting at the nearest pull box or condulet, around the loop for the specified number of turns, and back to the pull box or condulet.
  - 5.) Refer to table 647-9 for the number of turns for Quadrupole loops. Refer to table 647-8 for the number of turns for Bipole loops. Bipole loops require at least three (3) turns.

**NOTE: Loop wire from the street is to be spliced in condulets or pull boxes only.**

- e. Press the wire in the slot without using sharp objects that may damage the jacket.
- f. Hold the loop in place every 5 feet (1.5 m) with 1 inch (25 mm) strips of rubber, neoprene, flexible tubing, or foam backer rod as approved by the Engineer.
- g. Leave the hold down strips in place when filling the slot with loop sealant.
- h. Where encased loop wire is used, apply a waterproof seal to the ends of the polyethylene tubing that encase the wire to prevent moisture from entering the tube.
- i. Where the loop wires cross pavement joints and cracks, protect the loop wires using the method specified in "Miscellaneous Details" in the Plans.
- j. Twist Loop Lead-in 3 turns per foot.

### 3. Loop Sealing

After successfully testing each loop, fill the slots with sealant to fully encase the conductors.

- a. Seal the slot within one hour of cutting slot.
- b. Ensure that the sealant is at least 3 inches (75 mm) thick above the top conductor in the saw cut.

- c. Apply the sealant so that subsequent expansion does not extend the sealant material above the pavement surface.
  - d. Before the sealant sets, remove surplus sealant from the adjacent road surfaces without using solvents or epoxy sealants.
  - e. Obtain approval from the Office of Materials and Research to use polyurethane sealants. They shall conform to [Subsection 833.2.09](#).
  - f. When the Engineer determines that the loop sealant can accommodate traffic but the surface is tacky, dust the sealer on the pavement surface with cement dust before opening the roadway to traffic.
  - g. Dispose of the solvents used to clean loop installation equipment according to the manufacturer's specifications and local, State, and Federal regulations.
4. Loop Connections

Connect loop conductors to a shielded lead-in cable that runs from the pull box adjacent the pavement edge or conduit to the detector hook-up panel in the controller cabinet, unless otherwise specified in the Plans.

- a. Use continuous (no splices) shielded lead-in cable from the pull box or conduit to the cabinet input file terminal. Do not ground the shield in the loop lead-in cable at the cabinet.
- b. Connect each loop to an individual detector channel as specified in the Plans.
- c. If the Plans specify that two or more loops will be operated on the same detector channel or detector amplifier unit, wire them in series to their loop lead-in at the pull box or conduit.
- d. Use series-parallel connections when series connections do not meet the manufacturer's specified operating range for the detector amplifier unit.
- e. Make weather-tight and waterproof splices as detailed on the Plan Standard Detail Sheets. Make loop splices to loop lead-in cable only after the detector system has been tested and demonstrated under traffic conditions to the Engineer's satisfaction.

5. Loop Maintenance

Locate all existing loops, determine the operational status of all loop assemblies, and notify the Engineer prior to commencing loop construction activities at the intersection.

Maintain all existing, operational loops, unless otherwise notified by the Engineer. Repair of an existing loop that is non-operational prior to beginning work will be considered as extra work.

Locate points of conflict between new loops and existing loops, and install all new loops and saw cuts so as not to cut existing loop lead-ins and loop wires that are to be retained.

If an existing operational loop that is not scheduled for replacement fails during the construction time frame, notify the Engineer and complete the replacement of the damaged loops immediately.

The Engineer may grant a twenty-four (24) hour period to repair the loops if their operation is not critical. All costs associated with the replacement of the loops damaged during construction shall be charged and paid for by the Contractor.

**J. Pedestrian Push Button**

Install the push button with a pedestrian instruction sign as illustrated on the Department's Standard Detail Sheets and according to the Plans.

- 1. Place the pedestrian buttons as shown on the Signal Plan Sheet and within easy access of the pedestrian crosswalk. Position the pedestrian button to correspond to the appropriate signal phase. Locate pedestrian buttons perpendicular to the appropriate signal indication and signal phase, and as field conditions require.
- 2. Place the center of the buttons between 38 inches (0.965 m) and 42 inches (1.05 m) above the sidewalk or ground level.
- 3. Seal all openings to prevent moisture from entering the pushbutton.

**K. Cable**

Install and connect electrical cable to the proper equipment to produce an operating traffic signal system. Use stranded copper cable conforming to [Section 925](#).

Install wiring in accordance with ISMA, NEMA, UL, and the Department's Traffic Signal Wiring Standards, shown in [Tables 647-1, 647-2, 647-3, 647-4, 647-5 and 647-6](#) of this Specification.

In addition to the information provided below, see [Section 682](#), [Section 922](#), and [Section 925](#) for cable equipment and installation specifications.

<b>Table 647-1 Vehicular Signals Georgia DOT Wiring Standards</b>			
<b>Signal Indications</b>	<b>3-Section Signal Heads Seven Conductor Cable</b>		<b>5-Section Signal Heads Seven Conductor Cable</b>
	<b>Phases 2, 4, 6, and 8</b>	<b>Phases 1, 3, 5, and 7</b>	<b>Phases 1/6, 2/5, 3/8 &amp; 4/7</b>
<b>Red</b>	Red Wire		Red Wire
<b>Yellow</b>	Orange Wire		Orange Wire
<b>Green</b>	Green Wire		Green Wire
<b>Red Arrow</b>		White Wire with Black Tracker	
<b>Yellow Arrow</b>		Black Wire	Black Wire
<b>Green Arrow</b>		Blue Wire	Blue Wire
<b>Neutral</b>	White Wire	White Wire	White Wire

<b>Table 647-2 Vehicular Loop Detectors Georgia DOT Wiring Standards</b>				
<b>Detectors</b>	<b>Phases 3, 4, 7, and 8 Presence Loops</b>		<b>Phases 2 and 6 Setback Pulse Loops and Phases 1 and 5 Presence Loops</b>	
	<b>Loop Wires</b>	<b>Shielded Loop Lead-in Cable, 3 Pair</b>	<b>Loop Wires</b>	<b>Shielded Loop Lead-in Cable, 3 Pair</b>
<b>Right Curb Lane</b>	Red Wire	Red/Black Pair (1)	Red Wire	Red/Black Pair (1)
<b>Second Lane</b>	Green Wire	Green Black Pair (1)	Green Wire	Green Black Pair (1)
<b>Third Lane</b>	White Wire	White/Black Pair (1)	White Wire	White/Black Pair (1)
<b>Fourth Lane</b>	Red Wire	Red/Black Pair (2)	Red Wire	Red/Black Pair (2)
<b>Fifth Lane</b>	Green Wire	Green/Black Pair (2)	Green Wire	Green/Black Pair (2)
<b>Sixth Lane</b>	White Wire	White/Black Pair (2)		
<b>First Left-Turn Lane</b>			Red Wire	Red/Black Pair (3)
<b>Second Left-Turn Lane</b>			Green Wire	Green/Black Pair (3)

<b>Table 647-3 Pedestrian Signals Georgia DOT Wiring Standards</b>		
<b>Signal Indications</b>	<b>2-Section Signal Heads Seven Conductor Cable</b>	
	<b>Phases 2 and 6</b>	<b>Phases 4 and 8</b>
<b>Don't Walk</b>	Red Wire	White Wire with Black Tracker
<b>Walk</b>	Green Wire	Blue Wire
<b>Neutral</b>	White Wire	White Wire

<b>Table 647-4 Pedestrian Detectors Georgia DOT Wiring Standards</b>		
<b>Push Buttons</b>	<b>3 Pair Shielded Cable</b>	
	<b>Phase 2 and 6</b>	<b>Phase 4 and 8</b>
<b>Call</b>	Green and Black Pair	Red and Black Pair

**NOTE: Do not use aluminum cable.**

<b>Table 647-5 Ramp Meter Signals Georgia DOT Wiring Standards</b>	
<b>Signal Indications</b>	<b>3-Section Signal Heads Seven Conductor Cable L1,L2,L3</b>
<b>Red</b>	Red Wire
<b>Yellow</b>	Orange Wire
<b>Green</b>	Blue Wire
<b>Neutral</b>	White Wire

<b>Table 647-6 Ramp Meter Loop Detectors Georgia DOT Wiring Standards</b>				
	<b>Demand Detector Loops</b>		<b>Queue Detector Loops</b>	
	<b>Loop Wires</b>	<b>Shielded Loop Lead-in Cable, 3 Pair</b>	<b>Loop Wires</b>	<b>Shielded Loop Lead-in Cable, 3 Pair</b>
<b>Lane 1</b>	Red Wire	Red/Black Pair (2)	Red Wire	Red/Black Pair (1)
<b>Lane 2</b>	Green/Wire	Green Black Pair (2)	Green Wire	Green/Black Pair (1)
<b>Lane 3</b>	White Wire	White/Black Pair (2)	White Wire	White/Black Pair (1)
	<b>Passage Detector Loops</b>		<b>Mainline Detector Loops (if used)</b>	
	<b>Loop Wires</b>	<b>Shielded Loop Lead-in Cable, 3 Pair</b>	<b>Loop Wires</b>	<b>Shielded Loop Lead-in Cable, 3 Pair</b>
<b>Lane 1</b>	Red Wire	Red/Black Pair (3)	Red Wire	Red/Black Pair (4)
<b>Lane 2</b>	Green Wire	Green/Black Pair (3)	Green Wire	Green/Black Pair (4)
<b>Lane 3</b>	White Wire	White/Black Pair (3)	White Wire	White/Black Pair (4)

**L. Signal Cable for Vehicular Signal Heads and Pedestrian Heads**

Install cable for signal heads and pedestrian heads as follows:

1. For vehicle signal heads, install one 7-conductor signal cable for each intersection approach from the controller cabinet to the furthestmost through-signal head on each approach. From this furthestmost signal head, install a 7-conductor signal cable to each of the other signal heads on the same approach in sequence.
2. For pedestrian signal heads, install one 7-conductor signal cable from the controller cabinet to each pedestrian head installation location to operate either one or two pedestrian heads.
3. Make a minimum 1 foot (300 mm) diameter weather drip loop as shown in the Standard Detail Drawings in the Plans at the entrance to each pole, overhead conduit, and weatherhead.
4. Neatly tie signal cables leaving a structure or weatherhead to enter a signal fixture. Tie the cables to the messenger cable as illustrated in the Standard Detail Drawings.
5. Provide a 12 inch 3 turn diameter service loop at each signal head.
6. For Ramp Meter signal heads install one 7-conductor signal cable for each lane of the Ramp Meter operation from the controller cabinet .

#### M. Interconnect Communications Cable

Use fiber optic interconnect cable as specified in the Plans for all new interconnected signal systems. See Section 935 for fiber optic cable information, specifications and installation and testing techniques. Install interconnect communications cable as follows:

1. Provide support for the interconnect cable on new or existing utility poles or signal poles; install underground in conduit.
2. Use fiber optic standoff brackets as needed to prevent damage from poles, trees and other structures.
3. Pull cables with a cable grip that firmly holds the exterior covering of the cable.
4. Pull the cables without dragging them on the ground, pavement or over or around obstructions. The Engineer will inspect and approve the cable prior to installation. Use powdered soapstone, talc, or other approved inert lubricants to pull the cable through the conduit.
5. When using a separate messenger cable, spirally wrap the communications cable with a lashing machine according to the IMSA-20-2 Specifications.
6. Do not splice outside the signal cabinet except at the end of full reels of 5,000 feet (1500 m).
7. Ensure that splice points are near support poles and accessible without closing traffic lanes.
8. Unless drop cable assemblies for communications are used, loop the cable in and out of the control cabinets. Coil and tie 10 feet (3 m) of cable in the controller cabinet foundation. Tape the cable ends to keep moisture out until the terminals are attached.
9. Prevent damage to the cable during storage and installation.

<p><b>NOTE: Do not allow anyone to step on or run over any cable with vehicles or equipment.</b></p>
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#### N. Loop Detector Lead-in Cable

Use 3-pair shielded lead-in cable in compliance with [Section 925](#) and manufacturer's recommendations for Detector loop lead-in installed for loop detectors. Ensure the three pair has 3 separate distinguishing colors. Use a shielded lead-in cable connecting the loop to the detector hook-up panel in the controller cabinet, unless otherwise specified in the Plans. Provide a separate 3- pair for each phase or future phase.

1. Splice the loop detector wire to a shielded loop detector lead-in cable in a pull box adjacent to the loop detector installation.
2. Use continuous (no splices) shielded lead-in cable from the pull box or conduit to the cabinet input file terminal. Do not ground the shield in the loop lead-in cable at the cabinet.
3. Connect each loop to an individual detector channel as specified in the Plans.
4. Each detection loop shall be connected to the control cabinet via separate lead-in pair.
5. Set back loops with aerial loop leads to the control cabinet shall be supported by ¼ inch messenger cable with no splices between the control cabinet and the initial point of aerial attachment.
6. Make weather tight and waterproof splices between lead-in and loop wire. Loop installation may be approved only after the detector system has been tested and demonstrated under traffic conditions to the Engineer's satisfaction, during the Operational Test Period.



## O. Pedestrian Push Button Lead-in

Use 3-pair shielded lead-in cable compliant with [Subsection 925](#) for pedestrian push buttons. Install one 3-pair shielded lead-in cable to each pedestrian push button station(s) location to operate either one or two push buttons. Do not ground the shield for the push button lead-in cable at the controller cabinet. Do not use the same 3 pair cable for loop and pedestrian detectors.

## P. Messenger Cable, Stranded-Steel

Set messenger strands so that the height of the installed traffic signal heads conforms to the clearances on the Standard Detail Drawings. Lash cables to messenger cable or use lashing rods (Subsection 925.2.43). If lashing rods are used use lashing rods sized for the cables and messenger strand. Only use lashing rods that are of the same material as the messenger strand. .

1. Drill wood poles to receive the eye bolts so that the span wire and eyebolt at each connection form a straight angle.
2. Never pull or strain the messenger on the eye bolt to an angle of variance greater than ten degrees (10°).
3. Attach down guy wires to guy hooks. Never attach them directly to the eyebolt.
4. Ensure that messenger strand clearances conform with local utility company Standards.
5. Make stranded messenger cable attachment points with the appropriate size strand vises or 3 bolt clamps. Stranded steel messenger cable is not paid for separately under this Specification.
6. Use minimum ¼ inch messenger cable.
7. Use standoff brackets as needed to prevent damage from poles, trees or other structures.

**NOTE: Never splice messenger cable between structures or stand off brackets.**

## Q. Underground Cable for Signal Circuits

Underground cable for signal circuits includes cable, with conduit, as shown in the Plans. Install cable under existing pavement or surfaced shoulder, according to [Subsection 680.3.05](#).

### 1. Cable in Conduit

Pull cable into conduits as follows:

- a. Pull cables into conduits without electrical or mechanical damage. Pull cables by hand only. The use of trucks or other equipment is not permitted, unless approved by the Engineer. If mechanical pulling is approved, do not exceed the manufacturer's tension rating for the cable.
- b. Pull cables with a cable grip that firmly holds the exterior covering of the cable.
- c. Use powdered soapstone, talc, or other inert lubricants to place conductors in conduit according to manufacturer's recommendations.
- d. Handle and install the conductors to prevent kinks, bends, or other distortion that may damage the conductor or outer covering.
- e. Pull all cables in a single conduit at the same time. When pulling cables through hand holes, pole shafts, etc., use a pad of firm rubber or other material between the cable and the opening edges to prevent cable damage.
- f. When installing cable in conduit with existing signal cable circuits remove all existing cables and pull them back into the conduit with the new cables.
- g. The distance between pull boxes in a run of conduit shall not be greater than 100 feet (30 m), unless otherwise shown in the Plans or approved by the Engineer or District Signal Engineer, with the exception of fiber optic cable.
- h. The distance between pull boxes in a run of conduit for fiber optic cable shall not exceed 750 feet (225 m), unless otherwise shown in the Plans or approved by the Engineer. Identification tape and tone detection wire shall be used for fiber optic cable in conduit. All unused conduit shall have a continuous pull cable installed between pull boxes. All buried conduit shall be marked using sentinel marker posts identifying buried conduit at every pull box, approved by the Engineer. See [Section 682](#) for additional requirements.

### 2. Splices

Required splicing shall be performed according to the National Electric Code; use materials compatible with the sheath and insulation of the cable.

Insulate required splices with plastic, pressure sensitive, all-weather 1.5 mil (0.038 mm) electrical tape.



- a. Apply the tape half-lap to a thickness 1.5 times thicker than the factory-applied insulation and sheath. Taper it off over the sheath neatly to approximately 3 inches (75 mm) from the conductor splice.
- b. For cable splicing in junction boxes, use a heat-shrinkable, self-sealing splice instead of the above.
- c. Pad the sharp points and edges of the connector and fill voids with extra wraps of plastic tape. Do not stretch the tape excessively or cause creeping.
- d. Make the spliced joints watertight.

**Note: Splice detector wires to shielded loop detector lead-in at pull boxes located immediately after the loop wire leaves the roadway. No splices will be permitted in shielded loop detector lead-in cable from this point to the controller cabinet.**

## R. Aerial Cable for Signal Circuits

Aerial cable for signal circuits consists of one or all of the following cables:

- Loop lead-in (sensor and detector)
- Signal wiring (controller)
- Interconnect cable (communications)

Support these cables on existing or newly installed signal or utility poles as detailed in [Subsection 647.2.01.E](#).

## S. Conduit and Fittings

Install conduit by type (rigid, HDPE, PVC) as shown in the Plans and the Standard Detail Drawings. Refer to the NEC, for conduit full percentages.

Separate signal conductors from vehicle detector and communications interconnect cables, except inside of poles. Separate the power cable to the controller cabinet from all other cables in its own 1 in (25 mm) galvanized rigid steel conduit except inside poles. Ensure that conduit conforms to [Section 682](#), [Section 923](#) and [Section 925](#) with the following addition:

- Use flexible conduit only where shown in the Details or as directed to do so in writing by the District Signal Engineer.

Use the conduit size specified in the Plans, unless otherwise directed by the Engineer. Obtain written approval from the Engineer prior to installing conduit other than the size specified in the Plans.

All 2 inch (50 mm) conduit elbows shall be “sweep” type. The minimum radius for the elbow is 18 inches (450 mm), unless otherwise approved by the Engineer.

**NOTE: Do not use multi-cell conduit.**

Install conduit and fittings as follows:

1. Ensure that exposed conduit on poles are rigid, galvanized metal conduit.
2. Ream the ends of metallic conduit after cutting the threads. Ream other conduit as necessary.
3. Cut the ends square, and butt them solidly in the joints to form a smooth raceway for cables.
4. Make conduit joints to form a watertight seal.
5. Coat metallic conduit threads with red- or white-lead pipe compound, thermoplastic or Teflon seal. Ensure that they are securely connected.
6. Make plastic conduit joints with materials recommended by the conduit manufacturer.
7. Install bushings in the conduit to protect the conductors. When conduit is installed for future use, properly thread and cap the ends of the metallic conduit runs.
  - a. Plug the ends of nonmetallic conduit runs to prevent water or other foreign matter from entering the conduit system.
  - b. Seal the exposed conduit ends with a permanently malleable material.
  - c. Ensure that empty conduit installed for future wire or cable has a nylon pull string or cord inside that is impervious to moisture and rot and can withstand a load of 50 pounds (23 kg) without breaking. Secure this pull cord at each open end and at each pull box.

8. Ensure that conduit on pole exteriors are mounted with galvanized, two-hole straps or clamps. Place the clamps not more than 3 feet (1 m) from junction boxes, condulets, or weatherheads. Place it at 3 foot (0.9 m) intervals elsewhere.
  - a. Fasten the clamps to wood poles with galvanized screws or lag bolts.
  - b. Do not install conduit risers on concrete, steel, or mast arm poles unless approved by the Engineer.
9. Install a weatherhead at the end of exterior conduit runs on a pole or other structure to prevent moisture of other matter from entering the conduit.
10. After installation, ensure that the conduit or fitting placement has not warped or distorted any condulet, terminal, or control or junction box.
11. Ensure Conduit that is terminated at poles is grounded at the pull box.

## **T. Underground Conduit**

Underground conduit includes encased or direct burial conduit.

1. Install the conduit in a trench excavated to the dimensions and lines specified in the Plans.
  - a. Provide at least 18 inches (450 mm) finished cover, unless otherwise specified.
  - b. Under pavement, excavate at least 36 inches (900 mm) below the bottom of the pavement.
2. Before excavation, the Contractor is responsible for determining the location of electrical lines, drainage, or utility facilities in the area to prevent damage.
  - a. Place the conduit where it will not conflict with proposed guardrail, sign posts, etc.
  - b. Change locations of conduit runs, pull boxes, etc., if obstructions are encountered during excavation. Changes are subject to the Engineer's approval.
  - c. Where possible, provide at least 12 inches (300 mm) between the finished lines of the conduit runs and utility facilities such as gas lines, water mains, and other underground facilities not associated with the electrical system.
3. When the conduit run is adjacent to concrete walls, piers, footings, etc. maintain at least 4 inches (100 mm) of undisturbed earth or firmly compacted soil between the conduit and adjacent concrete or, when the conduit is encased, between the encasement and the adjacent concrete. Unless specified in the Plans, do not excavate trenches in existing pavement or surfaced shoulders to install conduit.
4. When placing conduit under an existing pavement, install the conduit by jacking and boring, or other approved means. See [Section 615](#) for jacking and boring pipe specifications. Obtain the Engineer's approval prior to installing conduit by means of boring-method.
5. When the Plans allow trench excavation through an existing pavement or surfaced shoulder, restore the pavement shoulder surface, base, and subgrade according to the Specification.
6. Cut trenches for conduit on a slight grade (0.25 percent minimum) for drainage, unless otherwise specified. When the grade can not be maintained all one way, grade the duct lines from the center, both directions, down to the ends.
7. Avoid moisture pockets or traps. Excavate vertical trench walls.
8. Tamp the bottom of the trench to produce a firm foundation for the conduit.
9. When necessary to prevent damage, sheet and brace the trenches and support pipe and other structures exposed in the trenches.
10. Conduit installed for fiber optic cable installation shall have identification tape and detectable tone wire installed for detection as specified and detailed in the Project Standard Detail Sheets.
11. Install direct burial conduit as shown in the Plans. Use rigid galvanized steel, polyvinyl chloride, or polyethylene conduit. Excavate at least 36 inches (900 mm) below the top of the finished ground or 36 inches (900 mm) below the bottom of the pavement.
12. When rock is in the bottom of the trench, install the conduit on a bed of compacted, fine-grain soil at least 4 inches (100 mm) thick.
13. Conduit installed for fiber optic cable installation shall have detectable tone wire installed for detection as specified in [Section 935](#) and detailed in Standard Detail Sheets.

## **U. Encased Conduit**

Place encased conduit in the locations shown in the Plans unless otherwise specified. Construct as follows:

1. Construct the encasement using Class A concrete that meets requirements in [Section 500](#).
2. Extend the encasement or conduit under roadway pavements or surfaces 6 inches (150 mm) past the outer edge of paved shoulders or sidewalks, or past curbs if no shoulder or sidewalk is present.
3. Extend the conduit at least 3 inches (75 mm) beyond the encasement.
4. Place 3 inches (75 mm) of concrete in the bottom of the trench and place the conduit on top of it.
5. Temporarily plug the ends of the conduit to prevent concrete or foreign materials from entering.
6. Cover the conduit with at least 3 inches (75 mm) of concrete. Wait to encase the conduit with concrete until the Engineer inspects and approves the conduit.
7. Cure the concrete encasement according to [Subsection 500.3.05.Z](#), except curing may be reduced to twenty-four (24) hours. Use a precast encasement if approved by the Engineer.

#### V. Backfilling

Immediately backfill the conduit after the Engineer's inspection and approval, except for encased conduit, which must complete a twenty-four (24) hour cure period.

1. Backfill with approved material free of rocks or other foreign matter.
2. Backfill in layers no greater than 6 inches (150 mm) loose depth, up to the original ground level.
3. Compact each layer to one hundred percent (100%) of the maximum laboratory dry density as determined by [GDT 7](#), [GDT 24a](#), [GDT 24b](#), or [GDT 67](#) whichever applies..

#### W. Conduit on Structures

Install conduits, condulets, hangers, expansion fittings, and accessories on structures according to the Plans and, unless otherwise specified, the following:

1. Run the conduit parallel to beams, trusses, supports, pier caps, etc.
2. Install horizontal runs on a slight grade without forming low spots so they may drain properly.
3. Run conduits with smooth, easy bends. Hold the conduit ends in boxes with locknuts and bushings to protect the conductors.
4. When not specified in the Plans or Special Provisions, submit the type and method for attachment to structures to the Engineer for submission to the District Traffic Operations Engineer for approval.
5. Ground galvanized rigid steel conduit in pull boxes.

All exposed conduit shall be galvanized, rigid conduit unless otherwise specified.

#### X. Testing Conduit

After installing the conduit, test it in the presence of the Engineer.

1. Test conduit using a mandrel 2 inches (50 mm) long and 0.25 inches (6 mm) smaller in diameter than the conduit.
2. Repair conduit to the Engineer's satisfaction if the mandrel can not pass through. If repairs are ineffective, remove and replace the conduit at no additional cost to the Department.
3. Thoroughly clean the conduits. When installing conduit but wiring at a later date:
  - a. Perform the mandrel test.
  - b. Ream the duct opening to remove burrs or foreign matter.
  - c. Thoroughly clean the duct.
  - d. Provide and install a weatherproof cap at each open end.
  - e. All installed conduit not used or containing cable shall have a continuous nylon pull string installed between junction boxes.

#### Y. Grounding

Ground the cabinets, controller, poles, pull boxes, and conduit to reduce extraneous voltage to protect personnel or equipment. See [Section 639](#) and [Section 924](#) for grounding requirements.

**NOTE: Grounding shall meet the minimum requirements of the NEC.**

Provide permanent and continuous grounding circuits with a current-carrying capacity high enough and an impedance low enough to limit the potential above the ground to a safe level.

Perform grounding as follows:

1. Bond the grounding circuits to nonferrous metal driven electrodes. Use electrodes that are at least 0.625 inches (15 mm) in diameter, 8 feet (2.4 m) long, and are driven straight into the ground.
2. Use the shortest possible ground lead that leads directly to a grounding source.
3. Ensure that the maximum resistance between the ground electrode and the cabinet ground buss or other point in the grounding system is no greater than twenty five (25) ohms.
4. Connect the ground electrodes and the ground wire with an exothermic weld.
5. Connect neutral conductors to the cabinet buss-bar and ground them at each terminal point.
6. Ground the cabinet with a No. 6 AWG solid copper wire between the buss-bar to the ground electrode. Bends shall not exceed 4 inch (100 mm) radius bends.
7. Permanently ground the poles by bonding the No. 6 AWG solid copper wire to a separate ground rod.
8. Ground pole-mounted accessories to the pole.
9. Underground metallic conduit or down guys are not acceptable ground electrodes. Do not use Snap-On connections.
10. For extended distances between Ramp Meter and IVDS additional grounding may be required by the manufacturer.

## **Z. Ground Rod**

Install copper clad ground rods in or adjacent to the traffic signal pole bases, controller cabinet bases, and pull boxes to shield and protect the grounding system.

When ground rods are not protected, bury them at least 2 inches (50 mm) below the finished ground level. See [Section 924](#) for information pertaining to ground rod composition.

1. Use 0.625 inch (15 mm) diameter ground rods at least 8 feet (2.4 m) long. Use copper clad ground rods.
2. Drive single ground rods vertically until the top of the rod is no more than 2 inches (50 mm) above the finished ground.
3. Attach a length of No. 6 AWG solid copper wire to the top of the ground rod using an exothermic weld.
4. When controller cabinets are mounted on timber poles, ground them with No. 6 AWG solid copper wire attached to the ground rod. Run the wire inside a minimum 0.75 inch (19 mm) rigid conduit attached to the timber pole and to the chassis ground in the controller cabinet.
5. When ground penetration is not obtained:
  - a. Place a horizontal ground rod system of three (3) or more parallel ground rods at least 6 feet (1.8 m) center-to-center and no more than 2 inches (50 mm) above the finished ground.
  - b. Ensure that this grounding system produces a resistance of 5 ohms or less.
  - c. Join the ground rods and connect them to the grounding nut of the traffic signal base with No. 6 AWG solid copper wire.
6. Install a ground wire on wood poles.
  - a. Use at least No. 6 AWG solid copper wire bonded to the grounding electrode and extending upward to a point perpendicular to the uppermost span.
  - b. Place wire staples no greater than 2 feet (0.6 m) apart to secure the ground wire to the pole.
  - c. Connect the span wire to the pole ground using copper split bolt connectors. Provide a separate ground rod for pole mount cabinets. Do not use the pole ground. Bond the pole ground to the pole cabinet ground rod.
7. Ensure that grounding for signal strain poles conforms to the grounding assembly typical erection Detail Sheet in the Plans.
8. Permanently ground cabinet and cabinet conduits to a multi-terminal main ground buss.
  - a. Use a No. 6 AWG solid copper wire bonded between the buss and grounding electrode.
  - b. Connect the power company neutral, conduit ground, and grounds of equipment housed in the cabinet to the buss-bar.
  - c. Do not ground to a permanent water system instead of the driven ground rod. Ensure that grounding devices conform to the requirements of the NEC and NEMA.
9. When testing for resistance ensure the ground is dry. The Contractor is responsible for submitting the ground test results.

## AA. Signal Poles

See [Section 501](#) for signal pole materials certification and [Subsection 925.2.27](#), [Subsection 925.2.28](#), [Subsection 925.2.29](#), [Subsection 925.2.30](#) and [Subsection 925.2.31](#) for traffic signal equipment. Refer to the Plans for pole locations. Where necessary, adjust pole location to avoid utility conflicts. Provide minimum clearance distances between the signal pole and the roadway as specified in the Plans and on the Standard Detail Drawings.

### 1. Strain Poles

Provide signal strain poles that conform to [Section 639](#).

Provide caissons or foundations that conform to the “Construction Detail for Strain Pole and Mast Arm Pole Foundations” in the Plans.

Determine the required foundation size based on the manufacturer’s specified “bending moment at yield” for each pole.

Provide strain poles with manufacturer-installed holes for pedestrian heads and push buttons. Seal unused holes with water tight plugs that match the pole finish provided by the manufacturer of the pole. All holes that are used shall have a rubber grommet or weather head.

Rake the poles during installation to provide a pole that is plumb once the load is applied.

### 2. Metal Poles

Install metal poles as follows:

- a. Ensure that anchor bolts, reinforcing bars, and ground rods conform to [Section 639](#) and [Section 852](#) and are placed in the excavation.
- b. Support the anchor bolts with a template to provide the proper bolt circle for the pedestal or pole to be installed.
- c. Wire the reinforcing bars together or to the anchor bolts.
- d. Wire the conduits in the base to the reinforcing bars for support. Ensure that they are accessible above and beyond the foundation.
- e. Before pouring the foundation concrete, determine that the anchor bolt orientation is correct so that the tensile load is divided between at least two anchor bolts. Pour and vibrate the concrete with the Engineer present.
- f. Ensure that the pole foundations and pedestals with the anchor-type base conform to [Section 500](#) and [Section 639](#). Do not install or locate poles without the Engineer’s approval. Ensure the foundation extends at least 2 inches above finished grade.

The Engineer may take a concrete test cylinder as it is being poured.

- 1.) Cure the cylinder and submit it for testing to the Office of Materials and Research.
  - 2.) If the concrete foundation fails to meet the requirements of the Specifications and is not accepted, replace the foundation upon notification of failure.
- g. After installing poles and applying the load of the signal span, inspect them for plumb and for the proper horizontal position of the mast arm, when applicable. Make sure all threads of the nut are threaded onto the anchor bolt.  
Correct deficiencies by using the leveling nuts on the anchor bolts or by adjusting the mast arm.
  - h. The Engineer will examine the pedestals and poles for damaged paint or galvanizing. Restore the finish coating where necessary.
  - i. After the Engineer approves the pole installation, provide an acceptable method of protecting the area between the pole base and the top of the foundation to prevent the accumulation of debris.

If the finish or galvanized steel materials is scratched, chipped, or damaged, the material will be rejected. The finish may be replaced as specified under [Section 645](#), with the Engineer’s approval.

**NOTE: Never add holes or openings to the metal pole or mast arm without approval from the Office of Bridge and Structural Design.**

- j. For poles or arms that need galvanization, thoroughly clean the steel poles and arms and touch up non-galvanized parts with i-d red or original-type primer.

Apply the remaining coats according to the System V (Heavy Exposure) [Section 535](#), unless otherwise indicated in the Plans. The entire pole shall be the same color.

- k. Install a service bracket and insulator on one pole at each intersection to attach power service wire as specified in the Plan Details. Install a disconnect box on the cabinet pole at each intersection to attach power service where the power service is provided overhead.
  - l. Install poles to which controller cabinets are attached with mounting plates, bolts, nipples, and at least two, 2 inch (50 mm) threaded openings at the top and bottom of the pole.
  - m. Attach the fittings to the poles as specified by the manufacturer in the Plans or as the Engineer directs. The fittings may include:
    - Cast aluminum cap
    - Pole clamp hardware for span wire attachment
    - Weatherhead with chase nipples and couplings
    - Galvanized elbow with bushing installed by cutting the pole and welding in place around the entire circumference
  - n. The Office of Materials and Research will inspect the anchor bolts. If approved, the Office of Materials and Research will display the inspector's hammer stamp mark on the top of the bolt.
3. Concrete Strain Poles
- a. Ensure that concrete strain poles meet the requirements of [Section 639](#). Use concrete poles that have threaded couplings to accept weatherheads, pedestrian head mounting hardware, or utility service points shown in the construction Details.
  - b. Install concrete strain poles so that the angle of variance between the eye bolt on the pole and the span wire is less than ten degrees (10°).
  - c. Verify pole hole orientations for pedestrian heads, pedestrian push button stations, luminaries arms, etc., with the Engineer prior to proceeding with traffic signal installation. For poles at cabinet location provide at least three 2 inch (50 mm) threaded openings.
  - d. Plug all unused holes. Use Grout or threaded fitting. Match the finish of the pole.
4. Mast Arms
- Install mast arms that can accommodate traffic signal mounting hardware and that adhere to the manufacturer's recommended procedures and [Section 925](#) and [Section 915](#). Do not add holes.
- a. Seal the openings in the mast arms to prevent pests from entering.
  - b. Align the mast arm to allow the signal heads to hang plumb at the correct height without using extensions.
  - c. All Mast arms are to be galvanized unless indicated otherwise in the Plans.

**NOTE: The Contractor shall submit a "Mast Arm Pole Chart" to the Engineer and the Office of Bridge and Structural Design for review and approval as described in [Subsection 647.1.03.F](#) of this Specification.**

Verify pole hole orientations for pedestrian heads, pedestrian push button stations, luminaries arms, etc., with the Engineer prior to proceeding with traffic signal installation.

5. Aluminum Pedestrian Pedestals Poles
- Install aluminum pedestal poles, which adhere to Section 850 on breakaway aluminum bases that meet the requirements for breakaway construction. See Section 925 for breakaway base requirements. See the Standard Detail Drawings for Pole and Foundation Details.
- a. Secure at least four anchor bolts in a concrete foundation as shown in the construction Detail.
  - b. As an alternate to a concrete foundation install a Pedestal Foundation Anchor Assembly (Subsection 925.2.29). Install the foundation until the top of the base plate is level with the ground. Slide bolt heads through the keyhole and under the base plate against the bolt head keepers with threads up. Bolt the pole base to the foundation. Adhere to the manufacturers instructions for installation.
    - 1.) Use a Universal Driving Tool with the correct kelly bar adaptor and bolts supplied with the tool.
    - 2.) Attach driving tool assembly to the foundation base plate using the bolts provided with each foundation. Be sure to align the tool soothe holes in the tool line up with the proper bolt circle on the foundation.



- 3.) Stand the foundation, with the attached drive tool assembly, upright and attach the drive-tool-foundation to the kelly bar.
  - 4.) Raise the kelly bar until the foundation swings free of the ground. Maneuver the kelly bar until the point of the foundation is over the marked installation location.
  - 5.) Lower the kelly bar until the point of the foundation is forced into the ground and the helix is flush with the ground surface.
  - 6.) Ensure the shaft of the foundation is plumb by checking the shaft with a level on tow sides that are at least 90 degrees from each other. Recheck the shaft to be sure it is plumb when the foundation has penetrated 1 foot into the ground.
  - 7.) When the base plate of the foundation is 1(25 mm) to 2 (50 mm) inches above the g round line remove driving tool.
- c. Contain the wiring inside the pole. Do not allow conduit outside the pole except to wire the pedestrian push button.
  - d. Position the pedestal pole plumb and high enough to clear the pedestrian’s head as shown in the Plans. Ensure that the bottom of the signal housing including brackets is not less than 9 feet or greater than 10 feet from the ground line.
  - e. Instruct the supplier to furnish a mill certificate that shows the alloy and physical properties of the steel used in fabricating the anchor bolts. The bolts may be subjected to a tensile and shear strength test.

6. Timber Poles

Timber poles do not require the use of concrete for filling the cavity around the pole base.

Use timber poles that meet the requirements of [Section 861](#). Use Class II for all signal support poles. Use Class IV for aerial loop lead-in or communication cable if approved by the Engineer. Poles shall be inspected and include AWW stamp.

Drill wood poles to receive the eye bolt so that the angle of variance between the eye bolt and span wire at each connection is less than ten degrees (10°). See the Standard Detail Drawings for additional information.

Guy timber poles use single or double guy wires as shown in the Plans and as directed by the Engineer. Guy helper cables with separate guy wires when helper signal span cables are indicated in the Plans.

**NOTE: Never attach down guy wires to eye bolts. Attach down guy wires to angle guy attachment only and install insulating rods on all down guy installations as detailed on Standard Detail Sheets .**

**BB. Pull Boxes**

Ensure that pull boxes conform to the Standard Detail Drawings or Plan Detail Sheet. Install pull boxes as required by the Specifications and Plans.

1. Include provisions for drains in pull box excavations as specified.
2. Do not place the aggregate for the drain until the Engineer approves the excavation.
3. Do not set the pull box until the aggregate is in place.
4. Set the pull boxes in place, level, and install conduits as required. Conduit entrance shall be through the open bottom in Types 1, 2, 3, 4S and 5S. Conduit entrance shall be through directly through cored holes in the side walls in Types 4 and 5. Conduit entrance shall be through the conduit terminators in Types 6 and 7.

Adjust the location of the pull box if necessary to avoid obstacles.

Where conduit entrance will be through the side wall in Types 4 and 5, or for conduit other than the terminator size provided in Types 6 and 7, use field cored conduit entrance holes in the side wall of the box. All field coring shall be made with a diamond-tipped masonry hole saw and according to the pull box manufacturer’s recommendations.

Use an underground-type conduit adhesive where joining conduit or conduit bodies of dissimilar materials, such as HDPE-to-PVC sweeps into pull boxes or installing into pull box conduit terminators.

- Do not locate pull boxes on the curb side of the signal pole in the intersection radius return
- Install pull boxes so that the long dimension is parallel to the adjacent roadway
- Install the pull box at a location that is level with the surrounding ground or pavement. Do not place a pull box in a ditch or depression. Unless otherwise shown in the Plans, when installed either in a sidewalk or in the ground, the top of the pull box shall be level with the sidewalk or ground surface

5. Obtain the Engineer's approval, and begin backfilling and installing the frame and cover. Ground metal lids or covers.

### CC. Span Wire and Span Wire Assemblies

Use span wire to support signal heads, cable, and other hardware only. Use messenger cable to support the aerial cable plant. Install span wire and messenger wire where specified in the Plans and in accordance with the Standard Detail Drawings. See [Section 925](#) for information on span wire and messenger cable.

1. Install signal span wire not to exceed the sag specified in the Standard Detail Drawings.
2. Use helper cables where specified in the Plans and on the Standard Detail Drawings.
3. See [Subsection 639.3.05.F](#) except, when erecting cable on a timber pole, in which case locate the attachment point a minimum of 18 inches (450 mm) from the top of the pole, to determine the required attachment point.
4. For construction of a box or modified box span, use bullrings. Be consistent throughout the intersection in use of bull rings or strandvises.
5. Install 12 inch (300 mm) diameter drip loop wrapped three times at the cable entrance to signal heads. Arrange cable so that it enters the structure from the bottom of the drip loop. Use a 24 inch (600 mm) diameter drip loop where cables enter a weatherhead and use 24 inch (600 mm) sag at corners of a span.
6. Lash cables to span wire or use aluminum wrap with at least three turns of wrap spaced at 6 inch (150 mm) increments.
7. Ground all span wire and down guy assemblies as shown on Standard Detail Sheets. Bond all span wire together and bond to ground at every pole.

### DD. Traffic Signal Heads

Place traffic signal heads according to the signal design and Plan Detail Drawings. Deviation from the Plans must be according to the MUTCD, current edition and at the Engineer's approval. Ensure all Traffic Signal Heads at an installation have the same appearance for the signal heads and the LED Modules. The Ramp Metering enforcement device shall be mounted on the back of one signal per lane and wired to the red display. The enforcement device shall be able to be viewed from downstream on the ramp.

1. Install traffic signal heads at least 17 feet (5.1 m), but no greater than 19 feet (5.7 m) over the roadway. All vertically attached signal head assemblies shall have a metal support plate installed within the top section (RED) indication of the signal head for additional support and stability. Install Ramp Metering traffic signal heads as shown on the Plans Detail Drawings.
2. Adjust signal heads on the same approach to have the same vertical clearance.
  - a. Measure the clearance from the pavement to the lowest part of the assembly, including brackets and back plates.
  - b. Mount traffic signals on the side of wood or metallic poles with a clearance of at least 12 feet (3.6 m) above the sidewalk or pavement grade of the center of the highway, whichever grade is higher.
  - c. Mount and adjust Ramp Metering traffic signals as per the Plan Detail Drawings.
  - d. Mount and adjust Ramp Meter enforcement device (head) as per the Plan Detail Drawings.
3. Connect the signal cable to the wire in each signal head to provide the correct signal indication when the cables are connected to the controller cabinet back panels. Do not splice cables. Use wire nuts to make the connections to the LED signal modules leadin. Make all connections in the top section.
4. Install optically programmable (OP) signal heads as shown in the Plans and Standard Detail Sheet and as directed by the manufacturer.
5. Mount OP heads securely or tether them to limit movement.
6. Mask the OP lamp for directing visibility under the Engineer's supervision.
7. Tether signal heads that have tunnel visors longer than 12 inches (300 mm), at the discretion of the Engineer.
8. Attach signal heads to mast arms using rigid mounting brackets. See [Section 925](#) for equipment information. Adjust signal heads on mast arms so that all red indications on the same mast arm are at the same elevation.
9. Install lane control heads for reversible lane systems and Ramp Metering heads as shown in the Plans and the Standard Detail Drawings. Center each signal over the lane or lanes under signal control.
10. Leave a vertical clearance for blank-out signs as shown on the Standard Detail Drawings. Use a spirit level to ensure that the bottom edge of each sign is horizontal.



## EE. Pedestrian Signal Heads

Install pedestrian signal heads on wood, concrete, steel strain poles, wood or steel auxiliary poles, or metal pedestal poles. Do not mix pole mount methods at the same intersection installation.

Install the pedestrian signal heads as shown on the Standard Detail Drawings and the intersection Plan Sheets and Drawings.

Leave a vertical clearance from the bottom of the head to the ground level of least 10 feet (3 m) unless specified by the Engineer.

### 1. Pedestal Mounts

Make pedestal mounts with a lower supporting assembly consisting of:

- a. A 4 inch (100 mm) slip-fitter bracket
- b. Hollow aluminum arms with a minimum inside cross-sectional area equal to a 1.5 inch (38 mm) pipe

Use serrated locking devices that firmly hold the signal heads in the required alignment.

### 2. Pole Mounts (Side of Pole)

For Metal poles, use side hinge “clamshell” mounting hardware or hardware as described in Wood Pole or Metal Pole alternate.

#### a. Side Hinge “Clamshell”

See the Standard Detail Drawings.

#### b. Wood Pole or Metal Pole alternate:

Make pole mounts with the upper and lower assembly consisting of:

- A post arm with a minimum cross-sectional area equal to a 1.5 inch (38 mm) pipe
- A post hub plate that matches the outside pole contour
- Secure the hubs to metal or concrete poles using 0.75 inch (19 mm) wide and 0.030 inch (0.75mm) thick stainless steel bands. Secure the hubs to wood poles using lag bolts

Space the junctions so that each pedestrian signal head can be directed toward approaching traffic as needed.

Use serrated locking devices that hold the pedestrian signal heads in alignment.

## FF. Blank-out Signs

Install blank-out signs as shown on Plans or as follows:

1. Securely fasten the signs to a stationary structure or to a messenger strand support system.
2. Center each sign over the lane or lanes under sign control, where applicable.
3. Leave a vertical clearance for blank-out signs as shown in the Plans or in Subsection [647.3.05.DD, “Traffic Signal Heads.”](#) Use a spirit level to ensure that the bottom edge of each sign is horizontal.
4. Use terminal strips to connect each sign electrically to the external control box or cabinet.
5. Install Ramp Meter Advance Warning Flasher Blank-out signs as shown on the Plans Detail Drawings.

## GG. Battery Backup System (BBS)

Install Battery Backup System (BBS) if indicated on the Plans. Only install Battery Backup Systems at locations using LED Signal Heads. Install in accordance with the option as indicated on the Plans.

With the Battery Backup submittal provide calculations for determining the size of the inverter and batteries based on the actual power requirements for the intersection installation. Ensure that all auxiliary items are included in the calculations. Ensure the submittal specifies the model number and the firmware revision that is being supplied.

Ensure that the external cabinet supplied meets the Section 925 Specifications and is base mounted next to the 332A cabinet as specified. Do not attach the battery external cabinet to the 332A cabinet unless otherwise specified. The external cabinet option allows for 2 separate configurations. Ensure that the correct configuration is installed in accordance with the Plans. Make all connections to the 332A cabinet through the base of the cabinets.

Provide date of manufacture of all batteries provided.

Ensure the BBS functions as required by the specifications. Ensure the “ON BATTERY” relay provides an input into the controller Alarm 2.

Provide copy of all documentation (Operation and Maintenance Manual) for items supplied. Include with documentation any communications firmware and cable required interrogate the unit for status, setup or logs.

## HH. Wireless Communications

Install, and integrate the spread spectrum wireless radio system with all necessary hardware in accordance with Special Provision: Section 926 – Wireless Communications Equipment: and Section 927 Wireless Communications Installation.. Prior to installing any equipment perform a radio path Site Survey test. Ensure the test evaluates the Signal Strength (dBm), Fade Margin (dB), Signal-to-Noise Ratio, Data Integrity (poll test), and a complete frequency spectrum scan. Ensure the radio path site survey test is performed using the supplied brand of radio equipment to be deployed. During the initial radio path signal strength test it may be determined that a repeater station may be necessary to complete the intended link. Provide the test results to the Engineer for review and approval. Submit copies of the test results and colored copies of the frequency spectrum scan along with an electronic copy of this information. Final locations of antennas and any necessary repeater stations are to be approved by the Engineer.

Install the antenna in such a manner that avoids conflicts with other utilities (separation distances in accordance with the guidelines of the National Electrical Safety Code) and as specified in the antenna manufacturer's recommendations. Secure the antenna mounting hardware to the pole and route the coaxial cable such that no strain is placed on the coaxial connectors. On wood pole installations run a separate ground from the antenna to the base of the pole. Bond the antenna mounting hardware to the pole ground using # 6 AWG bare copper wire using split bolt or compression type fitting.

Do not exceed the 1inch (25.4 mm) bend radius of the coaxial cable as it transverses from the cabinet to the antenna assembly. Connect the lightning arrestor to the coaxial cable in the equipment cabinet. Properly ground and secure the arrestor in the cabinet. Permanently label all cables entering the cabinet. Ensure that the power supply for the radio system is NOT connected to the GFCI receptacle circuitry located in the cabinet. Place a copy of all manufacturer equipment specifications and instruction and maintenance manuals in the equipment cabinet.

At certain locations it may be necessary to integrate the radio system with an existing communications system. Follow the Details shown in Plans.

### 647.3.06 Quality Acceptance

#### A. Testing Loop Detector Installation

Test each loop after installing the conductors in the slots cut in the pavement and before sealing.

- Perform a test where the loop wire is spliced to the shielded lead-in wire and where the shielded lead-in wire enters the controller cabinet
- If there are no splice points, such as in direct entry to the controller cabinet, only perform the tests at the controller
- Record the test results on the Loop Installation Data Sheet in [Table 647-10](#), as shown in this section. Make copies of the data sheet as needed
- Include the data sheets in the records, and place a copy in the controller cabinet

Conduct the following five (5) tests to evaluate each loop installation for acceptance before sealing the loop in the pavement:

##### 1. Induced AC Voltage Test

Read 0.05 V AC or less on a digital voltmeter or no deflection on the pointer of an analog meter.

##### 2. Inductance

Inductance (I) is measured in microhenries (mH), and the total inductance is equal to the inductance of loop plus inductance of the loop lead-in.

Acceptable inductance is within 10 percent (10%) of the calculated value for a single loop with the design criteria listed in [Table 647-8](#) and [Table 647-9](#):

<b>Table 647-8 Standard (Bi-Pole) Loops</b>	
6 ft x 6 ft (3 turns) [1.8 m x 1.8 m (3 turns)]	l = 76 mH per 100 feet of loop lead-in cable l = 76 mH per 30 m of loop lead-in cable
6 ft x 30 ft (2 turns) [1.8 m x 9 m (2 turns)]	l = 126 mH per 100 feet of loop lead-in cable l = 126 mH per 30 m of loop lead-in cable
6 ft x 40 ft (2 turns) [1.8 m x 12 m (2 turns)]	l = 165 mH per 100 feet of loop lead-in cable l = 165 mH per 30 m of loop lead-in cable
6 ft x 50 ft (2 turns) [1.8 m x 15 m (2 turns)]	l = 205 mH per 100 feet of loop lead-in cable l = 205 mH per 30 m of loop lead-in cable
6 ft x 70 ft (2 turns) [1.8 m x 21 m (2 turns)]	l = 285 mH per 100 feet of loop lead-in cable l = 285 mH per 30 m of loop lead-in cable

<b>Table 647-9 Quadrupole (QP) Loops</b>	
6 ft x 30 ft (2, 4, 2 turns) [1.8 m x 9 m (2, 4, 2, turns)]	l = 269 mH + 23 mH per 100 feet of loop lead-in cable l = 269 mH + 23 mH per 30 m of loop lead-in cable
6 ft x 40 ft (2, 4, 2 turns) [1.8 m x 12 m (2, 4, 2, turns)]	l = 349 mH + 23 mH per 100 feet of loop lead-in cable l = 349 mH + 23 mH per 30 m of loop lead-in cable
6 ft x 50 ft (2, 4, 2 turns) [1.8 m x 15 m (2, 4, 2, turns)]	l = 429 mH + 23 mH per 100 feet of loop lead-in cable l = 429 mH + 23 mH per 30 m of loop lead-in cable
6 ft x 60 ft (2, 4, 2 turns) [1.8 m x 18 m (2, 4, 2, turns)]	l = 509 mH + 23 mH per 100 feet of loop lead-in cable l = 509 mH + 23 mH per 30 m of loop lead-in cable
6 ft x 70 ft (2, 4, 2 turns) [1.8 m x 21 m (2, 4, 2, turns)]	l = 589 mH + 23 mH per 100 feet of loop lead-in cable l = 589 mH + 23 mH per 30 m of loop lead-in cable

3. Leakage Resistance to Ground

The resistance to ground shall be 5 Mohm or more.

4. Loop Resistance

The resistance reading on an ohmmeter is approximately within ten percent (10%) of the calculated value:

- Acceptable Resistance @ (dc @ 68 °F [20 °C]):ohms( $\mu$ )
- No. 18 AWG wire: R = 29.4 $\mu$ /mile (or) R = 5.5 x 10<sup>-3</sup> $\mu$ /ft. Approximately 5.5 ohms per 1,000 feet of No. 18 AWG wire)[R = 18.3 $\mu$ /km (or) R=18.3 x 10<sup>-3</sup> $\mu$ /m]
- No. 14 AWG wire: R = 13.32 $\mu$ /mile (or) R = 2.523 x 10<sup>-3</sup> $\mu$ /ft. Approximately 2.52 ohms per 1,000 feet of No. 14 AWG wire)[R = 8.3 $\mu$ /km (or) R=8.3 x 10<sup>-3</sup> $\mu$ /m]
- No. 12 AWG wire: R = 5.2 $\mu$ /mile (or) R = 9.85 x 10<sup>-4</sup> $\mu$ /ft. Approximately 0.98 ohms per 1,000 feet of No. 12 AWG wire [R = 3.24 $\mu$ /km (or) R = 3.24 x 10<sup>-3</sup> $\mu$ /m]

5. Loop Q

Q at 50 kHz is greater than 5.

Report to the Engineer an out-of-range reading on any of the above tests. If a test is found unacceptable, remove the loop, install new wire, and repeat the test procedure.

Include in the test results:

- Type and model number of the equipment used (must be ohmmeter having a high resistance scale of R x 10 KW or greater)
- The last calibration date of the equipment and the scale used

Check the loop using an impedance tester to determine the natural operating frequency and impedance. Ensure that the completed units detect all motor vehicles. If the loop detection system does not meet the above test requirements, payment will not be made for work on the signal installation until corrections are completed.

<b>Table 647-10 Loop Installation Data Sheet</b>	
<b>Conditions</b>	
Project Number:	
Date:	
Contractor:	
Weather:	
Temperature:	
Pavement Condition - Wet ( ) or Dry ( )	
<b>Location</b>	
City or County:	Phase:
Intersection Name or Number:	Function:
Route Number(s) or Name (s):	Lane Location:
Installation or Plan Sheet Number:	No. of Turns:
Size and Type of Loop:	Downstream/Upstream: Down ( ) Up ( )
Distance from Stop Bar:	Distance E.O.P./Curb to Lead-in:
Distance Lead-in Cable:	
<b>Material</b>	
Loop Wire Color/Insulation Type/Gauge:	
Loop Lead-In Wire Color/Insulation Type/Gauge:	
Splice Point:	
Conduit Length from Curb/E.O.P. to Splice Point:	
Conduit Length from Splice Point to Cabinet:	
Sealant Type and Part Number:	
Sealant Manufacturer and Lot No.:	
Interconnect Wire Type and Length:	
<b>Loop Tests</b>	
1. Induced Voltage _____ 2. Inductance _____ microhenries 3. Leakage Resistance to Ground _____ megohms 4. Loop Resistance _____ ohms 5. Loop Q (Quality) _____ Q	
<b>Comments</b>	
Inspector's Name, and Title	

**B. Field Tests**

In addition to performing tests during installation and before turning on the equipment, perform the following tests on traffic signal circuits in the presence of the Engineer:

- Test each circuit for continuity

Test each circuit for grounds. If a test fails, repair the circuit immediately. New signals shall operate in the flash mode for three (3) days prior to beginning stop-and-go operation unless otherwise directed by the Engineer.

For Ramp Metering:

The Contractor shall submit to and obtain approval from the Engineer for Ramp Metering testing procedures for each specific Ramp Meter location. The testing procedure shall demonstrate that all components: hardware, cable, and connections furnished and installed by the Contractor operates correctly and that all functions are in conformance with the specifications.

At a minimum, the Contractor shall demonstrate to the Engineer:

- The IVDS and loop detectors at each location are functioning properly with expected accuracy as specified. IVDS burn-in period shall only be in conjunction with the Ramp Meter signal burn-in period of 30 days.
- The Ramp Meter signals function properly at all stages, including non-metering, startup, metering, and shutdown.
- In multi-lane configurations, the Ramp Meter can operate a simultaneous release of vehicles from all lanes and as well as an alternating or staggered release of vehicles from the two (or three) lanes..
- Queue detectors are functioning as specified, including both queue detection and queue override.
- The Ramp Meter functions properly for both local traffic responsive and time of day operations.
- The advance warning sign can be clearly seen and can be activated and deactivated properly.
- The Ramp Meter can communicate properly with the hub/TMC.
- The traffic enforcement heads are operating as per the Plans and can be seen by enforcement personnel.

The Contractor shall coordinate closely with Engineer for conducting Ramp Meter field operational tests. Note: Pretest should be performed prior to calling the Engineer for formal field tests inspection. Pretest shall be defined as conducting all field tests in accordance with the Ramp Metering field testing procedures submitted and approved. Results of pretests shall be recorded and submitted to the Engineer. The Engineer may require the Contractor to address particular items noted in the pretest before beginning the actual field tests.

Operational test shall not begin until the field tests are accepted by the engineer. that will be performed during the Engineer's inspection. Begin operational tests after the Engineer is satisfied that all work has been completed. After the Ramp Meter has been placed in operation, the Contractor, in coordination with the system integrator, shall demonstrate that all equipment furnished and installed by the Contractor operates with all software and firmware as specified.

After successful completion of the test procedure, each Ramp Meter assembly shall go through a burn-in period for 30 consecutive days of normal Ramp Metering operations. During the burn-in period, the Contractor shall ensure that all Contractor-supplied equipment operates without failures of any type. If any equipment component malfunctions or fails to provide the specified functionality during the 30-day burn-in period, the Contractor shall replace or repair the defective equipment within 48 hours of notification by the Engineer.

After the malfunctioning component(s) have been repaired or replaced to the satisfaction of the Engineer, the Contractor shall begin a new 30-day burn-in period. The new 30-day burn-in period shall apply only to equipment components supplied by the Contractor. In the event of a failure or malfunctioning of equipment furnished by others which prevents the 30-day burn-in test from continuing, the Engineer will suspend the burn-in test and resume when the other equipment failures are corrected.

### **C. Operational Tests and Equipment Activation**

#### **After the equipment is installed and**

the field tests are completed successfully the Contractor shall request an initial equipment inspection. The Engineer shall notify in writing the District Signal Engineer a minimum of 10 working days prior to the inspection. The District Signal Engineer shall provide an in depth inspection and provide a written punch list of items for the Contractor to correct. Within ten days of the notification the Contractor shall correct the items noted.

Prior to activating new equipment and before removal of any existing intersection control or equipment, test and ensure any communications equipment is functional.

In the event that programming of the controller application is not a pay item for the contract the Engineer will notify the District Signal Engineer a minimum of 10 working days prior to activating the equipment.

Prior to activating equipment all Inductance loop, video detection equipment and detection zones shall be functional and operational.

When defects are resolved, the District Signal Engineer will begin the Contractor's operational test period to demonstrate that every part of the system functions as specified. The operational test shall be concurrent for the entire project.

1. The operational test for the traffic signal and Ramp Metering projects shall be at least thirty (30) days of continuous, satisfactory operation.
2. If a component or system fails or shows unsatisfactory performance, the condition must be corrected and the test repeated until thirty (30) days of continuous satisfactory operation is obtained.
3. The District Traffic Engineer will send the Engineer and Construction Office a letter showing the start, termination, suspension, or successful completion of the operational test period.
4. The District Engineer may recommend payment only after the successful completion of the test period.
5. The Contractor shall obtain written acceptance of the signal installation from the District Traffic Operations Engineer before Final Acceptance.

Costs incurred during operational tests, including power consumption, shall be at the Contractor's expense and included in the price bid for Contract Items.

### **647.3.07 Contractor Warranty and Maintenance**

#### **A. Traffic Signal Equipment Maintenance**

Perform an inspection with the Engineer to determine the operational status of existing field equipment and finalize materials and equipment that is to be removed due to the project.

Prepare written directions identifying what equipment was operational and non-operational and responsibility for repair.

Functional responsibility for new traffic signal equipment installed will become the responsibility of the Contractor until acceptance of the project. Contractor responsibility for operation, maintenance and response to reports of operational or equipment malfunction for existing or newly installed signal material at the intersection begins from the issuance of the Notice to Proceed (NTP) until Final Acceptance of the project.

Measure and document existing vertical signal head clearance during the inspection. Maintain existing vertical clearances until Final Acceptance.

Failure to measure and document vertical clearances as part of the inspection will require that all signals be maintained with a vertical clearance of 17 feet (5.1 m) until Final Acceptance. Maintain newly installed signals continuously as detailed in following sections, until Final Acceptance.

Provide a telephone number where the Worksite Traffic Control Supervisor (WTCS) responsible representative of the Contractor can be reached twenty four (24) hours a day seven (7) days a week in the event of an emergency.

If a signal is not functioning properly:

##### **1. Non-Emergency**

Commence work on this signal within three (3) days of the written notice from the Engineer. Failure to respond shall result in a per calendar day charged against monies due or that may become due until the maintenance work is started.

Liquidated damages are in addition to those specified in [Subsection 108.08, "Failure or Delay in Completing Work on Time,"](#) for delay or failure in completing the Work within the specified time and to the satisfaction of the Engineer.

The Contractor shall be responsible for all materials, equipment and expertise necessary to correct signal malfunction or repair.

##### **2. Emergency**

If the Engineer determines that the signal malfunction or failure is an operational hazard, the Contractor is to take corrective action within three (3) hours of the first attempt of notification. Response shall be considered only when qualified personnel and equipment are provided.

Failure to respond within three (3) hours will result in a non-refundable deduction of money of \$1,000.00 with an additional charge of \$500.00 per hour after the first three (3) hours until qualified personnel and equipment arrives on site and begins corrective action.

In addition, the cost of labor and material will be charged by the Department if the Department takes corrective action using its own forces or local municipality forces.

Total charges will not exceed \$5,000.00 (per emergency call) in addition to the material cost and labor incurred to make repairs by the Department or local municipality forces respond to the malfunction.

The Department will not be held responsible or liable for any alleged damage to the signal or as a result of the signal malfunction due to problems that may occur after Department or local municipality forces make emergency repairs.

The Contractor shall be responsible for all materials and equipment necessary to correct signal malfunction or repair.

Final Acceptance will not be given until payment for such work is received.

## **B. Warranties**

Provide manufacturer's warranties or guarantees on electrical, electronic, or mechanical equipment furnished, except state-supplied equipment.

Ensure that warranties and/or guarantees are consistent with those provided as customary trade and industry standard practices; or as otherwise specified in the Plans, Standard Specifications, or Special Provisions.

Upon Final Acceptance, transfer the manufacturer and Contractor warranties or guarantees to the Engineer. Ensure that warranties are continuous and state that they are subject to transfer.

Acceptance or approval of the Work does not waiver warranties or guarantees where required by the Specifications. Final Acceptance will not be granted until all warranties and guarantees are received.

## **C. Guaranties**

Repair and/or replace all equipment and material supplied under these Contract Documents which has been determined by the Engineer to not meet Specifications.

The Engineer reserves the sole right to determine suitability or unsuitability of the supplied equipment and material. The Contractor shall bear the total cost of delivery and transportation related to the repair and replacement of equipment and material throughout the duration of the Contract unless otherwise approved by the Engineer.

Transfer to the Engineer any warranties and guaranties remaining on all items after Final Acceptance. Perform transfer at 12:01 AM of the day following Final Acceptance.

## **647.4 Measurement**

### **647.4.01 General**

Traffic signal items complete, in place, and accepted of the kind, size, and type specified shall not be measured separately. Includes:

#### **A. Traffic Signal Installation**

Furnishing labor, materials, tools, equipment, and incidentals required to complete the work unless otherwise specified in this Subsection.

#### **B. Communications Wire, Fiber Optic Cable**

Communications cable, wire or fiber optic cable.

#### **C. Strain Poles, Traffic Signs**

#### **D. Highway signs, strain poles and pull boxes**

### **647.4.02 Limits**

General Provisions 101 through 150.

## **647.5 Payment**

### **647.5.01 General**

This item will be paid for under CONSTRUCTION COMPLETE. Includes furnishing labor, materials, tools, equipment, and incidentals required to complete the work.

Costs for installation, operation, maintenance, and removal of the traffic signal equipment are included under this Item.

No additional payment will be made for testing and storing State-supplied or Contractor-furnished traffic signal equipment.

Payment for various elements of traffic signals will be as shown on the Plans.

**A. Partial Payment**

The Contractor may initiate a partial payment process for the lump sum traffic signal Items by submitting a written request to the Engineer. If the Engineer approves this request, payment will be made as follows:

Underground (loops, pull boxes, and conduits)	20%
Overhead (span, heads, poles, push buttons)	30%
Cabinet, contents, and base	20%
Successful completion of operational test	10%

**647.5.02 Adjustments**

General Provisions 101 through 150.



**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SPECIAL PROVISION**

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

**Section 648-Traffic Impact Attenuator**

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*Delete Section 648 and substitute the following:*

**648.1 General Description**

This work includes furnishing and installing impact attenuator units/arrays to conform with Plan locations and details and/or as directed by the Engineer. All impact attenuator units/arrays shall be tested and approved at the specified NCHRP 350 Test Level.

**648.1.01 Definitions**

General Provisions 101 through 150.

Gating-A gating end treatment allows a vehicle impacting the nose or the side of the unit at an angle near the nose to pass through the device

Non- Gating-A non-gating end treatment is capable of redirecting a vehicle impacting the nose or the side of the unit along the unit's entire length.

**648.1.02 Related References**

**A. Standard Specifications**

General Provisions 101 through 150

**B. Referenced Documents**

National Cooperative Highway Research Program (NCHRP) Report 350.

ASTM A 123/A 123M

QPL 64

Roadside Design Guide

**648.1.03 Submittals**

**A. Installation Drawings**

Submit all required certifications, test reports and drawings of details for completing the installation. Obtain Engineer's approval of these documents before beginning work on attenuator installation. Portable Impact Attenuator arrays shall meet the requirements of Ga. Std. 4962, or manufacturer specifications.

**B. Manufacturer's Information**

## Section 648 – Traffic Impact Attenuator

---

Submit certification from the manufacturer that the attenuator unit/array and its interconnecting hardware replicates an NCHRP-350 approved attenuator in an accepted letter from the FHWA. Furnish items such as manufacturer's brochures or specifications that completely outline the manufacturer's recommendations for materials and installation methods. All workmanship and materials are subject to the Engineer's approval.

### 648.2 Materials

#### A. Attenuator

1. Ensure that materials are in accordance with the manufacturer's recommendations, specifications and details.
2. Use attenuators that have been classified as "accepted" by the Department's Office of Materials and Research and approved by the Federal Highway Administration (FHWA) as meeting NCHRP-350 for the test level specified
3. Ensure that restoration and/or repair can be accomplished without the necessity of removing the unit/array from the original location.
4. Where required, ensure the approach end of the attenuator is equipped with a reflectorized object marker in accordance with Plan Details. The object marker may be furnished by the manufacturer of the attenuator or by others. Ensure that the front most section of the unit (the "nose") is yellow in color unless specified otherwise.
5. Where required, use an approved back-up system as specified in the Plans.
6. For non-gating attenuators, anchor the attenuator to the pavement according to a system recommended by the manufacturer for the type pavement encountered.
7. Use Class "A" concrete for reinforced concrete pads, concrete back up if used, and concrete transition where required.
8. Use metal components and hardware galvanized according to ASTM A 123/A 123M unless otherwise specified. Ensure all metal components and hardware of permanent attenuators are free of corrosion when shipped.
9. In freezing conditions, water filled attenuators shall be treated according to the manufacturer's recommendations.

#### 648.2.01 Delivery, Storage, and Handling

##### A. General

General Provisions 101 through 150.

### 648.3 Construction Requirements

#### 648.3.01 Personnel

General Provisions 101 through 150.

#### 648.3.02 Equipment

General Provisions 101 through 150.

#### 648.3.03 Preparation

General Provisions 101 through 150.

#### 648.3.04 Fabrication

##### A. Design Criteria and Type Selection

The Impact Attenuator Unit Type will be shown on the plans. Two characters designate the type Permanent attenuator.

- First character  
Indicates the type of permanent installation.  
The letter "P" designates a permanent installation.  
The letter "S" designates a permanent self restoring (non-gating) installation which is capable of withstanding multiple hits without requiring repair or adjustment.
- Second character  
Designates the required NCHRP test level.
- Third character  
Indicates the traffic flow direction(s).

## Section 648 – Traffic Impact Attenuator

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The letter "B" indicates bi-directional traffic typical for median applications or when the unit is installed on the shoulder of a two-lane, two-way traffic facility. Bi-directional means traffic flows in opposite directions at the site of the attenuator installation.

The letter "U" indicates uni-directional traffic flow typical for gore areas. Uni-directional means traffic on both sides traveling the same direction, from the nose to the rear of the unit.

The letter "S" indicates traffic flow in one direction on a single side only, typical for a unit located on the outside shoulder of a roadway with one-way traffic and the other side of the attenuator not being exposed to traffic.

- Fourth character

Indicates the numerical value of the width, in inches (millimeters), of the base of the rigid object that the attenuator will be shielding.

At bridge columns, this character is typically the width of the column plus the barrier base widths on the column sides at the pavement surface.

### B. Example

A Type P-3-U-60 attenuator designates

a permanent installation

tested and approved at NCHRP test level 3

Uni-directional traffic flow

a 5' (1500 mm) wide base for the rigid object being shielded.

Temporary portable units/arrays may be either gating or non-gating based on construction sequencing and/or field conditions, See Specification Section 150. Unless otherwise specified, all permanent attenuators shall be non-gating.

#### 648.3.05 Construction

Field locate the position of the attenuator nose as shown on the plans prior to beginning the installation. Have any variations approved by the Engineer.

If the length of the attenuator unit/array is less than that indicated in the plan details for the specified conditions, the length of the concrete transition section or the length of the longitudinal barrier shall be increased as needed to provide a proper beginning point for the attenuator nose as shown in the plans.

The length of the system will be the combined length of the attenuator unit/array, the back-up system and any required transition. The length of the system shall not be excessive to the extent that it intrudes appreciably within the clear offset distance as shown on the plans.

The increased length of transition or barrier is considered as an incidental part of the system and will not be itemized separately.

Temporary portable units/arrays shall be installed, moved, reinstalled and maintained as required.

#### 648.3.06 Quality Assurance

Obtain certification from the manufacturer that the impact attenuator unit/array installed meets all required approvals and specifications and furnish these to the Engineer.

Furnish any mill test/galvanizing test reports and heat numbers for all metal components of the unit per current requirements of the Department's Office of Materials and Research.

#### 648.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

### 648.4 Measurement

No measurement to be included for this item. Includes components, hardware, anchors, incidentals, freeze treated water or sand, and labor for each installation shown on the plans or as directed by the Engineer.

**648.4.01 Limits**

**General Provisions 101 through 150.**

**648.5 Payment**

Payment will be made under CONSTRUCTION COMPLETE. Includes materials, labor, and incidentals necessary to complete the Item including installing, moving, reinstalling and maintaining Units/Arrays as required and the back-up system and transitions where required.

**648.5.01 Adjustments**

General Provisions 101 through 150.

February 15, 1999  
Revised September 2, 2002  
Revised July 21, 2003  
Revised January 8, 2004  
Revised April 9, 2004  
Revised February 28, 2007

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SPECIAL PROVISION**

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

**Section 652—Painting Traffic Stripe**

---

*Retain Section 652 and add the following:*

**Section 652—Polyurea Traffic Stripe**

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**652.1 General Description**

This work includes furnishing and applying reflectorized traffic line paint according to the Plans and these Specifications.

This Item also includes applying words and symbols according to Plan details, Specifications, and the current Manual on Uniform Traffic Control Devices.

**652.1.01 Definitions**

Painted Stripes: Solid or broken (skip) lines. The location and color are designated on the Plans.

Skip Traffic Stripes: Painted segments between unpainted gaps on a designated sequence with a ratio of 1:3 [ 10 ft (3 m) segment and 30 ft (9 m) gap] as specified on the Plans. The location and color are designated on the Plans.

**652.1.02 Related References**

**A. Standard Specifications**

**General Provisions 101 through 150.**

[Section 656—Removal of Pavement Markings](#)

[Section 870—Paint](#)

**B. Referenced Documents**

[QPL 46](#)

AASHTO M 247

ACI Method 503

ASTM C 4060

## Section 652—Painting Traffic Stripe

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ASTM D 711

ASTM D 1155

ASTM D 1213

ASTM D 4061

ASTM D 6359

ASTM E 303

ASTM E 1710

ASTM G 154

Federal Standard No. 595A-17778

### 652.2 Materials

#### A. Polyurea Composition Requirements

- Use a polyurea composition that is specifically formulated for use as a durable pavement marking material and for application at elevated temperatures not exceeding 170 °F (77 °C).
- Ensure the liquid markings consist of a two-component (Part A and Part B), 100% solids polyurea film formulated and designed to provide a simple volumetric mixing ratio as recommended by the manufacturer.
- Use white or yellow films for the markings. Ensure that these films are manufactured without the use of lead chromate pigments or other similar, lead-containing chemicals.
- Ensure that the white polyurea contains not less than 13% by weight rutile titanium dioxide pigment to insure adequate opacity, hiding power, and reflective properties.

#### B. Glass Beads and Ceramic Reflective Elements

Use glass beads and/or ceramic reflective elements for the reflective media system that ensures the polyurea pavement markings meet the reflectance performance requirements in Section 652.2.C.2.

#### C. Finished Product Requirements:

##### 1. Composition

Ensure that the retroreflective pavement markings consist of a mixture of high-quality resins, curing agent and pigments, with a reflective layer bonded to the top surface consisting of glass beads.

##### 2. Reflectance

When applied according to the manufacturer's recommendations, ensure that the white and yellow markings have the average initial and 12 months retroreflectance values shown in the tables below, as measured in accordance with the testing procedures of ASTM D4061 or ASTM E 1710.

An observation angle of 1.05° and an entrance angle of 88.8° corresponds to 30 meter geometry. The photometric quantity to be measured is the coefficient of retroreflected luminance ( $R_L$ ) and is expressed as millicandelas per square foot per foot-candle  $[(\text{mcd}\cdot\text{ft}^{-2})\cdot\text{fc}^{-1}]$ . The metric equivalent is expressed as millicandelas per square meter per lux  $[(\text{mcd}\cdot\text{m}^{-2})\cdot\text{lx}^{-1}]$ .

Determine the initial and 12 months retroreflectance of a single installation according to the measurement and sampling procedures outlined in ASTM D 6359, using a 30-meter retroreflectometer.

Average Minimum Initial Reflectance		
	White	Yellow
Entrance Angle	88.8°	88.8°
Observation Angle	1.05°	1.05°

## Section 652—Painting Traffic Stripe

Retroreflected Luminance $R_L [(mcd \cdot ft^{-2}) \cdot fc^{-1}]$	600	400
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Measure initial performance of pavement markings within 7 days after application.

Average Minimum Reflectance at 12 Months		
	White	Yellow
Entrance Angle	88.8°	88.8°
Observation Angle	1.05°	1.05°
Retroreflected Luminance $R_L [(mcd \cdot ft^{-2}) \cdot fc^{-1}]$	400	250

### 3. Color

Meet these color requirements:

- White markings are pure white and free from dirt or tint.
- Yellow markings are “Federal Yellow” in color.
- The material does not change its color and brightness characteristics after prolonged exposure to sunlight.

### 4. Skid Resistance

Ensure the surface of the retroreflective marking provides an initial average skid resistance value of 45 BPN when tested according to ASTM E303.

### 5. Color and Weathering Resistance

Ensure that the mixed polyurea compound, both white and yellow, when applied to 3 in (75 mm) x 6 in (150 mm) aluminum panels at  $15 \pm 1$  mils ( $0.381 \text{ mm} \pm 0.025 \text{ mm}$ ) wet thickness without glass beads and exposed in a Q.U.V. Environmental Testing Chamber, as described in ASTM G-53-77, conforms to the following minimum requirements:

- The color of the white polyurea compound is not darker than Federal Standard No. 595A-17778.
- The color of the yellow polyurea compound meets the requirements of the “Federal Yellow” color chart.

### 6. Drying Time (Laboratory)

When tested in accordance with ASTM D-711 the polyurea marking material shall reach a no-pick-up condition in 10 minutes or less. Perform this test with ASHTO M247 Type 1 beads applied at a rate of 0.099 pounds per square foot ( $0.483 \text{ kg/m}^2$ ). Ensure that the drying time does not increase substantially with decreasing temperature.

### 7. Drying Time (Field)

When installed at 77 °F (25 °C), at a wet film thickness of  $20 \pm 2$  mils ( $0.508 \text{ mm} \pm 0.051 \text{ mm}$ ) and reflectorized with glass beads and/or ceramic reflective elements, ensure that the polyurea markings reaches a no-track condition in less than 10 minutes. Dry to “no-tracking” will be considered as the condition where no visual deposition of the polyurea marking to the pavement surface is observed when viewed from a distance of 50 feet (15 m), after a traveling vehicle’s tires have passed over the marking.

### 8. Abrasion Resistance

Ensure that the wear index of the polyurea compound does not exceed 0.00026 lbs (120 mg) when tested in accordance with ASTM C4060 using a CS-17 wheel and under a load of 2.2 lbs (1000 g) for 1000 cycles.

### 9. Adhesion to Concrete

Ensure that the polyurea pavement marking materials, when tested according to ACI Method 503, have such a high degree of adhesion to the specified concrete surface that there is a 100% concrete failure in the performance

## Section 652—Painting Traffic Stripe

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of this test. Condition the prepared specimens at room temperature  $75 \text{ }^\circ \pm 2 \text{ }^\circ\text{F}$  ( $24 \text{ }^\circ\text{C}$ ) for a minimum of 24 hours and maximum of 72 hours prior to the performance of this test.

### 10. Adhesion to Asphalt

Ensure that the polyurea pavement marking materials, when tested according to ACI Method 503, have such a high degree of adhesion to the specified asphalt surface that there is a 100% asphalt failure in the performance of this test. Condition the prepared specimens at room temperature  $75 \text{ }^\circ \pm 2 \text{ }^\circ\text{F}$  ( $24 \text{ }^\circ\text{C}$ ) for a minimum of 24 hours and maximum of 72 hours prior to the performance of this test.

## 652.3 Construction Requirements

### 652.3.01 Equipment

#### A. Traveling Traffic Stripe Painter

To apply the traffic marking material, use a mobile, truck mounted and self contained pavement marking machine, specifically designed to apply two-component liquid materials, and glass beads, in a continuous and skip-line pattern.

Apply the two-component liquid materials through airless impingement mixing guns. The guns must accommodate a plural component material system at the manufacturer's recommended volumetric mixing ratio. The guns must have the capacity to deliver materials from approximately 1.5 (5.7 L) to 3 gal (11.4 L) per minute to compensate for a typical range of application speeds of 3 mph (5 km/h) to 6 mph (10 km/h). Ensure that the machine travels at a uniform rate of speed both uphill and downhill.

Select the necessary accessories such as spray tip, mix chamber or static tube, and rod diameter to ensure proper mixing.

Ensure that the machine meets the following:

- The machine is capable of applying three separate stripes, either solid or skip, in any specified pattern by utilizing three adjacent spray nozzles at the same time.
- Each nozzle is equipped with satisfactory cutoff valves that will apply skip lines automatically.
- The application equipment is maneuverable to the extent that straight lines can be followed and normal curves can be made in a true arc.
- The truck-mounted unit is provided with accessories to allow for the marking of symbols and legends.

Ensure that the mobile applicator also includes the following features:

- The mobile applicator provides individual material reservoirs for the storage of Part A and Part B of the resin composition.
- The applicator is equipped with heating equipment of sufficient capacity to maintain the individual resin components at the manufacturer's recommended temperature for spray application.
- The applicator is equipped with separate temperature controls for each component.
- The applicator is equipped with glass bead dispensing equipment and capable of applying the glass beads at a uniform rate.
- The application equipment is equipped with metering devices or pressure gauges on the proportioning pumps as well as stroke counters to monitor volumetric usage. Ensure that the metering devices or pressure gauges and stroke counters are visible.
- The applicator is equipped with all the necessary spray equipment, mixers, compressors, and other appurtenances to allow for the placement of reflectorized pavement markings in a simultaneous sequence of operations.

#### B. Cleaning Equipment

Use brushes, brooms, scrapers, grinders, high-pressure water jets, or air blasters to remove dirt, dust, grease, oil, and other foreign matter from painting surfaces without damaging the underlying pavement.



## Section 652—Painting Traffic Stripe

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### 652.3.02 Preparation

Before painting, thoroughly clean pavement surfaces of dust, dirt, grease, oil, and all other foreign matter.

Remove concrete curing compounds on new Portland cement concrete surfaces and existing pavement markings on both concrete and asphalt surfaces.

### 652.3.03 Construction

#### A. Atmospheric Conditions

Apply pavement markings only during conditions of dry weather and subsequently dry pavement surfaces. Ensure that the pavement surface temperature and the ambient temperature at the time of installation are both greater than 40 °F (4 °C) and that the relative humidity is not greater than 85%.

#### B. Alignment

Ensure that the traffic stripe is the specified length, width, and placement. On sections where no previously applied markings are present, ensure accurate stripe location by establishing control points at spaced intervals. The Engineer will approve control points.

#### C. Application

Apply the pavement markings as follows:

1. Apply the liquid marking material by spray method and according to the manufacturer's installation instructions.
2. Ensure marking configurations are in accordance with the "Manual on Uniform Traffic Control Devices."
3. Place the reflectorized pavement markings only on properly prepared surfaces and at the widths and patterns designated on the Plans. Do not begin marking operations until applicable surface preparation work is completed and approved by the Engineer.
4. Air-blast the surface first, to remove any dirt and residues from the pavement. Then apply the pavement markings as a continuous operation.
5. Heat Component A and Component B to the manufacturer's recommended temperatures.
6. Ensure that mixing of the two components occurs in a static tube or impingement chamber prior to reaching the application spray nozzle.
7. Spray the mixed resin onto the pavement surface at a minimum uniform wet thickness of 20 mils (0.51 mm).
8. Immediately following application, drop the glass beads and/or ceramic reflective elements onto the liquid marking at the application rates recommended by the binder manufacture.
9. The work will be subject to application rate checks for both paint and beads.

Following an application of glass beads, and upon curing, ensure that the resulting marking is an adherent reflectorized stripe of the specified thickness and width that is capable of resisting deformation by traffic.

#### D. Protective Measures

Protect newly applied paint as follows:

1. Traffic  
Control and protect traffic with warning and directional signs during painting. Set up warning signs before beginning each operation and place signs well ahead of the painting equipment. When necessary, use a pilot car to protect both the traffic and the painting operation.
2. Fresh Paint  
Protect the freshly painted stripe using cones or other satisfactory devices. Repair stripe damage or pavement smudges caused by traffic according to [Subsection 652.3.06](#).

#### E. Appearance and Tolerance of Variance

Continually deviating from stated dimensions is cause for stopping the work and removing the nonconforming stripe. (See [Section 656](#).) Adhere to the following measurements:

## Section 652—Painting Traffic Stripe

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1. Width

Do not lay stripe less than the specified width. Do not lay stripe more than 1/2 in (13 mm) over the specified width.

2. Length

Ensure that the 10 ft (3 m) painted skip stripe and the 30 ft (10 m) gap between painted segments vary no more than  $\pm 1$  ft (300 mm) each.

3. Alignment

- a. Ensure that the stripe does not deviate from the intended alignment by more than 1 in (25 mm) on tangents or curves of 1 degree or less.
- b. Ensure that the stripe does not deviate by more than 2 in (50 mm) on curves exceeding 1 degree.

### 652.3.04 Quality Acceptance

Ensure that stripes and segments of stripes are clean-cut and uniform. Markings that do not appear uniform or satisfactory, either during the day or night, or do not meet Specifications or become marred or damaged by traffic or from other causes, will be corrected at the Contractor's expense.

Sections of painted stripe, words, and symbols placed according to the Plans and Specifications and have dried so that paint will not be picked up or marred by vehicle tires will be accepted. The Contractor will be relieved of responsibility for maintenance on accepted sections.

#### A. Correction of Alignment

When correcting a deviation that exceeds the permissible tolerance in alignment, do the following:

1. Remove the affected portion of stripe, plus an additional 25 ft (8 m) in each direction.
2. Paint a new stripe according to these Specifications.

Remove the stripe according to [Section 656](#).

#### B. Removal of Excess Paint

Remove misted, dripped, or spattered paint to the Engineer's satisfaction. Do not damage the underlying pavement during removal.

Refer to the applicable portions of [Section 656](#).

### 652.4 Measurement

No measurement to be included for this item.

### 652.5 Payment

Payment will be made under CONSTRUCTION COMPLETE.

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SPECIAL PROVISION**

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

**Section 653—Thermoplastic Traffic Stripe**

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*Delete Section 653.1.02.B and substitute the following:*

**B. Referenced Documents**

[QPL 46B](#)

[QPL 71](#)

AASHTO M 249

AASHTO T 250

ASTM D 476

ASTM D 2240

ASTM D 4764

ASTM D 4960

*Delete Section 653.1.03 and substitute the following:*

**653.1.03 Submittals**

Ensure that the producers of the thermoplastic compound and glass spheres furnish to the Department copies of certified test reports showing results of all tests specified in this Section. Also, ensure that producers certify that the materials meet the other requirements of this Section by submitting copies of certification at the time of sampling.

*Delete Section 653.2.A and substitute the following:*

**653.2 Materials**

**A. Requirements**

Ensure that the resin of the thermoplastic material is an alkyd binder. The binder shall be Type A – alkyd. Ensure that at least one third of the binder composition is solid maleic-modified glycerol ester resin and is not less than 8% by weight of the entire material formulation. Do not use alkyd binder that contains petroleum based hydrocarbon resins. Ensure that the finished thermoplastic material is not adversely affected by contact with pavement materials or by

## Section 653—Thermoplastic Traffic Stripe

petroleum droppings from traffic. Use thermoplastic material that is produced from an approved source listed on [QPL 46B](#). Also ensure that thermoplastic material meets the requirements of AASHTO M 249 with the following exceptions:

### 1. Color

Confirm the color of thermoplastic is as follows:

- a. White-Use titanium dioxide that meets the requirements of ASTM D 476, Type II Rutile, as the pigment for white thermoplastic material. White thermoplastic material shall be free from dirt or tint. White thermoplastic material heated for  $240 \pm 5$  minutes at  $425 \pm 3$  °F ( $218 \pm 2$  °C) and cooled to  $77 \pm 3$  °F ( $25 \pm 2$  °C) shall match Federal Test Standard Number 595b-Color 17925. The material, when compared to the magnesium oxide standard using a standard color spectrophotometer according to ASTM D 4960, shall meet the following:

Scale	Definition	Magnesium Oxide Standard	Sample
Rd	Reflectance	100	75 min.
a	Redness-Greenness	0	-5 to +5
b	Yellowness-Blueness	0	-10 to +10

- b. Yellow-Yellow thermoplastic material heated for  $240 \pm 5$  minutes at  $425 \pm 3$  °F ( $218 \pm 2$  °C) and cooled to  $77 \pm 3$  °F ( $25 \pm 2$  °C) shall match Federal Test Standard Number 595b-Color 13538. The material, when compared to PR#1 Chart using a standard color spectrophotometer according to ASTM D 4960, shall plot within the following chromaticity coordinates:

Scale	1	2	3	4	5
X	0.492	0.513	0.514	0.507	0.483
y	0.471	0.463	0.460	0.445	0.445

### 2. Indentation Resistance

Measure the hardness by a Shore Durometer, Type A2, as described in ASTM D 2240. Maintain the temperature of the Durometer, 4.4 lb. (2 kg) load and the specimen at 115 °F (45 °C). Apply the Durometer and 4.4 lb. (2 kg) load to the specimen and the reading shall be between 50 to 75 units, after 15 seconds.

### 3. Reheating

Ensure that the compound does not break down, deteriorate, scorch, or discolor if held for 6 hours at the plastic temperature of 425 °F (218 °C); and if reheated up to the plastic temperature 4 times.

### 4. Drop-On Glass Spheres

Ensure that the spheres meet the requirements of [Subsection 652.2](#). Also, ensure that the spheres are produced from an approved source listed on [QPL 71](#).

### 5. Sealing Primer

Place the particular type of two-part epoxy binder-sealer at the application rate as recommended in writing by the thermoplastic material manufacturer.

*Delete Section 653.4 and substitute the following:*

## Section 653—Thermoplastic Traffic Stripe

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### **653.4 Measurement**

No measurement to be included for this item.

#### **653.4.01 Limits**

General Provisions 101 through 150.

*Delete Section 653.5 and substitute the following:*

### **653.5 Payment**

Payment will be made under CONSTRUCTION COMPLETE. Removal of existing traffic striping will not be paid for separately.

#### **653.5.01 Adjustments**

General Provisions 101 through 150.

MATERIALS AND RESEARCH

**GEORGIA DEPARTMENT OF TRANSPORTATION**  
**STATE OF GEORGIA**  
**SPECIAL PROVISION**

**Project Number: CSNHS-0008-00(232)**  
**P.I. Number: 0008232**  
**Troup County**

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**Section 657— Preformed Plastic Pavement Markings**

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*Delete Subsection 657.1 and Substitute the following:*

**657.1 General Description**

This work includes placing plastic pavement markings or legends according to the Plans and Specifications or as otherwise directed.

**657.1.01 Definitions**

General Provisions 101 through 150.

**657.1.02 Related References**

**A. Standard Specifications**

General Provisions 101 through 150.

**B. Referenced Documents**

ASTM D 638

ASTM D 4061

ASTM E 303

ASTM E 1710

Manual on Uniform Traffic Control Devices for Streets and Highways

[QPL 74](#)

**657.1.03 Submittals**

Transfer to the Department manufacturer warranties or guarantees for heat-applied and wet reflective preformed plastic marking materials. Ensure that warranties or guarantees state that they are subject to transfer.

*Delete Subsection 657.2 and Substitute with the following:*

**657.2 Materials**

Select one of the following types of preformed marking material according to the Plans and Proposal:

## Section 657— Preformed Plastic Pavement Markings

- Type TR – Temporary Removable Plastic Marking
- Type TN – Temporary Non-Removable Plastic Marking
- Type PA – Permanent Plastic Marking
- Type PB – Permanent Patterned Plastic Marking
- Type PW – Permanent Wet Reflective Plastic Marking

For a list of sources, see [QPL-74](#).

### A. General Requirements for Preformed Pavement Markings

#### 1. Shapes and Sizes

Use markings that conform to the shapes and sizes outlined in the Manual on Uniform Traffic Control Devices for Streets and Highways.

#### 2. Pigmentation

Use white or yellow pigmented plastic according to each marking type.

#### 3. Adhesion

Use markings that can be affixed to bituminous or Portland cement concrete pavements by pressure-sensitive precoated adhesive or a liquid contact cement.

Ensure that marking adhesive adheres to the roadway under normal climactic and traffic conditions.

#### 4. Conformability

Use markings that will mold to pavement contours, breaks, faults, and the like, by normal action of traffic at normal pavement temperatures.

#### 5. Resealability

Use markings containing resealing characteristics that allow the material to fuse to itself or to similar previously applied material under normal use.

#### 6. Glass or Ceramic Beads

Use markings with a layer of glass or ceramic beads bonded to the surface according to the marking type. Type PB contains ceramic beads and glass beads. Types TR, TN, and PA contain only glass beads.

Use glass beads with less than 2% by weight showing any milkiness, scoring or scratching. Use clear, transparent beads that are free from air inclusions and conform to the following:

	Glass Beads	Ceramic Beads
Refractive Index, (tested by oil immersion)	1.50 minimum	1.70 minimum
Uniform Distribution of Spheres	0.75 minimum	0.75 minimum

#### 7. Reflective Intensity

Determine reflective intensity using photometric testing procedures of Federal Specification L-S-300 A, Paragraph 4.4.7.

Ensure that marking types TR, TN, and PA use white or yellow film with the initial reflective intensity indicated in the table below, when measured at the angles shown. See [Subsection 657.2.C.2.k](#) for reflective intensity of Type PB.

	White		Yellow	
	0.2°	0.5°	0.2°	0.5°
Divergence Angle				
Incidence Angle	86°		86°	
Reflective Intensity --candle power per foot-candle per square foot (Candelas per Lux per square meter)	1.00	0.75	0.75	0.50

#### 8. Composition

## Section 657— Preformed Plastic Pavement Markings

Use markings made of high-quality polymeric materials and pigments. Ensure types TR, PA, and PB contain the following composition of materials:

Material	Min% By Weight
Resins and Plasticizers	20
Pigments	30
Graded Glass Beads	33

### B. Requirements for Temporary Markings (Types TR and TN)

#### 1. Temporary Removable Markings (Type TR)

Use temporary, removable markings that meet the following requirements:

##### a. Removability

Ensure the marking material can be removed from asphaltic and Portland cement as follows:

- Lifted intact or in large pieces.
- Lifted either manually or with a roll-up device.
- Lifted at temperatures above 40 °F (5 °C) without using heat, solvents, sand blasting, or grinding.

Ensure the pavement shows no objectionable staining or damage after removing the marking.

##### b. Elongation and Tensile Strength

Provide temporary markings with the following elongation and tensile strength when tested according to ASTM D 638:

Elongation	0.75 minimum
Tensile Strength	40 lbs/in <sup>2</sup> (275 kPa) minimum

Test as follows:

- 1) Cut a 1 in by 6 in (25 mm by 150 mm) specimen.
- 2) Test at a temperature between 70 °F and 80 °F (21 °C and 27 °C).
- 3) Test at a jaw speed of 12 in/min (300 m/min).

##### c. Adhesion

Ensure that at least 10 lbs (20 N) of force is required to lift stuck-on marking material from the pavement.

##### d. Glass Bead Retention

Confirm the glass bead retention quality of marking material in both of the following ways:

###### 1) Laboratory Test

- Take a 2 in by 6 in (50 mm by 150 mm) sample.
- Bend the sample over a ½ in (13 mm) diameter mandrel, leaving the 2 in (50 mm) side perpendicular to the mandrel axis.
- Ensure that the area on the mandrel shows no more than 10 percent of the beads entrapped by the binder less than 40 percent.

###### 2) Field test

Ensure the beads cannot be easily removed by scratching the material firmly with the thumbnail.

##### e. Skid Resistance

Ensure that the material surface provides a 35 BPN minimum skid resistance value when tested according to ASTM E 303.

##### f. Thickness

Ensure that the removable marking material is at least 20 mils (0.50 mm) thick not including the backing adhesive.

#### 2. Temporary Non-Removable markings (Type TN)



This type of pavement marking may use a conformable metallic foil backing with a precoated pressure-sensitive adhesive.

a. Abrasion Resistance

Use marking material that does not wear through to the backing surface in less than 125 cycles.

Test according to Federal Test Standard 141, Method 6192, using an H-22 wheel and a 250 gram load.

b. Skid Resistance

Ensure the retroreflective pliant polymer surface provides a skid resistance value of at least 35 BPN. Test according to ASTM E 303.

c. Elongation and Tensile Strength

No test for elongation and tensile strength is required for type TN marking.

d. Glass Bead Retention

Refer to [Subsection 657.2.B.1.d, “Glass Bead Retention”](#) for types TR and TN.

e. Thickness

Ensure the nonremovable marking material is at least 20 mils (0.50 mm) not including the adhesive backing.

**C. Requirements for Permanent Markings (Types PA, PB and PW)**

1. Permanent Plastic Marking (Type PA)

Provide permanent plastic markings with these features:

a. Adhesive and Backing

Use markings supplied with the following:

- A precoated adhesive
- An easily removable backing to protect the adhesive
- An adhesive backing that allows repositioning of the marking on the surface before permanently sticking with greater pressure

In addition, supply rolls of lane lines with a precoated adhesive but without the protective backing material.

b. Pigments

1) White

Use white marking material with at least 20 percent of the total pigment consisting of titanium dioxide that meets Federal Specification TT-P442 for a dense opaque marking.

2) Yellow

Use yellow marking material with sufficient yellow pigment for a durable finished color.

In addition, match the yellow to the Highway Yellow Color Tolerance Chart and Chip 33538 of Federal Standard 595.

3) Appearance

Ensure that each marking meets the following appearance standards:

- Markings are extruded to a uniform thickness.
- Edges are smoothly cut and true.
- Glass spheres are retained on all sides by the plastic base material.
- The wearing surface is free of indentations, displaced spheres, or other irregularities that retain dirt, dust, or other foreign materials.

c. Thickness

Ensure the permanent material is at least 60 mils (1.52 mm) thick, without the pre-coated adhesive.

d. Glass Bead Retention

Confirm that the surface glass beads are strongly bonded and are not easily removed by traffic. Test them as follows:

- 1) Use a Taber Abraser with an H-18 wheel and 125 gram load.

- 2) Inspect the sample at 200 cycles under the microscope to observe the extent and type of bead failure.
- 3) Ensure that no more than 15 percent of the beads have popped-out.
- 4) Verify that the predominant mode of failure is “wear-down” of the beads.

e. Reseal Test

Test the plastic to confirm that it reseals to itself. Test as follows:

- 1) Cut two samples, 1 in by 3 in (25 mm by 75 mm) each, keeping the adhesive backing material in place.
- 2) Overlap these pieces face-to-face on a flat steel plate. The overlap area should be 1 in<sup>2</sup> (625 mm<sup>2</sup>).
- 3) Center a 1000 gram weight over the overlap area.
- 4) Place the sample in an oven for 2 hours at 190 °F ± 10 °F (88 °C ± 5 °C).
- 5) Cool the sample to room temperature.
- 6) Ensure the sample pieces cannot be separated except by tearing. Reject material that separates without tearing.

f. Tensile Strength and Elongation

Ensure that the permanent markings have the following elongation and tensile strength when tested according to ASTM D 638:

Elongation	75% minimum
Tensile Strength	150 psi (1035 kPa) minimum

Test as follows:

**NOTE: Run this test 3 times and base the result on an average of the 3 tests.**

- 1) Cut 3 specimens, 1 in by 6 in (25 mm by 150 mm) each.
- 2) Place 1 in<sup>2</sup> (625 mm<sup>2</sup>) of carborundum extra-coarse emery cloth or its equivalent at each end of the test specimens to prevent the adhesive from sticking to test equipment.
- 3) Test at a temperature between 70 ° and 80 °F (21° and 27 °C).
- 4) Test at a jaw speed of 10 to 12 in/min (250 mm to 300 mm/min).

g. Skid Resistance

Test the plastic surface to verify that it provides a skid resistance value of at least 45 BPN. Test according to ASTM E 303.

h. Abrasion Resistance

Ensure that plastic loses no more than 0.25 grams of weight in 500 revolutions when abraded according to Federal Test Method Standard No. 141 (Method 6192).

Test the material with calibrate H-18 wheels with a 1000 gram load on each wheel.

i. Adhesive Shear Strength

Ensure that the load required to break the adhesive bond is strong enough to resist a load at least 10 lbs (4.54 kg).

Test as follows:

**NOTE: Run this test 3 times and base the result on an average of the 3 tests**

- 1) Cut 3 specimens, 1 in by 6 in (25 mm by 150 mm) each.
- 2) Apply a 1 in by 3 in (25 mm by 75 mm) piece of carborundum extra coarse emery cloth or its equivalent to the adhesive face of each test strip. Overlap the area by 1 in<sup>2</sup> (625 mm<sup>2</sup>).
- 3) Apply 60 psi (415 kPa) of pressure over the overlapped area for 120 seconds.  
Apply the load by gripping the ends of each laminated piece in a tensile test machine, such as a Dillon or Scott tester.
- 4) Run the test at 77 °F (25 °C).

## Section 657— Preformed Plastic Pavement Markings

- 5) Run the test at 0.25 in/min (64 mm/min).
2. Permanent Patterned Plastic Marking (Type PB)
- Use patterned plastic markings with these features:
- a. Patterned Surface
 

Ensure that the patterned surface has the following characteristics:

    - A reflective layer of ceramic beads bonded to a durable polyurethane topcoat.
    - The raised area comprises between 35 and 65 percent of the total marking face.
    - The surface presents a near vertical face to traffic from any direction.
    - The Office of Materials and Research approves the pattern configuration.
    - The channels between raised areas are free of exposed beads or particles.
  - b. Adhesive and Backing
 

Refer to [Subsection 657.2.C.1.a, “Adhesive and Backing”](#) for Type PA.
  - c. Pigments
 

Refer to [Subsection 657.2.C.1.b, “Pigments”](#) for Type PA.
  - d. Ceramic Beads
 

Ensure that the top layer of ceramic beads is bonded to a durable polyurethane surface.
  - e. Ceramic Bead Retention
 

Refer to [Subsection 657.2.C.1.d, “Glass Bead Retention”](#) for Type PA.
  - f. Thickness
 

Ensure the materials are at least 60 mils (1.52 mm) thick, not including the pre-coated adhesive backing.
  - g. Reseal Test
 

Refer to [Subsection 657.2.C.1.e, “Reseal Test”](#) for Type PA.
  - h. Tensile Strength and Elongation
 

Refer to [Subsection 657.2.C.1.f, “Tensile Strength and Elongation”](#) for Type PA.
  - i. Skid Resistance
 

Refer to [Subsection 657.2.C.1.g, “Skid Resistance”](#) for Type PA.
  - j. Abrasion Resistance
 

Refer to [Subsection 657.2.C.1.h, “Abrasion Resistance”](#) for Type PA.
  - k. Reflective Intensity
 

Determine reflective intensity using photometric testing procedures of Federal Specification L-S-300 A, Paragraph 4.4.7. Reflective values are as follows:

	White			Yellow		
	0.2°	1.0°	1.05°	0.2°	1.0°	1.05°
Observation Angle	0.2°	1.0°	1.05°	0.2°	1.0°	1.05°
Entrance Angle	86°	86.5°	88.8°	86°	86.5°	88.8°
Reflective Intensity--candle power per foot-candle per 5 ft <sup>2</sup> (Candelas per Lux per square meter)	1.10	0.70	0.50	0.80	0.50	0.30

3. Wet Reflective Preformed Pavement Markings (Type PW)
- a. Reflective Intensity
 

Determine reflective intensity using photometric testing procedures of ASTM D 4061 under dry conditions and ASTM E 1710 under wet conditions.

## Section 657— Preformed Plastic Pavement Markings

Create the wet test condition by pouring clean water from a bucket of approximately 3 gallon (11 Liter) capacity from a height of approximately 20 in (500 mm) above the surface. Pour the water evenly along the test surface so that a crest of water momentarily floods the measuring field and its surrounding area.

Ensure that markings use white or yellow film with the initial reflective intensity indicated in the table below, when measured at the angles shown.

	White			Yellow		
	0.2°	1.0°	1.05°	0.2°	0.5°	1.05°
Divergence Angle	0.2°	1.0°	1.05°	0.2°	0.5°	1.05°
Incidence Angle	86.0°	86.5°	88.8°	86.0°	86.5°	88.8°
Reflective Intensity --candle power per foot-candle per square foot (Candelas per Lux per square meter)	1.50	1.00	0.75	1.10	0.70	0.45

### b. Composition

Use markings made of high-quality polymeric materials, pigments and reflective glass beads enclosed in a polymeric layer.

### c. Adhesive and Backing

Use markings supplied with the following:

- A precoated adhesive.
- An easily removable backing to protect the adhesive.
- An adhesive backing that allows repositioning of the marking on the surface before permanently sticking with greater pressure.

In addition, supply rolls of lane lines with a precoated adhesive but without the protective backing material.

### d. Appearance

Ensure that each marking meets the following appearance standards:

- Markings are extruded to a uniform thickness.
- Edges are smoothly cut and true.
- Glass spheres are retained on all sides by the plastic base material.
- The wearing surface is free of indentations or other irregularities that retain dirt, dust, or other foreign materials.
- The color conforms to standard white or yellow highway colors.

### e. Thickness

Ensure the permanent material is at least 30 mils (0.76 mm) thick, without the pre-coated adhesive.

### f. Elongation and Tensile Strength

Provide temporary markings with the following elongation and tensile strength when tested according to ASTM D 638:

Elongation	0.75 minimum
Tensile Strength	150 psi (1035 kPa) minimum

Test as follows:

**NOTE: Run this test 3 times and base the result on an average of the 3 tests.**

- 1). Cut 3 specimens, 1 in by 6 in (25 mm by 150 mm) each.
- 2). Place 1 in<sup>2</sup> (625 mm<sup>2</sup>) of carborundum extra-coarse emery cloth or its equivalent at each end of the test specimens to prevent the adhesive from sticking to test equipment.
- 3). Test at a temperature between 70 °F and 80 °F (21 °C and 27 °C).
- 4). Test at a jaw speed of 10 to 12 in/min (250 mm to 300 mm/min).

## Section 657— Preformed Plastic Pavement Markings

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g. Skid Resistance

Test the plastic surface to verify that it provides a skid resistance value of at least 50 BPN. Test according to ASTM E 303.

h. Plastic Pull Test

- 1). Cut a test specimen to 1 in by 6 in (25 mm by 150 mm).
- 2). Ensure that the specimen can support a dead load weight of 6 lbs (27 N) for at least 30 minutes.
- 3). Test at a temperature between 70 °F and 80 °F (21 °C and 27 °C)

*Delete Subsection 657.4 and Substitute with the following:*

### **657.4 Measurement**

No measurement to be included for this item. Removal of existing pavement markings will not be paid for separately, but will be included in the payment for other Work under this Section.

#### **657.4.01 Limits**

General Provisions 101 through 150.

*Delete Subsection 657.5 and Substitute with the following:*

### **657.5 Payment**

Payment will be made under CONSTRUCTION COMPLETE. Includes applying markings, including adhesives, cleaning, application, and traffic control necessary to complete the Item.

#### **657.5.01 Adjustments**

General Provisions 101 through 150.

Date: November 1, 2002  
First Use Date January 1, 2003  
Revised December 30, 2002  
Revised August 4, 2003  
Revised April 27, 2004  
First Use Date June 1, 2004  
Revised October 31, 2005  
Revised February 28, 2007

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SPECIAL PROVISION**

**Project Number: CSNHS-0008-00(232)  
P.I. Number: 0008232  
Troup County**

**Section 700—Grassing**

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*Delete Section 700 and substitute the following:*

**700.1 General Description**

This work includes preparing the ground, furnishing, planting, seeding, fertilizing, sodding, and mulching disturbed areas within the Right-of-Way limits and easement areas adjacent to the right-of-way as shown on the Plans except as designated by the Engineer to remain natural.

**700.1.01 Definitions**

General Provisions 101 through 150.

**700.1.02 Related References**

**A. Standard Specifications**

[Section 160—Reclamation of Material Pits and Waste Areas](#)

[Section 163—Miscellaneous Erosion Control Items](#)

[Section 718—Wood Fiber](#)

[Section 822—Emulsified Asphalt](#)

[Section 882—Lime](#)

[Section 890—Seed and Sod](#)

[Section 891—Fertilizers](#)

[Section 893—Miscellaneous Planting Materials](#)

[Section 895—Polyacrylamide](#)

**B. Referenced Documents**

[QPL 33](#)

[QPL 84](#)

## Section 700—Grassing

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### 700.1.03 Submittals

Submit manufacturer’s product expiration date along with written instructions to ensure proper application, safety, storage, and handling of Polyacrylamide products used in The Work.

### 700.2 Materials

Use materials that meet the requirements of the following Specifications:

Material	Section
Wood Fiber Mulch	<a href="#">718.2</a>
Emulsified Asphalt	<a href="#">822</a>
Agricultural Lime	<a href="#">882.2.01</a>
Liquid Lime	<a href="#">882.2.01</a>
Seed	<a href="#">890.2.01</a>
Sod	<a href="#">890.2.02</a>
Fertilizer	<a href="#">891.2.01</a>
Plant Topsoil	<a href="#">893.2.01</a>
Mulch	<a href="#">893.2.02</a>
Inoculants	<a href="#">893.2.04</a>
Tackifiers	<a href="#">QPL 33</a>
Anionic Polyacrylamide	<a href="#">QPL 84 &amp; Section 895</a>

#### A. Seeds

Whenever seeds are specified by their common names, use the strains indicated by their botanical names.

#### B. Water

Obtain the water for grassing from an approved source. Use water free of harmful chemicals, acids, alkalies, and other substances that may harm plant growth or emit odors. Do not use salt or brackish water.

#### C. Asphalt

Secure the mulch with asphalt made of a homogenous emulsification of a refined petroleum. Ensure that the asphalt can be sprayed on with or without diluting with water.

Use suitable asphalt free of petroleum solvents or other diluting agents that may harm plant growth. Use asphalt according to [Section 822](#) or [Section 824](#), “slow setting”. Do not use asphalt that separates after freezing or from any other cause.

#### D. Fertilizer Mixed Grade

Select fertilizer mixed grade such as 10-10-10, 6-12-12, 5-10-15, or other analysis within the following limits:

- Nitrogen 5 to 10 percent
- Phosphorus 10 to 15 percent
- Potassium 10 to 15 percent

If using mixed grade fertilizer for hydroseeding, ensure that it has the following analysis:

- Nitrogen 5 to 19 percent

## Section 700—Grassing

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- Phosphorus 10 to 19 percent
- Potassium 10 to 19 percent

### E. Mulch

Use straw or hay mulch according to [Subsection 700.3.05.G](#).

Use wood fiber mulch in hydroseeding according to [Subsection 700.3.05.F.1](#).

### 700.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

## 700.3 Construction Requirements

### 700.3.01 Personnel

General Provisions 101 through 150.

### 700.3.02 Equipment

Use grassing equipment able to produce the required results.

Never allow the grading (height of cut) to exceed the grassing equipment's operating range.

#### A. Blower Equipment

When using blower equipment to apply bituminous treated mulch in a single operation, place two or more jets or spray nozzles at or near the end of the discharge spout to eject a uniform coat of mulch.

#### B. Mulch Material Equipment

Use mulching equipment that uniformly cuts the specified materials into the soil to the required control depth.

#### C. Rollers

Use at least 12 in (300 mm) diameter rollers with corrugated or notched surfaces. Do not use smooth surface rollers.

#### D. Hydroseeding Equipment

For hydroseeding equipment, see [Subsection 700.3.05.F](#).

### 700.3.03 Preparation

General Provisions 101 through 150.

### 700.3.04 Fabrication

General Provisions 101 through 150.

### 700.3.05 Construction

Follow the planting zones, planting dates, types of seed, seed mixtures, and application rates described throughout this Section. The Engineer has the authority to alter the planting dates as set forth by a period of 2 weeks. This 2-week period may be applied to either the beginning of the specified planting and/or to the end of the end of the specified planting season.

In general:

- Obtain the Engineer's approval before changing the ground cover type.
- Do not use annual rye grass seeds with permanent grassing.
- Follow the planting zones indicated on the [Georgia State Planting Zone Map](#), below.
- Sod may be installed throughout the year, weather permitting.



## Section 700—Grassing

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- For permanent grassing, apply the combined amounts of all seeds for each time period within each planting zone and roadway location listed in the [Seeding Table](#), below. Do not exceed the amounts of specified seed.

Planting Zone Map



SEEDING TABLE

Plant these combinations on shoulders, medians, and relatively flat areas. (Slopes 3:1 or flatter).									REQUIRED PERMANENT PLANTING
		Rye Grass, Millet, Cereal Grass (Oats)	Common Bermuda Grass (Hulled)	Common Bermuda Grass (Unhulled)	Tall Fescue	Weeping Love Grass	Scarified Interstate Lespedeza	Unscarified Interstate Lespedeza	
Planting Zones	Planting Dates								
1	March 1 – May 15		10 (11)	10 (11)	50 (56)				Common Bermuda Grass
1	May 16 – August 31		10 (11)	10 (11)					
1	September 1 – February 28	50 (56)							
2,3,4	April 1 – October 31		10 (11)	10 (11)					
2,3,4	November 1 – March 31	50 (56)							Common Bermuda Grass

Plant these combinations on back slopes, fill slopes and areas which will not be subject to frequent mowing, slopes steeper than 3:1									
1,2	March 1 – August 31					10 (11)	50 (56)		Interstate Lespedeza
1,2	September 1 – February 28				50 (56)			75 (84)	
3,4	April 1 – October 31					10 (11)	50 (56)		Interstate Lespedeza
3,4	November 1 – March 31	50 (56)							

A. Ground Preparation

Prepare the ground by plowing under any temporary grass areas and preparing the soil as follows:

1. Slopes 3:1 or Flatter

On slopes 3:1 or flatter, plow shoulders and embankment slopes to between 4 in and 6 in (100 mm and 150 mm) deep.

Plow front and back slopes in cuts to no less than 6 in (150 mm) deep. After plowing, thoroughly disk the area until pulverized to the plowed depth.

2. Slopes Steeper Than 3:1

Serrate slopes steeper than 3:1 according to Plan details when required.

On embankment slopes and cut slopes not requiring serration (sufficient as determined by the Engineer), prepare the ground to develop an adequate seed bed using any of the following methods as directed by the Engineer:

- Plow to a depth whatever depth is practicable.

## Section 700—Grassing

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- Use a spiked chain.
- Walk with a cleated track dozer.
- Scarify.

Disking cut slopes and fill slopes is not required.

### 3. All Slopes

#### a. Obstructions

Remove boulders, stumps, large roots, large clods, and other objects that interfere with grassing or may slide into the ditch.

#### b. Topsoil

Spread topsoil stockpiled during grading evenly over cut and fill slopes after preparing the ground.

Push topsoil from the top over serrated slopes. Do not operate equipment on the face of completed serrated cuts.

## B. Grassing Adjacent to Existing Lawns

When grassing areas adjacent to residential or commercial lawns, the Engineer shall change the plant material to match the type of grass growing on the adjacent lawn. The Contract Unit Price will not be modified for this substitution.

If the Engineer believes bituminous treated mulch would harm other portions of the work, bituminous treated mulch may be substituted with 1,500 lbs/acre (1680 kg/ha) of wood fiber mulch with tackifier.

## C. Temporary Grassing

Apply temporary grassing according to [Subsection 163.3.05.F](#). Determine lime requirements by a laboratory soil test.

In March or April of the year following planting and as soon as the weather is suitable, replace all areas of temporary grass with permanent grass by plowing or overseeding using the no-till method. If the no-till method is used, ensure that temporary grass is less than 3 inches in height (this may be achieved by mowing). Additional mulch will be required only if the temporary grass does not provide adequate mulch to meet the requirements of [Subsection 700.3.05.G, "Mulching."](#)

Temporary grass, when required, will be paid for according to [Section 163](#).

Projects that consist of asphalt resurfacing with shoulder reconstruction and/or shoulder widening: Type II Wood Fiber Blanket is used to stabilize disturbed areas, no till seeding will be used when permanent grassing is applied and the areas will not be re-disturbed.

## D. Applying Agricultural Lime and Fertilizer Mixed Grade

Apply and mix lime and fertilizer as follows:

### 1. Agricultural Lime

Uniformly spread agricultural lime on the ground at the approximate rate determined by the laboratory soil test.

A. Liquid Lime (Flowable Dolomitic Lime) may be applied during the hydroseeding operation at the rate of 2.5 gallons (of Liquid Lime concentrate) per acre (23.75 liters per hectare). This provides the equivalent of 1 ton per acre (2.25 mg per hectare) of agricultural lime. The remainder of lime specified by the soil test is applied as agricultural lime and uniformly spread over the surface of the ground.

B. Agricultural Lime may be used as filler material in mixed grade fertilizer in lieu of inert material. The use of agricultural lime as filler material is to be shown on the fertilizer bag or invoice from the supplier. Do not deduct any amount of fertilizer when lime is used as filler.

### 2. Fertilizer Mixed Grade

Uniformly spread the fertilizer selected according to [Subsection 700.2.D](#) over the ground at approximately 1,200 lbs/acre (1350 kg/ha).

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If using a higher analysis fertilizer with hydroseeding, apply it at the same rate per acre (hectare) as the standard fertilizer.

### 3. Mixing

Before proceeding, uniformly work the lime and fertilizer into the top 4 in (100 mm) of soil using harrows, rotary tillers, or other equipment acceptable to the Engineer.

On cut slopes steeper than 3:1, other than serrated slopes, reduce the mixing depth to the maximum practical depth as determined by the Engineer.

Omit mixing on serrated slopes.

## E. Seeding

Following is a list of both common names and botanical names for approved seed types. Whenever seeds are specified by the common names, the strains indicated by their botanical name apply.

Common Name	Botanical Name
Annual Ryegrass	Lolium multiflorum
*Bermuda Grass, Common Hulled and Unhulled	Cynodon dactylon
**Lespedeza Virgata	Lespedeza Ambro Virgata
**Lespedeza Sericea	Lespedeza cuneta, Var. Sericea
**Lespedeza Serala	Lespedeza cuneta, Var. Serala
**Lespedeza Interstate	Lespedeza cuneta, Var. Interstate
**Lespedeza Korean	Lespedeza stipulacea Maxim
Pensacola Bahiagrass	Paspalum notatum, var. Pensacola
Tall Fescue	Festuca arundinacea
Weeping Love Grass	Eragrostis curvula
*Do not use Giant Bermuda Seed (Cynodon species) including NK-37.	
**Requires inoculation.	

Prepare seed and sow as follows:

### 1. Inoculation of Seed

Inoculate each kind of leguminous seed separately with the appropriate commercial culture according to the manufacturer's instructions for the culture.

When hydroseeding, double the inoculation rate.

Protect inoculated seed from the sun and plant it the same day it is inoculated.

### 2. Sowing

Weather permitting, sow seed within 24 hours after preparing the seed bed and applying the fertilizer and lime.

Sow seed uniformly at the rates specified in the [Seeding Table](#). Use approved mechanical seed drills, rotary hand seeders, hydraulic equipment, or other equipment to uniformly apply the seed. Do not distribute by hand.

To distribute the seeds evenly sow seed types separately, except for similarly sized and weighted seeds. They may be mixed and sown together.

### 3. Rolling

Roll seeded areas before applying mulch, except on steep slopes where rollers cannot operate satisfactorily. On slopes inaccessible to compaction equipment, cover the seeds by dragging spiked chains over them or by using other methods.

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Do not sow during windy weather, when the prepared surface is crusted, or when the ground is frozen, wet, or otherwise non-tillable.

### 4. Overseeding

Temporary grass areas that were prepared in accordance with [Subsection 700.3.05.A](#), may be overseeded using the no-till method. The no-till method is defined by planting permanent grass seeds using a drill-type seeder over existing temporary grass without plowing or tilling soil and in accordance with [Subsection 700.3.05.C](#).

## F. Hydroseeding

Hydroseeding may be used on any grassing area. Under this method, spread the seed, fertilizer, and wood fiber mulch in the form of a slurry. Seeds of all sizes may be mixed together. Apply hydroseeding as follows:

1. Use wood fiber mulch as a metering agent and seed bed regardless of which mulching method is chosen. Apply wood fiber mulch at approximately 500 lbs/acre (560 kg/ha).
2. Prepare the ground for hydroseeding as for conventional seeding in [Subsection 700.3.05.A](#).
3. Use specially designed equipment to mix and apply the slurry uniformly over the entire seeding area.
4. Agitate the slurry mixture during application.
5. Discharge slurry within one hour after being combined in the hydroseeder. Do not hydroseed when winds prevent an even application.
6. Closely follow the equipment manufacturer's directions unless the Engineer modifies the application methods.
7. Mulch the entire hydroseeded area according to [Subsection 700.3.05.F.1](#), above, and [Subsection 700.3.05.G](#), below.

## G. Mulching

Except as noted in [Subsection 700.3.05.B](#) and [Subsection 700.3.05.C](#), apply mulch immediately after seeding areas as follows:

Areas with permanent grass seed and covered with slope mats or blankets will not require mulch.

Evenly apply straw or hay mulch between 3/4 in and 1-1/2 in (20 mm and 40 mm) deep, according to the texture and moisture content of the mulch material.

Mulch shall allow sunlight to penetrate and air to circulate as well as shade the ground, reduce erosion, and conserve soil moisture. If the type of mulch is not specified on the Plans or in the Proposal, use any of the following as specified.

### 1. Mulch with Binder

Apply mulch with binder regardless of whether using ground or hydroseeding equipment for seeding.

- a. Mulch uniformly applied manually or with special blower equipment designed for the purpose. When using a blower, thoroughly loosen baled material before feeding it into the machine so that it is uniformly coated with binder and broken up.
- b. After distributing the mulch initially, redistribute it to bare or inadequately covered areas in clumps dense enough to prevent new grass from emerging.

Do not apply mulch on windy days.

- c. Apply enough binder to the mulch to hold it in place. Immediately replace mulch that blows away.

When using a power blower to distribute the mulch, spray the binder onto the mulch as the mulch is ejected from the machine. If distributing the mulch by hand, immediately apply the binder uniformly over the mulched areas.

Use one of the following binders:

- Emulsified asphalt, SS-1h or SS-1 ([Section 822](#)) : The public, adjacent property, bridges, pavements, curbs, sidewalks, and other existing structures shall be protected from discoloration by the asphalt. Correct discoloration damage at no expense to the Department.
- Tackifier: Use a tackifier listed in the Laboratory Qualified Products Manual may be used at the manufacturer's recommended rates.

### 2. Walked-in-Mulch

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Apply walked-in-mulch on slopes ranging in steepness from 5:1 to 2:1 and treat as follows:

- a. Immediately walk it into the soil with a cleated track dozer. Make dozer passes vertically up and down the slope.
- b. Where walked-in-mulch is used, do not roll or cover the seeds as specified in [Subsection 700.3.05.E.3](#).

### H. Sod

Furnish and install sod in all areas shown on the Plans or designated by the Engineer.

#### 1. Kinds of Sod

Use only Common Bermudagrass (*Cynodon dactylon*) or one of the following Bermudagrass varieties:

Tifway 419  
Tifway II  
Tift 94  
Tifton 10  
Midlawn  
Midiron  
GN-1  
Vamont

No dwarf Bermuda types shall be used. Sod shall be nursery-grown and be accompanied with a Georgia Department of Agriculture Live Plant License Certificate or Stamp. Sod shall consist of live, dense, well-rooted material free of weeds and insects as described by the Georgia Live Plant Act.

#### 2. Type And Size Of Sod:

Furnish either big roll or block sod. Ensure that big roll sod is a minimum of 21 inches wide by 52 feet long. Minimum dimensions for block sod are 12 inches wide by 22 inches long. Ensure all sod consists of a uniform soil thickness of not less than 1 inch.

#### 3. Ground Preparation

Excavate the ground deep enough and prepare it according to [Subsection 700.3.05.A](#) to allow placing of sod. Spread soil, meeting the requirements of [Subsection 893.2.01](#), on prepared area to a depth of 4 inches.

#### 4. Application Of Lime And Fertilizer

Apply lime and fertilizer according to [Subsection 700.3.05.D](#) within 24 hours prior to installing sod.

#### 5. Weather Limitation

Do not place sod on frozen ground or where snow may hinder establishment.

#### 6. Install Sod

Install Sod as follows:

- Place sod by hand or by mechanical means so that joints are tightly abutted with no overlaps or gaps. Use soil to fill cracks between sod pieces, but do not smother the grass.
- Stake sod placed in ditches or slopes steeper than 2:1 or any other areas where sod slipping can occur.
- Use wood stakes that are at least 8 in (200 mm) in length and not more than 1 in (25 mm) wide.
- Drive the stakes flush with the top of the sod. Use a minimum of 8 stakes per square yard (meter) to hold sod in place.
- Once sod is placed and staked as necessary, tamp or roll it using adequate equipment to provide good contact with soil.
- Use caution to prevent tearing or displacement of sod during this process. Leave the finished surface of sodded areas smooth and uniform.

#### 7. Watering Sod

After the sod has been placed and rolled or tamped, water it to promote satisfactory growth. Additional watering will be needed in the absence of rainfall and during the hot dry summer months. Water may be applied by Hydro Seeder, Water Truck or by other means approved by the Engineer.

## Section 700—Grassing

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### 8. Dormant Sod

Dormant Bermuda grass sod can be installed. However, assume responsibility for all sod through establishment and until final acceptance.

### 9. Establishment

Sod will be inspected by the Engineer at the end of the first spring after installation and at the time of Final Inspection. Replace any sod that is not live and growing. Any cost for replacing any unacceptable sod will be at the Contractor's expense.

## I. Application of Nitrogen

Apply nitrogen at approximately 50 lbs/acre (56 kg/ha) when specified by the Engineer after plants have grown to 2 in (50 mm) high.

One application is mandatory and must be applied before Final Acceptance.

Apply nitrogen with mechanical hand spreaders or other approved spreaders capable of uniformly covering the grassed areas. Do not apply nitrogen on windy days or when the foliage is damp.

Do not apply nitrogen between October 15 and March 15 except in Zone 4. In planting zones 3 and 4 apply an additional application of nitrogen.

## J. Application of Polyacrylamide (PAM)

1. Prepare soil according to project Plans and Specifications prior to applying PAM.
2. Apply PAM according to manufacturer's recommendations and the requirements listed herein.
3. Apply Polyacrylamide (PAM) to all areas that receive permanent grassing.
4. Apply PAM (powder) before grassing or PAM (emulsion) to the hydroseeding operation.
5. Use only anionic PAM.
6. Ensure that the application method provides uniform coverage to the target and avoids drift to non-target areas including waters of the state.
7. Achieve > 80% reduction in soil loss as measured by a rainfall simulator test performed by a certified laboratory (1 hour storm duration, 3 inches (75 mm) rainfall per hour).
8. Ensure uniform coverage to the target area and minimize drift to non-target areas. Apply anionic PAM to all cut and fill slopes, permanently grassed or temporarily grassed, either prior to grassing or in conjunction with hydroseeding operations. Mulch will not be eliminated.
9. Use application rates in accordance with manufacturer's instructions.
10. Do not exceed 200 lbs/acre/year (224 kg/ha/year).

### 700.3.06 Quality Acceptance

The Engineer may require replanting of an area that shows unsatisfactory growth for any reason at any time.

Except as otherwise specified or permitted by the Engineer, prepare replanting areas according to the Specifications as if they were the initial planting areas. Use a soil test or the Engineer's guidance to determine the fertilizer type and application rate, then furnish and apply the fertilizer.

### 700.3.07 Contractor Warranty and Maintenance

#### A. Plant Establishment

Before Final Acceptance, provide plant establishment of the specified vegetation as follows:

##### 1. Plant Establishment

Preserve, protect, water, reseed or replant, and perform other work as necessary to keep the grassed areas in satisfactory condition.

##### 2. Watering

Water the areas during this period as necessary to promote maximum growth.



## Section 700—Grassing

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### 3. Mowing

Mow seeded areas of medians, shoulders, and front slopes at least every 6 months. Avoid damaging desirable vegetation.

In addition, mow as necessary to prevent tall grass from obstructing signs, delineation, traffic movements, sight distance, or otherwise becoming a hazard to motorists.

Do not mow lespedezas or tall fescue until after the plants have gone to seed.

### **B. Additional Fertilizer Mixed Grade**

Apply fertilizer at approximately 600 lbs/acre (675 kg/ha) each spring after initial plant establishment. Continue annual applications until Final Acceptance. This additional fertilizer will be measured and paid for at the Contract Unit Price for fertilizer mixed grade.

### **C. Growth and Coverage**

Provide satisfactory growth and coverage, ensuring that vegetation growth is satisfactory with no bare spots larger than 1 ft<sup>2</sup> (0.1 m<sup>2</sup>). Bare spots shall comprise no more than 1 percent of any given area. An exception is given for seed not expected to have germinated and shown growth at that time.

### **D. Permissible Modifications**

When all Items of the work are ready for Final Acceptance except for newly planted repaired areas or other areas with insufficient grass, the Contractor may fill the eroded areas or treat bare areas with sod obtained, placed, and handled according to [Subsection 700.3.05.H](#).

Carefully maintain the line and grade established for shoulders, front slopes, medians, and other critical areas.

Sod as described above will not be paid for separately, but will be an acceptable substitute for the satisfactory growth and coverage required under this Specification. These areas treated with sod are measured for payment under the Item for which the sod is substituted.

## **700.4 Measurement**

No measurement to be included for this item.

### **700.4.01 Limits**

General Provisions 101 through 150.

## **700.5 Payment**

Payment will be made under CONSTRUCTION COMPLETE.

### **A. Permanent Grassing**

Includes preparing the ground, seeding, wood fiber mulch, polyacrylamide, and providing plant establishment and other incidentals.

### **B. Straw or Hay Mulch**

Includes straw or hay mulch.

### **C. Fertilizer Mixed Grade**

Includes furnishing and applying the material.

### **D. Lime**

Includes furnishing and applying the material.

### **E. Nitrogen**

Includes furnishing and applying the material.

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### **F. Sod**

Includes ground preparation, including addition of topsoil, furnishing and installing live sod, and for Plant Establishment.

### **G. Temporary Grass**

Includes temporary grass.

### **700.5.01 Adjustments**

General Provisions 101 through 150.

**Georgia Department of Transportation**  
**State of Georgia**  
**Special Provision**  
**PROJECT: CSNHS-0008-00(232), TROUP COUNTY**  
**P.I. NO. 0008232**

**Section 702—Vine, Shrub, and Tree Planting**

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*Delete Section 702 and substitute the following:*

**702.1 General Description**

This Work includes furnishing and planting vines, shrubs, trees and plants, as well as treating regenerated areas according to the Specifications, Plans, and the Engineer.

**702.1.01 Definitions**

General Provisions 101 through 150.

**702.1.02 Related References**

**A. Standard Specifications**

[Section 108—Prosecution and Progress](#)

[Section 700—Grassing](#)

[Section 882—Lime](#)

[Section 891—Fertilizers](#)

[Section 893—Miscellaneous Planting Materials](#)

**B. Referenced Documents**

Standardized Plant Names

**702.1.03 Submittals**

**A. Certificates of Inspection**

Submit certificates of inspection with the invoice for each shipment of plants as required by law for transportation.

File certificates with the Engineer before the material is accepted. Plants may be rejected at the site regardless of Federal or State government inspections at the place of growth.

**B. Substitutions**

When both primary and alternate plants are specified, use the alternate only after providing written proof that the primary plants specified are not available. In this case a Supplemental Agreement is not required to use the alternate plants.

When a primary or an alternate plant cannot be furnished, provide the Engineer written proof that neither is available. A Supplemental Agreement is required for substitute plants in this case.

## 702.2 Materials

Ensure that materials meet the requirements of the following Specifications:

Material	Section
Water	<a href="#">700.2.B</a>
Agricultural Lime	<a href="#">882.2.01</a>
Fertilizers	<a href="#">891.2.01</a>
Plant Topsoil	<a href="#">893.2.01</a>
Landscape Mulch	<a href="#">893.2.02</a>
Vines, Shrubs, Trees, and Miscellaneous Plants	<a href="#">893.2.03</a>
Tree Paint	<a href="#">893.2.06</a>
Prepared Plant Topsoil	<a href="#">893.2.07</a>
Stakes	<a href="#">893.2.08</a>
Organic Soil Additives	<a href="#">893.2.09</a>

### A. Plant Specifications

Furnish plants according to the plant name and Specifications included on the Plans titled, "Plant Specifications."

#### 1. Plant Names

Ensure that the botanical and common names of plants specified conform with the most current edition of Standardized Plant Names, as adopted by the American Joint Committee on Horticultural Nomenclature.

Plants should be clearly labeled at the nursery. Labels should remain on the plants until inspected by the engineer.

#### 2. Grades

Ensure that plants meet the grade requirements of the most current American Nursery and Landscape Association ANSI Z60.1 and any other requirements.

Caliper used for establishing plant grades or trunk sizes is measured according to the American Nursery and Landscape Association ANSI Z60.1. Plant trees with straight stems and symmetrical branches according to their natural growth. Trees with broken or damaged terminal or main stems will be rejected. There should be one dominant leader to the top of the all large canopy shade trees. There can be a double leader in the top 10% of the tree.

Trees should be rooting into the root ball so that soil or media remains intact and trunk and root ball move as one when lifted, but not root bound. The trunk should bend when gently pushed and should not be loose so it pivots at or below the soil line.

There shall be no roots greater than 1/10 diameter of the trunk circling more than one-third the way around in the top half of the root ball. Roots larger than this may be cut provided they are smaller than one-third the trunk diameter.

The leaf-bearing crown should be full and uniform. Leaves should show no evidence of chlorosis, necrosis, disease or insect infestation.

#### 3. Substitutions

Use approved substitute plants, as designated by the Engineer, equal in value to specified plants. Request substitutions at least 30 days before the end of the planting season in the area.

### B. Nursery Plants

Unless otherwise specified, use plants stock-grown in a licensed nursery under intensive care and cultivation for at least one year. The largest branches of shade trees should be spaced at least 6 inches

apart. The branch system shall be normally developed and free of disease, injurious insects, disfiguring knots, sun-scald, injuries, bark abrasions, dead or dry wood, broken terminal growth, or other disfigurements. Stems should show no evidence of die-back. Ensure that proper certificates of inspection and a complete list of the nursery growers accompany nursery grown plants. See [Subsection 893.2.03](#).

### **C. Collected Plants**

Collected plants grow in the wild and are uncultivated and untransplanted. Do not take collected plants from areas infested with insects under quarantine. See [Subsection 893.2.03](#).

### **D. Approval and Selection of Materials and Work**

Select materials and execute operations required under the Specifications and drawings with the approval of the Engineer. Remove rejected materials from the site promptly.

## **702.2.01 Delivery, Storage, and Handling**

### **A. Bare-Rooted Plants**

Tie bare-rooted plants in bundles and place moist sphagnum moss, shingletoe, or other moisture-retaining material around the roots to keep the plants moist for up to 10 days. Over-wrap the bundle with a heavy weight, waterproof, flexible material, covering the roots and one-half of the tops. Keep the plants wrapped until they are planted or heeled-in.

Wrapped plants may be held in the package for up to 10 days from shipment if protected from the sun and wind. If unable to plant plants within 10 days from shipment, unwrap, spread the roots, heel-in using moist soil, and water well.

Protect roots of plants that have been heeled-in from drying out. Cover soil and roots with wet canvas, burlap, or straw while transporting and distributing them for planting. The type of protection depends on weather conditions and the length of time the plants remain unplanted. Use protection methods satisfactory to the Engineer.

### **B. Balled and Burlapped Plants (B&B)**

Ensure that the soil in the ball is the original and undisturbed soil in which the plant has grown.

1. Dig, burlap, transport, and handle the plant carefully to avoid loosening the soil (stripping or exposing the roots). Burlap shall be a natural biodegradable material. Do not use synthetic burlap.
2. Replace plants rejected because of broken or loose balls, or balls of less diameter than that specified.
3. Adequately protect the roots of balled and burlapped plants, unless they are planted immediately after they are delivered. Completely cover them with damp soil, sawdust, or other moist material until removing them for planting.
4. Keep plants moist while awaiting planting.
  - a. Do not saturate the ball, causing it to pull off in handling.
  - b. Handle B&B plants by the ball and not by the top growth.
  - c. Never leave the balls of plants unprotected overnight.

### **C. Container-Grown Plants**

Keep container-grown plants moist until planted. Handle them by the container or soil ball and not by the top growth.

### **D. Collected Plants**

Do not collect plants more than 24 hours before planting.

1. Select plants with good shape and form. Do not select poorly shaped, weak plants taken from dense shade and crowded conditions.
2. Dig collected plants with a wide root system equal to at least the spread of the top of the plant.

3. Protect the roots with a moist packing material.
4. Load them onto a covered truck, protected from the sun and wind and transfer them directly to the final planting site.
5. Prune collected plants by removing from one-third to one-half of the side branches as directed by the Engineer.

**E. Heeled-in Plants**

Properly maintain heeled-in plants until they are planted. Do not allow plants to remain heeled-in over the summer or for over 30 days without the Engineer's consent.

**F. Injury Prevention**

In digging, loading, unloading, planting, or otherwise handling plants, avoid injuring the trunk, branches, and roots of the plants. Injured plants will be rejected. Protect tops of shrubs and trees while in transit to prevent windburn.

## **702.3 Construction Requirements**

### **702.3.01 Personnel**

General Provisions 101 through 150.

### **702.3.02 Equipment**

General Provisions 101 through 150.

### **702.3.03 Preparation**

**A. Inspect Plants Before Digging**

The Engineer will inspect trees or plants from the bidder's source for acceptability. When rejecting the trees or plants, the Engineer reserves the right to pursue and examine other sources of plants to find acceptable specimens. This change will not constitute an increase in cost to the State.

**B. Clear and Grub**

Clear and grub before planting or beginning to prepare the plant bed. See [Special](#) Provision 202

**C. Prepare Plant Bed**

Prepare for planting as follows:

1. Planting Limits

Stake planting limits according to Plan details and the Engineer. Have the Engineer approve the method of plant identification before planting.

2. Applications of Soil Additives

- a. Apply fertilizer approximately 3 lbs/100 ft<sup>2</sup> (1.5 kg/10 m<sup>2</sup>) of bed surface. Fertilizer for plant bed may be 6-12-12 if 4-12-12 is not available.
- b. Apply agricultural lime for plant bed approximately 5 lbs/100 ft<sup>2</sup> (2.5 kg/10 m<sup>2</sup>) of bed surface.
- c. Spread an organic soil additive, (See [Subsection 893.2.09](#)), evenly throughout the designated area to at least 2 in (50 mm) deep. Thoroughly dig it into the soil to at least 6 in (150 mm) deep using a rotary hoe type tiller or other equipment that evenly mixes the soil, lime, fertilizer, and organic soil additive.
- d. Till the area until the surface is smooth and free of weeds, roots, rocks, and other debris, to the satisfaction of the Engineer.

### **702.3.04 Fabrication**

General Provisions 101 through 150.

### 702.3.05 Construction

#### A. Seasonal Limitations for Planting

For geographic seasonal limitations, refer to the Planting Zones Map found in [Subsection 700.3.05](#). Plant in Zones 1 and 2 between October 15 and January 20. Plant in Zones 3 and 4 between November 1 and January 1.

#### B. Planting Operations

Plant using either the pit method or the dibble method as called for on the Plant Specification sheet. Before beginning planting of each area, have available the necessary materials including prepared plant topsoil (see [Subsection 893.2.07](#)), water, stakes, and mulch.

When seasonal limitations and weather conditions permit, continuously water, mulch, guy, and stake, until completing the last operation.

After completing planting, provide a method for retaining water adjacent to the plant according to the details shown on the Plans or as directed by the Engineer.

##### 1. Planting By the Pit Method

###### a. Placing Bare-Rooted Plants

Plant bare-rooted plants delivered to the pit area. Protect roots from drying out until placing them in the pit.

- Center plants in pits and spread roots as they originally grew.
- Cover and prepare the topsoil according to details shown on the Plans.

###### b. Placing Balled and Burlapped Plants

Immediately plant these plants after they are delivered to the pit site. Never allow the balls to remain unprotected overnight.

- The pit diameter shall be a minimum of 3 times the diameter of the rootball. Center the ball in the prepared pit, leaving the top of the ball 1 in (25 mm) above the top of the ground for settlement.
- Cut away and remove the top 1/3 of burlap from the rootball. Cut all ropes and twine, pull the nails, and drop the remaining burlap to the bottom of the hole. Cut away and remove all wire from the root ball.
- Partially fill the pit with prepared plant topsoil and compact the soil enough to hold the ball firmly. Add mycorrhizal inoculant to plant topsoil if specified in plans.

###### c. Placing Container-Grown Plants

When the container is delivered to the pit site, split the container from top to bottom and carefully remove the plant.

- The pit diameter shall be a minimum of 3 times the diameter of the rootball. Spread into the hole any major roots growing around the container or prune them to remove any circular growth.
- Place the ball in the center of the prepared pit, leaving the top of the ball 1 in (25 mm) above the top of the ground for settlement.
- Partially fill the pit with prepared plant topsoil and compact the soil enough to hold the ball firmly. Add mycorrhizal inoculant to plant topsoil if specified in plans.

###### d. Completing Pit Plantings

After placing pit plantings, water plants thoroughly the same day regardless of weather or soil moisture conditions.

- After the water has soaked in, add prepared plant topsoil and compact firmly up to 2 in (50mm) below the adjacent ground.
- Stop compacting when the compacted prepared topsoil is 2 in (50 mm) below the adjacent ground.

- Fill the remainder of each pit with loose, prepared plant topsoil according to the details shown on the Plans.
- Prepare the loose topsoil to retain water adjacent to the plant according to the Plans or as directed by the Engineer.

## 2. Planting By the Dibble Method

If the Plans require the dibble method, perform the Work as outlined. Standard dibble blades are made in 10 in (250 mm) and 12 in (300 mm) heights. Use the 12 in (300 mm) blade on all plants except those with a root system of 8 in (200 mm) or less.

Locate plants as shown on the Plans or as approved by the Engineer. Only plant when there is adequate moisture in the ground and when the ground is not frozen.

Follow these steps when grass or other vegetation is present:

- Mow an area at least 2 ft (600 mm) on all sides of the proposed location of the individual dibbled plants to a height of 1 in (25 mm).
- Apply landscape mulch of the specified type and amount to the mowed area before planting.
- Dibble the seedling into the soil.
- Dibble the plant within 48 hours after mowing.
- Complete each planting according to the Plan details to retain water adjacent to the plant.

## C. Landscape Mulching

### 1. For Pit Plantings

Follow these requirements when mulching for pit plantings:

- Where the distance between plants is 8 ft (2.4 m) or less, spread mulch throughout and 3 ft (900 mm) beyond the outermost plants. Where plants are more than 8 ft (2.4 m) apart, apply mulch in a circular fashion around each plant, forming a ring 5 ft (1.5 m) in the outside diameter.

If plant pits are greater than 5 ft (1.5 m) in diameter, ensure that the mulch extends out to cover the berm as shown in the planting details on the Plans.

- Apply mulch within 3 days of planting at least 4 in (100 mm) in depth to obtain a compacted depth of at least 3 in (75 mm).

Compaction occurs naturally. Check compaction at least two months after spreading and exposing the mulch to the elements.

If the compacted depth is less than 3 in (75 mm), apply additional mulch to deficient areas within 1 month following notification.

- Apply mulch to a uniform depth and remove lumps for a neat appearance. Tuck mulch neatly against all paving edges, drainage structures, and where planting beds meet grassed areas.
- Leave a 1 in (25 mm) to 2 in (50 mm) ring of non-mulched area directly around all tree trunks.
- Do not mulch with Cypress Mulch.

### 2. For Plantings by the Dibble Method

Apply landscape mulch according to [Subsection 702.3.05.C.1](#) with the following exceptions:

- Apply mulch before planting.
- Ensure that the minimum compacted height after 2 months exposure is 2 in (50 mm).

## D. Wrapping

Do not wrap the trunks of tree unless specified in the plans. When wrapping is specified, tightly wrap the trunks of deciduous trees over 1.25 in (32 mm) in caliper. Wrap in strip burlap or waterproof crepe tree wrapping paper or other approved materials.

- Begin wrapping at the ground and extend spirally up and beyond the first rosette of branches with an overlap of one half the width of the wrapping material.



2. Tie the wrapping material securely with binder twine spaced every 12 in (300 mm) for the full length of the wrapping. Wrap immediately after planting.

#### **E. Staking and Guying**

##### 1. Perimeter Staking

Place perimeter stakes 2 in x 2 in x 36 in (50 mm x 50 mm x 900 mm). Stake the perimeter of indicated regenerated areas within specified planting dates according to the Plans or as directed by the Engineer.

##### 2. Vine, Shrub, and Miscellaneous Plant Staking

Use stakes to identify isolated vines, shrubs, and miscellaneous plants outside of solid mulched beds according to Plan details.

##### 3. Tree Staking and Guying

Stake trees with an identification stake and guy according to the details and dimensions shown on the Plans. Each guy wire shall consist of 18-gauge (1.2 mm) malleable galvanized iron wires twisted into a single strand and enclosed loosely into a rubber hose (or other approved covering or guying materials) extending around the trunk. Replace at no additional expense to the Department, any staking and guying materials that break or loosen.

**Nylon guying straps of accepted size and quality may be substituted for the hose and wire specified above.**

- a. After fastening the wire to the stake by tying or twisting it into a figure-8, nail or staple the wire to the stake to prevent slippage using a 4d nail or a 0.5 in (13 mm) staple.
- b. Tighten the wire so that twisting the wire causes a slight strain between the tree and the stake.
- c. Place guy wires above the first rosette of lower branches and fasten wire to the stake approximately 6 in (150 mm) above the ground.

#### **F. Pruning**

1. Prune plants on the site before planting and after initial inspection by the Engineer. Never prune severely to get plants to meet Specifications.
  - a. Follow modern horticultural practices and use approved tools designed for pruning. Lopping, topping, or shearing trees or shrubs will result in rejection.
  - b. Prune back damaged, scarred, frayed, split, and skinned branches, limbs, and roots to live wood nearest to the next sound, outside lateral bud, branch, limb, or root.
  - c. Leave the terminal leaders or buds in trees intact.
  - d. Remove approximately one-third of the smaller branches on nursery grown vines, shrubs, and trees for root-top balance.
  - e. Prune roots, when necessary, as directed by the Engineer.
  - f. Prune Crape Myrtles to maintain natural form only. Severely cutting back crape myrtles is not permitted. Remove sucker growth from Crape Myrtles.

#### **G. Watering**

1. Apply water in a manner to prevent erosion. Water plants at the time of planting. Water after applying fertilizer called for in [Subsection 702.3.05.H](#) and as necessary to maintain enough moisture to promote plant growth. Use tree gator watering bags or approved equivalent if specified in plans.
  - a. Apply enough water to wet the soil to a depth slightly below the roots. Direct the water to the ground around the plant, not the tops.
  - b. Do not allow plant foliage to dry out or plants to defoliate from lack of water. Remove plants in such condition from the site immediately.
  - c. Apply water once per week throughout the planting season in which the plants are installed. Follow [Subsection 702.3.07.B](#) and [702.3.07.C](#) for shrub and tree watering requirements throughout the life of the project.

## H. Spring Application of Fertilizer

### 1. Method and Rate of Application

Follow these requirements when applying fertilizer in the spring:

#### a. Trees

Deep-root feed trees each spring by using a 8-12-12 slow release fertilizer. Bore a 1.5 in (38 mm) diameter hole between 18 in to 24 in (450 mm to 600 mm) deep at the rate of 8 to 10 holes per tree.

Use 1 cup (0.25 L) of fertilizer per 1 in (25 mm) in caliper of tree measured 6 in (150 mm) off the ground. Fill the holes with soil upon completing each hole.

#### b. Shrubs

Fertilize shrubs with a 6-12-12 slow release 60 percent organic fertilizer by spreading fertilizer around the base of the plant and working it into the soil by hand. Use 0.5 cup ( 0.12 L) of fertilizer per foot (300 mm) of shrub height.

#### c. Bed Areas

Spread fertilizer on bed areas (defined by method of planting in [Subsection 702.3.05.B](#)), over the mulch at the rate of 3 lbs/100 ft<sup>2</sup> (1.5 kg/10 m<sup>2</sup>) using 6-12-12 or 8-12-12. Thoroughly water in the plants.

#### d. Vines

Fertilize vines when not planted in a bed at the rate of 1/4 cup (60 ml) per vine using 6-12-12 or 8-12-12. Thoroughly water in the plants.

#### e. Regenerated Areas

Spread fertilizer on regenerated areas evenly at a rate of 3 lbs/100 ft<sup>2</sup> (1.5 kg/10 m<sup>2</sup>) and thoroughly water in using 6-12-12.

<b>NOTE: 2 cups (1 L) of 6-12-12 or 8-12-12 equals 1 lb (1 kg).</b>
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### 2. Time of Application

Apply fertilizer in the spring in Zones 1 and 2 (with reference to the Planting Zones specified in [Subsection 702.3.05.A](#)) between April 1 and April 15. Apply between March 15 and April 1 for Zones 3 and 4.

For late plantings, do not apply fertilizer less than 30 days after the plantings.

### 3. Additional Fertilizer Grades 8-12-12 or 6-12-12

Approximately one month after the spring fertilizer is applied, the Engineer will inspect planted areas and determine if an additional application of fertilizer is needed for any plant or group of plants.

If the Engineer determines additional fertilizer is required, apply fertilizer at the rate specified in [Subsection 702.3.05.H](#). Make the additional application between June 15 and July 15th.

## I. Treatment of Regenerated Areas

Treating regenerated areas includes staking the perimeter and applying fertilizer in the spring.

Pruning, mulching, staking (except perimeter staking), guying, mowing, weeding, and watering (except watering following fertilization) are not required.

Perform perimeter staking as specified in [Subsection 702.3.03.C.1](#). Apply fertilizer in the spring as specified in [Subsection 702.3.03.C.2](#).

## J. Restoration and Cleanup

Restore areas where existing grass has been damaged or scarred during planting operations at no expense to the Department. Restore the disturbed areas to their original conditions as directed by the Engineer. Clean up debris, spoil piles, and containers and leave the Project area clean.

### **702.3.06 Quality Acceptance**

Preserve the plants in a healthy growing condition. The acceptability of the plant material planted and maintained as specified will be determined at the end of an establishment period.

The plant establishment period is the period from the last planting specified in [Subsection 702.3.05.B](#) until the following October 1. Plant all plants in one planting season unless otherwise approved by Engineer.

#### **A. Establishment Period and Final Inspection**

At the end of the first planting season, the establishment period begins. The Department will make the final inspection 30 days before the end of the establishment period. Replace dead, dying, diseased, unsatisfactory, and missing plants, prior to Final Acceptance of the Project. Assume responsibility for the plants until the Final Acceptance of the Project or a portion of the Project.

### **702.3.07 Contractor Warranty and Maintenance**

Project maintenance includes, but is not limited to, watering, cultivating, weeding, pruning, repairing, adjusting guys and stakes, and performing other work as ordered by the Engineer until final acceptance.

An additional 5% (calculated by type) of all plants actually planted shall be delivered to the City of West Point (Contractor to coordinate details with the Engineer) prior to Final Acceptance. Plants shall be in individual containers suitable for storage up to one year. The City of West Point shall be named/ included on any extended warranties on all plants.

Promptly remove from the Project area dead plants or those that no longer conform to the requirements of [Subsection 702.2.A.2](#).

Mow the entire right-of-way within the limits of the Project up to a maximum of four times per calendar year.

#### **A. Leaning Trees**

Straighten leaning trees as directed by the Engineer. Follow Staking and Guying requirements for replacements or repairs as per [Subsection 702.3.05.E](#).

#### **B. Shrub Maintenance**

##### **1. Pruning**

Prune or thin shrubs, as directed by the Engineer, at least two times per year, once before spring and once during mid-summer. Maintain an attractive shape and fullness with respect to the intended character of the planting. See [Subsection 702.3.05.F](#).

##### **2. Landscape Mulching**

Continuously maintain shrub and tree beds with a clean, freshly mulched appearance using the mulch originally specified. See [Subsection 702.3.05.C](#).

a. Apply a 2 in (50 mm) loose layer of specified mulch (top-dressing) on top of all areas, including tree pits, initially mulched, at the following times:

- In August, during the first plant establishment period.
- In April, during the second plant establishment period.
- In August, during the second plant establishment period.
- In April, prior to the final inspection.

##### **3. Applying Fertilizer**

See [Subsection 702.3.05.H](#).

##### **4. Applying Pesticides**

a. Inspect all planted or seeded vegetation for insects, grubs, mites, diseases, etc., once every two weeks. Apply insecticides, fungicides, and herbicides according to the manufacturer's recommendations to effectively control or eradicate the problem.

- b. Perform all pesticide applications under the direct supervision of a trained licensed commercial pesticide operator whose license includes subcategory 27 – Right of Way Pest Control. Carry the pesticide license/certification on the work site during applications. Carry all labeling associated with the chemical being applied at the work site.
  - c. Submit all product information data sheets and EPA approval numbers on all pesticides proposed to be used prior to application for approval.
  - d. Notify the Engineer a minimum of 48 hours prior to any and all pesticide applications.
  - e. Add a blue dye to all spray applications unless approved otherwise by the Engineer.
  - f. Monitor the weather and spray under proper weather conditions. Spraying shall not occur when the weather is greater than 10 miles per hour.
  - g. Wear the proper safety attire. Wear long sleeve shirts, long pants, gloves, and safety glasses. Wear or use any additional protective safety attire or gear as recommended by the product's manufacturer.
  - h. Repair any damage that is a result of mishandling or misuse of materials, at no expense to the Department, to the satisfaction of the Engineer.
5. Edging
- a. Edge all shrub pits, shrub beds, and tree pits twice a month throughout the life of the project such that the vee-cut edging detail specified on the plans is maintained. Prevent grass and weeds from growing over or into the shrub beds and tree pits.
  - b. Use equipment specifically designed for edging. Line trimming equipment shall not be used.
6. Watering
- a. Check all planted material once a week throughout the contract for dryness by removing the mulch from their base and "sampling the soil" approximately 4 in (100mm) deep. Water if the soil is not moist.
  - b. Water all planted material if a drought (no rain for two weeks) occurs. Provide the water required to meet the watering requirements.
  - c. Water each plant thoroughly until the ground is saturated to a depth slightly below the root ball. Apply water in a manner to prevent erosion.
7. Weed Control
- Perform weed control throughout the project, a minimum of once every two weeks, in all areas within the project limits to maintain tree pits, shrub beds, sidewalks, curb and gutter, walkways, ditch paving, concrete medians, and other pavement weed free. Meet the following conditions:
- a. Perform weed control to prevent weeds from becoming established, setting seed, or from becoming visible in the planting beds.
  - b. Completely remove all undesirable plants (weeds) by hand pulling. Removal of weeds may be accomplished using herbicides if approved by the Engineer.
  - c. Apply an approved pre-emergent herbicide twice each year, once in the spring and once in the fall, throughout the contract. Apply pre-emergent to all shrub beds and tree pits. Notify the Engineer 48 hours prior to spraying. Use a blue dye in all applications unless approved otherwise by the Engineer.
  - d. If noted on plans, eradicate all invasive exotic pest plants found within the project limits throughout the life of the project.
  - e. Dispose off site on a daily basis all weed, exotic plants, clippings, litter, and debris generated.
8. Policing
- Remove debris such as paper, broken limbs, bottles, cans, etc., a minimum of the first and third week of each month from all areas within the project limits while maintaining the site.

### C. Tree Maintenance

- 1. Watering  
See [Subsection 702.3.07.B.6](#)

2. Landscape Mulch  
See [Subsection 702.3.07.B.2](#)
3. Fertilizer  
See [Subsection 702.3.05.H](#).
4. Abnormal Conditions  
Periodically (once every two weeks) observe trees and shrubs for abnormal conditions such as insects, borers, web worms, red spiders, etc., and immediately treat.
5. Sucker Growth  
Remove sucker growth once a month. Sucker growth is the shoots that sprout out around the base of the tree trunk.
6. Pruning and Deadwood  
Remove deadwood at least two times a year. Prune dead branches. Paint cuts, and wounds or scars with tree paint only when specified in the plans. Do not top Crape Myrtles. See [Subsection 702.3.05.F](#).
7. Pesticide Control

**Apply pesticides as necessary to control bores, aphids, mealy bugs, mites, and tent worms, and diseases. Follow the manufacturer's instructions. . See [Subsection 702.3.07.B.4](#). NOTE: Use chemicals according to Federal, State and county directives on environmental control that carry an EPA approval number.**

8. Weed Control  
See [Subsection 702.3.07.B](#)
9. Staking and Guying  
Remove all guy wires/nylon strapping and stakes from plants which have gone through one complete growing season.

## **702.4 Measurement**

### **A. Plants** – not measured separately.

Plants must be living and in an acceptable condition at the time of Final Acceptance according to approved plan.

### **B. Fertilizer** – not measured separately.

Spring application fertilizer applied to planted and regenerated areas is include in price bid for project. Fertilizer, lime, and plant topsoil used in prepared plant topsoil or plant bed preparation are not measured for separate payment.

### **C. Perimeter Stakes**

Perimeter stakes is not measured for payment unless such item is shown as a separate Pay Item in the Proposal.

### **D. Clearing and Grubbing**

Clearing and grubbing is not measured for payment unless the Item is shown as a separate Pay Item in the Proposal.

### **E. Landscape Mulch** – not measured separately.

The quantity of landscape mulch and top-dressing is included in price bid for project. The presence of weeds or other growth, or foreign material, will be cause for rejection of pay request. The addition of landscape mulch in deficient areas will not be measured for payment.

#### **702.4.01 Limits**

General Provisions 101 through 150.

## 702.5 Payment

### A. **Plants** – paid for under CONSTRUCTION COMPLETE.

If the Contractor fails to properly maintain the landscaping, the Department will assess liquidated damages according to the schedule of deductions shown in [Subsection 108.08](#), but not less than \$150 per calendar day, and will continue until project maintenance is approved by the Engineer.

The liquidated damages are in addition to those specified for delay or failure in completing the Work within the specified time.

Includes furnishing, planting, replanting as required, pruning, staking, guying, soil conditioning, and preparing plant beds, including applying additives, digging plant pits, preparing plant topsoil and mulch, disposing of waste material, and maintaining the plants during the plant-establishment period.

### B. **Fertilizer** – paid for under CONSTRUCTION COMPLETE.

### C. **Perimeter Stakes** – paid for under CONSTRUCTION COMPLETE.

### D. **Landscape Mulch** – paid for under CONSTRUCTION COMPLETE.

#### **702.5.01 Adjustments**

General Provisions 101 through 150.

Office of Maintenance

**GEORGIA DEPARTMENT OF TRANSPORTATION**

**STATE OF GEORGIA**

**SUPPLEMENTAL SPECIFICATION**

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

**Section 710—Permanent Soil Reinforcing Mat**

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*Delete Subsection 710 and substitute the following:*

**710.1 General Description**

This work includes furnishing and placing a permanent mat over prepared areas according to the Plans or as directed by the Engineer.

**710.1.01 Definitions**

General Provisions 101 through 150.

**710.02 Related References**

**A. Specifications**

[Section 700—Grassing](#)

[Section 881—Fabrics](#)

**B. Referenced Documents**

[QPL 49](#)

**710.1.03 Submittals**

General Provisions 101 through 150.

**710.2 Materials**

Use materials listed in the [QPL 49](#).

Ensure that materials meet the following requirements.

**A. Preformed Mat**

Use mat with a web of mechanical or melt-bonded polymer nettings, monofilaments, or fibers entangled to form a dimensionally stable matrix. Bond the mat with one of the following:

- Polymer welding
- Thermal fusion
- Polymer fusion

- Fibers placed between two high-strength, biaxially oriented nets bound by parallel-lock stitching with polyolefin, nylon, or polyester threads

Use a mat with enough strength and elongation to limit stretching and maintain its shape before, during, and after installation under dry or wet conditions. Provide a mat with stabilized components that avoid ultraviolet degradation and are inert to chemicals normally encountered in a natural soil environment. Ensure that the mat conforms to the following physical properties:

Property	Minimum Value	Test Method
Thickness	1/2 in (13 mm)	
Weight	0.60 lbs/yd <sup>2</sup> (325 g/m <sup>2</sup> )	
Roll width	38 in (965 mm)	
Tensile strength		ASTM D 5034*
Length (50% elongation)	15 lbs/in (2.5 N/mm)	
Length (ultimate)	20 lbs/in (3.5 N/mm)	
Width (50% elongation)	5 lbs/in (1 N/mm)	
Width (ultimate)	10 lbs/in (2 N/mm)	
Ultraviolet stability	80%	ASTM D 4355
1,000 hours in an Atlas ARC Weatherometer (ASTM G 23, Type D)		ASTM D 822
* Modified to use minimum 6 in (150 mm) wide test specimens.		

#### B. Stakes or Staples

Use 1 in by 3 in (25 mm by 75 mm) wood stakes made from sound stock cut in a triangular shape. Cut stakes 12 in to 18 in (300 mm to 450 mm) long depending on soil compaction. Use metal staples with the following characteristics:

- 11 gauge steel
- U shape
- Legs at least 8 in (200 mm) long
- Crown 2 in (50 mm) across

#### C. Filter Fabric

Use woven or nonwoven filter fabric that meets the requirements of [Subsection 881.2.05, "Plastic Filter Fabric."](#)

### 710.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

*Delete Subsection 710.3 and substitute the following:*

## 710.3 Construction Requirements

### 710.3.01 Personnel

General Provisions 101 through 150.

### 710.3.02 Equipment

General Provisions 101 through 150.

### 710.3.03 Preparation

#### A. Site Preparation

Before protecting areas with mat, prepare the area according to [Section 700](#) with the following steps:



1. Bring to final grade
2. Plow
3. Lime
4. Fertilize
5. Grass

Provide a smooth, firm, and stable surface free of rocks, clods, roots, or other obstructions that would prevent the mat from contacting the soil directly.

#### **710.3.04 Fabrication**

General Provisions 101 through 150.

#### **710.3.05 Construction**

##### **A. Installing Mat**

Do not use a mat in areas with rock outcroppings or large rocks. Install the mat either in ditches or on slopes according to the following requirements:

##### **1. Ditches**

To install the mat in ditches:

- a. Cut a transverse trench 6 in wide by 9 in deep (150 mm wide by 225 mm deep) at the ends of the mat and at 25 ft (7.5 m) intervals along the ditch.
- b. Cut longitudinal, 4 in (100 mm) deep anchor slots along each side of the mat along the full length of the ditch, burying mat edges.

The Engineer will require additional or deeper anchor slots for large volumes of water.

- c. Roll out the center strip of matting, starting at the lower end of the ditch.
- d. Roll out each adjacent strip of matting to overlap the preceding strip at least 3 in (75 mm).
- e. Overlap the ends of each mat roll 3 ft (1 m) with the upslope mat on top. Stretch the mat to the bottom of the slot, folding it back and staking through two layers of material.
- f. Stake each strip of matting at 1 ft (300mm) intervals in each anchor slot, with one stake serving the overlapped edges of adjoining strips.
- g. Backfill and compact the slot.
- h. Fold the mat back over the slot and continue in the upstream direction (closed anchor slot).
- i. Stake the mat snugly in the longitudinal slots and at intervals a maximum of 5 ft (1.5 m) along the ditch (open anchor slot).
- j. Backfill and dress the longitudinal anchor slots.

Lay up to 10 ft (3 m) of filter fabric under runs of matting that begin at pipe outlets.

##### **B. Grassing**

Grass the entire area where mat will be placed and disturbed soil area according to [Section 700](#).

#### **710.3.06 Quality Acceptance**

General Provisions 101 through 150.

#### **710.3.07 Contractor Warranty and Maintenance**

General Provisions 101 through 150.

#### **710.4 Measurement**

No measurement to be included for this item.

**710.4.01 Limits**

Overlaps and anchor slots are incidental to the work and are not measured for payment.

**710.5 Payment**

Includes furnishing and installing the mat according to this Specification, including filter fabric and maintenance.

Payment will be made under CONSTRUCTION COMPLETE.

**710.5.01 Adjustments**

General Provisions 101 through 150.

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**Supplemental Specification**

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

**Section 800—Coarse Aggregate**

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*Delete Section 800 and substitute the following:*

**800.1 General Description**

This section includes requirements for coarse aggregate. All aggregate shall be the specified type, class, and grade, and shall meet the requirements for the intended use.

**800.1.01 Related References**

**A. Standard Specifications**

[Section 424—Bituminous Surface Treatment](#)

**B. Referenced Documents**

AASHTO	ASTM	
T 11	C 277	C 295
T 27	C 289	C 586
T 96	C 294	E 30
T 104		G 23

[GDT 104](#)

[GDT 129](#)

[GDT 133](#)

[QPL 2](#)

[SOP 1](#)

**800.2 Materials**

**800.2.01 Coarse Aggregate**

**A. Requirements**

The Contractor shall use the type, group, class, and grade of coarse aggregate specified. For coarse aggregate sources, see [QPL 2](#).

1. Coarse Aggregate Types

Type	Characteristics
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Type	Characteristics
Crushed stone	Sound, durable rock particles.
Gravel	Sound, durable rock without damaging coatings.
Air-cooled blast furnace slag	Sound, durable particles with uniform density and quality, or other slags that have a good service record.  Dry slag shall weigh at least 70 lb/ft <sup>3</sup> (1120 kg/m <sup>3</sup> ) compacted and shall contain less than 30% glassy particles by weight. Do not use slag as aggregate for Portland cement concrete.
Synthetic aggregate	Sound, durable, expanded clay, shale, or other manufactured product.

2. Coarse Aggregate Groups

- a. Group I: Limestone, dolomite, marble, or any combination thereof. Ensure Group I aggregates meet the abrasion requirement for Class A stone when used in Portland cement concrete of any type or class.
- b. Group II: Slag, gravel, granitic and gneissic rocks, quartzite, synthetic aggregate, or any combination thereof.

3. Classes

Aggregates are classified by physical properties that determine how they are used.

- a. Do not blend aggregates that meet abrasion requirements with aggregates that do not meet requirements.
- b. "Class A" and "Class B" aggregate used in Portland cement concrete, asphaltic concrete, and bituminous surface treatment shall meet these limits:

Percent Wear AASHTO T 96 ("B" Grading)		
	Class A	Class B
Group I Aggregates	0-40	41-55
Group II Aggregates	0-50	51-60

- c. "Class B" aggregates used in all applications other than Portland cement concrete, asphaltic concrete, or bituminous surface treatment shall meet these limits:

Percent Wear AASHTO T 96 ("B" Grading)	
	Class B
Group I Aggregates	41-55
Group II Aggregates	51-65

4. Soundness

Test coarse aggregate used in Portland cement concrete, bituminous surfaces, bituminous bases, aggregate bases, or surface treatment with five alternations of the magnesium sulfate soundness test.

- a. Use aggregate with a weight loss of less than 15 percent.
- b. The 15 percent soundness loss for a Class "CS" concrete is waived if it has a 5-year service record.
- c. If the material meets all the requirements except for the 15 percent soundness requirement, the material may be used in Zones 3 and 4 (see [Subsection 424.3.05](#), "Construction Requirements") under the following conditions:
  - 1) The aggregate in bituminous courses and in all types and classes of Portland cement concrete construction, except as stated in Group I, has a satisfactory five-year service record under similar service and exposure.
  - 2) The Engineer's investigation shows that it equals or exceeds the quality of approved aggregate (in cases where the material's uniformity changes at the source, or does not have a five-year service record).

5. Grades

Use coarse aggregate that is well graded within the limits and sizes specified in [Table 800.1](#).

6. Detrimental Substances

- a. Detrimental substances include shale, weathered or decomposed rock, friable particles, or any substance that may be detrimental for the use intended..

- b. Do not use any aggregate that can cause a deleterious reaction.
- c. Do not use aggregates that contain Chrysotile (defined as fibrous serpentinite) as a temporary or permanent unbound surfacing for roads, nor as stabilizer for soil used as subgrade, base, or surface course.
- d. Detrimental substances shall not exceed the following limits:

1) For Portland Cement Concrete:

Substance	Max % Allowed
Mica schist—Materials defined in ASTM C 294 as phyllite or schist. Use <a href="#">GDT 104</a> to analyze these materials.	5
Materials that pass the No. 200 (75 µm) sieve.	1.5
Flat and elongated pieces (with lengths more than five times the average thickness).	10
Sulphur content computed as sulfide sulphur (for bridge-type structures)—If the sulphur content exceeds 0.01%, do not use the aggregate unless it passes a petrographic analysis and a weathering test equivalent to 6 months or more of exposure.	0.01
Other local detrimental substances. (Any Combination)	2.0
NOTE: Do not use aggregate in Portland Cement concrete that is capable of producing a deleterious reaction when combined with Portland Cement.	

2) For Asphaltic Concrete:

Substance	Max. % Allowed
Mica schist—Materials defined in ASTM C 294 as phyllite or schist. Use <a href="#">GDT 104</a> to analyze these materials. (Use this requirement for Interstate Construction only.)	10
Flat or elongated particles (with lengths more than five times the average thickness).	10
Glassy particles (slag).	30
Other local detrimental substances. (Any combination)	2.0

3) For Bituminous Surface Treatment:

Substance	Max. % Allowed
Mica schist—Materials defined in ASTM C 294 as phyllite or schist. Use <a href="#">GDT 104</a> to analyze these materials.	10
Material finer than No. 200 (75 µm) sieve.	
#5 Stone	0.5
#6 Stone	0.7
#7 Stone	0.7
#89 Stone	1.0
Flat and elongated particles (with lengths more than five times the average thickness).	10
Glassy particles (slag).	30
Other local detrimental substances. (Any combination)	2

- e. Ensure that gravel used in asphaltic concrete and bituminous surface treatment meets the following additional requirements:
  - Consists of siliceous particles.
  - A minimum of 85%, by count, of the material retained on the No. 4 (4.75 mm) sieve has one or more fractured faces.
  - The fracture is for the approximate average diameter or thickness of the particle.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

Test as follows:

Test	Method
Material that passes the No. 200 (75 µm) sieve	AASHTO T 11
Sulphur content	ASTM E 30, Leco method
Weathering	ASTM G 23
Petrographic analysis	ASTM C 295
Soundness (magnesium sulfate)	AASHTO T 104
Percent wear	AASHTO T 96
Aggregate gradation	AASHTO T 27
Reactivity	ASTM C 227, C 289, and C 586
Schist or phyllite	<a href="#">GDT 104</a>
Flat and elongated particles	<a href="#">GDT 129</a>
Friable Particles	<a href="#">GDT 133</a>

**D. Materials Warranty**

General Provisions 101 through 150.

**TABLE 800.1 - SIZES OF COARSE AGGREGATES**

SIZE NO	NOMINAL SIZE SQUARE OPENINGS		AMOUNTS FINER THAN EACH LABORATORY SIEVE (SQUARE OPENINGS). %, BY WEIGHT										
	(1)	mm	2 ½"	2"	1 ½"	1"	¾"	½"	3/8"	No. 4	No. 8	No-16	No. 50
			63 mm	50 mm	37.5mm	25 mm	19 mm	12.5 mm	9.5 mm	4.75 mm	2.36mm	1.18 mm	300 µm
3	2-1	50 - 25	100	90-100	35-70	00-15	-----	00-5	----	-----	-----	-----	-----
357	2-No. 4	50 - 4.75	100	95-100	-----	35-70	-----	10-30	----	00-5	-----	-----	-----
4	1 ½ - ¾	37.5 - 19	-----	100	90-100	20-55	00-15	-----	00-5	-----	-----	-----	-----
467	1 ½-No. 4	37.5 - 4.75	-----	100	95-100	-----	35-70	-----	10-30	00-5	-----	-----	-----
5	1-1/2	25 - 12.5	-----	-----	100	90-100	20-55	00-10	00-5	-----	-----	-----	-----
56	1-3/8	25 - 9.5	-----	-----	100	90-100	40-75	15-35	00-15	00-5	-----	-----	-----
57	1-No. 4	25 - 4.75	-----	-----	100	95-100	-----	25-60	-----	00-10	00-5	-----	-----
6	¾-3/8	19 - 9.5	-----	-----	-----	100	90-100	20-55	00-15	00-5	-----	-----	-----
67	¾-No. 4	19 - 4.75	-----	-----	-----	100	90-100	-----	20-55	00-10	00-5	-----	-----

68	¾-No. 8	19 – 2.36	-----	-----	-----	100	90- 100	-----	30- 65	05- 25	00-10	0-5	-----
7	½-No. 4	12.5 – 4.75	-----	-----	-----	-----	100	90- 100	40- 70	00- 15	00-5	-----	-----
78	½-No. 8	12.5 – 2.36	-----	-----	-----	-----	100	90- 100	40- 75	05- 25	00-10	0-5	-----
8	3/8- No. 8	9.5 – 2.36	-----	-----	-----	-----	-----	100	85- 100	10- 40	0-10	0-5	-----
89	3/8- No. 16	9.5 – 1.18	-----	-----	-----	-----	-----	100	90- 100	20- 55	0-15	0-10	0-5
9	No. 4- No. 16	4.75 – 1.18	-----	-----	-----	-----	-----	-----	100	85- 100	10-40	0-10	0-5

(1) In inches, except where otherwise indicated. Numbered sieves are those of the United States Standard Sieve Series.

- Does not contain any deleterious substances.
  - Natural sand is free of organic matter, roots, or twigs.
  - Aggregate is manufactured from Class A or B crushed stone, gravel, slag, or synthetic aggregate that meets the requirements of [Section 800](#).
  - A combination of natural and manufactured sands meets the requirements in [Subsection 802.2.01.A.3](#) and [Subsection 802.2.01.A.4](#) after being combined.
- b. Do not use crushed alluvial gravel as virgin aggregate in any mixture.
2. Groups  
Fine aggregate groups include:
- a. Group I—Limestone, dolomite, marble, or combination thereof
  - b. Group II—Gravel, slag, granitic and gneissic rocks, quartzite, natural sand, or a combination thereof
3. Sand Equivalent  
Use these sand equivalent values:

Material	Sand Equivalent Value
Group I	At least 28
Group II	At least 40
Natural sand	At least 25
Blended sand*	Natural sand at least 20; combined blend at least 25
*Blended natural sands or natural sand blended with stone screenings that meet the Group I or Group II sand equivalent limits.	

4. Mica
- a. Use fine aggregate with no more than 35 percent free mica in asphaltic concrete surface mixes.
  - b. When approved by the Engineer, use fine aggregate with more than 35 percent mica if blended with natural sand or sand manufactured from Group II aggregates. Ensure the blend has no more than 35 percent free mica and meets all other requirements of this Section, [Section 800](#) and [Section 828](#).
5. Aggregate for Stone Matrix Asphalt  
Manufactured screenings will be considered as fine aggregate and shall contain no more than 20 percent by weight coarser than a No. 4 (4.75 mm) sieve.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

Test the fine aggregate as follows:

Test	Method
Aggregate gradation	AASHTO T 27
Sand equivalent	<a href="#">GDT 63</a>
Mica content	<a href="#">GDT 76</a> or ASTM C 295

**D. Materials Warranty**

General Provisions 101 through 150.



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**Section 801—Fine Aggregate**

---

*Delete Section 801 and substitute the following:*

**801.1 General Description**

This section includes the requirements for fine aggregate. All aggregate shall be the specified type, class, and grade.

**801.1.01 Related References**

**A. Standard Specifications**

[Section 800—Coarse Aggregate](#)

[Section 441—Miscellaneous Concrete](#)

**B. Referenced Documents**

<b>AASHTO</b>	<b>ASTM</b>
T 11	C 295
T 21	
T 27	
T 112	
T 303	

[GDT 4](#)

[GDT 5](#)

[GDT 63](#)

[GDT 75](#)

[GDT 132](#)

[QPL 1](#)

[SOP 1](#)

## 801.2 Materials

### 801.2.01 Fine Aggregate for Cushion

#### A. Requirements

Use the type, class, and grade of fine aggregate specified.

1. Types

Use fine aggregate for cushion under granite curb or brick that is natural or manufactured sand with hard, strong, durable particles. Make manufactured sand from crushed gravel or stone meeting the requirements of [Section 800](#). For a list of fine aggregate sources, see [QPL 1](#).

2. Grades

Use fine aggregate for cushion with less than 10 percent total silt and clay. Grade as follows:

Size	Percent by Weight
Passing No. 4 (4.75 mm) sieve	100
Passing No. 16 (1.18 mm) sieve	25-75
Passing No. 100 (150 µm) sieve	0-25

#### B. Fabrication

General Provisions 101 through 150.

#### C. Acceptance

Test as follows:

- Sieve analysis—AASHTO T 27

#### D. Materials Warranty

General Provisions 101 through 150.

### 801.2.02 Fine Aggregate for Portland Cement Concrete of All Types and for Mortar

#### A. Requirements

1. Concrete and Mortar

Use fine aggregate for concrete and mortar that consists of natural sand, manufactured sand, or blends of natural and manufactured sands, having hard, clean, strong, durable, uncoated particles, meeting the requirements of the Specifications.

2. Manufactured Sand

Use manufactured sand made exclusively from crushed stone or gravel that meets [Section 800](#) requirements.

Manufactured sand used in concrete for construction of Portland cement concrete pavement, approach slabs, and bridge decks, shall be made from Group II aggregates as specified in [Subsection 800.2.01.A.2](#).

3. Miscellaneous Concrete

Sand manufactured from synthetic aggregate meeting the requirements of [Section 800](#) may be blended with natural sands or manufactured sands made from crushed stone or gravel for use in miscellaneous concrete as described in [Section 441](#).

Blend at least 50 percent natural sand or manufactured sand made from crushed stone or gravel.

4. Concrete Sand

Concrete sand that passes the No. 10 (2 mm) sieve shall have these characteristics:

Characteristic	Requirement
Durability index	70 or greater

Sand equivalent	70 or greater
-----------------	---------------

5. Detrimental Substances

Keep detrimental substances within these limits:

Substance	Maximum Percent by Weight
Clay lumps	0.5 maximum in total sample
Coal and lignite	0.5 maximum in total sample
All detrimental substances (any combination)	2.0 maximum in total sample
NOTE: Do not use fine aggregate in Portland cement concrete that is capable of producing a deleterious reaction with Portland cement	

Provided the material passing the No. 16 (1.18 mm) sieve is petrographically determined to be essentially free of detrimental substances, test results for coal and lignite and other detrimental substances listed will be based upon a petrographic analysis of material retained on the No. 16 (1.18 mm) sieve.

Calculations will be based upon the weighted average for the total sample.

Other detrimental substances include constituents such as shale, weathered or decomposed rock, soft or friable particles, coated grains, or other substances that might be considered detrimental for the use intended.

6. Organic Impurities (natural sands only)

Ensure all fine aggregate is free from detrimental amounts of organic impurities.

Do not use materials that have colorimetric test (AASHTO T 21) results darker than the Reference Standard color plate.

7. Grades

Grade fine aggregates for Portland cement concrete and mortar as follows:

Size No.	Description	Total Percent by Weight Passing Each Sieve					
		3/ 8 in (9.5 mm)	No. 4 (4.75 mm)	No. 16 (1.18 mm)	No. 50 (300 µm)	No. 100 (150 µm)	No. 200 (75 µm)
10 NS	Natural concrete sand	100	95-100	45-95	8-30	1-10	0-3
20 NS	Natural mortar sand	100	100	90-100	15-50	0-15	0-5
10 SM	Standard manufactured concrete sand	100	95-100	45-95	8-30	1-10	0-4
10 FM	Fine manufactured concrete sand	100	95-100	45-95	15-42	6-22	0-9

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

Test as follows:

Test	Method
Petrographic analysis	ASTM C 295
Material that passes a No. 200 (75 µm) sieve	AASHTO T 11

Organic impurities	AASHTO T 21
Sieve analysis	AASHTO T 27
Sand equivalent	<a href="#">GDT 63</a>
Reactivity	AASHTO T 303
Durability index	<a href="#">GDT 75</a>
Clay lumps	AASHTO T 112
Friable Particles	<a href="#">GDT 132</a>
NOTE: The percent passing the No. 200 sieve (75 µm) for size 10FM will be based upon the total percent determined by AASHTO T-11 and AASHTO T-27. The percent passing the No. 200 sieve (75 µm) for sizes 10NS, 20NS and 10SM will be as determined by AASHTO T-11 only.	

**D. Materials Warranty**

General Provisions 101 through 150.

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**Section 802—Aggregates for Asphaltic Concrete**

---

*Delete Section 802 and substitute the following:*

**802.1 General Description**

This section includes the requirements for fine and coarse aggregates used in asphaltic concrete.

**802.1.01 Definitions**

**Fine Aggregate:** All aggregate passing a No. 8 (2.36 mm) sieve

**Coarse Aggregate:** All aggregate retained on a No. 8 (2.36 mm) sieve

**802.1.02 Related References**

**A. Standard Specifications**

[Section 800—Coarse Aggregate](#)

[Section 828—Hot Mix Asphaltic Concrete Mixtures](#)

**B. Referenced Documents**

AASHTO T 27

AASHTO T 96

ASTM C 295

[GDT 63](#)

[GDT 76](#)

[SOP 1](#)

**802.2 Materials**

**802.2.01 Fine Aggregate for Asphaltic Concrete**

**A. Requirements**

Use the appropriate type, group, class, and grade of fine aggregate.

1. Types

Use fine aggregate made of sharp, strong, angular material meeting the required performance characteristics when combined into a mixture.

a. Ensure that the aggregate meets the following requirements:

## 802.2.02 Coarse Aggregate for Asphaltic Concrete

### A. Requirements

#### 1. Types

Ensure coarse aggregate meets the following requirements:

- Class A or B crushed stone, gravel, slag, or synthetic aggregate as in [Subsection 800.2](#).
- Have uniform quality throughout without any deleterious substances.
- Meet the required performance characteristics when combined into a mixture.

**NOTE: Do not use alluvial gravel as virgin aggregate.**

#### 2. Groups

Coarse aggregate shall be one of either group below as specified in the composition Table in [Subsection 828.2.A.2](#):

- Group I—Limestone, dolomite, marble, or combination thereof
- Group II—Gravel, slag, granite and gneissic rocks, quartzite, or combination thereof

#### 3. Aggregate for Stone Matrix Asphalt

Use coarse aggregate that meets requirements of this Section and [Section 800](#) except as follows:

- Use Class A aggregate only with percent wear of each individual size not to exceed 45 percent based on the B grading of AASHTO T 96
- Use aggregate which contains no more than 20 percent flat and elongated pieces (length greater than three times the average thickness) for that portion of the blend of all aggregate retained on the No. 4 (4.75 mm) sieve.

### B. Fabrication

General Provisions 101 through 150.

### C. Acceptance

Test as follows:

Test	Method
Coarse Aggregate	<a href="#">Subsection 800.2.01.C</a>

### D. Materials Warranty

General Provisions 101 through 150.

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**Section 803—Stabilizer Aggregate**

---

*Delete Section 803 and substitute the following:*

**803.1 General Description**

This section includes the requirements for stabilizer aggregate, Types I through III, and Type IV stabilizer sand.

**803.1.01 Related References**

**A. Standard Specifications**

[Section 800—Coarse Aggregate](#)

**B. Referenced Documents**

AASHTO T 27

AASHTO T 96

[GDT 63](#)

[SOP 1](#)

**803.2 Materials**

**803.2.01 Type I Stabilizer**

**A. Requirements**

Use the appropriate type, class, and grade of stabilizer aggregate.

Use material of uniform quality that meets the requirements of [Section 800](#), Class A or B aggregate, and [SOP 1](#). Crushed concrete may be used provided it meets the requirements of [Section 800](#) that are applicable to Group 2 aggregates. Ensure the material meets the following gradation:

Sieve Size	% Passing by Weight
1-1/2 in (37.5 mm)	100
1 in (25 mm)	80-100
No. 8 (2.36 mm)	0-5

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

Use the following test:

Test	Method
Sieve analysis	AASHTO T 27

**D. Materials Warranty**

General Provisions 101 through 150.

**803.2.02 Type II Stabilizer Aggregate**

**A. Requirements**

Use material that meets the requirements of [Section 800](#), Class A or B aggregate, and [SOP 1](#). Crushed concrete may be used provided it meets the requirements of [Section 800](#) that are applicable to Group 2 aggregates.

The aggregate shall:

- Not contain overburden soil or disintegrated rock
- Have a sand equivalent value of at least 20 for material passing the No. 10 (2 mm) sieve
- Meet these gradation requirements:

Sieve Size	% Passing by Weight
2 in (50 mm)	100
1-1/2 in (37.5 mm)	95-100
No. 10 (2 mm)	15-45
No. 200 (75 µm)	0-12

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

Test type II stabilizer as follows:

Test	Method
Sieve analysis	AASHTO T 27
Sand equivalent	<a href="#">GDT 63</a>

**D. Materials Warranty**

General Provisions 101 through 150.

**803.2.03 Type III Stabilizer Aggregate**

**A. Requirements**

Use material that meets the requirements of [Section 800](#), Class A or B aggregate, and [SOP 1](#). Crushed concrete may be used provided it meets the requirements of [Section 800](#) that are applicable to Group 2 aggregates.

Ensure the stabilizer aggregate does not contain soil or decomposed rock and that the Sand Equivalent value of the material passing the No. 10 sieve is not less than 20.



The aggregate shall meet these gradation requirements:

Sieve Size	% Passing by Weight
6 in (150 mm)	100
2 in (50 mm)	25-75
No. 10 (2 mm)	15-35

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

Test Type III stabilizer as follows:

Test	Method
Sieve analysis	AASHTO T 27
Percent wear	AASHTO T 96

**D. Materials Warranty**

General Provisions 101 through 150.

**803.2.04 Type IV Stabilizer Sand**

**A. Requirements**

Make Type IV stabilizer sand from either natural sand, manufactured sand, or any combination of natural and manufactured sands.

1. If using manufactured sand, make the sand from Class A or B crushed stone, gravel, slag, or synthetic aggregate that meets [Section 800](#) requirements and conforms to [SOP 1](#).
2. Type IV stabilizer sand shall have a sand equivalent of at least 35 for material passing the No. 10 (2 mm) sieve and shall also meet these gradation requirements.

Sieve Size	% Passing by Weight
No. 10 (2 mm)	60-100
No. 60 (250 µm)	5-40
No. 200 (75 µm)	0-20

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

Test Type IV stabilizer as follows:

Test	Method
Sieve analysis	AASHTO T 27
Sand equivalent	<a href="#">GDT 63</a>

**D. Materials Warranty**

General Provisions 101 through 150.

DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA

PROPOSAL

DO NOT UNSTAPLE THIS BOOKLET...ENTER ALL REQUIRED INFORMATION  
----- EITHER BY HAND OR BY STAMP.

DATE OF OPENING : April 20, 2007

CALL ORDER : 001

CONTRACT ID : B12829-07-000-0

PCN	PROJECTS AND CONTRACT NO.
----- 0008232010000	----- CSNHS-0008-00(232) 01

COUNTY : TROUP

CODE \_\_\_\_\_ ISSUED TO:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

PART 2 OF 2  
THE CONTRACTOR SHALL RETURN ALL PARTS OF THE PROPOSAL  
WITH HIS BID UNLESS BIDDING ELECTRONICALLY

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

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**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**Supplemental Specification**

**Project Number: CSNHS-0008-00(232)**

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**Section 810—Roadway Materials**

---

*Delete Subsection 810.2.01.A and substitute the following:*

**A. Requirements**

Do not use materials containing logs, stumps, sod, weeds, or other perishable matter.

1. Classes

The materials are divided into six major classes. Classes I, II, and III are further subdivided and identified by description and physical property requirements specified in the table below and in Table 1. Classes IV, V, and VI are identified by descriptive requirements.

<b>Class I</b>	
IA1 and IA2	Medium- to well-graded sand or clayey sand.
IA3	Fine-grained, silty, or clayey sand; usually less dense than IA1 or IA2. These soils have an excellent bearing capacity.
<b>Class II</b>	
IIB1, IIB2, and IIB3	Medium- to well-graded sandy clays, sandy silts, and clays with some mica. These soils generally have low volume change properties and good densities that serve well as subgrade material.
IIB4	Similar to IIB1, IIB2, and IIB3, but generally contain more mica and are more sensitive to moisture. The bearing value of these soils is less predictable.  The soils may or may not be satisfactory for subgrade material. Analyze file data or run laboratory and/or field tests for Class IIB4 when considering it for a subgrade material.
<b>Class III</b>	
IIIC1, IIIC2, IIIC3 and IIIC4	Medium- to fine-graded micaceous sandy silts, micaceous clayey silts, chert clays, and shaly clays. Undesirable characteristics are high volume change properties and/or low densities.  The bearing values are unpredictable. The Department recommends testing these materials in a laboratory, where possible, before use. One exception is District 6, where chert clay soils are prevalent.  Chert clay soils (IIIC4) with less than 55% passing the No. 10 (2 mm) sieve may be considered suitable for subgrade materials. These soils are found generally in the

**Section 810—Roadway Materials**

	northwest corner of the state in Dade, Walker, Catoosa, Whitfield, Murray, Chattooga, Gordon, and Floyd counties.
Class IV	Highly organic soils or peat, muck, and other unsatisfactory soils generally found in marshy or swampy areas.
Class V	Shaly materials that are not only finely laminated but have detrimental weathering properties and tend to disintegrate.
Class VI	Rock or boulders that cannot be readily incorporated into the embankment by layer construction, and that contain insufficient material to fill the interstices when they are placed.

**Table 1: Physical Properties (Material Passing No. 10 (2.00 mm) Sieve)**

Sub-Class	No. 60 (250 µm) Sieve % Passing	No. 200 (75 µm ) Sieve % Passing	Clay, %	Volume Change, %	Maximum Dry Density lbs/ft <sup>3</sup> (kg/m <sup>3</sup> )
<b>Class I</b>					
A1	15-65	0-25	0-12	0-10	115+ (1840+)
A2	15-85	0-35	0-16	0-12	100+ ( 1600+)
A3	15-100	0-25	0-12	0-18	98+ (1570+)
<b>Class II</b>					
B1		0-30	0-20	0-10	120+ (1920+)
B2		0-45	0-30	0-15	110+ (1760+)
B3		0-60	0-50	0-20	105+ (1680+)
B4		0-75		0-25	90+ (1440+)
<b>Class III</b>					
C1		0-75		0-30	90+ (1440+)
C2				0-35	80+ (1280+)
C3				0-60	80+ (1280+)
C4*					80- (1280-)
*Chert clay soils in District 6 having less than 55% passing the No. 10 (2.00 mm) sieve may be considered suitable for subgrade material.					

Test the soil density with [GDT 7](#).

1. Review the mixture and the percentages of each material, and approve a mixture suitable for the Project.

**D. Materials Warranty**

General Provisions 101 through 150.

**812.2.04 Mechanically Stabilized Embankment Backfill**

**A. Requirements**

Use material comprised of crushed stone, natural sand, or a blend of crushed stone and natural sand free of soils, organic or any other deleterious substances that meet the following additional requirements:

1. Crushed Stone

Use a material manufactured from Class A or B stone that is free of soil overburden has a soundness loss of not more than 15 percent, and conforms to the requirements of [SOP 1](#).

2. Natural Sand

Use material that consists of strong, hard, durable particles, is non-plastic, and has a durability index of at least 70.

3. Gradation

Sieve Size	% Passing by Weight
4 in (100 mm)	100
2 in (50 mm)	80 -100
No. 10 (2 mm)	20 - 90*
No 200 (75 µm)	0 - 12
* Natural Sand may be 20 - 100	

4. Chemical

Ensure the material meets the following chemical requirements:

Test Method	Requirement
pH	6.0 – 9.5
Resistivity	>3000 ohms/cm
Chlorides	<100 ppm
Sulfates	<200 ppm
Note: These chemical requirements are not applicable to MSE walls stabilized with an approved extensible reinforcement.	

5. Maximum Dry Density

Use backfill material with a maximum dry density equal to or greater than the design unit weight shown on the plans. If no maximum dry density of the backfill material is shown, use a weight of 125 lb/ft<sup>3</sup> (2000 kg/m<sup>3</sup>).

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

Test the material as follows:

Test Method	Requirement
Percent Wear	AASHTO T96 ("A" Grading)

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**Section 812—Backfill Materials**

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*Delete Section 812 and substitute the following:*

**812.1 General Description**

This section includes the requirements for four types of material used as backfill: foundation backfill, Types I and II, imperfect trench backfill, Type III, and mechanically stabilized wall backfill.

**812.1.01 Related References**

**A. Standard Specifications**

[Section 810—Roadway Materials](#)

**B. Referenced Documents**

AASHTO T 27

[GDT 4](#)

[GDT 6](#)

[GDT 7](#)

[GDT 67](#)

[SOP 1](#)

**812.2 Materials**

**812.2.01 Foundation Backfill, Type I**

**A. Requirements**

1. Use natural or artificial mixtures of materials consisting of hard, durable particles of sand or stone, mixed with silt, clay and/or humus material for Type I backfill.
2. Have the final blend of material meet the requirements of Class I or II soils in [Subsection 810.2.01](#).

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

Test as follows:

Test	Method
Soil gradation	<a href="#">GDT 4</a>
Volume change	<a href="#">GDT 6</a>
Maximum density	<a href="#">GDT 7</a> or <a href="#">GDT 67</a>

**D. Materials Warranty**

General Provisions 101 through 150.

**812.2.02 Foundation Backfill, Type II**

**A. Requirements**

1. Type

Use material that meets the requirements of [Section 800](#), Class A or B aggregate, and [SOP 1](#). Crushed concrete may be used provided it meets the requirements of [Section 800](#) that are applicable to Group 2 Aggregates.

Do not use backfill aggregate containing soil or decomposed rock.

2. Gradation

Use material that meets the following gradation requirements:

Sieve Size	% Passing by Weight
1-1/2 in (37.5 mm)	100
1 in (25 mm)	80-100
No. 8 (2.36 mm)	0-5

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

Test as follows:

Test	Method
Sieve analysis	AASHTO T 27

**D. Materials Warranty**

General Provisions 101 through 150.

**812.2.03 Imperfect Trench Backfill, Type III**

**A. Requirements**

1. Type

Use material made from either of the following for Type III backfill:

- A natural soil with a density of less than 95 lb/ft<sup>3</sup> (1520 kg/m<sup>3</sup>) when tested with [GDT 7](#)
- An artificial mixture of soil and organic material, such as hay, leaves, or straw

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

The laboratory will:



Sieve Analysis	AASHTO T 27
Material Passing No. 200 (75 μm) Sieve	AASHTO T 11
Durability Index	<a href="#">GDT 75</a>
Maximum Dry Density	<a href="#">GDT 7</a> or <a href="#">GDT 24a</a> , <a href="#">GDT 24b</a>
Soundness (Magnesium Sulfate)	AASHTO T 104

**D. Materials Warranty**

General Provisions 101 through 150.

**GEORGIA DEPARTMENT OF TRANSPORTATION**

**STATE OF GEORGIA**

**SUPPLEMENTAL SPECIFICATION**

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**Section 814—Soil Base Materials**

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*Delete Subsection 814.1.01 and substitute the following:*

**814.1.01 Related References**

**A. Standard Specifications**

[Section 209—Subgrade Construction](#)

[Section 301—Soil-Cement Construction](#)

[Section 800—Coarse Aggregate](#)

[Section 810—Roadway Materials](#)

[Section 831—Admixtures](#)

**B. Referenced Documents**

AASHTO T 89

AASHTO T 90

ASTM D 516

[GDT 4](#)

[GDT 6](#)

[GDT 7](#)

[GDT 65](#)

[GDT 67](#)

[GDT 98](#)

*Delete 814.2.02 and substitute the following:*

**814.2.02 Soil-Cement Material**

**A. Requirements**

1. Ensure that the material for soil-cement base will:

- a. Meet the requirements of [Subsection 810.2.01](#) for Classes IA1, IA2, IA3, or IIB1 with the following modifications:

Clay content	4 to 25%
--------------	----------

## Section 814—Soil Base Materials

Volume change	18% maximum
Liquid Limit	25% maximum
Plasticity Index	10% maximum
Maximum dry density	95 lb/ft <sup>3</sup> (1520 kg/m <sup>3</sup> ) minimum
Sulfates	4000 ppm
pH	4.0 minimum

- b. Be friable and not contain large amounts of heavy or plastic clay lumps, organic material, roots, or other substances that would interfere with how the Portland cement sets, plant production, or the finished surface of the base and meet the requirements of [Subsection 301.3.05.A.2, “Pulverization”](#) or [Subsection 301.3.05.B.1, “Soil”](#).
  - c. Produce a laboratory unconfined compressive strength of at least 450 psi (3.1 MPa). To make the sample, mix in a maximum of 8 percent Type I Portland cement, moist-cure for 7 days, and test with [GDT 65](#).
2. Analyze the soil-cement design and create a Job Mix Formula for each Project where soil-cement base or subbase is specified. Have the Job Mix Formula approved by the Engineer before starting base or subbase construction.
  3. You may use fly ash or slag that meets the requirements of [Subsection 831.2.03](#) as admixtures for poorly reacting soils when the blend of soil and fly ash, or slag, meets the design requirements in this Subsection.
  4. Ensure that subgrade material used underneath the soil-cement base meets the sulfate and pH requirements of this subsection (See Subsection 209.3.05.A.7).

### B. Fabrication

General Provisions 101 through 150.

### C. Acceptance

Test as follows:

Test	Method
Soil gradation	<a href="#">GDT 4</a>
Volume Change	<a href="#">GDT 6</a>
Maximum density	<a href="#">GDT 7</a> or <a href="#">GDT 67</a>
Soil-Cement Design	<a href="#">GDT 65</a>
pH	<a href="#">GDT 98</a>
Sulfates	ASTM D 516
Liquid Limit	AASHTO T 89
Plastic Limit and Plasticity Index	AASHTO T 90

### D. Materials Warranty

General Provisions 101 through 150.

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**Supplemental Specification**

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

**Section 815—Graded Aggregate**

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*Delete Section 815 and substitute the following:*

**815.1 General Description**

This section includes the requirements for material to be used for base, subbase, or shoulder course material, and includes graded aggregate, unconsolidated limerock base, and crushed concrete base.

**815.1.01 Related References**

**A. Standard Specifications**

[Section 800—Coarse Aggregate](#)

**B. Referenced Documents**

AASHTO T 27

ASTM C 295

ASTM D 3042

FL DOT Method FM5-515

SOP-1

[GDT 63](#)

**815.2 Materials**

**815.2.01 Graded Aggregate**

**A. Requirements**

1. Type

Use graded aggregate base, subbase, or shoulder course material of uniform quality.

- a. Obtain the graded aggregate from an approved source or deposit that will yield a satisfactory mixture meeting all requirements of this Specification.
- b. Use material that is crushed or processed as a part of the mining operations, or, mix two grades of material so that when combined in the central mix plant, the mixture meets the specifications.

2. Retained on the No. 10 (2 mm) sieve

Ensure that the material retained on the No. 10 (2 mm) sieve is Class A or B aggregate that meets the requirements of [Section 800](#).

3. Passing the No. 10 (2 mm) sieve

Ensure that any material passing the No. 10 (2 mm) sieve is relatively free of detrimental substances, such as soil overburden, decomposed rock, and/or swelling silts.

4. Stabilized Mixtures

Ensure that mixtures to be stabilized react satisfactorily when mixed with Portland cement. The Engineer will specify the percentage of Portland cement to use.

5. Gradation

Grade the graded aggregate base, subbase, or shoulder material as follows:

Sieve Size	Percent Passing By Weight
<b>Group I Aggregates</b>	
2 in (50 mm)	100
1-1/2 in (37.5 mm)	97-100
3/4 in (19.0 mm)	60-95
No. 10 (2 mm)	25-50 (Note 1, 2 and 3)
No. 60 (250 µm)	10-35
No. 200 (75 µm)	7-15
<b>Group II Aggregates</b>	
2 in (50 mm)	100
1-1/2 in (37.5 mm)	97-100
3/4 in (19 mm)	60-90
No. 10 (2 mm)	25-45 (Note 2 and 4)
No. 60 (250 µm)	5-30
No. 200 (75 µm)	4-11
NOTE 1: Group I aggregates having less than 37% passing the No. 10 (2 mm) sieve, shall have at least 9 percent passing the No. 200 (75 µm) sieve.	
NOTE 2: For graded aggregate stabilized with Portland Cement, 30-50 percent by weight shall pass the No. 10 (2 mm) sieve. All other requirements remain the same.	
NOTE 3: Material passing the No. 10 (2 mm) sieve shall have a sand equivalent of at least 20 for Group I aggregates.	
NOTE 4: Material passing the No. 10 (2 mm) sieve shall have a sand equivalent of at least 28 for Group II aggregates. Sand Equivalent values as low as 20 will be acceptable provided they are attributed exclusively to rock flour and the percent passing the No. 10 (2 mm) sieve does not exceed 40.	

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

Test as follows:

Test	Method
Gradation	AASHTO T 27
Sand Equivalent	<a href="#">GDT 63</a>

**D. Materials Warranty**

General Provisions 101 through 150.

**815.2.02 Unconsolidated Limerock Base**

**A. Requirements**

1. Type

Use limerock base, subbase, or shoulder course material of uniform quality.

- a. To ensure uniform quality, the Department may restrict approved sources to specific mining areas, mining processes at a specific mining site, or both.
- b. Use a limerock base that yields a mixture to meet these Specifications.
- c. Use material that is crushed or processed as a part of the mining operations, or mix two grades of material so that when combined in the central mix plant the mixture meets the specifications.
- d. Use limerock base, subbase, or shoulder material that has the following characteristics:

Limerock bearing ratio	At least 100.
Deleterious substances	Do not allow chert or other extremely hard pieces that will not pass the 2 in (50 mm) sieve.  Do not allow clay, sand, organics, or other materials in quantities that may damage bonding, finishing, or strength.  All material passing the No. 40 (425 µm) sieve shall be non-plastic.
Carbonate content (magnesium or calcium)	At least 90%.

2. Gradation

Grade the limerock base so at least 97 percent by weight passes the 3-1/2 in (90 mm) sieve.

- a. Grade the material uniformly to dust. The fine portion passing the No. 10 (2 mm) sieve shall all be dust of fracture.
- b. Crush or break the limerock base, if necessary to meet size requirements before placing the material on the road.
- c. Ensure that materials having soundness losses of 20% or less, comply with the following gradation requirements:

**Gradation Requirements**

SIEVE SIZE	PERCENT PASSING BY WEIGHT
2" (50 mm)	100
1-1/2" (37.5 mm)	97-100
3/4" (19 mm)	60-95
No. 10 (2.00 mm)	25-45
No. 60 (250 µm)	10-30
No. 200 (75 µm)	7-20

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

Test as follows:

Test	Method
Gradation	AASHTO T 27
Limerock bearing ratio	FL DOT Method FM5-515
Petrographic analysis	ASTM C 295
Total carbonates (insoluble residue)	ASTM D 3042

**D. Materials Warranty**

General Provisions 101 through 150.

**815.2.03 Crushed Concrete Base**

**A. Requirements**

1. Sources

Obtain sources of crushed concrete materials approved by the Office of Materials and Research. The criteria for approval will be as outlined in Standard Operating Procedure No. 1, "Monitoring the Quality of Coarse and Fine Aggregates" except that the raw material will be recyclable concrete as specified herein rather than a geological deposit of aggregate.

2. Type

Use crushed concrete derived exclusively from Portland cement concrete pavement or structural concrete as a base, subbase, or shoulder course.

Ensure that the material does not contain delivery unit washout material.

3. Gradation

Ensure that the finished product meets the quality and gradation requirements of [Subsection 815.2.01](#) for Group II aggregates, except that the aggregate will be recycled concrete.

Ensure that the finished product is free of foreign materials such as asphaltic concrete, steel reinforcement, clay balls, soils, epoxy expansion material, and miscellaneous paving materials.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

Test as follows:

Test	Method
Gradation	AASHTO T 27
Sand Equivalent	<a href="#">GDT 63</a>

**D. Materials Warranty**

General Provisions 101 through 150.

**GEORGIA DEPARTMENT OF TRANSPORTATION**

**STATE OF GEORGIA**

**SUPPLEMENTAL SPECIFICATION**

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

**Section 819—Fiber Stabilizing Additives**

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*Delete Section 819 and Substitute the following:*

**819.1 General Description**

This Section covers the general requirements for fiber stabilizing additives incorporated into asphaltic concrete mixtures. These fibers are used to stabilize the asphalt film surrounding aggregate particles to reduce drain-down of the asphalt cement., use cellulose or mineral fiber stabilizer listed on QPL 77, Fiber Stabilizing Additives.

**819.1.01 Related References**

**A. Standard Specifications**

General Provisions 101 through 150.

**B. Referenced Documents**

AASHTO T 245

AASHTO T 305

ASTM D 128

GDT 130

QPL 77

**819.2 Materials**

Use an approved mineral or cellulose fiber stabilizing additive currently listed in QPL 77. Approved additives shall meet the requirements below. Dosage rates below are typical ranges. Use the dosage rate prescribed in the Job Mix Formula, as approved by the Office of Materials and Research.

**A. Requirements for all fiber types**

1. Use a fiber stabilizer of the type and properties appropriate to the plant's metering and delivery system.
2. When tested in a standard mixture according to AASHTO T 305, the fiber stabilizing additive shall limit drain-down to not more the 0.2% of the weight of the mixture. For the purpose of evaluating these additives, the following test conditions apply.
  - The mixture tested shall consist of a standard No. 7 stone and 6.4% asphalt cement.
  - Mixing and compaction temperatures for the test shall be as prescribed in AASHTO T 245, Section 3.3.1.
  - Wet mixing time shall be  $60 \pm 2$  seconds.



- Unseparated fibers, determined by visual inspection of the mixture after the drain-down test, shall not exceed 5% of total fiber content.

**B. Cellulose Fibers**

Add cellulose fibers at a dosage rate between 0.2% and 0.4% by weight of the total mix, according to the approved Job Mix Formula. Fiber properties shall be as follows:

- Ash Content by ASTM D 128: 23% maximum non-volatile content
- pH: 7.0 to 12.0
- Moisture Content: 5.0% maximum

**C. Cellulose Pellets**

Use cellulose fiber stabilizing additive in pellet form that meets the requirements of Subsection 819.2.A and Subsection 819.2.B. Use pellets that disperse sufficiently at mixing temperature to blend uniformly into the asphalt mixture. Use pellets that do not exceed 0.24 in (6.0 mm) average pellet diameter. Pellets may contain binder ingredients such as asphalt cement, wax, or polymer. Do not use pellets if the binder ingredient exceeds 20.0% of the total weight of the pellets. Use binder that produces no measurable effect on the properties of the asphalt cement. Do not use fiber pellets which soften or clump together when stored at temperatures up to 122 °F (50 °C).

Add approved palletized fiber stabilizing additive at a dosage rate between 0.2% and 0.4% by weight of the total mix, according to the approved Job Mix Formula established by the Office of Materials and Research.

**NOTE: If the binder material constitutes more than 3% of the pellet weight, the dosage rate shall be based upon the net fiber content.**

**D. Mineral Fibers**

Use mineral fibers made from virgin basalt, diabase, slag or other silicate rock. Add the fiber at a dosage rate prescribed in the approved Job Mix Formula, between 0.3% and 0.6% by weight of the total mix. Use approved mineral fiber from QPL 77, meeting the following requirements for Shot content, as tested according to GDT 130:

Sieve	Minimum Percent Passing
No 60	90
No. 230	60

**E. Materials Warranty**

General Provisions 101 through 150.

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**Supplemental Specification**

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

**Section 820—Asphalt Cement**

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*Delete Section 820 and substitute the following:*

**820.1 General Description**

This Section includes the requirements for asphalt cements prepared from crude petroleum.

**820.1.01 Related References**

**A. Standard Specifications**

General Provisions 101 through 150.

**B. Referenced Documents**

Standard Operating Procedure (SOP 4)

AASHTO R 28

AASHTO T 48

AASHTO T 179

AASHTO T 240

AASHTO T 313

AASHTO T 314

AASHTO T 315

AASHTO T 316

**820.2 Materials**

**820.2.01 Asphalt Cement**

**A. Requirements**

1. Type

Use a material that is homogenous and water-free and that does not foam when heated to 347 °F (175 °C).

Ensure that a blend used to produce a specified performance grade meets the following requirements:

- Is uniform and homogeneous without separation
- Uses PG 64-22 or PG 67-22 described below for the base asphalt
- Consists of production materials that have not been “air-blown or acid modified” to achieve the performance grade

2. Grade

Use the various grades of asphalt cement that meet the requirements shown in the test requirements for Petroleum Asphalt Cements

Add only Styrene-Butadiene-Styrene (SBS) or Styrene-Butadiene (SB) to neat asphalt to produce a binder that meets requirements for PG 76-22.

### Test Requirements for Petroleum Asphalt Cements

Test And Method	Test Temperature				Original Binder	Residue Of Binder After:	
	PG 58-22	PG 64-22	PG 67-22	PG 76-22 (Note d)		Rolling Thin Film Oven, AASHTO:T 240	Pressure Aging AASHTO: R 28
Flash Point, Min., AASHTO T 48					446 °F (230 °C)		
Viscosity, Max., AASHTO T 316, (Note a)	275 °F (135 °C)				3Pa-S (3000CP)		
Mass Loss (%), Max., AASHTO T 240, (Note b)						0.5	
Dynamic Shear, G*/sin δ, AASHTO T 315, 10 Rad/Sec	136 °F (58 °C)	147 °F (64 °C)	153 °F (67 °C)	169 °F (76 °C)	≥ 1.0 kPa	≥ 2.2 kPa	
Dissipated Energy, Dynamic Shear, G* sin δ, AASHTO T 315, 10 Rad/Sec	72 °F (22 °C)	77 °F (25 °C)	80 °F (26.5 °C)	88 °F (31 °C)			≤ 5000 kPa
Creep Stiffness, 60 sec., AASHTO T 313, (Note c)	10 °F (- 12 °C)						S ≤ 300 000 kPa m ≥ 0.300
Direct Tension, 1.0 mm/min., AASHTO T314, Failure Strain	10 °F (- 12 °C)						Report

**Notes:**

- a. The Department may waive this requirement if the supplier warrants that the asphalt binder can be adequately pumped and mixed at temperatures that meet all applicable safety standards.
- b. Heat loss by AASHTO: T 179 may be accepted in lieu of mass loss by AASHTO: T 240.
- c. If the creep stiffness is below 300 000 kPa, the direct tension test is not required. If the creep stiffness is ≥300 000 kPa, report the Direct Tension Failure Strain value. Satisfy the m-value requirement in either case.
- d. The maximum Phase Angle measured by DSR shall be ≤ 75 degrees.

If modification is required, thoroughly blend the composite materials at the supply facility prior to being loaded into the transport vehicle. Ensure all blending procedures, formulation, and operations are approved by the Office of Materials and Research.

3. Certification: Provide certified test results from an approved, certified laboratory of blends for proposed PG asphalt for each specification characteristic of the asphalt cement proposed for shipment. Provide the certified results to the State Materials and Research Engineer as required in Standard Operating Procedure (SOP 4).

In the event there is reason to suspect a sample will be outside specification limits, the State Materials and Research Engineer may interrupt production until test results are known.

**B. Materials Warranty**

General Provisions 101 through 150.

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**Supplemental Specification**

**PROJECT NO.:** CSNHS-0008-00(232)

**P.I. NO.:** 0008232

**Section 828—Hot Mix Asphaltic Concrete Mixtures**

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*Delete Section 828 and substitute the following:*

**828.1 General Description**

This specification includes the requirements for hot mix asphaltic concrete mixtures, including:

- Open-graded surface mixtures (OGFC and PEM)
- Stone Matrix Asphalt mixtures (SMA)
- Superpave mixtures
- Fine-graded (4.75 mm) mixtures

**828.1.01 Definitions**

The Nominal Maximum Sieve Size is one standard sieve size larger than the first sieve to retain more than ten percent of the aggregate, per AASHTO PP28. Mixture types in this section are identified according to Nominal Maximum Sieve Size.

**828.1.02 Related References**

**A. Standard Specifications**

[Section 400–Hot Mix Asphaltic Concrete Construction](#)

[Section 800–Coarse Aggregate](#)

[Section 802–Aggregates for Asphaltic Concrete](#)

[Section 819–Fiber Stabilizing Additives](#)

[Section 820–Asphalt Cement](#)

[Section 831–Admixtures](#)

[Section 882–Lime](#)

[Section 883–Mineral Filler](#)

**B. Referenced Documents**

AASHTO PP 2

AASHTO PP28

AASHTO TP 8-94

AASHTO T 112

AASHTO T 209

AASHTO T 305

AASHTO T 312

AASHTO T-245

ASTM PS-129

- [SOP-36](#)
- [SOP-2 SP](#)
- [GDT 56](#)
- [GDT 66](#)
- [GDT 114](#)
- [GDT 115](#)
- [GDT 123](#)
- [QPL 1](#)
- [QPL 2](#)
- [QPL 7](#)
- [QPL 26](#)
- [QPL 41](#)
- [QPL 77](#)
- [QPL 81](#)

## 828.2 Materials

### A. Requirements

Use approved hot mix asphalt concrete mixtures that meet the following requirements:

1. Produce each asphalt mixture according to a Job Mix Formula and Asphalt Mix Design approved by the Department. For submittal and approval of Job Mix Formulas, see [Subsection 400.1](#).
2. Ensure that individual acceptance test results meet the Mixture Control Tolerances specified in the appropriate table below, [Subsections 828.2.01](#) through [828.2.04](#).
3. Ensure that the Engineer approves all materials used to prepare and place the mixtures before incorporating them into the Work. Use only the ingredients listed in the approved Asphalt Mix Design and Job Mix Formula. For virgin aggregates use sources which meet the requirements of [Section 802](#) and are listed in [QPL 1](#) or [QPL 2](#); for mixes in which local sand is permitted, use the approved sand source identified in the mix design. For mixtures containing Reclaimed Asphalt Pavement (RAP), use only RAP from the approved stockpile identified in the mix design. Use asphalt cement meeting the requirements of [Section 820](#), from a source listed in [QPL 7](#).
4. Obtain approved Superpave mix designs and 4.75 mm mix designs from a mix design laboratory certified by the Department. Obtain approved mix designs for types PEM, OGFC, and SMA mixtures from the Department's Office of Materials and Research, which produces and furnishes these mix designs.
5. Ensure that Superpave and 4.75 mm mix designs are designed in accordance with [SOP-2SP](#) ("Control of Superpave Bituminous Mixture Designs") and are approved by the Department as provided therein. Ensure that these mixes are designed by a laboratory and technician certified in accordance with [SOP-36](#), ("Certification of Laboratories and Personnel for Design of Superpave Asphalt Mixtures").
6. Use only mixtures composed of the aggregate groups and blends indicated in the Proposal and Plans by their pay item designations, defined as follows:

Pay Item Designation	Allowable Aggregate Groups
Group I or II	Group I, Group II, or Blend I
Group II only	Group II only
Blend I	Either 100% Group II material or a blend of Group I and Group II. Do not use Group I material for more than 60%, by weight, of the total aggregate nor more than 50%, by weight, of the coarse aggregate fraction.

7. For patching or leveling use Group I, Group II, or Blend I. Mix types for patching and leveling are specified in [Subsection 400.3.03.B](#).

8. Include lime (hydrated lime) from an approved source and meeting the requirements of [Subsection 882.2.03](#) in all paving courses except as otherwise provided in the Contract. For a list of approved sources of lime, see [QPL 41](#).
  - a. Add lime to each mixture at the rate prescribed in the approved mix design.
  - b. Mix designs using only virgin aggregate shall include lime at a minimum rate of 1.00 % of the total dry aggregate weight. Mix designs using RAP shall include lime at a minimum rate equal to 1.00 % of the virgin aggregate fraction plus 0.50 % of the aggregate in the RAP fraction.
  - c. If necessary to meet requirements for mixture properties, and pursuant to an approved mix design, add more lime or add lime plus an approved Heat-Stable Anti-Stripping Additive that meets the requirements of [Subsection 831.2.04](#). However, the Department will not make additional payment for these materials. For a list of sources of Heat-Stable Anti-Stripping Additives, see [QPL 26](#).
  - d. Where specifically allowed in the contract on LARP, airport, and parking lot projects, an approved Heat-Stable Anti-Stripping Additive that meets the requirements of [Subsection 831.2.04](#) may be substituted for hydrated lime. In this case the mix gradation shall be adjusted as necessary to replace the lime with an equivalent volume of fines passing the 0.075 mm sieve. Add Heat-Stable Anti-stripping Additive at a minimum rate of 0.5 percent of the asphalt cement portion.
9. Use performance grade PG 67-22 asphalt cement in all mix designs and mixtures except as follows:
  - a. For mixtures containing 25% or greater RAP, the Engineer will determine the performance grade to be used.
  - b. On PR, LARP, airport, and parking lot projects, PG 64-22 may be substituted for PG 67-22, with approval of the Office of Materials and Research, on roads having current ADT less than 2,000.
  - c. Use only grade PG 76-22 in the following mixes: SMA, 12.5 mm PEM, 12.5 mm and 9.5 mm OGFC, 12.5 mm Superpave, excluding shoulder construction, on projects with ADT greater than 25,000; and in all mixtures for which polymer-modified asphalt is specified in the pay item.
10. Use of local sand is restricted as follows:
  - a. Do not place mixtures containing local sand on the traveled way of the mainline or ramps of the Interstate System. Mixtures with local sand may be used for shoulder construction on these facilities.
  - b. Local sand shall not constitute more than 20 % of the total aggregate weight of any mix design or production mix.
  - c. Subject to the above limits, 19 mm, 12.5 mm, and 9.5 mm Superpave mix designs and 4.75 mm mix designs containing local sand may be used on projects with a current ADT not exceeding 2,000.
  - d. 25 mm Superpave mix designs containing not more than 20 % local sand may be used on all facilities except the main line and ramps of the Interstate System.
  - e. Obtain local sand for use in asphalt mixtures from a source approved by the Department.
  - f. Approval of local sand sources: The Department will sample, test, and approve sources of local sand. Local sand shall not contain more than 7.0 % clay by weight and shall be free of foreign substances, roots, twigs, and other organic matter. It shall be free of clay lumps, as determined by AASHTO T 112, and shall have a sand equivalent value exceeding 25%, as determined by [GDT 63](#).

## **B. Fabrication**

1. Design procedures: For all Superpave and 4.75 mm mixes, designers shall adhere to the Superpave System for Volumetric Design (AASHTO T 312 and AASHTO PP 2), as adapted in SOP-2SP. The Department will design open-graded mixes and Stone Matrix Asphalt (SMA) mixes according to [GDT 114](#) and [GDT 123](#), respectively. In all cases, the procedure for measuring Maximum Specific Gravity ( $G_{mm}$ ) shall be AASHTO T 209. In addition to gradation and volumetric analysis, mix designs shall include the following performance tests, as applicable.
  - a. Permeability test: Superpave and Stone Matrix mix designs shall include testing according to ASTM PS-129. Specimen air voids for this test shall be  $6.0 \pm 1.0$  %. The average permeability of three specimens may not exceed 3.60 ft per day ( $125 \times 10^{-5}$  cm per sec).
  - b. Moisture susceptibility test: Mix designs of all types except open-graded surface mixes shall include testing for moisture susceptibility according to [GDT 66](#). Specimen air voids for this test shall be  $7.0 \pm 1.0$ %. The minimum tensile splitting ratio is 0.80, except that a tensile splitting ratio of no less than
2. Performance Test:
  - a. Permeability test: Superpave and Stone Matrix mix designs shall include testing according to ASTM PS-129. Specimen air voids for this test shall be  $6.0 \pm 1.0$  %. The average permeability of three specimens may not exceed 3.60 ft per day ( $125 \times 10^{-5}$  cm per sec).
  - b. Moisture susceptibility test: Mix designs of all types except open-graded surface mixes shall include testing for moisture susceptibility according to [GDT 66](#). Specimen air voids for this test shall be  $7.0 \pm 1.0$ %. The minimum tensile splitting ratio is 0.80, except that a tensile splitting ratio of no less than

0.70 may be acceptable if all individual strength values exceed 100 psi (690 kPa). Average splitting strength of the three conditioned and three controlled samples shall be not less than 60 psi (415 kPa) for either group. Retention of coating as determined by [GDT 56](#) shall be not less than 95%.

- c. Rutting susceptibility test. Mix designs of all types except Open-graded Surface Mixes (OGFC and PEM), and mixtures designed exclusively for trench widening shall include testing according to [GDT 115](#). Design limits for this test are as follows: Specimen air voids for this test shall be  $5.0 \pm 1.0\%$  for all mix types. Testing temperature shall be 64°C (147°F) for all mix types except 25 mm Superpave mixes, which shall be tested at 49°C (120°F). Maximum deformation shall be 5.0 mm for all mixes except 4.75 mm mix, 9.5 mm Type I and 9.5 mm Type II Superpave mixes. Maximum deformation for the 9.5 mm Type II Superpave mix shall be 6.0 mm at 64°C (147°F) and 8.0 mm at 64°C (147°F) for the 4.75 mm and 9.5 mm Type I Superpave mix.
- d. Fatigue testing: The Department may verify Superpave designs by fatigue testing according to AASHTO TP 8-94 or other procedure approved by the Department.

**C. Acceptance**

See [Subsection 106.03 and Section 400](#). Ensure that individual test results meet the Mixture Control Tolerances listed in [Subsections 828.2.01, 828.2.02, 828.2.03, or 828.04](#), whichever applies.

**D. Materials Warranty**

See General Provisions 101 through 150.

**828.2.01 Open-Graded Surface Mixtures**

**A. Requirements**

Use approved mixtures that meet the following mixture control tolerances and design criteria:

Sieve Size	Mixture Control Tolerance, %	Design Gradation Limits, % Passing		
		9.5 mm OGFC	12.5 mm OGFC	12.5 mm PEM
3/4 in (19 mm) sieve	±0.0		100	100
1/2 in (12.5 mm) sieve	±6.1	100*	85-100	80-100
3/8 in (9.5 mm) sieve	±5.6	85-100	55-75	35-60
No. 4 (4.75 mm) sieve	±5.7	20-40	15-25	10-25
No. 8 (2.36 mm) sieve	±4.6	5-10	5-10	5-10
No. 200 (75 µm) sieve	±2.0	2-4	2-4	1-4
Range for % AC	±0.4	6.0-7.25	5.75-7.25	5.5-7.0
Class of stone ( <a href="#">Section 800</a> )		"A" only	"A" only	"A" only
Drain-down (AASHTO T305), %		<0.3	<0.3	<0.3

\* Mixture control tolerance is not applicable to this sieve for this mix.

1. In 12.5 mm and 9.5 mm OGFC and 12.5 mm PEM mixes, use only PG 76-22 asphalt cement (specified in [Section 820](#)).
2. All OGFC and PEM mixes shall include a stabilizing fiber of the type (cellulose or mineral) specified in the mix design and meeting the requirements of [Section 819](#). The dosage rate shall be as specified in the mix design and shall be sufficient to prevent drain-down exceeding the above tolerance.

**B. Fabrication**

See Section 400.

**C. Acceptance**

See [Subsection 106.03 and Section 400](#). Ensure that individual test results meet the Mixture Control Tolerances listed in [Subsections 828.2.01, 828.2.02, 828.2.03, or 828.04](#), whichever applies.

**D. Materials Warranty**

See General Provisions 101 through 150.



## 828.2.02 Stone Matrix Asphalt Mixtures

### A. Requirements

Use approved mixtures that meet the following mixture control tolerances and design criteria:

Sieve Size	Mixture Control Tolerance	Design Gradation Limits, Percent Passing		
		9.5 mm SMA	12.5 mm SMA	19 mm SMA
1- in (25 mm) sieve	±0.0			100
3/4 in (19 mm) sieve	±7.0	100*	100*	90-100
1/2 in (12.5 mm) sieve	±6.1	98-100**	85-100	44-70
3/8 in (9.5 mm) sieve	±5.6	70-100	50-75	25-60
No. 4 (4.75 mm) sieve	±5.7	28-50	20-28	20-28
No. 8 (2.36 mm) sieve	±4.6	15-30	16-24	15-22
No. 50 (300 µm) sieve	±3.8	10-17	10-20	10-20
No. 200 (75 µm) sieve	±2.0	8-13	8-12	8-12
Range for % AC	±0.4	6.0-7.5	5.8-7.5	5.5-7.5
Design optimum air voids (%)		3.5 ±0.5	3.5 ±0.5	3.5 ±0.5
% aggregate voids filled with AC (VFA)		70-90	70-90	70-90
Tensile splitting ratio after freeze-thaw cycle GDT-66		80%	80%	80%
Drain-down (AASHTO T305), %		<0.3	<0.3	<0.3

\*Mixture control tolerance is not applicable to this sieve for this mix.

\*\*Mixture control tolerance shall be ± 2.0% for this sieve for 9.5 mm SMA mixes placed at spread rates greater than 135 lb/yd<sup>2</sup>. For 9.5 mm SMA mixes placed at spread rates of 135 lb/yd<sup>2</sup> or less, 100 % passing is required on this sieve.

1. SMA mixtures shall be compacted at 50 gyrations with the Superpave Gyrotory compactor or 50 blows with the Marshall compactor.
2. All SMA mixtures shall contain mineral filler and fiber stabilizing additives and shall meet the following requirements:
  - a. Asphalt cement grade PG-76-22 (specified in [Section 820](#)) is required in all SMA mixtures.
  - b. Aggregates for SMA shall meet the requirements of [Subsection 802.2.02.A.3](#).
  - c. Use mineral filler that meets requirements of [Section 883](#) and is approved by the Department. Approved sources of mineral filler are listed in [QPL 81](#).
  - d. Do not use local sand in lieu of mineral filler.
  - e. Use an approved Fiber Stabilizing Additive of the type (cellulose or mineral) specified in the mix design and meeting the requirements of [Section 819](#). Approved sources of Fiber Stabilizing Additive are listed in [QPL 77](#). The dosage rate will be as specified in the mix design and shall be sufficient to prevent drain-down exceeding the above tolerance.

### B. Fabrication

See Section 400.

### C. Acceptance

See [Subsection 106.03](#) and [Section 400](#). Ensure that individual test results meet the Mixture Control Tolerances listed in [Subsections 828.2.01](#), [828.2.02](#), [828.2.03](#), or [828.04](#), whichever applies.

### D. Materials Warranty

See General Provisions 101 through 150.

### 828.2.03 Superpave Asphalt Concrete Mixtures

#### A. Requirements

Ensure that Superpave mixtures meet the following mixture control tolerances and design limits:

1. All mixes are to be designed at a design gyration number ( $N_{des}$ ) of 65 gyrations and an initial gyration number ( $N_{ini}$ ) of 6 gyrations.
2. Gradation limits for Superpave mixtures are as follows:

Sieve Size	Mixture Control Tolerance	Design Gradation Limits, Percent Passing				
		9.5 mm Superpave Type I	9.5 mm Superpave Type II	12.5 mm Superpave Note 1	19 mm Superpave	25 mm Superpave
1-1/2 in (37.5 mm) sieve						100
1-in (25.0 mm) sieve	± 8.0			100*	100*	90-100
3/4 in (19.0 mm) sieve	±8.0**	100*	100*	98-100****	90-100	55-89**
1/2 in (12.5 mm) sieve	±6.0***	98-100****	98-100****	90-100	60-89	50-70
3/8 in (9.5 mm) sieve	±5.6	90-100	90-100	70-89	55-75	
No. 4 (4.75 mm) sieve	±5.6	65-85	55-75			
No. 8 (2.36 mm) sieve	±4.6	48-55	42-47	38-46	32-36	30-36
No. 200 (75 µm) sieve	±2.0	5.0-7.0	5.0-7.0	4.5-7.0	4.0-6.0	3.5-6.0

\* Mixture control tolerance is not applicable to this sieve for this mix.

\*\* Mixture control tolerance shall be ± 10.0% for this sieve for 25 mm Superpave.

\*\*\*Mixture control tolerance shall be ± 8.0% for this sieve for 19 mm Superpave.

\*\*\*\*Mixture control tolerance shall be ± 2.0% for this sieve for 12.5 mm and 9.5 mm mixes.

Note 1: Use PG 76-22 in 12.5 mm Superpave, excluding shoulder construction, on all projects with ADT greater than 25,000.

3. The Mixture Control Tolerance for asphalt cement shall be ± 0.4% for all mix types.

4. Volumetric limits are as follows:

Design Parameter	Mix Type	Limits
% of Max. Specific Gravity ( $G_{mm}$ ) at design gyrations, $N_{des}$	All	96%
% $G_{mm}$ at the initial number of gyrations, $N_i$	All	91.5% maximum
% voids filled with asphalt (VFA) at $N_{des}$	9.5 mm Type I	Min. 72; Max. 80
	9.5 type 2 and 12.5 mm	Min. 72; Max. 76
	19 mm	Min. 71; Max 76
	25 mm	Min. 69; Max 76
Fines to effective asphalt binder ratio ( $F/P_{be}$ )	9.5 mm Type I	0.6 to 1.4
	all other types	0.8 to 1.6
Minimum % Voids in Mineral Aggregate (VMA) Note: VMA shall be calculated using the effective specific gravity of the aggregate ( $G_{se}$ ). See SOP-2SP.	25 mm	13.0
	19 mm	14.0
	12.5 mm	15.0
	9.5 Type I	16.0
	9.5 Type II	16.0

**B. Fabrication**

See Section 400.

**C. Acceptance**

See [Subsection 106.03 and Section 400](#). Ensure that individual test results meet the Mixture Control Tolerances listed in [Subsections 828.2.01, 828.2.02, 828.2.03, or 828.04](#), whichever applies.

**D. Materials Warranty**

See General Provisions 101 through 150.

**828.2.04 Fine-Graded Mixtures**

**A. Requirements**

Design gyrations ( $N_{des}$ ) for fine-graded mixes shall be 50 gyrations. Ensure that fine-graded mixtures meet the following mixture control tolerances and design limits:

<b>ASPHALTIC CONCRETE - 4.75 mm Mix</b>		
<b>Sieve Size</b>	<b>Mixture Control Tolerance</b>	<b>Design Gradation Limits, % passing</b>
1/2 in (12.5 mm) sieve*	±0.0	100*
3/8 in (9.5 mm) sieve	±5.6	90-100
No. 4 (4.75 mm) sieve	±5.7	75-95
No. 8 (2.36 mm) sieve	±4.6	60-65
No. 50 (300 µm) sieve	±3.8	20-50
No. 200 (75 µm) sieve	±2.0	4-12
Range for % AC	±0.4	6.00 – 7.50
Design optimum air voids (%)		4.0 – 7.0
% Aggregate voids filled with AC		60 - 80

\* Mixture control tolerance is not applicable to this sieve for this mix.

**B. Fabrication**

See Section 400.

**C. Acceptance**

See [Subsection 106.03 and Section 400](#). Ensure that individual test results meet the Mixture Control Tolerances listed in [Subsections 828.2.01, 828.2.02, 828.2.03, or 828.04](#), whichever applies.

**D. Materials Warranty**

See General Provisions 101 through 150.

DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA

Supplemental Specification

Project Number: CSNHS-0008-00(232)

P.I. Number: 0008232

Troup County

Section 841—Iron Pipe

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*Delete Section 841 and substitute the following:*

**841.1 General Description**

This section includes the requirements for iron pipe, including cast iron soil pipe and fittings, and ductile iron pipe and appurtenances.

**841.1.01 Related References**

**A. Standard Specifications**

[Section 106—Control of Materials](#)

[Section 848—Pipe Appurtenances](#)

**B. Referenced Documents**

ASTM A 74

ASTM B 29

ASTM C 564

ANSI/AWWA A 21.4

ANSI/AWWA A 21.10

ANSI/AWWA A 21.11

ANSI/AWWA A 21.50

ANSI/AWWA A 21.51

ANSI/AWWA A 21.53

**841.2 Materials**

For each item in this Section, submit a certification from the manufacturer as per the requirements in [Subsection 106.05, “Materials Certification.”](#)

Include the chemical and physical properties of the materials and their conformance with this Specification on the certification.

**841.2.01 Cast Iron Soil Pipe and Fittings**

**A. Requirements**

1. Type

Use cast iron soil pipe and fittings that meet the requirements of ASTM A 74, including the inside and outside coatings.

- a. Rubber Gasket Joints: Use rubber gasket joints for cast iron soil pipes that meet the requirements of ASTM C 564.
- b. Lead Joints: Use refined lead that meets the requirements of ASTM B 29. Do not use reclaimed lead.
- c. Plain End Cast Iron Soil Pipe: Plain end cast iron soil pipe may be joined with steel bolted couplings if they meet the requirements of [Subsection 848.2.02](#).

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

The Department accepts material that is properly certified by the manufacturer.

**D. Materials Warranty**

General Provisions 101 through 150.

**841.2.02 Ductile Iron Pipe and Appurtenances**

**A. Requirements**

Use ductile iron pipe that meets the requirements of ANSI/AWWA A 21.50 and A 21.51 for the class and joint specified.

1. Fittings  
Use fittings that meet the requirements of ANSI/AWWA A 21.10 or A21.53 for the class and joint specified.
2. Rubber Gasket Joints  
Use rubber gasket joints that meet the requirements of ANSI/AWWA A 21.11.
3. Flanges  
Use flanges that meet the requirements of ANSI/AWWA A 21.11.
4. Plain End Ductile Iron Pipe  
Plain end ductile iron pipe may be joined with steel-bolted couplings if they meet the requirements of [Subsection 848.2.02](#).
5. Cement Mortar Linings  
Use cement mortar linings that meet the requirements of ANSI/AWWA A 21.4. Line all ductile iron pipe and fittings with cement mortar unless specified otherwise.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

The Department accepts material that is properly certified by the manufacturer.

**D. Materials Warranty**

General Provisions 101 through 150.

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SUPPLEMENTAL SPECIFICATION**

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

**Section 843—Concrete Pipe**

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*Delete Section 843 and substitute the following:*

**843.1 General Description**

This section includes the requirements for reinforced concrete pipe, nonreinforced concrete pipe, and concrete underdrain pipe.

**843.1.01 Related References**

**A. Standard Specifications**

[Section 800—Coarse Aggregate](#)

[Section 801—Fine Aggregate](#)

[Section 831—Admixtures](#)

[Section 880—Water](#)

**B. Referenced Documents**

AASHTO M 86( M 86M), Class II

AASHTO M 170 ( M 170M)

AASHTO M 175 (M 175M) or AASHTO M 176 (M 176M)

[QPL 4](#)

[SOP-19](#)

**843.2 Materials**

**843.2.01 Reinforced Concrete Pipe**

**A. Requirements**

1. Type

Use reinforced concrete pipe that meets the requirements of AASHTO M 170 (M 170M), with the changes described in the following table. For a list of sources, see [QPL 4](#).

<b>Material</b>	<b>Requirements</b>	<b>Other Modifications</b>
Coarse aggregate	<a href="#">Subsection 800.2.01</a>	Gradation requirements do not apply
Fine aggregate	<a href="#">Subsection 801.2.02</a>	Gradation requirements do not apply

Fly ash	<a href="#">Subsection 831.2.03.A</a>	None
Water	<a href="#">Subsection 880.2.01</a>	None

**NOTE: Before manufacture, you may request approval of modified designs that differ from the Specifications.**

2. Certification

- a. File a certificate with the Engineer stating that the concrete pipe manufactured for Department use meets the requirements of reinforcement steel specified in this Section.  
A bonded legal authority of the manufacturing company shall endorse the requirements certification.
- b. Submit a guarantee with the certificate stating that concrete pipe will be replaced, without cost to the purchaser, if the reinforcement steel does not meet these Specifications.
- c. Ensure that the guarantee remains in effect as long as the manufacturer furnishes concrete pipe for Department use.
- d. This guarantee does not limit the right of the Department to inspect and check the materials in manufactured concrete pipe prior to and during pipeline construction.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

The Department will test and inspect using [SOP-19](#).

**D. Materials Warranty**

See the Certification requirements under [Subsection 843.2.01.A.2](#).

**843.2.02 Nonreinforced Concrete Pipe**

**A. Requirements**

1. Type

Use nonreinforced concrete pipe to convey sewage, industrial waste, and storm water that meets the requirements of AASHTO M 86 (M 86M), Class II, with the following changes:

Material	Requirements	Other Modifications
Coarse aggregate	<a href="#">Subsection 800.2.01</a>	Gradation requirements do not apply
Fine aggregate	<a href="#">Subsection 801.2.02</a>	Gradation requirements do not apply
Fly ash	<a href="#">Subsection 831.2.03.A</a>	None
Water	<a href="#">Subsection 880.2.01</a>	None

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

Test and inspect with [SOP-19](#).

**D. Materials Warranty**

General Provisions 101 through 150.

### 843.2.03 Concrete Underdrain Pipe

#### A. Requirements

1. Type

Use concrete underdrain pipe that meets the requirements of AASHTO M 175 (M 175M) or AASHTO M 176 (M 176M), with the following changes unless the Plans state otherwise:

Material	Requirements	Other Modifications
Coarse aggregate	<a href="#">Subsection 800.2.01</a>	Gradation requirements do not apply
Fine aggregate*	<a href="#">Subsection 801.2.02</a>	Gradation requirements do not apply
Fly ash	<a href="#">Subsection 831.2.03.A</a>	None
Water	<a href="#">Subsection 880.2.01</a>	None
*Use fine aggregate in standard strength, perforated, nonreinforced concrete underdrain pipe.		

#### B. Fabrication

General Provisions 101 through 150.

#### C. Acceptance

Test and inspect with [SOP-19](#).

#### D. Materials Warranty

General Provisions 101 through 150.



DEPARTMENT OF TRANSPORTATION  
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**Section 846—Polyvinyl Chloride (PVC) Profile Wall Drain Pipe**

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*Delete Section 846 and Substitute the following:*

**Section 846—Polyvinyl Chloride (PVC) Drain Pipe**

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**846.1 General Description**

This section includes the requirements for Polyvinyl Chloride (PVC) Drain Pipe.

**846.1.01 Related References**

**A. Standard Specifications**

[Section 106—Control of Materials](#)

**B. Referenced Documents**

AASHTO M 304

ASTM F 477

ASTM F 949

ASTM D 3212

**846.2 Materials**

**846.2.01 Polyvinyl Chloride (PVC) Profile Wall Drain Pipe**

**A. Requirements**

Use pipe that meets the requirements of AASHTO M 304.

Ensure joints are watertight and have elastomeric seals that meet the requirements of ASTM F 477.

Assemble the joints according to the manufacturer's recommendations.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

Have the manufacturer test the joint tightness according to ASTM D 3212 and certify the results according to [Subsection 106.05](#).

**D. Materials Warranty**

General Provisions 101 through 150.

### **846.2.02 Polyvinyl Chloride (PVC) Corrugated Smooth Interior Drain Pipe**

#### **A. Requirements**

Use pipe that meets the requirements of ASTM F 949.

Ensure joints are watertight and have elastomeric seals that meet the requirements of ASTM F 477.

Assemble the joints according to the manufacturer's recommendations.

#### **B. Fabrication**

General Provisions 101 through 150.

#### **C. Acceptance**

Have the manufacturer test the joint tightness according to ASTM D 3212 and certify the results according to [Subsection 106.05](#).

#### **D. Materials Warranty**

General Provisions 101 through 150.

**DEPARTMENT OF TRANSPORTATION  
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**Supplemental Specification**

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

**Section 854—Castings and Forgings**

*Delete Section 854 and Substitute the following:*

**854.1 General Description**

This section includes the requirements for the following castings and forgings:

- Gray iron drainage castings
- Cast aluminum alloy railing posts
- Aluminum alloy sand mold castings
- Steel castings
- Steel forgings
- Cold-finished carbon shafting
- Steel castings for bridges

**854.1.01 Related References**

**A. Standard Specifications**

[Section 501—Steel Structures](#)

**B. Referenced Documents**

<b>AASHTO</b>	<b>ASTM</b>
M 102/ M 102M	ASTM A 27/ A 27M
M 169	ASTM B 26/ B 26 M, Alloy UNS A03560
M 306	ASTM B 108

[QPL 11](#)

ANSI 356 Temper T 6

**854.2 Materials**

**854.2.01 Gray Iron Drainage Castings**

**A. Requirements**

Each foundry shall conform to Standard Operating Procedure 18 (SOP 18), “Inspection of Gray Iron Drainage Castings”.

1. Type

Use gray iron drainage castings that meet the requirements of AASHTO M 306, Class 35B.

Use foundries listed on [QPL 11](#).

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

The Department will accept the castings based on the following:

- Quality of work and conformance to dimension and shape requirements, including acceptable proof load tests and drawings on file with the Office of Materials and Research-Inspection Services Branch for each casting design supplied.
- Tension bar test results

**D. Materials Warranty**

General Provisions 101 through 150.

**854.2.02 Cast Aluminum Alloy Railing Posts**

**A. Requirements**

1. Type

Use permanent mold types of cast-aluminum alloy roadway railing post that meet ASTM B 108 requirements.

Ensure that the finish on the castings meets the specifications on the Plans.

2. Certification

Submit a report with each shipment of castings that includes test results and certifies compliance with this Specification.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

The Department will accept the castings based on the following:

- Quality of work and conformance to dimension and shape requirements
- Certification that the physical and chemical properties of the material meet these Specifications

**D. Materials Warranty**

General Provisions 101 through 150.

**854.2.03 Aluminum Alloy Sand Mold Castings**

**A. Requirements**

1. Type

Use aluminum base alloy and castings that meet the requirements of ASTM B 26/ B 26M, Alloy UNS A03560 or ANSI 356 Temper T 6.

2. Certification

Submit a report with each shipment of castings that includes test results and certifies compliance with this Specification.

**B. Fabrication**

Sandblast or otherwise clean the scale and sand off the castings to produce a smooth and uniform surface.

**C. Acceptance**

The Department will accept the castings based on the following:

- Quality of work and conformance to the dimension and shape requirements, as inspected when received

- Certification that the physical and chemical properties of the material meet these Specifications

#### **D. Materials Warranty**

General Provisions 101 through 150.

### **854.2.04 Steel Castings**

#### **A. Requirements**

1. Type  
Use carbon steel castings that meet the requirements of ASTM A 27/ A 27M, Grade 65-35 (450-240). Ensure that the form and dimensions of the steel castings are true to pattern.
2. Certification  
Submit a report with each castings shipment that includes test results and certifies compliance with this Specification.

#### **B. Fabrication**

1. If the Plans require large castings, suspend and hammer them all over. Ensure that no cracks, flaws, or other defects appear after this treatment. The Department will not accept sharp unfilleted angles or corners.
2. Coat surfaces marked "Finished" as soon as practical after finishing with a corrosion-resistant grease before removing them from the shop.
3. Apply a shop coat of paint to casting surfaces milled for removing scale, scabs, fins, blisters, or other surface deformations. Ensure that the shop coat of paint meets the requirements of [Subsection 501.3.04.D.10, "Shop Painting."](#)

#### **C. Acceptance**

The Department will accept the castings based on the following:

- Quality of work and conformance to the dimension and shape requirements, as inspected when received
- Certification that the physical and chemical properties of the material meet these Specifications

#### **D. Materials Warranty**

General Provisions 101 through 150.

### **854.2.05 Steel Forgings**

#### **A. Requirements**

1. Type  
Use steel forgings that meet the requirements of AASHTO M 102/M 102M for the class shown on the Plans.
2. Certifications
  - a. Submit a record to the Engineer of the annealing charges that show the forgings in each charge, the melt or melts from which they were secured, and the treatment they received.
  - b. Submit a report with each castings shipment that includes test results and certifies compliance with this Specification.

#### **B. Fabrication**

General Provisions 101 through 150.

#### **C. Acceptance**

The Department will accept the castings based on the following:

1. Quality of work and conformance to the dimension and shape requirements, as inspected when received
2. Certification that the physical and chemical properties of the material meet these Specifications

#### **D. Materials Warranty**

General Provisions 101 through 150.

### **854.2.06 Cold-finished Carbon Shafting**

#### **A. Requirements**

1. Type

Use cold-finished carbon steel bars that meet the requirements of AASHTO M 169 for the grade shown on Plans.

2. Certification

Submit a certification to the Engineer that shows the chemical properties of the material and conformance to the Specifications.

#### **B. Fabrication**

General Provisions 101 through 150.

#### **C. Acceptance**

The Department will accept the material based on favorable review of the certification.

#### **D. Materials Warranty**

General Provisions 101 through 150.

### **854.2.07 Steel Castings for Bridges**

#### **A. Requirements**

1. Type

Use steel castings for bridge components that meet the requirements of ASTM A 27/ A 27M for the class shown on the Plans.

2. Certification

Submit a certification to the Engineer that shows the physical and chemical properties of the material and conformance to the Specifications.

#### **B. Fabrication**

General Provisions 101 through 150.

#### **C. Acceptance**

The Department will accept the material based on favorable review of the certification.

#### **D. Materials Warranty**

General Provisions 101 through 150.

**DEPARTMENT OF TRANSPORTATION  
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**SUPPLEMENTAL SPECIFICATION**

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

**Section 861—Piling and Round Timber**

---

*Delete Section 861 and substitute the following:*

**861.1 General Description**

This section includes the requirements for timber piles and timber poles.

**861.1.01 Related References**

**A. Standard Specifications**

Section 863—Preservative Treatment of Timber Products

**B. Referenced Documents**

ANSI 05.1

National Electrical Safety Code (National Institute of Standards and Technology)

QPL 50

**861.2 Materials**

**A. Definition and Limitation of Defects**

Decay: Disintegration of the wood substance due to wood-destroying fungi. The words “dote” and “rot” mean the same as decay. Red heart is a form of decay.

Compression Wood: An abnormal, dense, hard growth frequently occurring on the underside of limbs and leaning trunks of coniferous trees. It is characterized by very wide and eccentric annual growth rings and includes what appears to be an exceptional proportion of summerwood growth.

The contrast in color between springwood and summerwood, however, is usually less in compression wood than in normal wood.

Turpentine Butt: A scar caused from bleeding the trees to obtain turpentine.

Scar: A damaged surface caused from injury to the tree during growth.

Sweep: Deviation of a piece or stick from a straight line measured from the center of one end to the center of the other end. A straight line from the center of the butt to the center of the tip shall lie entirely within the body of the pile.

Short Crook: A crook in which the direction of the piece or stick changes in a very short distance measured lengthwise.

Burst Check: A crack approximately at right angles to the annual rings, usually radial cracks in sticks from the center or from near the center to the outside, or a combination of this crack and a ring shake caused through either seasoning, exposure to high temperature, or the process of preservative treatment.

Unsound Knot: A knot solid across the face, but containing incipient decay.

Cluster Knot: Two or more knots grouped together, the fibers of the wood being deflected around the entire unit.

A group of single knots with fibers deflected around each knot separately is not a cluster, even though the knots may be close together.

Punk Knot: A fungus decay that extends from the interior of the piece of pile to the outside, which when prodded is usually found to contain a snuff-like substance.

Ring Knots: Three or more knots appearing in the same line of circumference, or any foot of length.

## 861.2.01 Timber Piles

### A. Requirements

1. Use round timber piles of any species of wood that will withstand driving and support the load specified. Use plants listed on QPL 50.

2. Soundness

Use piles of sound wood, free from decay, red heart, or insect attack.

a. Cedar and Cypress: The butt ends may have a pipe or stump rot hole not more than 1-1/2 in (40 mm) in diameter. Cypress piles may have peck aggregating not more than 1-1/2 in (40 mm) in diameter.

b. Southern Pine: Piles may have unsound knots less than half the permitted size of a sound knot, providing that the unsoundness does not extend more than 1-1/2 in (40 mm) deep and that the adjacent areas of the trunk are not affected.

3. Density

a. All piles shall be dense with at least 6 annual rings per 1 in (25 mm) and 1-1/2 in (40 mm) or more of summerwood (the darker, harder portion of the annual ring), as measured over the outer 3 in (75 mm) of butt diameter on a radial line from the pith.

The contrast in color between summerwood and springwood shall be sharp and the summerwood shall be darker in color.

b. Piles excluded by the above rule may be accepted provided they have at least four annual rings per 1 in (25 mm) and 1/3 or more summerwood, as measured over the outer 3 in (75 mm) of butt diameter on a radial line from the pith.

4. Knots

a. Sound knots:

For piles 50 ft (15 m) long or less, and in 3/4 of the length of piles over 50 ft (15 m), measured from the butt	Sound knots less than 4 in (100 mm) or 1/3 the diameter of the pile, whichever is smaller.
For the top 1/4 length of piles over 50 ft (15 m) long	Sound knots less than 5 in (125 mm) or 1/2 the diameter of the pile, whichever is smaller
The size of a knot shall be its diameter measured at right angles to the length of the pile.	

b. Unsound knots are not permitted except in Southern Pine piles as specified in Subsection 861.2.01.A.2.b.

c. The sum of sizes of all knots in any 12 in (300 mm) of the pile shall not exceed twice the size of the largest permitted single knot.

5. Holes

Allow holes that average less than 1/2 inch (15 mm) in diameter if the sum of the average diameter of all holes in any 1 ft<sup>2</sup> (0.1m<sup>2</sup>) of pile surface is less than 1-1/2 in (40 mm).

6. Splits and Shakes

Splits shall not be longer than the butt diameter of the pile.



The length of any shake or combination of shakes in the outer half of the radius of butt of the pile, when measured along the curve of the annual ring, shall not exceed 1/3 the circumference of the butt of the pile.

7. Sapwood

Piles to be treated with preservative shall have at least 1 in (25 mm) of sapwood at the butt end.

8. Heartwood

- a. In untreated piles for use in exposed work, the diameter of the heartwood at the butt shall be at least 8/10 of the diameter of the pile at the butt.
- b. If high heartwood content is required for untreated foundation piles, the Plans will specify the ratio of heartwood to total diameter.

9. Peeling

- a. Peel piles by removing all of the outer bark and at least 80 percent of the inner bark, well distributed over the surface of the pile.
- b. If piles will be treated with preservative, do not leave inner bark wider than 1/2 in (15 mm).
- c. Do not remove more than three annual rings of the solid wood.

10. Cutting and Trimming

- a. Saw butts and tips square with the axis of the pile.
- b. Trim or smoothly cut all knots and limbs flush with the surface of the pile or the surface of the swell surrounding the knot.

11. Straightness

In general, a straight line from the center of the butt to the center of the tip shall lie entirely within the body of the pile.

If specified, the Department can accept long piles for foundations (but not for trestles) if the straight line lies partly outside the body of the pile. The maximum distance between the line and the pile shall not exceed 0.5 percent of the length of the pile or 3 in (75 mm), whichever is smaller.

12. Taper

Cut piles above the butt swell so it has a continuous taper from the point of butt measurement to the tip.

13. Twist of Grain

Do not allow spiral grain to exceed 180 degrees of twist when measured over any 20 ft (6 m) section of the pile.

14. Limits of Defects

- a. Piles shall not have short crooks that deviate more than 2-1/2 in (65 mm) from straightness in any 5 ft (1.5 m) length.
- b. Burst checks in piles shall be less than 1 in (25 mm) wide, measured at the outside, and shall not extend over 12 in (300 mm) long.

15. Circumferences, Diameters, and Lengths

- a. The circumferences of piles measured under the bark shall have the minimum and maximum values in Table 1 (metric Table 1) for the class specified. No more than 10 percent of the piles in any shipment may have circumferences 2 in (50 mm) less than the tabulated minimum values.

**NOTE: Requirements for tip circumference of piles that are longer than the required length may be applied at the tip end of the required length.**

- b. The ratio of the maximum to the minimum diameter at the butt of any pile shall not exceed 1.2.
- c. Individual piles may vary from the length specified by  $\pm 12$  in (300 mm) in piles shorter than 40 ft (12 m), and  $\pm 2$  ft (600 mm) in piles 40 ft (12 m) or longer.
- d. The average length of all piles of a specified length in each lot shall not be less than the length specified.

**Table 1  
Circumferences and Diameters of Timber Piles**

Length Feet (meter)	3 ft (900 mm) from butt				At tip, minimum	
	Minimum		Maximum		Circumference In (mm)	Dia. (approx.) In (mm)
	Circumference In (mm)	Dia. (approx.) In (mm)	Circumference In (mm)	Dia. (approx.) In (mm)		
	Douglas Fir, Hemlock, Larch, Pine, Spruce, or Tamarack					
Under 40 (12)	38 (950)	12 (300)	63 (1575)	20 (500)	25 (625)	8 (200)
40 to 50 (12 to 15)	38 (950)	12 (300)	63 (1575)	20 (500)	22 (550)	7 (175)
51 to 70 (15.1 to 21.4)	41 (1025)	13 (325)	63 (1575)	20 (500)	22 (550)	7 (175)
71 to 90 (21.5 to 27.5)	41 (1025)	13 (325)	63 (1575)	20 (500)	19 (475)	6 (150)
Over 90 (27.5)	41 (1025)	13 (325)	63 (1575)	20 (500)	16 (400)	5 (125)
	Oak and Other Hardwoods, Cypress					
Under 30 (9)	38 (950)	12 (300)	57 (1425)	18 (450)	25 (625)	8 (200)
30 to 40 (9 to 12)	41 (1025)	13 (325)	63 (1575)	20 (500)	22 (550)	7 (175)
Over 40 (12)	41 (1025)	13 (325)	63 (1575)	20 (500)	19 (475)	6 (150)
	Cedars					
Under 30 (9)	38 (950)	12 (300)	69 (1725)	22 (550)	25 (625)	8 (200)
30 to 40 (9 to 12)	41 (1025)	13 (325)	69 (1725)	22 (550)	25 (625)	8 (200)
Over 40 (12)	41 (1025)	13 (325)	69 (1725)	22 (550)	22 (550)	7 (175)

**NOTE: If the pile length is 25 feet (7.6 m) or less, a minimum circumference of 34 in (850 mm) and minimum diameter of 11 in (275 mm) at a point 3 ft (900 mm) from the butt are required.**

16. Branding and Inspection

- a. Ensure the pile length and the diameter of the butt and tip are branded in the butts of the piles.
- b. Legibly brand the Preliminary inspection date in the tips.

**B. Fabrication**

Seasoning and Preservative Treatment: Where required, season and treat according to Section 863.

**C. Acceptance**

The Department will reject the pile based on any of the following defects:

- Decay
- Deep scars

- Unsound knots
- Punk knots
- Ring knots
- Cluster knots
- Compression wood (if readily identifiable based on ordinary visual inspection)

The Department may accept piles with sound turpentine scars undamaged by insects, provided they meet all other requirements.

**D. Materials Warranty**

General Provisions 101 through 150.

**861.2.02 Timber Poles**

**A. Requirements**

1. Select timber poles from plants listed on QPL 50.
2. Ensure that the poles that meet the requirements of the latest revision of ANSI 05.1, in the National Electrical Safety Code published by the National Institute of Standards and Technology, with the following exceptions:
  - a. Section 2 Definitions—Modify the “Short Crook” definition as follows:  
 “Any localized deviation from straightness within any section 5 ft (1.5 m) or less in length shall not be more than 1 in (25 mm) when measured with a straightedge parallel to the long axis of the pole.”
  - b. Section 4 Material Requirements, 4.4.9 Shape (1), (a)—shall read as follows:  
 “For poles 50 ft (15 m) and shorter, of all species except northern white cedar, a straight line joining the edge of the pole at the butt and the edge of the pole at the top, in 90 percent or more of those poles supplied, shall not be distant from the surface of the pole at any point by more than 1 in (25 mm) for each 10 ft (3 m) of length between these points. In the remainder of those poles supplied (10 percent), the poles may have a deviation of 1 in (25 mm) for each 6 ft (1.8 m) of length when measured as above.”
  - c. Section 4 Material Requirements, 4.4.9 Shape (2)—shall read as follows:  
 “Sweep in two planes (double sweep) - NOT PERMITTED.”
3. Use the class and length specified on the Plans.
4. You may peel poles by machine, except that poles more than 55 ft (17 m) long may be debarked and trimmed by hand in lieu of machine peeling. Trim so that you preserve the buttressing effects of all overgrown knots.
5. Unless otherwise specified or indicated on the Plans, frame poles with flat roofs and slab grains.
6. Frame, drill, and machine poles as necessary before preservative treatment.

**B. Fabrication**

Seasoning and Preservative Treatment: Where required, season and treat according to Section 863.

**C. Acceptance**

General Provisions 101 through 150.

**D. Materials Warranty**

General Provisions 101 through 150.

**GEORGIA DEPARTMENT OF TRANSPORTATION**  
**STATE OF GEORGIA**  
**SUPPLEMENTAL SPECIFICATION**

**Project Number: CSNHS-0008-00(232)**  
**P.I. Number: 0008232**  
**Troup County**

**Section 866—Precast Concrete Catch Basin, Drop Inlet, and Manhole Units**

---

*Delete Section 866 and substitute the following:*

**866.1 General Description**

This section includes the requirements for manufacturing the following to the dimensions shown on the Plans:

- Precast reinforced concrete catch basins
- Drop inlets
- Manhole units

**866.1.01 Related References**

**A. Standard Specifications**

[Section 500—Concrete Structures](#)

[Section 853—Reinforcement and Tensioning Steel](#)

**B. Referenced Documents**

AASHTO M 199

AASHTO T 22

AASHTO T 24

[SOP 19](#)

[QPL 4](#)

[QPL 86](#)

**866.2 Materials**

The materials to be used shall meet AASHTO M 199 and the following requirements:

Material	Section
Concrete, Class AA-1, Vibrated, Air Entrained	<a href="#">500*</a>
Reinforcement for Concrete	
Steel Bars	<a href="#">853.2.01</a>
Steel Wire	<a href="#">853.2.06</a>
Welded Steel Fabric	<a href="#">853.2.07</a>

Macro-Synthetic Fibers	<a href="#">941</a>
*Ensure that the concrete compressive strength is at least 4,000 psi (28 MPa). Do not use the gradation requirements.	

For a list of sources, see [QPL 4](#).

## 866.2.01 Precast Concrete Catch Basin, Drop Inlet, and Manhole Units

### A. Requirements

#### 1. Reinforcement

Follow the Plans, except as follows:

- a. Do not let steel reinforcement vary by more than 1/4 in (5 mm) from the position shown in the design, except at pipe connections.
- b. Ensure the cover on the steel reinforcement is not less than that shown on the Plans.
- c. Macro-synthetic fibers are permitted as reinforcement in lieu of steel reinforcement in precast manhole riser sections only. Approved fibers are listed on the Department's [Qualified Products List 86 \(QPL 86\)](#), entitled Macro-Synthetic Fibers for Concrete Reinforcement.

#### 2. Ensure all precast concrete units are true to shape with smooth, dense, and uniform surfaces.

### B. Fabrication

#### 1. Casting

- a. Place the concrete in each unit without interruption.
- b. Consolidate the concrete with an approved vibrator and hand-tamping as necessary. Force the concrete into the corners of the forms to prevent stone pockets or cleavage planes.

#### 2. Holes for Pipes

Make each hole about 4 in (100 mm) larger than the outside diameter of the appropriate pipe.

#### 3. Curing:

Cure the units with one of the following methods until the minimum compressive strength has been achieved, or for 24 hours, whichever comes first.

##### a. Method 1

- 1) Place the units in a curing chamber, free from outside drafts, and cure them in a moist atmosphere not exceeding 160 °F (70 °C).
- 2) Use steam injection for the time and temperature needed to obtain proper curing.
- 3) Construct the curing chamber and place the units so that steam may fully circulate around the entire unit.

##### b. Method 2

- 1) Keep the units wet by covering the concrete not in contact with the forms with wet burlap or other suitable material.
- 2) Protect the units from freezing between when you place the concrete until curing is complete.

#### 4. Removing the Forms

Leave the forms in place until you can remove them without damaging the unit.

#### 5. Quality of Work

- a. Correct minor surface cavities or irregularities that do not impair the service value of the unit by pointing with an approved mortar. Apply the mortar immediately after removing the forms.
- b. Minor defects will not be cause for rejection.

### C. Acceptance

#### 1. Testing Facilities

Ensure that the manufacturer furnishes facilities and assistance as required for the Inspector to sample and test quickly and efficiently.

**NOTE: Check [QPL 4](#) for pre-approved manufacturers that supply material compliant with this Specification.**

2. The Department will accept the units based on the results of compressive tests on concrete cylinders and on inspection during manufacture. The tests will determine the unit's conformance with the design and quality of work prescribed in these Specifications and on the Plans.

3. The Department will accept any unit that meets the test requirements, regardless of age.

4. Rejection

The Inspector will reject units if they fail to meet any requirements in this Specification, and for any of the following defects:

- Imperfect mixing and molding
- Honeycombed or open texture
- Exposure of the reinforcement that indicates the reinforcement is misplaced

5. Marking

Ensure that each approved unit is marked with the name or trademark of the manufacturer and the date it was cast. The mark will be stenciled or otherwise placed on the inside of the unit so it is clearly legible at time of delivery.

a. When approved by the Inspector, each unit will be stamped with the official mark of the Department or Certified Pipe Technician number (CPT).

b. Accepted units or finished units will be rejected at any time if found to be defective.

6. Test as follows:

Test	Method
Compressive strength	AASHTO T 22 and AASHTO T 24

7. Compressive Strength Test

The Inspector shall do the following:

a. Make compression tests on cylinders to satisfy the minimum strength requirements.

b. Make at least three cylinders from each day's pour and cure them in the same manner as the precast units.

#### **D. Materials Warranty**

1. Shipping

Do not ship or transport any unit to the installation site unless it bears the required markings, stated in [Subsection 866.2.01.C.5](#).

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SUPPLEMENTAL SPECIFICATION**

**Project Number: CSNHS-0008-00(232)  
P.I Number: 0008232  
Troup County**

**Section 868—Bituminous Adhesive for Raised Pavement Markers**

---

*Delete Section 868 and substitute the following:*

**868.1 General Description**

This section includes the requirements for bituminous hot-melt adhesive used to place raised pavement markers.

**868.1.01 Related References**

**A. Standard Specifications**

[Section 106—Certification of Materials](#)

**B. Referenced Documents**

AASHTO	ASTM	
T 48	C 430	D 1856
T 49	D 70	D 2669
T 53	D 1754	D 2712
T 202	D 1796	D 3407

**868.2 Materials**

**868.2.01 Bituminous Adhesive**

**A. Requirements**

1. Adhesive

Use an adhesive made of asphaltic material and a homogeneously mixed filler that meets the following physical requirements:

- a. Adhesive Properties: Use the asphaltic material with filler.

	Min.	Max.	Test Method
Softening point	200° F (95 °C)	—	AASHTO T 53
Penetration, mm 3.5 oz (100 g), 5 sec., 77 °F (25 °C)	10	20	AASHTO T 49
Flow	—	0.2 in (5 mm)	ASTM D 3407 (modified in <a href="#">Subsection 868.2.01.C</a> )
Viscosity, 400 °F (204 °C)	—	60 Poises (	ASTM D 2669 (modified in

		6.0 Pa-s)	<a href="#">Subsection 868.2.01.C</a>
Flash point, C.O.C.	550 °F (285 °C)	—	AASHTO T 48

- b. Asphalt Properties: Use the filler-free material derived from the extraction and Abson recovery process explained in [Subsection 868.2.01.C](#).

	Min.	Max.	Test Method
Penetration, mm 3.5 oz (100 g), 5 sec., 77 °F (25 °C)	25	—	AASHTO T 49
Viscosity, 275 °F (135 °C)	12 Poises (1.2 Pa-s)	—	AASHTO T 202
Viscosity ratio, 275 °F (135 °C)	—	2.2	See <a href="#">Subsection 868.2.01.C</a>

- c. Filler Properties: Use the filler separation techniques described in [Subsection 868.2.01.C](#).

	Min.	Max.	Test Method
Filler content, percent by weight	50	70	See Subsection 868.2.01.C
Filler fineness, percent passing			
No. 325 (45 µm)	75		ASTM C 430 (modified in <a href="#">Subsection 868.2.01.C</a> )
No. 200 (75 µm)	95		
No. 100 (150 µm)	100		

- d. Certification: Submit a certification from the manufacturer that includes the physical properties of the bituminous adhesives and that the material conforms with this Specification, as stated in [Subsection 106.05](#), “[Materials Certification](#).”

## 2. Packaging and Labeling

- Pack the adhesive in a self-releasing cardboard container of approximately 10 in (250 mm) that can be stacked properly.
- Fill the containers with two 30 lb (13.5 kg) cubes that have a net weight of 60 lbs (27 kg).
- Put the manufacturer, quantity, and batch number on the label.
- Print “Bituminous Adhesive for Pavement Markers” on the label.

## B. Fabrication

General Provisions 101 through 150.

## C. Acceptance

### 1. Flow

Determine flow according to Section 6, Flow, of ASTM D 3407.

- Set the oven temperature at  $158 \pm 2$  °F ( $70 \pm 1$  °C).
- Prepare samples according to Subsection 7.1 of AASHTO T 49.

### 2. Viscosity

Determine viscosity according to ASTM D 2669 using a spindle speed of 10 rpm.

- Heat the adhesive to approximately 410 °F (210 °C) and then let cool.
- Determine viscosity at  $400 \pm 1$  °F ( $204 \pm 0.6$  °C).

### 3. Asphalt Properties

Determine the base asphalt properties based on the material obtained from the following extraction and Abson recovery methods:



- a. Extract the asphalt by heating the adhesive to the point where it will easily flow.
- b. Add 125 to 150 g of adhesive to 400 mL of trichloroethylene that has a temperature of 125 ° to 150 °F (51 ° to 66 °C).
- c. Stir the mixture to dissolve the asphalt.
- d. Decant the trichloroethylene-asphalt mixture.
- e. Recover the asphalt using the Abson recovery method described in ASTM D 1856, except do not use the extraction methods of ASTM D 2712, and do not filter the solvent-asphalt mixture.
- f. Centrifuge the extraction solution of trichloroethylene and asphalt for at least 30 minutes at 770 times gravity in a batch centrifuge.
- g. Decant the solution into a distillation flask. Do not include any filler sediment.
- h. Apply heat and bubble carbon dioxide slowly until the solution reaches a temperature of 300 °F (149 °C).
- i. Increase the carbon dioxide flow to between 800 to 900 mL per minute.
- j. Maintain the decanted solution temperature between 320 ° and 335 °F (160 ° and 168 °C) with this carbon dioxide flow for at least 20 minutes and until the trichloroethylene vapors are completely removed from the distillation flask.
- k. Repeat the extraction-recovery method as necessary to obtain the desired quantity of asphalt.
- l. Determine penetration, 275 °F (135 °C) viscosity, and viscosity ratio with the recovered asphalt.

#### 4. Viscosity Ratio

Determine the 275 °F (135 °C) viscosity ratio by comparing the 275 °F (135 °C) viscosity on the base asphalt before and after the Thin-Film Oven Test.

- a. Perform the Thin-Film Oven Test as described in ASTM D 1754.
- b. Determine the specific gravity with a pycnometer as described in ASTM D 70 for use in the Thin-Film Oven Test.
- c. Calculate the 275 °F (135 °C) viscosity ratio by dividing the viscosity after the Thin-Film Oven Test by the original 275 °F (135 °C) viscosity.

#### 5. Filler Material

Separate the filler material from the asphalt to determine filler content and filler fineness.

##### a. Filler Content

- 1) Determine the portion by weight of the adhesive that is insoluble in 1, 1, 1-trichloroethane by weighing  $10.00 \pm 0.01$  g of solid adhesive into a centrifuge flask with a volume of approximately 100 mL, as specified in ASTM D 1796.
- 2) Add 50 mL of 1, 1, 1-trichloroethane to the adhesive.
- 3) Break the adhesive into small pieces to dissolve the solids.
- 4) Place the sample flask in a balanced centrifuge and spin with a minimum relative centrifugal force of 150 (as determined in Section 6 of ASTM D 1796) for 10 minutes.
- 5) Remove the sample flask and decant the solvent, without losing any solids.
- 6) Repeat the application of solvent and centrifuging until the solvent is clear and the filler is visually free of asphalt.
- 7) Dry the filler at 160 °,  $\pm 5$  °F (71°,  $\pm 3$  °C) to remove solvent and weigh the resulting filler.
- 8) Filter the decanted solvent to verify that no filler was lost.
- 9) Calculate the percent filler content as follows:

$$\text{Filler Content, \% by weight (g)} = \frac{\text{Filler Wt. (g)} \times 100}{\text{Original Adhesive Wt. (g)}}$$

##### b. Filler Fineness

- 1) Determine filler fineness according to ASTM C 430, using No. 325 (45 µm), No. 200 (75 µm), and No. 100 (150 µm) sieves.

- 2) Modify this method by using a water-soluble, non-ionic wetting agent, such as Triton X-100, to aid the wetting action. Use a surfactant solution that is approximately 1 percent by weight.
- 3) Thoroughly wet the 1-gram dry sample in the surfactant solution.
- 4) Soak the sample for 30 minutes.
- 5) Transfer the filler to the sieve cup.
- 6) Spray water on the filler for two minutes.
- 7) Add surfactant solution as needed and physically disperse clumped particles.
- 8) Dry the sample and handle as directed in ASTM C 430.

The Department will reject any bituminous adhesive if it meets all requirements of this Specification but fails in actual use.

**D. Materials Warranty**

General Provisions 101 through 150.

**GEORGIA DEPARTMENT OF TRANSPORTATION**  
**STATE OF GEORGIA**  
**SPECIAL PROVISION**  
**PROJECT NO. CSNHS-0008-00 (232), Troup County**  
**P.I. NO. 0008232**

**Section 881- Fabrics**

*Add the following to Subsection 881.2.08:*

**881.2.08 Filter Fabric for Embankment Stabilization**

**A. Requirements**

1. Use woven filter fabric for embankment stabilization.
2. Sew fabric with a lock stitch using high strength polypropylene or nylon thread.
3. Obtain approval of the stitch and sewing method from the Engineer prior to use.
4. Use fabric that meets the following minimum tensile strength requirements:

Fabric Type	Tensile Strengths in lbs/in (kN/m) width			
	Warp Direction		Fill Direction	
	5% Strain	Ultimate	5% Strain	Ultimate
Polyester	200 (35)	500 (87.5)	100 (17.5)	250 (43.8)
Polypropylene	200 (35)	800 (140)	100 (17.5)	400 (70)

Minimum Seam Strength = 100 lbs/in (17.5 kN/m) width

- a. Tensile strengths at 5% strain are based on reduction factors from the ultimate strengths of 0.4 for polyester and 0.25 for polypropylene fabrics.
  - b. Use of reduction factors other than those shown are allowed only if verified by laboratory tests acceptable to the Department.
5. Submit a certification from the manufacturer that shows the physical properties of the material used and how it meets this Specification. Submit the certificate according to Subsection 106.05, "Materials Certification."

8.2.15

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

Test according to the following:

<b>Test</b>	<b>Method</b>
Tensile strength, elongation	ASTM D 4595 Wide Strip Test
Seam Strength	ASTM D 4884 Wide Strip Test

1. Run the tests at a strain rate of 10% per minute.
2. Use a pre tensioning load of 10 lbs/in (1.75 kN/m) or 3%, whichever is less.

**D. Materials Warranty**

General Provisions 101 through 150.

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SUPPLEMENTAL SPECIFICATION**

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

**Section 882—Lime**

---

*Delete Subsection 882 and substitute the following:*

**882.1 General Description**

This Section includes the requirements for agricultural lime; lime for soil stabilization; and lime for asphaltic concrete.

**882.1.01 Related References**

**A. Specifications**

General Provisions 101 through 150.

**B. Referenced Documents**

AASHTO M 303

ASTM C 25

ASTM C 110

ASTM C 977

“Official Methods of Analysis,” Association of Official Agricultural Chemists

[QPL 41](#)

**882.2 Materials**

**882.2.01 Agricultural Lime**

**A. Requirements**

1. Use agricultural lime made of ground dolomitic limestone with the following properties:

Requirements	Percent by Weight
Total carbonates, min.	85
Elemental magnesium derived from magnesium carbonate, min.	6
Passing No. 10 (2.00 mm) sieve, min	90
Passing No. 100 (150 µm) sieve, min	25

2. If desired, substitute liquid lime concentrate for one ton per acre (2240 kg/ha) of the ground dolomitic limestone. Use liquid lime concentrate conforming to the following composition by weight:

Component	Minimum	Maximum
Calcium Carbonate (CaCO <sub>3</sub> )	30.0%	
Magnesium Carbonate (MgCO <sub>3</sub> )	30.0%	
Moisture		30.0%

Add liquid lime concentrate to the hydroseeding mix at a rate of 2.5 gallons per acre (23 liters per hectare)

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

Test agricultural lime according to the “Official Methods of Analysis” of the Association of Official Agricultural Chemists.

**D. Materials Warranty**

General Provisions 101 through 150.

**882.2.02 Lime for Soil Stabilization**

**A. Requirements**

Use either a commercial dry hydrated lime or a commercial granular or pelletized quicklime for soil stabilization.

1. Hydrated Lime: Use hydrated lime that meets the requirements of ASTM C 977, except that at least 85 percent by weight of the lime shall pass the No. 200 (75 µm) sieve.
2. Quicklime: Use quicklime that meets the requirements of ASTM C 977, except that the lime shall contain at least 94 percent total calcium oxide and magnesium oxide (CaO + MgO), and at least 90 percent total available calcium oxide (CaO).
  - a. Ensure the quicklime meets one of the following grade requirements (by weight):

Grade A	Grade B
100% passes the 3/8 in (9.5 mm) sieve	100% passes the No. 10 (2.00 mm) sieve
0% passes the 1/4 in (6.3 mm) sieve	

- b. Furnish certified test reports with each shipment of lime attesting that the lime meets the requirements of the Specification. However, the Engineer may inspect, test, and reject the material at any time.
- c. You may use lime from more than one source or more than one type on the same Project, but do not mix the limes.
- d. Protect the lime from exposure until used. Ensure that the lime is dry enough to flow freely when handled.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

Test the hydrated and quicklime used for soil stabilization according to ASTM C 977.

**D. Materials Warranty**

General Provisions 101 through 150.

**882.2.03 Lime for Asphaltic Concrete**

**A. Requirements**

Use hydrated lime that meets the chemical and physical properties of AASHTO M 303, Type I.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

1. Run the chemical analysis of hydrated lime used in asphaltic concrete according to ASTM C 25.
2. Test the physical properties of the hydrated lime according to the residue test in ASTM C 110.

**NOTE:** [QPL 41](#) for lime is used in asphaltic concrete only.

3. See [QPL 41](#) for acceptable hydrated lime that meets the requirements of this Specification.

**D. Materials Warranty**

General Provisions 101 through 150.

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SUPPLEMENTAL SPECIFICATION**

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

**Section 893—Miscellaneous Planting Materials**

---

*Delete Section 893 and substitute the following:*

**893.1 General Description**

This section includes the requirements for miscellaneous planting materials, such as the following:

- Plant topsoil
- Mulch
- Vines, shrubs, trees, and miscellaneous plants
- Inoculants
- Porous material
- Prepared plant topsoil
- Tree paint
- Stakes
- Organic soil additives
- Erosion Control Compost

**893.1.01 Related References**

**A. Specifications**

[Section 814—Soil Base Materials](#)

[Section 822—Emulsified Asphalt](#)

**B. Referenced Documents**

“USA Standard for Nursery Stock” of the American Association of Nurserymen, Inc.

“Standardized Plant Names”

“Method of Test for Moisture Content of Hay or Straw” United States Department of Agriculture and the United States Composting Council, “Test Methods for the Examination of Composting and Compost” (TMECC).

[GDT 41](#)

**893.1.02 Submittals**

**A. Submissions for Erosion Control Compost**

Submit a notarized certification that includes the following:

- The feedstock by percentage in the final compost product.
- A statement that the compost meets federal and state health and safety regulations.



- A statement that the composting process has met time and temperature requirements.
- A copy of the lab analysis, less than four months old, performed by a Seal of Testing Assurance certified lab verifying that the compost meets the physical requirements specified.

When requested by the Engineer, one Solvita Compost Maturity Test kit (six tests) for every 1000 yd<sup>3</sup> (765 m<sup>3</sup>) of compost supplied shall be provided. The Solvita Compost Maturity Test kit is available from:

Woods End Research Laboratory Inc.  
Box 297  
Mt. Vernon, Maine 04352  
1-800-0451-0337  
email: [info@woodsend.org](mailto:info@woodsend.org)  
or approved equal.

## 893.2 Materials

### 893.2.01 Plant Topsoil

#### A. Requirements

1. Use plant topsoil with the following characteristics:
  - Obtained from well-drained, arable land, but not from fields where tobacco grew in the last three years, or where Johnson grass or kudzu is present.
  - Friable, loamy soil with between 2 and 30 percent organic matter. Determine the percentage by measuring the loss on ignition of oven-dried samples ignited at 1,200 °F (650 °C).
  - Reasonably free from subsoil, heavy or stiff clay, coarse sand, and other deleterious substances.
  - Has no toxic amounts of acid or alkaline elements.
  - Can sustain healthy plant life.
  - Meets the grade requirements of [Subsection 814.2.01.A.8](#).
2. The Department reserves the right to inspect all plant topsoil during the planting period. The Department will reject any material that does not meet the Specifications.
3. Do not use frozen, muddy, or nonfriable topsoil.
4. Before delivering any topsoil to the job site, clear stones larger than 2 in (50 mm) size and roots, sticks, brush, coarse litter, and other substances that would interfere with mixing, planting, and maintenance.

#### B. Fabrication

General Provisions 101 through 150.

#### C. Acceptance

General Provisions 101 through 150.

#### D. Materials Warranty

General Provisions 101 through 150.

### 893.2.02 Mulch

#### A. Requirements

1. Use mulch materials from two groups:
  - a. Grassing and Erosion Control: Threshed rye, oat or wheat straw; or Bermuda grass hay
  - b. Vine, Shrub, Tree, and Miscellaneous Plant Plantings: Pine straw, pine bark, or hardwood mulch (see [Subsection 893.2.09.A.2](#) for pine bark and hardwood mulch).
2. Use mulch materials from either group that meet the following requirements:
  - Are accepted by the Engineer.
  - Can be distributed uniformly when properly loosened
  - Produce the desired results

- Meet the moisture requirements specified herein
  - Contain no excessive amounts of noxious weed seeds
3. Noxious Weed Seeds  
Do not use hay or straw mulch material that has an excessive quantity of matured seeds from noxious weeds or other species that would harm surrounding farmland.
  4. Moisture Content  
Ensure that the mulch material is reasonably dry, especially when bituminous treated mulches must retain the bituminous material.
  5. Erosion Control Compost  
Use erosion control compost that consists of 50% untreated wood chips blended with 50% general use compost measured by volume.
    - a. Wood Chips shall be fresh or partially composted wood chips less than or equal to 3 in (75 mm) in length with 100% passing a 2 in (50 mm) sieve and less than 10% passing a 1 in (25 mm) sieve. Wood chips shall not contain any visible refuse or other physical contaminants, material toxic to plant growth, or over 5% sand, silt, clay or rock material.
    - b. Produce General Use Compost by aerobic (biological) decomposition of organic matter. Compost feedstock may include, but is not limited to, leaves and yard trimmings, Class A biosolids, food scraps, food processing residuals, manure or other agricultural residuals, forest residues, bark, and paper. Compost shall not contain any visible refuse or other physical contaminants, material toxic to plant growth, or over 5% sand, silt, clay or rock material. Mixed municipal solid waste compost and Class B biosolids, as defined in the United States Environmental Protection Agency Code of Federal Regulations (USEPA, CFR), Title 40, Part 503 are unacceptable. Ensure Compost meets all applicable USEPA, CFR, Title 40, Part 503 Standards for Class A biosolids and the following requirements:

**Table 1 – Physical Requirements for Compost**

Test	Requirements	Test Method
Organic Matter Content	30-65% (dry mass)	TMECC 05.07-A
Particle Size	100 % passing 5/8 in (15.62 mm) sieve 70% retained on 3/8 in (9.5 mm) sieve	TMECC 02.02-B
Soluble Salts	5.0 max. * dS/m	TMECC 04.10-A
Fecal Coliform	Pass	TMECC 07.01-B
pH	5.5 – 8.5 pH	TMECC 04.11-A
Stability	8 or below	TMECC 05.08-B,
Maturity	greater than 80%	TMECC 05.05-A
Heavy Metals	Pass	TMECC 04.06 and TMECC 04.13-B

\*A soluble salt content up to 10.0 dS/m for compost used in Compost Manufactured Topsoil will be acceptable.

**NOTE: All physical requirements are in accordance with the United States Department of Agriculture and the United States Composting Council, “Test Methods for the Examination of Composting and Compost” (TMECC).**

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

1. If the material feels damp, the Department will use [GDT 41](#) to test for moisture content.
2. To pass, materials shall have a moisture content of 12 percent or less.

**D. Materials Warranty**

General Provisions 101 through 150.

**893.2.03 Vines, Shrubs, Trees, and Miscellaneous Plants**

**A. Requirements**

1. Use stock that meets the requirements of all State and Federal Laws for inspection of plant diseases and infestation.
2. Use nursery grown and collected plant materials that meet all regulations of the States of their origin and destination, and that meet Federal regulations governing interstate movement of nursery stock.
3. Use stock that is true to name and variety and is of first class quality with well developed tops and vigorous, healthy root systems.

<p><b>NOTE: Use plant names according to the edition of “Standardized Plant Names” in effect at the time of Invitation For Bids.</b></p>
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4. Use only nursery-grown stock that have had their roots pruned during their development, unless otherwise specified.
  - a. The Department will not accept plants and/or trees that are severely cut back or pruned to conform to contract size requirements.
  - b. The Department will reject trees and shrubs that are undersized, have poorly developed tops or root systems, or are infected with disease or infested with insects.
5. Certification  
Furnish all certificates of disease and infestation inspection, a list of plant materials purchased, and a complete list of nurseries from which each plant was grown.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

The Department will inspect plants at the nursery whenever necessary.

1. Inspect and grade living plants for type, size, and quality according to the requirements and recommendations of “USA Standard for Nursery Stock” of the American Association of Nurserymen, Inc.
2. Even if the Department accepts materials after a test at the source, the Department may inspect the stock during planting and reject any that does not meet specification.
3. The Department will reject any of the following:
  - Stock damaged during digging, loading, transporting, planting, and transplanting
  - Broken or loose balls or balls of less diameter than that specified
4. Replace rejected stock at your own expense.
5. Dispose of rejected stock to the satisfaction of the Engineer.

**D. Materials Warranty**

1. Delivery
  - a. Give the Engineer at least 24 hours notice before delivering any stock to the job site.
  - b. Send an invoice with each shipment that shows the sizes and varieties of material included.
2. Packaging  
Pack stock for shipment to properly protect against drying, freezing, breaking, or other injury.
  - a. Pack and clearly label each variety in separate bundles.
  - b. Designate plants that are to be balled and burlapped as “B&B.”
    - 1) Place as many fibrous roots as possible in the ball.
    - 2) Securely and tightly wrap the ball with burlap. Tie a cord or wire around the ball, or pin it with nails to hold the burlap in place.
  - c. For remaining plants, dig them bare-rooted and puddle them immediately after digging them up and when receiving them at the Project. Use the standard practices of the nursery trade.

#### **893.2.04 Inoculants**

##### **A. Requirements**

1. Use a pure culture of nitrogen-fixing bacteria for an inoculant to treat seeds. Select an inoculant for maximum vitality and ability to transform nitrogen from the air into soluble nitrates and deposit them into the soil.
2. Use only purebred cultures less than one year old.

##### **B. Fabrication**

General Provisions 101 through 150.

##### **C. Acceptance**

The Engineer will review acceptable cultures.

##### **D. Material Warranty**

General Provisions 101 through 150.

#### **893.2.05 Porous Material**

##### **A. Requirements**

Protect roots with gravel, broken stone, slag, broken concrete, brick bats, or other acceptable coarse aggregate ranging in size from 1-1/2 to 4 in (38 to 100 mm). Excessive amounts of lime in the form of brick mortar shall be grounds for rejection.

##### **B. Fabrication**

General Provisions 101 through 150.

##### **C. Acceptance**

The Department will reject the material if it has excessive amounts of lime in the brick mortar.

##### **D. Material Warranty**

General Provisions 101 through 150.

#### **893.2.06 Tree Paint**

##### **A. Requirements**

Use tree paint that meets the requirements of [Subsection 822.2.01](#), or use any commercial tree paint with antiseptic qualities.

##### **B. Fabrication**

General Provisions 101 through 150.

##### **C. Acceptance**

See [Subsection 822.2.01.C](#).

##### **D. Material Warranty**

General Provisions 101 through 150.

#### **893.2.07 Prepared Plant Topsoil**

##### **A. Requirements**

1. Use prepared plant topsoil made from plant topsoil, organic soil additive, commercial fertilizer, and lime, as described in [Subsection 893.2.07.B](#).
2. Base any volume for peat moss used as an organic soil additive on the compressed bale.
3. For loose peat, double the volume.

##### **B. Fabrication**

1. Make prepared plant topsoil from the following:

- Four parts plant topsoil, [Subsection 893.2.01](#)

- At least one part organic soil additive, by volume, [Subsection 893.2.09](#)
- A commercial fertilizer, grade 6-12-12, at the rate of 3 lb/yd<sup>3</sup> (1.8 kg/m<sup>3</sup>)
- Lime at the rate of 5 lb/yd<sup>3</sup> (3 kg/m<sup>3</sup>)

2. Base the above volumes on naturally compacted, undisturbed topsoil.

**C. Acceptance**

See the appropriate subsections.

**D. Material Warranty**

General Provisions 101 through 150.

**893.2.08 Stakes**

**A. Requirements**

1. Use wood stakes as indicated in the Specifications or shown on the Plans. Use the stakes for vine, shrub, tree, and miscellaneous plantings.
2. Saw wood stakes from either oak or gum. Use only stakes that are number two common or better, either rough or dressed.

**B. Fabrication**

1. Cut the stakes from sound, solid, undecayed wood, without unsound knots.
2. Shape stakes to within 1/4 in (6 mm) for all dimensions.
3. Taper all stakes at one end.

**C. Acceptance**

The Department will reject any stake that does not meet the following test:

1. Draw a line from the center of the top to the center of the butt of each stake.
2. Ensure that the line stays within the body of the stake and is not more than 1 in (25 mm) from the geometric center of the stake.

**D. Materials Warranty**

General Provisions 101 through 150.

**893.2.09 Organic Soil Additives**

**A. Requirements**

Use four types of organic additives: peat moss, pine bark, compost, and hardwood mulch.

1. Peat Moss

Use peat moss that meets the following requirements:

- Be granulated sphagnum virtually free from woody substances, consisting of at least 75 percent partially decomposed stems and leaves of sphagnum
- Be essentially brown in color
- Be free of sticks, stones, and mineral matter
- Be in an air-dry condition
- Shows an acid reaction of 3.5 pH to 5.5 pH
- Meets State and Federal regulations

2. Pine Bark

Use pine bark that meets the following requirements:

- Be obtained from disease-free wood, 100 percent of which is 9 in<sup>2</sup> (5625 mm<sup>2</sup>) or less in area, and 50 percent is more than 1 in<sup>2</sup> (625 mm<sup>2</sup>) in area.
- Contain no noxious weed seeds, soil, sawdust or any substance toxic to plant growth
- Be at least two years old

3. Compost

Use compost that meets the following requirements:

- Be organic materials that have undergone biological decomposition
- Be disinfected using composting or similar technologies
- Be stabilized so it is beneficial to plant growth
- Be mature, dark brown or black in color and have minimal odors
- Contain no human pathogens
- Fall within a pH range of 5 to 8

Provide to the Department a list of all the ingredients in the original compost mix in the order of their relative proportions on a weight basis.

4. Hardwood Mulch

Use hardwood mulch that meets the following requirements:

- Derived from disease-free deciduous trees
- Particle size of less than 1 in (25 mm) diameter and less than 3 in (75 mm) in length. Hardwood mulch shall complete two composting cycles of 140 °F (60 °C) so that all viable weed seeds are destroyed and no further decomposition due to nitrification will occur
- Free from toxic levels of acidity and alkalinity

Provide test results stating that the ingredients meet Federal, State, and local requirements for priority pollutant limits and do not contain levels of any chemicals that are harmful to plants or humans.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

The Department will accept the materials based upon their compliance with this specification.

**D. Material Warranty**

General Provisions 101 through 150.

**GEORGIA DEPARTMENT OF TRANSPORTATION**

**STATE OF GEORGIA**

**SUPPLEMENTAL SPECIFICATION**

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

**Section 894—Fencing**

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*Delete Section 894 and substitute the following:*

**894.1 General Description**

This section includes the requirements for the following types of fence and fencing accessories:

- Chain link fence
- Woven wire fence
- Barbed wire
- Ground rods
- Field fencing
- Silt fabric fencing

**894.1.01 Related References**

**A. Standard Specifications**

[Section 862—Wood Posts and Bracing](#)

[Section 881—Fabrics](#)

**B. Referenced Documents**

ASTM		AASHTO
A 116	A 239	M 111
A 121	A 584	M 181
A 123/ A 123M	A 585	M 232/ M 232M
A 153/ A 153M	A 702	
	F 1043	

**894.2 Materials**

**894.2.01 Chain Link Fence**

**A. Requirements**

Use zinc or aluminum coated steel fabrics, fittings, accessories, and posts for chain link fence conforming to the following requirements:

#### 1. Fence Fabric

Use woven wire with reasonably uniform 2 in (50 mm) square mesh. Ensure that the mesh has parallel sides and horizontal and vertical diagonals of uniform dimensions. Use the wire size specified on the Plans or in the Proposal.

- a. Zinc Coated: Use steel fabric that conforms to AASHTO M 181. Ensure that the wire and hot-dip coating conform to AASHTO M 181, Type I, Class C.
- b. Aluminum Coated: Use steel fabric conforming to AASHTO M 181. Ensure the wire and coating conform to AASHTO M181, Type II.

#### 2. Fittings and Accessories

- a. Tension Wire: Use wire that conforms to AASHTO M 181. Use wire coated according to AASHTO M 181, Section 25.2 for aluminum coated fabric. Use wire coated according to AASHTO M 181, Section 3.5.2 for zinc-coated fabric.
- b. Fittings: Use fittings conforming to AASHTO M 181.
  - 1) Ensure fittings or accessories not included in AASHTO M 181 conform to industry standards for heavy, industrial-type fences.
  - 2) Hot-dip the materials in zinc with AASHTO M 111 Grade 50 Coating. For aluminum coated fabric, you may use materials made from Aluminum Alloy 360, die-cast, or Sand Alloy 356, ZG61A, or Tenzalloy.
  - 3) Use bolts and nuts that conform to industry standards and are zinc coated with the hot-dip process according to AASHTO M 232/ M 232M.

#### 3. Posts, Rails, and Braces

Use posts, rails, and braces that conform to AASHTO M 181 and ASTM F 1043. Diameter, wall thickness, and weight must conform to ASTM F 1043, Figure 2, Summary of Requirements for Industrial Fence, and the physical tolerance and material requirements must conform to AASHTO M 181. Do not use Light Industrial/Commercial Fence as detailed in ASTM F 1043, Figure 3. Check the Plans for specifications on posts used for special applications. Use special posts that conform to AASHTO M 181 or that are approved by the Office of Materials and Research.

#### 4. Gates

Use support posts and gate frames as designated on the Construction Detail or Project Plans. Use gate materials that meet the requirements of [Subsection 894.2.01.A.3](#).

- a. Use the same coating requirements as for the fence posts. Coat gate frames after completing all welding.
- b. Use fittings and hinges conforming to [Subsection 894.2.01.A.2.b](#).

### **B. Fabrication**

Ensure that the chain link fence fabric is produced by recognized, good commercial practices.

1. Apply the zinc or aluminum coating to the fabric in a continuous process. Do not apply in roll form.
2. Carefully inspect the coated fabric visually, both before and after weaving, to determine the coating quality.

### **C. Acceptance**

The Department will reject chain link fabric that has excessive roughness, blisters, sal ammoniac spots, bruises, flaking, bare spots, or other obvious defects to any considerable extent.

### **D. Materials Warranty**

General Provisions 101 through 150.

## **894.2.02 Woven Wire Fence**

### **A. Requirements**

#### 1. Fabric

Use fabric that meets the requirements of ASTM A 116, Design Number 1047-6-11, with Class 3 coating.

- a. Ensure that the galvanizing is uniform.



- b. Ensure that less than 5 percent of the joints are deficient in zinc coating, as determined by ASTM A 239.
- c. You may use aluminum coated steel that meets the requirements of ASTM A 584, Design Number 1047-6-11, for the woven wire fence fabric.

2. Posts

Use steel or wood posts of the sizes shown on the Plans.

- a. Use wood posts that meet the requirements of [Subsection 862.2.01](#).
- b. Use steel posts and bracing that meet the requirements of ASTM A 702. Galvanize posts and braces with the hot-dip method according to ASTM A 123/A 123M.

3. Certification

Furnish a certification to the Engineer from the manufacturer that shows the physical properties of the materials.

4. Accessories

Galvanize the following accessories according to ASTM A 153/ A 153M. Use 0.80 oz./ft<sup>2</sup> (245 g/m<sup>2</sup>) as the galvanizing minimum. Galvanize other accessories as necessary or specified on the Plans.

- a. Wire Fasteners: Use fasteners that meet the requirements of ASTM A 702.
- b. Tension Wire: Use No. 11 gauge wire.
- c. Staples: Use No. 9 gauge staples 1-1/2 in (38 mm) long.
- d. Nails: Use 1 in (25 mm) roofing nails to fasten metal caps to wooden posts.

5. Gates

Use support posts and gate frames of the size designated on the Construction Detail or Project Plans.

- a. Use a frame that is an all welded unit. Ensure that the gate is galvanized after welding with 2 oz./ft<sup>2</sup> (610 g/m<sup>2</sup>) of spelter coating.
- b. Use hinges, latches, and other accessories of good commercial quality that are coated as in [Subsection 894.2.02.A.4](#).

**B. Fabrication**

1. Ensure that the woven wire fence fabric is produced by methods recognized as good commercial practices.
2. Carefully inspect the galvanized fabric to determine the zinc coating quality.

**C. Acceptance**

The Department will reject woven wire fabric that has excessive roughness, blisters, sal ammoniac spots, bruises, flaking, bare spots, or other obvious defects to any considerable extent.

**D. Materials Warranty**

General Provisions 101 through 150.

**894.2.03 Barbed Wire**

**A. Requirements**

1. Galvanized Steel Barbed Wire  
Use wire that meets the requirements of ASTM A 121 and has a Class 3 zinc coating.
2. Aluminum Coated Steel Barbed Wire  
Use wire that meets the requirements of ASTM A 585.
3. Posts  
Use posts as specified in [Subsection 894.2.02.A.2](#) for barbed wire fence.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

General Provisions 101 through 150.

#### **D. Materials Warranty**

General Provisions 101 through 150.

#### **894.2.04 Ground Rods**

##### **A. Requirements**

1. Use ground rods that are 9/16 to 5/8 in (14 to 16 mm) diameter and at least 8 ft (2.4 m) long, unless otherwise shown on the Plans.
2. Ensure that the ground rods are galvanized steel with a minimum coating of 2 oz./ft<sup>2</sup> (610 g/m<sup>2</sup>) according to the requirements of ASTM A 153/ A 153M.

##### **B. Fabrication**

General Provisions 101 through 150.

##### **C. Acceptance**

General Provisions 101 through 150.

#### **D. Materials Warranty**

General Provisions 101 through 150.

#### **894.2.05 Field Fencing (Woven Wire and Barbed Wire)**

##### **A. Requirements**

###### 1. Definition

Field fencing designates replacement fencing outside the Right of Way or temporary fencing inside the Right of Way, provided you do not reuse the materials for permanent fencing inside the Right of Way.

###### 2. Fence fabric

Use woven wire fabric that meets the requirements of ASTM A 116 Design No. 939-6-12-1/2, and has a Class I coating, unless otherwise designated.

###### 3. Barbed wire

Use wire that meets the requirements of ASTM A 121 and has a Class I coating. Use the same number of barbed wire strands as the existing or replaced fence, or as specified in the Plans.

###### 4. Posts

Use either galvanized steel, painted steel, or treated timber of the dimensions and spacing shown on the Construction Detail or Plans.

###### 5. Gates

Use posts, frame material, hinges, and fittings of acceptable commercial quality. Get approval from the Engineer before use.

###### 6. Use the Special Plan Details and/or Special Provisions for any special design of the field fence.

##### **B. Fabrication**

General Provisions 101 through 150.

##### **C. Acceptance**

1. Get approval from the Engineer for all materials. Ensure that the materials are of an acceptable commercial quality and are equivalent in quality to the fence being replaced or to the existing fence, as applicable.
2. Do not send materials to the laboratory unless requested by the Engineer or required by the Plans.

#### **D. Materials Warranty**

General Provisions 101 through 150.

## 894.2.06 Silt Fabric Fencing

### A. Requirements

#### 1. Fabric

- a. See [Subsection 881.2.07, "Silt Fence Filter Fabric,"](#) for the types of fabric available.
- b. Use a woven wire support fence with Type "C" fence.
  - 1) Ensure that the wire fence fabric is at least 26 inches (660 mm) high with at least 6 horizontal wires.
  - 2) Ensure that the vertical wires have a maximum spacing of 12 in (155 mm).
  - 3) Ensure that the top and bottom wires are at least 10 gauge (2.49 mm) and all other wires are at least 12-1/2 gauge (2.03 mm).
  - 4) You may use other designs subject to approval by the Office of Materials and Research.

#### 2. Posts

Use post sizes and types as determined by the type of fence being installed. Generally hardwood posts will be limited to ash, hickory, or oak. Other hardwoods may be acceptable if approved by the Office of Materials and Research.

- a. Type "A" Fence: Use either wood or steel posts that are at least 4 ft (1.2 m) long.
  - 1) If using soft wood, use posts that are at least 3 in (75 mm) in diameter or nominal 2 x 4 in (33 x 89 mm) and straight enough to provide a fence without noticeable misalignment.
  - 2) If using hardwood, use posts that are 1-1/2 x 1-1/2 in (38 x 38 mm) with a minus tolerance of 3/8 in (9 mm) providing the cross sectional area is at least 2.15 in<sup>2</sup> (1385 mm<sup>2</sup>).
  - 3) If using steel, use posts that are "U," "T," or "C" shaped with a minimum weight of 1.15 lb/ft (1.7 kg/m), and have projections for fastening the fence to the posts.
- b. Type "B" Fence: Use either wood or steel posts that are at least 3 ft (900 mm) long.
  - 1) If using soft wood, use posts that are at least 2 in (50 mm) in diameter or nominal 2 x 2 in (33 x 33 mm).
  - 2) If using hardwood, use posts that are 1 x 1 in (25 x 25 mm) with a minus tolerance of 1/4 in (6 mm) providing the cross sectional area is at least 0.95 in<sup>2</sup> (610 mm<sup>2</sup>).
  - 3) If using steel posts, use types "U," "T," or "C" shapes with a minimum weight of 0.75 lb/ft (1.1 kg/m).
- c. Type "C" Fence: Use only steel posts with a minimum length of 4 ft (1.2 m). Use "U," "T," or "C" shaped posts with a minimum weight of 1.15 lb/ft (1.7 kg/m). Use posts that have projections for fastening the woven wire and filter fabric.

<b>NOTE: You must use woven wire to provide extra support for Type "C" fence installations.</b>
---

#### 3. Fasteners for Wooden Posts

- a. Wire Staples: Use staples that are at least 17 gauge (1.37 mm), legs at least 1/2 in (13 mm) long, and a crown at least 3/4 in (19 mm) wide.
- b. Nails: Use nails that are at least 14 gauge (2.03 mm), 1 in (25 mm) long, with button heads of at least 3/4 in (19 mm).

### B. Fabrication

General Provisions 101 through 150.

### C. Acceptance

General Provisions 101 through 150.

### D. Materials Warranty

General Provisions 101 through 150.

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SPECIAL PROVISION**

**Project Number: CSNHS-0008-00(232)  
P.I. Number: 0008232  
Troup County**

**Section 895—Polyacrylamide (PAM)**

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**895.1 General Description**

This section covers the use of anionic Polyacrylamide (PAM) as a flocculant on construction projects.

**895.1.01 Related References**

**A. Standard Specifications**

[Section 700—Grassing](#)

**B. Referenced Documents**

[QPL 84](#)

**895.2 Materials**

**A. Requirements**

Use only Polyacrylamide (PAM) products listed on the Qualified Products List ([QPL 84](#)).

Ensure Polyacrylamide (PAM) emulsions and powders are of the **anionic type only** and meet the following requirements:

1. Meets the EPA and FDA acrylamide monomer limits of equal to or greater than 0.05% acrylamide monomer.
2. Has a density of 10% to 55% by weight and a molecular weight of 16 to 24 Mg/mole.
3. Mixture is non-combustible.
4. Contains only manufacturer recommended additives.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

1. Polyacrylamide (PAM) products must meet the requirements of [Section 895](#) and be listed on [QPL 84](#).
2. Provide manufacturer's data on charge density and molecular weight.

**D. Materials Warranty**

General Provisions 101 through 150.

**DEPARTMENT OF TRANSPORTATION**

**STATE OF GEORGIA**

**SUPPLEMENTAL SPECIFICATION**

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

**Section 911—Sign Posts**

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*Delete Section 911 and substitute the following:*

**911.1 General Description**

This section includes the requirements for the following:

- Galvanized steel sign posts
- Galvanized steel structural shape posts
- Aluminum structural shape posts
- Delineator posts
- Wood sign posts
- Ground-mounted breakaway sign supports

**911.1.01 Related References**

**A. Standard Specifications**

[Section 106—Certification of Materials](#)

[Section 859—Guard Rail Components](#)

[Section 862—Wood Posts and Bracing](#)

[Section 863—Preservative Treatment of Timber Products](#)

[Section 913—Reflectorizing Materials](#)

**B. Referenced Documents**

<b>ASTM</b>		
A 1	A709/A 709M	B 221 (B 221M)
A 123/A 123M	A 499	B 308 (B 308M)
A 153/A 153M	A 653/A 653M	B 695
A 193/A 193M	B 209 (B 209M)	B 766
A 307	B 211 (B 211M)	G 53

AASHTO M 181, Section 32

ANSI B 1.13M

ANSI B 18.22.1

AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals (current edition)

Georgia Standard No. 9055

Southern Pine Inspection Bureau Grading Rules, 1977 Edition

NCHRP 350

[QPL 29](#)

[QPL 35](#)

[QPL 69](#)

## 911.2 Materials

### 911.2.01 Galvanized Steel Sign Posts (Drive Type)

#### A. Requirements

Use drive-type steel posts made of flanged “U” channel or square tubular sections. For a list of sources, see [QPL 35](#).

##### 1. U-Channel

Use U-channel posts made of rerolled rail steel or new billet steel that meets the mechanical requirements of ASTM A 499, Grade 60, and the chemical requirements of ASTM A 1 for rails with nominal weights of 91 lbs/yd (45 kg/m) or greater.

- a. Dimensions, Weights, Tolerances: Use the dimensions, weights, and tolerances in [Table 1](#) for U-channel posts, unless otherwise indicated on the Plans.
  - 1) Use post lengths as specified on the Plans.
  - 2) Use post assemblies within a sign structure from the same manufacturer.

**Table 1—Dimensions, Weights, and Tolerances for Galvanized Steel Sign Posts (Drive Type)**

Outside Diameters	TP 1 in (mm)	TP 2 in (mm)	TP 3 in (mm)	TP 4 in (mm)	Tolerance in (mm)
Flange Width					
a. Rib Back	2.063 (50)	3.125 (80)	3.5 (90)	3.75 (95)	± 0.125 (± 3)
b. Flat Back	2.313 (60)	3.125 (80)	3.5 (90)	3.75 (95)	± 0.125 (± 3)
Depth of “U”					
a. Rib Back	0.875 (22)	1.500 (40)	1.875 (50)	2.000 (50)	± 0.125 (± 3)
b. Flat Back	0.875 (22)	1.500 (40)	1.750 (45)	1.750 (45)	± 0.125 (± 3)
Weight per linear foot (meter) before drilling, punching holes, or galvanizing)					
a. Rib Back	1.12 lb (1.7 kg)	2 lb (3 kg)	3 lb (4.5 kg)	4 lb (6 kg)	± 5%
b. Flat Back	1.12 lb (1.7 kg)	2 lb (3 kg)	3 lb (4.5 kg)	4 lb (6 kg)	± 5%

- b. Bolt Holes: Ensure the bolt holes are properly punched or drilled with the following characteristics:
  - 1) Holes are 3/8 in (10 mm) diameter and spaced 1 in, ±1/32 in (25 mm, ± 1 mm), center to center.
  - 2) Ensure that the holes start 1 in (25 mm) from the top and extend the full length of the post for Types II, III, and IV, and at least 18 in (450 mm) for Type I.

- 3) The Department will not accept field-punched holes.
  - c. Coatings: Ensure that the posts are coated according to ASTM A 123/A 123M after the holes are punched or drilled.
2. Square Tubular
- Use square tubular posts that meet the requirements of ASTM A 653/A 653M, Structural Steel, Grade 50, Class 1 (Grade 340, Class 1).
- a. Dimensions, Weights, Tolerances: Use the dimensions, weights, and tolerances shown in [Table 2](#) for square tubular posts unless otherwise indicated on the Plans:

**Table 2—Dimensions, Weights, and Tolerances for Square Tubular Posts**

	TP 5	TP 6	TP 7	TP 8	TP 9	Tolerance
Outside size, in (mm)	1.000 (25)	1.7 50 0(45)	2.000 (50)	2.500 (63)	2.250 (57.2)	± 0.010 (0.3)
Wall thickness, in (mm)	0.0 65 (1.7)	0.083 (2.1)	0.083 (2.1)	0.105 (2.7)	0.083 (2.1)	± 0.010 (0.2)
Weight before drilling/ punching holes or galvanizing, lb/ft (kg/m)	0.83 (1.2)	1.8 (2.7)	2.1 (3.1)	3.4 (5.1)	2.27 (3.4)	± 5%

- 1) Use post lengths as specified on the Plans.
  - 2) Use post assemblies within a sign structure from the same manufacturer.
  - b. Bolt Holes: Ensure all bolt holes are properly punched or drilled with the following characteristics:
    - 1) Holes are 7/16 in, ± 1/64 in (11 mm, ± 0.5 mm) diameter and spaced 1 in, ± 3/64 in (25 mm, ± 1 mm) center to center.
    - 2) Ensure that the holes start 1 in (25 mm) from the top and extend the full length of the post on all four sides for Types 6, 7, and 8, and at least 18 in (450 mm) on all four sides for Type 5.
    - 3) The Department will not accept field-punched holes.
  - c. Coatings: Coat square tubular posts with zinc at a minimum thickness of 0.90 oz/ft<sup>2</sup> (275 g/m<sup>2</sup>).
3. Bolts, Nuts, and Washers
- Use bolts, nuts, metallic washers, and spacers made of aluminum, stainless steel, or galvanized steel. Use stainless steel that meets the requirements of ASTM A 193/A 193M, Type B8.
- a. Bolts: Use bolts 5/16 in (8 mm) diameter with hexagonal heads. Ensure they are long enough to extend at least 0.25 in (6 mm) beyond the nut when installed.
    - 1) Use a bolt thread fit of ANSI B 1.13M, Class 6H.
    - 2) If using aluminum bolts, ensure that the aluminum meets the requirements of ASTM B 211 (B 211M), Alloy 2024-T4.
  - b. Nuts: Use self-locking, plastic-insert hex nuts.
    - 1) Use a bolt thread fit of ASNI B 1.13, Class 6G.
    - 2) If using aluminum bolts, ensure that the aluminum meets the requirements of ASTM B 211(B 211M), Alloy 2017-T4.
  - c. Washers: Place metallic washers under all bolt heads. Place nylon washers between the metallic washer and the sign face.
    - 1) If using aluminum washers, ensure that the aluminum meets the requirements of ASTM B 209 (B209M), Alloy 2024-T4.
    - 2) Use aluminum washers with 25/64 in (10 mm) inside diameter, 0.75 in (19 mm) outside diameter, and 0.091 in (2.3 mm) thick.
    - 3) Use standard galvanized and stainless steel washers that meet the size requirements of ANSI B 18.22.1.

- 4) Use nylon washers with 13/32 in (10 mm) inside diameter, 13/16 in (21 mm) outside diameter, and 1/16 in (1.6 mm) thick. Use nylon washers in combination with metallic washers to prevent torsional damage caused by the twisting action of the bolt heads.

d. Coatings: Use galvanized steel bolts and nuts that meet ASTM A 307 requirements.

#### **B. Fabrication**

1. Roll or form post sections of the dimensions specified.
2. Round all sharp corners and make rough or burred parts smooth.
3. Punch or drill holes as specified in [Subsection 911.2.01.A.1.b.](#)
4. Galvanize as necessary, according to ASTM A 153/A 153M.

#### **C. Acceptance**

Get approval for each sign support matrix from the FHWA.

The FHWA evaluates the matrix according to the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals, current edition.

#### **D. Materials Warranty**

General Provisions 101 through 150.

### **911.2.02 Galvanized Steel Structural Shape Posts**

#### **A. Requirements**

1. Ensure that the galvanized steel shapes for sign posts match the shape and dimensions shown on the Plans.
  - a. Use steel that meets the requirements of ASTM A 709 (A 709M) Grade 36 (245).
  - b. Galvanize the shapes according to ASTM A 123/A 123M. Handle the structural shape through only one hole during galvanizing.
2. Submit a certification according to [Subsection 106.05, "Materials Certification."](#)

#### **B. Fabrication**

General Provisions 101 through 150.

#### **C. Acceptance**

General Provisions 101 through 150.

#### **D. Materials Warranty**

General Provisions 101 through 150.

### **911.2.03 Aluminum Structural Shape Posts**

#### **A. Requirements**

1. Ensure that the aluminum shapes for sign posts match the shape and dimensions shown on the Plans.

<b>NOTE: Use aluminum that meets the requirements of ASTM B 308/B 308M, Alloy 6061-T6.</b>
--

2. Submit a certification according to [Subsection 106.05, "Materials Certification."](#)

#### **B. Fabrication**

General Provisions 101 through 150.

#### **C. Acceptance**

General Provisions 101 through 150.



**D. Materials Warranty**

General Provisions 101 through 150.

**911.2.04 Delineator Posts**

**A. Requirements**

- 1. Check the Plans for the types of delineator posts to use. For a list of sources, see [QPL 69](#).
- 2. If using flexible delineator posts, use only those indicated on the Georgia Department of Transportation Qualified Products List.
- 3. Mounting  
Fasten all delineators to be mounted on galvanized or aluminum posts with commercial aluminum lock bolts.

**NOTE: Fasten delineators to be mounted on wood posts with galvanized wood screws.**

- 4. Galvanized Steel Posts  
Use posts that meet the requirements of [Subsection 911.2.02.A](#).
- 5. Aluminum Flange Type Posts  
Use aluminum that meets the requirements of ASTM B 221 (B 221M), Alloy 6063-T6.
  - a. Provide a post section in the form of a flanged “U” with dimensions shown on the Plans. Point the bottom of the post.
  - b. Punch or drill holes as specified in [Subsection 911.2.01.A.1.b](#).
- 6. Wood Delineator Posts  
Use 4 in (100 mm) square posts of the length specified on the Plans.
  - a. Use wood posts that meet the requirements of [Subsection 862.2.02](#).
  - b. Treat wood posts with preservative according to [Section 863](#).
- 7. Flexible Delineator Posts  
Use posts made of a durable plastic or poly resin material. Check the Plans to see the type of flexible delineator post used for each location.
  - a. Physical Characteristics: Use posts that can either be driven into the ground with equipment that does not damage the posts or reflective sheeting, or be surface-mounted onto pavement.
    - 1) Drill or form pilot holes where necessary to embed the posts as shown on the Plans.
    - 2) Classify flexible delineator posts as follows:

Type I	Curved or flat
A	Soil mount
B	Surface mount
Type II	Tubular
A	Soil mount
B	Surface mount

- 3) Use durable, flexible, non-discoloring posts that can recover from repeated vehicle impacts.
- 4) Ensure that materials used to manufacture flexible delineator posts are stabilized with UV (ultraviolet) inhibitors to prevent degradation.
- 5) Ensure that the posts are inert to normal atmospheric elements and chemicals possibly used in grass or weed control.
- 6) Use material for the post that can accept reflective sheeting.
- b. Color: Use gray, white, or yellow posts, as required.
- c. Reflective Sheeting: Use white or yellow reflective sheeting on the posts as required.

Use sheeting that meets the requirements of [Subsection 913.2.01](#), Type III.

Obtain approved reflective sheetings from [QPL 29](#).

- d. Certification: Submit a certification from the manufacturer that the flexible delineator posts are formulated of the same material as when tested by National Transportation Product Evaluation Program (NTPEP) and will meet the requirements of this Specification.

## **B. Fabrication**

General Provisions 101 through 150.

## **C. Acceptance**

### 1. Performance Criteria

Get approval for flexible delineator posts through the evaluation performed by NTPEP.

The Department will use the data generated by the NTPEP testing to select usable materials that performed satisfactorily when tested with the following material and field tests.

### 2. Shapes and Dimensions (Materials Test)

- a. Ensure that flexible delineator posts are curved, flat, or tubular with the upper 14 in (350 mm) presenting at least a 3 in (75 mm) wide profile facing approaching traffic.
- b. Place the top of the wide profile sheeting 0.5 in (13 mm) from the top of the delineator post.
- c. Cap the top of tubular posts to prevent water inclusion.
- d. Design flexible delineator posts that are soil mounted to connect with a drive-type anchor base made of corrosion-resistant material. When a post is no longer serviceable, remove it and replace it in the same anchor base.
- e. Ensure that the minimum length for the anchor base is 18 in (450 mm) and the minimum height above ground for the soil mount flexible delineator posts is 48 in (1200 mm).
- f. Design surface-mount flexible delineator posts to connect with the base assembly and be easily replaced when the existing post is no longer serviceable. Use post heights of 24 in (600 mm), 36 in (900 mm), or 48 in (1200 mm), as required.

### 3. Weathering (Materials Test)

- a. Ensure that flexible delineator posts withstand 1,000 hours of UV exposure in the QUV weatherometer without significant color change or physical deterioration. If the Department sees splitting, cracking, delaminating, or other failures, it will reject the delineator post.
- b. The Department will conduct the test according to ASTM G 53.

### 4. Field Tests

Perform impact tests on the flexible delineator posts as described below:

- a. Install 8 delineator posts in 2 rows of 4 each so that 1 row will be bumper hits and 1 row will be wheel hits in 1 pass of the vehicle.
  - b. Set the delineator post with a height of 48 in,  $\pm 1$  in (1200 mm,  $\pm 25$  mm) from ground level with the reflective sheeting facing the test vehicle.
  - c. Use a standard American sedan or pickup for the test vehicle. Ensure that the vehicle has no unusually sharp hood ornaments or other appurtenances.
  - d. Impact 8 delineator posts 10 times with the test vehicle at 55 mph (90 kph)
  - e. Hit the posts five times at an ambient temperature of 32 °F,  $\pm 5$  °F (0 °C,  $\pm 2$  °C) and five times at an ambient temperature of 85 °F,  $\pm 5$  °F (30 °C,  $\pm 2$  °C).
  - f. After concluding the impact test, ensure that at least 5 of the 8 posts remain intact, are securely anchored, and return to their original vertical orientation within an angle of  $\pm 10$  degrees.
  - g. Of the 5 posts that remain intact, ensure that they also retain at least 50 percent of their reflective sheeting and show minimal signs of distress (cracking, loss of rigidity).
5. The Department will place flexible delineator posts that pass the laboratory material test and field test requirements on the approved list.

## **D. Materials Warranty**

General Provisions 101 through 150.

### **911.2.05 Wood Sign Posts**

#### **A. Requirements**

1. Use wood sign posts to support special signs, when noted on the Plans. Use posts that comply with Georgia Standard No. 9055.
2. Treat the posts with preservative according to [Section 863](#) and Standard No. 9055 notes.
3. Use wood that matches that specified in [Subsection 859.2.04](#), except that it shall meet the grading requirements for No. 1 SR or No. 2 SR as specified in the current Southern Pine Inspection Bureau Rules.

#### **B. Fabrication**

General Provisions 101 through 150.

#### **C. Acceptance**

General Provisions 101 through 150.

#### **D. Materials Warranty**

General Provisions 101 through 150.

### **911.2.06 Ground Mounted Breakaway Sign Supports**

#### **A. Requirements**

1. Use ground-mounted breakaway sign supports of any assembly approved by the Department as a breakaway foundation. For a list of sources, see [QPL 63](#).
2. Design the support to modified AASHTO wind loads of 70 mph (112 kph).
3. Certification

Furnish a copy from the manufacturer of an independent testing agency report showing that the support has been dynamically tested according to AASHTO Standard Specifications for Highway Signs, Luminaires, and Traffic Signals, current edition.

  - a. Furnish evidence that the support has been tested and has met the criteria established in NCHRP 350.
  - b. Supply a certification showing the physical properties of the material and how it meets the Specifications, as stated in [Subsection 106.05, "Materials Certification."](#)
  - c. Show evidence that the assembly has been used successfully in installations with similar environmental and Project conditions to the satisfaction of the Department.
4. Sign Support Design
  - a. Type A: A single-post mount that can support a 7 ft<sup>2</sup> (0.65 m<sup>2</sup>) sign mounted to the centroid 9 ft (2.7 m) above ground.
  - b. Type B: A two-post mount that can support a 18 ft<sup>2</sup> (1.67 m<sup>2</sup>) sign mounted to the centroid 9 ft (2.7 m) above ground.
  - c. Type C: A three-post mount that can support a 37 ft<sup>2</sup> (3.4 m<sup>2</sup>) sign mounted to the centroid 9 ft (2.7 m) above ground.
5. Base Assembly
  - a. Ensure that the furnished base assembly protrudes no more than 4 in (100 mm) above ground.
  - b. Ensure that the foundation assembly is compatible with the applicable sign post in [Subsection 911.2.01](#).
  - c. Ensure that the assembly is galvanized with the hot-dip method as per ASTM A 123/A 123M or an approved equal.
  - d. To use an alternate protective coating, obtain approval from the Office of Materials and Research before using it on Department Projects.
6. Assembly Hardware

- a. Use base attachment hardware that matches the Plans and is as recommended by the manufacturer.
- b. Ensure that the hardware is protectively coated as in ASTM A 153/A 153M, ASTM B 695 Class 55, or ASTM B 766 Type II, class 12-, whichever is applicable.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

Use foundation assemblies that are FHWA-approved for the specific design category for which the unit was evaluated.

Foundation assemblies are evaluated according to AASHTO Standard Specifications for Highway Signs, Luminaires, and Traffic Signals, current edition.

**D. Materials Warranty**

General Provisions 101 through 150.

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SPECIAL PROVISION**

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

**Section 913—Reflectorizing Materials**

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*Delete Section 913 and substitute the following:*

**913.1 General Description**

This section includes the requirements for reflective sheeting.

**913.1.01 Definitions**

- Reflective Sheeting Types:
  - Type I: Medium-intensity retroreflective sheeting (engineering grade) that is typically an enclosed lens glass-bead retroreflective material.
  - Type II: Medium-high-intensity retroreflective sheeting (super engineering grade), that is typically enclosed lens glass-bead retroreflective material.
  - Type III: High-intensity retroreflective sheeting that is typically an encapsulated glass-bead retroreflective material.
  - Type IV: High-intensity retroreflective sheeting that is typically an unmetallized microprismatic retroreflective element material.
  - Type V: Super-high-intensity retroreflective sheeting that is typically a metallized microprismatic retroreflective element material. This material is typically used for delineators.
  - Type VI: Elastomeric high-intensity retroreflective sheeting without adhesive that is typically a vinyl microprismatic retroreflective material. This material is typically used for orange temporary roll up signs.
  - Type VII: Super-high-intensity retroreflective sheeting that is typically an unmetallized microprismatic retroreflective element material.
  - Type VIII: Super-high-intensity retroreflective sheeting that is typically an unmetallized microprismatic retroreflective element material.
  - Type IX: Very-high-intensity retroreflective sheeting that is typically an unmetallized microprismatic retroreflective element material.
  - Type X: Super-high intensity retroreflective sheeting that is typically an unmetallized microprismatic retroreflective element material.

**913.1.02 Related References**

**A. Standard Specifications**

General Provisions 101 through 150.

## **B. Referenced Documents**

ASTM D 4956

[QPL 29](#)

## **913.2 Materials**

### **913.2.01 Type I, II, III, IV, V, VI, VII, VIII, IX, and X Reflective Sheeting**

#### **A. Requirements**

1. Use reflective sheeting that meets the requirements of ASTM D 4956.
2. Use reflective sheeting as listed in [QPL 29](#).
3. Use reflective sheeting that has been evaluated by the National Transportation Product Evaluation Panel (NTPEP) test facility or other approved test facility.
4. Submit the following to the Department:
  - a. A certificate with each lot or shipment stating the following:
    - The material supplied will meet all the test requirements listed herein.
    - You have performed the specified tests to ensure compliance.
    - You will submit test results upon request.

#### **B. Fabrication**

General Provisions 101 through 150.

#### **C. Acceptance**

1. The Engineer will reject reflective sheeting in the following situations:
  - a. The material fails to meet any one of the designated requirements.
  - b. The material meets the requirements but later fails during sign fabrication or in actual field use. Cracks, wrinkles, delamination, color change, or abnormal loss of reflectivity constitute failure.
  - c. Natural causes deteriorate the material to the extent that:
    - 1) The sign is ineffective for its intended purpose as defined in [Subsection 913.2.01.C.1.b](#) above.
    - 2) The average nighttime reflective brightness does not meet the outdoor weathering requirements of ASTM D4956.

#### **D. Materials Warranty**

Transfer to the Department a performance warranty for Type I, II, III, IV, V, VI, VII, VIII, IX, or X reflective sheeting issued by the manufacturer.

Ensure that the warranties cover the full replacement cost, including material and labor.

Include in these warranties a provision that the warranty is subject to a transfer to the Department.

Submit a warranty from the manufacturer that states that the reflective sheeting—processed, applied to sign blank materials, and cleaned—meets the outdoor weathering photometric requirements of ASTM D 4956.

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**Special Provision**

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

**Section 917—Reflectors and Nonreflective Characters**

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*Delete Subsection 917.1 and substitute the following:*

**917.1 General Description**

This section includes the requirements of demountable characters with Type IX reflective sheeting, and direct-applied, nonreflective characters.

**917.1.01 Related References**

**A. Standard Specifications**

[Section 106—Certification of Materials](#)

[Section 913—Reflectorizing Materials](#)

**B. Referenced Documents**

ASTM B 209 (B 209M)

ASTM D 822

*Delete Subsection 917.2.01 and substitute the following:*

**917.2.01 Demountable Characters with Type IX Reflective Sheeting**

**A. Requirements**

1. Use Type IX reflective sheeting letters, numerals, symbols, and borders that meet the requirements of [Subsection 913.2.02](#), Type IX.
2. Use a silver color, unless otherwise specified on the Plans.
3. Apply the characters to aluminum flat frames as recommended by the sheeting manufacturer.
4. Use flat frames (letter, numerals, symbols and borders) made from aluminum sheet 0.032 in (0.813 mm) thick matching ASTM B 209 (209M), Alloy 3003-H14.
5. Submit to the Department:
  - One letter of a predominant size and type to be used on the Project.
  - A certificate to the Engineer stating that the material used on the Project is the same as the sample submitted.

**B. Fabrication**

1. Before applying any sheeting, properly degrease, etch, and treat each frame with a light, tight amorphous chromate-type coating.

## Section 917—Reflectors and Nonreflective Characters

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2. Mechanically apply the reflective sheeting to the prepared flat aluminum frames. Use the proper equipment as prescribed by the sheeting manufacturer.
3. When recommended by the sheeting manufacturer, coat the completed demountable letters, numerals, symbols and borders with a clear finish approved by the sheeting manufacturer.  
Apply the clear coat to the sheeting surface to ensure the sheeting has a fully glossy coat and a complete edge seal.
4. Ensure that the finished letters, numerals, symbols, and borders show careful workmanship, are clean cut, sharp, and have a plane surface.
5. Use the character size and shape to determine the hole spacing to mount the frame with aluminum rivets or other approved non-corrosive fasteners. Do not space holes more than 8 in (200 mm) on center.

### C. Acceptance

The Department will accept the material based on test results of samples taken by the Department or of samples submitted by the manufacturer or fabricator, when directed. The sample shall consist of one letter of predominant size and type to be used on the Project. Samples submitted by the manufacturer or fabricator to the Engineer, shall include a certificate stating that the material used on the Project is the same as the sample submitted.

### D. Materials Warranty

General Provisions 101 through 150.

Office of Materials and Research



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**DEPARTMENT OF TRANSPORTATION**  
**STATE OF GEORGIA**  
**SPECIAL PROVISION**  
**PROJECT NO. CSNHS-0008-00(232)**  
**P.I. NO. 0008232**  
**Section 925—Traffic Signal Equipment**

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*Delete Section 925 and substitute the following:*

### **925.1 General Description**

This section provides Specifications for a variety of traffic signal equipment. Ramp Meters are defined as a form of traffic signalization and all general provisions for traffic signalization are applicable unless otherwise noted in the Plans and Specifications.

#### **925.1.01 Related References**

##### **A. Standard Specifications**

[Section 500—Concrete Structures](#)  
[Section 639—Strain Poles for Overhead Sign and Signal Assemblies](#)  
[Section 647—Traffic Signal Installation](#)  
[Section 682—Electrical Wire, Cable and Conduit](#)  
[Section 833—Joint Fillers and Sealers](#)  
[Section 861—Piling and Round Timber](#)  
[Section 870—Paints \(Field Painting\)](#)  
[Section 915—Mast Arm Assemblies](#)  
[Section 922—Electrical Wire and Cable](#)  
[Section 923—Electrical Conduit](#)  
[Section 935—Fiber Optic System](#)  
[Section 938—Detection](#)  
[Section 939—Communications and Electronic Equipment](#)

##### **B. Referenced Documents**

- National Electrical Manufacturers Association ( NEMA) Standards Publication TS 1 Section 15
- NEMA Standard Publication TS 2- 1998
- Institute of Transportation Engineers (ITE)Vehicle Traffic Control Signal Heads Specification
- ITE Vehicle Traffic Control Signal Heads: Light Emitting Diode (LED)Circular Signal Supplement June 27, 2005 Specification
- ITE Vehicle Traffic Control Signal Heads – Part 3: Light Emitting Diode (LED) Vehicle Arrow Traffic Signal Modules Specification
- ITE Pedestrian Traffic Control Signal indications – Part 2: Light Emitting Diode (LED) Pedestrian Traffic Signal Modules Specification
- International Municipal Signal Association (IMSA) #20-1 Specification
- IMSA #20-4Specification
- IMSA #20-6Specification

- IMSA #50-2 Specification
- IMSA #51-1 Specification
- Underwriters Laboratory Inc. (UL) 94 Tests for Flammability of Plastic Materials for Parts in Devices and Appliances
- UL 493 Standard for Safety for Thermoplastic-Insulated Underground Feeder and Branch-Circuit Cables
- Traffic Signal Control Equipment Specifications, January 1989 edition and applicable addenda, State of California Business, Transportation & Housing Agency
- State of California Department of Transportation (CALTRANS) Qualified Products List (QPL) Controller Assemblies for the Model 170/2070 Traffic Controller,
- CALTRANS Transportation Electrical Equipment Specifications (TEES) August 16, 2002 and applicable addenda
- Georgia Department of Transportation Qualified Products List 75 "Polyurethane Sealant for Inductive Loops" (American Society of Testing and Materials (ASTM) A36 Standard Specification for Carbon Structural Steel
- ASTM A53 Standard Specification for Pipe, Steel, Black and Hot Dipped, Zinc-Coated, Welded and Seamless
- ASTM A123 Standard Specification for Zinc (Hot-Dip Galvanized) Coating on Iron and Steel Products
- ASTM A153 Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware
- ASTM A325 Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
- ASTM A475 Standard Specification for Zinc-Coated Steel Wire Strand
- ASTM A572 Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel
- ASTM C1028 Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method
- ASTM D256 Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics
- ASTM D638 Standard Test Methods for Tensile Properties of Plastics
- ASTM D785 Standard Test Method for Rockwell Hardness of Plastics: Electrical Insulating Materials
- ASTM D790 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials

## 925.2 Materials

### 925.2.01 General

#### A. Requirements

Ensure that the traffic signal equipment and materials meet the Plans and Specifications.

All equipment furnished shall be new and meet the requirements of the following:

- Underwriter's Laboratory Incorporated (UL)
- Electronic Industries Association (EIA)
- National Electric Code (NEC)
- American Society of Testing and Materials (ASTM)
- American National Standards Institute (ANSI)
- International Municipal Signal Association (IMSA)
- National Electrical Manufacturers Association (NEMA)
- Applicable Standards, Specifications, and Regulations of the:
  - Georgia Department of Transportation
  - Traffic Signal Electrical Facility & NaviGator Support (TSEF)
  - 935 E. Confederate Avenue, Building 5
  - Atlanta, GA 30316

## B. Fabrication

General Provisions 101 through 150.

## C. Acceptance

General Provisions 101 through 150.

## D. Materials Warranty

- Provide to the District Signal Engineer or maintaining agency all manufacturers' warranties and guarantees for all signal equipment items listed in this document as well as any signal equipment listed in the Plans, except for state supplied equipment.
- Ensure that warranties and guarantees are consistent with those provided as customary trade practices; or as otherwise specified in the Plans, Standard Specifications, Supplemental Specifications or Special Provisions.
- Ensure that manufacturer's and supplier's warranties and guarantees are transferable to the agency or user that is responsible for traffic signal maintenance, are continuous throughout their duration and state that they are subject to such transfer.
- Ensure equipment provided under this specification shall be warranted by the manufacturer to be free from defects in materials and workmanship for a period of two years from date of receipt or one year from date of acceptance of installation.
- Ensure the manufacturer will repair any faulty equipment during this period at no charge to the Department for parts, labor or shipping to and from the factory.

### 925.2.02 Type 2070 Controller Assemblies

#### A. Requirements

For 2070 controller cabinet assemblies, use 2070 controller units that meet the requirements of the following or are previously approved by TSEF:

- *Traffic Electrical Equipment Specifications (TEES)* published by the State of California Business, Transportation, and Housing Agency; Department of Transportation, current edition and current addenda
- CALTRANS Qualified Products List (QPL)
- Ensure the unit supplied is compatible with current GDOT licensed firmware.

The following Specifications augment the CALTRANS Specifications and take precedence over conflicting CALTRANS Specifications.

#### 1. Input/output (I/O) and Configuration:

The 2070 Controller shall be supplied in one of the following configurations, as specified in the Plans (all modules are specified in TEES, but these configurations supersede the defined configurations in TEES):

- 2070L: Provide Chassis, 2070-1B Single-Board CPU, 2070-2A Field I/O Module, 2070-3B Front Panel (8x40 display), 2070-4B 3.5-amp Power Supply, and a 2070-7A Module. This unit is intended for interfacing in Type 170E or ITS cabinets and shall provide the default input and output configuration as shown in Tables 925-13, 925-15 and 925-16 for ITS cabinets using a traffic signal application.
- 2070LC: Provide Chassis, 2070-1B Single-Board CPU, 2070-2B Field I/O Module, 2070-3B Front Panel (8x40 display), 2070-4B 3.5-amp Power Supply, and a 2070-7A Module. This unit is intended for interfacing in ITS cabinets only and shall provide the default input and output configuration as shown in Tables 925 -13, 925-15 and 925-16 for ITS cabinets using a traffic signal application.
- 2070 LB: Provide Chassis, 2070-1B Single –Board CPU, 2070-2A Field I/O Module, 2070-3C Front Panel, 2070-4B 3.5-amp Power Supply, This unit is intended for interfacing in Type 170E or ITS cabinets where a user interface is not required and shall provide the default input and output configuration as shown in Tables 925 -13, 925-15 and 925-16 for ITS cabinets using a traffic signal application.
- 2070 LN1: Provide Chassis, 2070-1B Single-Board CPU, 2070-2B Field I/O Module, 2070-3B Front Panel (8x40 display), 2070-4NB 3.5-amp Power Supply, 2070-8 NEMA Interface Module, and a 2070-7A Module. This unit is intended for interfacing in NEMA TS 1 or NEMA TS 2 Type 2 cabinets.
- 2070 LN2: Provide Chassis, 2070-1B Single-Board CPU, 2070-2N Field I/O Module, 2070-3B Front Panel (8x40 display), 2070-4NB 3.5-amp Power Supply, and a 2070-7A Module. This unit is intended for interfacing in a NEMA TS 2 Type 1 cabinet.

2. Power Supply Modules:

Either the 2070-4A, 2070-4B, 2070-4NA or 2070-4NB module shall be provided as required in the configuration requirements in the preceding Item. In addition to all requirements of the TEES, the power supplies shall be clearly marked as a “2070-4A”, “2070-4B”, “2070-4NA”, or “2070-4NB”. The Vendor may supply a 2070-4A or 4NA power supply module in lieu of a 2070-4B or 4NB, as long as it is so marked and adds no additional cost to GDOT.

3. Documentation:

Include with each controller, manuals that document the programming, operation, and maintenance of the unit. Include schematic drawings and pin assignment charts in the manuals for maintenance. Documentation shall include all components, including communications modules. Specific reference is made to section 1.2.4 Documentation in the CALTRANS TEES concerning required documentation to be provided.

4. Testing:

Provide for complete testing of unit before it is shipped. If unit is shipped with applications firmware installed, it must be tested with the application (e.g. Traffic Signal Control). If a random sample of greater than 10 percent of the units tested is rejected then the total shipment shall be rejected and vendor will be responsible for all costs to test and repair all units provided.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

See Subsection 925.2.01 for compliance with CALTRANS QPL. Also see item 4 Testing in Section A above.

**D. Materials Warranty:**

(See Subsection 925.2.01 D for Materials Warranties).

**925.2.03 Type 2070 Controller Subassemblies**

**A. Requirements**

For 2070 controller subassemblies, use 2070 controller subassembly units that meet the requirements of the following or are previously approved by TSEF:

- *Traffic Electrical Equipment Specifications (TEES)* published by the State of California Business, Transportation, and Housing Agency; Department of Transportation, current edition and current addenda
- CALTRANS Qualified Products List (QPL)

The following Specifications augment the CALTRANS Specifications and take precedence over conflicting CALTRANS Specifications.

1. 2070 1B Module:

The 2070 1B module may be supplied as a separate item to be used in all versions of the 2070 controller. The 2070 1B module shall be supplied complete with the operating software. Ensure it contains the required files to be compatible with the current GDOT applications software.

2. 2070 2A Field I/O Module

The 2070 2A Field I/O module may be supplied as a separate item. The 2070 2A Field I/O module shall consist of the Field Controller Unit; Parallel Input/Output Ports; other Module Circuit Functions (includes muzzle jumper); Serial Communication Circuitry; Module Connectors C1S, C11S and C12S mounted on the module front plate; VDC Power Supply (+12VDC to + 5VDC) and required software. Ensure it contains any configuration jumpers to be compatible with current GDOT Applications software. Ensure the 2070 2A field I/O Module functions with a Model 2070L or 2070LB Controller Assembly and is compatible with current GDOT applications software.

3. 2070 2B Field I/O Module:

The 2070 2B Field I/O module may be supplied as a separate item and consist of the Serial Communication Circuitry, DC power Supply, and Module Connector 12S mounted on the module front plate only. Ensure it contains any configuration jumpers to be compatible with current GDOT Applications software. Ensure the 2070 2B field I/O Module functions with a Model 2070 LC or 2070LN1 Controller Assembly and is compatible with current GDOT applications software.

4. 2070 2N Field I/O Module:

The 2070 2N Field I/O module may be supplied as a separate item and provides a NEMA TS2-1 compatible SDLC interface via Serial Port 3. AC power to the 2070 Unit and Fault Monitor Logic Output via 2070 Serial Port 5 and Output Frame Byte 9 Bit 6 to the NEMA TS2 Cabinet Monitor Unit (CMU). Ensure it contains any configuration jumpers to be compatible with current GDOT Applications software. Ensure the 2070 2N field I/O Module functions with a Model 2070 LN2 Controller Assembly and is compatible with current GDOT applications software.
5. 2070 3B Front Panel Display Module:

The 2070 3B Display Module may be supplied as a separate item and provides a Front Panel Assembly controller, two keyboards, AUX switch alarm bell and an 8 line by 40 character display. This assembly shall also include a panel with latch assembly and two TSD #1 hinge attaching devices, assembly PCB, external serial port connectors, CPU active LED indicator, contrast adjustment knob, and Front Panel Harness. Ensure it contains any configuration jumpers to be compatible with current GDOT Applications software. Ensure the 2070 3B Front Panel Assembly Module functions with Models 2070L, 2070LC, 2070LN1 and 2070 LN2 Controller Assemblies and is compatible with current GDOT applications software. Ensure the hardware hinge attaching devices mate with existing 2070 assemblies. Ensure the Front Panel Harness is connected to the front panel via a removable connector. Ensure the front panel connector supports the aux switch.
6. 2070 3C Front Panel Display Module:

The 2070 3C Display Module may be supplied as a separate item and provides a System Serial Port 6 Lines, Isolated and vectored to Connector C60S. This assembly shall also include a panel with latch assembly and two TSD #1 hinge attaching devices, assembly PCB, external serial port connectors, CPU active LED indicator, and Front Panel Harness. Ensure it contains any configuration jumpers to be compatible with current GDOT Applications software. Ensure the 2070 3B Front Panel Assembly Module functions with Model 2070LB Controller Assembly and is compatible with current GDOT applications software. Ensure the hardware hinge attaching devices mate with existing 2070 assemblies. Ensure the Front Panel Harness is connected to the front panel via a removable connector. Ensure the front panel connector supports the aux switch.
7. 2070 4B Power Supply Module:

The 2070 4B Power Supply Module may be supplied as a separate item and is an independent, self contained module. Ensure that it is vented and cooled by convection only. Provide module that slides into power supply compartment from the back of the chassis and is attached to the Backplane mounting surface by its four TSD #3 Devices. Ensure the module supplies at least 3.5 amperes of +5VDC. Ensure the 2070 4B Power Supply Module is compatible with Models 2070L, 2070LB, and 2070LC Controller Assemblies and is compatible with current GDOT applications software. Ensure the connection harness PS 2 on existing units can be mated with the 4B module supplied. A 2070 4A Power Supply Module may be provided in place of a 4B module as long as it is labeled as such and there is no additional cost to GDOT. Ensure the module supplied is appropriately marked as a 4B or 4A module.
8. 2070 4NB Power Supply Module:

The 2070 4NB Power Supply Module may be supplied as a separate item and is an independent self contained module. Ensure that it is vented and cooled by convection only. Provide module that slides into power supply compartment from the back of the chassis and is attached to the Backplane mounting surface by its four TSD #3 Devices. Ensure the module supplies at least 3.5 amperes of +5VDC. Ensure the 2070 4B Power Supply Module is compatible with Models 2070 LN1 and 2070 LN2 Controller Assemblies and is compatible with current GDOT applications software. Ensure the connection harness PS 2 on existing units can be mated with the 4B module supplied. Ensure the 4NB power supply module supports the NEMA TS1 and TS2 Standards. A 2070 4A Power Supply Module may be provided in place of a 4B module as long as it is labeled as such and there is no additional cost to GDOT. Ensure the module supplied is appropriately marked as a 4NA or 4NB module.
9. 2070 6B Communications Module:

The 2070 6B Communications Module is supplied as a separate item. The 6B communications module is a dual async/modem serial module. Ensure the module supports both Serial and modem FSK communications on both of two separate ports. Ensure the Modem data baud rate supports 0 to 9600. Ensure the module is configured to support FSK communications on the C2S connection. Ensure it contains any configuration jumpers to be compatible with current GDOT Applications software.
10. 2070 7A Communications Module:

The 2070 7A Communications Module may be supplied as a separate item. The 7A communications module is a dual async serial communications module. Ensure the module supports serial communications on both ports. Ensure it contains any configuration jumpers to be compatible with current GDOT Applications software.

11. 2070 8 Field I/O Module:

The 2070 8 Field I/O Module may be supplied as a separate item. The 8 Field I/O Module consists of the module chassis, module power supply, Field Control Unit Controller, parallel input/output ports, serial communications circuits and module connectors. Ensure the EX1 connector is provided with appropriate mating connections to interface with either 6B or 7A communications modules. Ensure the 2070 8 Field I/O module is provided with the appropriate mating connector to mate with the C12S connector on the 2070 2B Field I/O module. Ensure the 2070 8 Field I/O module functions as part of a Model 2070 LN1 controller.

12. 2070 D Panel:

The 2070 D panel is supplied as a separate item. The 2070 D panel supports the inputs and outputs of the “D” connector provided on a 2070-8 module which is also part of a Model 2070 LN1. Ensure the “D” Connector panel supports all 61 pins with a connecting MS “D” connector and terminal blocks. Ensure the 2070 D Panel provides adequate cable length to allow attachment in an existing NEMA Cabinet. Ensure that the terminal blocks allow for two connections.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

(See Subsection 925.2.01 for compliance with CALTRANS QPL).

**D. Materials Warranty:**

(See Subsection 925.2.01.D for Materials Warranties).

**925.2.04 Type 170E Cabinet Assemblies**

**A. Requirements**

In addition to the CALTRANS Specifications, ensure that the cabinet assembly conforms to the requirements listed below, which take precedence over conflicting CALTRANS Specifications.

1. Cabinet configuration:

Supply cabinets in accordance with these Specifications. Equip the cabinets with auxiliary equipment as follows:

a. Model 332A Cabinet:

Lower input field termination panel

1 – Model 242 DC Isolator in Slot 14 of Upper Input File

4 – Flash Transfer Relays

2 – Model 204 Flashers

1- Auxiliary Cabinet Shelf to support Communication Devices

1- 4 Position Power Strip

b. Model 336S Cabinet:

1-Model 242 DC Isolator in Slot 14 of Input File

4- Flash Transfer Relays

2-Model 204 Flashers

1- Auxiliary Cabinet Shelf to support Communication Devices

1- 4 Position Power Strip

1-"M" Base Adapter installed (Base Mount Cabinets Only)

1-Aluminum Cover Plate for Cabinet Bottom (Pole Mount Cabinets Only)

c. Model 337 Cabinet

3-Flash Transfer Relays

1-Model 204 Flasher

d. Model 334 Cabinet with Auxiliary Output File for Ramp Metering Operations

1- Auxiliary Equipment Shelf

1- Output/PDA Type 3 with Model 206 24 Volt DC Power Supply with flash transfer relay

1- Model 208 Monitor Unit

- 1- Model 420 Auxiliary Output File
- 1-Load Switch Model 200
- 1- 4 Position Power Strip
- 1- Lower Input Field Termination Panel
- 1- Detector Test Switch Panel

Note: Include above components in cabinet at time of delivery.

Other auxiliary cabinet components such as controllers, monitors, load switches, etc. will be ordered as separate items.

2. Finish
 

Use cabinets that have a bare aluminum finish (see [Subsection 925.2.07.A.1](#) for controller-cabinet minimum fabrication Specifications).
3. Locks
 

Equip the main cabinet door with locks that accept No. 2 Corbin keys. Provide two sets of keys with each cabinet. One set of keys is defined as one – No. 2 key and one - police panel key.
4. Power
 

Equip the cabinet assemblies with a power distribution assembly to generate AC and DC power for the electronic components, except the DC power for the controller units. Provide the Model 332 and 336S cabinets with a DC isolator for stop time/flash sense, located in slot 14 of the input file.
5. Mounting
 

Equip the cabinets for pole or base mounting, as specified in the Plans.

  - a. Base Mount
 

Supply Model 336S cabinets, when specified as base mount, with a “M” base-mounting adapter installed.
  - b. Pole Mount
 

Supply Model 336S or 337 cabinets, when specified as pole mount, with two exterior pole mounting brackets that allow for mounting on steel, concrete, and timber poles.

Ensure that the bracket mounting holes are properly reinforced with metal plates of adequate size and strength, welded longitudinally across the inside depth of the cabinet.

Ensure that the exterior-mounting bracket is shipped installed on the cabinet housing. Additionally, provide an aluminum plate, which covers the bottom cabinet opening.
6. Unused Phase Monitoring
 

Provide odd-phase reds with ballast resistor dummy loads. Do not wire the cabinet to monitor pedestrian yellow indications.

Neatly lace and bundle the wiring from the signal monitor for pedestrian yellow monitoring on the back panel.
7. Red Monitoring
 

Provide a connector and terminal assembly designated as P20 for monitoring the absence of red as an integral part of the output file. Terminate the connector and ensure compatible with the cable and C connector of a Type 2010 conflict monitor unit capable of monitoring the absence of red.

Provide the pin assignments of the P20 connector and terminal assemble with the cabinet Plans.

Ensure that the P20 connector is physically alike to the cable and connector of a Type 2010 conflict monitor unit to prevent the absence of red cable connector from being inserted into the P20 connector 180 degrees out of alignment.

Submit details for programming of the unused red channels for approval.
8. Cabinet Light
 

Include in each cabinet one fluorescent strip lighting fixture mounted inside the top front portion of the cabinet. Do not use screw in type fluorescent lamp.

The fixture includes a cool white lamp, covered, and operated by a normal power factor, UL listed ballast.

Install a door-actuated switch to turn on the cabinet light when either door is opened.
9. Cabinet Interlock
 

Do not install the interlock circuit, as detailed in the CALTRANS Specifications.

## 10. Cabinet Drawer

Equip each Model 334, 332A, and 336S cabinet with an aluminum storage compartment mounted in the rack assembly with the approximate following dimensions: 16 inches (400 mm) wide, 14 inches (350 mm) long, and 1.75 inches (44 mm) deep.

Mount this compartment directly under the Type 2070 controller. Provide a drawer with telescoping drawer guides to allow full extension from the rack assembly.

When extended, the storage compartment opens to provide storage space for cabinet documentation and other miscellaneous items.

Ensure that the storage compartment be of adequate construction to support a weight of 25 pounds (12 kg) when extended.

Provide a top for the storage compartment that has a non-slip plastic laminate attached, which covers a minimum of 90% of the surface area of the top.

## 11. Auxiliary Equipment Shelf

Provide a “shelf” in each cabinet that provides a location to mount Fiber modem, dialup modem and/or Field hardened switch. Provide shelf in location that allows easy access to AC power outlets and communications links (telephone, interconnect). Locate shelf so as not block access to other equipment or modules including Battery Backup System.

## 12. Power Strip

Equip each cabinet with a metal power strip (minimum of 4 outlets) to support AC power for external communications devices in cabinet. Provide metal strip that is mounted vertically on the rear rail. Ensure that the power strip may be used by block power supplies such that the block power supply does not block other outlets. Attach power strip to a permanent location that is easily accessible to devices in the rear of the cabinet. Provide hard wire connection to the Cabinet AC power. Do not use plug in power strips.

## 13. Surge Protection

Equip each cabinet with devices to protect the control equipment from surges and over voltages.

Design the surge protector panels to allow for adequate space for a wire connection and surge protector replacement without the removal of terminal blocks or panels. Provide surge protectors for the input sections as detailed below and as shown in the Input Terminal and Surge Arrestor Detail.

Supply surge protectors that meet the following Specifications.

### a. AC Service Input

- Include a surge protection unit for each cabinet on the AC service input that meets or exceeds the following requirements: Provide a hybrid type power line surge protection device on the cabinet service panel..

Install the protector between the applied line voltage and earth ground. Use a surge protector capable of reducing the effect of lightning transient voltages applied to the AC line that conforms to the following:

Peak surge current for an 8 x 20  $\mu$ s waveform: 20,000A for 20 occurrences

Clamp voltage @ 20,000A: 280V max

Maximum continuous operating current: @ 120V / 60 Hz 10A

Series Inductance: AC Line/AC Neutral - 200 micro henries

Response time: Voltage never exceeds 280V during surge

Spike suppression for +/- 700 V spike: +/- 40 V deviation from sine wave at all phases angles between 0 and 180 degrees.

- Provide a protector that is modular and uses a 12 pin Beau connector with the following terminals:
  - Main Line (AC line first stage terminal)
  - Main Neutral (AC neutral input terminal)
  - Equipment Line In (AC line second stage input terminal, 10A)
  - Equipment Line Out (AC line second stage output terminal, 10A)
  - Equipment neutral out (neutral terminal to protected equipment)
  - GND (Earth connection)
- Supply a protector that is epoxy encapsulated in a flame-retardant material.



- Configure the Equipment Line Out to provide power to the Type 2070 and to the 24 V power supply.
- b. AC+ Interconnect Cable Inputs
- Use a surge protection device to protect each AC interconnect line as it enters the cabinet with a surge protection device that meets or exceeds the following requirements:
- 3-electrode gas tube type of surge arrestor
  - Striking voltage of 300-500 V DC with a minimum holder over voltage of 155V DC
  - A three terminal device, one of which is connected to ground, the other two are connected across each input respectively
  - The units must meet the following minimum requirements:
 

Impulse breakdown:	Less than 100V in less than 1.1 $\mu$ s at 10 kV/ $\mu$ s
Impulse breakdown balance:	0.01 microsecond (or less) difference at 10 kV/ $\mu$ s impulse
Energy application:	Withstands 20A AC for one (1) second applied ten (10) times at three (3) minute intervals on either section
Current rating:	10,000A (8 x 20 $\mu$ s impulse)
Capacitance:	6 pF, line to ground
- c. Inductive Loop Detector Inputs
- Provide surge arrestors in the cabinet as shown in Table 925-5, Table 925-7 or Table 925-9 for the applicable cabinet. Protect each inductive loop detector channel input by an external surge protection device that meets or exceeds the following requirements:
- A three-terminal device, two (2) of which are connected across the signal inputs of the detector with the third connected to the chassis ground to protect against common mode damage.
  - Instantly clamps differential mode surges (induced voltage across the loop detector input terminals) via a semiconductor array. The array appears as a low capacitance to the detector.
  - Clamps common mode surges (induced voltage between the loop leads and ground) via solid state clamping devices.
  - Withstand 25-100A surge current occurrences of a 10 x 700  $\mu$ s waveform.
  - Have the following clamp characteristics:
    - Maximum break over voltage: 170 V
    - Maximum on-stage clamping voltage: 3V
    - Response Time: <5 ns
    - Off-stage leakage current: <10  $\mu$ A
    - Capacitance: less than 220 pf
  - Ensure that the unit also meets the following minimum requirements:
    - Peak surge current: 6 times
    - Differential mode: 400 A (8 x 20 ms)
    - Common mode: 1,000 A (8 x 20 ms)
    - Estimated occurrences: 500 @ 200 A
    - Response time: 40 ns
    - Input capacitance: 35 pF typical
    - Temperature: -40° F to +185° F (-40° C to 85° C)
    - Mounting: No. 10-32 x 3/8-inch (No. 5 x 10 mm) bolt
    - Clamp voltage
      - @400 A diff. Mode: 30 V max.
      - @1,000 A comm. Mode: 30 V max.
- d. Signal Load Switches (Switchpacks)

Provide the output of all switchpacks in all output files and output/PDAs with metal oxide varistors (MOV) tied from the AC positive field terminal to the chassis ground to protect switchpacks from surges on the AC output lines

Ensure that these MOVs meet or exceed these requirements:

- Steady state sinusoidal voltage (RMS) rating at 50 to 60 Hz of at least 150 V at 77 °F (25 °C)
- Steady state applied DC voltage rating of at least 200 V at 77 °F (25 °C)
- Transient energy rating is of at least 80 J for a single impulse of 10/1,000  $\mu$ s current waveform at 77 °F (25 °C)
- Peak current rating of 6,500 A for a single impulse of 8/20  $\mu$ s waveform with the rated continuous voltage applied
- Varistor voltage of at least 212 V at 1.0mA of DC current applied for the duration of 20  $\mu$ s to 5s
- Clamping voltage of at least 395 V with an applied 8/20  $\mu$ s impulse of 100 A
- Typical capacitance at a frequency of 0.1 to 1.0 MHz of 1600 pF
- Two-terminal device, one of which is connected to the AC output of the signal load switch on the output file terminals (backside of the field terminals) with the other connected to AC neutral

e. Communication Inputs

Protect low voltage communications input as it enters the cabinet with a solid-state surge protection unit that meets or exceeds these requirements:

- Dual pair (4-wire) module with a printed circuit board connector, double sided and gold plated for reliability
- Ability to mate with and be installed in a 10-circuit Buchanan connector Part Number PCB1B10S or Tyco Part Number 2-1437410-3 or equivalent
- Usable as two independent signal pairs
- The data circuits pass through the protection in a serial fashion
- C2 connector of the 2070 controller that terminates on the line side of the unit
- Communication field wires for this local side that terminate on the line side of the unit
- Ground terminals connected to power ground
- Ensure that the unit meets the following minimum requirements:

Peak surge current:	10 kA (8 x 20 $\mu$ s wave shape) 500A (10 x 700 $\mu$ s wave shape)
Occurrences @ peak:	50 typical
Response time:	<1ns
Voltage Clamp:	8V line to line
Series Resistance:	24 $\Omega$ total
Temperature	-40 °F (-40 °C) to +185 °F (85 °F)
Primary protector:	3 element gas tube 5kA, (8 x 20 $\mu$ s wave shape), per side
Secondary protector:	Silicon avalanche, 1.5 kW minimum

f. Low Voltage DC Inputs

Provide an external surge protection device for each low voltage DC input channel which meets the same requirements as the communication inputs with the following exception of the Voltage clamp, which shall be 30 V line-to-line.

14. Type 2010 Signal Monitors:

a. Introduction

This Specification sets forth the minimum requirements for a rack-mountable, sixteen channel, solid-state 2010 Signal Monitor for a Type 170E Traffic Cabinet Assembly. Ensure that as a minimum, the Signal Monitor complies with all Specifications outlined in Chapter 3 Section 6 of the *California TEES*, August 2002. Where differences occur, this Specification governs. Ensure that the manufacturer of the unit is listed on the current California Department of Transportation (CALTRANS) Qualified Products List (QPL) for signal monitors.

Provide a Signal Monitor that is capable of monitoring sixteen channels consisting of a Green input, a Yellow input, and a Red input for each channel. Ensure that the unit also includes the enhanced monitoring functions described in [Subsection 925.2.04.A.15.b](#), diagnostic display functions described in [Subsection 925.2.04.A.15.c](#), event logging functions described in [Subsection 925.2.04.A.15.d](#), communications functions described in [Subsection 925.2.04.A.15.e](#), and hardware functions described in [Subsection 925.2.04.A.15.f](#).

b. Monitor Functions

Except for Conflict faults, compute all fault timing for each channel individually.

1). Conflict Monitoring

Ensure that the Signal Monitor is able to detect the presence of conflicting green or yellow signal voltages on the AC field terminals between two or more non-compatible channels. A Conflict fault (CONFLICT) shall be a latching fault.

2). Conflict Recognition Time

Ensure the Signal Monitor shall trigger when voltages on any conflicting channels are present for more than 500 ms. Ensure that the Signal Monitor does not trigger when voltages on any conflicting channels are present for less than 200 ms. Conflicting signals sensed for more than 200 ms and less than 500 ms may or may not trigger the unit.

3). 24VDC Monitoring VDC

Ensure that the Signal Monitor is able to detect that the cabinet +24 Vdc supply has fallen below 18 Vdc. A 24VDC failure (VDC FAIL) shall be a latching fault.

4). 24VDC Recognition Time

Ensure that the Signal Monitor shall trigger when the voltage on the +24V input is below 18 Vdc for more than 500 ms. Ensure that the Signal Monitor does not trigger when the voltage on the +24V input is below 18 Vdc for less than 200 ms. A voltage level of +22 Vdc will be required to prevent the unit from triggering.

5). Controller Watchdog Monitoring

Ensure that the Signal Monitor triggers when the Watchdog input does not toggle within the programmed time period (WDT ERROR). Ensure that the unit remains latched in the fault state until reset by the Reset button, an External Reset input command, or AC Line voltage restoring from an AC Line Brownout event (see 2.4). Ensure that a reset resulting from an AC Line Brownout event does not clear the WDT ERROR LED.

a). Controller Watchdog Latch Option

Ensure a programming option sets the Watchdog monitoring function to a latching mode and that only a reset from the Reset button or External Reset input can clear a Watchdog fault. An AC Line brownout condition will not reset the fault.

b). Controller Watchdog Recognition Time

Ensure a programming option sets the maximum Watchdog recognition time to: 1000 + or - 100 ms; or 1500 + or - 100 ms.

c). Controller Watchdog Enable Switch

Provide an internal switch to disable the Watchdog monitoring function. Mount the switch on the PCB and be clearly label "WD ENABLE - ON...OFF". Ensure that placement of the switch in the OFF position causes monitoring of the Watchdog to be inhibited.

d). WDT ERROR LED Control

Ensure that the WDT ERROR LED illuminates when the unit has been triggered by a Watchdog fault. Ensure that it can only be cleared by a reset command from the front panel Reset switch or External Reset input. If the Watchdog monitoring function is inhibited due to the Watchdog Enable switch, the WDT ERROR LED shall flash at a 0.5 Hz rate.

6). AC Line Monitoring

a). AC Line Brownout Recognition

Ensure that the Signal Monitor is able to detect that the AC Line has fallen below 98 + or - 2 Vac for greater than 400 + or - 50 ms. This shall force the output Relay to the de-energized "fault" state, enable the Stop-Time output, and cause the AC POWER LED to flash at a 2 Hz rate. Ensure that the unit maintains this state until the AC Line voltage rises above 103 + or - 2 Vac for greater than 400 + or - 50 ms. Provide a jumper option which will change the AC Brownout dropout level to 92 + or - 2 Vac and the restore level to 98 + or - 2 Vac.

- b). AC Line Power-up and Brownout Delay Time

When the AC Line is greater than 103 + or - 2 volts after power-up or Brownout restore, ensure that the Signal Monitor holds the Output Relay in the de-energized "fault" state and enable the Stop-Time output, for a period of not less than 6.0 + or - 0.5 seconds and not greater than 10.0 + or - 0.5 seconds. Ensure that this flash interval is terminated after at least 6.0 + or - 0.5 seconds if the Signal Monitor has detected at least five transitions of the Watchdog input. If the Signal Monitor does not detect five transitions of the Watchdog input before 10.0 + or - 0.5 seconds, ensure that the Signal Monitor goes to the fault state. During this interval, ensure that the AC POWER LED flashes at a 4 Hz rate.
- 7). Red Fail Monitoring

Ensure that the Signal Monitor is able to detect the absence of an active voltage on the green and yellow and red field signal inputs of a channel. Red Fail fault (RED FAIL) shall be a latching fault. Ensure that the Red Fail monitoring function is enabled for all channels except when the Red Enable input is not active, or pin #EE is active, or Special Function #1 input is active, or Special Function #2 input is active.

  - a). Red Fail Recognition Time

Ensure the Signal Monitor triggers when an active voltage on one of the three inputs of a channel are absent for more than 1500 ms. Ensure that the Signal Monitor does not trigger when an active voltage on one of the three inputs of a channel are absent for less than 1200 ms. Channels without proper voltages sensed for more than 1200 ms and less than 1500 ms may or may not trigger the unit. Provide an option switch (RF 2010) which will change the fault recognition time to between 700 ms and 1000 ms.
  - b). Red Interface Cable Fault

Ensure a programming option is provided such that operating without the Red Interface cable installed shall cause the Signal Monitor to enter the fault mode causing the Output relay contacts to close and enabling the Stop-Time output to the controller. To indicate this fault mode, ensure that the Red Fail indicator is illuminated with all fault channel indicators Off.

Ensure that any Red Fail preemption control to the monitor uses the Special Function inputs #1 or #2.
- 8). Dual Indication Monitoring

Ensure that the Signal Monitor is able to detect the presence of active voltage on the green and yellow, green and red, or yellow and red field signal inputs of a channel. GYR Dual Indication fault (DUAL IND) shall be a latching fault. Ensure this function is enabled on a per channel basis using dip switches mounted on the PCB labeled "CH1" through "CH16". Ensure that the GYR Dual Indication monitoring function is enabled for all selected channels except when the Red Enable input is not active or pin #EE is active.

  - a). GY Dual Indication Monitoring

Ensure that the Signal Monitor is able to detect the presence of active voltage on the green and yellow field signal inputs of a channel. GY Dual Indication fault (DUAL IND) shall be a latching fault. Enable this function with a dip switch on the PCB labeled "GY ENABLE". When the switch is in the ON position, monitor all channels for simultaneous active green and yellow inputs on a channel. When selected by the GY ENABLE switch, ensure that the GY Dual Indication monitoring function is disabled when pin #EE is active.
  - b). Dual Indication Recognition Time

Ensure that the Signal Monitor triggers when multiple inputs are active on a channel for more than 500 ms. Ensure that the Signal Monitor does not trigger when multiple inputs are active on a channel for less than 250 ms. Channels with multiple voltages active for more than 250 ms and less than 500 ms may or may not trigger the unit.
- 9). Sequence (Short or Absent Yellow) Monitoring

Ensure that the Signal Monitor is able to detect that a channel has not provided an adequate Yellow Clearance interval during a green to yellow to red sequence. A Sequence failure (SEQUENCE) shall be a latching fault. Ensure that this function is enabled on a per channel basis using dip switches mounted on the PCB labeled "CH1" through "CH16". Ensure that the Sequence monitoring function is enabled for all selected channels except when the Red Enable input is not active or pin #EE is active.

10). Sequence Recognition Time

The minimum Yellow Clearance interval may be modified by switches mounted on the PCB labeled "YEL TIME 1", "YEL TIME 2", and "YEL TIME 3". Ensure that the Yellow Clearance interval is 2.7 seconds plus 0.2 seconds times the binary sum of the three switches. The minimum Yellow Clearance interval shall therefore have a range of 2.7 seconds to 4.1 seconds, 0.1 seconds.

11). Flickering Indication Detection

Ensure that the Signal Monitor provides a method of detecting Conflict, Red Fail, and Dual Indication faults that result from intermittent or flickering field signal inputs that may not meet the duration requirements but continue to flicker for an extended period of time. These flickering indications shall result in a latching fault with an indication illuminated along with the resulting Conflict, Red Fail, or Dual Indication indicator. Provide an option switch to disable this option.

12). Configuration Change Monitoring

On power-up, reset, and periodically during operation, ensure that the Signal Monitor compares the current configuration settings with the previously stored value and if the settings have changed, the Signal Monitor automatically logs the new setting. Ensure that these settings include the permissive diode matrix, all switches, all jumpers, and the Watchdog Enable switch.

Provide a programming option such that any change in the configuration parameters will cause the Signal Monitor to enter the fault mode causing the Output relay contacts to close and enabling the Stop-Time output to the controller. To indicate this fault mode ensure that the PCA indicator will flash at a 4 Hz rate. Depressing the Reset button for 5 full seconds is required to clear this fault and log the new configuration parameters.

If the programming option is not selected, ensure that the unit does not set the fault mode but will still log the configuration change.

13). Program Card Ajar

Ensure that when the Programming Card is removed or not seated properly, the Signal Monitor forces the Output Relay to the de-energized "fault" state, enable the Stop-Time output, and illuminate the PCA LED. A reset command from the front panel Reset switch or External Reset input is required once the Program Card is in place.

14). Exit Flash

When the Signal Monitor exits the flash state (Output relay de-energized) as a result of a Reset command or AC Line brownout restore, ensure that the Stop Time output goes to the inactive state  $250 + OR - 50$  ms before the Output relay transfers to the energized state. This transition will provide an early indication to the Controller Unit that the cabinet will transfer from flash to signal operation.

c. Display Functions

Ensure that it is possible to view the active channels for each individual color (GYR) during operation and when latched in a fault state. When the Signal Monitor is latched in a fault state ensure that it is also possible to view the active channels for each individual color and fault status for each channel for the current fault and the two previous faults.

1). Previous Fault GYR Display

When the Signal Monitor has been triggered by a fault the channel status display will alternate between the channels which were involved in the fault (fault status) for 2 seconds, and the field signals active at the time of the fault for 6 seconds. The channels involved in the fault will flash their respective Green, Yellow, and Red indicators simultaneously at a 4 Hz rate for the 2 second interval.

The two previous faults may also be displayed individually. This status is not reset by an AC Line power interruption. To enter this display mode remove the Program Card. The sequence is as follows:

Reset	Event	PCA LED	Fault Status LEDs	Channel Status LEDs
---	#1	Single flash	Current Fault Status (newest)	Current Field status
#1	#2	Double flash	Event #2 Fault Status	Event #2 Field status
#2	#3	Triple flash	Event #3 Fault Status (oldest)	Event #3 Field status
(repeats back to top)				

d. Event Logging Functions

Ensure that the Signal Monitor is capable of storing in non-volatile memory a minimum of 100 events. Mark each event with the time and date of the event. These events consist of fault events, AC Line events, reset

events, and configuration change events. Provide a graphical means of displaying the signal states of all field inputs for 30 seconds prior to a fault trigger event. Provide the capability to assign a four-digit identification number to the unit shall be provided. Upload the event logs to a PC using the serial port of the Signal Monitor and software provided by the manufacturer.

Ensure each event log report contains the following information:

- Monitor ID#: a four digit (0000-9999) ID number assigned to the monitor.
- Time and Date: time and date of occurrence.
- Event Number: identifies the record number in the log. Event #1 is the most recent event.

1). Monitor Status Report (CS)

Ensure the Current Status report contains the following information:

- a). Fault Type: the fault type description.
- b). Field Status: the current GYR field status and field RMS voltages if the monitor is not in the fault state, or the latched field status and field RMS voltages and fault channel status at the time of the fault.
- c). Cabinet Temperature: the current temperature if the monitor is not in the fault state, or the latched temperature at the time of the fault.
- d). AC Line Voltage: the current AC Line voltage if the monitor is not in the fault state, or the AC Line voltage at the time of the fault.
- e). Control Input Status: the current state and RMS voltages of the Red Enable input, EE input, and Special Function #1 and #2 inputs if the monitor is not in the fault state, or the status latched at the time of the fault.

2). Previous Fault Log (PF)

Ensure the Previous Fault log contains the following information:

- a). Fault Type: the fault type description.
- b). Field Status: the latched field status with RMS voltages, and fault channel status at the time of the fault.
- c). Cabinet Temperature: the latched temperature at the time of the fault.
- d). AC Line Voltage: the AC Line voltage at the time of the fault.
- e). Control Input Status: the latched state of the Red Enable input, EE input, and Special Function #1 and #2 inputs at the time of the fault.

3). AC Line Event Log (AC)

The AC Line log shall contain the following information:

- a). Event Type: describes the type of AC Line event that occurred.
  - Power-up—AC on, monitor performed a cold start
  - Interrupt—AC Line < Brownout level
  - Restore—AC restored from brown-out or interruption (AC Off), no cold start
- b). AC Line Voltage: the AC Line voltage at the time of the event.

4). Monitor Reset Log (MR)

Ensure the Monitor Reset log contains the following information:

- a). The monitor was reset from a fault by the front panel Reset button or External Reset input.

5). Configuration Change Log (CF)

Ensure the Configuration Change log contains the following information:

- a). Program Card Matrix: the permissive programming for each channel.
- b). Yellow Disable Jumpers: the Yellow Disable programming for each channel.
- c). Dual/Sequence Switches: the switch programming for each channel.
- d). Option Switches: RF 2010, RP Disable, GY Enable, SF1 Polarity, Sequence Timing, Minimum Flash Enable, Configuration Fault Enable, Red Cable Fault enable, AC Brownout timing.
- e). Watchdog Programming: Watchdog Enable, Watchdog Latch, and Watchdog timing.
- f). Configuration CRC: A unique CRC value which is based on the configuration of items #a through #e above.

Indicate on the log, which items have been changed since the last log entry.

- 6). Signal Sequence Log  
Provide a log that graphically displays all field signal states for up to 30 seconds prior to the current fault trigger event. Ensure that the resolution of the display is at least 50 milliseconds.
- e. Communications Functions
  - 1). Controller Unit Communications  
Ensure that the Signal Monitor is compatible with the protocol of the current GDOT licensed firmware for 2070 controllers and Central System Control. Ensure the 2010 Conflict Monitor supplied is able to communicate via a serial link to the 2010 Controller and then to a Central System using the current licensed GDOT Central System Software for reporting, configuring and logging.
  - 2). Personal Computer Communications  
Have the manufacturer provide software to access the Signal Monitor status and event logs described in [Subsection 925.2.04.A.15.d](#). Ensure this software operates with Microsoft Windows 2000™ or Windows XP™
- f. Hardware
  - 1). Red Monitoring
    - a). Red Field Inputs  
Ensure that the Signal Monitor is capable of monitoring sixteen Red field signals. Ensure that a Red input is sensed active when the input voltage exceeds 70 Vrms. Ensure that a Red input is sensed not active when the input voltage is less than 50 Vrms. A Red input may or may not be sensed active when the input voltage is between 50 Vrms and 70 Vrms.
    - b). Red Enable Input  
Ensure that the Red Enable input provides an AC input to the unit which enables Red Monitoring, Dual Indication Monitoring, and Sequence monitoring when the input is sensed active.  
Ensure that the Red Enable input is sensed active when the input voltage exceeds 70 Vrms. Ensure that the Red Enable input is sensed not active when the input voltage is less than 50 Vrms. The Red Enable input may or may not be sensed active when the input voltage is between 50 Vrms and 70 Vrms.
    - c). Special Function Preemption Inputs  
Ensure that the Special Function Preemption inputs #1 and #2 provide an AC input to the unit which disables only Red Fail Monitoring (Lack of Output) when either input is sensed active.  
Ensure that a Special Function input is sensed active when the input voltage exceeds 70 Vrms. Ensure that a Special Function input is sensed not active when the input voltage is less than 50 Vrms. A Special Function input may or may not be sensed active when the input voltage is between 50 Vrms and 70 Vrms.  
Use a PCB mounted switch to provide the option to invert the active status of the Special Function #1 input. When the switch is in the ON position, ensure that the Special Function #1 input is sensed not active when the input voltage exceeds 70 Vrms. Ensure that the Special Function #1 input is sensed active when the input voltage is less than 50 Vrms. The Special Function #1 input may or may not be sensed active when the input voltage is between 50 Vrms and 70 Vrms.
    - d). Red Interface Connector  
This connector provides the required inputs for the unit to monitor the Red field signal outputs. Ensure the connector is a 20 pin connector that mates with the P20 Cable from the output file. Provide a high quality connector that is polarized to insure proper mating with the cable. Ensure Ejector latches are included to facilitate removal and prevent the cable from inadvertently disconnecting. Ensure the unit shall function as a standard 210 Signal Monitor when the cable is disconnected. Use the pin assignments shown in Table 925-1.

<b>Table 925 -1 Red Interface Connector</b>			
<b>Pin</b>	<b>Function</b>	<b>Pin</b>	<b>Function</b>
1	Channel 15 Red	11	Channel 9 Red
2	Channel 16 Red	12	Channel 8 Red
3	Channel14 Red	13	Channel 7 Red
4	Chassis Ground*	14	Channel 6 Red
5	Channel 13 Red	15	Channel 5 Red
6	Special Function #2	16	Channel 4 Red
7	Channel 12 Red	17	Channel 3 Red
8	Special Function #1	18	Channel 2 Red
9	Channel 10 Red	19	Channel 1 Red
10	Channel 11 Red	20	Red Enable
*A jumper option shall be provided to allow the connection of Pin #4 to be made with Chassis Ground.			

2). Front Panel

Ensure the front panel is constructed of sheet aluminum with a minimum thickness of 0.090 in. (2.286 mm), and finished with an anodized coating. Ensure the model information shall be permanently displayed on the front surface.

a). Indicators

Ensure that all display indicators are mounted on the front panel of the Signal Monitor and are water clear, T-1 package, Super Bright type LEDs. Ensure that all fault LEDs are red except the AC POWER indicator which is green. Provide a separate Red, Yellow, and Green indicator for each channel. Label the indicators and provide the information as follows:

i. *AC POWER*

Ensure the AC Power indicator flashes at a rate of 2 Hz when the unit has detected a low voltage condition as described in [Subsection 925.2.04.A.15.b.10.a](#). Ensure the AC POWER indicator flashes at a rate of 4 Hz during the minimum flash interval as described in [Subsection 925.2.04.A.15.b.10.b](#). Ensure that the indicator illuminates when the AC Line voltage level is restored above the brownout level. Ensure the indicator extinguishes when the AC Line voltage is less than 80 Vac.

ii. *VDC FAILED*

Ensure the VDC FAILED indicator illuminates when a 24VDC fault condition is detected. This indicator remains extinguished if the monitor has not been triggered by a 24VDC fault.

iii. *WDT ERROR*

Ensure the WDT ERROR indicator illuminates when a controller Watchdog fault is detected. Ensure the WDT Error indicator flashes ON once every 2 seconds if the WD Enable switch on the monitor is placed in the OFF position to disable Watchdog monitoring, or the AC Line voltage is below the Watchdog disable level.

iv. *CONFLICT*

Ensure that the CONFLICT indicator illuminates when a conflicting signal fault is detected.

v. *DIAGNOSTIC*

Ensure the DIAGNOSTIC indicator illuminates when one of the following faults is detected: Internal Watchdog fault, Memory Test fault, or Internal power supply fault. This indicator is intended to inform the service technician of a monitor hardware or firmware failure.

vi. *RED FAIL*

Ensure the RED FAIL indicator illuminates when an absence of signal is detected on a channel(s). Ensure the RED FAIL indicator flashes ON once every two seconds if the RED ENABLE input is not active, or a Special Function input is active, or the EE input is active



- vii. *DUAL IND.*  
Ensure the Dual IND. indicator illuminates when a GY-Dual or GYR-Dual Indication fault is detected on a channel(s).
  - viii. *SEQUENCE*  
Ensure the Sequence indicator illuminates when the minimum Yellow Clearance time has not been met on a channel(s).
  - ix. *PCA*  
Ensure the PCA indicator illuminates if the Program Card is absent or not properly seated. If the unit is in the Diagnostic Display mode, ensure the PCA indicator flashes ON (once, twice, or three times) to indicate the fault event number being displayed. See [Subsection 925.2.04.A.15.c.](#)
  - x. *RP DETECT*  
Ensure the RP DETECT indicator illuminates when the unit has detected a Conflict, Red Fail, or Dual Indication fault as a result of recurring pulse field inputs.
  - xi. *CHANNEL STATUS*  
Ensure that during normal operation the 48 Channel Status indicators display all active signals (Red, Green, and Yellow).  
  
In the fault mode, ensure that the Channel Status indicators display all signals active at the time of the fault for six seconds and then indicate the channels involved in the fault for 2 seconds.
- b). Front Panel Control-Reset Button
- i. *Provide a momentary SPST Control switch labeled RESET on the unit front panel to reset the monitor circuitry to a non-failed state. Position the switch on the front panel such that the switch can be operated while gripping the front panel handle. Ensure that a reset command issued from either the front panel button or External Reset input is a one-time reset input to prevent the unit from constant reset due to a switch failure or constant external input, and causes all LED indicators to illuminate for 300 ms.*
  - ii. *The Reset button also provides control of the Diagnostic Display mode. For a complete description of Diagnostic Display operation, see [Subsection 925.2.04.A.15.c.](#)*
- c). Serial Communications Connector  
Use this connector to provide EIA-232 serial communications. Ensure that it is a high quality 9 pin metal shell D subminiature type with female contacts. Refer to Table 925-2 for Pin assignments.

<b>Table 925-2 Serial Communications Connector</b>	
<b>Pin</b>	<b>Function</b>
1	DCD*
2	TX DATA
3	RX DATA
4	DTR (Data Terminal Ready)
5	SIGNAL GROUND
6	DSR
7	DSR*
8	CTS*
9	NC
* Provide Jumper options to allow the connection of Pin #4 to be made with Pin #7, and the connection of Pin #8 to be made with Pin #1.	

- 3). Electronics
- a). RMS Voltage Sampling  
Use high speed sampling techniques to determine the true RMS value of the AC field inputs. Sample each AC input at least 32 times per cycle. Ensure that the RMS voltage measurement is insensitive to phase, frequency, and waveform distortion.
  - b). Internal MPU Watchdog  
Use a microprocessor for all timing and control functions. Verify continuing operation of the microprocessor by an independent monitor circuit, that forces the Output Relay to the de-energized "fault" state, enable the Stop-Time output, and illuminate the DIAGNOSTIC indicator if a pulse is not received from the microprocessor within 300 ms.  
If the microprocessor should resume operation, ensure the Signal Monitor continues to operate. Ensure that this monitoring circuit is also configurable to latch in the fault state. Ensure the unit requires a power-up cycle to reset the circuit once it is triggered.
  - c). Sockets  
In the interest of reliability, ensure that only the PROM memory device for the microprocessor firmware is socket mounted. Ensure that the PROM memory socket is a precision screw machine type socket with a gold contact finish providing a reliable gas tight seal. Low insertion force sockets or sockets with "wiper" type contacts are not acceptable.
  - d). Internal Power Supply  
Use a built-in, high-efficiency switching power supply to generate all required internal voltages. Ensure that all supply voltages regulated. Failure of the internal power supply to provide proper operating voltages shall force the output Relay to the de-energized "fault" state, enable the Stop-Time output, and illuminate the DIAGNOSTIC indicator. Provide a user replaceable slow blow fuse for the AC Line input. Ensure the unit is operational over the AC Line voltage range of 75 Vac to 135 Vac.
  - e). EIA-232 Interface  
Ensure the EIA-232 port interface electronics is electrically isolated from all monitor electronics except chassis ground.
  - f). Configuration Parameters  
Select user-programmed configuration settings using PCB mounted switches or jumpers. Designs requiring a Personal Computer (PC) to program or verify the configuration parameters are not acceptable. Ensure that user-programmed configuration settings that are transferred to memory are stored in a programmable read-only memory (PROM or EEPROM). Designs using a battery to maintain configuration data are not acceptable.
  - g). Field Terminal Inputs  
Ensure that all 120 Vac field terminal inputs provide an input impedance of 150K 50K ohms and be terminated with a discrete resistor having a power dissipation rating of 0.5 Watts or greater and a voltage rating exceeding 350 volts.
  - h). Component Specifications  
Ensure that all electrical components used in the Signal Monitor are rated by the component manufacturer to operate beyond the full unit operating temperature range of -29 °F to 165 °F(-34 °C to +74 °C).
  - i). Printed Circuit Boards  
Ensure that all printed circuit boards meet the requirements of the *California Traffic Signal Control Equipment Specifications*, January 1989, plus the following requirements to enhance reliability:
    - i. *All plated-through holes and exposed circuit traces are plated with solder.*
    - ii. *Both sides of the printed circuit board are covered with a solder mask material.*
    - iii. *The circuit reference designation for all components and the polarity of all capacitors and diodes are clearly marked adjacent to the component. Ensure that Pin #1 for all integrated circuit packages is designated on both sides of all printed circuit boards.*
    - iv. *All electrical mating surfaces are gold plated.*
    - v. *All printed circuit board assemblies are coated on both sides with a clear moisture-proof and fungus-proof sealant.*

- vi. *All components and wire harnesses are mounted to the PCB using plated holes. "Piggy back" connections or jumper wires are not acceptable.*

15. Model 208 Monitor Unit

Provide Model 208 Monitor Unit in accordance with CALTRANS TEES and the following. Provide monitor that is on the CALTRANS QPL and provides the pin assignment as shown in Table 925-3.

The Model 208 Monitor Unit shall reliably sense and cause a relay output contact (FAILED STATE) when monitoring the following:

- A Watchdog Timer (WDT) Timeout Condition
  - Cabinet +24 VDC Power Supply below specified threshold
- a. WDT Monitor Requirements
  - b. WDT Circuitry shall be provided to monitor a controller unit output line state routed to the monitor unit at its assigned pin. The WDT Circuitry shall sense any line state change and the time between the last change. No state change for  $1.5 \pm 0.1$  seconds shall cause a FAILED state. The timer shall reset at each state change in a NON FAILED state.
    - 1). Only the Unit Reset or a WDT inactive due to the voltage sense shall reset the WDT from a FAILED state.
    - 2). A FAILED state caused by the WDT shall illuminate a front panel indicator light label "WDT ERROR". The indicator shall remain ON until Unit Reset Issuance.
    - 3). The WDT Circuitry shall sense the incoming VAC Line and when the voltage falls below  $98 \pm 2$ VAC for  $50 \pm 17$  ms shall inhibit the WDT Function. When the WDT Circuitry sensed the incoming VAC Line rise above  $103 \pm 2$ VAC for  $50 \pm 2$ ms the WDT shall become active. A hysteresis between the Voltage Inhibit and the Voltage Active Setting shall be a minimum of 3 Volts.
  - c. Power Supply Monitor Requirements
    - 1). The monitor unit shall sense the Cabinet +24 VDC Power Supply Output Voltage.
    - 2). Voltages sensed at +18 VDC or below for a duration of 500 ms or longer shall cause a FAILED state.
    - 3). Voltages sensed at +22 VDC or above shall NOT cause a FAILED state.
    - 4). Voltages sensed below +22 VDC for a duration of 200 ms or less shall NOT cause a FAILED state.
    - 5). All timing and voltages conditions other than those specified above may or may not cause a FAILED state.
    - 6). A FAILED state caused by sensing the power supply shall illuminate a front panel indicator light labeled "VDC FAILED". The indicator shall remain ON until Unit Reset.
    - 7). Only Unit Reset shall reset the power supply sense circuitry from a FAILED state.
  - d. FAILED State Output Circuits
    - 1). An electro-mechanical relay shall be provided to switch an output circuit during a FAILED state. The relay coil shall be energized in a NON FAILED State.
    - 2). The relay contacts shall be rated for a minimum of 3 amperes at 120 VAC and 100,000 operations. Contact opening /closing time shall be 30 ms or less.
  - e. Monitor Unit Reset
    - 1). A momentary SPST CONTROL switch labeled "RESET" shall be provided on the unit front panel to reset the monitor unit circuitry to a NON FAILED state. The switch shall be so positioned on the front panel that the switch can be operated while gripping the front panel handle.
    - 2). The unit shall be provided with provision to drive an external NE@H light through a 56K Ohm, ½ Watt Series resistor (resident on unit)
    - 3). The PDA Type 3 WDT Reset Input shall not be sensed by the unit
    - 4). The output relay CONTACT FOR FAILED STATE shall be OPEN.

<b>Table 925-3 Pin Assignments For Model 208 Monitor Unit</b>	
<b>PIN</b>	<b>FUNCTION</b>
1/44	DC Ground
2/43	WDT Ext. Reset
5/40	WDT IN
10/35	+24 VDC
15/30	AC-
17/28	Normally Open, Circ. #2
19/26	AC+
20/25	Normally Closed, Circ. #1
21/24	Circ. Common #1 & #2
22/23	WDT Lamp (External)
NOTE: Card connector keyed between pins 2 & 3, and pins 11 & 12.	

16. Model 242 DC Isolator

Provide Model 242 DC Isolators that are in accordance with the latest version of CALTRANS Specifications as referenced earlier in this section. Provide isolators that:

- Allow the 242 isolator input signal polarity to easily be inverted without the use of tools. Acceptable methods are removable jumpers or dip switches. Unacceptable methods are soldering or desoldering a diode or resistor.
- Output is OFF for input voltages greater than 12 volts;
- Output is ON for voltages of less than 8 volts that have a duration of at least 5 to 25 ms (optional 2-7 ms);
- Minimum output pulse width is 100 ms with a valid input (can be disabled);
- Output is optically isolated open collector NPN transistor;
- Capable of sinking 50 ma when on;
- Can register a new input within 25 ms of the old signal going away; and
- Output clamped on power up and down
- Compatible with 2070 controllers and latest version of CALTRANS TEES including errata

17. Model 200 Switchpack

Provide Model 200 Switchpacks that are in accordance with the latest version of CALTRANS Specifications as referenced earlier in this section.

18. Model 204 Flasher Unit

Provide Model 204 Flasher Units that are in accordance with the latest version of CALTRANS Specifications as referenced earlier in this section.

19. Flash Transfer Relay

Provide Flash Transfer Relays that are in accordance with the latest version of CALTRANS Specifications as referenced earlier in this section.

20. Cabinet Model 332A

[Table 925-5 Required Surge Arrestors for Model 332A Cabinet.](#)

Supply Model 332A (lower input panel) cabinets, with housing Type 1B, and all components as described in these Specifications.

Supply cabinets having two input files which conform to the CALTRANS Specifications and configured to accept two 2070 controllers in the top portion of the cabinet. Ensure the cabinet has two shelves provided for controller(s).

Configure the cabinet for dial up communications. Mount a two (2) circuit Buchanan connector on the right side panel (from rear door).

Mount a phone jack with a RJ11 connector above or to the right of the Buchanan terminal block.

Wire the phone jack to the Buchanan and to the Terminal Block (TB0) in accordance with [Figure 925-2](#).

A manual jack shall be installed on the police panel. The jack shall intermate with a three circuit 1/4 inch (6.35 mm) diameter phone plug. The tip and ring (middle) circuits of the jack shall be connected to the logic ground and the interval advance inputs of controller unit. When the manual hand cord is plugged into the jack and the pushbutton is pressed, logic ground shall be connected to the interval advance input of the controller unit.

A Manual ON- OFF Switch shall be provided on the police panel which grounds the Manual Control Enable (C1 Pin 53) input to the controller whenever the switch is in the ON position.

A manual pushbutton with cord shall be provided. The cord shall have a minimum length of 3 feet (0.9 m). It shall have a 1/4 inch (6.35 mm) diameter, three circuit plug connected to one end and a manual pushbutton enclosed in a hand held enclosure at the other end. A complete cycle (push-release) of the manual pushbutton shall terminate the controller unit interval which is active except the vehicular yellow and all red clearance intervals. Cycling the pushbutton during the vehicular yellow or all red clearance intervals shall not terminate the timing of those intervals.

21. Cabinet Model 332A with Auxiliary Output File)

Ensure that this unit meets the requirements of [Subsection 925.2.04.A.20](#) above, except that the cabinet is configured with an Auxiliary Output File. Additionally, the field wiring terminals may be mounted on the rear of the input file.

22. Cabinet Model 336S (Base Mount)

This unit meets the CALTRANS Specification with the addition of approximately 6 additional inches (150 mm) of cabinet height exclusive of the "M" base adapter. Configure the internal component layout so that the additional space is available in the bottom area of the cabinet cage. Ensure that the field wiring input panels and surge protection conform to [Table 925-6 Model 336S Default Input File Assignment Detail](#) and [Table 925-7 Required Surge Arrestors for Model 336S Cabinet](#).

Ensure that the C1 connector harness is provided with pins for all 104 inputs and outputs from the controller.

A manual jack shall be installed on the police panel. The jack shall intermate with a three circuit 1/4 inch (6.35 mm) diameter phone plug. The tip and ring (middle) circuits of the jack shall be connected to the logic ground and the interval advance inputs of controller unit. When the manual hand cord is plugged into the jack and the pushbutton is pressed, logic ground shall be connected to the interval advance input of the controller unit.

A Manual ON- Off Switch shall be provided on the police panel which grounds the Manual Control Enable (C1 Pin 53) input to the controller whenever the switch is in the ON position

A manual pushbutton with cord shall be provided. The cord shall have a minimum length of 3 feet (0.9 m). It shall have a 1/4 inch (6.35 mm) diameter, three circuit plug connected to one end and a manual pushbutton enclosed in a hand held enclosure at the other end. A complete cycle (push-release) of the manual pushbutton shall terminate the controller unit interval which is active except the vehicular yellow and all red clearance intervals. Cycling the pushbutton during the vehicular yellow or all red clearance intervals shall not terminate the timing of those intervals.

23. Cabinet Model 336S (Pole Mount)

Ensure that this unit meets the requirements of [Subsection 925.2.04.A.22](#) above, except that the cabinet is configured for pole mounting as specified in the General Requirements for Type 170 Cabinet Assemblies.

24. Cabinet Model 336S (Base Mount with Auxiliary Output File)

Ensure that this unit meets the requirements of [Subsection 925.2.04.A.22](#) above, except that the cabinet is configured with an Auxiliary Output File. Additionally, the field wiring terminals may be mounted on the rear of the input file.

25. Cabinet Model 337

The Model 337 cabinet is a compact cabinet with an output capacity of four vehicle phases plus two pedestrian phases; the dimensions not to exceed 17 inches (425 mm) deep x 20 inches (500 mm) wide x 35 inches (875 mm) high and its shipping weight not to exceed 175 pounds (80 kg).

Supply the cabinet assembly with capacity for 11, two-channel slots in the input file.

Ensure that the pin assignments of the C1 connector are compatible with the 2070 controller as applicable according to the required number of input/outputs.

Ensure that the 337 cabinet uses standard Type 170 input and output file units.

Equip the cabinet with a C2 connector harness with field terminals protected with surge protectors for communication inputs as specified under communications inputs.

Ensure that the cabinet has two full-size doors to allow complete access from the front or back of the cabinet. Design the rack assembly to mount in CALTRANS standard rails to allow for a Model 204 flasher.

Provide a receptacle to accept the plug in power distribution assembly card guides and edge connectors for the input file card guides to support the conflict monitor, and load switches and flash transfer relays.

Due to the compact design of this cabinet assembly, the Department of Transportation may accept a non-standard type of power distribution assembly (PDA).

26. Cabinet Model 334 with Auxiliary Output File for Ramp Metering Operations

The Controller Cabinet shall comply with the CALTRANS Traffic Signal Equipment Specifications (1989), Model 334 Cabinet Specifications (Chapter 6). **DO NOT** use the February 1993 Amendments for Specifications for the Model 334C Cabinet. Do use the Specification Clarifications dated December 20, 1993.

Provide Cabinet configured as shown in Figure 925-1.

Provide Detector Test Switch Panel. Before providing cabinet submit Detector Switch Test panel design and mounting location for approval. Panel shall include one switch for each of the 13 detector inputs.

- a. The Detector Test Switch Panel shall be mounted in the cabinet on the rails. The panel shall be fabricated from brushed aluminum.
- b. Each switch will be labelled as to function. The label shall be silkcreened on the test panel and be at least ¼ inch in height.
- c. A three position switch shall be provided for each detector input. The switch shall function as follows:
  - Down (Momentary) - Call is placed into the controller on the appropriate input in parallel with field input
  - Up (Lock) – Call is placed into the controller on the appropriate input in parallel with field input.
  - Center (Lock)– Normal Operation field output of detector is connected to the controller unit.

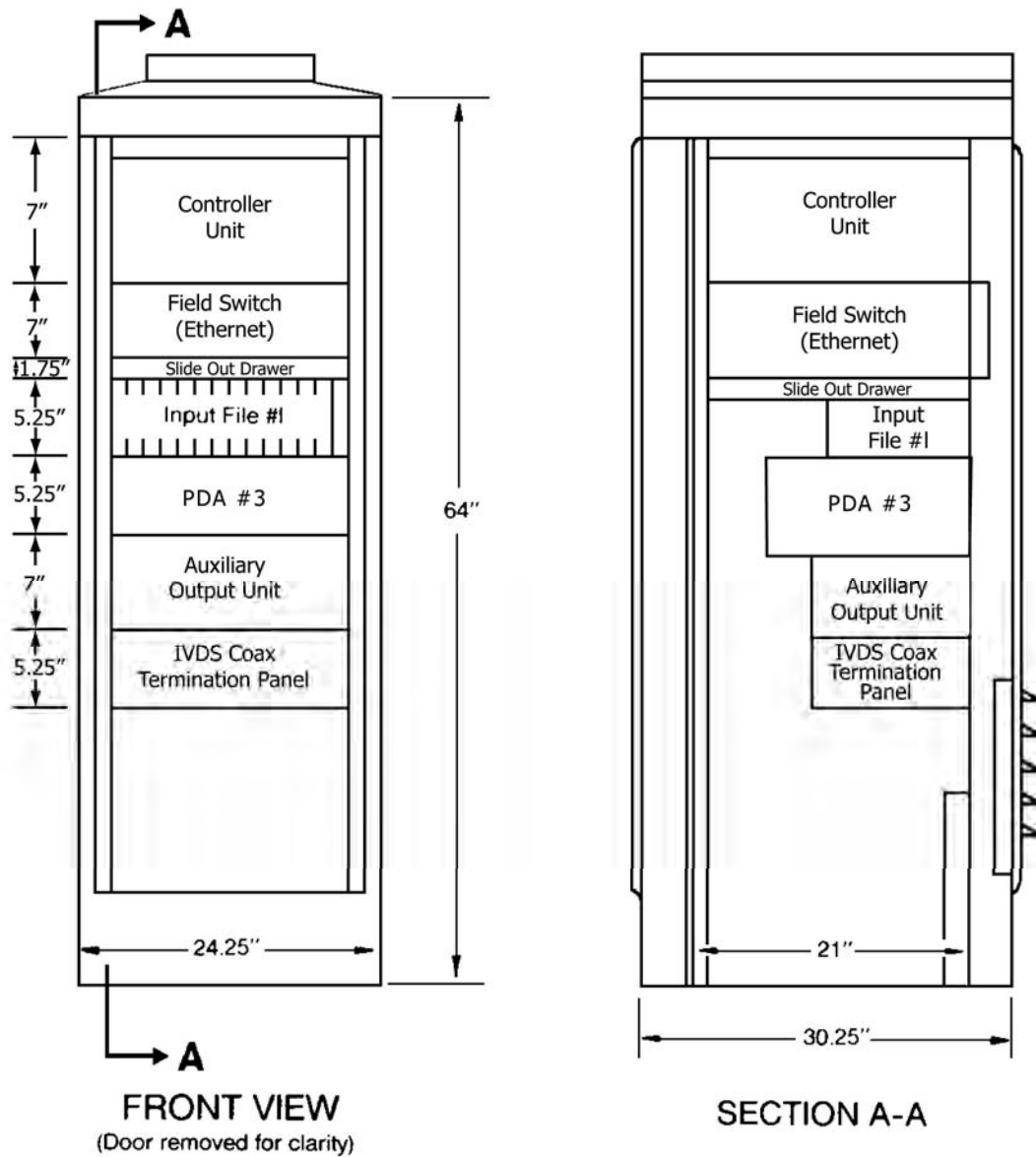


Figure 925-1 Typical 334 Cabinet Configuration

**B. Fabrication**

Refer to [Subsection 925.2.06.A.1](#) for controller cabinet minimum fabrication Specifications.

**C. Acceptance**

Refer to [Subsection 925.2.01.A](#) for compliance with CALTRANS QPL.

**D. Materials Warranty**

Refer [Subsection 925.2.01.D](#) for Materials Warranties.

**Table 925-6 Model 336S Default Input File Assignment Detail**

Slot		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Type		Det	Det	Det	Det	Det	Det	Det	Det	DC	TBA	TBA	DC	DC	DC
Channel 1	C1 Pin	56	39	58	41	55	40	57	42	51	71	72	67	68	81
	Function	Ph1	Ph2	Ph3	Ph4	Ph5	Ph6	Ph7	Ph8	SE1	EVA	EVB	Ph2 PED	Ph6 PED	FLASH
	Field Term	TB-7 1,2	TB-7 5,6	TB-7 9,10	TB-8 1,2	TB-8 5,6	TB-8 9,10	TB-9 1,2	TB-9 5,6	TB-5 1,2	TB-5 5,6	TB-5 9,10	TB-4 1,2	TB-4 5,6	NC
Channel 2	C1 Pin	47	43	49	45	48	44	50	46	52	73	74	69	70	82
	Function	Ph2 CALL	Ph2	Ph4 CALL	Ph4	Ph6 CALL	Ph6	Ph8 CALL	Ph8	R/R	EVC	EVD	Ph4 PED	Ph8 PED	STOP TIME
	Field Term	TB-7 3,4	TB-7 7,8	TB-7 11,12	TB-8 3,4	TB-8 7,8	TB-8 11,12	TB-9 3,4	TB-9 7,8	TB-5 3,4	TB-5 7,8	TB-5 11,12	TB-4 3,4	TB-4 7,8	NC

**Table 925-7 Required Surge Arrestors for Model 336S Cabinet**

Field Terminal Block	Terminals	Required Arrestor
TB-4	1-12	Section 925.2.04.A.13.f
TB-5	1-4	Section 925.2.04.A.13.f
TB-5	5-12	Terminal Block only Section 925.2.04.A.13.f
TB-7, TB-8, TB-9	1-12	Section 925.2.04.A.13.c

**Table 925-8 Model 334 Default Input File Assignment Detail**

Slot		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Type		Det	Det	Det	Det	Det	Det	Det	Det	Det	Det	Det	TBA	TBA	TBA
Channel 1	C1 Pin	46	50	49	55	51	57	59	61	81	79	53	41	43	45
	Function	L1 D1	L2 D2	L1 Q1	L3 Q3	L1 MLA	L2 MLA	L3 MLA	L4 MLA		L3 D3				
	Field Term	TB-2 1,2	TB-2 5,6	TB-2 9,10	TB-3 1,2	TB-3 5,6	TB-3 9,10	TB-4 1,2	TB-4 5,6	TB-4 9,10	TB-5 1,2	TB-5 5,6	TB-5 9,10	TB-6 1,2	TB-6 5,6
Channel 2	C1 Pin	39	47	48	56	52	58	60	62	80	82	54	40	42	44
	Function	L1 P1	L2 P2	L2 Q2		L1 MLB	L2 MLB	L3 MLB	L4 MLB		L3 P3				
	Field Term	TB-2 3,4	TB-2 7,8	TB-2 11,12	TB-3 3,4	TB-3 7,8	TB-3 11,12	TB-4 3,4	TB-4 7,8	TB-4 11,12	TB-5 3,4	TB-5 7,8	TB-5 11,12	TB-6 3,4	TB-6 7,8



Table 925-9 Required Surge Arrestors for Model 334 Cabinet		
Field Terminal Block	Terminals	Required Arrestor
TB-2, TB-3, TB-4	1-12	Section 925.2.04.A.13.c
TB-5	1-4	Section 925.2.04.A.13.c

Table 925 - 10 Model 334 PDA Type 3 Output File															
	SP 1					SP 2					SP 3				
	C1 Pin	Out #	Conn	Func	Field Term	C1 Pin	Out #	Conn	Func	Field Term	C1 Pin	Out #	Conn	Func	Field Term
SP R	2	0	C6-1	Warn 1	T4-7	4	2	C6-3	Lane 1 R	T4-4	7	5	C6-6	Lane 2 R	T4-1
SP Y	37	34	C6-9		T4-8	5	3	C6-4	Lane 1 Y	T4-5	8	6	C6-7	Lane 2 Y	T4-2
SP G	3	1	C6-2	Warn 2	T4-9	6	4	C6-5	Lane 1 G	T4-6	9	7	C6-8	Lane 2 G	T4-3

Table 925 - 11 Model 334 Auxiliary Output File															
	SP 9					SP 10					SP 11				
	C1 Pin	Out #	Conn	Func	Field Term	C1 Pin	Out #	Conn	Func	Field Term	C1 Pin	Out #	Conn	Func	Field Term
SP R	97	53	C5-14	Lane 3 R	A124	94	50	C5-11	Not used	A121	91	48	C5-9	Not used	A114
SP Y	98	54	C5-15	Lane 3 Y	A125	95	51	C5-12	Not used	A122	101	37	C5-18	Not used	A115
SP G	99	55	C5-16	Lane 3 G	A126	96	52	C5-13	Not used	A123	93	49	C5-10	Not used	A116
	SP 12					SP 13					SP 14				
	C1 Pin	Out #	Conn	Func	Field Term	C1 Pin	Out #	Conn	Func	Field Term	C1 Pin	Out #	Conn	Func	Field Term
SP R	88	45	C5-6	Not used	A111	85	42	C5-3	Not used	A104	83	40	C5-1	Not used	A101
SP Y	89	46	C5-7	Not used	A112	86	43	C5-4	Not used	A105	100	36	C5-17	Not used	A102
SP G	90	47	C5-8	Not used	A113	87	44	C5-5	Not used	A106	84	41	C5-2	Not used	A103

**925.2.05 Type ITS Cabinet Assemblies**

**A. Requirements**

Ensure that the cabinet assembly meets the requirements of the CALTRANS Specifications as described in this document. In addition to the CALTRANS Specifications, ensure that the cabinet assembly conforms to the requirements listed below, which take precedence over conflicting CALTRANS Specifications.

1. Cabinet configuration:

Supply cabinets in accordance with the following information and table 925-12.

- a. Cabinet Traffic Signal Application - Series 340
  - 340 - 4 Door Cabinet with “P” Base Ground Mount
  - 342 - 2 Door Cabinet with “170” Base (332) Ground Mount
  - 346 - 2 Door Cabinet with ”170” Base (336S), Adaptor Mount
- b. Cabinet Traffic Management Application - Series 350
  - 354 - 2 Door Cabinet with “170” Base (332) Ground Mount
  - 356 - 2 Door Cabinet with “170” Base (336S) Adaptor Mount

<b>Table 925-12 ITS Cabinet Configurations</b>					
<b>Items</b>	<b>ITS Cabinet Versions</b>				
	<b>340</b>	<b>342</b>	<b>346</b>	<b>354</b>	<b>356</b>
	<b>Qty</b>	<b>Qty</b>	<b>Qty</b>	<b>Qty</b>	<b>Qty</b>
Housing # 1/ Cage #1		1		1	
Housing # 2/Cage #2			1		1
Housing #3/Two Cage #1	1				
“J” Panel Cage #1	4	2		2	
“J” Panel Cage #2			2		2
Service Panel Assembly with AC -/EG Bus	1	1	1	1	1
Raw/Clean AC power Assembly	1	1	1	1	1
Raw Clean AC power Extension	1				
AC Clean Module Assembly	1				
DC Power/Comm Assembly	2	1	1	1	1
DC Power/Comm Extension	2	1		1	1
Cabinet Shelf Assembly	2	1	1	1	1
Input Assembly	3	2	1	1	1
Six Pack Output Assembly	1			1	1
Fourteen Pack output Assembly	1	1	1		
PDA ITS Assembly	1	1	1	1	1
Control/Serial Bus harness	8	6	4	4	4
Serial Bus 3 Harness	3	1	1	1	1

Note: Input Assembly shall include a Model 218 SIU. Output Assembly shall include a Model 218 SIU, Model 214 AMU and Model 205 Transfer Relays. The PDA ITS (Traffic Signal Application) shall include two Model 204 Flasher Units, Model 212 CMU and two Model 216 Power Supply Units and attached harnesses. The PDA ITS (Traffic Management System Application) shall include Model 212 CMU and two Model 216 Power Supply Units and attached harnesses.

- c. Model 340 Cabinet:
  - Field termination panels
  - 9 – Flash Transfer Relays
  - 2 – Model 204 Flashers
  - Specific Equipment Layout and other cabinet devices determined on a project specific basis

- d. Model 342 Cabinet:
  - 1-Model 242 DC Isolator
  - 6- Flash Transfer Relays
  - 2-Model 204 Flashers
- e. Model 346 Cabinet
  - 1-Model 242 DC Isolator
  - 6-Flash Transfer Relays
  - 2-Model 204 Flasher
  - 1-"M" Base Adapter installed (Base Mount Cabinets Only)
  - 1-Aluminum Cover Plate for Cabinet Bottom (Pole Mount Cabinets Only)
- f. Model 354 Cabinet:
  - Specific Equipment Layout and additional cabinet equipment determined on a project specific basis.
- g. Model 356 Cabinet
  - Specific Equipment Layout and additional cabinet equipment determined on a project specific basis.
  - 1-"M" Base Adapter installed (Base Mount Cabinets Only)
  - 1-Aluminum Cover Plate for Cabinet Bottom (Pole Mount Cabinets Only)

Note: Include above components in cabinet at time of delivery.

Other auxiliary cabinet components such as controllers, load switches, etc. will be ordered as separate items.

2. Finish

Use cabinets that have a bare aluminum finish (see [Subsection 925.2.06.A.1](#) for controller-cabinet minimum fabrication specifications).

3. Locks

Equip the main cabinet door with locks that accept No. 2 Corbin keys. Provide two sets of keys with each cabinet. One set of keys is defined as one – No. 2 key and one - police panel key.

4. Power

Equip the cabinet assemblies with an ITS power distribution assembly to generate AC and DC power for the electronic components, except the DC power for the controller units.

5. Mounting

Equip the cabinets for pole or base mounting, as specified in the Plans.

a. Base Mount

Supply Model 346 and 356 cabinets, when specified as base mount, with a “M” base-mounting adapter installed.

b. Pole Mount

Supply Model 346 and 356 cabinets, when specified as pole mount, with two exterior pole mounting brackets that allow for mounting on steel, concrete, and timber poles.

Ensure that the bracket mounting holes are properly reinforced with metal plates of adequate size and strength, welded longitudinally across the inside depth of the cabinet.

Ensure that the exterior-mounting bracket is shipped installed on the cabinet housing. Additionally, provide an aluminum plate, which covers the bottom cabinet opening.

6. Cabinet Light

Include in each cabinet one fluorescent strip lighting fixture mounted inside the top front portion of the cabinet. Do not use a screw in type fluorescent lamp.

The fixture includes a cool white lamp, covered, and operated by a normal power factor, UL listed ballast.

Install a door-actuated switch to turn on the cabinet light when either door is opened.

7. Cabinet Interlock

Do not install the interlock circuit, as detailed in the CALTRANS Specifications.

## 8. Cabinet Drawer

Equip each Model 340, 342, 346, 352 and 356 cabinet with an aluminum storage compartment mounted in the rack assembly with the approximate following dimensions: 16 inches (400 mm) wide, 14 inches (350 mm) long, and 1.75 inches (44 mm) deep.

Mount this compartment directly under the Type 2070 controller. Provide a drawer with telescoping drawer guides to allow full extension from the rack assembly.

When extended, the storage compartment opens to provide storage space for cabinet documentation and other miscellaneous items.

Ensure that the storage compartment be of adequate construction to support a weight of 25 pounds (12 kg) when extended.

Provide a top for the storage compartment that has a non-slip plastic laminate attached, which covers a minimum of 90% of the surface area of the top.

## 9. Test Program

Supply each cabinet with a diagnostic test program, which verifies the operation of the cabinet. Ensure that the program can test cabinet wiring related to the output file, input file, and police panel and flash switches. In addition, ensure that the program can check the operation of the SIU, AMU and CMU by generating all possible conflicts, in sequence,

## 10. Surge Protection

Equip each cabinet with devices to protect the control equipment from surges and over voltages.

Design the surge protector panels to allow for adequate space for a wire connection and surge protector replacement without the removal of terminal blocks or panels. Provide surge protectors for the input sections as detailed below and as shown in the Input Terminal and Surge Arrestor Detail.

Supply surge protectors that meet the following Specifications.

### a. AC Service Input

Include a surge protection unit for each cabinet on the AC service input that meets or exceeds the following requirements:

- Provide a hybrid type power line surge protection device on a service panel which plugs into a 12 pin Beau Connector which mounts on a service panel.

Install the protector between the applied line voltage and earth ground. Use a surge protector capable of reducing the effect of lightning transient voltages applied to the AC line that conforms to the following:

Peak surge current for an 8 x 20 $\mu$ s waveform:	20,000A for 20 occurrences
Clamp voltage @ 20,000A	280V max
Maximum continuous operating current:	@ 120V / 60 Hz 10A
Series Inductance:	AC Line/AC Neutral - 200 microhenries
Response time:	Voltage never exceeds 280V during surge
Spike suppression for +/- 700 V spike:	+/- 40 V deviation from sine wave at all phases angles between 0 and 180 degrees.

- Provide a protector with the following terminals:
  - Main Line (AC line first stage terminal)
  - Main Neutral (AC neutral input terminal)
  - Equipment Line In (AC line second stage input terminal, 10A)
  - Equipment Line Out (AC line second stage output terminal, 10A)
  - Equipment neutral out (neutral terminal to protected equipment)
  - GND (Earth connection)
- Supply a protector that is epoxy encapsulated in a flame-retardant material.
- Configure the Equipment Line Out to provide power to the Type 2070 and to the 24 V power supply.

b. Inductive Loop Detector Inputs

Protect each inductive loop detector channel input by an external surge protection device that meets or exceeds the following requirements:

- A three-terminal device, two (2) of which are connected across the signal inputs of the detector with the third connected to the chassis ground to protect against common mode damage.
- Instantly clamps differential mode surges (induced voltage across the loop detector input terminals) via a semiconductor array. The array appears as a low capacitance to the detector.
- Clamps common mode surges (induced voltage between the loop leads and ground) via solid state clamping devices.
- Withstand 25-100A surge current occurrences of a 10 x 700  $\mu$ s waveform.
- Have the following clamp characteristics:

Maximum break over voltage:	170 V
Maximum on-stage clamping voltage:	3V
Response Time:	<5 ns
Off-stage leakage current:	<10 $\mu$ A
Capacitance:	less than 220 pf
- Ensure that the unit also meets the following minimum requirements:

Peak surge current:	6 times
Differential mode:	400 A (8 x 20 ms)
Common mode:	1,000 A (8 x 20 ms)
Estimated occurrences:	500 @ 200 A
Response time:	40 ns
Input capacitance:	35 pF typical
Temperature:	-40° F to +185° F (-40° C to 85° C)
Mounting:	No. 10-32 x 3/8-inch (No. 5 x 10 mm) bolt

Clamp voltage	
@400 A diff. Mode:	30 V max.
@1,000 A comm. Mode:	30 V max.

c. Signal Load Switches (Switchpacks)

Provide the output of the switchpack in the output file with transient protection via the nine position transient protection device in the output file. Protect switchpacks from surges on the AC output lines.

Ensure that the transient protectors meet or exceed these requirements:

- Steady state sinusoidal voltage (RMS) rating at 50 to 60 Hz of at least 150 V at 77 °F (25 °C)
- Steady state applied DC voltage rating of at least 200 V at 77 °F (25 °C)
- Transient energy rating is of at least 80 J for a single impulse of 10/1,000  $\mu$ s current waveform at 77 °F (25 °C)
- Peak current rating of 6,500 A for a single impulse of 8/20  $\mu$ s waveform with the rated continuous voltage applied
- Varistor voltage of at least 212 V at 1.0mA of DC current applied for the duration of 20  $\mu$ s to 5s
- Clamping voltage of at least 395 V with an applied 8/20  $\mu$ s impulse of 100 A
- Typical capacitance at a frequency of 0.1 to 1.0 MHz of 1600 pF
- Two-terminal device, one of which is connected to the AC output of the signal load switch on the output file terminals (backside of the field terminals) with the other connected to AC neutral

d. Communication Inputs

Protect low voltage communications input as it enters the cabinet with a solid-state surge protection unit that meets or exceeds these requirements:

- Dual pair (4-wire) module with a printed circuit board connector, double sided and gold plated for reliability

- Ability to mate with and be installed in a 10-circuit Buchanan connector Part Number PCBIB10S or Tyco Part Number 2-1437410-3 or equivalent
- Usable as two independent signal pairs
- The data circuits pass through the protection in a serial fashion
- C2 connector of the 2070 controller that terminates on the line side of the unit
- Communication field wires for this local side that terminate on the line side of the unit
- Ground terminals connected to power ground
- Ensure that the unit meets the following minimum requirements:

Peak surge current:	10 kA (8 x 20 $\mu$ s wave shape)
	500A (10 x 700 $\mu$ s wave shape)
Occurrences @ peak:	50 typical
Response time:	<1ns
Voltage Clamp:	8V line to line
Series Resistance:	24 $\Omega$ total
Temperature	-40 °F (-40 °C) to +185 °F (85 °F)
Primary protector:	3 element gas tube 5kA, (8 x 20 $\mu$ s wave shape), per side
Secondary protector:	Silicon avalanche, 1.5 kW minimum

e. Low Voltage DC Inputs

Provide an external surge protection device for each low voltage DC input channel which meets the same requirements as the communication inputs with the following exception of the Voltage clamp, which shall be 30 V line-to-line.

11. Type 212 ITS Cabinet Monitor Unit

a. Introduction

Supply each cabinet with Type 212 ITS Cabinet Monitor Unit (CMU). Ensure the Type 212 CMU meets the CALTRANS TEES Specifications and functions as a unit with the a Type 214 Auxiliary Monitor Unit to provide the following monitoring functions: Cabinet Power Supplies,; Conflicting Channel Monitor, Serial Bus1 and 3 Error; Message 62; Diagnostic Error; Multiple Channel Inputs; Lack of Signal Inputs; Yellow Clearance; Yellow plus Red Clearance; Police and Power Distribution Switch Monitor; door Switches and Main Contactor Status; Circuit Breakers; Flash Unit Output Status; and AC Line Level Sense. Ensure the Unit supplied is listed on the most recent California Department of Transportation Qualified Products List (QPL).

b. Configuration

Supply Type 212 CMU capable of monitoring up to 28 physical load switch channels (RYG) plus 4 virtual channels for a total of 32 channels.

c. Programming

Ensure complete programming of the Type 212 CMU is by an interchangeable Datakey nonvolatile memory device. The Datakey shall store all of the configuration parameters. Ensure the programming of the datakey can easily be accomplished by a PC and provide datakey and programming device with the delivery of the first unit ordered. Orders of multiple ITS cabinets require delivery or 1 programming device with PC software for every 10 cabinets.

d. Logging

Ensure the Type 212 CMU maintains a non volatile event log recording. The complete intersection status as well as previous fault events, AC Line events, configuration changes, monitor resets, cabinet temperature and true RMS voltages for all field inputs. A real time clock time shall stamp each log event with the time and date. Ensure a Signal Sequence History Log is stored in nonvolatile memory. The information stored in the signal sequence log shall provide graphic displays of up to 30 seconds of signal status prior to the fault trigger event with 50 ms resolution.

The Type 212 CMU shall be provided with PC Software that allows a review of status, event log review and archival.

12. Type 214 ITS Auxiliary Monitor Unit

a. Introduction

Supply each ITS cabinet output assembly with a Type 214 ITS Auxiliary Monitor Unit (AMU). Ensure the Type 214 CMU meets the CALTRANS TEES Specifications and functions with the a Type 212 Cabinet Monitor Unit to provide cabinet monitoring functions to perform the following monitoring functions: Cabinet Power Supplies, Conflicting Channel Monitor, Serial Bus 1 and 3 Error; Message 62; Diagnostic Error; Multiple Channel Inputs; Lack of Signal Inputs; Yellow Clearance; Yellow plus Red Clearance; Police and Power Distribution Switch Monitor; door Switches and Main Contactor Status; Circuit Breakers; Flash Unit Output Status; and AC Line Level Sense. Ensure the Unit supplied is listed on the most recent California Department of Transportation Qualified Products List (QPL). The Type 214 AMU shall provide the field signal sensing.

b. Current Monitoring

Supply Type 214 AMU capable of operating in a 14 channel mode or a 6 channel mode. Ensure the address select is correct for the output assembly in which the Model 214 AMU is installed.

c. Diagnostics

Ensure the Type 214 AMU has self diagnostic tests that execute continuously to provide for correct operation to properly monitor the current for use with LED signal heads.

13. Type 218 ITS Serial Interface Unit

a. Introduction

Supply each input and output assembly with a Type 218 ITS Serial Interface Unit (SIU). Ensure the Type 218 ITS SIU supplied meets the CALTRANS TEES Specifications. Ensure the Unit supplied is listed on the most recent California Department of Transportation Qualified Products List (QPL). The Type 218 ITS SIU shall provide the interface between the 2070 controller and the input and output files.

b. Configuration

Supply Type 218 SIU capable of operating in all input and output modes. Provide a Model 218 SIU that is configured correctly for the input or output file for which it is supplied.

c. Programming

Ensure programming of the Type 218 SIU is programmed by assembly mounted address jumpers and that no other setup is required.

d. Diagnostics

Ensure the Type 218 SIU supplied has a complete set of internal diagnostics self-tests run continuously to monitor critical components of the unit. Provide unit with a front panel LED indicator that can be used to report the current Input/Output assembly address assignment of the unit for cabinet configuration verification. Ensure unite has a diagnostic EIA-232 port on the front panel to interface with the SIU 218 functions.

14. Model 242 DC Isolator

Provide Model 242 DC Isolators that are in accordance with the latest version of CALTRANS Specifications as referenced earlier in this section. Provide isolators that:

- Allow 242 isolator input signal polarity to easily be inverted without the use of tools. Acceptable methods are removable jumpers or dip switches. Unacceptable methods are soldering or desoldering a diode or resistor.
- Output is OFF for input voltages greater than 12 volts;
- Output is ON for voltages of less than 8 volts that have a duration of at least 5 to 25 ms (optional 2-7 ms);
- Minimum output pulse width is 100 ms with a valid input (can be disabled);
- Output is optically isolated open collector NPN transistor;
- Capable of sinking 50 ma when on;
- Can register a new input within 25 ms of the old signal going away; and
- Output clamped on power up and down

15. Model 200 Switchpack

Provide Model 200 Switchpacks that are in accordance with the latest version of CALTRANS Specifications as referenced earlier in this section.

16. Model 204 Flasher Unit

Provide Model 204 Flasher Units that are in accordance with the latest version of CALTRANS Specifications as referenced earlier in this section.

17. Flash Transfer Relay

Provide Flash Transfer Relays that are in accordance with the latest version of CALTRANS Specifications as referenced earlier in this section.

18. Cabinet Model 342

Provide Cabinet Model 342 that meets the CALTRANS Specification with the addition of surge protection as detailed in [Table 925-13 Model 342 ITS Cabinet Default Input Files Assignment Detail](#), Table 925-14 Required Surge Arrestors for Model 342 ITS Cabinet, and Table 925-15 Model 342 & 346 ITS Cabinet Default Output File Assignment Detail.

Supply Model 342 with lower input panel cabinets, with housing Type 1, and all components as described in these Specifications.

Supply cabinets having two input files which conform to the CALTRANS Specifications and configured to accept two 2070 controllers in the top portion of the cabinet.

Configure the cabinet for dial up communications. Mount a two (2) circuit Buchanan connector on the right side panel (from rear door).

Mount a phone jack with a RJ11 connector above or to the right of the Buchanan terminal block.

Wire the phone jack to the Buchanan and to the Terminal Block (TB0) in accordance with [Figure 925-3](#).

19. Cabinet Model 346 (Base Mount)

This unit meets the CALTRANS Specification with the addition of approximately 6 additional inches (150 mm) of cabinet height exclusive of the "M" base adapter. Configure the internal component layout so that the additional space is available in the bottom area of the cabinet cage. Ensure that the field wiring input panels and surge protection conform to [Table 925-16 Model 346 ITS Cabinet Default Input File Assignment Detail](#), [Table 925-17 Required Surge Arrestors for Model 346 Cabinet](#), and [Table 925-15 Model 342 & 346 Default ITS Cabinet Default Output File Assignment](#).

20. Cabinet Model 346 (Pole Mount)

Ensure that this unit meets the requirements of [Subsection 925.2.04.A.19](#) above, except that the cabinet is configured for pole mounting as specified in the General Requirements for Type ITS Cabinet Assemblies.

21. Cabinet Model 340

The Model 340 cabinet configuration will be determined by the special provisions of the project.

Ensure that the input and output port assignments are compatible with the 2070 controller as applicable according to the required number of input/outputs. Ensure that the 340 cabinet uses standard ITS cabinet input and output file units.

Equip the cabinet with a C2 connector harness with field terminals protected with surge protectors for communication inputs as specified under communications inputs.

Ensure that the cabinet has four full-size doors to allow complete access from the front or back of the cabinet. Design the rack assembly to mount in CALTRANS standard rails to allow for a Model 204 flasher.

Provide a receptacle to accept the plug in power distribution assembly card guides and edge connectors for the input file card guides to support the conflict monitor, and load switches and flash transfer relays.

**B. Fabrication**

Refer to [Subsection 925.2.07.A.1](#) for controller cabinet minimum fabrication Specifications.

**C. Acceptance**

Refer to [Subsection 925.2.02.A](#) for compliance with CALTRANS QPL.

**D. Materials Warranty**

Refer [Subsection 925.2.01.D](#) for Materials Warranties.



**Table 925 – 13 Model 342 ITS Cabinet Default Input Files Assignment Detail**

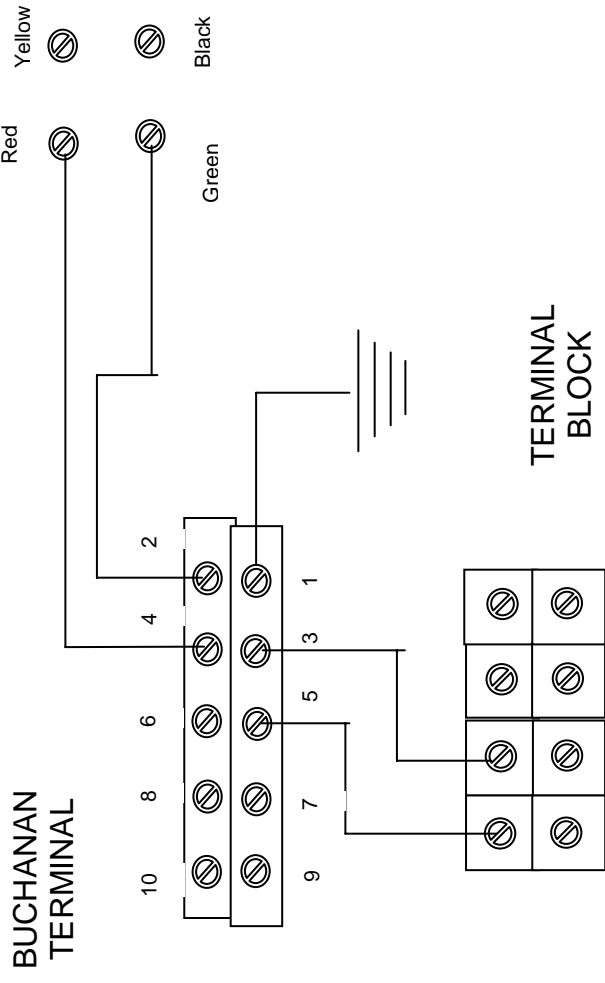
Input File	Chan	Item	File Slot												
			1	2	3	4	5	6	7	8	9	10	11	12	
1	Upper	SIU Pin	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	
		SIU Byte, Bit	2,6	3,0	3,2	3,4	3,6	4,0	4,2	4,4	4,6	4,6	5,0	5,2	5,4
		SIU Input #	7	9	11	13	15	17	19	21	23	23	25	27	29
		2070 Input #	17	0	28	8	22	6	43	25	51	51	32	12	38
		2070 Port	3,2	1,1	4,5	2,1	3,7	1,7	6,4	4,2	7,4	7,4	5,1	2,5	5,7
		Function	Ph 1 Det	Ph 2 Det	Ph 2 Det	Ph 2 Det	Ph 3 Det	Ph 4 Det	Ph 4 Det	Ph 4 Det	Sp Det 1	Sp Det 5	Pd 2 Det	Pre 1	Pre 5
	Lower	Field Term	TB-2 1,2	TB-2 5,6	TB-2 9,10	TB-4 1,2	TB-4 5,6	TB-4 9,10	TB-6 1,2	TB-6 5,6	TB-6 9,10	TB-8 4,6	TB-9 10,12	TB-9 5,6	
		SIU Pin	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	
		SIU Byte, Bit	2,7	3,1	3,3	3,5	3,7	4,1	4,3	4,5	4,7	5,1	5,3	5,5	
		SIU Input #	8	10	12	14	16	18	20	22	24	26	28	30	
		2070 Input #	21	4	41	19	2	30	10	53	52	34	13	39	
		2070 Port	3,6	1,5	6,2	3,4	1,3	4,7	2,3	7,6	7,5	5,3	2,6	5,8	
2	Upper	Function	Ph 1 Det	Ph 2 Det	Ph 2 Det	Ph 3 Det	Ph 4 Det	Ph 4 Det	Ph 4 Det	Ph 4 Det	Sp Det 2	Sp Det 6	Pre 2	Pre 6	
		Field Term	TB-2 3,4	TB-2 7,8	TB-2 11,12	TB-4 3,4	TB-4 7,8	TB-4 11,12	TB-6 3,4	TB-6 3,4	TB-6 3,4	TB-6 11,12	TB-8 5,6	TB-9 11,12	TB-9 8,9
		SIU Pin	B25	A26	B26	A27									
		SIU Byte, Bit	8,7	9,0	9,1	9,2									
		SIU Input #	Opto In 1	Opto In 2	Opto In 3	Opto In 4									
		2070 Input #	46	14	47	45									
	Lower	2070 Port	6,7	2,7	6,6	6,8									
		Function	Fish Sen	MCE	Int Adv	S T									
		SIU Pin	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	
		SIU Byte, Bit	2,6	3,0	3,2	3,4	3,6	4,0	4,2	4,4	4,6	5,0	5,2	5,4	
		SIU Input #	7	9	11	13	15	17	19	21	23	25	27	29	
		2070 Input #	16	1	29	9	18	7	44	54	49	33	36	15	
Opto Inputs	Upper	2070 Port	3,1	1,2	4,6	2,2	3,3	1,8	6,5	7,7	7,2	5,2	5,5	2,8	
		Function	Ph 5 Det	Ph 6 Det	Ph 6 Det	Ph 6 Det	Ph 7 Det	Ph 8 Det	Ph 8 Det	Ph 8 Det	Sp Det 3	Sp Det 7	Pre 3	Spare 1	
		Field Term	TB-3 1,2	TB-3 5,6	TB-3 9,10	TB-5 1,2	TB-5 5,6	TB-5 9,10	TB-7 1,2	TB-7 5,6	TB-7 5,6	TB-7 9,10	TB-8 7,9	TB-9 4,6	TB-8 1,3
		SIU Pin	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	B15	B16	
		SIU Byte, Bit	2,7	3,1	3,3	3,5	3,7	4,1	4,3	4,5	4,7	5,1	5,3	5,5	
		SIU Input #	8	10	12	14	16	18	20	22	24	26	28	30	
	Lower	2070 Input #	20	5	42	18	3	31	11	55	50	35	37	40	
		2070 Port	3,5	1,6	6,3	3,3	1,4	4,8	2,4	7,8	7,3	5,4	5,6	6,1	
		Function	Ph 5 Det	Ph 6 Det	Ph 6 Det	Ph 7 Det	Ph 8 Det	Ph 8 Det	Ph 8 Det	Ph 8 Det	Sp Det 4	Sp Det 8	Pre 4	Spare 2	
		Field Term	TB-3 3,4	TB-3 7,8	TB-3 11,12	TB-5 3,4	TB-5 7,8	TB-5 11,12	TB-7 3,4	TB-7 7,8	TB-7 7,8	TB-7 11,12	TB-8 8,9	TB-9 7,9	TB-8 2,3
		SIU Pin	B25	A26	B26	A27									
		SIU Byte, Bit	8,7	9,0	9,1	9,2									

**Table 925 – 14 Required Surge Arrestors for Model 342 ITS Cabinet**

Field Terminal Block	Terminals	Required Arrestors for Model 342 Cabinet
TB - 8	1-12	Section 925.2.05.A.10.f
TB - 9	10-12	Section 925.2.05.A.10.f
TB - 9	4-9	Section 925.2.05.A.10.f
TB - 2, TB - 3, TB - 4, TB - 5, TB - 6, TB - 7	1-12	Section 925.2.05.A.10.c

**Table 925 - 15 Model 342 & 346 ITS Cabinet Default Output File Assignment Detail**

Switch Pack														
Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<b>SIU Pin</b>	A2	B3	A5	B6	A8	B9	A11	B12	A14	B15	A17	B18	A20	B21
<b>SIU Byte, Bit</b>	2,0	2,3	2,6	3,1	3,4	3,7	4,2	4,5	5,0	5,3	5,6	6,1	6,4	6,7
<b>SIU Output #</b>	1	4	7	10	13	16	19	22	25	28	31	34	37	40
<b>2070 Output #</b>	13	10	8	5	2	0	29	26	24	21	18	16	53	50
<b>2070 Output Port</b>	2,6	2,3	2,1	1,6	1,3	1,1	4,6	4,3	4,1	3,6	3,3	3,1	7,6	7,3
<b>AMU Pin</b>	C16	C17	C18	C19	C20	C21	C22	C23	C24	C25	C26	C27	C28	C29
<b>AMU Channel</b>	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<b>Field Term</b>	TR-1 1,2	TR-2 1,2	TR-3 1,2	TR-4 1,2	TR-5 1,2	TR-6 1,2	TR-7 1,2	TR-8 1,2	TR-9 1,2	TR-10 1,2	TR-11 1,2	TR-12 1,2	TR-13 1,2	TR-14 1,2
<b>Function</b>	Ph 1 Rd	Ph 2 Rd	Pd 2 DW	Ph 3 Rd	Ph 4 Rd	Pd 4 DW	Ph 5 Rd	Ph 6 Rd	Pd 6 DW	Ph 7 Rd	Ph 8 Rd	Pd 8 DW	Ov A Rd	Ov B Rd
<b>SIU Pin</b>	B2	A4	B5	A7	B8	A10	B11	A13	B14	A16	B17	A19	B20	A22
<b>SIU Byte, Bit</b>	2,1	2,4	2,7	3,2	3,5	4,0	4,3	4,6	5,1	5,4	5,7	6,2	6,5	7,0
<b>SIU Output #</b>	2	5	8	11	14	17	20	23	26	29	32	35	38	41
<b>2070 Output #</b>	14	11	32	6	3	34	30	27	33	22	19	35	54	51
<b>2070 Output Port</b>	2,7	2,4	5,1	1,7	1,4	5,3	4,7	4,4	5,2	3,7	3,4	5,4	7,7	7,4
<b>AMU Pin</b>	B16	B17	B18	B19	B20	B21	B22	B23	B24	B25	B26	B27	B28	B29
<b>AMU Channel</b>	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<b>Field Term</b>	TR-1 3,4	TR-2 3,4	TR-3 3,4	TR-4 3,4	TR-5 3,4	TR-6 3,4	TR-7 3,4	TR-8 3,4	TR-9 3,4	TR-10 3,4	TR-11 3,4	TR-12 3,4	TR-13 3,4	TR-14 3,4
<b>Function</b>	Ph 1 Yel	Ph 2 Yel	Pd 2 PC	Ph 3 Yel	Ph 4 Yel	Pd 4 PC	Ph 5 Yel	Ph 6 Yel	Pd 6 PC	Ph 7 Yel	Ph 8 Yel	Pd 8 PC	Ov A Yel	Ov B Yel
<b>SIU Pin</b>	A3	B4	A6	B7	A9	B10	A12	B13	A15	B16	A18	B19	A21	B22
<b>SIU Byte, Bit</b>	2,2	2,5	3,0	3,3	3,6	4,1	4,4	4,7	5,2	5,5	6,0	6,3	6,6	7,1
<b>SIU Output #</b>	3	6	9	12	15	18	21	24	27	30	33	36	39	42
<b>2070 Output #</b>	15	12	9	7	4	1	31	28	25	23	20	17	55	52
<b>2070 Output Port</b>	2,8	2,5	2,2	1,8	1,5	1,2	4,8	4,5	4,2	3,8	3,5	3,2	7,8	7,5
<b>AMU Pin</b>	A16	A17	A18	A19	A20	C21	C22	C23	A24	A25	A26	A27	A28	A29
<b>AMU Channel</b>	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<b>Field Term</b>	TR-1 5,6	TR-2 5,6	TR-3 5,6	TR-4 5,6	TR-5 5,6	TR-6 5,6	TR-7 5,6	TR-8 5,6	TR-9 5,6	TR-10 5,6	TR-11 5,6	TR-12 5,6	TR-13 5,6	TR-14 5,6
<b>Function</b>	Ph 1 Grn	Ph 2 Grn	Pd 2 W	Ph 3 Grn	Ph 4 Grn	Pd 4 W	Ph 5 Grn	Ph 6 Grn	Pd 6 W	Ph 7 Grn	Ph 8 Grn	Pd 8 W	O A Grn	O B Grn



Note: For a typical signal installation, the Model 342 cabinet is the design standard.

Figure 925-3—Wiring Diagram for Dial-up Communications

**Table 925 - 16 Model 346 ITS Cabinet Default Input Files Assignment Detail**

Input File	Channel	Item	File Slot												
			1	2	3	4	5	6	7	8	9	10	11	12	
1	Upper	SIU Pin	A5	A6	A7	A8	A9	A10	A11	A12	A13	A14	A15	A16	
		SIU Port	2,6	3,0	3,2	3,4	3,6	4,0	4,2	4,4	4,6	5,0	5,2	5,4	
		SIU In #	7	9	11	13	15	17	19	19	21	23	25	27	29
		2070 In #	17	0	19	2	16	1	18	18	3	12	36	32	33
		2070 Port	3,2	1,1	3,4	1,3	3,1	1,2	3,3	3,3	1,4	2,5	5,5	5,1	5,2
		Function	Ph 1 Det	Ph 2 Det	Ph 3 Det	Ph 4 Det	Ph 5 Det	Ph 6 Det	Ph 7 Det	Ph 8 Det	Ph 8 Det	Pre 1	Pre 3	Pd 2 Det	Pd 6 Det
	Fld Term	T-7 1,2	T-7 5,6	T-7 9,10	T-8 1,2	T-8 5,6	T-8 9,10	T-9 1,2	T-9 5,6	T-9 5,6	T-5 1,2	T-5 5,6	T-4 1,2	T-4 5,6	
	Lower	SIU Pin	B8	B9	B10	B11	B12	B13	B14	B15	B16	B17	B18	B19	
		SIU Port	2,7	3,1	3,3	3,5	3,7	4,1	4,3	4,5	4,7	5,1	5,3	5,5	
		SIU In #	8	10	12	14	16	18	20	22	24	26	28	30	
		2070 In #	8	4	10	6	9	5	11	7	13	37	34	35	
		2070 Port	2,1	1,5	2,3	1,7	2,2	1,6	2,4	1,8	2,6	5,6	5,3	5,4	
Function		Ph 2 Det	Ph 2 Det	Ph 4 Det	Ph 4 Det	Ph 5 Det	Ph 6 Det	Ph 7 Det	Ph 8 Det	Ph 8 Det	Pre 2	Pre 4	Pd 4 Det	Pd 8 Det	
Opto	Fld Term	T-7 3,4	T-7 7,8	T-7 11,12	T-8 3,4	T-8 7,8	T-8 11,12	T-9 3,4	T-9 7,8	T-5 3,4	T-5 7,8	T-4 3,4	T-4 7,8		
	SIU Pin	B25	A26	B26	A27										
	SIU Port	8,7	9,0	9,1	9,2										
	SIU In #	Opto In 1	Opto In 2	Opto In 3	Opto In 4										
	2070 In #	46	14	47	45										
	2070 Port	6,7	2,7	6,6	6,8										
Function	Fish Sen	MCE	Int Adv	S T											

**Table 925 – 17 Required Surge Arrestors for Model 346 ITS Cabinet**

Field Terminal Block	Terminals	Required Arrestors for Model 346 Cabinet
TB - 4	1-12	Section 925.2.05.A.10.f
TB - 5	1-4	Section 925.2.05.A.10.f
TB - 5	5-12	TERMINAL BLOCK ONLY Section 925.2.05.A.10.f
TB - 7, TB - 8, TB - 9	1-12	Section 925.2.05.A.10.c

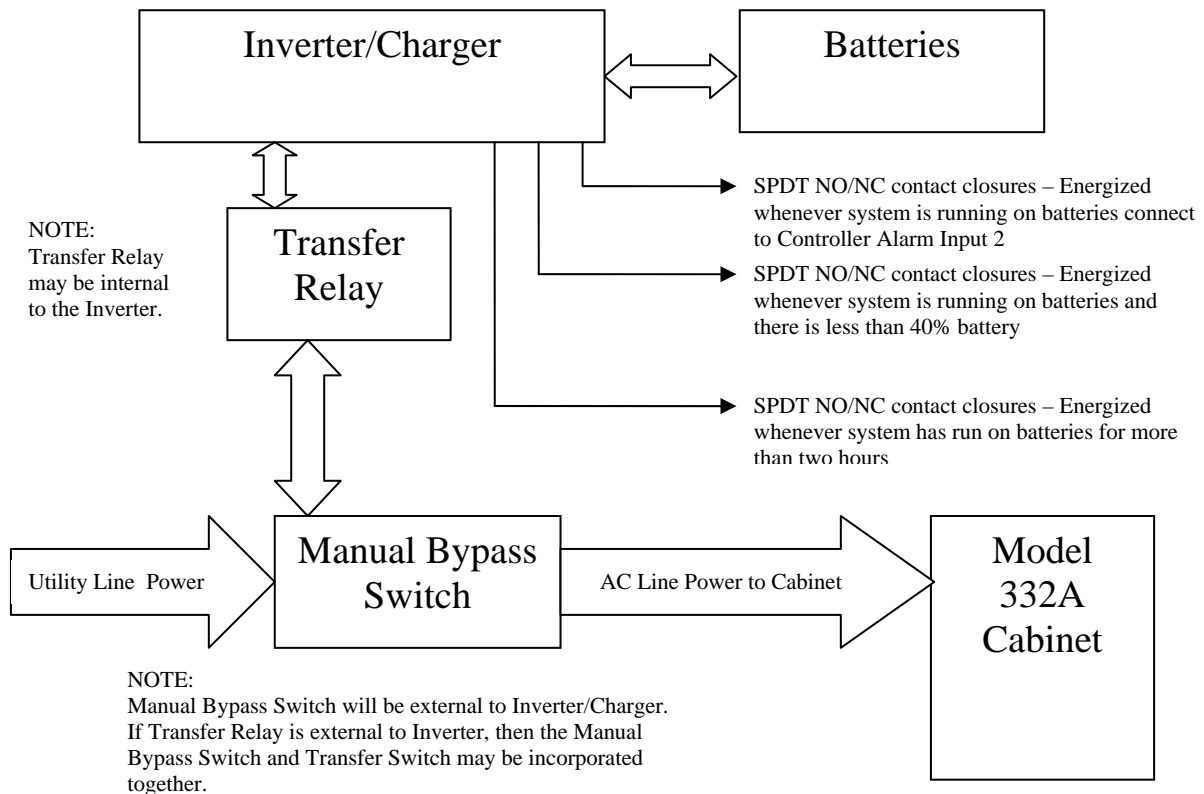
## 925.2.06 Battery Backup System

### A. Requirements

This specification is for establishing the minimum requirements for a complete emergency battery backup system for use with Light Emitting Diode Traffic Signal Modules at intersections with 332 cabinets. The Battery Backup System (BBS) shall include, but not be limited to the following: Inverter/Charger, Power Transfer Relay, Batteries, a separate manually operated non-electric Bypass Switch and all necessary hardware and interconnect wiring. The BBS shall be capable of providing power for full run-time operation for an “LED –only” intersection (all colors: red, yellow, green and pedestrian heads) or flashing mode operation and intersection Red LED’s. The BBS shall be designed for outdoor applications, in accordance with the CALTRANS TEES.

Figure 925-4 Battery Backup Block Diagram

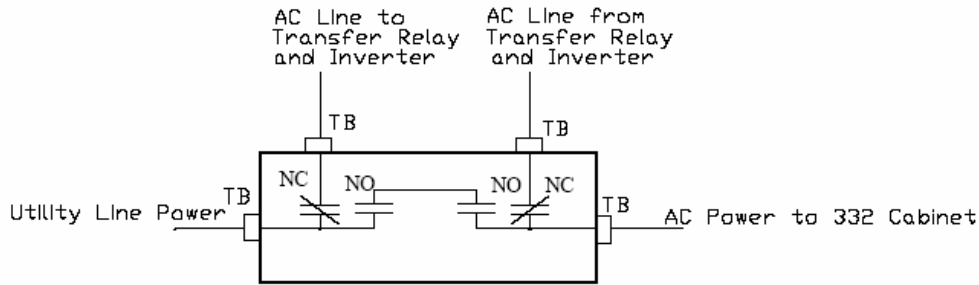
### Battery Back Up System (BBS) Block Diagram



#### 1. Operation:

- a. The BBS shall provide a minimum two (2) hours of full run-time operation for an “LED-only” intersection (minimum 700W/1000VA active output capacity, with 80% minimum inverter efficiency).
- b. The maximum transfer time allowed, from disruption of normal utility line voltage to stabilized inverter line voltage from batteries, shall be 65 milliseconds. The same maximum allowable transfer time shall also apply when switching from inverter line voltage to utility line voltage.
- c. The BBS shall include a Manual Bypass Switch which provides capability to transfer the power service to disable the BBS and operate only from the power service provided. The Manual Bypass Switch shall be as shown in Figure 925-5.

Figure 925 – 5 Manual Bypass Switch (Shown in normal BBS Mode)

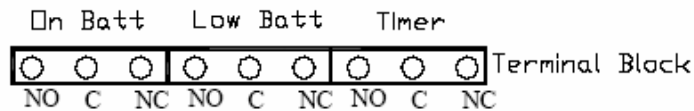


Notes:

1. TB - #8 Terminal Blocks
2. NO - Normally Open
3. NC - Normally Closed
4. NO/NC contacts shall all toggle simultaneously with one single manually operated switch.
5. Manual Bypass Switch shall only switch line. Neutral and Equipment Ground are not switched and shall be connected to 332 Cabinet buses.

- d. The BBS shall provide the user with 3-sets of normally open (NO) and normally closed (NC) single-pole double-throw (SPDT) dry relay contact closures, available on a panel-mounted terminal block, rated at a minimum 120V/1A, and labeled so as to identify each contact. For typical configuration, see Figure 925-6.
- 1). The first set of NO and NC contact closures shall be energized whenever the unit switches to battery power. Contact shall be labeled or marked "On Batt."
  - 2). The second set of NO and NC contact closures shall be energized whenever the battery approaches approximately 40% of remaining useful capacity. Contact shall be labeled or marked "Low Batt."
  - 3). The third set of NO and NC contact closures shall be energized two hours after the unit switches to battery power. Contact shall be labeled or marked "Timer."
  - 4). Relay contact activation shall be annunciated on the front panel via a visual indication. This can be either discreet LED, or part of LCD screen, etc.

Figure 925 – 6 Relay Contacts (NO/NC) available on panel-mounted terminal block (typ)



Notes:

1. NO/NC contacts may either share or use separate commons.

- e. Operating temperature for both the inverter/charger, power transfer relay and manual bypass switch shall be  $-37^{\circ}\text{C}$  ( $-35\text{F}$ ) to  $+74^{\circ}\text{C}$  ( $+165\text{F}$ ).
- f. Both the Power Transfer Relay and Manual Bypass Switch shall be rated at 240VAC/30 amps, minimum
- g. The BBS shall use a temperature-compensated battery charging system. The charging system shall compensate over a range of 2.5 – 4.0 mV/  $^{\circ}\text{C}$  (5-8 F) per cell. The temperature sensor shall be external to the inverter/charger unit. The temperature sensor shall come with 3 meters (10 feet) of wire.
- h. Batteries shall not be recharged when battery temperature exceeds  $50^{\circ}\text{C}$  ( $122\text{F}$ )  $\pm 3^{\circ}\text{C}$  (6 F).
- i. BBS shall bypass the utility line power whenever the utility line voltage is outside of the following voltage range: 100VAC to 130VAC ( $\pm 2\text{VAC}$ ).

- j. When utilizing battery power, the BBS output voltage shall be between 110 VAC and 125 VAC, pure sine wave output,  $\leq 3\%$  THD,  $60\text{Hz} \pm 3\text{Hz}$ .
- k. BBS shall be compatible with CALTRANS Model 332A Cabinets, Model 170E Controllers, Model 2070 Controllers and cabinet components for full time operation.
- l. In cases of low (below 98VAC) or absent utility line power, when the utility line power has been restored at above  $105\text{ VAC} \pm 2\text{ VAC}$  for more than 30 seconds, the BBS shall transfer from battery backed inverter mode back to utility line mode.
- m. In cases of high utility line power (above 132VAC), when the utility line power has been restored at below  $125\text{VAC} \pm 2\text{ VAC}$  for more than 30 seconds, the BBS shall transfer from battery backed inverter mode back to utility line mode
- n. BBS shall be equipped to prevent a malfunction feedback to the cabinet or from feeding back to the utility service.
- o. In the event of inverter/charger failure, battery failure or complete battery discharge, the power transfer relay shall revert to the NC (and de-energized) state, where utility line power is connected to the cabinet.
- p. Recharge time for the battery, from “protective low-cutoff” to 80% or more of full battery charge capacity, shall not exceed twenty (20) hours.

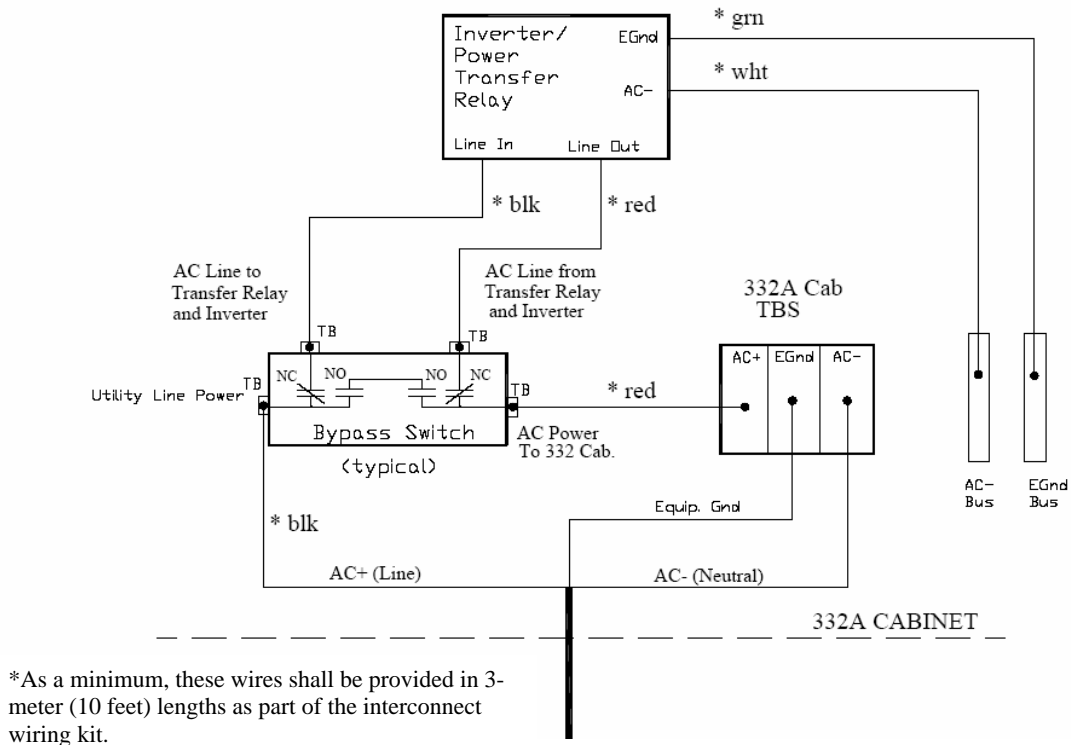
## 2. Mounting/Configuration

NOTE: All references made to EIA rail or EIA 19” (482.6mm) rack shall conform to Electronic Industries Standards EIA-310-B, Racks, Panels, and Associated Equipment, with 10-32 “Universal Spacing” threaded holes.

### a. General

- 1). Inverter/Charger Unit shall be shelf-mounted or rack-mounted on a standard EIA 19” rack. If the inverter/charger is mounted inside the 332A Cabinet (Configuration 1), a shelf shall be provided that supports the weight of the unit.
- 2). Power Transfer Relay and Manual Bypass Switch shall be mounted on EIA rail.
- 3). All interconnect wiring shall be provided between Power Transfer Relay, Bypass Switch and Cabinet Terminal Service Block and shall be no less than 3 meters (9’10”) of UL Style 1015 CSA TEW with the following characteristics:
  - AWG Rating: 10 AWG
  - Stranding: 105 strands of 30 AWG tinned copper
  - Rating: 600 V, 105 °C, PVC Insulation
- 4). Relay contact wiring provided for each set of NO/NC relay contact closure terminals shall be a minimum of 3 meters (10 feet) of UL Style 1015 CSA TEW 18 AWG wire, same ratings as above, except 16 strands of 30 AWG tinned copper. Wiring shall be of adequate length for particular installation.
- 5). Figure 925-7 provides clarification as to how BBS Power Transfer Relay and Manual Bypass Switch are interconnected with Model 332A Cabinets in order to ensure interchangeability between all BBS manufacturers.

Figure 925- 7 BBS Utility Power Connection Diagram

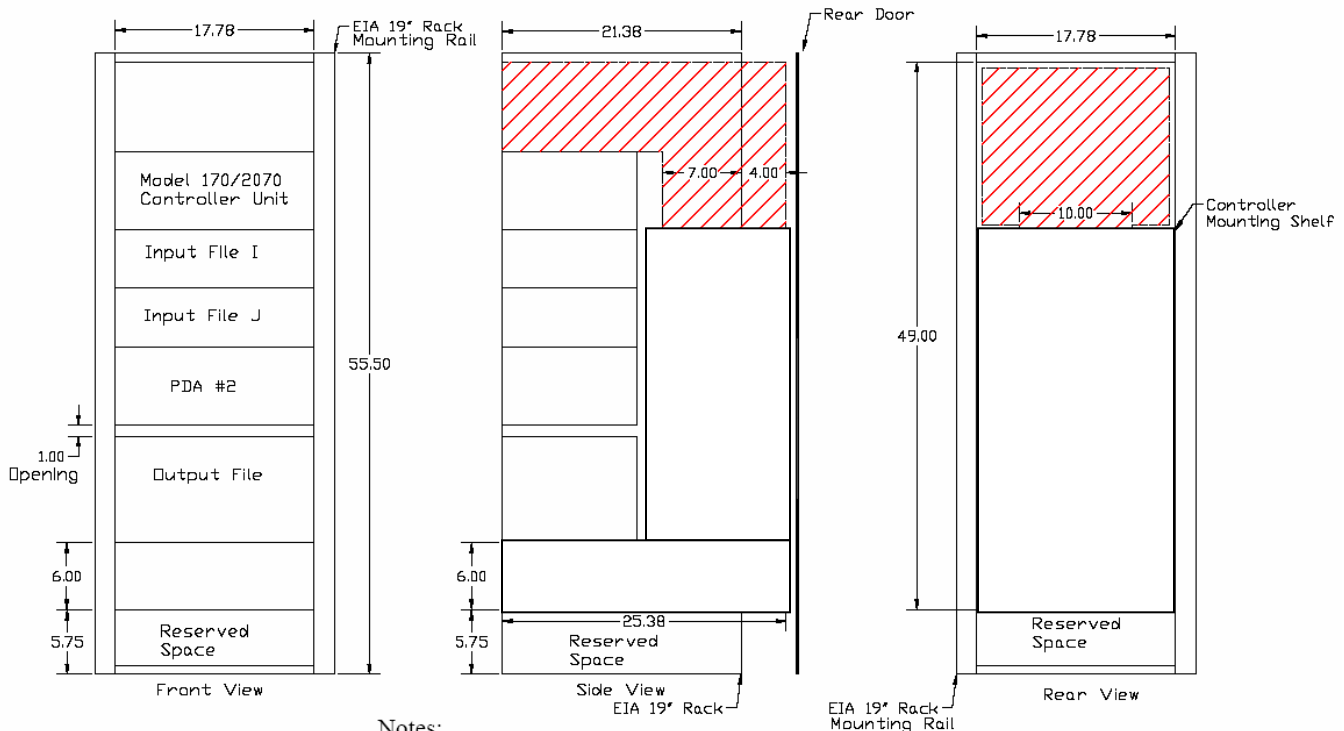


- 6). All necessary hardware for mounting (shelf angles, rack, etc) shall be included in the bid price of the BBS. All bolts/fasteners and washers shall meet the following requirements:
  - Screw type: Pan Head Phillips machine screw
  - Size and Thread pitch: 10-32
  - Material: 18-8 stainless steel (Type 316 stainless steel is acceptable as an alternate)
  - Washer: Use one flat washer (18-8 stainless steel) under the head of each 10-32 screw (provided that the screws are properly tightened, lock washers are unnecessary.)
  - Number of screws per hinge bracket: Minimum of six (6) screws per hinge bracket spaced evenly along bracket, with one screw near each end.
- 7). There shall be two (2) basic BBS mounting options:
  - a). Configuration 1 – The BBS (Inverter/Charger, Bypass Switch and Transfer Relay only) installed inside the 332A Cabinet, with the batteries installed in the externally mounted cabinet. See Figure 925-8 for location of inverter in 332A cabinet.
  - b). Configuration 2 – The entire BBS, including batteries, installed inside the externally mounted cabinet.



Figure 925-8 BBS Mounting Diagram

For a typical Model 332A Cabinet



Notes:

Area inside of dashed lines represents available mounting locations for BBS. Prescribed available mounting areas are approximate. All dimensions shown are in inches.

8). External Cabinet

- a). The External Cabinet shall be used for housing batteries and/or BBS, which includes inverter/charger unit, power transfer relay, manually operated bypass switch, any other control panels, and all wiring and harnesses.
- b). The same Inverter/Charger, Power Transfer Relay and manually operated Bypass Switch that fits inside a typical fully equipped CALTRANS Model 332A Cabinet shall also be able to fit inside the externally mounted cabinet.
- c). The External Cabinet shall be a NEMA 3R rated cabinet conforming to TEES, August 16, 2002 Chapter 7, Section 2-Housings for the construction and finish of the cabinet. The specific finish of the external cabinet shall match the finish of the 332A cabinet. Anti-Graffiti paint shall not be used. Two separate mounting installations shall be used. Refer to the project plans for the appropriate mounting installation.
  - i). *Mounting Installation Type A shall be typically used for installing at locations with existing 332 cabinet. This cabinet mounting installation shall attach the external cabinet to the side of the 332 cabinet in the relationship as shown in figure 925-9. Type A mounting installation shall use fasteners that meet the following requirements:*
    - (Total of 8 bolts per cabinet with 2 flat washers per bolt and 1 K-lock nut per bolt)
    - Cabinet mounting bolts shall be:
    - 18-8 Stainless Steel Hex Head (Fully Threaded)
    - 3/8" – 16 X 1"
    - Washers shall be:
    - Designed for 3/8" bolt
    - 18-8 Stainless Steel 1" OD round flat type
    - K-lock washer shall be:
    - 18-8 Stainless Steel, Hex Nut Assembled with Free-Spinning Tooth Washer
    - 3/8" – 16 Screw size

External Cabinet to 332A Cabinet couplings shall provide a conduit for power connections between the 332A Cabinet and External Cabinet. The couplings shall consist of three parts and meet the following requirements:

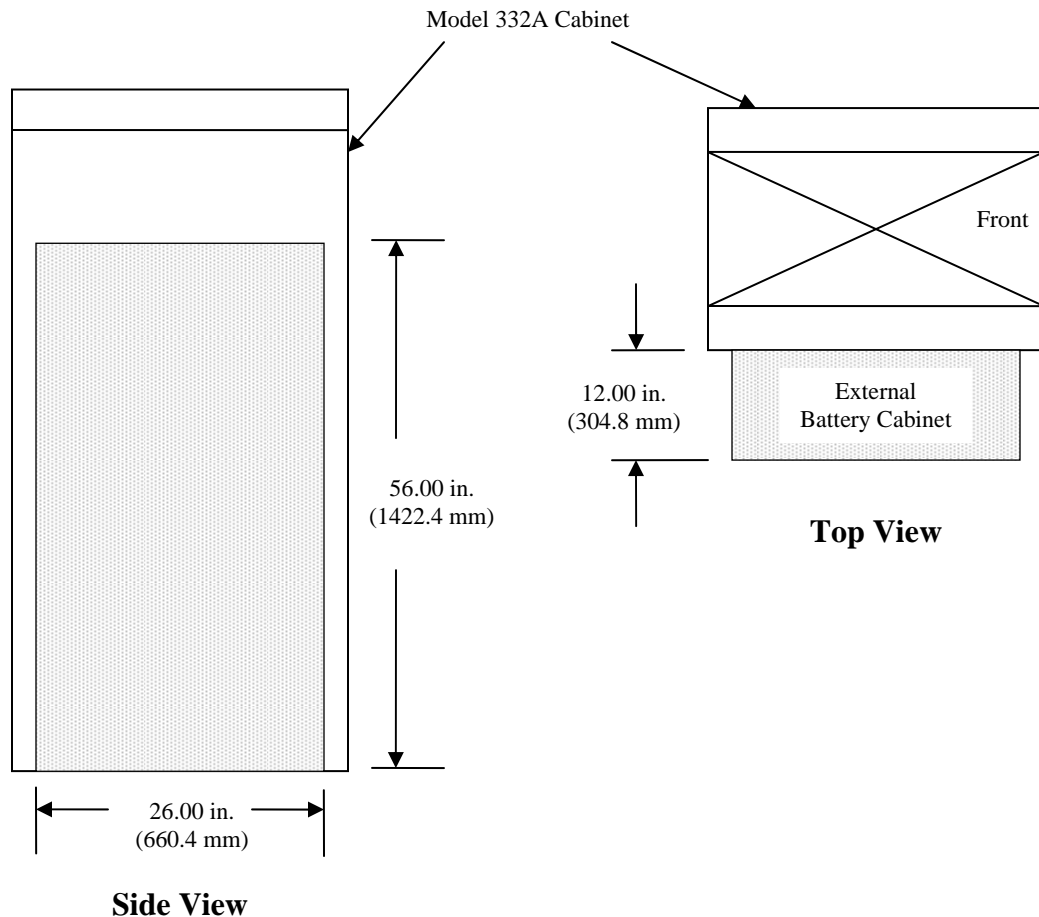
- 2" Nylon Insulated, Steel Chase Nipple
- 2" Sealing, Steel Locknut
- 2" Nylon Insulated, Steel Bushing

The external cabinet shall come provided with all bolts, washers, nuts and cabinet-cabinet coupler fittings provided, necessary for mounting the external cabinet to the 332A Cabinet.

ii. Mounting Installation Type B shall be typically used for locations where a new traffic controller cabinet and foundation are being installed. This cabinet installation shall provide the external battery cabinet as a base mount cabinet on the same foundation as the 332 cabinet. Connections between the cabinets shall be through conduit in the cabinet base. The external cabinet shall be installed in the same relationship as shown in figure 925-9 to the 332 cabinet. The external cabinet shall be installed so that it is centered on the 30 inch left side of the 332 cabinet.

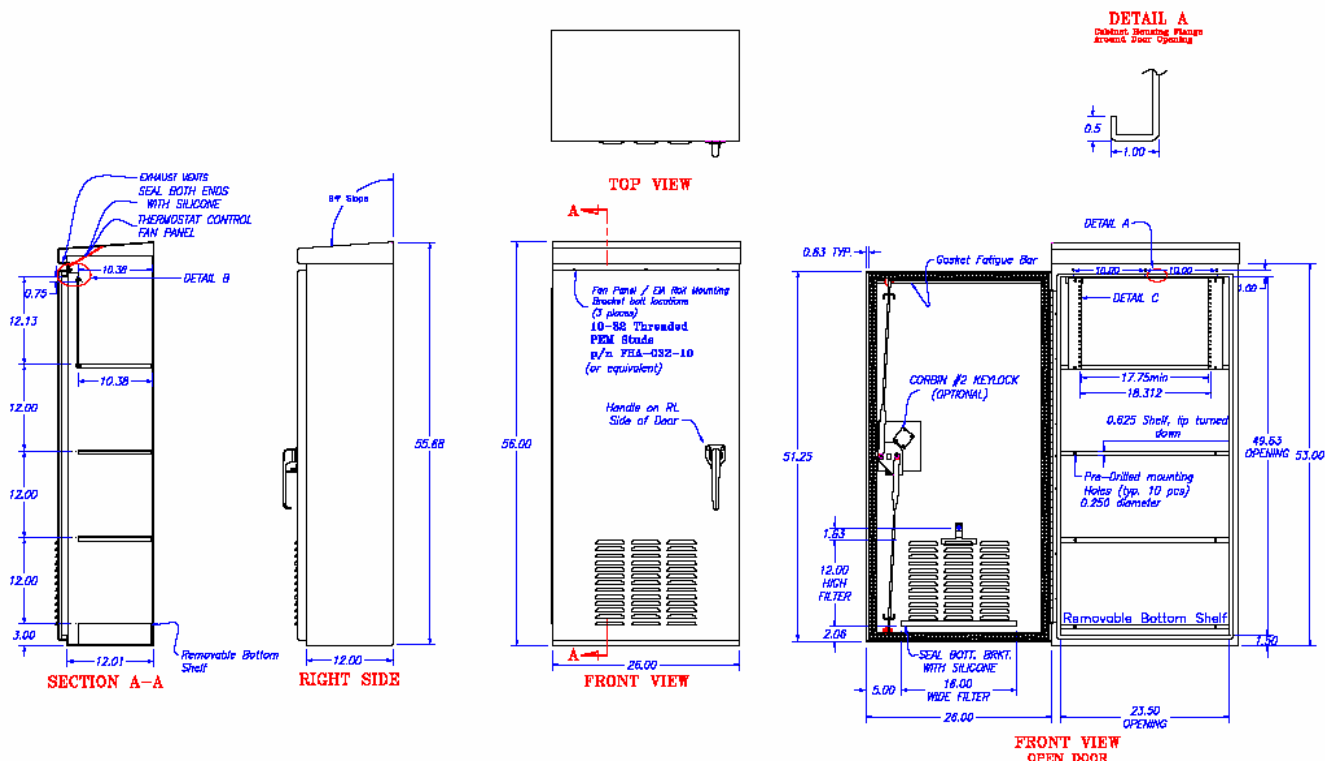
Figure 925-9 External BBS Cabinet Details

## External Battery Cabinet



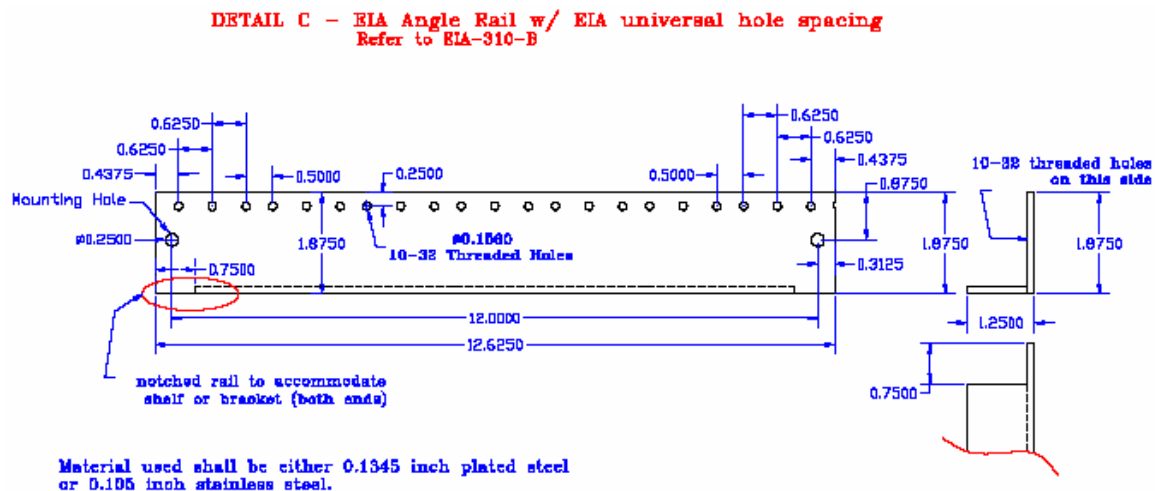
- d). The specific dimensions and details of the external battery cabinet shall be as shown in Figures 925 – 10 through 925 – 12.

Figure 925-10 External BBS Cabinet Details



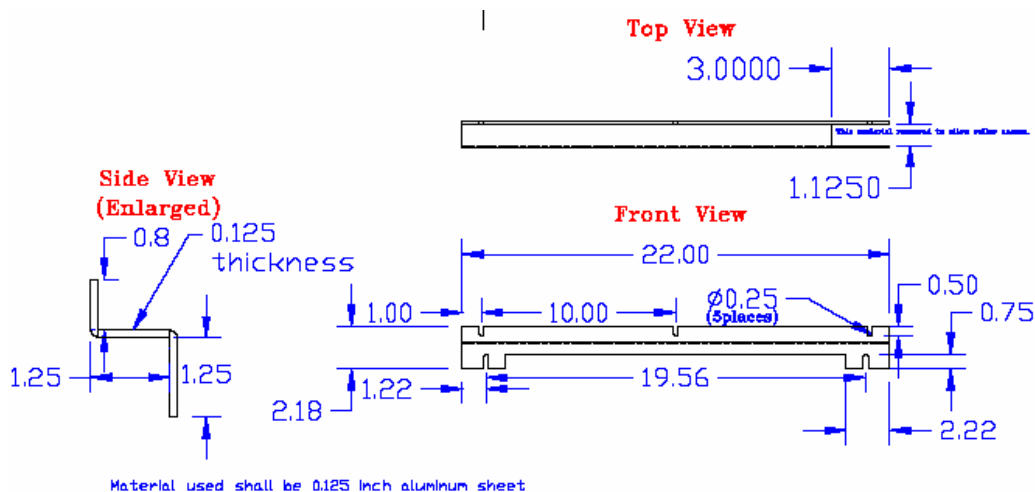
- e). Four shelves shall be provided. There shall be a minimum of 304.8mm (12”) clearance between shelves. Each shelf shall be a minimum of 263.65mm (10.38”) X 635.0mm (25”), and capable of supporting a minimum of 57kg (125 lbs.). Shelf edges shall be turned down on all four sides for support and to provide a flat top surface. Shelves shall be predrilled with EIA rail mounting holes. Shelves shall provide a vertical “passageway” for wiring in the rear of the cabinet on both the left and right.
- f). The bottom shelf shall be capable of being removed.

Figure 925-11 EIA Rail for Mounting Inverter or PTR inside External BBS Cabinet



- g). The external cabinet shall be ventilated through the use of louvered vents, filter, and one thermostatically controlled fan as per TEES Chapter 7 Section 2-Housings.
- h). External cabinet fan shall be AC operated from the same line output of the Manual Bypass Switch that supplies power to the 332 Cabinet. A 2-position terminal block shall be provided on the fan panel, along with 3 meters (10 feet) of connected hookup wire.
- i). The door shall be attached to the cabinet through the use of either a continuous stainless steel piano hinge or four, two-bolts per leaf, hinges as per TEES Chapter 7 Section 2. The door shall use a padlock clasp or latch and lock mechanisms as described in the TEES, in order to lock the door.
- j). Two EIA angle rails, per Detail C, Figure 925 – 11, along with all necessary mounting hardware (4 sets of 10-32 bolts and nuts with captive washers) shall be provided with the external cabinet (not installed). Rails shall be symmetric to allow for installation on either right or left sides of the cabinet. Mounting holes and bracket shall allow for EIA rail installation at any location in the external cabinet. The EIA mounting angle nominal thickness shall be either 0.1345 inch (3.4163mm) plated steel or 0.105 inch (2.667mm) stainless steel.
- k). EIA rail mounting bracket shall be of continuous, one-piece design bolted into the cabinet to provide adequate support for rail-mounted equipment. See Figure 925 – 12.
- l). Pressed in, flush-head threaded screw posts shall be inserted into the front face of the cabinet enclosure top sill. These threaded posts shall be used to mount both the fan panel and the EIA rail-mounting bracket. The screw posts shall be #10-32 thread size stud 0.625 inches in length. Refer to Figure 925 – 10, front views for mounting detail.

Figure 925 – 12 EIA Rail Mounting Bracket for Mounting EIA Rails inside External BBS Cabinet



### 3. Maintenance, Displays, Controls and Diagnostics

- a. The BBS shall include a display and /or meter to indicate current battery charge status and conditions.
  - 1). The BBS shall provide voltmeter standard probe input-jacks (+) and (-) to read the exact battery voltage drop at the inverter input.
  - 2). The BBS shall include a 0 to 100% battery capacity LED indicator.
- b. The BBS shall have lightning surge protection compliant with IEEE/ANSI C.62.41.
- c. The BBS shall be equipped with an integral system to prevent battery from destructive discharge and overcharge.
- d. The BBS and batteries shall be easily replaced with all needed hardware and shall not require any special tools for installation.
- e. The BBS shall include a front-panel event counter display to indicate the number of times the BBS was activated and a front-panel hour meter to display the total number of hours the unit has operated on battery power. Both meters shall have push button resets.

- f. Manufacturer shall include a set of equipment lists, operation and maintenance manuals, and board-level schematic and wiring diagrams of the BBS, and the battery data sheets. Manual shall conform to TEES August 16, 2002, Chapter 1, Section 1.2.4.2.

#### 4. Battery System

- a. Individual batteries shall be:
  - 1). Voltage rating: 12V type
  - 2). Group size: 24 maximum
  - 3). Batteries shall be easily replaced and commercially available off the shelf.
- b. Batteries used for BBS shall consist of 4 to 8 batteries with a cumulative minimum rated capacity of 240 amp-hours.
- c. Batteries shall be deep cycle, sealed prismatic lead-calcium based AGM/VRLA (Absorbed Glass Mat/ Valve Regulated Lead Acid).
- d. Batteries shall be certified by the manufacturer to operate over a temperature range of  $-25\text{ }^{\circ}\text{C}$  (-13F) to  $+74\text{ }^{\circ}\text{C}$  (+165 F).
- e. The batteries shall be provided with appropriate interconnect wiring and corrosion-resistant mounting trays and/or brackets appropriate for the cabinet into which they will be installed.
- f. Batteries shall indicate maximum recharge data and recharging cycles.
- g. Battery Harness
  - 1). Battery interconnect wiring shall be via two-part modular harness.
  - 2). Part I shall be equipped with red (+) and black (-) 30.48 cm (12 inches) cabling that can be permanently connected to the positive and negative posts of each battery. Each red and black pair shall be terminated into an Anderson Power Pole Connector or AMP Power Series Connector or equivalent style connector.
  - 3). Part II shall be equipped with the mating Power Pole style connector for the batteries and a single, insulated Power Pole style connection to the inverter/charger unit. Harness shall be fully insulated and constructed to allow batteries to be quickly and easily connected in any order to ensure proper polarity and circuit configuration.
  - 4). Power Pole style connectors may be either one-piece or two-piece. If a two-piece connector is used, a locking pin shall be used to prevent the connectors from separating.
  - 5). The length of the battery interconnect harness (Part II) shall be a minimum of 152.4 cm (60 inches) from the Inverter/Charger plug to the first battery in the string. The lateral length of the harness between battery connectors shall be a minimum of 30.48 cm (12 inches).
  - 6). All battery interconnect harness wiring shall be UL Style 1015 CSA TEW or Welding Style Cable or equivalent, all of proper gauge with respect to design current and with sufficient strand count for flexibility and ease of handling.
  - 7). Battery terminals shall be covered and insulated with molded boots so as to prevent accidental shorting.

#### B. Fabrication

Refer to [Subsection 925.2.07.A.1](#) for controller cabinet minimum fabrication Specifications.

#### C. Acceptance

General Provisions 101 through 150. Each BBS shall be manufactured in accordance with a manufacturer Quality Assurance (QA) program. The QA program shall include two Quality Assurance procedures: (1) Design QA and (2) Production QA. The Production QA shall include statistically controlled routine tests to ensure minimum performance levels of BBS units built to meet this specification and a documented process of how problems are to be resolved. The manufacturer, or an independent testing lab hired by the manufacturer, shall perform Design Qualification Testing on new BBS system(s) offered, and when any major design change has been implemented on an existing design. A major design change is defined as any modification, material, electrical, physical or theoretical, that changes any performance characteristics of the system, or results in a different circuit configuration. Where a dispute arises in determining if a system is a new design or if the system has had a major design change, the State will make the final determination if Design Qualification Testing is required prior to production consideration.

Production Quality Control tests shall be performed on each new system prior to shipment. Failure to meet this requirements shall be cause for rejection. The manufacturer shall retain test results for seven years. Each BBS shall be given a minimum 100-hour burn-in period to eliminate any premature failures. Each system shall be visually inspected for any exterior physical damage or assembly anomalies. Any defects shall be cause for rejection.

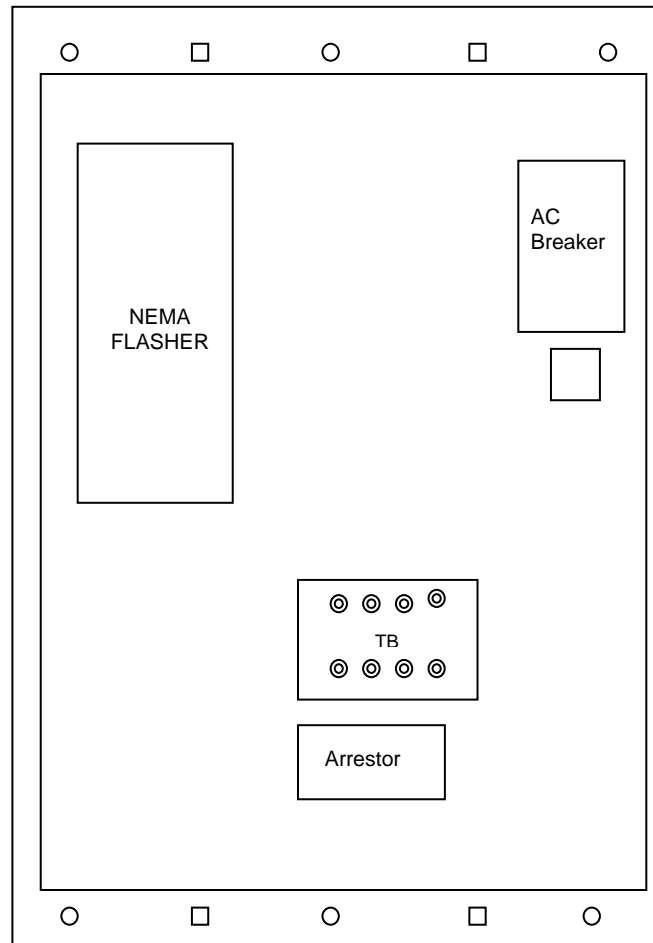
## D. Materials Warranty

Refer to [Subsection 925.2.01.D](#) for Materials Warranties. Manufacturers shall provide a two (2) year factory-repair warranty for parts and labor on the BBS from date of acceptance by the Department. Batteries shall be warranted for full replacement for two (2) years from date of purchase. The warranty shall be included in the total bid price of the BBS.

## 925.2.07 Flashing Beacon Assembly

### A. Requirements

This specification is for a flashing signal cabinet, which consists of an aluminum cabinet containing a flasher assembly, Field connection terminal block, surge arrester and circuit breaker wired in a manner to operate flashing beacons. Refer to [Figure 925-13](#).



Note: Front view of cabinet Door Assembly not shown  
No scale

Figure 925-13—Typical Flashing Signal Cabinet Layout

#### 1. Cabinet

Supply a NEMA Type 3R cabinet assembly, manufactured of aluminum with a minimum thickness of 0.125 inches (3 mm).

Ensure that the cabinet exterior has a smooth, uniform “bare” aluminum finish with all joints between adjoining cabinet components (sides and bottom) continuously welded on the outside to prevent the intrusion of moisture and dust.

Ensure that all welds are free of cracks, blow holes and other irregularities.

Supply a cabinet with the following exterior dimensions:

	<u>Minimum</u>	<u>Maximum</u>
Height	14 inches (350 mm)	18 inches (450 mm)
Width	10 inches (250 mm)	14 inches (350 mm)
Depth	7 inches (175 mm)	10 inches (250 mm)

Use a cabinet door that is double flanged on all four sides to prevent the entry of dirt and liquids when the door is open.

Install a one-piece gasket formed around the door opening to insure a weather tight seal when the door is secured. Attach the door to the cabinet housing by a continuous tamper proof hinge.

Equip each cabinet with a Corbin #2 lock and one key. Police panel type locks are not acceptable.

Install an aluminum back panel in the cabinet, mounted on standoffs, to facilitate mounting of internal components.

Install exterior aluminum mounting brackets, which extend a minimum of 1.75 inches (44 mm) and a maximum of 2.5 inches (63 mm) from the top and bottom of the cabinet.

Use brackets that extend across the full width of the cabinet back on the top and bottom.

Provide these brackets with holes for mounting to a flat surface with screws and vertical slots for banding to steel, concrete or wooden signal poles.

## 2. Flasher Unit

Supply a standard plug in two circuits NEMA flasher.

Ensure that the flasher is of all solid state construction, meets the requirements of the NEMA Standards and is rated at a minimum of 10 A per circuit.

Ensure that the flasher utilizes zero voltage turn-on and turn-off current and is capable of dimming outputs.

## 3. Surge Arrestor

Supply a flasher cabinet that incorporates an AC surge arrestor to protect the internal components from lightning and over voltages on the AC service input.

The requirements for the surge arrestor are:

Two Stage Arrestor	
Peak Surge Current	20000 A
Peak Surge Voltage @ 20KA	280 V
Clamp Voltage	280 V @ 20 kA
Continuous AC Voltage	120 V AC RMS
Response Time	<5 nsec
Operating Temp.	-40 °F to 185 °F (-40 °C to 85 °C)

## 4. Circuit Breaker

Include a 15 A circuit breaker in the cabinet. The circuit breaker shall have the following characteristics.

Thermal Magnetic 1 pole 120/240 VAC at 50/60 Hz 15 A

Interrupting Rating of 10KA at 48 VDC

Wire Size 14 to 2 AWG

35 MM Din Rail mounting

## 5. Terminal Block

Include a four position terminal block in the cabinet for making field connections. Properly label all field terminal connections.

## 6. Construction

Assemble the flasher assembly, terminal block, surge arrestor and circuit breaker in the cabinet as shown on the attached drawing.

Wire all components together as a working unit, thus requiring only field connections to and from the AC power and flashing beacons.

## B. Fabrication

Refer to [Subsection 925.2.07.A.1](#) for controller cabinet minimum fabrication specifications.

**C. Acceptance**

General Provisions 101 through 150.

**D. Materials Warranty**

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

**925.2.08 Flashing Signal Cabinet With Time Clock**

**A. Requirements**

This specification is for a flashing signal cabinet with time clock which consists of an aluminum cabinet containing a flasher assembly, time clock, field connection terminal block, surge arrestor and circuit breaker wired in a manner to operate school flashing beacons. Refer to [Figure 925-14](#).

1. Cabinet

Supply a NEMA Type 3R cabinet assembly that is manufactured of aluminum with a minimum thickness of 0.125 inches (3 mm).

Ensure that the cabinet exterior has a smooth, uniform natural aluminum finish, and that all joints between adjoining cabinet components (sides and bottom) are continuously welded on the outside to prevent the intrusion of moisture and dust.

Ensure that all welds are free of cracks, blow holes and other irregularities.

The exterior dimensions of the cabinet are as follows:

	<u>Minimum</u>	<u>Maximum</u>
Height	14 inches (350 mm)	18 inches (450 mm)
Width	10 inches (250 mm)	14 inches (350 mm)
Depth	12 inches (300 mm)	16 inches (400mm)

Supply a cabinet door that is double flanged on all four sides to prevent the entry of dirt and liquids when the door is open.

Use a one-piece gasket that is formed around the door opening to insure a weather tight seal when the door is secured.

Attach the door to the cabinet housing with a continuous tamper proof hinge.

Provide each cabinet with a Corbin #2 lock and one key. Police panel type locks are not acceptable.

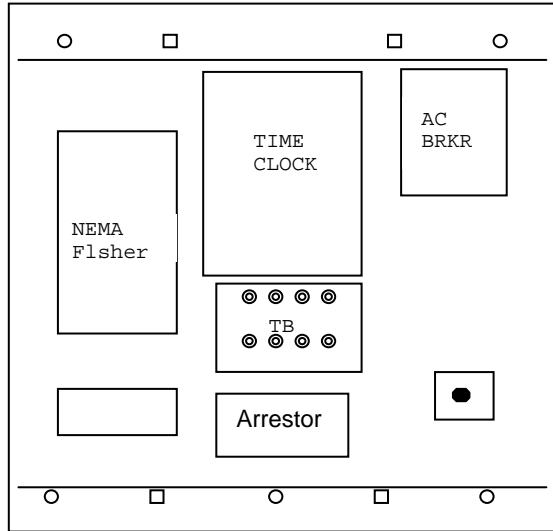
Supply each cabinet with an aluminum back panel mounted on standoffs to facilitate mounting of internal components.

Supply cabinets with exterior aluminum mounting brackets, which extend a minimum of 1.75 inches (44 mm) and a maximum of 2.5 inches (63 mm) from the top and bottom of the cabinet.

Use brackets that extend across the full width of the cabinet back on the top and bottom.

Provide these brackets with holes for mounting to a flat surface with screws and vertical slots for banding to steel, concrete or wooden signal poles.





Note: Front view of cabinet Door Assembly not shown No scale

Figure 925-14—Typical Flashing Cabinet with Time Clock Cabinet Layout

2. Flasher Unit

Supply a standard plug in, two circuits NEMA flasher.

Ensure that the flasher is of all solid state construction, meets the requirements of the NEMA Standards and is rated at a minimum of 10 A per circuit.

Ensure that the flasher utilizes zero voltage turn-on and turn-off current and be capable of dimming outputs.

3. Time Switch

Supply a time switch that meets the requirements of [Subsection 925.2.09](#) of this specification.

4. Surge Arrestor

Supply flasher cabinets that incorporate an AC surge arrester to protect the internal components from lighting and over voltages on the AC service input.

The requirements of the surge arrester are as follows:

Two Stage Arrester

Peak Surge Current	20000 A
Peak Surge Voltage @ 20KA	280 V
Clamp Voltage	280 V @ 20 kA
Continuous AC Voltage	120 V AC RMS
Response Time	<5 nsec
Operating Temp.	-40 °F to 185 °F (-40 °C to 85 °C)

5. Circuit Breaker

Include a 15 A circuit breaker in each cabinet. The circuit breaker shall have the following characteristics.

- Thermal Magnetic 1 pole 120/240 VAC at 50/60 Hz 15 A
- Interrupting Rating of 10KA at 48 VDC
- Wire Size 14 to 2 AWG
- 35 MM Din Rail mounting

6. Terminal Block

Include a four position terminal block in each cabinet for making field connections. Properly label all field terminal connections.

## 7. Construction

Assemble the flasher assembly, terminal block, surge arrestor and circuit breaker in the cabinet as shown on the attached drawing.

Wire all components together as a working unit, thus requiring only field connections of the AC power and flashing beacons.

## B. Fabrication

Refer to [Subsection 925.2.07.A.1](#) for controller cabinet minimum fabrication Specifications.

## C. Acceptance

General Provisions 101 through 150.

## D. Materials Warranty

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

## 925.2.09 Time Clock

### A. Requirements

Supply time clocks that are single circuit, calendar programmable, solid state, fully self-contained units (RTC AP 21 or Eltec NTC 17E or equivalent) that meet the following Specifications:

1. Alphanumeric liquid crystal display.
2. Automatic daylight savings time and leap year compensation. Changes in the daylight savings time program made through the keypad do not require hardware modification.
3. Minimum twenty-four (24) hour capacitive back up. Battery back up is not acceptable.
4. Keypad entry programming without the use of any external devices such as a PC, external programming unit, another time switch, etc.
5. Operate on 95 to 135 V AC, 60 Hz line current.
6. SPDT relay output rated at 15 A.
7. Maximum size of 4.25 inches (110 mm) wide, 8.25 inches (210 mm) high and 2 inches (50 mm) deep.
8. A programming manual is to be included with each unit.

### B. Fabrication

General Provisions 101 through 150.

### C. Acceptance

General Provisions 101 through 150.

### D. Materials Warranty

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

## 925.2.10 Self Tuning Loop Detector

### A. Requirements

This specification sets forth the minimum acceptable design, operational and functional performance requirements for multi-channel, inductive loop vehicle detection systems.

1. General Requirements
  - a. Mounting  
Ensure that the unit is configured for rack mount insertion into a NEMA (TS 1 or TS 2) card rack and/or CALTRANS Type 2070 cabinet input file.
  - b. Environmental  
Ensure that the unit is in full compliance with the environmental tests, transient tests and size requirements of NEMA standard TS-1 Section 15, TS-2 Section 6.5 and the California Type 2070 Specifications.  
Provide documentation from an independent laboratory, which certifies that the unit is in compliance with the above Specifications.

- c. LED Indicator  
Ensure that each channel includes two high visibility LED indicators; one for the detect state and the second to indicate the status of the fault monitor.
  - d. Phase Indicator  
Ensure that each channel has an erasable write-on pad to aid in identification of the associated phase or function.
2. Operational Requirements
- a. Tuning  
Supply units that are fully digital and self-tuning.  
Ensure that each channel of the unit can automatically tune to any loop and lead in combination within two (2) seconds of application of power or when a reset signal is received.  
Ensure that the tuning circuit is designed so that drift, caused by environmental changes or changes in applied power, does not cause false actuations.
  - b. Scanning  
Supply units that sequentially scan each channel (only one channel energized at any given time) to eliminate crosstalk from multiple loops in adjacent lanes and/or allow overlapped loops for directional control and/or allow use of multi-conductor homerun cable when connected to the same detector unit.
  - c. Sensitivity Setting  
Ensure that each channel is equipped with front panel selectable sensitivity settings in presence and pulse modes.
  - d. Frequency  
Supply units that have a minimum of three switch selectable operating frequencies.
  - e. Inductance Range  
Ensure that each channel can tune to an inductive load from 50 to 2000 microhenries with a Q factor > 5.
  - f. Grounded Loops  
Ensure that each channel can continue to operate with poor quality loop systems ( $Q > 2$ ) including those that have a single point short to ground.
  - g. Fault Monitoring  
Supply units that constantly monitor the operation of each channel.  
Ensure that the unit detects shorted loops, open circuit loops or sudden changes in inductance (>25% of nominal).  
Ensure that each type of fault is indicated on a fault LED by a unique sequence of flashes until the fault is rectified.  
Ensure that while the channel is in the fault condition, the channel output remains in the detect state.  
When the fault is rectified, the fault LED continues to emit the sequence signifying the last fault detected, but the detect LED and output returns to normal operation.
  - h. Failsafe Output  
Ensure that each channel output generates a continuous solid state output to the controller when power to the detector is removed.
  - i. Operational Modes  
Supply units with each channel selectable for either pulse or presence modes and that meet the following requirements:
    - Pulse Mode  
This setting provides a single output pulse (125 ms +/- 25) in response to a vehicle entering the loop. If a vehicle remains in the sensing zone in excess of two (2) seconds, the unit "tunes out" said vehicle. The channel is then capable of detecting another vehicle entering the same detection zone.
    - Presence Mode  
The presence hold time is a minimum of four (4) minutes for small vehicles (motorcycles) and a minimum of sixty (60) minutes for automobiles.  
Ensure that the unit tunes out of continuous peak hour traffic over long or multiple small loops as long as there is vehicle motion in the sensing zone every ten (10) minutes.

j. Resets

Ensure that the channels are manually resettable by removing the power momentarily.

Ensure that the channels reset remotely when the voltage on Pin C falls below 8 V DC for a period > 15 $\mu$ s, and that the unit resumes normal operation within four (4) seconds after the application of power or after a reset signal of 15 $\mu$ s.

k. Field Tuning

Ensure that field adjustments to the operation of the detector do not require the use of a meter, circuit changes, special software or any substitutions, modifications or additions to the unit.

3. Performance Requirements

If testing should be required, provide the Department with a test unit and/or software within ten (10) calendar days of the request.

Should the unit fail to meet the design and/or performance requirements of this specification, the unit will be rejected.

Ensure that the units meet the following requirements:

- a. Capable of detecting passage, holding presence and accurately counting all types of licensed motor vehicles when connected in various loop configurations and lead-in combinations without detecting vehicles in adjacent lanes.
  - Typical Loop Configurations with Lead-in of 5 feet (1.5 m) to 1,500 feet (1000 m) are:
    - 6 feet x 6 feet (1.8 m x 1.8 m)
    - 6 feet x 20 feet (1.8 m x 6 m)
    - 6 feet x 40 feet [(1.8 m x 12 m) standard or quadropole]
- b. Capable of responding to an inductance change of 0.02% and sense vehicles at speeds of up to 80 mph (130 km/h).
- c. Not detect vehicles, moving or stopped, at distances greater than three feet for any loop perimeter.
- d. Detect all vehicles over multiple turn and/or multiple loops that may be connected in series, parallel or series/parallel with homerun lengths from <5 feet (1.5 m) to > 1,500 feet (1,000 m).

4. Optional Features

In addition to the requirements listed in the previous sections, the units may be requested with any combination of the following optional features:

a. Option 1- Timing Features - Delay & Extension

When this option is specified, ensure that the unit incorporates the following features:

- 1). Delay Timing  
Minimum selectable delay time of 1 to 30 seconds in minimum 1-second increments for each channel.
- 2). Extension Timing  
Minimum selectable extension time of 0.5 to 10 seconds in minimum 0.5-second increments for each channel.

b. Option 2 - Advanced Features

When the option for advanced features is specified, supply units that incorporate the following advanced features:

- 1). Serial Port Interface  
When the serial port interface is specified, equip the detector with a front and rear panel RS 232 port for the transmission of data. Provide Windows 95 compatible software for interfacing with the detector.
- 2). PC Interface  
Ensure that PC software, when connected directly to the unit through the front panel RS 232 port, provides a screen to display the following loop system operating characteristics, on a per channel basis, for system setup, data collection and diagnostics.
  - Loop Status
  - Loop Inductance ( $\mu$ H)
  - Loop Frequency (kHz)
  - Inductance Change (nH)

- Last Fault: Open, Shorted, >25% ΔL
  - Fault Occurrence: Date & Time
  - Vehicle Count
- 3). Speed, Volume & Occupancy  
 The software, when connected directly to the unit, is capable of collecting and storing speed, volume and occupancy data from each detector channel.  
 The software allows assignment of loop-to-loop distances to enable accurate speed and vehicle length measurements.  
 The speed volume and occupancy information is uploaded and stored in the vendor-supplied software.  
 Upon request, supply the necessary information/protocols to allow the Department to write custom software to retrieve speed, volume and occupancy data.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

General Provisions 101 through 150.

**D. Materials Warranty**

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

**925.2.11 Loop Sealant**

**A. Requirements**

Furnish and install loop sealant according to [Subsection 833.2.09, “Polyurethane Sealant for Inductive Loops”](#). For a list of sources, see [QPL 75](#).

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

General Provisions 101 through 150.

**D. Materials Warranty**

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

**925.2.12 Vehicle Signal Heads**

**A. Requirements**

Supply vehicle signal heads that are 12 inches (300 mm) in diameter for traffic signal control applications. For ramp metering systems supply both 12 inches (300 mm) and 8 inches (200 mm) as per the Plans.

Ensure that the 8 inch (200mm) or 12 inch (300 mm) polycarbonate vehicle signal heads meet the current ITE specification on Vehicle Traffic Control Signal Heads with the following modifications and / or clarifications:

1. Unless otherwise approved by the Engineer or as noted on the Plans, supply signal heads with the following exterior color scheme:
  - Signal Housing - Highway Yellow.
  - Front Face including Doors and Visors: Flat Black
2. Provide housing and housing door that are one piece injection molded ultraviolet and heat stablized polycarbonate resin with the color impregnated in the material.
3. Terminate the wiring from each signal section in the top section of the head assembly. Ensure that the cable jacket is a minimum of 6 inches inside the signal head assembly.
4. Provide the appropriate Vehicle Signal LED Signal in each section either Circular or Arrow Module.
5. Provide an effective seal with the LED module to make the assembly weather tight.

6. Mount one aluminum reinforcing support plate in the top of the red section of each three, four or five-section signal head for the installation of mounting hardware.
7. Install a support plate between each section of all signal heads. Place these plates such that there is a plate in the bottom of and/or top of any sections where sections adjoin to another section.
8. Provide Signal Heads that use stainless steel hardware and are weather tight. Ensure signal heads that are supplied are sealed for mounting in all possible configurations.
9. Provide Signal Heads that have housing door that “positively” latches using two eyebolts and wing nuts. Ensure the Signal door has hinge lugs molded on one side and two latch jaws are molded on the other side.
10. Provide signal heads that provide a positive method of holding the lens such that the lens does not rotate. Ensure the lens is weather tight. Lens clips which do not apply firm pressure to the lens gasket to avoid rotation are not acceptable.

**B. Fabrication**

Refer to ITE Standards for material composition and finish Specifications.

**C. Acceptance**

Refer to ITE Standards for material composition, finish Specifications, and wind loading requirements.

**D. Materials Warranty**

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

**925.2.13 Pedestrian Signal Head**

**A. Requirements**

Provide each section with a visor encompassing the top and sides of the signal face of a size and shape adequate to shield the lens from external lighted sources.

An acceptable option is a “Z-crate” or louver type visor for mounting over the Pedestrian signal face.

Construct the housing of one piece cast aluminum alloy with two integrally hinge lugs, screw slots and openings at each end. Construct the door of one piece cast aluminum alloy with two hinge lugs cast on top of the door and two latch points cast on the bottom. Provide hinge pins of stainless steel to attach the door to the housing and two eye bolts and wing nuts on the other side of the door.

Ensure that the door is provided with a neoprene gasket capable of making a weather resistant, dustproof seal when closed. Supply Pedestrian signal heads with a black face and a yellow body, unless otherwise specified on the Plans.

Ensure that Pedestrian indications are distinguishable to the Pedestrian both day and night and at all distances from 10 feet (3 m) to the full width of the areas to be crossed.

Use symbols that are 12 inches (300 mm) high. Use only internal illumination.

Ensure that when illuminated, the “HAND” symbol is Portland Orange and the “PERSON” symbol is Lunar White, meeting the ITE Standards. Ensure that an opaque material obscures all areas of the face or lens, except for the message. Ensure that when not illuminated, the symbols are not to be distinguishable by Pedestrians at the far end of the crosswalk they control.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

General Provisions 101 through 150.

**D. Materials Warranty**

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

## 925.2.14 Optically Programmed Signal Head

### A. Requirements

Supply signal heads that permit the visibility zone of the indication to be determined optically and require no hoods or louvers.

The projected indication may be selectively visible or veiled anywhere within 15 degrees of the optical axis.

Ensure that no indication results from external illumination and that one light unit does not illuminate a second. The components of the optical system include the lamp, lamp collar, optical limiter-diffuser, and objective lens.

Ensure that the optical system accommodates projection of diverse, selected indications to separate portions of the roadway such that only one indication will be simultaneously apparent to any viewer.

Ensure that the projected indication conforms to ITE transmittance and chromaticity Standards.

#### 1. Construction

- a. Provide an LED Lamp Module that is a direct replacement for the incandescent lamp. Ensure the Lamp modules are on the latest CALTRANS QPL for LED Programmed Visibility Modules. Ensure the unit provided operates over the voltage range of 80 to 135 VAC and the temperature range of -40 C (-40 F) to 74 C (165 F). Provide modules that conform to the applicable portions of section 925.2.15. Ensure the unit provides a minimum luminous intensity of 500 candela and does not exceed 18 watts at 25 C (77 F).

Couple the lamp to the diffusing element with a collar including a specular inner surface. The diffusing element may be discrete or integral with the convex surface of the optical limiter.

- b. Supply an optical limiter with an accessible imaging surface at focus on the optical axis for objects 900 to 1,200 feet (270 to 360 m) distance and permit an effective veiling mask to be variously applied as determined by the desired visibility zone.

Ensure that the optical limiter is provided with positive indexing means and is composed of heat-resistant glass.

- c. Ensure that the objective lens is a high-resolution planar incremental lens hermetically sealed within a flat laminate of weather resistant acrylic or approved equal.

Supply a lens that is symmetrical in outline and that may be rotated to any 90-degree orientation about the optical axis without displacing the primary image.

#### 2. Mounting

- a. Supply signals that mount to standard 1.5 inch (38 mm) fittings as a single section, as a multiple section face, or in combination with other signals.

Provide signal sections with an adjustable connection that permits incremental tilting from 0 to 10 degrees above or below the horizontal while maintaining a common vertical axis through couplers and mounting.

Ensure that terminal connections permit external adjustment about the mounting axis in 5-degree increments.

- b. Ensure that the signal is mountable with ordinary tools and capable of being serviced with no tools.

Supply attachments such as back plates or adapters that conform and readily fasten to existing mounting surfaces without affecting water and light integrity of the signal. Supply heads with tri-studs for mounting.

#### 3. Electrical

Supply lamp fixtures that comprise a separately accessible housing and integral lamp support indexed ceramic socket and self-aligning, quick release lamp retainer.

Ensure that electrical connection between case and lamp housing can be accomplished with an interlock assembly, which disconnects lamp holder when opened. Include a covered terminal block for clip or screw attachment of lead wires for each signal section.

Use concealed No. 18 AWG, stranded and coded wires to interconnect all sections to permit field connection within any section.

#### 4. Photo Controls

Ensure that each signal includes integral means for regulating its intensity between limits as a function of the individual background illumination.

Ensure that lamp intensity is not less than 97% of uncontrolled intensity at 10 750 lux, and reduces to 15 + 2% of maximum at less than 10.75 lux.

Ensure that response is proportional and essentially instantaneous to any detectable increase of illumination from darkness to 10 750 lux, and damped for any decrease from 10 750 lux.

Ensure that the intensity controller is comprised of an integrated, directional light sensing and regulating device interposed between lamp and line wires.

Ensure that it is compatible with 60 Hz input and responsive within the range 105 to 135 V AC.

Output may be phase controlled, but ensure that the device provides nominal terminal impedance of 1,200  $\Omega$  open circuit and a corresponding holding current.

## **B. Fabrication**

General Provisions 101 through 150.

## **C. Acceptance**

General Provisions 101 through 150.

## **D. Materials Warranty**

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

### **925.2.15 LED Signal Modules**

#### **A. Requirements**

This specification covers Type 1 Light Emitting Diode (LED) red, green and yellow modules for vehicle signals for both Circular and Arrow indications. It also covers LED Pedestrian “HAND & PERSON” signal modules.

##### **1. General Requirements All Modules**

Ensure that Type 1 LED signal module include a LED circuit board with LEDs and required circuit components, 36 inch (900 mm) 16 AWG wire leads with strain relief and spade terminals, a rigid housing, and a one piece neoprene gasket.

Supply Type 1 LED signal modules that are watertight when mounted in the traffic signal housing.

Submit life data on the LEDs from the LED Signal Module manufacturer to calculate the expected useful life.

Supply modules with permanent markings of date of manufacture and date of installation.

Ensure that the Type 1 LED signal modules utilize the same mounting hardware that is used to secure the incandescent lens and gasket assembly.

##### **2. Optical All Modules**

Provide test data from an independent laboratory to verify that the performance of the product meets current ITE requirements.

Ensure that the individual LEDs are wired such that a catastrophic failure of one LED will result in the loss of not more than 5% of the signal module light output.

The failure of a single LED in a string or cluster of LED's causes loss of light from only that LED, not the entire string or indication.

Provide control circuitry that prevents the current flow through the LEDs in the “off” state to avoid any false indications as may be perceived by the human eye during daytime and nighttime hours.

Ensure that the LED signal module is operationally compatible with existing or new supplied conflict monitors (NEMA TS-1, NEMA TS-2, Model 210, Model 2010, ITS Cabinet CMU and AMU)..

Ensure that the LED Signal Module is operationally compatible with existing or new supplied load switches.

##### **3. Electrical All Modules**

Supply LED signal modules that operate over the temperature range of -40 °F to 165 °F (-40 °C to 74 °C).

Ensure that the power factor is 90% or greater, at nominal rated voltage, at 77 °F (25 °C), after 60 minutes of operation. Provide modules that do not exceed the maximum power consumption as shown in Table 925-18.



<b>Vehicle Indications</b>	<b>Red</b>		<b>Yellow</b>		<b>Green</b>	
<b>Temperature</b>	<b>25 C</b>	<b>74 C</b>	<b>25 C</b>	<b>74 C</b>	<b>25 C</b>	<b>74 C</b>
12 Inch (300 mm) Circular	11	17	22	25	15	15
8 Inch (200 mm) Circular	8	13	13	16	12	12
12 Inch (300 mm) Arrow	9	12	10	12	11	11
<b>Pedestrian Indications</b>	<b>Hand</b>				<b>Man</b>	
<b>Temperature</b>	<b>25 C</b>	<b>74 C</b>	<b>25 C</b>	<b>74 C</b>	<b>25 C</b>	<b>74 C</b>
12 Inch (300 mm)	10	12			9	12

Ensure that the total harmonic distortion (THD) is less than 20% at rated voltage, at 77 °F (25 °C) and that all LED traffic signal modules are in compliance with FCC noise regulations.

Ensure that the LED signal modules operate on line voltage, 120 V AC nominal, and are able to operate over the voltage range of 80 V AC to 135 V AC. Power Supply must be integral to the module.

Provide transient voltage suppression rated at 1,500 W for 1 millisecond and fusing with a maximum rating of 2 A to minimize the effect and repair cost of an extreme over voltage situation or other failure mode.

Ensure the lens of the modules that are polymeric and are not frosted have a surface coating to provide front surface abrasion resistance. Ensure the Red and Yellow section module lens are tinted to correspond with the wavelength (chromaticity ) of the LED. Ensure Green Section modules are clear.

Ensure the modules allow a reduction of the intensity of the light output in response to an input from the traffic signal controller. Ensure the minimum light output when dimmed is not less than 30% of the minimum maintained luminous intensity as defined in the applicable Signal Head Module.

#### 4. Circular Signal Modules

Supply LED Circular Signal Modules that fit in standard incandescent vehicle traffic signal housings and meet the Performance Specification of the ITE Vehicle Traffic Control Signal Heads: LED Circular Signal Supplement. In case of conflict, this specification shall govern. Before delivery of any modules supply certification that module is to be in compliance with these specifications. In addition substantiating documentation must be supplied from an independent test laboratory to show the product has passed design qualification testing in accordance with section 6.4 of the ITE Vehicle Traffic Control Signal Heads: LED Circular Signal Supplement. Ensure the report includes a Minimum Maintained Luminous Intensity chart for the module being provided that uses the same horizontal and vertical angles as shown in Table 1 of the ITE Vehicle Traffic Control Signal Heads: LED Circular Signal Supplement. Ensure all modules are provided with a signed copy of the production and test and inspection as detailed in section 6.3 of the ITE Vehicle Traffic Control Signal Heads: LED Circular Signal Supplement.

Supply lenses for that are made of ultraviolet stabilized polycarbonate. Ensure that the external lens surface is smooth, with no raised features, to, minimize the collection of dirt, diesel smoke, and other particulate contaminates, and to facilitate periodic cleaning.

Ensure that Circular Signal Modules have prominent and permanent markings to designate the proper orientation of the signal module in the traffic signal housing. This marking should be an up arrow or the word “UP” or “TOP”.

Ensure Circular Signal Module meets the photometric requirements as indicated and described in the ITE VTCSH LED Circular Signal Supplement.

Supply Red and Yellow LEDs that utilize AllnGap technology, either AS (Absorbing Substrate or TS (Transparent Substrate) and do not exhibit degradation of more than 30% of their initial light intensity following accelerated life testing (operating at 185 F (85 C) and 85% humidity, for 1000 hours). AlGaAs technology is not acceptable.

Supply Green LEDs that utilize gallium nitride technology.

#### 5. Vehicle Arrow Signal Modules

Supply LED Arrow Signal Modules that fit in standard incandescent vehicle traffic signal housings and meet the Performance specification of ITE Vehicle Traffic Control Signal- LED Vehicle Arrow Traffic Signal Supplement.

Ensure that Arrow Signal Modules provided are omni directional and marked as OD so that they may be rotated at any angle. Ensure the Arrow modules Photometrics support the luminous intensity as indicated in table 925-19.

Before delivery of any modules supply certification that module is to be in compliance with these specifications. In addition substantiating documentation must be supplied from an independent test laboratory to show the product has

passed design qualification testing in accordance with section 6.4 of the ITE Vehicle Traffic Control Signal Heads: LED Circular Signal Supplement. Ensure the report includes a Minimum Maintained Luminous Intensity chart for the module being provided that uses the same horizontal and vertical angles as shown in Table 1 of the ITE Vehicle Traffic Control Signal Heads: LED Vehicle Arrow Traffic Signal Supplement. Ensure all modules are provided with a signed copy of the production and test and inspection as detailed in section 6.3 of the ITE Vehicle Traffic Control Signal Heads: LED Vehicle Arrow Traffic Signal Supplement.

Supply lenses for that are made of ultraviolet stabilized polycarbonate. Ensure that the external lens surface is smooth, with no raised features, to, minimize the collection of dirt, diesel smoke, and other particulate contaminants, and to facilitate periodic cleaning. Supply Red and Yellow LEDs that utilize AllnGap technology, either AS (Absorbing Substrate or TS (Transparent Substrate) and do not exhibit degradation of more than 30% of their initial light intensity following accelerated life testing (operating at 185 F (85 C) and 85% humidity, for 1000 hours). AlGaAs technology is not acceptable.

Supply Green LEDs that utilize gallium nitride technology.

Supply LED Arrow Signal Modules that fit in standard incandescent vehicle traffic signal housings and meet the “ITE Vehicle Traffic Control Signal Heads Part 3: Light Emitting Diode (LED) Vehicle Traffic Signal Modules”. Use Table 925- 19 for all references to minimum maintained Intensity values. Ensure the LED arrow modules meet the required luminous intensity as shown in Table 925-19.

<b>Table 925 - 19 Minimum Maintained Luminous Intensity Values for Arrow LED Indications</b>									
<b>Angle</b>					<b>Angle</b>				
<b>Ver</b>	<b>Hor</b>	<b>12 inch (300 mm)</b>			<b>Ver</b>	<b>Hor</b>	<b>12 inch (300 mm)</b>		
<b>+</b>	<b>+ or -</b>	<b>Red</b>	<b>Yellow</b>	<b>Green</b>	<b>-</b>	<b>+ or -</b>	<b>Red</b>	<b>Yellow</b>	<b>Green</b>
<b>2.5</b>	<b>2.5</b>	56.8	141.6	73.9	<b>2.5</b>	<b>2.5</b>	56.8	141.6	73.9
	<b>7.5</b>	47	117.1	61.1		<b>7.5</b>	47	117.1	61.1
	<b>12.5</b>	32.1	80.1	41.8		<b>12.5</b>	32.1	80.1	41.8
	<b>17.5</b>	18.2	45.3	23.7		<b>17.5</b>	18.2	45.3	23.7
	<b>22.5</b>	8.5	21.2	11.1		<b>22.5</b>	8.5	21.2	11.1
	<b>27.5</b>	3.3	8.2	4.3		<b>27.5</b>	3.3	8.2	4.3
<b>7.5</b>	<b>2.5</b>	47	117.1	61.1	<b>7.5</b>	<b>2.5</b>	47	117.1	61.1
	<b>7.5</b>	38.9	97	50.6		<b>7.5</b>	38.9	97	50.6
	<b>12.5</b>	26.7	66.5	34.7		<b>12.5</b>	26.7	66.5	34.7
	<b>17.5</b>	15.1	37.7	19.7		<b>17.5</b>	15.1	37.7	19.7
	<b>22.5</b>	7.1	17.7	9.2		<b>22.5</b>	7.1	17.7	9.2
	<b>27.5</b>	2.8	6.9	3.6		<b>27.5</b>	2.8	6.9	3.6
<b>12.5</b>	<b>2.5</b>	32.1	80.1	41.8	<b>12.5</b>	<b>2.5</b>	32.1	80.1	41.8
	<b>7.5</b>	26.7	66.5	34.7		<b>7.5</b>	26.7	66.5	34.7
	<b>12.5</b>	18.3	45.7	23.9		<b>12.5</b>	18.3	45.7	23.9
	<b>17.5</b>	10.5	26.1	13.6		<b>17.5</b>	10.5	26.1	13.6
	<b>22.5</b>	5.0	12.4	6.4		<b>22.5</b>	5.0	12.4	6.4
	<b>27.5</b>	-	-	-		<b>27.5</b>	-	-	-
<b>17.5</b>	<b>2.5</b>	18.2	45.3	23.7	<b>17.5</b>	<b>2.5</b>	18.2	45.3	23.7
	<b>7.5</b>	15.1	37.7	19.7		<b>7.5</b>	15.1	37.7	19.7
	<b>12.5</b>	10.5	26.1	13.6		<b>12.5</b>	10.5	26.1	13.6
	<b>17.5</b>	6.0	15.0	7.8		<b>17.5</b>	6.0	15.0	7.8
	<b>22.5</b>	2.9	7.2	3.8		<b>22.5</b>	2.9	7.2	3.8
	<b>27.5</b>	-	-	-		<b>27.5</b>	-	-	-
<b>22.5</b>	<b>2.5</b>	8.5	21.2	11.1	<b>22.5</b>	<b>2.5</b>	8.5	21.2	11.1
	<b>7.5</b>	7.1	17.7	9.2		<b>7.5</b>	7.1	17.7	9.2
	<b>12.5</b>	5.0	12.4	6.4		<b>12.5</b>	5.0	12.4	6.4
	<b>17.5</b>	2.9	7.2	2.8		<b>17.5</b>	2.9	7.2	2.8
	<b>22.5</b>	-	-	-		<b>22.5</b>	-	-	-
	<b>27.5</b>	-	-	-		<b>27.5</b>	-	-	-

<b>Table 925 - 19 Minimum Maintained Luminous Intensity Values for Arrow LED Indications</b>									
<b>Angle</b>					<b>Angle</b>				
<b>Ver</b>	<b>Hor</b>	<b>12 inch (300 mm)</b>			<b>Ver</b>	<b>Hor</b>	<b>12 inch (300 mm)</b>		
<b>+</b>	<b>+ or -</b>	<b>Red</b>	<b>Yellow</b>	<b>Green</b>	<b>-</b>	<b>+ or -</b>	<b>Red</b>	<b>Yellow</b>	<b>Green</b>
<b>27.5</b>	<b>2.5</b>	3.3	8.2	4.3	<b>27.5</b>	<b>2.5</b>	3.3	8.2	4.3
	<b>7.5</b>	2.8	6.9	3.6		<b>7.5</b>	2.8	6.9	3.6
	<b>12.5</b>	-	-	-		<b>12.5</b>	-	-	-
	<b>17.5</b>	-	-	-		<b>17.5</b>	-	-	-
	<b>22.5</b>	-	-	-		<b>22.5</b>	-	-	-
	<b>27.5</b>	-	-	-		<b>27.5</b>	-	-	-

6. Pedestrian Signal Modules

Supply LED Pedestrian Traffic Signal Modules that fit in standard pedestrian one section signal head manufactured in accordance with the ITE Pedestrian Traffic Control Signal Indications (PTCSI) housings and meet the ITE Pedestrian Traffic Signal Modules specification.

Ensure that the Pedestrian Indications for the “Hand” and “Man” are filled in so as to provide a solid indication. Do not supply Pedestrian Indications for the Hand and Man that are “outlines”.

Ensure that Pedestrian Signal Modules have prominent and permanent markings to designate the proper orientation of the signal module in the pedestrian signal housing. This marking should be an up arrow or the word “UP” or “TOP”.

Ensure Pedestrian Signal Module meets the photometric requirements as indicated and described in the ITE PTCSI LED Pedestrian Traffic Signal Module Specification.

Supply Portland Orange LEDs that utilize AllnGap technology, either AS (Absorbing Substrate or TS (Transparent Substrate) and do not exhibit degradation of more than 30% of their initial light intensity following accelerated life testing (operating at 185 F (85 C) and 85% humidity, for 1000 hours). AlGaAs technology is not acceptable.

Supply White LEDs that utilize InGaN technology.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

General Provisions 101 through 150.

**D. Materials Warranty**

Ensure that LED traffic signal modules and LED Pedestrian modules are performance warranted to be in compliance with the minimum intensity values as shown in Table 925-19. Provide independent laboratory test results indicating that LED indications satisfy the minimum intensity Standards for LED traffic signal modules, measured at 120 V AC and 165 °F (74 °C), for a period of five (5) years.

Ensure that the manufacturer’s name, part number, date code, and electrical characteristics of the LED signal module is visible on the assembly, and that each LED signal module is identified for warranty purposes.

**925.2.16 LED Pedestrian and Countdown Signal Module**

**A. Requirements**

This specification covers LED traffic signal module designed as a retrofit replacement for the message bearing surface of nominal 16” x 18” traffic signal housing built to the PTSCI Standard. The message bearing surface of the module consists of an overlapping “Hand” and “Man” Symbols with a numerical display of numbers from 00 to 99.

1. General Requirements

Ensure that the unit supplied meets the applicable portions of section 925.15 of this specification.

Ensure that the message numbers “00” to “99” are a minimum of 7 inches in height and consist of two rows of LEDs.

Ensure the module fits in the Pedestrian Signal Housing without modification to the housing and requires no special tools for installation.

Supply LED signal modules that are watertight when mounted in the traffic signal housing.

Supply life data from the LED Signal Module manufacturer to calculate the expected useful life

Supply modules with permanent markings for date of manufacture and date of installation.

## 2. Optical

Provide test data from an independent laboratory to verify that the performance of the product meets current ITE requirements.

Ensure that the individual LEDs are wired such that a catastrophic failure of one LED will result in the loss of not more than 5% of the signal module light output.

The failure of a single LED in a string causes loss of light from only that LED, not the entire string or indication.

Provide control circuitry that prevents the current flow through the LEDs in the "off" state to avoid any false indications as may be perceived by the human eye during daytime and nighttime hours.

Ensure that the LED signal module is operationally compatible with existing or new supplied conflict monitors (NEMA TS-1, NEMA TS-2, Model 210, Model 2010, ITS Cabinet CMU and AMU).

Ensure that the LED Signal Module is operationally compatible with existing or new supplied load switches.

Ensure that the intensity of the LED signal module does not vary by more than 10% over the allowable voltage range as specified in the electrical section below.

Ensure that the LED signal modules maintain not less than 90% of the required intensity, as defined by the ITE intensity Standards for LED traffic signal modules.

Ensure that each module provides an average luminous of at least 3750 candela per square meter of lighting surface for the "Hand" and 5300 candela per square meter for the Man symbol.

Ensure this over the temperature range of -40 °F to 165 °F (-40 °C to + 74 °C) at 120 V AC, when new and after four (4) years of field installation.

Provide an exterior lens which is uniform and frosted to reduce sun phantom effect.

## 3. Electrical

Supply LED signal modules that operate over the temperature range of -40 °F to 165 °F (-40 °C to 74 °C).

Ensure that the power factor is 90% or greater, at nominal rated voltage, at 77 °F (25 °C), after 60 minutes of operation.

Ensure that the total harmonic distortion (THD) is less than 20% at rated voltage, at 77 °F (25 °C) and that all LED traffic signal modules are in compliance with FCC noise regulations.

Ensure that the LED signal modules operate on line voltage, 120 V AC nominal, and are able to operate over the voltage range of 80 V AC to 135 V AC.

Provide transient voltage suppression rated at 1,500 W for 1 millisecond and fusing with a maximum rating of 2 A to minimize the effect and repair cost of an extreme over voltage situation or other failure mode.

Ensure the modules allow a reduction of the intensity of the light output in response to an input from the traffic signal controller. Ensure the minimum light output when dimmed is not less than 30% of the minimum maintained luminous intensity as defined in the applicable ITE Signal Head Module.

## 4. Operation

Supply LED Modules which start counting when the flashing "Don Walk" Indication starts and will countdown to "0" when the steady "Don't Walk" signal turns on. Ensure that the unit maintains a consistent countdown during a short power failure (i.e. Traffic Controller does not restart). Ensure that if Traffic Controller restarts that the countdown timer display is turned off until one full pedestrian clearance Cycle is timed. Ensure that the unit will turn off the counter if the steady Don't Walk Display starts while the countdown timer is displaying a number other than 00.

## **B. Fabrication**

General Provisions 101 through 150.

## **C. Acceptance**

General Provisions 101 through 150.

## **D. Materials Warranty**

Ensure that LED traffic signal modules and LED Pedestrian modules are performance warranted to be in compliance with the latest ITE and CALTRANS minimum intensity Standards for LED traffic signal modules, measured at 120 V AC and 165 °F (74 °C), for a period of five (5) years.

Ensure that the manufacturer's name, part number, date code, and electrical characteristics of the LED signal module is visible on the assembly, and that each LED signal module is identified for warranty purposes.

### **925.2.17 Blank-Out Signs**

#### **A. Requirements**

Ensure that each sign provides a clearly visible and definable legend for 500 feet with ample safety factors.

Provide hardware to mount the sign on standard 1.5 inch (38 mm) pipe brackets or to mount directly to signal mast arms or span wire or as outlined in the Plans.

Ensure LED blankout signs conform to the requirements of section 9252.15 for LED modules and optical requirements

Supply blank-out signs face 30 inches x 36 inches (750 mm x 900 mm) that are capable of displaying one message at a time in one direction.

##### **1. Case**

Use a case formed from aluminum extrusion F1-6-E and a special aluminum door frame angle.

For Alloy 6063-T5, ensure that the wall is at least 0.075 inches thick and the corners and joints are at least 0.080 inches (2 mm) thick.

Use filler arc for all welding. Ensure all hinges and fastening hardware, nuts, bolts, fasteners on the housing and internal components are stainless steel

Use a BR-type take-apart door hinge and draw bolt. Furnish one P-15 1.5 inch (38 mm) hub on the top surface.

Prime the entire case with zinc chromate, bake the inside with two coats of non-yellowing white, and paint the outside with two coats of highway yellow.

##### **2. Electrical**

Ensure that all blankout signs are LED and conform to current ITE Standards. Supply all signs with the necessary mounting hardware to provide for mounting as shown on the Plans. Provide mounting for one way or two way configurations.

Obtain approval for messages and letter dimensions from the Engineer.

##### **3. Sun Phantom Screen**

Attach to each sign a heavy-duty aluminum louver-type sun phantom screen covering the entire sign face. Slant the louvers down enough to eliminate the sun glare without obstructing the view of the sign face.

##### **4. Painting**

Paint the signal surfaces, inside and out, with two coats of oven-baked enamel in addition to the primer coat. Paint the non-illuminated portions of the signal face black. Paint the housings, brackets, fittings, and etc. highway yellow.

##### **5. Lens**

Use a fabricated, three-section Plexiglas lens clear face, with or without legend, which can accept a silk-screened legend on the first surface. Provide a thickness of at least 0.31 inches (8 mm).

##### **6. Legend**

Acceptable legends are as follows:

- NO LEFT TURN
- NO RIGHT TURN
- SIGNAL AHEAD
- NO TURNS

#### **B. Fabrication**

General Provisions 101 through 150.

## C. Acceptance

General Provisions 101 through 150.

## D. Materials Warranty

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

### 925.2.18 Lane-Use Control Signal

#### A. Requirements

Ensure that all signals are LED and conform to current ITE Standards. Supply all signals with the necessary mounting hardware to provide for mounting as shown on the Plans. Provide mounting for one way or two way configurations.

##### 1. General Requirements

###### a. Weight

Ensure that one-way units weigh not more than 50 pounds (23 kg) and two-way units weigh not more than 60 pounds (27 kg), regardless of messages.

###### b. Color

Ensure that the color of lane-use control signal indications is clearly visible for 0.25 mile (0.38 km) at all times under normal atmospheric conditions. Provide lane-use control signals with a visibility angle of a minimum of 60 degrees.

###### c. Housing

Ensure that the housing of each signal is polycarbonate or a one-piece corrosion resistant aluminum alloy die casting or equal and meets current related ASTM Specifications.

Ensure that all configurations are balanced to provide a plumb hanging unit. Ensure that all components are readily and easily accessible from the open door.

###### d. Housing door

Ensure that the housing door is one-piece corrosion resistant aluminum or polycarbonate and meets current related ASTM Specifications.

Provide two substantial door hinges with stainless steel hinge pins. Ensure hinges are on the left side of each section with a latch boss on the right side.

Provide stainless steel dual eye bolt latches or similar approved devices to securely close and latch the housing door. Equip the housing or door with a continuous molded neoprene gasket to make the interior of the unit dustproof and waterproof.

###### e. Wiring

Provide each signal housing with a complete terminal board. Ensure that one side of terminal strip accommodates socket leads and the other side accommodates field wires. Ensure that the terminal board provides totally separate wiring of each symbol.

Ensure each lamp is separately wired to a terminal block located in each housing. Provide each lamp holder socket with color-coded leads.

For combination symbols, color-code socket leads separately to distinguish between red "X", yellow "X" or downward arrow symbols. Provide leads that are No. 14 AWG type THW, 600 V AC, and fixture wire with 194 °F (90 °C) thermoplastic insulation.

###### f. Visors

Provide visors not less than 12 inches (300 mm) long for multiple unit and 7 inches (175 mm) long for single unit signals for each signal face.

Ensure that the visors are constructed of sheet aluminum or polycarbonate and encompass the top and sides of each section.

###### g. Painting

Paint all signal surfaces, inside and out, with two coats of oven baked enamel in addition to the primer coat. Paint the insides of the visors flat black.

The non-illuminated portions of the signal face black or dark gray and all housings, brackets and fittings highway yellow.

###### h. Hardware and fittings:

Supply all necessary fittings, pipe brackets, hangers, hubs, etc. for the type of mounting specified. Ensure all fittings are aluminum or galvanized coated to prevent rust and corrosion.

i. Sun -phantom screen

Provide each signal face with a screen, which substantially counteracts sun phantom effect.

2. Signal Display

Ensure that the symbols, which are on an opaque black or dark gray background, meet ITE requirements and are blacked out when not illuminated.

3. LED Optical System

- a. Ensure that the LEDs supplied for the lane use control signal meet the Specifications for a type module as required in section 925.2.14. Ensure that each separate color indication in a sign face is illuminated by independent LEDs
- b. Ensure that the green arrow indication does not utilize the same termination points as any "X" indication.
- c. Ensure that total power required for any single indication does not exceed 250 W.
- d. Ensure that all modules are contained behind a water tight signal face or lens assembly.
- e. Ensure that the entire optical system is weatherproof and is not vulnerable to extremes in temperature or moisture.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

General Provisions 101 through 150.

**D. Materials Warranty**

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

**925.2.19 Pedestrian Push Button Station**

**A. Requirements**

Ensure that Pedestrian push buttons are of tamperproof construction and consist of a direct push type button and single momentary contact switch in cast aluminum housing. The pushbutton cover shall also be of cast aluminum. The housing and cover shall be free of voids, pits, dents, molding sand excessive foundry grinding marks. Exterior surface shall be smooth and cosmetically acceptable, free of molding fins, cracks and other exterior blemishes.

Provide housing and cover with an alodine conversion coating so as to provide a proper base for paint adhesion. Finish the housing with baked enamel and paint the push button housing and Pedestrian heads highway yellow (unless otherwise specified by the Engineer).

The assembly shall be capable of being mounted to a flat or curved surface. Ensure the assembly includes the appropriate sign as shown in the Plan Details.

Ensure that any screws or bolts are stainless steel. Provide the unit with a 0.5 inch (13 mm) threaded opening with plug.

Ensure that the assembly is weatherproof and so constructed that when properly installed, it will be impossible to receive an electrical shock under any weather condition.

Ensure that Pedestrian Pushbuttons are integrated with a sign as shown in the standard details. Only provide the 5" by 7" sign unless otherwise indicated in the Plans. .

Ensure the button assembly is configured to have an embossed arrow on the convex surface of the button. The arrow shall be capable of rotating for proper movement direction. Ensure the rotation of the button will not affect the successful operation of the pedestrian detection.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

General Provisions 101 through 150.

#### **D. Materials Warranty**

Refer to [Subsection 925.2.01D](#) for Materials Warranties.

#### **925.2.20 Signal Head Back Plate**

##### **A. Requirements**

Ensure that each back plate is designed to properly shield a traffic signal head from background distractions for better visibility.

Design the back plates to extend beyond the signal head to a minimum of 6 inches (150 mm) on all sides and have all corners rounded with minimum 2 inch (50 mm) radii.

Construct the back plates from aluminum, UV stabilized polycarbonate or, ABS plastic material with a finished color of flat black. If aluminum back plates are provided ensure that each back plate has two coats of “baked on enamel” paint.

Ensure that polycarbonate back plates are at least 0.15 inches (4 mm) thick; ABS back plates are at least 0.05 inches (1 mm) thick and metal back plates are at least 0.05 inches (1 mm) thick.

Design the back plates with predrilled holes to provide for simple attachment to the specified brand, size and configuration of traffic signal head with all mounting hardware included.

Ensure that the back plates do not interfere with the signal mounting hardware. Ensure that the back plates include louvers.

##### **B. Fabrication**

General Provisions 101 through 150.

##### **C. Acceptance**

General Provisions 101 through 150.

##### **D. Materials Warranty**

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

#### **925.2.21 Signal Head Visors**

##### **A. Requirements**

Typically, visors are one piece tunnel type and removable unless specified otherwise in the signal Plans.

Ensure that visors are polycarbonate and at least 9 inches (225 mm) deep for 12 inch (300 mm) heads. Special angle visors are full circle with the long side at least 18 inches (450 mm) deep. Ensure that visors provide a positive method of attaching to the door of the signal head that do not allow rotation. An acceptable method is to provide tabs that use stainless steel screws.

Unless otherwise specified by the Engineer, provide black signal head visors.

##### **B. Fabrication**

General Provisions 101 through 150.

##### **C. Acceptance**

General Provisions 101 through 150.

##### **D. Materials Warranty**

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

#### **925.2.22 Signal Head Louvers**

##### **A. Requirements**

Ensure that louvers (with the vanes oriented vertically) are directional with a 7-degree cutoff right of center. Rotating the louver 180 degrees will produce a 7-degree cutoff left of center.

Provide twelve-inch (300 mm) louvers with 5 vanes. Finish all louvered surfaces in flat black. Ensure that programmable louvers are directional with a 7-degree cutoff and that all louver surfaces have a flat black finish.



Ensure that the units can be installed and programmed in accordance with the manufacturer's instruction on visors that are recommended by the manufacturer.

Have the programmable louver display approved by the Engineer prior to placing the signal in stop and go operation.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

General Provisions 101 through 150.

**D. Materials Warranty**

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

**925.2.23 Hardware For Mast Arm Mounting**

**A. Requirements**

1. Ensure that signal heads are rigidly mounted to the mast arm. Provide mounting hardware that is in accordance with the following: Adjustability

Ensure the mounting bracket is completely adjustable such that it allows; rotational adjustment about the bracket axis; vertical adjustment; rotational adjustment about the Mast Arm; and rotational adjustment from the vertical plane.

2. Attachment

Ensure the bracket is provided with Stainless Steel Band to fasten the bracket to the arm. Ensure the bracket is easily adjustable to fit all sizes of round, elliptical or other shaped structure without special tools or equipment.

3. Signal Accommodations

Ensure the bracket attaches to the signal to assure maximum rigidity by clamping the signal top and bottom. Ensure a standard bracket accommodates all major signal manufacturers signal for 3, 4 and 5 section signal head configurations.

4. Wiring

All electrical wiring shall be completely concealed with the bracket. The vertical support shall be a gusseted "C" shaped extruded aluminum tube to accommodate the signal cable regardless of vertical positioning of the tube.

5. Materials

The upper and lower arms shall be cast 319 aluminum or equivalent. The lower arm shall be internally threaded to accommodate the threaded vertical support tube. Ensure the lower arm is furnished with plastic covers which slide and snap into place. Both arms shall have 72 tooth serrations cast into the arm to assure a positive lock with signal housing and shall be secured about their rotational axis with setscrews. Ensure the arms have a tri-bolt arrangement for attachment to the signal housing.

Ensure the vertical support is gusseted tube extruded from 6063-T6 aluminum. Ensure the tube includes a vinyl closure strip.

Ensure the mast arm clamp assembly is cast from 713 aluminum alloy or equivalent. Provide an assembly that allows for 360 degrees of rotation with no internal bracing obstructing the center opening. Provide two stainless steel bands that have minimum tensile strength of 100,000 PSI.

Ensure that each bracket is complete with all necessary bolt, washers, gaskets and miscellaneous items to allow assembly of the signal to the bracket and the bracket to the mast arm. Ensure all aluminum parts have an Aldine finish. All non stainless steel parts shall have a yellow zinc di-chromate or galvanize finish.

This item will be approved upon submittal of catalog cuts. Refer to Standard Detail Drawings for additional information.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

General Provisions 101 through 150.

#### **D. Materials Warranty**

Refer to [Subsection 925.2.01D](#) for Materials Warranties.

#### **925.2.24 Hardware For Signal Head Pole Mounting**

##### **A. Requirements**

Ensure this item consists of hardware adequate for the specific mounting. As a minimum provide the following hardware. 1 ½ inch pipe nipples of die cast aluminum that are a minimum of 12 inches and threaded with 1 ½ inch NPS threads on either end. On the upper and lower arm there shall be a serrated 72 tooth boss with set screw. The upper arm shall have a neoprene gasket to provide weather tight fit. Hub plates for pole mounting shall be provided and they shall be appropriate for the particular mounting (round or flat). Hardware shall die cast aluminum alloy 380 or extruded. All die cast parts shall be cleaned in an alkaline cleaning compound Extruded parts shall have an alodine conversion coating to provide proper base for paint adhesion. The assembly is to be painted federal yellow and baked in an oven. Ensure the assembly is provided with all required hardware. All other hardware shall be stainless steel.

##### **B. Fabrication**

General Provisions 101 through 150.

##### **C. Acceptance**

Ensure that this item consists of hardware as shown in the standard details.

This item will be approved upon submittal of catalog cuts.

##### **D. Materials Warranty**

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

#### **925.2.25 Balance Adjuster**

##### **A. Requirements**

Ensure this item consists of hardware that is cast from 316 Stainless Steel or 65-45-12 Ductile Iron or equivalent. Ensure castings are free of voids, pits, dents, molding sand and excessive grinding marks. Exterior surface shall be cosmetically acceptable and free of molding fins, cracks and other exterior blemishes. All hardware shall be supplied and be stainless steel or galvanized.

##### **B. Fabrication**

General Provisions 101 through 150.

##### **C. Acceptance**

Ensure this item consists of hardware as shown in the Standard Details. This item will be approved upon submittal of catalog cuts.

##### **D. Materials Warranty**

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

#### **925.2.26 Hardware For Mounting 12 Inch (300 mm) Pedestrian Head**

##### **A. Requirements**

Ensure this item meets the same criteria as 925.2.24.A and is in accordance with the Standard Details.

##### **B. Fabrication**

General Provisions 101 through 150.

##### **C. Acceptance**

Ensure this item consists of hardware as shown in the Standard Details. This item will be approved upon submittal of catalog cuts.

**D. Materials Warranty**

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

**925.2.27 Pedestal Pole**

**A. Requirements**

The Pedestal poles support vehicle signal heads, pedestrian signal heads, and push button. Furnish Pedestal poles according to type and overall length.

Pedestal pole for vehicle display for one lane ramp metering operation shall be constructed to support one 12” signal head and one 8” signal head assembly as shown in the Plans.

Pedestal pole for ramp meter advance warning sign and flashing beacon shall be constructed to meet the sign manufacturer’s structural requirements. Pedestal pole mounting adapter shall rigidly attach to the sign case’s structural bracing. Cable entrance to the sign case shall be through the inside of the pole.

1. Ensure that all poles are made of one continuous piece of bare finish aluminum from top to base connection for the entire height of the pole.

The shaft, of appropriate shape, may or may not be uniformly tapered from butt to tip. A pole used to support only a traffic signal may be tapered.

2. Fabricate pole caps, when required, of cast material, and secure in place with set-screws.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

General Provisions 101 through 150.

**D. Materials Warranty**

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

**925.2.28 Pedestal Pole Base**

**A. Requirements**

Ensure that all design radii are smooth and intact. Ensure that the exterior surface finish is smooth and cosmetically acceptable by being free of molding fins, cracks and other exterior blemishes.

Fabricate from new aluminum ingot. Do not use scrap materials.

Minimum requirements are as follows:

• ALUMINUM ALLOY NO.	319	ELONGATION [% IN 2 IN. (50 mm)]	2.5
• TENSILE STRENGTH, KSI (MPa)	34 (234)	BRINELL HARDNESS	85
• YEILD STRENGTH, KSI (MPa)	19 (131)	SHEAR STRENGTH, KSI (MPa)	232 (1600)

1. Ensure this item consists of square cast aluminum with bare finish, and has a minimum weight of 21 pounds (9.5 kg). Thread the upper end to receive a 4 inch (100 mm) National Pipe Thread (NPT) pipe shaft.
2. Design the base so that it may be fastened to a foundation with four (4) 0.75 inch (19 mm) anchor bolts located 90 degrees apart on the bottom of the base. Provide slots in the bottom of the base 1.5 inch (38 mm) wide and 2.5 inches (63 mm) long measured along the circumference of the bolt circle, allowing a proper fit even if the bolts are placed slightly off center.
3. Design the base to accommodate bolt circles of a minimum of 12 inches (300 mm) through a maximum of 14.5 inches (363 mm) and anchor bolts with a minimum of 0.63 inches (16 mm) through 1 inch (25 mm) diameter.
4. Design the base with a removable plastic door. Ensure that the door opening is free of burrs and sharp edges and is no less than 8.5 inches (213 mm) square. Attach the door to the base using one socket button head screw to prevent unauthorized entry.
5. Ensure that the base meets or exceeds 1985 AASHTO breakaway requirements. Provide test reports from an FHWA approved independent laboratory certifying that the base has been tested and meets all applicable requirements. In addition, supply a statement of certification from the FHWA stating such tests have been accepted and approved.

6. In order to prove structural soundness, provide a certification from a recognized independent structural laboratory certifying that the base will withstand a bending moment of 10,750 ft-lbs (14 575 N-m).
7. Ensure that the door is injection molded from ABS plastic to deter vandalism and theft, and has the following properties:

<u>TEST</u>	<u>ASTM METHOD</u>	<u>VALUE</u>
Tensile @ Yield [0.13 inches (3 mm)]	D638	6600 psi (45 500 kPa)
Flexural @ Yield	D790	11,000 psi (75 850 kPa)
Rockwell Hardness	D785	101 (R Scale)
Notched Izod	D256	5 ft-lb./in. (0.03 N-m/mm)

8. Ensure that the door exhibits the following properties:
  - Has an edge thickness of 0.25 inches (6 mm) and a minimum thickness of 0.156 inches (4 mm)
  - Contains flame-retardant material, meeting or exceeding underwriters laboratories UL 94 test H.B
  - Gray aluminum tone in color, unless otherwise specified
  - Contains ultra-violet inhibitors and stabilizers for protection against UV degradation
  - Is injection molded with a smooth front finish
  - Has flat and straight surfaces without blisters, buckling or warping; have reinforcing ribs
  - Contains two (2) injection molded lugs on the bottom of the door with slots of the proper width and depth to fit the base door opening.
9. Supply the base with a set of four (4) anchor bolts, 0.75 inch (19 mm) diameter by 18 inches (450 mm) in length, material per ASTM A 572A 572M, Galvanized per ASTM A 153/A 153M. Supply (1) hex nut and (1) flat washer with each bolt.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

General Provisions 101 through 150.

**D. Materials Warranty**

General Provisions 101 through 150.

**925.2.29 Pedestal Pole Foundation Anchor Assembly**

**A. Requirements**

Provide Foundation Anchor assembly that is 4 inches (100 mm) in diameter by 56 inches (1400 mm) with a single helical blade and a square fixed baseplate with combination underside holt-head retainer and dirt scrappers allowing flush- mount with the ground.

Provide Baseplate that is steel and conforms to ASTM A-36 material. Provide pipe with helical blade that is manufactured from ASTM A-53ERW Grade B Steel. Ensure 4 inch pipe has 2 inch (50 mm) by 3 inch (75mm) entrance hole 18 inches below the steel plate. Ensure the anchor assembly is hot dipped galvanized finish after fabrication and complies with ASTM A-123.

Ensure base plate has four slotted mounting holes to fit bolt circles from 7 ¾ inch (195mm) to 14 ¾ inch (375 mm). Provide 4 slotted mounting hole with a ¾ inch keyhole slot to permit bolt installation and replacement from the top surface without digging under the baseplate.

Ensure assembly is furnished with;

- Quantity of four ¾ inch(20 mm) -10NC x 3 inch(75 mm) square head galvanized ASTM 325 anchor bolts;
- Quantity of four ¾ inch(20 mm) plain flat galvanized washers;
- Quantity of four 3/16 inch(5 mm) thick galvanized plate washers;
- and Quantity of four ¾ inch (20 mm) galvanized hex nuts.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

General Provisions 101 through 150.

**D. Materials Warranty**

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

**925.2.30 Timber Poles**

**A. Requirements**

Ensure that all timber poles meet the requirements of [Section 861](#). Poles must be inspected and tested by the GDOT Office of Materials and Research and hammer stamped by the inspector.

Ensure that all poles have a brand or stamp 10 feet (3 m) from the butt that notes the type wood, date of manufacture, manufacturer, class and length.

Ensure that all timber poles that have guy attachments or support span wire or arms that suspend signal heads over the roadway or sidewalk are Class II.

Poles that support loop lead-in, messenger or communications cable that does not have guy attachments may be Class IV size.

Ensure that all poles meet the requirements in the table below unless otherwise noted on the traffic signal Plans or list of materials.

Class	Nominal Length, ft (m)	Minimum Circumference	
		At 6 feet (2.4 m) from butt, in. (mm)	
II	30 (9)	34.0 (850)	
II	35 (10.5)	36.5 (913)	
II	40 (12)	38.5 (963)	
II	45 (13.5)	40.5 (1013)	
II	50 (15)	42.0 (1050)	
IV	30 (9)	29.5 (738)	
IV	35 (10.5)	31.5 (788)	
IV	40 (12)	33.5 (838)	
IV	45 (13.5)	35.0 (875)	

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

General Provisions 101 through 150.

**D. Materials Warranty**

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

**925.2.31 Steel Strain Poles**

**A. Requirements**

Ensure that steel strain poles conform to [Section 639](#) and include hardware for span wire attachments, anchor base, and anchor bolts for the purpose of supporting span wire suspended signs and/or signals.

For signal supports, ensure that the opening at the top and bottom of the pole is large enough to allow all wiring into and out of pole. Do not strap conduit to strain pole because of insufficient opening allowances.

**B. Fabrication**

General Provisions 101 through 150.

### C. Acceptance

General Provisions 101 through 150.

### D. Materials Warranty

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

## 925.2.32 Pre-Stressed Concrete Strain Pole

### A. Requirements

Ensure that Pre-stressed concrete strain poles for overhead signs and signal supports conform to [Section 500](#).

For signal supports, ensure that the opening at the top and bottom of the pole is large enough to allow all wiring into and out of pole. Do not strap conduit to strain pole because of insufficient opening allowances.

### B. Fabrication

General Provisions 101 through 150.

### C. Acceptance

General Provisions 101 through 150.

### D. Materials Warranty

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

## 925.2.33 Traffic Signal Pull Box

### A. Requirements

Ensure that traffic signal pull boxes a matched assembly of a box and cover from the same manufacturer.

For all pull boxes except Types 4 and 5, use pull boxes manufactured in a single unit for the full depth required in the size in an open bottom configuration. Do not use stacked pull boxes.

For pull boxes Types 4 and 5, use stacked pull boxes as shown in the Plans, where the top unit is open bottom and the bottom unit is closed bottom manufacture. In the bottom unit provide a drain hole.

Provide pull boxes that are constructed of fiberglass-reinforced composite polymer concrete product or steel wire reinforced portland cement concrete product with a concrete gray or tan color.

Ensure that pull boxes meet all requirements of ANSI 77 2002 Tier 15. Provide compliance test documentation.

Provide a ¼-inch galvanized wire mesh between the gravel base and the open bottom box or closed bottom box drain hole for all pull box types.

Use Type 1 pull boxes [12 inches x 12 inches (300 mm x 300 mm)] for loop lead-ins. When loop lead-ins and splices and other cables are required, use Type 2 pull boxes [11 inches x 18 inches (275 mm x 450 mm)] or Type 3 pull boxes [17 inches x 30 inches (425 mm x 750 mm)]. Use Type 4, 4S, 5, 5S, 6 and 7 pull boxes for fiber optic cable. Furnish one-piece covers for all pull boxes except Types 5, 5S, and 7. Furnish two-piece covers for Types 5, 5S, and 7.

Furnish covers with a skid-resistant surface with a minimum coefficient of friction of 0.5 when tested in accordance with ASTM C1028.

Furnish covers with stainless steel hold-down bolts, minimum size 3/8-16.

Furnish covers with the logo "TRAFFIC SIGNAL" for pull box Types 1, 2 and 3, and with other pull box types when installed for traffic signal cabling at a traffic signal.

Unless otherwise shown in the Plans or installed for traffic signal cabling at a traffic signal, furnish covers with the logo "GDOT COMMUNICATIONS" for pull box Types 4, 4S, 5, 5S, 6 and 7.

Furnish pull box Types 4, 5, 6 and 7 with factory-installed cable racks and rack hooks.

Cable racks and rack hooks shall be hot-dipped galvanized steel.

Each cable rack rail shall be minimum 24 inches (600 mm) in length with rack hook mounting holes on the entire length. Install two racks on each of the pull box long side walls. For Type 4 and 5 pull boxes only, each cable rack rail may be comprised of two minimum 12 inch (300 mm) units installed on the stacked box side walls.

Mount cable racks to the side walls using minimum 3/8-16 stainless steel hardware.

Furnish a minimum of four rack hooks, minimum 6 inch length (150 mm), per pull box. Furnish an additional four rack hooks for each through cable stored in the pull box. Furnish an additional two rack hooks for each splice closure stored in the pull box.

Furnish Types 6 and 7 pull boxes with factory-installed non-metallic conduit terminators for Sch. 40 and SDR11 2-inch (53 mm) of the quantity and location as shown in the Plans, or for a different conduit size if shown in the Plans.

Terminator bodies shall be manufactured from high-impact polystyrene or approved equivalent.

When joining conduits of dissimilar materials, furnish an airtight and watertight conduit adhesive intended for direct-contact underground use.

Refer to the Standard Detail Drawings and the Traffic Signal Design Manual for further information.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

General Provisions 101 through 150.

**D. Materials Warranty**

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

**925.2.34 Prefabricated Controller Cabinet Base**

**A. Requirements**

Ensure that prefabricated controller cabinet bases are designed to withstand wind loading of 100 mph (160 km/h) with the cabinets as shown in the Plans mounted. Refer to Standard Detail Drawings for further information. Ensure the prefab controller cabinet base has the correct bolt pattern for the cabinet(s) to be installed. Only provide precast polymer concrete products that have been preapproved.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

General Provisions 101 through 150.

**D. Materials Warranty**

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

**925.2.35 Loop Lead-In Cable**

**A. Requirements**

Ensure that loop detector lead-in cable is No. 18 AWG, 3-pair shielded cable that meets IMSA specification #50-2.

Ensure that identification markings are stamped on the jacket.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

General Provisions 101 through 150.

**D. Materials Warranty**

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

**925.2.36 Loop Detector Wire**

**A. Requirements**

Ensure that loop detector wire, meets IMSA specification 51- -3 and is 14 AWG..

Ensure that identification markings are stamped on the cable jacket.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

General Provisions 101 through 150.

**D. Materials Warranty**

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

**925.2.37 Aerial (Lashed) & Duct Signal Cable**

**A. Requirements**

Ensure that aerial (lashed) or duct (conduit) No. 14 AWG, stranded, 7-conductor, with black polyethylene (PE) jacket and 600 V AC rating meets IMSA specification #20-1. Use conductors that are straight, not twisted pairs.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

General Provisions 101 through 150.

**D. Materials Warranty**

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

**925.2.38 Self-Supporting Twisted Pair Aerial Signal Communications Cable**

**A. Requirements**

Ensure that self-supporting, figure eight, aerial signal communications cable, No. 19 AWG, stranded 6-pair conductors is rated at 600 V AC and meet IMSA specification #20-4-1984.

Use conductors that are twisted pairs with copper tape shield under a black PE jacket. Ensure that messenger strand is 0.25 inch (6 mm), 7-strand and conforms to ASTM A 475 Siemens-Martin grade or better with a Class A coating.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

General Provisions 101 through 150.

**D. Materials Warranty**

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

**925.2.39 Underground Feeder Cable, Type UF**

**A. Requirements**

Ensure that underground feeder cable, Type UF w/ground has two (2) conductors with pvc/nylon jacket and a minimum 600 V AC rating per UL #493. Two-conductor, No. 6 AWG wire may be used.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

General Provisions 101 through 150.

**D. Materials Warranty**

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.



#### 925.2.40 Messenger & Guy Strand (Span Wire)

##### A. Requirements

Ensure that all messenger and guy strand (span wire) conforms to ASTM A 475 Siemens-Martin grade or better with a Class A coating, 7-wire span wire.

Ensure ¼-inch (6 mm) Messenger & guy strand shall be used to support interconnect cable or as tether spans.

Messenger & guy strand 0.31 inch (7 mm) shall be used only where it is essential to match an existing 0.31 inch (7 mm) span wire that will not be replaced as part of a new installation.

Ensure all span wire for signal heads, blank out sign, optically programmed heads, lane control signs, standard, aerial or sidewalk guys uses a minimum Messenger & guy strand 0.38 inch (9 mm) as a minimum size.

##### B. Fabrication

General Provisions 101 through 150.

##### C. Acceptance

General Provisions 101 through 150.

##### D. Materials Warranty

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

#### 925.2.41 Power Disconnect Box

##### A. Requirements

Ensure that all power disconnect boxes are NEMA 3R 240 V AC, 60 Amp Phase 1 (metal non-fused 2 pole). Ensure the disconnect box is supplied with a padlock keyed as per directions of District Signal Engineer. Provide power disconnect box that is not fused and does not have a circuit breaker. Supply with a service grounding kit.

##### B. Fabrication

General Provisions 101 through 150.

##### C. Acceptance

General Provisions 101 through 150.

##### D. Materials Warranty

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

#### 925.2.42 Cable Ties

##### A. Requirements

Ensure that all cable ties are nylon, ultraviolet resistant black and consist of the following as a minimum:

Nominal Length	8 inches (200 mm)
Width	0.30 inches (7 mm)
Tensile Strength	120 pounds (55 kg)

##### B. Fabrication

General Provisions 101 through 150.

##### C. Acceptance

General Provisions 101 through 150.

##### D. Materials Warranty

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

### **925.2.43 Lashing Rod**

#### **A. Requirements**

Ensure that all lashing rods are sized in accordance with messenger and cable(s) diameters to be supported. Provide lashing rods that are of the same material as the messenger or guy strand.

#### **B. Fabrication**

General Provisions 101 through 150.

#### **C. Acceptance**

General Provisions 101 through 150.

#### **D. Materials Warranty**

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

### **925.2.44 Stainless Steel Lashing Wire**

#### **A. Requirements**

Provide lashing wire that is type 316 stainless steel with 0.045 inch (1 mm) diameter.

#### **B. Fabrication**

General Provisions 101 through 150.

#### **C. Acceptance**

General Provisions 101 through 150.

#### **D. Materials Warranty**

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

### **925.2.45 Guy Insulators**

#### **A. Requirements**

Ensure that all guy insulators are high impact resistant PVC with ultraviolet stabilizers added for retention of color. Ensure that insulators attach to the guy so that they cannot easily be removed. Use guy insulators which are yellow unless otherwise directed.

#### **B. Fabrication**

General Provisions 101 through 150.

#### **C. Acceptance**

General Provisions 101 through 150.

#### **D. Materials Warranty**

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

### **925.2.46 Universal Closure Kit**

#### **A. Requirements**

Supply a Universal Signal Closure Kit to seal the signal head at either the top or bottom. Ensure that the kit will fit any manufacturer's signal head (top or bottom) without the use of special tools or modification.

1. Ensure that the gasket is 60-70 durometer neoprene.
2. Ensure that Closure Cap is injection molded ABS plastic. The plastic is to be loaded with UV stabilizers.
3. Ensure that Adapter Bar is made so that it will secure the closure cap and compensate for varying thickness of signal heads.
4. Provide two # 10 (9mm) screws to fit any manufacturer's signal head. Ensure that one screw is 0.75 inches (19 mm) in length and the second screw is 1 inch (25 mm) in length.

5. Pack each assembly in a clear plastic bag. Mark the bag with the manufacturer's name and part number. Include the Universal Signal Closure Kit in a package containing the span wire clamp and Tri-Stud wire entrance fitting.
6. Ensure that the Closure Cap is molded to closely match the color of the signal head (Federal Yellow). The adapter bar and screws are to be zinc plated steel.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

General Provisions 101 through 150.

**D. Materials Warranty**

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

**925.2.47 Cast Aluminum Span Wire Clamp**

**Requirements**

Provide Span Wire Clamps that are cast from Aluminum Alloy 713 or equivalent, free of voids, pits, dents, molding sand and excessive foundry grinding marks. Ensure that all design radii are smooth and intact.

Provide an exterior surface finish that is smooth and cosmetically acceptable, free of molding fins, cracks and other exterior blemishes. Ensure that span wire clamps are fabricated from aluminum ingot with minimum requirements as follows:

- ALUMINUM ALLOY No. 713
- YIELD STRENGTH, ksi (MPa) 25 (172)
- TENSILE STRENGTH, ksi (MPa) 35 (240)
- BRINELL HARDNESS 75
- ELONGATING [% in 2 inches (50 mm)] 3

1. Ensure that the Span Wire Clamp can accommodate cables 0.25 inch (6 mm) to 0.63 inch (16 mm) diameter.
2. Ensure that the weight is less than 1.75 pounds (0.8 kg) with hardware.
3. Ensure that the Span Wire Clamp have a minimum overall length of 7 inches (175 mm).
4. Ensure that the Span Wire Clamp have a centerline dimension from cable to clevis pin of 2 inches (50 mm) [+/- 0.5 inches (13 mm)].
5. Ensure that the Span Wire Clamp have a cast aluminum cable bar to protect the cable when tightening the U-bolts.
6. Ensure that the Span Wire Clamp have a mounting opening of 0.75 inches (19 mm) [+/- 0.03 inches (0.8 mm)].
7. Ensure that the Span Wire Clamp have 0.5 inch (13 mm) - 13 NPT U-bolts with 0.5 inch (13 mm) lock washers and nuts.
8. Ensure that the clevis pin are 0.63 inch (16 mm) diameter with a length of 2.25 inches (56 mm) and secured with a hump back stainless steel cotter pin.
9. Ensure that the Clamp and Cable Bar have an Alodine 1200 conversion coating to help resist oxidation.
10. Ensure that the Clevis Pin and hardware are galvanized per ASTM 123/A 123M or stainless steel.

**B. Fabrication**

General Provisions 101 through 150.

**C. Acceptance**

General Provisions 101 through 150.

**D. Materials Warranty**

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

## 925.2.48 Cast Aluminum Tri-Stud Span Wire Entrance Fitting

### A. Requirements

Ensure that the Tri-Stud Span Wire Entrance Fittings are cast from Aluminum Alloy 713 or equivalent, free of voids, pits, dents, molding sand and excessive foundry grinding marks.

Ensure that the all design radii are smooth and intact. Ensure that the exterior surface finish is smooth and cosmetically acceptable, free of molding fin, cracks and other exterior blemishes.

Ensure that the material is fabricated from aluminum ingot with minimum requirements as follows:

- ALUMINUM ALLOY No. 713
- YIELD STRENGTH, ksi (MPa) 25 (172)
- TENSILE STRENGTH, ksi (MPa) 35 (240)
- BRINELL HARDNESS 75
- ELONGATION [% in 2 inches (50 mm)] 3

1. Ensure that the Tri-Stud Span Wire Entrance fitting has a mounting support at the top of the wire entrance 0.69 inches (17 mm) thick [+/- 0.07 inches (1.5 mm)].
2. Ensure that the Tri-Stud Span Wire Entrance fitting weight is not less than 1.75 pounds (0.8 kg) with hardware.
3. Ensure that the mounting support has at least six (6) clevis openings for adjustment with suspension bracing between every two (2) openings.
4. Ensure that the Tri-Stud Span Wire Entrance has a minimum of 0.5 inch (13 mm) diameter throughout for wire access and that wire access is free of burrs and casting webs.
5. Ensure that the Wire Entrance opening is recessed and has a neoprene grommet with sealed membrane sections.
6. Ensure that the signal head attachment end is serrated and has a minimum of 3-signal head centering bosses extending 0.19 inches (5 mm) from the serrations.
7. Ensure that the serrations have a 72-tooth design to match the signal head.
8. Ensure that three (3) stainless steel studs are cast into the wire entrance fitting. Ensure that the studs are 0.31 inches (7 mm) and extend 1.5 inches (38 mm) [+/- 0.13 inches (4 mm)] beyond the serrations. Provide each Tri-Stud span wire entrance fitting with a Tri-Stud hardware kit.
9. Ensure that the Tri-Stud Span Wire Entrance Fitting has an alodine conversion coating to provide a proper base for paint adhesion. Ensure that the assembly is painted federal yellow and baked in a drying oven after painting.
10. Ensure that the all Hardware is galvanized or stainless steel.

### B. Fabrication

General Provisions 101 through 150.

### C. Acceptance

General Provisions 101 through 150.

### D. Materials Warranty

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

## 925.2.49 Bull Rings

### A. Requirements

Provide bull rings that are galvanized weldless steel 0.63 inch (16 mm) diameter. Submit catalog cuts for approval.

### B. Fabrication

General Provisions 101 through 150.

### C. Acceptance

General Provisions 101 through 150.

### D. Materials Warranty

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

### 925.2.50 Ramp Meter Enforcement Device

#### A. Requirements

For each metered lane, provide one ramp meter enforcement device mounted on the back of one signal per lane and wired directly to the red signal display, (Refer to 647.3.05.L). This installation shall include a Red 44 LED Array (allnGaP), Pixel housing, 6061 aluminum powder coated swivel bracket, 2 inch lens, with an aluminum hood. Mounted and adjusted as per the Plans.

#### B. Fabrication

General Provisions 101 through 150.

#### C. Acceptance

General Provisions 101 through 150.

#### D. Materials Warranty

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

### 925.2.51 Advance Warning Flasher Blank-Out Sign

#### A. Requirements

The Advance Warning Flasher blank-out sign shall display the message “PREPARE TO STOP” and shall have the dimensions shown in the Plans. The advance warning flasher blank-out sign assembly shall consist of:

- The legend color shall be double stroke red LED Letters
- The LED shall conform to the Federal color Standards.
- The formed letters shall conform to the United States Department of Transportation's Standard Alphabet.
- Two yellow 12 inches (300 mm) traffic signal heads (flashing Beacons) shall be mounted on each end of the sign as shown in the Plans.
- The Yellow Flashing Beacon will be designed using the 925.2.06 Flashing Beacon Assembly, 925.2.15 LED Signal Modules, and 925.2.11 Vehicle Signal Heads requirements. The Yellow Flashing Beacon shall alternate. The flashing beacon cabinet assembly shall be located outside attached to the sign pedestal pole. The surge arrester in the flashing beacon cabinet assembly shall protect the blank-out sign and the flasher unit/flashing beacons. Provide a non-fused disconnect switch instead of the circuit breaker required in 925.2.06, wired to disconnect all power to the advance warning flasher assembly.
- The sign shall be equipped with a photo-cell for dimming of the sign legend. Dimming shall be as per the manufacturers Specifications.
- The assembly shall be capable of continuous operation over a temperature range of -37 °C (-34 F) to +74 °C (165 F). The advance warning flasher blank-out sign assembly housing shall consist of:
- The entire front face of the sign shall be protected by a sheet of polycarbonate mounted in the cast door frame. Lens material shall be 3 millimeter thick clear polycarbonate with vandal resistant properties.
- The sign shall include a 2.5 millimeter thick aluminum weatherproof housing and door with internal structural frame.
- The interior of the unit shall be painted with a flat black enamel to eliminate internal reflection and two coats of yellow standard color No. 13538 baking enamel for exterior surfaces.
- The signal shall completely blank-out when not energized.

#### B. Fabrication

General Provisions 101 through 150.

#### C. Acceptance

General Provisions 101 through 150.

#### D. Materials Warranty

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

## **925.2.52 Vinyl Electrical Tape**

### **A. Requirements**

Ensure electrical tape used is flame retardant, cold and weather resistant. Provide tape that is rated for 600 volts and for use between 0 F (-18 C) and 176 F (80 C).

Ensure tape is 0.0085inches (0.2 mm) thick and meets the requirements of UL 510 and Mil-I-24391. Provide tape that remains flexible with abrasion resistance.

### **B. Fabrication**

General Provisions 101 through 150.

### **C. Acceptance**

General Provisions 101 through 150.

### **D. Materials Warranty**

Refer to [Subsection 925.2.01.D](#) for Materials Warranties.

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SUPPLEMENTAL SPECIFICATION**

**Project Number: CSNHS-0008-00(232)  
P.I. Number: 0008232  
Troup County**

*Addition to the Standard Specifications:*

**Section 941—Macro-Synthetic Fibers for Concrete  
Reinforcement**

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**941.1 General Description**

This section includes the requirements for manufacturing macro-synthetic fibers which are permitted as reinforcement in lieu of steel reinforcement in the following selected precast concrete products:

- Precast concrete manhole riser sections
- Precast concrete flared end sections

**941.1.01 Related References**

**A. Standard Specifications**

[Section 866—Precast Concrete Catch Basin, Drop Inlet, and Manhole Units](#)

**B. Referenced Documents**

ASTM C 1116

ASTM C 1399

ASTM D 3822

[QPL 86](#)

GDOT Standard 1120

**941.2 Materials**

For a list of sources, see [QPL 86](#).

**941.2.01 Macro-Synthetic Fibers for Concrete Reinforcement**

**A. Requirements**

1. Ensure that macro-synthetic fibers are manufactured from virgin polyolefins (polypropylene and polyethylene) and comply with ASTM C 1116.4.1.3. Fibers manufactured from materials other than polyolefins must show documentary evidence confirming their long term resistance to

deterioration when in contact with the moisture and alkalis present in cement paste and/or the substances present in air-entraining and chemical admixtures.

2. The minimum fiber length required is 1.50 in (38 mm).
3. Ensure that macro-synthetic fibers have an aspect ratio (length divided by the equivalent diameter of the fiber) between 45 and 150.

#### **B. Acceptance**

1. Ensure that macro-synthetic fibers have a minimum tensile strength of 40 ksi (276 MPa) when tested in accordance with ASTM D 3822.
2. Minimum dosage rate in pounds of fibers per cubic yard is established by determining a minimum average residual strength of no less than 150 psi (1034 kPa) when tested in accordance with ASTM C 1399. In all cases, ensure a minimum fiber dosage rate of 5 lbs/yd<sup>3</sup> (2.9 kg/m<sup>3</sup>) and a maximum fiber dosage rate of 10 lbs/yd<sup>3</sup> (5.9 kg/m<sup>3</sup>).
3. Ensure that macro-synthetic fibers have a minimum modulus of elasticity of 400 ksi (2758 MPa) when tested in accordance with ASTM D 3822.
4. The fiber manufacturer is required to obtain independently performed test results that confirm the requirements listed herein and submit those for approval by the Engineer.
5. Approved fibers are listed on the Department's [Qualified Products List 86 \(QPL-86\), "Macro-Synthetic Fibers for Concrete Reinforcement"](#).

#### **C. Materials Warranty**

General Provisions 101 through 150.



**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SPECIAL PROVISION**

**Construction Activity Schedule**

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To satisfy the requirements of the NPDES Permit for storm water discharge, the successful bidder submit a Construction Activity Schedule that provides the timing of all major construction activities no later than ten calendar days following award of the Contract by the Department. Include in the schedule, the estimated project start date and the Completion Date specified in the Contract.

Send the Construction Activity Schedule to the Office of Contract Administration. The Construction Activity Schedule may be submitted with the executed contract.

Failure or refusal to submit the Construction Activity Schedule

Failure or refusal to submit the Construction Activity Schedule shall be deemed either:

1. Failure to execute the Contract, if the Contract has not yet been executed; or
2. Material breach of the Contract, if the Contract has been executed.

If the Contractor fails to execute the Contract as stated in Item 1, above, the bid bond shall become the property of the Department, not as a penalty, but in liquidated damages sustained. If the Contractor fails to submit the Construction Activity Schedule after execution of the Contract, the Contractor will be declared in default of the Contract.

The submittal of the Construction Activity Schedule is in addition to the Progress Schedule required by the Contract according to Section 108.03—PROSECUTION AND PROGRESS of the Specifications.

Georgia DOT Project: CSNHS-0008-00(232) Troup County  
GDOT P.I. 0008232



### MEMORANDUM OF UNDERSTANDING

between the  
Georgia Department of Transportation (hereafter the DEPARTMENT)  
and

BellSouth (hereafter the OWNER)

Whereas the DEPARTMENT proposes to undertake a design-build project to construct a new interchange on I-85 @ CR 98/Gabbettville Road within the existing right of way, in the City of West Point, Troup County, Georgia by contract through competitive bidding procedures; and,

Whereas the DEPARTMENT will accomplish the design-build project through a Design Consultant, Design Consultant Team and/or Contractor hereafter referred to as CONTRACTOR; and,

Whereas the OWNER has the following utility facilities which may need to be adjusted or relocated as a result of the proposed contract:

Type of facility or facilities of the OWNER:

- Domestic water mains and distribution lines and associated appurtenances.
- Sanitary Sewer facilities and/or Storm Drainage System
- Electrical Distribution (overhead and underground) wires, poles, etc.
- Electrical Transmission (overhead and underground) wires, poles, etc.
- Natural Gas Distribution Facilities (underground)
- Telecommunications facilities and equipment
- Cable TV facilities.
- Street Lighting
- Internet Data Service

Whereas the OWNER desires the following to be installed as new additional facilities during the proposed contract.

Insert detailed description of proposed new additional utility installations:

NONE

Design Responsibilities for adjusted, relocated, and new additional utility facilities:

\_\_\_\_ (1a) Whereas the OWNER does not have adequate staff to perform the design functions for the adjustment or relocation of its facilities and is willing to have this design work included in the contract to be let by the DEPARTMENT.

\_\_\_\_ (2a) Whereas the OWNER is willing to have this design work included in the contract to be let by the DEPARTMENT.

(3a) Whereas the OWNER will perform its own relocation or adjustment design.

If method (1a) or (2a) for the adjustment, relocation or installation of new facilities is selected, all design necessary for the adjustment or relocation of the described utilities in accordance with the plans when approved shall be included in the project contract and accomplished by the CONTRACTOR except as follows (check none or list any work items to be performed by the OWNER):

\_\_\_\_ None.

Excluded Items: \_\_\_\_\_

Construction Responsibilities for adjusted, relocated, and new additional utility facilities:

\_\_\_\_ (1b) Whereas the OWNER does not have adequate equipment and staff to adjust its facilities and is willing to have this work included in the contract to be let by the DEPARTMENT.

\_\_\_\_ (2b) Whereas the OWNER is willing to have this work included in the contract to be let by the DEPARTMENT.

(3b) Whereas the OWNER will perform its own relocations or adjustments.

If method (1b) or (2b) for the adjustment, relocation or installation of new facilities is selected, all work necessary for the adjustment or relocation of the described utilities in accordance with the plans when approved shall be included in the project contract and accomplished by the CONTRACTOR except as follows (check none or list any work items to be performed by the OWNER):

\_\_\_\_ None.

Excluded Items: \_\_\_\_\_

The following is hereby mutually agreed to and understood by both parties:

1. The identification of existing facilities including preparation of base maps plans will be accomplished by the DEPARTMENT prior to award of the project contract and thereafter supplemented by the CONTRACTOR.
2. The CONTRACTOR shall coordinate reviews of the information and obtain acceptance from the OWNER and DEPARTMENT when required. However; the OWNER shall apply for and obtain any required permits from the DEPARTMENT and perform any final design or proprietary design needed to administer its own relocation work if the work will not be included in the project contract (list any work not included in the project in space provided above). If the preliminary plans indicate that no conflict exists, and the OWNER accepts this information, the OWNER shall provide a letter of “no conflict” to the CONTRACTOR.
3. The CONTRACTOR will research the property interest of each OWNER and present the findings to the DEPARTMENT and OWNER for approval. The CONTRACTOR will coordinate resolution of any disputed items. The plans and estimate for the utility work shall be subject to approval of both the DEPARTMENT and the OWNER prior to construction. If the OWNER chooses to include the subject utility work in the project construction and the research indicates that no property interest exists, and the OWNER cannot refute this finding with evidence that would substantiate the property interest in legal proceedings, the OWNER shall provide confirmation in writing that OWNER will reimburse the DEPARTMENT for any adjustment or relocations necessary; and an agreement will be prepared and executed in accordance with the DEPARTMENT’S “Utility Accommodation Policy and Standards Manual”. If the OWNER chooses to perform it own relocations and the OWNER holds no property interest as stated above; the OWNER shall confirm in writing that the OWNER will relocate its own facilities at no cost to the DEPARTMENT and the CONTRACTOR.
4. All construction engineering and contract supervision shall be the responsibility of the DEPARTMENT and the CONTRACTOR to assure that all utility work included in the project contract is accomplished in accordance with plans and specifications and to consult with the OWNER before authorizing any changes or deviations which affect the OWNER’S facility.
5. For Utility work included in the contract, the OWNER or the OWNER’S Consultant shall have the right to visit and inspect the work at any time and advise the CONTRACTOR and the DEPARTMENT’S Engineer of any observed discrepancies or potential problems. The DEPARTMENT agrees to notify the OWNER when all utility work is completed and ready for final inspection by the OWNER.
6. Upon completion of the utility work included in the contract and upon certification by the DEPARTMENT’S Engineer that the work has been completed in accordance with the plans and specifications, the OWNER will accept the adjusted, relocated, and additional facilities and will thereafter operate and maintain said facilities located within public right of way subject to the DEPARTMENT’S “Utility Accommodation Policy and Standards, 1988 edition” and any agreements in effect without further cost to the DEPARTMENT or it’s CONTRACTOR.

- 7. For the purpose of utility coordination, relocation and reimbursement matters, the OWNER shall cooperate with the CONTRACTOR in the same manner as if directly with the DEPARTMENT in accordance with the laws of Georgia, the DEPARTMENT'S "Utility Accommodation Policy and Standards, 1988 edition" and any agreements in effect between the DEPARTMENT and OWNER. The OWNER agrees to cooperate in good faith with the CONTRACTOR and to respond to all requests for information or meetings required to reach a resolution of any disputed items.

The Memorandum of Understanding will be incorporated into the project contract by reference or Exhibit.

APPROVED FOR THE OWNER BY:

*Dywanne Taylor*  
(Signature)

2-2-07  
(Date)

Area Manager  
(Title)

APPROVED FOR THE DEPARTMENT BY:

*[Signature]*  
(Signature)

2/16/2007  
(Date)

STATE UTILITIES ENGINEER

Georgia DOT Project: CSNHS-0008-00(232) Troup County  
GDOT P.I. 0008232

## MEMORANDUM OF UNDERSTANDING

between the  
Georgia Department of Transportation (hereafter the DEPARTMENT)  
and  
Charter Communications, Inc. (hereafter the OWNER)

Whereas the DEPARTMENT proposes to undertake a design-build project to construct a new interchange on I-85 @ CR 98/Gabbettville Road within the existing right of way, in the City of West Point, Troup County, Georgia by contract through competitive bidding procedures; and,

Whereas the DEPARTMENT will accomplish the design-build project through a Design Consultant, Design Consultant Team and/or Contractor hereafter referred to as CONTRACTOR; and,

Whereas the OWNER has the following utility facilities which may need to be adjusted or relocated as a result of the proposed contract:

Type of facility or facilities of the OWNER:

- Domestic water mains and distribution lines and associated appurtenances.
- Sanitary Sewer facilities and/or Storm Drainage System
- Electrical Distribution (overhead and underground) wires, poles, etc.
- Electrical Transmission (overhead and underground) wires, poles, etc.
- Natural Gas Distribution Facilities (underground)
- Telecommunications facilities and equipment
- Cable TV facilities.
- Street Lighting
- Internet Data Service

Whereas the OWNER desires the following to be installed as new additional facilities during the proposed contract.

Insert detailed description of proposed new additional utility installations:

*None*

Design Responsibilities for adjusted, relocated, and new additional utility facilities:

\_\_\_\_(1a) Whereas the OWNER does not have adequate staff to perform the design functions for the adjustment or relocation of its facilities and is willing to have this design work included in the contract to be let by the DEPARTMENT.

\_\_\_\_(2a) Whereas the OWNER is willing to have this design work included in the contract to be let by the DEPARTMENT.

(3a) Whereas the OWNER will perform its own relocation or adjustment design.

If method (1a) or (2a) for the adjustment, relocation or installation of new facilities is selected, all design necessary for the adjustment or relocation of the described utilities in accordance with the plans when approved shall be included in the project contract and accomplished by the CONTRACTOR except as follows (check none or list any work items to be performed by the OWNER):

\_\_\_\_ None.

Excluded Items: \_\_\_\_\_.

Construction Responsibilities for adjusted, relocated, and new additional utility facilities:

\_\_\_\_(1b) Whereas the OWNER does not have adequate equipment and staff to adjust its facilities and is willing to have this work included in the contract to be let by the DEPARTMENT.

\_\_\_\_(2b) Whereas the OWNER is willing to have this work included in the contract to be let by the DEPARTMENT.

(3b) Whereas the OWNER will perform its own relocations or adjustments.

If method (1b) or (2b) for the adjustment, relocation or installation of new facilities is selected, all work necessary for the adjustment or relocation of the described utilities in accordance with the plans when approved shall be included in the project contract and accomplished by the CONTRACTOR except as follows (check none or list any work items to be performed by the OWNER):

\_\_\_\_ None.

Excluded Items: \_\_\_\_\_.

The following is hereby mutually agreed to and understood by both parties:

1. The identification of existing facilities including preparation of base maps plans will be accomplished by the DEPARTMENT prior to award of the project contract and thereafter supplemented by the CONTRACTOR.
2. The CONTRACTOR shall coordinate reviews of the information and obtain acceptance from the OWNER and DEPARTMENT when required. However; the OWNER shall apply for and obtain any required permits from the DEPARTMENT and perform any final design or proprietary design needed to administer its own relocation work if the work will not be included in the project contract (list any work not included in the project in space provided above). If the preliminary plans indicate that no conflict exists, and the OWNER accepts this information, the OWNER shall provide a letter of “no conflict” to the CONTRACTOR.
3. The CONTRACTOR will research the property interest of each OWNER and present the findings to the DEPARTMENT and OWNER for approval. The CONTRACTOR will coordinate resolution of any disputed items. The plans and estimate for the utility work shall be subject to approval of both the DEPARTMENT and the OWNER prior to construction. If the OWNER chooses to include the subject utility work in the project construction and the research indicates that no property interest exists, and the OWNER cannot refute this finding with evidence that would substantiate the property interest in legal proceedings, the OWNER shall provide confirmation in writing that OWNER will reimburse the DEPARTMENT for any adjustment or relocations necessary; and an agreement will be prepared and executed in accordance with the DEPARTMENT’S “Utility Accommodation Policy and Standards Manual”. If the OWNER chooses to perform it own relocations and the OWNER holds no property interest as stated above; the OWNER shall confirm in writing that the OWNER will relocate its own facilities at no cost to the DEPARTMENT and the CONTRACTOR.
4. All construction engineering and contract supervision shall be the responsibility of the DEPARTMENT and the CONTRACTOR to assure that all utility work included in the project contract is accomplished in accordance with plans and specifications and to consult with the OWNER before authorizing any changes or deviations which affect the OWNER’s facility.
5. For Utility work included in the contract, the OWNER or the OWNER’s Consultant shall have the right to visit and inspect the work at any time and advise the CONTRACTOR and the DEPARTMENT’S Engineer of any observed discrepancies or potential problems. The DEPARTMENT agrees to notify the OWNER when all utility work is completed and ready for final inspection by the OWNER.
6. Upon completion of the utility work included in the contract and upon certification by the DEPARTMENT’S Engineer that the work has been completed in accordance with the plans and specifications, the OWNER will accept the adjusted, relocated, and additional facilities and will thereafter operate and maintain said facilities located within public right of way subject to the DEPARTMENT’S “Utility Accommodation Policy and Standards, 1988 edition” and any agreements in effect without further cost to the DEPARTMENT or it’s CONTRACTOR.
7. For the purpose of utility coordination, relocation and reimbursement matters, the OWNER shall cooperate with the CONTRACTOR in the same manner as if directly with the DEPARTMENT in accordance with the



laws of Georgia, the DEPARTMENT'S "Utility Accommodation Policy and Standards, 1988 edition" and any agreements in effect between the DEPARTMENT and OWNER. The OWNER agrees to cooperate in good faith with the CONTRACTOR and to respond to all requests for information or meetings required to reach a resolution of any disputed items.

The Memorandum of Understanding will be incorporated into the project contract by reference or Exhibit.

APPROVED FOR THE OWNER BY:

Clayton Loring  
(Signature)

02-26-07  
(Date)

CONSTRUCTION SUPERVISOR  
(Title)

APPROVED FOR THE DEPARTMENT BY:

[Signature]  
(Signature)

2-26-2007  
(Date)

STATE UTILITIES ENGINEER

Georgia DOT Project: CSNHS-0008-00(232) Troup County  
GDOT P.I. 0008232

### MEMORANDUM OF UNDERSTANDING

between the  
Georgia Department of Transportation (hereafter the DEPARTMENT)  
and  
City of LaGrange, GA (hereafter the OWNER)

Whereas the DEPARTMENT proposes to undertake a design-build project to construct a new interchange on I-85 @ CR 98/Gabbettville Road within the existing right of way, in the City of West Point, Troup County, Georgia by contract through competitive bidding procedures; and,

Whereas the DEPARTMENT will accomplish the design-build project through a Design Consultant, Design Consultant Team and/or Contractor hereafter referred to as CONTRACTOR; and,

Whereas the OWNER has the following utility facilities which may need to be adjusted or relocated as a result of the proposed contract:

Type of facility or facilities of the OWNER:

- Domestic water mains and distribution lines and associated appurtenances.
- Sanitary Sewer facilities and/or Storm Drainage System
- Electrical Distribution (overhead and underground) wires, poles, etc.
- Electrical Transmission (overhead and underground) wires, poles, etc.
- Natural Gas Distribution Facilities (underground)
- Telecommunications facilities and equipment
- Cable TV facilities.
- Street Lighting
- Internet Data Service

Whereas the OWNER desires the following to be installed as new additional facilities during the proposed contract.

Insert detailed description of proposed new additional utility installations:

Replace existing 8" steel gas main with  
new 10" main

Design Responsibilities for adjusted, relocated, and new additional utility facilities:

\_\_\_\_ (1a) Whereas the OWNER does not have adequate staff to perform the design functions for the adjustment or relocation of its facilities and is willing to have this design work included in the contract to be let by the DEPARTMENT.

\_\_\_\_ (2a) Whereas the OWNER is willing to have this design work included in the contract to be let by the DEPARTMENT.

(3a) Whereas the OWNER will perform its own relocation or adjustment design.

If method (1a) or (2a) for the adjustment, relocation or installation of new facilities is selected, all design necessary for the adjustment or relocation of the described utilities in accordance with the plans when approved shall be included in the project contract and accomplished by the CONTRACTOR except as follows (check none or list any work items to be performed by the OWNER):

\_\_\_\_ None.

Excluded Items: \_\_\_\_\_.

Construction Responsibilities for adjusted, relocated, and new additional utility facilities:

\_\_\_\_ (1b) Whereas the OWNER does not have adequate equipment and staff to adjust its facilities and is willing to have this work included in the contract to be let by the DEPARTMENT.

\_\_\_\_ (2b) Whereas the OWNER is willing to have this work included in the contract to be let by the DEPARTMENT.

(3b) Whereas the OWNER will perform its own relocations or adjustments.

If method (1b) or (2b) for the adjustment, relocation or installation of new facilities is selected, all work necessary for the adjustment or relocation of the described utilities in accordance with the plans when approved shall be included in the project contract and accomplished by the CONTRACTOR except as follows (check none or list any work items to be performed by the OWNER):

\_\_\_\_ None.

Excluded Items: \_\_\_\_\_.

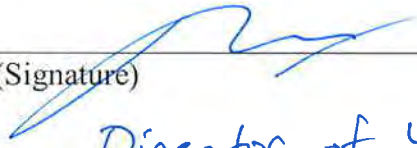
The following is hereby mutually agreed to and understood by both parties:

1. The identification of existing facilities including preparation of base maps plans will be accomplished by the DEPARTMENT prior to award of the project contract and thereafter supplemented by the CONTRACTOR.
2. The CONTRACTOR shall coordinate reviews of the information and obtain acceptance from the OWNER and DEPARTMENT when required. However; the OWNER shall apply for and obtain any required permits from the DEPARTMENT and perform any final design or proprietary design needed to administer its own relocation work if the work will not be included in the project contract (list any work not included in the project in space provided above). If the preliminary plans indicate that no conflict exists, and the OWNER accepts this information, the OWNER shall provide a letter of “no conflict” to the CONTRACTOR.
3. The CONTRACTOR will research the property interest of each OWNER and present the findings to the DEPARTMENT and OWNER for approval. The CONTRACTOR will coordinate resolution of any disputed items. The plans and estimate for the utility work shall be subject to approval of both the DEPARTMENT and the OWNER prior to construction. If the OWNER chooses to include the subject utility work in the project construction and the research indicates that no property interest exists, and the OWNER cannot refute this finding with evidence that would substantiate the property interest in legal proceedings, the OWNER shall provide confirmation in writing that OWNER will reimburse the DEPARTMENT for any adjustment or relocations necessary; and an agreement will be prepared and executed in accordance with the DEPARTMENT’S “Utility Accommodation Policy and Standards Manual”. If the OWNER chooses to perform it own relocations and the OWNER holds no property interest as stated above; the OWNER shall confirm in writing that the OWNER will relocate its own facilities at no cost to the DEPARTMENT and the CONTRACTOR.
4. All construction engineering and contract supervision shall be the responsibility of the DEPARTMENT and the CONTRACTOR to assure that all utility work included in the project contract is accomplished in accordance with plans and specifications and to consult with the OWNER before authorizing any changes or deviations which affect the OWNER’s facility.
5. For Utility work included in the contract, the OWNER or the OWNER’s Consultant shall have the right to visit and inspect the work at any time and advise the CONTRACTOR and the DEPARTMENT’S Engineer of any observed discrepancies or potential problems. The DEPARTMENT agrees to notify the OWNER when all utility work is completed and ready for final inspection by the OWNER.
6. Upon completion of the utility work included in the contract and upon certification by the DEPARTMENT’S Engineer that the work has been completed in accordance with the plans and specifications, the OWNER will accept the adjusted, relocated, and additional facilities and will thereafter operate and maintain said facilities located within public right of way subject to the DEPARTMENT’S “Utility Accommodation Policy and Standards, 1988 edition” and any agreements in effect without further cost to the DEPARTMENT or it’s CONTRACTOR.
7. For the purpose of utility coordination, relocation and reimbursement matters, the OWNER shall cooperate with the CONTRACTOR in the same manner as if directly with the DEPARTMENT in accordance with the

laws of Georgia, the DEPARTMENT'S "Utility Accommodation Policy and Standards, 1988 edition" and any agreements in effect between the DEPARTMENT and OWNER. The OWNER agrees to cooperate in good faith with the CONTRACTOR and to respond to all requests for information or meetings required to reach a resolution of any disputed items.

The Memorandum of Understanding will be incorporated into the project contract by reference or Exhibit.

APPROVED FOR THE OWNER BY:

  
(Signature) Director of Utilities

(Title)

2/19/07  
(Date)

APPROVED FOR THE DEPARTMENT BY:

  
(Signature)

STATE UTILITIES ENGINEER

2-26-2007  
(Date)



Georgia DOT Project:  
GDOT P.I.

CSNHS-0008-00(232) Troup County  
0008232



**MEMORANDUM OF UNDERSTANDING**

between the  
Georgia Department of Transportation (hereafter the DEPARTMENT)  
and  
**CITY OF WEST POINT** (hereafter the OWNER)

Whereas the DEPARTMENT proposes to undertake a design-build project to construct a new interchange on I-85 @ CR 98/Gabbettville Road within the existing right of way, in the City of West Point, Troup County, Georgia by contract through competitive bidding procedures; and,

Whereas the DEPARTMENT will accomplish the design-build project through a Design Consultant, Design Consultant Team and/or Contractor hereafter referred to as CONTRACTOR; and,

Whereas the OWNER has the following utility facilities which may need to be adjusted or relocated as a result of the proposed contract:

Type of facility or facilities of the OWNER:

- Domestic water mains and distribution lines and associated appurtenances.
- Sanitary Sewer facilities and/or Storm Drainage System
- Electrical Distribution (overhead and underground) wires, poles, etc.
- Electrical Transmission (overhead and underground) wires, poles, etc.
- Natural Gas Distribution Facilities (underground)
- Telecommunications facilities and equipment
- Cable TV facilities.
- Street Lighting
- Internet Data Service

Whereas the OWNER desires the following to be installed as new additional facilities during the proposed contract.

Insert detailed description of proposed new additional utility installations:

**WATER MAIN ALONG KIA BOULEVARD, KIA PARKWAY & WEBB ROAD**

**SEWER MAIN CROSSING KIA PARKWAY**

**PLANS AND SPECIFICATIONS ARE NOT COMPLETE ON THESE PROJECTS.**

Design Responsibilities for adjusted, relocated, and new additional utility facilities:

\_\_\_\_(1a) Whereas the OWNER does not have adequate staff to perform the design functions for the adjustment or relocation of its facilities and is willing to have this design work included in the contract to be let by the DEPARTMENT.

\_\_\_\_(2a) Whereas the OWNER is willing to have this design work included in the contract to be let by the DEPARTMENT.

X (3a) Whereas the OWNER will perform its own relocation or adjustment design.

If method (1a) or (2a) for the adjustment, relocation or installation of new facilities is selected, all design necessary for the adjustment or relocation of the described utilities in accordance with the plans when approved shall be included in the project contract and accomplished by the CONTRACTOR except as follows (check none or list any work items to be performed by the OWNER):

\_\_\_\_ None.

Excluded Items: \_\_\_\_\_.

Construction Responsibilities for adjusted, relocated, and new additional utility facilities:

\_\_\_\_(1b) Whereas the OWNER does not have adequate equipment and staff to adjust its facilities and is willing to have this work included in the contract to be let by the DEPARTMENT.

\_\_\_\_(2b) Whereas the OWNER is willing to have this work included in the contract to be let by the DEPARTMENT.

X (3b) Whereas the OWNER will perform its own relocations or adjustments.

If method (1b) or (2b) for the adjustment, relocation or installation of new facilities is selected, all work necessary for the adjustment or relocation of the described utilities in accordance with the plans when approved shall be included in the project contract and accomplished by the CONTRACTOR except as follows (check none or list any work items to be performed by the OWNER):

\_\_\_\_ None.

Excluded Items: \_\_\_\_\_.

The following is hereby mutually agreed to and understood by both parties:

1. The identification of existing facilities including preparation of base maps plans will be accomplished by the DEPARTMENT prior to award of the project contract and thereafter supplemented by the CONTRACTOR.
2. The CONTRACTOR shall coordinate reviews of the information and obtain acceptance from the OWNER and DEPARTMENT when required. However; the OWNER shall apply for and obtain any required permits from the DEPARTMENT and perform any final design or proprietary design needed to administer its own relocation work if the work will not be included in the project contract (list any work not included in the project in space provided above). If the preliminary plans indicate that no conflict exists, and the OWNER accepts this information, the OWNER shall provide a letter of “no conflict” to the CONTRACTOR.
3. The CONTRACTOR will research the property interest of each OWNER and present the findings to the DEPARTMENT and OWNER for approval. The CONTRACTOR will coordinate resolution of any disputed items. The plans and estimate for the utility work shall be subject to approval of both the DEPARTMENT and the OWNER prior to construction. If the OWNER chooses to include the subject utility work in the project construction and the research indicates that no property interest exists, and the OWNER cannot refute this finding with evidence that would substantiate the property interest in legal proceedings, the OWNER shall provide confirmation in writing that OWNER will reimburse the DEPARTMENT for any adjustment or relocations necessary; and an agreement will be prepared and executed in accordance with the DEPARTMENT’S “Utility Accommodation Policy and Standards Manual”. If the OWNER chooses to perform it own relocations and the OWNER holds no property interest as stated above; the OWNER shall confirm in writing that the OWNER will relocate its own facilities at no cost to the DEPARTMENT and the CONTRACTOR.
4. All construction engineering and contract supervision shall be the responsibility of the DEPARTMENT and the CONTRACTOR to assure that all utility work included in the project contract is accomplished in accordance with plans and specifications and to consult with the OWNER before authorizing any changes or deviations which affect the OWNER’s facility.
5. For Utility work included in the contract, the OWNER or the OWNER’s Consultant shall have the right to visit and inspect the work at any time and advise the CONTRACTOR and the DEPARTMENT’S Engineer of any observed discrepancies or potential problems. The DEPARTMENT agrees to notify the OWNER when all utility work is completed and ready for final inspection by the OWNER.
6. Upon completion of the utility work included in the contract and upon certification by the DEPARTMENT’S Engineer that the work has been completed in accordance with the plans and specifications, the OWNER will accept the adjusted, relocated, and additional facilities and will thereafter operate and maintain said facilities located within public right of way subject to the DEPARTMENT’S “Utility Accommodation Policy and Standards, 1988 edition” and any agreements in effect without further cost to the DEPARTMENT or it’s CONTRACTOR.
7. For the purpose of utility coordination, relocation and reimbursement matters, the OWNER shall cooperate with the CONTRACTOR in the same manner as if directly with the DEPARTMENT in accordance with the laws of Georgia, the DEPARTMENT’S “Utility Accommodation Policy and Standards, 1988 edition” and



any agreements in effect between the DEPARTMENT and OWNER. The OWNER agrees to cooperate in good faith with the CONTRACTOR and to respond to all requests for information or meetings required to reach a resolution of any disputed items.

The Memorandum of Understanding will be incorporated into the project contract by reference or Exhibit.

APPROVED FOR THE OWNER BY:

Billy H. Head  
(Signature)

2/2/2007  
(Date)

MAYOR

(Title)

APPROVED FOR THE DEPARTMENT BY:

Jeff Bahr  
(Signature)

2/16/2007  
(Date)

STATE UTILITIES ENGINEER

Georgia DOT Project: CSNHS-0008-00(232) Troup County  
GDOT P.I. 0008232

### MEMORANDUM OF UNDERSTANDING

between the  
Georgia Department of Transportation (hereafter the DEPARTMENT)  
and  
DIVERSE POWER INC (hereafter the OWNER)

Whereas the DEPARTMENT proposes to undertake a design-build project to construct a new interchange on I-85 @ CR 98/Gabbettville Road within the existing right of way, in the City of West Point, Troup County, Georgia by contract through competitive bidding procedures; and,

Whereas the DEPARTMENT will accomplish the design-build project through a Design Consultant, Design Consultant Team and/or Contractor hereafter referred to as CONTRACTOR; and,

Whereas the OWNER has the following utility facilities which may need to be adjusted or relocated as a result of the proposed contract:

Type of facility or facilities of the OWNER:

- Domestic water mains and distribution lines and associated appurtenances.
- Sanitary Sewer facilities and/or Storm Drainage System
- Electrical Distribution (overhead and underground) wires, poles, etc.
- Electrical Transmission (overhead and underground) wires, poles, etc.
- Natural Gas Distribution Facilities (underground)
- Telecommunications facilities and equipment
- Cable TV facilities.
- Street Lighting
- Internet Data Service

Whereas the OWNER desires the following to be installed as new additional facilities during the proposed contract.

Insert detailed description of proposed new additional utility installations:

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Design Responsibilities for adjusted, relocated, and new additional utility facilities:

\_\_\_\_(1a) Whereas the OWNER does not have adequate staff to perform the design functions for the adjustment or relocation of its facilities and is willing to have this design work included in the contract to be let by the DEPARTMENT.

\_\_\_\_(2a) Whereas the OWNER is willing to have this design work included in the contract to be let by the DEPARTMENT.

(3a) Whereas the OWNER will perform its own relocation or adjustment design.

If method (1a) or (2a) for the adjustment, relocation or installation of new facilities is selected, all design necessary for the adjustment or relocation of the described utilities in accordance with the plans when approved shall be included in the project contract and accomplished by the CONTRACTOR except as follows (check none or list any work items to be performed by the OWNER):

\_\_\_\_None.

Excluded Items: \_\_\_\_\_

Construction Responsibilities for adjusted, relocated, and new additional utility facilities:

\_\_\_\_(1b) Whereas the OWNER does not have adequate equipment and staff to adjust its facilities and is willing to have this work included in the contract to be let by the DEPARTMENT.

\_\_\_\_(2b) Whereas the OWNER is willing to have this work included in the contract to be let by the DEPARTMENT.

(3b) Whereas the OWNER will perform its own relocations or adjustments.

If method (1b) or (2b) for the adjustment, relocation or installation of new facilities is selected, all work necessary for the adjustment or relocation of the described utilities in accordance with the plans when approved shall be included in the project contract and accomplished by the CONTRACTOR except as follows (check none or list any work items to be performed by the OWNER):

\_\_\_\_None.

Excluded Items: \_\_\_\_\_

The following is hereby mutually agreed to and understood by both parties:

1. The identification of existing facilities including preparation of base maps plans will be accomplished by the DEPARTMENT prior to award of the project contract and thereafter supplemented by the CONTRACTOR.
2. The CONTRACTOR shall coordinate reviews of the information and obtain acceptance from the OWNER and DEPARTMENT when required. However; the OWNER shall apply for and obtain any required permits from the DEPARTMENT and perform any final design or proprietary design needed to administer its own relocation work if the work will not be included in the project contract (list any work not included in the project in space provided above). If the preliminary plans indicate that no conflict exists, and the OWNER accepts this information, the OWNER shall provide a letter of “no conflict” to the CONTRACTOR.
3. The CONTRACTOR will research the property interest of each OWNER and present the findings to the DEPARTMENT and OWNER for approval. The CONTRACTOR will coordinate resolution of any disputed items. The plans and estimate for the utility work shall be subject to approval of both the DEPARTMENT and the OWNER prior to construction. If the OWNER chooses to include the subject utility work in the project construction and the research indicates that no property interest exists, and the OWNER cannot refute this finding with evidence that would substantiate the property interest in legal proceedings, the OWNER shall provide confirmation in writing that OWNER will reimburse the DEPARTMENT for any adjustment or relocations necessary; and an agreement will be prepared and executed in accordance with the DEPARTMENT’S “Utility Accommodation Policy and Standards Manual”. If the OWNER chooses to perform it own relocations and the OWNER holds no property interest as stated above; the OWNER shall confirm in writing that the OWNER will relocate its own facilities at no cost to the DEPARTMENT and the CONTRACTOR.
4. All construction engineering and contract supervision shall be the responsibility of the DEPARTMENT and the CONTRACTOR to assure that all utility work included in the project contract is accomplished in accordance with plans and specifications and to consult with the OWNER before authorizing any changes or deviations which affect the OWNER’s facility.
5. For Utility work included in the contract, the OWNER or the OWNER’s Consultant shall have the right to visit and inspect the work at any time and advise the CONTRACTOR and the DEPARTMENT’S Engineer of any observed discrepancies or potential problems. The DEPARTMENT agrees to notify the OWNER when all utility work is completed and ready for final inspection by the OWNER.
6. Upon completion of the utility work included in the contract and upon certification by the DEPARTMENT’S Engineer that the work has been completed in accordance with the plans and specifications, the OWNER will accept the adjusted, relocated, and additional facilities and will thereafter operate and maintain said facilities located within public right of way subject to the DEPARTMENT’S “Utility Accommodation Policy and Standards, 1988 edition” and any agreements in effect without further cost to the DEPARTMENT or it’s CONTRACTOR.
7. For the purpose of utility coordination, relocation and reimbursement matters, the OWNER shall cooperate with the CONTRACTOR in the same manner as if directly with the DEPARTMENT in accordance with the

laws of Georgia, the DEPARTMENT'S "Utility Accommodation Policy and Standards, 1988 edition" and any agreements in effect between the DEPARTMENT and OWNER. The OWNER agrees to cooperate in good faith with the CONTRACTOR and to respond to all requests for information or meetings required to reach a resolution of any disputed items.

The Memorandum of Understanding will be incorporated into the project contract by reference or Exhibit.

APPROVED FOR THE OWNER BY:

Charles S. Fehrl  
(Signature)

2-16-07  
(Date)

MANAGER, STAKING SERVICES  
(Title)

APPROVED FOR THE DEPARTMENT BY:

Jeff Beh  
(Signature)

2-22-2007  
(Date)

STATE UTILITIES ENGINEER

## MEMORANDUM OF UNDERSTANDING

between the  
Georgia Department of Transportation (hereafter the DEPARTMENT)  
and  
Georgia Power Co. (hereafter the OWNER)

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Whereas the DEPARTMENT proposes to undertake a design-build project to construct a new interchange on I-85 @ CR 98/Gabbettville Road within the existing right of way, in the City of West Point, Troup County, Georgia by contract through competitive bidding procedures; and,

Whereas the DEPARTMENT will accomplish the design-build project through a Design Consultant, Design Consultant Team and/or Contractor hereafter referred to as CONTRACTOR; and,

Whereas the OWNER has the following utility facilities which may need to be adjusted or relocated as a result of the proposed contract:

Type of facility or facilities of the OWNER:

- Domestic water mains and distribution lines and associated appurtenances.
- Sanitary Sewer facilities and/or Storm Drainage System
- Electrical Distribution (overhead and underground) wires, poles, etc.
- Electrical Transmission (overhead and underground) wires, poles, etc.
- Natural Gas Distribution Facilities (underground)
- Telecommunications facilities and equipment
- Cable TV facilities.
- Street Lighting
- Internet Data Service

Whereas the OWNER desires the following to be installed as new additional facilities during the proposed contract.

Insert detailed description of proposed new additional utility installations:

None

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Design Responsibilities for adjusted, relocated, and new additional utility facilities:

\_\_\_\_(1a) Whereas the OWNER does not have adequate staff to perform the design functions for the adjustment or relocation of its facilities and is willing to have this design work included in the contract to be let by the DEPARTMENT.

\_\_\_\_(2a) Whereas the OWNER is willing to have this design work included in the contract to be let by the DEPARTMENT.

(3a) Whereas the OWNER will perform its own relocation or adjustment design.

If method (1a) or (2a) for the adjustment, relocation or installation of new facilities is selected, all design necessary for the adjustment or relocation of the described utilities in accordance with the plans when approved shall be included in the project contract and accomplished by the CONTRACTOR except as follows (check none or list any work items to be performed by the OWNER):

\_\_\_\_None.

Excluded Items: All GPC transmission and distribution facilities.

Construction Responsibilities for adjusted, relocated, and new additional utility facilities:

\_\_\_\_(1b) Whereas the OWNER does not have adequate equipment and staff to adjust its facilities and is willing to have this work included in the contract to be let by the DEPARTMENT.

\_\_\_\_(2b) Whereas the OWNER is willing to have this work included in the contract to be let by the DEPARTMENT.

(3b) Whereas the OWNER will perform its own relocations or adjustments.

If method (1b) or (2b) for the adjustment, relocation or installation of new facilities is selected, all work necessary for the adjustment or relocation of the described utilities in accordance with the plans when approved shall be included in the project contract and accomplished by the CONTRACTOR except as follows (check none or list any work items to be performed by the OWNER):

\_\_\_\_None.

Excluded Items: All GPC transmission and distribution facilities.

The following is hereby mutually agreed to and understood by both parties:

1. The identification of existing facilities including preparation of base maps plans will be accomplished by the DEPARTMENT prior to award of the project contract and thereafter supplemented by the CONTRACTOR.
2. The CONTRACTOR shall coordinate reviews of the information and obtain acceptance from the OWNER and DEPARTMENT when required. However; the OWNER shall apply for and obtain any required permits from the DEPARTMENT and perform any final design or proprietary design needed to administer its own relocation work if the work will not be included in the project contract (list any work not included in the project in space provided above). If the preliminary plans indicate that no conflict exists, and the OWNER accepts this information, the OWNER shall provide a letter of “no conflict” to the Department.
3. The CONTRACTOR will research the property interest of each OWNER and present the findings to the DEPARTMENT and OWNER for approval. The CONTRACTOR will coordinate resolution of any disputed items. The plans and estimate for the utility work shall be subject to approval of both the DEPARTMENT and the OWNER prior to construction. If the OWNER chooses to include the subject utility work in the project construction and the research indicates that no property interest exists, and the OWNER cannot refute this finding with evidence that would substantiate the property interest in legal proceedings, the OWNER shall provide confirmation in writing that OWNER will reimburse the DEPARTMENT for any adjustment or relocations necessary; and an agreement will be prepared and executed in accordance with the DEPARTMENT’S “Utility Accommodation Policy and Standards Manual”. If the OWNER chooses to perform it own relocations and the OWNER holds no property interest as stated above; the OWNER shall confirm in writing that the OWNER will relocate its own facilities at no cost to the DEPARTMENT and the CONTRACTOR.
4. All construction engineering and contract supervision shall be the responsibility of the DEPARTMENT and the CONTRACTOR to assure that all utility work included in the project contract is accomplished in accordance with plans and specifications and to consult with the OWNER before authorizing any changes or deviations which affect the OWNER’s facility.
5. For Utility work included in the contract, the OWNER or the OWNER’s Consultant shall have the right to visit and inspect the work at any time and advise the CONTRACTOR and the DEPARTMENT’S Engineer of any observed discrepancies or potential problems. The DEPARTMENT agrees to notify the OWNER when all utility work is completed and ready for final inspection by the OWNER.
6. Upon completion of the utility work included in the contract and upon certification by the DEPARTMENT’S Engineer that the work has been completed in accordance with the plans and specifications, the OWNER will accept the adjusted, relocated, and additional facilities and will thereafter operate and maintain said facilities located within public right of way subject to the DEPARTMENT’S “Utility Accommodation Policy and Standards, 1988 edition” and any agreements in effect without further cost to the DEPARTMENT or it’s CONTRACTOR.
7. For the purpose of utility coordination, relocation and reimbursement matters, the OWNER shall cooperate with the CONTRACTOR in the same manner as if directly with the DEPARTMENT in accordance with the



laws of Georgia, the DEPARTMENT'S "Utility Accommodation Policy and Standards, 1988 edition" and any agreements in effect between the DEPARTMENT and OWNER. The OWNER agrees to cooperate in good faith with the CONTRACTOR and to respond to all requests for information or meetings required to reach a resolution of any disputed items.

The Memorandum of Understanding will be incorporated into the project contract by reference or Exhibit.

APPROVED FOR THE OWNER BY:

Mark Tilden  
(Signature)

2-15-07  
(Date)

Project Manager - DOT/SU  
(Title)

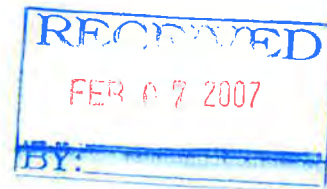
APPROVED FOR THE DEPARTMENT BY:

Rob Bahm  
(Signature)

2/16/2007  
(Date)

STATE UTILITIES ENGINEER

Georgia DOT Project: CSNHS-0008-00(232) Troup County  
GDOT P.I. 0008232



### MEMORANDUM OF UNDERSTANDING

between the  
Georgia Department of Transportation (hereafter the DEPARTMENT)  
and  
Georgia Transmission Corporation (hereafter the OWNER)

Whereas the DEPARTMENT proposes to undertake a design-build project to construct a new interchange on I-85 @ CR 98/Gabbettville Road within the existing right of way, in the City of West Point, Troup County, Georgia by contract through competitive bidding procedures; and,

Whereas the DEPARTMENT will accomplish the design-build project through a Design Consultant, Design Consultant Team and/or Contractor hereafter referred to as CONTRACTOR; and,

Whereas the OWNER has the following utility facilities which may need to be adjusted or relocated as a result of the proposed contract:

Type of facility or facilities of the OWNER:

- Domestic water mains and distribution lines and associated appurtenances.
- Sanitary Sewer facilities and/or Storm Drainage System
- Electrical Distribution (overhead and underground) wires, poles, etc.
- Electrical Transmission (overhead and underground) wires, poles, etc.
- Natural Gas Distribution Facilities (underground)
- Telecommunications facilities and equipment
- Cable TV facilities.
- Street Lighting
- Internet Data Service

Whereas the OWNER desires the following to be installed as new additional facilities during the proposed contract.

Insert detailed description of proposed new additional utility installations:

N/A

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Design Responsibilities for adjusted, relocated, and new additional utility facilities:

\_\_\_\_(1a) Whereas the OWNER does not have adequate staff to perform the design functions for the adjustment or relocation of its facilities and is willing to have this design work included in the contract to be let by the DEPARTMENT.

\_\_\_\_(2a) Whereas the OWNER is willing to have this design work included in the contract to be let by the DEPARTMENT.

X(3a) Whereas the OWNER will perform its own relocation or adjustment design.

If method (1a) or (2a) for the adjustment, relocation or installation of new facilities is selected, all design necessary for the adjustment or relocation of the described utilities in accordance with the plans when approved shall be included in the project contract and accomplished by the CONTRACTOR except as follows (check none or list any work items to be performed by the OWNER):

\_\_\_\_None.

Excluded Items:\_\_\_\_\_.

Construction Responsibilities for adjusted, relocated, and new additional utility facilities:

\_\_\_\_(1b) Whereas the OWNER does not have adequate equipment and staff to adjust its facilities and is willing to have this work included in the contract to be let by the DEPARTMENT.

\_\_\_\_(2b) Whereas the OWNER is willing to have this work included in the contract to be let by the DEPARTMENT.

X(3b) Whereas the OWNER will perform its own relocations or adjustments.

If method (1b) or (2b) for the adjustment, relocation or installation of new facilities is selected, all work necessary for the adjustment or relocation of the described utilities in accordance with the plans when approved shall be included in the project contract and accomplished by the CONTRACTOR except as follows (check none or list any work items to be performed by the OWNER):

\_\_\_\_None.

Excluded Items:\_\_\_\_\_.

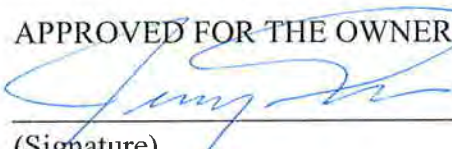
The following is hereby mutually agreed to and understood by both parties:

1. The identification of existing facilities including preparation of base maps plans will be accomplished by the DEPARTMENT prior to award of the project contract and thereafter supplemented by the CONTRACTOR.
2. The CONTRACTOR shall coordinate reviews of the information and obtain acceptance from the OWNER and DEPARTMENT when required. However; the OWNER shall apply for and obtain any required permits from the DEPARTMENT and perform any final design or proprietary design needed to administer its own relocation work if the work will not be included in the project contract (list any work not included in the project in space provided above). If the preliminary plans indicate that no conflict exists, and the OWNER accepts this information, the OWNER shall provide a letter of “no conflict” to the CONTRACTOR.
3. The CONTRACTOR will research the property interest of each OWNER and present the findings to the DEPARTMENT and OWNER for approval. The CONTRACTOR will coordinate resolution of any disputed items. The plans and estimate for the utility work shall be subject to approval of both the DEPARTMENT and the OWNER prior to construction. If the OWNER chooses to include the subject utility work in the project construction and the research indicates that no property interest exists, and the OWNER cannot refute this finding with evidence that would substantiate the property interest in legal proceedings, the OWNER shall provide confirmation in writing that OWNER will reimburse the DEPARTMENT for any adjustment or relocations necessary; and an agreement will be prepared and executed in accordance with the DEPARTMENT’S “Utility Accommodation Policy and Standards Manual”. If the OWNER chooses to perform it own relocations and the OWNER holds no property interest as stated above; the OWNER shall confirm in writing that the OWNER will relocate its own facilities at no cost to the DEPARTMENT and the CONTRACTOR.
4. All construction engineering and contract supervision shall be the responsibility of the DEPARTMENT and the CONTRACTOR to assure that all utility work included in the project contract is accomplished in accordance with plans and specifications and to consult with the OWNER before authorizing any changes or deviations which affect the OWNER’s facility.
5. For Utility work included in the contract, the OWNER or the OWNER’s Consultant shall have the right to visit and inspect the work at any time and advise the CONTRACTOR and the DEPARTMENT’S Engineer of any observed discrepancies or potential problems. The DEPARTMENT agrees to notify the OWNER when all utility work is completed and ready for final inspection by the OWNER.
6. Upon completion of the utility work included in the contract and upon certification by the DEPARTMENT’S Engineer that the work has been completed in accordance with the plans and specifications, the OWNER will accept the adjusted, relocated, and additional facilities and will thereafter operate and maintain said facilities located within public right of way subject to the DEPARTMENT’S “Utility Accommodation Policy and Standards, 1988 edition” and any agreements in effect without further cost to the DEPARTMENT or it’s CONTRACTOR.
7. For the purpose of utility coordination, relocation and reimbursement matters, the OWNER shall cooperate with the CONTRACTOR in the same manner as if directly with the DEPARTMENT in accordance with the

laws of Georgia, the DEPARTMENT'S "Utility Accommodation Policy and Standards, 1988 edition" and any agreements in effect between the DEPARTMENT and OWNER. The OWNER agrees to cooperate in good faith with the CONTRACTOR and to respond to all requests for information or meetings required to reach a resolution of any disputed items.

The Memorandum of Understanding will be incorporated into the project contract by reference or Exhibit.

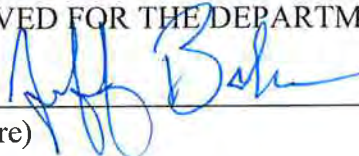
APPROVED FOR THE OWNER BY:

  
\_\_\_\_\_  
(Signature)

2-6-07  
\_\_\_\_\_  
(Date)

Sr. VICE PRESIDENT  
\_\_\_\_\_  
(Title)

APPROVED FOR THE DEPARTMENT BY:

  
\_\_\_\_\_  
(Signature)

2/16/2007  
\_\_\_\_\_  
(Date)

STATE UTILITIES ENGINEER

Georgia DOT Project:  
GDOT P.I.

CSNHS-0008-00(232) Troup County  
0008232



### MEMORANDUM OF UNDERSTANDING

between the  
Georgia Department of Transportation (hereafter the DEPARTMENT)  
and  
INTERSTATE TEL. Co. (hereafter the OWNER)

Whereas the DEPARTMENT proposes to undertake a design-build project to construct a new interchange on I-85 @ CR 98/Gabbettville Road within the existing right of way, in the City of West Point, Troup County, Georgia by contract through competitive bidding procedures; and,

Whereas the DEPARTMENT will accomplish the design-build project through a Design Consultant, Design Consultant Team and/or Contractor hereafter referred to as CONTRACTOR; and,

Whereas the OWNER has the following utility facilities which may need to be adjusted or relocated as a result of the proposed contract:

Type of facility or facilities of the OWNER:

- Domestic water mains and distribution lines and associated appurtenances.
- Sanitary Sewer facilities and/or Storm Drainage System
- Electrical Distribution (overhead and underground) wires, poles, etc.
- Electrical Transmission (overhead and underground) wires, poles, etc.
- Natural Gas Distribution Facilities (underground)
- Telecommunications facilities and equipment
- Cable TV facilities.
- Street Lighting
- Internet Data Service

Whereas the OWNER desires the following to be installed as new additional facilities during the proposed contract.

Insert detailed description of proposed new additional utility installations:

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Design Responsibilities for adjusted, relocated, and new additional utility facilities:

\_\_\_\_ (1a) Whereas the OWNER does not have adequate staff to perform the design functions for the adjustment or relocation of its facilities and is willing to have this design work included in the contract to be let by the DEPARTMENT.

\_\_\_\_ (2a) Whereas the OWNER is willing to have this design work included in the contract to be let by the DEPARTMENT.

(3a) Whereas the OWNER will perform its own relocation or adjustment design.

If method (1a) or (2a) for the adjustment, relocation or installation of new facilities is selected, all design necessary for the adjustment or relocation of the described utilities in accordance with the plans when approved shall be included in the project contract and accomplished by the CONTRACTOR except as follows (check none or list any work items to be performed by the OWNER):

\_\_\_\_ None.

Excluded Items: \_\_\_\_\_

Construction Responsibilities for adjusted, relocated, and new additional utility facilities:

\_\_\_\_ (1b) Whereas the OWNER does not have adequate equipment and staff to adjust its facilities and is willing to have this work included in the contract to be let by the DEPARTMENT.

\_\_\_\_ (2b) Whereas the OWNER is willing to have this work included in the contract to be let by the DEPARTMENT.

(3b) Whereas the OWNER will perform its own relocations or adjustments.

If method (1b) or (2b) for the adjustment, relocation or installation of new facilities is selected, all work necessary for the adjustment or relocation of the described utilities in accordance with the plans when approved shall be included in the project contract and accomplished by the CONTRACTOR except as follows (check none or list any work items to be performed by the OWNER):

\_\_\_\_ None.

Excluded Items: \_\_\_\_\_

The following is hereby mutually agreed to and understood by both parties:


1. The identification of existing facilities including preparation of base maps plans will be accomplished by the DEPARTMENT prior to award of the project contract and thereafter supplemented by the CONTRACTOR.
2. The CONTRACTOR shall coordinate reviews of the information and obtain acceptance from the OWNER and DEPARTMENT when required. However; the OWNER shall apply for and obtain any required permits from the DEPARTMENT and perform any final design or proprietary design needed to administer its own relocation work if the work will not be included in the project contract (list any work not included in the project in space provided above). If the preliminary plans indicate that no conflict exists, and the OWNER accepts this information, the OWNER shall provide a letter of "no conflict" to the CONTRACTOR.
3. The CONTRACTOR will research the property interest of each OWNER and present the findings to the DEPARTMENT and OWNER for approval. The CONTRACTOR will coordinate resolution of any disputed items. The plans and estimate for the utility work shall be subject to approval of both the DEPARTMENT and the OWNER prior to construction. If the OWNER chooses to include the subject utility work in the project construction and the research indicates that no property interest exists, and the OWNER cannot refute this finding with evidence that would substantiate the property interest in legal proceedings, the OWNER shall provide confirmation in writing that OWNER will reimburse the DEPARTMENT for any adjustment or relocations necessary; and an agreement will be prepared and executed in accordance with the DEPARTMENT'S "Utility Accommodation Policy and Standards Manual". If the OWNER chooses to perform it own relocations and the OWNER holds no property interest as stated above; the OWNER shall confirm in writing that the OWNER will relocate its own facilities at no cost to the DEPARTMENT and the CONTRACTOR.
4. All construction engineering and contract supervision shall be the responsibility of the DEPARTMENT and the CONTRACTOR to assure that all utility work included in the project contract is accomplished in accordance with plans and specifications and to consult with the OWNER before authorizing any changes or deviations which affect the OWNER's facility.
5. For Utility work included in the contract, the OWNER or the OWNER's Consultant shall have the right to visit and inspect the work at any time and advise the CONTRACTOR and the DEPARTMENT'S Engineer of any observed discrepancies or potential problems. The DEPARTMENT agrees to notify the OWNER when all utility work is completed and ready for final inspection by the OWNER.
6. Upon completion of the utility work included in the contract and upon certification by the DEPARTMENT'S Engineer that the work has been completed in accordance with the plans and specifications, the OWNER will accept the adjusted, relocated, and additional facilities and will thereafter operate and maintain said facilities located within public right of way subject to the DEPARTMENT'S "Utility Accommodation Policy and Standards, 1988 edition" and any agreements in effect without further cost to the DEPARTMENT or it's CONTRACTOR.
7. For the purpose of utility coordination, relocation and reimbursement matters, the OWNER shall cooperate with the CONTRACTOR in the same manner as if directly with the DEPARTMENT in accordance with the



laws of Georgia, the DEPARTMENT'S "Utility Accommodation Policy and Standards, 1988 edition" and any agreements in effect between the DEPARTMENT and OWNER. The OWNER agrees to cooperate in good faith with the CONTRACTOR and to respond to all requests for information or meetings required to reach a resolution of any disputed items.

The Memorandum of Understanding will be incorporated into the project contract by reference or Exhibit.

APPROVED FOR THE OWNER BY:

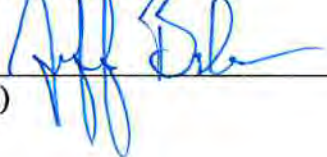
  
\_\_\_\_\_  
(Signature)

2-13-07  
\_\_\_\_\_  
(Date)

Dire. OSP  
\_\_\_\_\_

(Title)

APPROVED FOR THE DEPARTMENT BY:

  
\_\_\_\_\_  
(Signature)

2/16/2007  
\_\_\_\_\_  
(Date)

STATE UTILITIES ENGINEER

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SPECIAL PROVISION**

**PROJECT NO. CSNHS-0008-00(232)**

**P.I. NO. 0008232**

---

*Add the following:*

**ESCROW BID DOCUMENTATION**

**Scope and Purpose**

The purpose of this specification is to preserve the bid documents of the successful bidder (Contractor) for use by the parties in any claims or litigation between the Department and Contractor arising out of this contract.

The Contractor shall submit a legible copy of bid documentation used to prepare the bid for this contract to the Department. Such documentation shall be placed in escrow with a banking institution or other bonded document storage facility and preserved by that institution/facility as specified in the following sections of this specification.

**Bid Documentation**

The term "bid documentation" as used in this specification means all writings, working papers, computer printouts, charts, and all other data compilations which contain or reflect information, data, and calculations used by the Contractor to determine the bid in bidding for this project. The term "bid documentation" includes, but is not limited to, Contractor equipment rates, Contractor overhead rates, labor rates, efficiency or productivity factors, arithmetic extensions, and quotations from subcontractors and material suppliers to the extent that such rates and quotations were used by the Contractor in formulating and determining the amount of the bid. The term "bid documentation" also includes any manuals which are standard to the industry used by the Contractor in determining the bid for this project. Such manuals may be included in the bid documentation by reference. Such reference shall include the name and date of the Publication and the Publisher. The term does not include bid documents provided by the Department for use by the Contractor in bidding on this project.

**Submittal of Bid Documentation**

The Contractor shall submit the bid documentation to the Department in a container suitable for sealing, no later than ten calendar days following award of the Contract by the Department. The Department will not issue a Notice to Proceed until the acceptable documentation has been received. The container shall be clearly marked "Bid Documentation" and shall also show on the face of the container the Contractor's name, the date of submittal, the Project Number, the P.I. Number, the Contract Number, and the County.

**Affidavit**

In addition to the bid documentation, an affidavit, signed under oath by an individual authorized by the Contractor to execute bidding proposals shall be included. The affidavit shall list each bid document with sufficient specificity so a comparison may be made between the list and the bid documentation to ensure that all of the bid documentation listed in the affidavit has been enclosed. The affidavit shall attest that the affiant has personally examined the bid

documentation, that the affidavit lists all of the documents used by the Contractor to determine the bid for this project, and that all such bid documentation has been included.

### **Verification**

Upon receipt of the bid documentation authorized representatives of the Department and the Contractor will verify the accuracy and completeness of the bid documentation compared to the affidavit. Should a discrepancy exist the Contractor shall immediately furnish the Department with any other needed total documentation. The Department, upon determining that the bid documentation is complete, will, in the presence of the Contractor's representative, immediately place the complete documentation and affidavit in the container and seal it. Both parties will deliver the sealed container to a banking institution or other bonded document storage facility selected by the Department for placement in a safety deposit box, vault or other secure accommodation.

### **Duration and Use**

The bid documentation and affidavit shall remain in escrow during the life of the Contract or until such time as the Contractor notifies the Department of his intention to file a claim or his initiation of litigation against the Department related to the Contract. Notification of the Contractor's intention to file a claim or litigation against the Department shall be sufficient evidence for the Department to obtain the release and custody of the bid documentation. If no such notification is received and the Contractor has signed the final Standard Release Form the Department shall instruct the banking institution or other bonded document storage facility to release the sealed container to the Contractor.

The Contractor agrees that the sealed container placed in escrow contains all of the bid documentation used to determine the bid and that no other bid documentation shall be utilized by the Contractor in litigation over claims brought by the Contractor arising out of this contract.

### **Refusal or Failure to Provide Bid Documentation**

Failure or refusal to provide bid documentation shall be deemed either:

1. Failure to execute the Contract if the Contract has not yet been executed or,
2. Material breach of the Contract if the Contract has been executed.

Should the Contractor fail to execute the Contract as stated in 1 above, the Department will retain the bid bond. Refusal of the Contractor to provide adequate documentation after execution of the Contract will be considered material breach of the Contract and the Contractor will be declared in default of the Contract. The Department may, at its option terminate the contract for default. These remedies are not exclusive and the Department may take such other action as is available to it under the law.

### **Confidentiality of Bid Documentation**

The bid documentation and affidavit in escrow are, and will remain, the property of the Contractor. The Department has no interest in, or right to, the bid documentation and affidavit other than to verify the contents and legibility of the bid documentation unless notification of the intention to file claim is received or litigation ensues between the Department and Contractor. In the event of such notification or litigation, the bid documentation and affidavit shall become the property of the Department.

### **Cost and Escrow Instructions**

The cost of the escrow will be borne by the Department. The Department will provide escrow instructions to the banking institution or other bonded document storage facility consistent with this specification.

### **Escrow Agreement**

A copy of the Escrow Agreement the successful bidder will be required to sign is attached. The successful bidder (contractor) agrees that they will sign the Escrow Agreement. Should the Contractor fail to sign the Escrow Agreement, when presented, the Department will retain the bid bond. If the Contract has been executed, and the Contractor fails to sign the Escrow Agreement, the Contractor may be declared in default of the Contract.

**Payment**

There will be no separate payment for compilation of the data, container or cost of verification of the bid documentation. All costs shall be included in the overall Contract bid price.

**Escrow Agreement  
For  
Bid Documents**

THIS AGREEMENT is made and entered into this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, by and among the Department of Transportation, an agency of the State of Georgia, hereinafter called the "DEPARTMENT"; \_\_\_\_\_; hereinafter called the "CONTRACTOR"; and \_\_\_\_\_, hereinafter called the "ESCROW AGENT".

WHEREAS, the DEPARTMENT awarded a project on \_\_\_\_\_, 20\_\_, based on a bid proposal submitted by the CONTRACTOR, hereinafter called the "PROPOSAL", for the construction of Project Number \_\_\_\_\_ County(ies), Georgia, hereinafter called the "PROJECT", pursuant to which the CONTRACTOR shall cause the work therein to be constructed; and

WHEREAS, the DEPARTMENT and CONTRACTOR are desirous of entering into an Escrow Agreement, to provide for specific contingencies governing the escrow and control of the PROPOSAL bid documentation; hereinafter called "BID DOCUMENTS"; and

WHEREAS, the DEPARTMENT and CONTRACTOR desire the ESCROW AGENT to hold the BID DOCUMENTS of the CONTRACTOR;

NOW THEREFORE, for and in consideration of the mutual covenants contained herein, it is agreed by and between the parties hereto that:

**ARTICLE I**

**ESCROW BID DOCUMENTATION**

The parties hereto agree to the establishment of Escrow of the BID DOCUMENTS for the PROPOSAL pursuant to the Specifications, Supplemental Specifications, or Special Provisions pertaining to construction under the contract. It is the understanding of the parties hereto that the DEPARTMENT shall pay the ESCROW AGENT, as determined by separate agreement, for the escrow of the BID DOCUMENTS submitted to the ESCROW AGENT under the terms of this Agreement.

**ARTICLE II**

**ACKNOWLEDGMENT**

By its signature below, the ESCROW AGENT hereby acknowledges receipt from the DEPARTMENT and CONTRACTOR of a sealed container bearing the CONTRACTOR'S name, address and PROJECT Number assigned by the DEPARTMENT and containing, as specified by the affidavit of the CONTRACTOR, the PROPOSAL BID DOCUMENTS for the aforementioned PROJECT.

**ARTICLE III  
DEPOSIT OF BID DOCUMENTS**

The PROPOSAL BID DOCUMENTS shall remain on deposit with the ESCROW AGENT until those conditions of release, as specified in ARTICLE IV, RELEASE FROM ESCROW, are met. As long as the BID DOCUMENTS remain in escrow with the ESCROW AGENT, the ESCROW AGENT shall not allow any person access, to gain possession, or to in any way interfere with the sealed BID DOCUMENT container.

**ARTICLE IV  
RELEASE FROM ESCROW**

Upon being presented, by the DEPARTMENT, with a CONTRACTOR signed final Standard Release Form for the contract for the PROJECT, the ESCROW AGENT shall deliver to the CONTRACTOR the sealed container bearing the CONTRACTOR'S name and address and project number on it. The ESCROW AGENT is also authorized to release the BID DOCUMENT sealed container to the DEPARTMENT without the CONTRACTOR'S signed consent subject to the following conditions:

1. The CONTRACTOR has provided written notification to the DEPARTMENT of the CONTRACTOR'S intention to file a claim related to the contract for the PROJECT; or
2. The CONTRACTOR has initiated litigation against the DEPARTMENT relating to the contract for the PROJECT.

Prior to any release from escrow to the DEPARTMENT the ESCROW AGENT shall verify that either condition of release to the DEPARTMENT, as stated above, has been met by providing written notice to the CONTRACTOR of the ESCROW AGENT'S intention to release the PROPOSAL BID DOCUMENTS to the DEPARTMENT. Such written notice from the ESCROW AGENT shall be sent by certified mail no less than ten (10) calendar days prior to release to the DEPARTMENT. Upon any release from escrow of the PROPOSAL BID DOCUMENT container the ESCROW AGENT shall cause the execution of Exhibit A, Escrow Release for

PROPOSAL BID DOCUMENTS, as attached hereto and incorporated herein as if fully contained, by the party receiving the BID DOCUMENT container.

**ARTICLE V  
INDEMNITY**

The CONTRACTOR agrees to indemnify and hold the ESCROW AGENT harmless against any loss, claim, damage, liability or expenses incurred in connection with any action, suit, proceeding, claim or alleged liability arising from this Escrow Agreement, provided, however, that the ESCROW AGENT shall not be so indemnified or held harmless for its negligence or acts of bad faith by it or any of its agents or employees.

**ARTICLE VI  
NOTICES**

All notices and other communication shall be in writing and shall be deemed to have been duly given and delivered if mailed by certified mail, return receipt requested, postage prepaid to the addresses stated herein:

DEPARTMENT:

Georgia Department of Transportation

ATTN: Treasurer

#2 Capitol Square

Atlanta, Georgia 30334-1002

CONTRACTOR:

ESCROW AGENT:

**ARTICLE VII  
DUTIES OF ESCROW AGENT**

The duties and responsibilities of the ESCROW AGENT shall be limited to those expressly set forth herein and the ESCROW AGENT shall act only in accordance with this ESCROW Agreement.

Notwithstanding specific provisions hereunder, the ESCROW AGENT shall at all times act upon and in accordance with the joint written instructions of the DEPARTMENT and CONTRACTOR.

**ARTICLE VIII.**

**LAWS**

This Escrow Agreement shall be deemed to have been executed in Fulton County, Georgia and the laws of the State of Georgia shall apply.

**ARTICLE IX**

**ASSIGNMENT**

This Escrow Agreement shall not be assigned without the written consent of all the parties hereto.

**ARTICLE X**

**SURVIVAL OF CONTRACT**

Except as may be expressly modified, all terms and conditions of this Escrow Agreement remain in full force and effect. The establishment of this Escrow Agreement is limited solely by the contingency of release of the PROPOSAL BID DOCUMENTS by the CONTRACTOR to the DEPARTMENT, as established by Article IV, Release From Escrow. Nothing contained herein shall alter the rights of the parties hereto.

The covenants herein contained shall, except as otherwise provided, accrue to the benefit of and be binding upon the successors and assigns of the parties hereto.



IN WITNESS WHEREOF, the parties hereunto set their hands and seals the day above first  
written.

CONTRACTOR:

ESCROW AGENT:

BY:

BY:

\_\_\_\_\_  
(SEAL)

\_\_\_\_\_  
(SEAL)

TITLE:

TITLE:

\_\_\_\_\_  
WITNESS

\_\_\_\_\_  
WITNESS

DEPARTMENT OF TRANSPORTATION

BY:

\_\_\_\_\_

TITLE: STATE TRANSPORTATION OFFICE ENGINEER

\_\_\_\_\_  
WITNESS

ESCROW CONTAINER SEAL NUMBERS:

**Exhibit A**  
**ESCROW RELEASE**  
**OF**  
**BID DOCUMENTS**

This is to certify that on this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_, the sealed container identified as:

**“Bid Documentation”**

CONTRACTOR:

PROJECT NUMBER:

P.I. NUMBER:

CONTRACT NUMBER:

DATE OF SUBMITTAL:

(Evidence by Agreement dated \_\_\_\_\_).

was released from escrow and personally handed to the below named individual acknowledging receipt, representing the CONTRACTOR/DEPARTMENT, by the ESCROW AGENT upon the presentation of the required documentation pursuant to Article IV, Release from Escrow, of the agreement dated \_\_\_\_\_, 20\_\_\_, a copy of such documentation is attached hereto.

Acknowledgment of Receipt:

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Acknowledgment of Release:

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ESCROW AGENT

**ESCROW CONTAINER SEAL NUMBERS:**

**AFFIDAVIT**

STATE OF GEORGIA

COUNTY OF FULTON

COMES NOW \_\_\_\_\_ (Name) \_\_\_\_\_, \_\_\_\_\_ (Title) \_\_\_\_\_

of \_\_\_\_\_ (Company Name) \_\_\_\_\_ who, after having been duly sworn,  
on oath, state and depose as follows:

**1.**

This Affidavit is based upon the personal knowledge of the Affiant.

**2.**

\_\_\_\_\_ (Company Name) \_\_\_\_\_ submitted a bid on Georgia Department of  
Transportation Project \_\_\_\_\_, \_\_\_\_\_ COUNTY(IES) which bid was  
the low, responsive bid, and a Contract has been entered into between \_\_\_\_\_ (Company Name) \_\_\_\_\_ and the Georgia  
Department of Transportation, known as Contract No. B\_\_\_\_\_.

**3.**

This Affidavit is given in compliance with the special provision entitled "ESCROW BID  
DOCUMENTATION" forming part of the Contract Documents of Contract No. B\_\_\_\_\_.

**4.**

The Affiant attests that, in his capacity for \_\_\_\_\_ (Company Name) \_\_\_\_\_, he is personally  
aware the "Bid Documentation" which was used by the Company in determining, formulating, and submitting the  
bid on Project No. \_\_\_\_\_, \_\_\_\_\_ COUNTY(IES).

**5.**

The Affiant further states that he has examined the bid documentation which has been placed in a sealed  
container marked "Bid Documentation", and that all such Bid Documentation utilized by the Company in  
determining, formulating, and submitting its bid is contained in the sealed container so marked.

6.

Each bid document contained in the sealed container is separately listed on Exhibit A, which is attached hereto and incorporated herein as fully as if included in this Affidavit at this paragraph 6.

Further Affiant sayeth not.

\_\_\_\_\_  
(Company Name)

By: \_\_\_\_\_

\_\_\_\_\_  
(Name)

Its: \_\_\_\_\_  
(Title)

Sworn to and subscribed before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

\_\_\_\_\_  
NOTARY PUBLIC

My Commission expires:\_\_\_\_\_

First Use Date: November 1, 2002  
Revised March 2, 2007

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SPECIAL PROVISION**

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

**SECTION 103- Award and Execution of Contract**

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*Delete paragraph one of Subsection 103.02 and substitute the following:*

If a Contract is Awarded, it will be Awarded to the lowest reliable bidder whose Proposal shall have met all the prescribed requirements. The Contract will be Awarded, if at all, within 50 calendar days after the opening of the Proposals, unless a longer period is specified in the Proposal or the successful Bidder agrees in writing a longer period for the Award.

Office of Contract Administration

**DEPARTMENT OF TRANSPORTATION**

**STATE OF GEORGIA**

**SPECIAL PROVISION**

**PROJECT: CSNHS-0008-00(232), Troup County, PI # 0008232**

**Section 107 – Legal Regulations and Responsibility to the Public**

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*Add the following to Subsection 107.23:*

**G. Protection of Federally Threatened and/or Endangered Species**

The following conditions are intended as a minimum to protect the bald eagle (*Haliaeetus leucocephalus*) and barn swallow (*Hirundo rustica*) and their habitat during any activities that are in close proximity to the known location(s) of these species.

1. The Contractor shall advise all project personnel employed to work on this project about the potential presence and appearance of the federally protected bald eagle and barn swallow and that there are civil and criminal penalties for harming, harassing, or killing bald eagles, which are protected under the Endangered Species Act of 1973, and/or barn swallows, which are protected under the Migratory Bird Treaty Act of 1918. Bald eagles are also protected by the Eagle Protection Act of 1940. Pictures and habitat information will be provided to the Contractor at the preconstruction conference.
2. Removal of the existing bridges and/or culverts and extension of existing culverts shall be done outside of the breeding season of the barn swallow (April 1st - August 31st) or exclusionary devices, constructed of plastic or canvas sheeting or other materials proposed by the contractor, shall be installed prior to the start of the breeding season. The exclusionary barriers shall be placed along the full length of bridges to prevent the birds from accessing any existing nesting habitat. For culverts, exclusionary devices shall be placed at the inlet and outlet to prevent birds from entering the culverts to access nesting habitat. The barriers shall be installed prior to April 1 and shall remain in place until August 31 or until the work is complete, whichever is first. If the restrictive barriers fail to prevent nesting, then the bridge or culvert demolition or culvert extension must be postponed until after August 31 when the breeding season is complete.
3. The Contractor shall cease all construction activities upon the sighting of a bald eagle within 100 yards of the project area. The Contractor shall only resume construction activities once the bald eagle has not been observed in the project area or within 100 yards of the project area for at least 30 minutes.
4. In order to protect the foraging habitat of the bald eagle, the required erosion control measures are to be considered minimum erosion control requirements for this area. Install other erosion control measures as needed or directed by the Engineer to ensure effective erosion control and sedimentation containment.
5. Each day, prior to commencement of construction activities, the Contractor shall walk all worksites on which equipment will be used to ensure that no bald eagles are present. If a bald eagle is sighted within 100 yards of the project area, the Project Engineer shall be notified immediately, and all activity shall cease pending Section 7 consultation by the Department with the U.S. Fish and Wildlife Service and the lead Federal Agency. The bald eagle shall not be touched, moved or harassed.

## Section 107 – Legal Regulations and Responsibility to the Public

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6. In the event any incident occurs that causes harm to or that could be detrimental to the continued existence of the bald eagle and/or barn swallow along the project corridor, the Contractor shall report the incident immediately to the Project Engineer who in turn will notify:
  - a. U.S. Fish and Wildlife Service, Athens Office at (706) 613-9493;;
  - b. Federal Highway Administration (FHWA), Georgia Division at (404) 562-3630; and
  - c. Harvey Keepler, Georgia Department of Transportation, Office of Environment/Location at (404) 699-4401 or (770) 478-7268.

In the event of possible harm to the bald eagle and/or barn swallow, the above agencies and the Project Engineer shall be notified immediately and all activity shall cease pending Section 7 consultation by the Department with the U. S. Fish and Wildlife Service and the lead Federal Agency.

7. The Contractor shall keep a log detailing any sightings or injury to bald eagles and/or barn swallows in or adjacent to the project until such time that Final Acceptance of the project is made. Following project completion, the log and a report summarizing any incidents and/or sightings with bald eagles and/or barn swallows shall be submitted by the Contractor to the:
  - a. Project Engineer;
  - b. U.S. Fish and Wildlife Service, Athens Office, 105 Westpark Drive, Suite D, Athens, GA 30606;
  - c. Georgia Department of Natural Resources, Nongame/Endangered Wildlife Program, 116 Rum Creek Drive, Forsyth, Georgia 31029
  - d. Federal Highway Administration, Georgia Division, 61 Forsyth Street, S.W., Suite 17T100, Atlanta, GA 30303.
  - e. Harvey Keepler, Georgia Department of Transportation, Office of Environment/Location, 3993 Aviation Circle, Atlanta, GA 30336;
8. All costs pertaining to any requirement contained herein shall be included in the overall bid submitted unless such requirement is designated as a separate Pay Item in the Proposal.



**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SPECIAL PROVISION**

**Section 108—Prosecution and Progress  
(Federal Aid Projects)**

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*Delete Subsection 108.06 and substitute the following:*

The Engineer has the authority to suspend the Work wholly or in part, for as long as he may deem necessary, because of unsuitable weather, or other conditions considered unfavorable for continuing the Work, or for as long as he may deem necessary by reason of failure of the Contractor to carry out orders given, or to comply with any provisions of the Contract. If the performance of all or any portion of the Work is suspended or delayed by the Engineer, in writing, for an unreasonable period of time (not originally anticipated, customary, or inherent to the construction industry) and the Contractor believes that additional compensation and/or contract time is due as a result of such suspension or delay, the Contractor shall submit to the Engineer, in writing, a request for adjustment within 7 calendar days of receipt of the notice to resume work. The request shall set forth the reasons and support for such adjustment.

Upon receipt, the Engineer will evaluate the Contractor's request. If the Engineer agrees that the cost and/or time required for the performance of the Contract has increased as a result of such suspension and the suspension was caused by conditions beyond the control of, and not the fault of, the Contractor, its suppliers, or subcontractors at any approved tier, and not caused by weather, the Engineer will make an adjustment (excluding profit) and modify the Contract in writing accordingly. The Engineer will notify the Contractor of his/her determination whether or not an adjustment of the Contract is warranted.

No contract adjustment will be allowed unless the Contractor has submitted the request for adjustment within the time prescribed.

No contract adjustment will be allowed under this clause to the extent that performance would have been suspended or delayed by any other cause, or for which an adjustment is provided for or excluded under any other term or condition of this Contract.

**DEPARTMENT OF TRANSPORTATION**  
**STATE OF GEORGIA**  
**SPECIAL PROVISION**  
**PROJECT: CSNHS-0008-00(232), TROUP COUNTY**  
**P.I. NO. 0008232**

**Section 108 – Prosecution and Progress**

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**108.07 Determination of Contract Time**

*Add the following:*

- H. Early Completion of the Work: If time charges for the overall completion of the work cease on or before November 30, 2008, the Contractor will be eligible for an incentive payment of \$10,000 per Calendar Day beginning the day after Time Charges cease and continuing up to and including the date of December 31, 2008. The total amount paid as incentive shall not exceed \$1,000,000.00 (One Million Dollars).

Time for completion of The Work may be extended as provided in Sub-Section 108.07.E. However, for the purposes of calculating and determining the eligibility for the incentive payment, the November 30, 2008 and December 31, 2008 dates will not be adjusted for any reason, cause or circumstance whatsoever, regardless of fault, save for and except in the instance of a catastrophic natural event (i.e. hurricane) or a declared state of emergency.

In the event of a catastrophic natural event (i.e. hurricane), or a declared state of emergency, that directly and substantially affects the Contractor's operations on the Project, the Department will extend the November 30, 2008 and December 31, 2008 dates on a day for day basis commensurate with the number of days that the Engineer determines the Project was impacted.

The following conditions are precedent to the Contractor's entitlement to any incentive payment:

1. The Contractor shall complete all work on Contract Items to the satisfaction of the Engineer such that time charges cease on or before the November 30, 2008 date.
2. The Contractor shall notify the Department in writing, within 30 days after time charges cease, that the Contractor elects to be paid the incentive payment and such written notice shall constitute a full and complete waiver of any and all claims against the Department arising out of, or in connection with, the Contract, which the Contractor has or may have had, except claims for adjustments as to the quantities of Contract Items appearing on the Final Statement.
3. Traffic must be open. Open to Traffic shall be defined as – All pavement shall be complete through final surface including shoulders. Project shall be final dressed and grassed throughout. All signs and guardrail shall be in final locations. All striping shall be complete. Striping may be temporary,

however it shall meet final configuration including islands, words, turn arrows, and stop bars, etc. No work should be remaining that will require lane closures (excludes turn lanes). Final striping shall be complete by final contract completion date. Variances to these criteria will be at the discretion of the Engineer and must be approved by the Department.

*Delete Subsection 108.08 and substitute the following:*

**108.08 FAILURE OR DELAY IN COMPLETING WORK ON TIME:**

Time is an essential element of the Contract, and any delay in the prosecution of The Work may inconvenience the public, obstruct traffic, or interfere with business. In addition to the aforementioned inconveniences, any delay in completion of The Work will always increase the cost of engineering. For this reason, it is important that The Work be pressed vigorously to completion. Should the Contractor or, in the case of default, the Surety fail to complete The Work within the time stipulated in the Contract or within such extra time that may be allowed, charges shall be assessed against any money due or that may become due the Contractor.

For each Calendar Day that any work shall remain uncompleted after the Contract Time expires, the sum of \$10,000 will be deducted from any money due the Contractor, not as a penalty, but as liquidated damages; provided however, that due account shall be taken of any adjustment of the contract time for completion of the work granted under the provisions of Sub-Section 108.07.E.

The Department may waive such portions of the liquidated damages as may accrue after the work is in condition for safe and convenient use by the traveling public.

**LIQUIDATED DAMAGES:** The amount of such charges is hereby agreed upon as fixed liquidated damages due the Department after the expiration of the time for completion specified in the Contract. The Contractor and the Contractor's Surety shall be liable for liquidated damages in excess of the amount due the Contractor on the final payment.

These fixed liquidated damages are not established as a penalty but are calculated and agreed upon in advance by the Department and the Contractor due the uncertainty and impossibility of making a determination as to the actual and consequential damages which are incurred by the Department, the State and the general public as a result of the failure on the part of the Contractor to complete the work on time.

1. **DEDUCTION FROM PARTIAL PAYMENTS:** Liquidated damages, as they accrue, will be deducted from periodic partial payments.
2. **DEDUCTION FROM FINAL PAYMENT:** The full amount of liquidated damages will be deducted from final payment to the Contractor and/or the Contractor's Surety.
3. **NO LIQUIDATED DAMAGES CHARGED FOR DELAY BY THE DEPARTMENT:** In case of default of the Contract and the subsequent completion of The Work by the Department as hereinafter provided, the Contractor and the Contractor's Surety shall be liable for the liquidated damages under the Contract, but no liquidated damages shall be chargeable for any delay in the final completion of The Work by the Department due to any unreasonable

action, negligence, omission of delay of the Department, In any suit for the collection of or involving the assessment of liquidated damages, the reasonableness of the amount shall be presumed. The liquidated damages referred to herein are intended to be and are cumulative and shall be in addition to every other remedy now or hereafter enforceable at law, in equity, by statute, or under the Contract.

- B. No waiver of Department's Rights: Permitting the Contractor to continue and finish The Work or any part of it after the expiration of the time allowed for completion or after an extension of time, shall not operate as a waiver of the rights of the Department under the Contract.
- C. For this project, an overall completion date has been established. In addition, the following intermediate contract times have been established:
1. Failure to complete all work, including bridge substructure and superstructure (only that which Contractor constructs from below the bridge) and all permanent safety features, along the mainline of I-85 northbound, within 75 feet outside the existing outside edge of pavement to a point halfway in the median (measured as ½ the distance from inside edge of pavement northbound to inside edge of pavement southbound) within 180 calendar days, will result in the assessment of Liquidated Damages at the rate of \$5,000 per calendar day. Day one of the 180 days will start at the beginning of any Contractor activities within the limits listed above. Note: Work referenced in 108.08.C.1 and 108.08.C.2 may overlap, but the total time to complete the two may not exceed 270 days.
  2. Failure to complete all work, including bridge substructure and superstructure (only that which Contractor constructs from below the bridge) and all permanent safety features, along the mainline of I-85 southbound, within 75 feet outside the existing outside edge of pavement to a point halfway in the median (measured as ½ the distance from inside edge of pavement northbound to inside edge of pavement southbound) within 180 days, will result in the assessment of Liquidated Damages at the rate of \$5,000 per calendar day. Day one of the 180 days will start at the beginning of any Contractor activities within the limits listed above. Note: Work referenced in 108.08.C.1 and 108.08.C.2 may overlap, but the total time to complete the two may not exceed 270 days.
  3. Failure to open lanes on I -85 as specified in Subsection 150.11 A will result in the assessment of liquidated damages at the rate of \$1,000.00 per hour or portion thereof.
  4. Failure to open two-way access from existing Webb Road to the Sandtown Road 365 calendar days after NTP as specified in Subsection 999.1.03.A will result in the assessment of liquidated damages at the rate of \$1,000.00 per day
  5. Failure to complete all work, including bridge substructure and superstructure (only that which Contractor constructs from below the bridge) and all permanent safety features, along the mainline of I-85 northbound and southbound, within 75 feet outside the existing outside edge of pavements within 270 days, will result in the assessment of Liquidated Damages at the rate of \$5,000 per calendar day.

Day one of the 270 days will start at the beginning of any Contractor activities within the limits listed above. See work referenced in 108.08.C.1 and 108.08.C.2.

6. Failure to open two-way access along KIA Blvd, starting from the intersection of Gabbettville Road and Sandtown Road, moving eastward to just east of the Truck Road, along with the final alignment(s) of the Truck Road from KIA Blvd to the West Point Economic Development Pad by December 31, 2007 as specified in Subsection 999.1.03.A will result in the assessment of liquidated damages at the rate of \$5,000.00 per day

All Liquidated Damages specified above are cumulative and are in addition to those which may be assessed in accordance with Sub-section 108.08 for failure to complete the overall Project.

*Office of Urban Design*

Date: March 2, 2007

**DEPARTMENT OF TRANSPORTATION**

**STATE OF GEORGIA**

**SPECIAL PROVISION**

**PROJECT: CSNHS-0008-00(232), TROUP COUNTY**

**P.I. NO. 0008232**

**SECTION 150 - TRAFFIC CONTROL**

*Retain Section 150 and add the following:*

**150.11 Special Conditions:**

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**For I-85 Mainline**

- A. Perform no work or move equipment or materials on the traveled way that interferes with traffic flow between the hours of 6:00 AM to 9:00 AM and 4:00 PM to 6:00 PM Monday thru Friday. Failure to adhere to these restrictions will result in deductions as specified in Section 108.08.C.3

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SPECIAL PROVISION**

**Section 161—Control of Soil Erosion and Sedimentation**

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*Add the following:*

**161.1 General Description**

This Work includes using control measures shown on the Plans, ordered by the Engineer, or as required during the life of the Contract to control soil erosion and sedimentation through the use of any of the devices or methods referred to in this Section.

**161.1.01 Definitions**

Certified Personnel— certified personnel are defined as persons who have successfully completed the Georgia Soil and Water Conservation Commission erosion control certification program (Level IA), possess a current certification card from the Commission, and a current WECS certification card.

**161.1.02 Related References**

**A. Standard Specifications**

[Section 105—Control of Work](#)

[Section 106—Control of Materials](#)

[Section 107—Legal Regulations and Responsibility to the Public](#)

[Section 109—Measurement and Payment](#)

[Section 160—Reclamation of Material Pits and Waste Areas](#)

[Section 162—Erosion Control Check Dams](#)

[Section 163—Miscellaneous Erosion Control Items](#)

[Section 166—Restoration or Alteration of Lakes and Ponds](#)

[Section 170—Silt Retention Barrier](#)

[Section 171—Temporary Silt Fence](#)

[Section 205—Roadway Excavation](#)

[Section 434—Sand Asphalt Paved Ditches](#)

[Section 441—Miscellaneous Concrete](#)

[Section 603—Rip Rap](#)

[Section 700—Grassing](#)

[Section 710—Permanent Soil Reinforcing Mat](#)

[Section 715—Bituminous Treated Roving](#)

[Section 716—Erosion Control Mats \(Blankets\)](#)

Erosion control measures contained in the Specifications include:

<b>Erosion Control Measure</b>	<b>Section</b>
Baled Straw Erosion Checks	<a href="#">163.3.05.D</a>
Bituminous Treated Mulch	<a href="#">700.3.05.G</a>
Concrete Paved Ditches	<a href="#">441</a>
Bituminous Treated Roving	<a href="#">715</a>
Erosion Control Mats (Blankets)	<a href="#">716</a>
Erosion Control Check Dams	<a href="#">162</a>
Grassing	<a href="#">700</a>
Maintenance of Temporary Erosion Control Devices	<a href="#">165</a>
Permanent Soil Reinforcing Mat	<a href="#">710</a>
Reclamation of Material Pits and Waste Areas	<a href="#">160</a>
Rip Rap	<a href="#">603</a>
Restoration or Alteration of Lakes and Ponds	<a href="#">166</a>
Sand-Asphalt Ditch Paving	<a href="#">434</a>
Sediment Basin	<a href="#">163.3.05.C</a>
Silt Control Gate	<a href="#">163.3.05.A</a>
Silt Retention Barrier	<a href="#">170</a>
Sod	<a href="#">700.3.05.H</a> & <a href="#">700.3.05.I</a>
Mulch	<a href="#">163</a>
Temporary Grassing	<a href="#">163.3.05.F</a>
Temporary Silt Fence	<a href="#">171</a>
Temporary Slope Drains	<a href="#">163.3.05.B</a>
Triangular Sediment Barrier	<a href="#">720</a>
Silt Filter Bag	<a href="#">719</a>
Organic & Synthetic Material Fiber Blanket	<a href="#">713</a>

**B. Referenced Documents**

Erosion and Sedimentation Control Plans

**161.1.03 Submittals**

**A. Status of Erosion Control Devices**

The Worksite Erosion Control Supervisor (WECS) or certified personnel will inspect the installation and maintenance of the Erosion Control Devices according to [Subsection 167.3.05.B](#) and the plan.

1. Submit all reports to the Engineer within 24 hours of the inspection. Refer to [Subsection 167.3.05.C](#) for report requirements.
2. The Engineer will review the reports and inspect the Project for compliance and concurrence with the submitted reports.



3. The Engineer will notify the WECS or certified personnel of any additional items that should be added to the reports.
4. Items listed in the report requiring routine maintenance or correction shall be corrected within 24 hours.

## **B. Erosion and Sedimentation Control Plan**

### **1. Project Plans**

Erosion and sedimentation control plans for the construction of the project will be provided by the Department. The erosion and sedimentation control plans will be prepared for the various stages of construction necessary to complete the project.

If the Contractor elects to alter the stage construction from that shown in the plans, it will be the responsibility of the Contractor to have the plans revised by a Licensed Professional to reflect all changes in Staging. This will also include any revisions to erosion and sedimentation control item quantities. If the changes affect the Comprehensive Monitoring Program (CMP), the Contractor is responsible for any revisions to the CMP.

Submit revised plans and quantities to the Engineer for review prior to land disturbing activities.

### **2. Haul Roads, Borrow Pits, Excess Material Pits, etc.**

The Contractor is responsible for preparing erosion and sedimentation control plans for construction access roads and or haul roads (inside the Right of Way), borrow pits, excess material pits, etc. Prepare these plans for all stages of construction and include the appropriate items and quantities. Submit these plans to the Engineer for review prior to land disturbing activities. These plans are to be prepared by a Licensed Professional.

If construction access roads, haul roads, borrow pits, excess material pits, etc., (inside the Right of Way) encroach within the 25 foot (7.6 m) buffer along the banks of all state waters or within the 50 ft. (15 m) buffer along the banks of any state waters classified as a "trout stream", a stream buffer variance must be obtained by the Contractor prior to beginning any land disturbing activity in the stream buffer.

### **3. Erosion Control for Borrow and Excess Material Pits Outside the Right-of-Way**

Erosion control for borrow pits and excess material pits outside the right of way is the responsibility of the Contractor. All costs associated with complying with local, state, and federal laws and regulations is the responsibility of the Contractor. If borrow or excess material pits require coverage under the National Pollutant Discharge Elimination System permit (NPDES), submit a copy of all documentation required by the NPDES permit to the Engineer.

### **4. Culverts and Pipes**

Prior to construction on new or existing culverts or pipes submit the proposed methods of construction including the method of erosion and sediment control, to the Engineer for review. Proposed methods to include if streams are to be piped, pumped or diverted.

## **161.2 Materials**

General Provisions 101 through 150.161.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

## **161.3 Construction Requirements**

### **161.3.01 Personnel**

#### **A. Duties of the Worksite Erosion Control Supervisor**

Before beginning Work, designate a Worksite Erosion Control Supervisor (WECS) to initiate, install, maintain, inspect, and report the condition of all erosion control devices as described in Sections 160 through 171 or in the Contract documents.

The WECS and alternate (if necessary) shall:

- Be an employee of the Prime Contractor.
- Have at least one year of experience directly related to roadway construction in a supervisory capacity.
- Successfully completed the Georgia Soil and Water Conservation Commission Certification Course Level IA and the Department's WECS Certification Course.
- Provide phone numbers where the WECS can be located 24 hours a day.

The WECS' duties include the following:

1. Be available or have an approved representative available 24 hours a day and have access to the equipment, personnel, and materials needed to maintain erosion control and flooding control.
2. Inform the Engineer in writing whenever the alternate WECS assumes project responsibilities.
3. Ensure that erosion control deficiencies are corrected within 24 hours or immediately during emergencies.
4. During heavy rain, have the construction area patrolled day or night, any day of the week to quickly detect and correct erosion or flooding problems before they interfere with traffic flow, safety, or downstream turbidity.
5. Be on the site 45 minutes after receiving notification of an emergency. The Department may handle emergencies without notifying the Contractor. The Department will recover costs for emergency maintenance work according to [Subsection 105.15, "Failure to Maintain Roadway or Structures."](#)
6. Maintain and submit for project record, "As-built" Erosion and Sedimentation Control Plans that supplement and graphically depict EC-1 reported additions and deletions of BMPs.
7. Ensure that both the WECS and the alternate meet the criteria of this Subsection.
8. The WECS shall maintain a current certification card for the duration of the project. Recertification of the WECS will be required prior to the expiration date shown on the Certification card in order to remain as the Certified Personnel and the WECS for the project.

Failure of the WECS or alternate to perform the duties specified in the Contract, or whose performance, has resulted in a citation being received from a State or Federal Regulatory Agency, e.g. the Georgia Environmental Protection Division, shall result in one or more of the following;

- Suspension of the WECS' certification for a period of not less than 30 days
- Removal of the Contractor's project superintendent in accordance with Sections 105.05 and 108.05 for a period not less than 14 days
- Department wide revocation of the WECS certification for a period of 12 months
- Removal of the Contractor's project superintendent in accordance with Sections 105.05 and 108.05

### **161.3.02 Equipment**

General Provisions 101 through 150.

### **161.3.03 Preparation**

General Provisions 101 through 150.

### **161.3.04 Fabrication**

General Provisions 101 through 150.

### **161.3.05 Construction**

Coordinate the temporary and permanent erosion control provisions in this Specification with the permanent erosion control provisions in the Contract to ensure economical, effective, and continuous erosion control throughout the construction and post-construction periods.

At all times that land disturbing activity is underway, a person meeting the requirements of, “certified personnel” (Level IA certified) who also possesses a current WECS certification card must be on the project. This person may be an employee of the prime contractor or the sub contractor. If the WECS is not on the project, someone that has received the Level IA certification from the Georgia Soil and Water Conservation Commission must be on the project. If the sub-contractor is the only entity on the project and they are engaged in land disturbing activity, there must be a Level IA certified person on site.

#### **A. Control Dust Pollution**

Keep dust pollution to a minimum during any of the activities. The Engineer may direct roadways or other areas to be sprinkled with water to reduce pollution.

#### **B. Perform Permanent or Temporary Grassing**

Perform permanent grassing, temporary grassing, or mulching on cut and fill slopes weekly (unless a shorter period is required by Subsection 107.23) during grading operations. Projects with grassing of 3 acres (1 ha) or less may be treated every 2 weeks (unless a shorter period is required by Subsection 107.23). When conditions warrant, the Engineer may require more frequent intervals.

Under no circumstances shall the grading ( height of cut) exceed the height operating range of the grassing equipment. It is extremely important to obtain a cover, whether it is mulch, temporary grass or permanent grass. Adequate mulch is a must.

When grading operations or other soil disturbing activities have stopped, perform grassing or erosion control as shown in the Plans, as shown in an approved Plan submitted by the Contractor, or as directed by the Engineer.

Implement permanent or temporary erosion control as follows:

1. Incorporate permanent erosion control features into the Project at the earliest practicable time. Use temporary erosion control measures under these conditions:
  - To correct conditions that develop during construction but were unforeseen during the design stage.
  - To use as needed before installing permanent erosion control features.
  - To temporarily control erosion that develops during normal construction practices but are not associated with permanent control features on the Project.

#### **C. Seed and Mulch**

Refer to Subsection [161.3.05.B, “Perform Permanent or Temporary Grassing”](#).

#### **D. Implement Permanent or Temporary Erosion Control**

The Engineer has the authority to:

- Limit the surface area of erodible earth material exposed by clearing and grubbing.
- Limit the surface area of erodible earth material exposed by excavation and borrow and fill operations.
- Direct the Contractor to provide immediate permanent or temporary erosion control to prevent contamination of adjacent streams or water courses, lakes, ponds, or other areas of water impoundment.

Such Work may include constructing items listed in the table in [Subsection 161.1.02.A, “Related References”](#) or other control devices or methods to control erosion.

## E. Erodible Area

1. Schedule and perform operations to complete temporary silt fence installation, sediment basin construction, and other temporary erosion control devices concurrently with clearing and grubbing.
2. Perform grading operations and implement permanent erosion control features immediately after installing temporary erosion control devices.

The Engineer will limit the area of excavation, and embankment operations in progress to correspond with the Contractor's ability to keep the finish grading, mulching, seeding, and other permanent erosion control measures current.

If seasonal limitations make coordination unrealistic, implement temporary erosion control measures immediately.

3. After installing temporary erosion control devices, grassing, mulching, stabilizing the area, and having it approved by the Engineer, release the area from the 17 acres (7 ha) limit.

**NOTE: Never allow the surface area of erodible earth material exposed at one time to exceed 17 acres (7 ha) except as approved by the State Construction Engineer.**

After analyzing Project conditions, the State Construction Engineer may increase the 17 acres (7 ha) limit of surface area of erodible earth material exposed at one time.

The maximum of 17 acres (7 ha) of exposed erodible earth applies to the entire Project and to all combined operations. The maximum of 17 acres (7 ha) does not apply to exposed erodible earth for each operation. If the 17 acre limitation is increased by the State Construction Engineer, the WECS shall not be assigned to another project in that capacity and should remain on site at all times the exposed acreage exceeds 17 acres.

## F. Perform Grading Operations

Perform the following grading operations:

1. Complete each roadway cut and embankment continuously, unless otherwise specified in the Contract or ordered by the Engineer.
2. Maintain the top of the earthwork in roadway sections throughout the construction stages to allow water to run off to the outer edges.
3. Provide temporary slope drain facilities with inlets and velocity dissipaters (straw bales, silt fence, aprons, etc.) to carry the runoff water to the bottom of the slopes. Place drains at intervals to handle the accumulated water.
4. Continue temporary erosion control measures until permanent drainage facilities have been constructed, pavement placed, and the grass on planted slopes stabilized to deter erosion.

## G. Perform Construction in Stream Beds

Perform construction in stream beds as follows:

1. Unless otherwise approved in writing by the Engineer, restrict construction operations in rivers, streams, and impoundments to:
  - Areas where channel changes are shown on the Plans
  - Areas that must be entered to construct temporary or permanent structures
2. If channel changes are not shown on the Plans, the Contractor may construct diversion channels as appropriate to protect the stream from erosion.
3. Clear rivers, streams, and impoundments of the following as soon as conditions permit:
  - Falsework
  - Piling that is to be removed
  - Debris
  - Other obstructions placed or caused by construction operations

4. Do not ford live streams with construction equipment.
5. Use temporary bridges or other structures that are adequate for a 25-year storm for stream crossings. Include costs in the price bid for the overall contract.
6. Do not operate mechanized equipment in live streams except to construct channel changes or temporary or permanent structures, and to remove temporary structures, unless otherwise approved in writing by the Engineer.

#### **H. General Requirements**

**Projects that consist of asphalt resurfacing, shoulder reconstruction and/or shoulder widening; schedule and perform the construction of the project to comply with the following:**

After temporary and permanent erosion control devices are installed and the area permanently stabilized (temporary or permanent) and approved by the Engineer, the area may be released from the 1 acre (0.4 ha) limit.

The maximum of 1 acre (0.4 ha) of erodible earth applies to the entire project and to all combined operations, including borrow and excess material operations that are within the right of way, not 1 acre (0.4 ha) of exposed erodible earth for each operation.

<p><b>NOTE: Never allow the surface area of erodible earth material exposed at one time to exceed 1 acre (0.4 ha).</b></p>
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1. Do not allow the disturbed exposed erodible area to exceed 1 acres (0.4 ha). This 1 acre (0.4 ha) limit includes all disturbed areas relating to the construction of the project including but not limited to slope and shoulder construction.
2. At the end of each working day, permanently stabilize all of the area disturbed by slope and shoulder reconstruction to prevent any contamination of adjacent streams or other watercourses, lakes, ponds or other areas of water impoundment. For purposes of this Specification, the end of the working day is defined as when the construction operations cease. For example, 6:00 a.m. is the end of the working day on a project that allows work only between 9:00 p.m. and 6:00 a.m.)
3. Stabilize the cut and fill slopes and shoulder with permanent or temporary grassing and a Wood Fiber Blanket ([Section 713](#), Type II). Mulching is not allowed. Borrow pits, soil disposal sites and haul roads will not require daily applications of wood fiber blanket. The application rate for the Wood Fiber Blanket on shoulder reconstruction is the rate specified for Shoulders. For shoulder reconstruction, the ground preparation requirements of [Subsection 700.3.05.A.1](#) are waived. Preparation consists of scarifying the existing shoulders 4 to 6 in (100 to 150 mm) deep and leaving the area in a smooth uniform condition free from stones, lumps, roots or other material.
4. If a sudden rain event occurs that would not allow the Contractor to apply the Type II Wood Fiber Blanket per [Section 713](#), install Wood Fiber Blanket Type I per [Section 713](#) if directed by the Engineer. Wood Fiber Blanket Type I application is for emergency use only.

Install temporary grass or permanent grass according to seasonal limitations and Specifications. When temporary grass is used, use the overseeding method ([Subsection 700.3.05.E.4](#)) when planting permanent grass.

3. Remove and dispose of all material excavated for the trench widening operation at an approved soil disposal site by the end of each working day. When shoulder reconstruction is required, this material may be used to reconstruct the graded shoulder after all asphaltic concrete pavement has been placed.
4. Provide immediate permanent and/or temporary erosion control measures for borrow pits, soil disposal sites and haul roads to prevent any contamination of adjacent streams or other watercourses, lakes, ponds or other areas of water impoundment.

5. Place asphalt in the trench the same day as the excavation occurs. Place asphalt or concrete in driveways and side roads being re-graded the same day as the excavation occurs. Stabilize any disturbed or exposed soil that is not covered with asphalt with a Wood Fiber Blanket (and grass seed). Payment will be made for the Wood Fiber Blanket and grass seed only if the shoulder has been constructed to final dimensions and grade and no further grading will be required.
6. Do not allow the grading (height of cut or fill) to exceed the operating range of the grassing equipment.
7. When grading operations or other soil disturbing activities are suspended, regardless of the reason, promptly perform all necessary permanent stabilization and/or erosion control work.
8. Use temporary erosion control measures to:
  - To correct conditions that develop during construction but were unforeseen during the design stage.
  - To use as needed before installing permanent erosion control features.
  - To temporarily control erosion that develops during normal construction practices but are not associated with permanent control features on the Project.
9. When conditions warrant, such as unfavorable weather (rain event), the Engineer may require more frequent intervals for this work.

#### **161.3.06 Quality Acceptance**

Before Final Acceptance of the Work, clean drainage structures within the project limits, both existing and newly constructed, and ensure that they are functioning properly. Costs to accomplish this work are incidental and shall be included in the overall bid for the Contract.

#### **161.3.07 Contractor Warranty and Maintenance**

Maintain the erosion control features installed to:

- Contain erosion within the limits of the right-of-way
- Control storm water discharges from disturbed areas

Effectively install and maintain the erosion control features. Ensure these features contain the erosion and sediment within the limits of the rights of way and control the discharges of storm-water from disturbed areas to meet all local, state, and federal requirements on water quality.

If a construction Project has separate contractors, the Prime Contractor shall maintain the erosion control features at grading sites as acceptable to the Engineer until the Contract is accepted. If any erosion control devices are damaged by any contractor either by neglect, by construction methods, or any other reasons, including acts of nature, they shall be repaired within 24 hours by the Prime Contractor at no cost to the Department.

### **161.4 Measurement**

Control of soil erosion and sedimentation is not measured separately for payment.

#### **161.4.01 Limits**

General Provisions 101 through 150.

### **161.5 Payment**

When no pay item is shown in the Contract, the requirements of this Specification and the Erosion Control Plan shall be in full effect. The cost of complying with these requirements will not be paid for separately, but shall be included in the overall bid submitted with the exception of inspections performed by qualified personnel which will be included in Section 167.

When listed as a pay item in the Contract, payment will be made at the unit price bid for each particular item.

No payment will be made for erosion control outside the Right-of-Way or construction easements except as provided for by the Plans.

### 161.5.01 Enforcement and Adjustments

#### A. Failure to Provide a WECS

If a designated WECS is not maintained or if the Contractor does not comply with this Specification, cease activities except traffic control and erosion control work. Monies that are due or that may become due also may be withheld according to the Specifications

#### B. Failure to Comply with Specifications

If the Contractor fails to comply with any of the requirements of this Specification, all activities shall cease immediately except traffic control and erosion control related work.

Monies that are currently due or that may become due shall be withheld according to the specifications. In addition, nonrefundable monies shall be deducted from the contract as shown in the Schedule of Deductions table below. These deductions are in addition to any actions taken in the above subsections. Deductions assessed for uncorrected deficiencies shall continue until all corrections are completed to the satisfaction of the Engineer. Receipt of a Consent Order or Notice of Violation, etc from any Regulatory Agency will also result in the assessment of Deductions from the table below.

Schedule of Deductions for Each Calendar Day of Erosion Control Deficiencies Initial Occurrence* Original Total Contract Amount		
From More Than	To and Including	Daily Charge
0	\$100,000	\$750
\$100,000	\$1,000,000	\$1125
\$1,000,000	\$5,000,000	\$2000
\$5,000,000	\$15,000,000	\$3000
\$15,000,000	-	\$5000

\*Continued non-compliance with the requirements of this specification may result in the doubling of the above tabulated Daily Charge.

Upon written request from the Contractor, the Engineer may allow, limited activities to concurrently proceed once significant portions of the corrective work have been completed. This authorization may be similarly rescinded if in the opinion of the Engineer corrective work is not being diligently pursued.

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SPECIAL PROVISION**

**PROJECT NO. CSNHS-0008-00 (232), Troup County  
P.I. NO. 0008232**

**SECTION 205 – ROADWAY EXCAVATION**

*Add the following to Sub-section 205.3.05.E:*

The soils that will be excavated from the following cut sections are primarily Class IIIC soils with poor load carrying characteristics. Do not place these soils within 3 feet (915 mm) of the subgrade directly beneath the pavement in fill sections. These soils may be placed in the bottom of high fill sections, in the shoulders or in the median as directed by the Engineer:

**Station-to-Station**

**Location**

**Kia Parkway**

475+50± to 478+50±  
482+00± to 484+50±  
516+50± to 519+50±  
520+50± to 522+50±  
522+50± to 525+00±  
578+50± to 581+50±  
634+50± to 642+50±  
648+50± to 654+50±  
654+50± to 657+50±  
663+50± to 665+50±  
665+50± to 666+50±

Left  
Right  
Left  
Center  
Right  
Left, Center, Right  
Left, Center, Right  
Left, Center, Right  
Center, Right  
Left, Center, Right  
Left, Right

**Kia Boulevard**

122+50± to 124+50±  
176+50± to 179+50±

Left  
Left, Center, Right



Ramp A

216+50± to 219+50±

Right

Ramp C

306+50± to 312+50±

Left, Center, Right

315+50± to 317+50±

Left, Center, Right

317+50± to 318+50±

Right

Warner Road

102+50± to 103+50±

Left, Right

103+50± to 105+50±

Left, Center, Right

111+50± to 113+50±

Right

114+00± to 116+50±

Left, Right

123+50± to 126+50±

Left, Right

124+00± to 125+50±

Center

126+50± to 127+50±

Left

Truck Road

101+50± to 103+50±

Left, Center, Right

103+50± to 104+50±

Left

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SPECIAL PROVISION**

**PROJECT: CSNHS-0008-00(232), TROUP COUNTY**

**P.I. NO. 0008232**

**Section 206—Borrow Excavation**

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*Delete Subsection 206.4 and substitute the following:*

**206.4 Measurement**

No separate measurement to be included for this item.

**206.4.01 Limits**

General Provisions 101 through 150.

*Delete Subsection 206.5 and substitute the following:*

**206.5 Payment**

Payment will be made under CONSTRUCTION COMPLETE.

**206.5.01 Adjustments**

General Provisions 101 through 150.

**DEPARTMENT OF TRANSPORTATION  
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**PROJECT: CSNHS-0008-00(232), TROUP COUNTY**

**P.I. NO. 0008232**

**Section 207—Excavation and Backfill for Minor Structures**

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*Delete Subsection 207.4 and substitute the following:*

**207.4 Measurement**

No separate measurement will be included for this item.

**A. Excavation**

The following considerations are not measured for payment:

- Excavation for minor structures, including undercut for backfill materials as shown on the Plans
- Excavation for an imperfect trench which is required at locations specified in the Plans but which is not measured for payment
- Removal of water
- Removal of material from any area required to be reexcavated
- Excavation and backfill of temporary drainage ditches

**B. Extra Depth Excavation**

The following extra depth excavations are not measured for payment:

1. Extra depth excavation because of Contractor negligence
2. Extra depth excavation (required by the Engineer) below the original Plan elevation of the bottom of the footing or the flow line of a culvert pipe that does not exceed 3 ft (1 m)

*Delete Subsection 207.5 and substitute the following:*

**207.5 Payment**

Payment will be made under CONSTRUCTION COMPLETE. Includes excavation for Minor Structures, Sheeting and Bracing, Backfill Materials, Normal Backfill.

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**Section 310—Graded Aggregate Construction**

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*Delete Subsection 310.4 and substitute the following:*

**310.4 Measurement**

No measurement to be included for this item.  
Bituminous prime is not measured for separate payment.

**310.4.01 Limits**

General Provisions 101 through 150.

*Delete Subsection 310.5 and substitute the following:*

**310.5 Payment**

**A. Graded Aggregate**

Payment will be made under CONSTRUCTION COMPLETE.

This shall be full compensation for:

- Materials
- Shaping and compacting the existing roadbed
- Loading, hauling, and unloading
- Crushing and processing
- Mixing
- Spreading
- Watering
- Compacting and shaping
- Maintenance
- Priming, when required
- All incidentals necessary to complete The Work

**310.5.01 Adjustments**

General Provisions 101 through 150.

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**GEORGIA DEPARTMENT OF TRANSPORTATION**  
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**P.I. NO. 0008232**

**Special Provision**

**Section 413—Bituminous Tack Coat**

---

**413.1 General Description**

This work includes furnishing and applying a bituminous tack coat on a prepared road surface including cleaning the road surface.

**413.1.01 Definitions**

General Provisions 101 through 150.

**413.1.02 Related References**

**A. Standard Specifications**

[Section 109—Measurement and Payment](#)

[Section 400—Hot Mix Asphaltic Concrete Construction](#)

[Section 424—Bituminous Surface Treatment](#)

[Section 427—Emulsified Asphalt Slurry Seal](#)

[Section 820—Asphalt Cement](#)

[Section 824—Cationic Asphalt Emulsion](#)

**B. Referenced Documents**

General Provisions 101 through 150.

**413.1.03 Submittals**

General Provisions 101 through 150.

**413.2 Materials**

Ensure that materials meet the following Specifications:

<b>Material</b>	<b>Section</b>
Asphalt cement, performance grade PG 58-22, PG 64-22, or PG 67-22	<a href="#">820.2.01</a>
Cationic emulsified asphalt CRS-2h or CRS-3	<a href="#">824.2.01</a>

Asphalt cement of performance grade PG 58-22, PG 64-22 or PG 67-22 is used for bituminous tack coat in work performed in [Section 400](#). Use cationic emulsified asphalt as a special application material only if directed by the Engineer.

The Department may change the grade or type of bituminous materials without a change in the Contract Unit Price if the Engineer determines that the grade or type selected is not performing satisfactorily.

**413.2.01 Delivery, Storage, and Handling**

General Provisions 101 through 150.

**413.3 Construction Requirements**

**413.3.01 Personnel**

General Provisions 101 through 150.

**413.3.02 Equipment**

Provide equipment in good repair, including the following units that meet the requirements of [Subsection 424.3.02, Equipment.](#)

- Power broom and blower
- Pressure distributor

**413.3.03 Preparation**

General Provisions 101 through 150.

**413.3.04 Fabrication**

General Provisions 101 through 150.

**413.3.05 Construction**

**A. Seasonal and Weather Limitation**

Do not apply tack coat if the existing surface is wet or frozen. Do not place emulsified asphalt if the air temperature in the shade is less than 40 °F (4 °C).

**B. Application**

Coat the entire areas to be paved with the tack coat unless directed otherwise by the Engineer. Apply tack coat with distributor spray bars instead of hand hoses, except in small areas that are inaccessible to spray bars.

**C. Temperature of Material**

Apply bituminous materials within the temperature ranges specified below.

<b>Bituminous Materials</b>	<b>Temperature of Application °F (°C)</b>
Asphalt cement	350 - 400 (175 - 205)
CRS-2h	140 - 180 (60 - 80)
CRS-3	140 - 180 (60 - 80)

**D. Cleaning**

Immediately before applying the tack coat, clean the entire area free of loose dirt, clay, and other foreign materials.

**E. Application Rate**

The Engineer will determine the application rate of the bituminous tack coat.

**F. Limitations and Areas Coated**

Apply only enough tack coat to the prepared road surface that can be covered with the new pavement course the same working day the tack coat is applied.

## G. Maintenance and Protection

After applying the tack coat material, allow it to break until it is tacky enough to receive the surface course. Do not allow traffic on the tack.

### 413.3.06 Quality Acceptance

General Provisions 101 through 150.

### 413.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

## 413.4 Measurement

This item will not be measured separately.

Diluting emulsified tack coat is not ordinarily allowed except when used underneath slurry seal. If allowed, this item will not be measure separately.

### 413.4.01 Limits

General Provisions 101 through 150.

## 413.5 Payment

This item will be paid for under CONSTRUCTION COMPLETE.

Includes preparing, cleaning, furnishing, hauling, applying material, and providing incidentals to complete the work.

Asphalt Cement Price Adjustment payment or deductions will be made under:

### 413.5.01 Adjustments

#### A. Asphalt Cement Price Adjustment

1. **Formula:** The Asphalt Cement Price Adjustment will be computed on a *monthly* basis in accordance with the following:

PA = Price Adjustment.

APM= the "Monthly Asphalt Cement Price" for the month the bituminous tack coat is placed.

APL = the "Monthly Asphalt Cement Price" for the month which the project was let.

TMT = Total Monthly Tonnage of asphalt cement used for bituminous tack coat (asphalt cement tack coat only, emulsified bituminous materials for tack coat are excluded) converted from gallons to tons (megagrams) by the Engineer and certified for payment.

- a. If the asphalt cement price for the month is *greater* than the asphalt cement price for the month in which the project was let:

$$PA = [((APM-APL)/APL) - 0.05] \times TMT \times APL$$

- b. If the asphalt cement price for the month is *less* than the asphalt cement price for the month in which the project was let:

$$PA = [((APM-APL)/APL) + 0.05] \times TMT \times APL$$

2. **Price Adjustment Triggers:** No price adjustment shall be made on any bituminous tack coat placed on projects with less than 366 calendar days from the Contract Letting Date to the specified Completion Date. If the Original Contract contains 366 calendar days or more the Price Adjustment Trigger shall be made for any bituminous tack coat placed from the Contract Letting Date to the specified Completion Date. A price adjustment shall not be made until the APM is greater than 5% above or below the APL.

3. **“Monthly Asphalt Cement Price”**: The Department will determine and publish a “Monthly Asphalt Cement Price” based on the following formulas:

$$\text{Monthly Asphalt Cement Price} = (50\% \times \text{NBAP}) + (50\% \times \text{LBAP});$$

Where;

NBAP = “National Base Asphalt Price”, (in dollars/ton) is calculated based on arithmetic average of the previous four weeks “Posted Prices Asphalt Cement” for the “East Coast Market – GA/FL” as listed in the “ASPHALT WEEKLY MONITOR®” published by “Poten and Partners” or at [www.poten.com](http://www.poten.com) .

LBAP = “Local Base Asphalt Price”, (in dollars/ton) is based on the arithmetic average posted price of PG asphalt cement as specified in Section 820, from the Department’s monthly survey obtained from approved asphalt cement suppliers of bituminous materials to the Department projects F.O.B. the suppliers terminal. However, the highest price and the lowest price are excluded from the calculation of average price, LBAP.

4. **“Asphalt Cement Quantity Calculation”**: The Total Monthly Tonnage (TMT) of asphalt cement computed by the Engineer will be calculated as follows:

TMT = Sum of all asphalt cement quantities used as bituminous tack coat converted from gallons to tons (megagrams) certified by the Engineer. It is the responsibility of the Contractor to provide information containing adequate detail (as determined by the Engineer) as to placed tonnage.

Asphalt Cement Price for the Month (APM) will be adjusted monthly. Price adjustments (PA) will be made monthly and all calculations for Price Adjustments shall be performed by the Engineer as specified in SOP-39 “Determination of Asphalt Cement Index and Asphalt Cement Price Adjustment”.

5. **“Other Restrictions”**:
- a. There is a cap of 125% above the APL for any price adjustment.
  - b. Unless specifically provided for by Supplemental Agreement or Contract Amendment, no further asphalt cement price adjustment will be made after *the original Contract Time has expired*. Irrespective of any other provision in the contract, for purposes of this specification, “Contract Time” does not include any time extensions or Supplemental Agreements which affect the completion of the Contract. The Asphalt Cement Price Adjustment for asphalt cement used as bituminous tack coat placed after the original Contract Time expires will be computed based on the Monthly Asphalt Cement Price at the time the Contract Time has expired, or the Monthly Asphalt Cement Price at the time the Contract was let, *whichever is less*.

**6. Assumed Contract Unit Price.**

The following price shall be used in adjustment calculations where a Contract Unit Price is referenced.

Material	Assumed Unit Price/Ton
Bituminous Tack Coat	\$2.00



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**Section 430—Portland Cement Concrete Pavement**

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*Delete Subsection 430.4 and substitute the following:*

**430.4 Measurement**

No separate measurement will be included for this item.

**430.4.01 Limits**

General Provisions 101 through 150.

*Delete Subsection 430.5 and substitute the following:*

**430.5 Payment**

Payment will be made under CONSTRUCTION COMPLETE. Includes full compensation for furnishing and placing materials, reinforcements, dowel and joint materials, supplies, and incidentals to complete the work.

No additional payment will be made for pavement with an average thickness greater than on the Plans. No additional payment will be made for a lot of concrete that develops more strength at 28 days than the compressive strength established in [Subsection 430.3.06.F, “Concrete Strength Acceptance.”](#)

If, based on the Department’s profilograph tests, the Engineer determines that the Contractor profilograph test results are inaccurate, the Contractor will be charged for profilograph testing at \$500 for each trace mile (\$250 for each trace kilometer), with a minimum charge of \$500.

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**Section 436—Asphaltic Concrete Curb**

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*Delete Subsection 436.4 and substitute the following:*

**436.4 Measurement**

No separate measurement will be included for this item.

**436.4.01 Limits**

General Provisions 101 through 150.

*Delete Subsection 436.5 and substitute the following:*

**436.5 Payment**

Payment will be made under CONSTRUCTION COMPLETE. Includes full compensation for furnishing materials, including bituminous material, preparing the subgrade or pavement surfaces, cleaning, hauling, mixing, placing and replacing if required, and maintaining the curb to complete the Item.

**436.5.01 Adjustments**

General Provisions 101 through 150.

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**SPECIAL PROVISION**

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**Section 439—Portland Cement Concrete Pavement (Special)**

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*Add the following to Subsection 439.1.02.A:*

[Section 511—Reinforcement Steel](#)

*Add the following to Subsection 439.1.02.B:*

SOP 10

*Add the following to Subsection 439.1.03:*

**D. Paving Plan**

Submit a paving plan for approval before beginning construction operations. Include details of all operations in the concrete paving process, including transverse and longitudinal construction joint layout, sequencing, curing, lighting, early opening, leave-outs, sawing, construction methods and description of all equipment. Transmit the paving plan to the Engineer for approval, 30 days prior to concrete placement.

*Delete Subsection 439.2.C and substitute the following:*

**C. Composition of Concrete**

Design the concrete mix to confirm to the following requirements:

1. Coarse Aggregate

Use coarse aggregate size No. 467, 67 or 57 for plain Portland cement concrete pavement.

Use size No. 67 or 57 coarse aggregate for continuous reinforced concrete pavement.

Separate size No. 467 in individual stockpiles of size No. 4 and size No. 67. Blend according to approved mix design proportions.

2. Fine Aggregate

Use fine aggregate that meets the requirements for size No. 10.

When using two sizes or sources of fine aggregate to produce the proper gradation, blend according to the approved design proportions.

*Add the following to Subsection 439.2:*

**D. Reinforcing Steel**

Provide deformed steel for bar reinforcement in accordance with [Section 853](#) of the Specifications or as shown on the plan details. Provide approved positioning and supporting devices (baskets and chairs) capable of securing and holding the reinforcing steel in proper position before and during paving. Store supporting devices in a manner to prevent corrosion and distortion.

1. Dowels

Provide smooth, straight dowels of the size shown on the plan details, free of burrs and conforming to the requirements of [Subsection 853.2.08](#).

For expansion joint construction, provide dowel caps on the lubricated end of each dowel bar. Provide dowel caps filled with a soft compressible material with enough range of movement to allow complete closure of the expansion joint.

2. Tie Bars

Provide straight deformed steel tie bars of the size shown on the plan details and conforming to the requirements of [Subsection 853.2.09](#). Provide either multiple-piece tie bars or single-piece tie bars as shown on the plan details. Provide multiple-piece tie bars composed of 2 pieces of deformed reinforcing steel with a coupling capable of developing a minimum tensile strength of 125% of the design yield strength of the deformed steel when tensile-tested in the assembled configuration.

3. Support Chairs

Provide bar supports capable of securing and holding the reinforcing steel in the proper position and conforming to the requirements of [Subsection 511.2, "Materials"](#). Except the use of mortar blocks are restricted to concrete lug anchor construction.

*Add the following to Subsection 439.3.01:*

**B. Certified Concrete Plant Operator**

If using onsite batch plant, have the Office of Materials and Research certify the concrete plant batcher and technician in accordance with [SOP 10, "Quality Assurance of Concrete Plants in Georgia"](#) before paving.

*Delete Subsection 439.3.02 and substitute the following:*

**439.3.02 Equipment**

**A. Equipment Requirements**

Provide equipment and tools to perform the work. Provide equipment that allows the paver to operate at a constant production rate and minimizes starting and stopping. The Engineer may limit the production rate or batch size if equipment does not keep pace with the other operations or causes poor workmanship.

**B. Ramp Screeds and Hand Finishing Tools**

Ramp screeds and hand finishing tools may be used instead of conventional mainline paving equipment.

**C. Mixing Plant**

If using onsite batch plant, have the Office of Materials and Research inspect and certify the mixing plant before paving. Approval and compliance of the plant will be in accordance with [SOP 10, "Quality Assurance of Concrete Plants in Georgia"](#) and [Section 500](#) of the Specifications.

Scales used to weigh concrete materials and the devices to measure water will meet the requirements of Subsection 500.3.02.C.3.

**D. Spreading Equipment**

Provide self-propelled mechanical spreader(s) capable of placing the concrete on the base material over the full width and depth of the pavement. Equip the spreader with a hopper or other type of spreading equipment that will distribute the concrete over the base material without segregation.

**E. Hauling Equipment**

Provide sufficient number of trucks to ensure adequate and continuous supply of concrete to the paver. Equip trucks hauling concrete from the plant to the paver with covers to protect the material from inclement weather and to reduce evaporation loss.

**F. Paving Equipment**

Ensure that equipment operating on the pavement has rubber-tired wheels or flat steel wheels. Wait to operate concrete or shoulder paving equipment on the pavement until the concrete is 14 days old or has 2,500 psi (15 MPa) compressive strength.

Paving equipment may be either slip-form or fixed form.

#### **G. Surface Finish Equipment**

Provide a self-propelled machine to produce the surface finish of the mainline and transverse plastic concrete grooving. Ensure that the equipment uses rectangular-shaped steel tines of the same size and uniform length. Use tines with a width between 0.08 in. (2 mm) and 0.130 in. (3.5 mm). Space the tines 3/8 in. (10 mm) apart, not to exceed 1/2 in. (13 mm). Hand-operated tining equipment that produces an equivalent texture may be used only on small or irregularly shaped areas or, when permitted, in emergencies due to equipment breakdown.

#### **H. Curing Equipment**

Provide a self-propelled machine for applying membrane curing compound using mechanically pressurized spraying equipment with atomizing nozzles. Provide equipment and controls that maintain the required uniform rate of application over the entire paving area. Provide a machine capable of containing drift of curing compound to outlying areas. Hand-operated pressurized spraying equipment with atomizing nozzles may only be used on small or irregular areas or, when permitted, in emergencies due to equipment breakdown.

#### **I. Protective Equipment**

Provide materials to protect the concrete edges and surface against rain, including:

- Standard metal forms or wood planks to protect the pavement edges
- Covering materials such as burlap or cotton mats, curing paper, or plastic sheeting material to protect the pavement surface

#### **J. Reinforcing Steel Inserting Equipment (Tie Bars)**

Provide inserting equipment that accurately inserts and positions reinforcing steel in the plastic concrete parallel to the profile grade and horizontal alignment in accordance to plan details.

*Delete Subsection 439.3.05.B.6 and substitute with the following:*

6. Deposit concrete near the formed joints. Place or discharge concrete only in the center of joint assembly.

*Add the following to Subsection 439.3.05.B:*

8. Arrange the operation so that leave-outs in continuous reinforced concrete pavement are unnecessary. The Engineer may grant permission for leave-outs in case of emergency provided a plan is approved for increasing the reinforcement, if required, at no additional expense to the Department.

*Delete Subsection 439.3.05.D and substitute the following:*

#### **D. Protection From Rain**

Protect the unhardened concrete from rain. See Subsection 439.3.02.I, "Protective Equipment".

When rain is imminent, stop paving operations and place forms against the sides of the pavement. Cover the surface of the unhardened concrete with the protective covering. Remove and replace areas damaged from rain with no additional expense to the Department.

*Delete Subsection 439.3.05.G.4 and substitute the following:*

4. When removing and replacing a pavement section, remove an area to the nearest transverse joint and the full width of the lane. Saw the sections to be removed to a vertical face and replace the concrete using a construction joint with dowels.

Delete Subsection 439.3.05.H.3 and substitute the following:

3. Longitudinal Sawed Joints

- a. Cut longitudinal sawed joints with a mechanical saw within three days after the concrete is placed and before traffic or equipment enters the pavement.
- b. When concrete is placed against existing concrete, begin sawing when concrete has hardened enough to prevent surface raveling, usually 4 hours after placement, but no later than 24 hours. Concrete should be sawn to a depth of 2 in. (50 mm).

Add the following to Subsection 430.3.05.H:

8. Concrete Lug Anchors for Continuously Reinforced Concrete Pavement (CRC)

Construct lug anchors in accordance with the plan details. Use concrete of the same Class as specified for the CRC pavement.

- a. Excavate the trenches for lug anchors after the base and when required by the plans, the asphalt interlayer is in place.
- b. Place the reinforcement steel in the trench according to plan details. Maintain clearances and support reinforcement steel using mortar blocks fabricated according to Subsection 511.2.1.g of the Specifications. Remove any earth material or other debris which may have dislodged and fallen into the trench before the reinforcement steel is placed.
- c. Construct lug anchors using one of the following two methods:
  - 1. Method 1: Construct lug anchors with pavement slab in one continuous placement of concrete to form a monolithic structure.
    - a. Place the concrete in layers not to exceed 18 in. (450 mm) thick.
    - b. Compact each layer with suitable vibrators according to Subsection 430.3.05.D, except place lug anchor concrete against earth, not forms.
    - c. Remove all loose earth before concrete placement and do not allow earth to be placed into the concrete during placement and compaction.
  - 2. Method 2: Construct lug anchors in advance of the construction of the pavement slab.
    - a. Construct lug anchors according to Subsection 430.3.05.K.8, except construct a shear key joint between the anchor and slab.
    - b. Construct shear key joint according to plan details.
    - c. During the time interval between completion of the lug anchor and placement of the concrete slab, keep the shear key joint and the protruding reinforcement steel clean and free of dirt or other materials which may weaken the bond between the lug anchors and the pavement slab.

Delete Subsection 439.3.06.I and substitute with the following:

**I. Texture Depth Testing**

Test the pavement surface to determine the texture depth by using GDT 72 at locations selected by the Engineer.

Transversely saw-groove areas with a surface texture depth less than 0.018 in. (0.5 mm) at no additional expense to the Department. Meet the depth requirement of 0.035 in. (0.9 mm) or greater.

Perform saw-grooving to meet the following dimensions:

Width	1/8 in. (3 mm)
Depth	3/16 in. (5 mm)
Spacing	1/2 in. (12 mm) center-to-center

*Delete Subsection 439.4:*

*Add Subsection 439.4:*

Portland cement concrete pavement (special) complete, in-place and accepted, will not be measured separately.

Reinforced concrete lug anchors below the bottom of the normal pavement will not be measured separately.

*Delete Subsection 439.5:*

*Add Subsection 439.5:*

Concrete pavement completed and accepted will be paid for under CONSTRUCTION COMPLETE.

Payment is full compensation for furnishing and placing materials, reinforcements, dowels, joint materials, supplies, and incidentals to complete the work including any reinforced concrete lug anchors (including furnishing and installing all materials, including reinforcement, for all excavation, for the satisfactory disposal of surplus material and for all incidentals necessary to complete the anchor).

Office of Materials and Research

**GEORGIA DEPARTMENT OF TRANSPORTATION**  
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**SPECIAL PROVISION**

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**Section 442—Roller Compacted Concrete Pavement**

**442.1 General Description**

This work includes constructing pavement composed of Roller Compacted Concrete (RCC) on a prepared subgrade or subbase course. Follow the requirements of these Specifications and conform to the lines, grades, thickness, and cross sections shown on the Plans or as directed by the Engineer.

**442.1.01 Definitions**

General Provisions 101 through 150.

**442.1.02 Related References**

**A. Standard Specifications**

Section 106—Control of Materials

Section 430—Portland Cement Concrete Pavement

Section 500—Concrete Structures

**B. Referenced Documents**

ASTM C 1435

AASHTO T 22

AASHTO T 180, Method D

QPL 10

GDT 59

**442.1.03 Submittals**

Submit the following to the Engineer at least 35 days before start of any production of RCC:

**A. Concrete Mix Design**

Submit a mix design prepared by a qualified testing laboratory. The Engineer will transmit the design to the Office of Materials and Research for approval.

Include details on aggregate gradation, cementitious materials, admixtures (if used), compressive strengths, required moisture and density to be achieved and quantities of individual materials per cubic yard for the mix design.

**B. Paving Plan**

Submit paving procedures describing direction of paving operations, paving widths, planned longitudinal and transverse cold joints, curing methods and patterns and description of all equipment.



## 442.2 Materials

Ensure that materials meet the requirements of the following Specifications:

Material	Section
Coarse Aggregate, Class A or B Crushed Stone or Gravel	800
Fine Aggregate, Size No. 10	801.2.02
Portland Cement, Type 1	830.2.01
Portland Pozzolan cement	830.2.03
Chemical Admixtures	831.2.02
Fly Ash and Slag	831.2.03
Curing Agents	832
Joint Fillers and Sealers	833
Low Modulus Silicone Sealant for Roadway Construction Joints	833.2.06
Water	880.2.01

### A. Fly Ash

Ensure the use of fly ash conforms to Subsection 430.2.A.1, 2 and 4, “Fly Ash” and that the fly ash mix conforms to Subsection 442.3.06, “Quality Acceptance”.

### B. Granulated Iron Blast-Furnace Slag

Ensure the use of slag conforms to Subsection 430.2.B.1, 2 and 4, “Granulated Blast-Furnace Slag” and that the slag mix conforms to Subsection 442.3.06, “Quality Acceptance”.

### C. Composition of RCC

#### 1. Aggregates

Use aggregates manufactured to meet the gradation at the quarry or blended at the plant site to produce the desired results. Use aggregates that are well graded without gradation gaps and conform to the following gradation:

Sieve Size	Percent Passing By Weight
1 in (25 mm)	100
3/4 in (19 mm)	90 – 100
1/2 in (12.5 mm)	70 – 100
3/8 in (9.5 mm)	60 – 85
No. 4 (4.75 mm)	40 – 60
No. 16 (1.18 mm)	20 – 40
No. 100 (150 µm)	6 – 18
No. 200 (75 µm)	2 – 8

Produce evidence that the proportions have the potential for strength development at 28 days as required in Subsection 442.3.06.B, “Approval of Mix Design Proportions”.

## 442.3 Construction Requirements

### 442.3.01 Personnel

General Provisions 101 through 150.

### 442.3.02 Equipment

Provide equipment and tools to construct RCC that will produce a completed pavement meeting the requirements for mixing, transporting, placing, compacting, finishing, and curing as provided in this specification. All equipment will be on hand and approved by the Engineer before work can proceed.

#### A. Mixing Plant

Produce an RCC pavement mixture in the proportions defined by the approved mix design and within the specified tolerances.

Capacity of the plant will be sufficient to produce a uniform mixture at a rate compatible with the placement equipment.

##### 1. Pugmill Plant

- a. Pugmill plant shall be a central plant with a twin shaft pugmill mixer, capable of batch or continuous mixing.
- b. Equip plant with synchronized metering devices and feeders to maintain the correct proportions of aggregates, cement, fly ash and water.
- c. The pugmill plant will also meet the following:
  - 1) Aggregate Storage
    - a. If previously blended aggregate is furnished, storage may be in a stockpile from which it is fed directly to a conveyor feeding mixer.
    - b. If aggregate is furnished in two size groups, aggregate separation must be provided at the stockpile.
  - 2) Aggregate Bins
    - a. Control feed rate by a variable speed belt or operate gate calibrated to accurately deliver any specified quantity of material.
    - b. If two aggregate size stockpile sources are used, the feed rate from each bin shall be readily adjustable to change aggregate proportions, when required.
    - c. Feed rate controls must maintain the established proportions of aggregate from each stockpile bin when the combined aggregate delivery is increased or decreased.
  - 3) Plant Scales
    - a. If utilized, for any weigh box or hopper will be either of beam or springless dial type, and be sensitive to 0.5 percent of the maximum load required.
    - b. Provide beam-type scales that have a separate beam for each aggregate size, with a single telltale actuated for each beam, and a tare beam for balancing hopper.
    - c. Belt scales will be of an approved design.
    - d. Provide standard weights accurate to plus or minus 0.1 percent for checking plant scales.
  - 4) Cement, Fly Ash or Slag Material Storage
    - a. Provide separate and independent storage silos for Portland cement, fly ash or slag.
    - b. Identify clearly each silo to avoid confusion during silo loading.
  - 5) Cement, Fly Ash or Slag Feed Unit

To assure a uniform and accurate quantity of cementitious materials enters the mixer, provide satisfactory means of dispensing Portland cement, fly ash or slag, volumetrically or by weight.
  - 6) Water Control Unit

- a. Measure by weight or volume the required amount of water for the approved mix.
  - b. Equip the unit with an accurate metering device.
  - c. Keep RCC mixture at optimum moisture by having the rate of water added adjustable.
- 7) Gob Hopper

For continuous operating pugmills, attach a gob hopper to the end of the final discharge belt to temporarily hold the RCC discharge to allow the plant to operate continuously.

2. Central Mix Batch Plant

Central mix batch plant may be used in RCC work meeting the requirements of Subsection 500.3.04.E of the Specifications.

3. Dry Batch Plant

- a. A dry batch plant meeting the requirements of Subsection 500.3.04.E of the Specifications may be used on projects with less than 5000 cubic yards of RCC.
- b. RCC may be mixed at a central point or wholly or in part in truck mixers as provided in Subsection 500.3.04.E of the Specifications.

**B. Paver**

Place RCC with an asphalt paver meeting the following requirements:

- 1. Equip the paver with compacting devices capable of producing a RCC pavement with a minimum of 90% of the maximum density in accordance with AASHTO T 180, Method D.
- 2. Spread and finish the RCC material without segregation, to the required thickness, smoothness, surface texture, cross-section and grade using a paver of suitable weight and stability.

**C. Compactors**

- 1. For primary compaction, use self-propelled smooth steel drum vibratory rollers having minimum weight of 10 tons (9.07 Mg).
- 2. For finish rolling as required for final compaction or for removing roller marks, use a steel drum roller, operating in static mode, a rubber tired roller or combination roller.
- 3. For compacting areas inaccessible to large rollers, use walk-behind vibratory rollers or plate tampers.

**D. Haul Trucks**

- 1. Provide sufficient number of trucks to ensure adequate and continuous supply of RCC material to paver.
- 2. Equip trucks hauling RCC material from the plant to the paver with covers to protect the material from inclement weather and to reduce evaporation losses.

**E. Water Trucks**

- 1. Throughout the paving and curing process, have at least one water truck or other similar equipment on-site and available.
- 2. Equip the water truck with a spreader pipe containing fog nozzles capable of evenly applying a fine mist of water to the surface of the RCC without damaging the final surface.

**442.3.03 Preparation**

Prepare the subgrade/subbase as required by the Plans and Specifications before placing the RCC.

Ensure that the foundation immediately under the RCC pavement and the areas supporting the paving equipment will not contribute to deficient pavement thickness or excessive yield losses.

**442.3.04 Fabrication**

General Provisions 101 through 150.

### 442.3.05 Construction

#### A. Mixing RCC

Use the same mix design and materials for the entire project. If the source of cement, fly ash, slag, or aggregates is changed, suspend construction and submit a new mix design to the Engineer for approval.

1. Mixing Time
  - a. Assure complete and uniform mixing of all ingredients.
  - b. The volume of RCC material in the mixing chamber should not exceed the manufacturer's rated capacity for dry concrete mixtures.
  - c. Keep sides of the mixer and mixer blade surfaces free of hardened RCC and other materials.
  - d. Check mixer blades routinely for wear and replace if wear is sufficient to cause inadequate mixing.

2. Mixing Ingredient Tolerances

Ensure that mixing plant receive the quantities of individual ingredients to within the following tolerances:

Material	Variation by Weight
Cementitious Materials	± 2.0%
Water	± 3.0%
Aggregates	± 4.0%

3. Plant Calibration
  - a. Prior to RCC production, provide a complete and comprehensive calibration of the plant in accordance to the manufacturer's recommendation.
  - b. Concrete batch plants currently listed on QPL 10, the calibration requirement is waived.

Supply daily plant records of production and quantities of materials used that day to the Engineer. These records may be used as a check on plant calibration.

#### B. Transporting RCC

Transport RCC pavement material from the plant to the paver as follows:

1. Use dump trucks fitted with retractable protective covers for protection from inclement weather or excessive evaporation.
2. Dump the trucks clean with no buildup or hanging of RCC material in the corners.
3. Deposit the RCC material directly into the hopper of the paver or secondary distribution system which deposits the material into the paver hopper.

#### C. Placing RCC

1. Subgrade/Subbase Condition
  - a. Keep subgrade/subbase surface clean and free of foreign material, ponded water and frost prior to RCC placement.
  - b. Uniformly moisten subgrade/subbase at the time of RCC placement.
  - c. If the subbase becomes dry, uniformly water, but the method of watering used will not form mud or pools of freestanding water.
2. Paver Requirements

- a. Adjust the paver and regulate the speed to prevent segregation and provide a surface course that is smooth and continuous without tears and pulling. Limit the spread of the RCC to a length that can be compacted and finished within the appropriate time limit under the prevailing air temperature, wind, and climatic conditions.
  - b. Proceed in a steady, continuous operation with minimal starts and stops.
  - c. Regulate speed to assure a constant supply of RCC material in the hopper.
  - d. Maintain RCC material above the auger shaft at all times during paving.
3. Lift Thickness
- Construct pavements greater than 10 in (250 mm) in two lifts of equal thickness.
4. Adjacent Lane Placement
- a. Place adjacent paving lanes within 60 minutes.
  - b. If more than 60 minutes has elapsed between placements of adjacent lanes, the vertical joint will be considered a cold joint. Prepare the cold joint in accordance with Subsection 442.3.05.E.2, "Cold Vertical Joints".
  - c. At the discretion of the Engineer, this time may be increased or decreased depending on the use of set retarding admixtures or the ambient weather conditions of temperature, wind, and humidity.
5. Multiple Lift Placement
- a. The thickness of each lift will meet the requirements of Subsection 442.3.05.C.3, "Lift Thickness".
  - b. Place second lift within 60 minutes of the completion of the first lift.
  - c. If more than 60 minutes has elapsed, the interface between the first and second lift will be considered a cold joint. Prepare cold joint in accordance with Subsection 442.3.05.E.4, "Horizontal Cold Lift Joints".
  - d. At the discretion of the Engineer, this time may be increased or decreased depending on the use of set retarding admixtures or the ambient weather conditions of temperature, wind, and humidity.
  - e. To reduce the opportunity for cold joints to develop, the use of multiple pavers in tandem formation is advantageous.
6. Hand Spreading
- a. Limit hand spreading, broadcasting, or fanning to immediately behind the paver and before compaction.
  - b. Remove any segregated coarse aggregate from the surface before compaction.
7. Segregation
- a. If segregation occurs in the RCC during paving operations, cease the spreading until the cause is determined and corrected to the satisfaction of the Engineer.
  - b. If the Engineer determines the segregation to be severe, remove and replace the segregated area at no additional cost.

Place RCC in a pattern so that the curing water from the previous placements will not pose a runoff problem on the fresh RCC surface or on the subbase layer.

#### **D. Compacting**

- 1. Immediately begin compaction behind the placement of RCC material and complete within 60 minutes of the start of mixing at the plant.
- 2. This time may be increased or decreased depending on the use of set retarding admixtures or ambient weather conditions of temperature, wind and humidity.
- 3. Plan operations and supply sufficient rollers to ensure these criteria are met.
- 4. Determine the sequence and number of passes by vibratory and non-vibratory rolling to obtain the specified density and surface finish.
- 5. Operation of rollers in the vibratory mode while stopped or reversing direction is not allowed.

6. Using rubber tire rollers for final compaction to knead and seal the surface is permissible.
7. Rolling Longitudinal and Transverse Joints:
  - a. Do not operate roller within 12 in. (300 mm) of the edge of a freshly placed lane until the adjacent lane is placed.
  - b. Within the allowable time roll together both edges of the two lanes.
  - c. When a cold joint is planned, roll the complete lane and follow cold joint procedures as specified in Subsection 442.3.05.E.2, "Cold Vertical Joints".
  - d. Provide additional rolling for longitudinal joints with a vibratory roller as necessary to produce the specified density for the full depth of the lift and provide a tight smooth transition across the joint.
  - e. Smooth out any uneven marks left during the vibratory rolling utilizing a non-vibratory or rubber tire roller.
  - f. Roll until a smooth, flat surface, free of tearing and cracking is obtained.
  - g. Avoid displacement of RCC pavement by operating the speed of the rollers slow enough at all times.
  - h. Correct any displacement of RCC pavement resulting from reverse direction of the roller or from any other causes.
8. Density Requirements:
  - a. Perform in-place field density tests in accordance with GDT-59, direct transmission, as soon as possible, but no later than 30 minutes after completion of rolling. Only wet density will be used for evaluation.
  - b. In-place field density will be not less than 98% of the average maximum laboratory density obtained according to AASHTO T 180, Method D, based on a moving average of five consecutive tests, with no test below 95%.
  - c. RCC properly placed and compacted, but not meeting these requirements will be cored and tested at no additional cost.
  - d. If tested area achieves the 28 day design strength as outlined in Subsection 442.3.06.D, "Concrete Strength Acceptance", it will be paid for at full price.
  - e. Areas that fail the strength test will be removed and replaced at no additional cost.

## E. Joints

1. Fresh Vertical Joints:
  - a. A vertical joint is considered a fresh joint when an adjacent RCC lane is placed within 60 minutes of placing the previous lane, with time adjusted depending on use of retarders or ambient conditions. Fresh joints will not require the treatment specified for cold joints.
  - b. Construct joints to assure continuous bond between new and previously placed lanes.
2. Cold Vertical Joints:

<p><b>Note: Vertical joints that are constructed utilizing a drop extension or edging shoe are exempt from the following requirement when placed up to 15 degrees from vertical.</b></p>
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- a. Cold joints are any planned or unplanned construction joint in the RCC pavement that does not qualify as fresh joints.

Treat longitudinal and transverse cold joints as followed:

  - 1) Cut the joint vertically full depth. Cut vertically at least 6 in. (150 mm) from the exposed edge.
  - 2) The edge of cold joints cut within 2 hours of placing the RCC pavement may be cut with an approved wheel cutter, or motor grader or other approved method provided that no edge raveling occurs.
  - 3) Edges of cold joints cut after 2 hours of placing the RCC pavement, cut to 1/4 to 1/3 of the depth of the RCC pavement and excess material removed.
  - 4) If the excess material cannot be removed without causing tearing and raveling, cut full depth.

- b. Clean the joint of any loose or foreign material prior to placing fresh RCC material against a compacted cold vertical joint.
- c. Before placement of fresh RCC, wet the compacted cold joint to prevent excess loss of moisture.

### 3. Fresh Horizontal Joints

- a. For multi-layer construction, a horizontal joint is considered a fresh joint when an subsequent RCC lift is placed within 60 minutes of placing the previous lift, with time adjusted depending on use of retarders or ambient weather conditions.
- b. Clean the surface of all loose material and moisten the surface prior to placement of the subsequent lift.

### 4. Horizontal Cold Lift Joints

- a. For horizontal cold joints, clean all loose material and moisten the surface prior to placement of the subsequent lift.
- b. The Engineer or Plans may require use of a cement slurry or grout between lifts. If required, apply supplementary bonding materials immediately prior to placement of the subsequent lift.

### 5. Control Joints:

Joint locations shall be shown on the Plans or as directed by the Engineer.

- a. Early entry saws should be utilized as soon as possible behind the rolling operation and set to the manufacturer's recommendation.
- b. Saw cut control joints to 1/4 depth of the compacted RCC pavement.
- c. Saw as soon as possible without causing raveling or other damage to the pavement, but no later than 18 hours after placement.

### 6. Joints at Structures

Treat joints between RCC pavement and concrete structures as cold vertical joints.

## **F. Finishing**

1. The finished surface of the RCC pavement, when tested with a 10 foot (3 m) straight edge or crown surface template, will not vary by more than 1/4 inch (6 mm) at any one point.
2. When the surface smoothness is outside of the specified tolerance, grind the surface to within the tolerance by use of self-propelled diamond grinders at no additional cost.
3. Milling to obtain a final riding surface is not acceptable.

## **G. Curing**

Immediately after final rolling and compaction testing, keep the surface of the RCC pavement continuously moist for 7 days or until an approved curing method is applied.

### 1. Water Cure:

- a. Apply water cure using water truck equipped with misting spray nozzles, soaking hoses, sprinkler system or other means that will assure a uniform moist condition to the RCC.
- b. Apply moisture in a manner that will not wash out or damage the surface of the finished RCC pavement.

### 2. Curing Compound:

- a. Apply curing compound as specified in Subsection 430.3.05.L.1 of the Specifications.
- b. Ensure the application provides a uniform void-free membrane across the entire RCC pavement surface.

### 3. White Polyethylene Sheeting

Use sheet material as specified in Subsection 430.05.L.2 of the Specifications

## **H. Sealing Joints**

If required by the Plans or directed by the Engineer, seal joints in accordance to Subsection 430.3.05.M, "Seal the Joints" of the Specifications.

## **I. Permitting Traffic on Pavement**

Before using the pavement as a haul road for loaded or unloaded vehicles:

1. Protect the RCC from vehicular traffic during the curing period.
2. Ensure that compressive strength tests show the RCC has developed at least 2000 psi (14 MPa) and is at least 4 days old.
3. If required by the Plans or directed by the Engineer, seal the joints before permitting vehicles or equipment on the pavement.

### **442.3.06 Quality Acceptance**

#### **A. Concrete Mixing**

Ensure mixing of RCC conforms to the requirements of Subsection 442.3.05.A, "Mixing RCC".

#### **B. Approval of Mix Design Proportions**

The Office of Materials and Research will review concrete mix designs and will verify compressive strength development.

The Department will approve material combinations and mix designs using approved materials and complying with Subsection 442.2, "Materials" and the following:

##### **1. Compressive Strength**

Prepare and test 6 cylinders according to ASTM C 1435 and AASHTO T 22 to determine the 28 day compressive strength for RCC.

The mix design will demonstrate a compressive strength of 4000 psi (28 MPa) at 28 days.

#### **C. Thickness**

The Engineer will designate pavement areas to be examined for depth measurement compliance with the Plan and Specifications.

The Engineer will evaluate areas deficient by more than 1/2 in (13 mm) thick. If the Engineer requires removal, remove and replace the pavement in full cross sections according to Plan requirements. The Engineer may require a reduction in payment if removal and replacement is not required.

#### **D. Concrete Strength Acceptance**

RCC pavement not meeting density requirements outlined in Subsection 442.3.05.D.8, "Density Requirements" will be accepted based on compressive strength development at 28 days. The compressive strength value shall be at least 3,500 psi (25 MPa).

### **442.3.07 Contractor Warranty and Maintenance**

General Provisions 101 through 150.

## **442.4 Measurement**

No separate measurement will be made for this item.

### **442.4.01**

General Provisions 101 through 150.

## **442.5 Payment**

The work will be paid for under CONSTRUCTION COMPLETE. Includes providing materials, equipment, and labor, mixing, transporting, handling, placing, compaction and providing incidentals to complete the work.



#### **442.5.01 Adjustments**

The most current Mean Item Summary Unit Price per square yard of RCC pavement will be used as the assumed value to adjust for RCC pavement accepted with a 28 day compressive strength or thickness deficiency.

Office of Materials and Research

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SPECIAL PROVISION**

**PROJECT: CSNHS-0008-00(232), TROUP COUNTY**

**P.I. NO. 0008232**

**Section 511—Reinforcement Steel**

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*Delete Subsection 511.4 and substitute the following:*

**511.4 Measurement**

No separate measurement will be included for this item.

**511.4.01 Limits**

**A. Construction of Minor Items**

No measurement or payment will be made for the cost of bar reinforcement steel used in constructing minor items. Payment shall be made under CONSTRUCTION COMPLETE.

**B. Prestressed Concrete Bridge Members**

Bar reinforcement steel in prestressed concrete bridge members will be considered a component part of the members. Payment shall be made under CONSTRUCTION COMPLETE.

**C. Handrail End Posts**

Reinforcement steel in handrail end posts that are a part of the superstructure or substructure will be considered part of the superstructure or substructure items. Payment shall be made under CONSTRUCTION COMPLETE.

**D. Lap Splices**

Extra reinforcement steel in lap splices permitted for convenience at splices not shown on the Plans will not be measured for payment. Payment shall be made under CONSTRUCTION COMPLETE.

*Delete Subsection 511.5 and substitute the following:*

**511.5 Payment**

Payment will be made under CONSTRUCTION COMPLETE. Includes full compensation for all costs to conform to approved plan details, reinforcement steel in concrete bridges, culverts, concrete handrailings, concrete parapets, barriers, and other items, including minor items, requiring reinforcing steel to complete the Item.

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SPECIAL PROVISION**

**PROJECT NO. CSNHS-0008-00 (232)  
P.I. NO. 0008232**

**SECTION 524 – DRILLED CAISSON FOUNDATIONS**

**524.1 General Description**

This Work consists of furnishing all labor, materials, equipment, tools and services necessary for construction of drilled caisson foundations and includes all incidentals and additional work in conjunction therewith. Adhere to the Department's Plans, Special Provisions and Standard and Supplemental Specifications for all Work.

**524.2 Materials**

Use materials that meet the requirements of the Standard Specifications with the following exceptions:

- Use non-air-entrained Class AA concrete with a coarse aggregate size of No. 67 stone and a slump at time of placement of between 7 and 9 inches (178 mm and 229 mm). Use 10 percent additional cement and a retarder or water reducing agent in all concrete.
- Use Grade 60 (Grade 420) reinforcing bars that conform to ASTM 615 (ASTM A 615M). If wire spirals are used, use spirals that conform to ASTM A 82.
- Use Grade 2 steel casing that conforms to ASTM A 252.

**524.3 Construction Requirements**

**524.3.01 Personnel**

Construct drilled caissons and supervise the work with personnel who are experienced in this type work. Visit and examine the work site and all conditions, and take into consideration all such conditions that may affect the work. At least 30 days prior to beginning drilled caisson work, submit to the Engineer for review and approval the following proof of the ability of the personnel to construct drilled caisson foundations:

1. Evidence of the successful completion of at least five projects similar in concept and scope to the proposed foundation. Include names, addresses and telephone numbers of the owners' representatives for verification.
2. Résumés of foreman and drilling operators to be employed on this project. Provide evidence showing that the drill operator has experience and knowledge of the drill rig to be used on the project. The Department will be sole judge of the qualifications of the foreman and drill rig operator.
3. A detailed sequence of construction for drilled caisson work that describes all materials, methods and equipment to be used, including, but not limited to the following:
  - casing sizes with proposed top and tip elevations
  - drilling equipment including the manufacturer's specifications on the drill rig
  - methods and equipment for stabilizing and cleaning shaft excavations
  - methods of materials handling and disposal
  - methods and equipment for placing concrete
  - details of tremie and sealing methods, if required
  - details of reinforcement placement, including support and centralization methods

Do not begin drilled caisson construction until the qualifications, construction plan and methods have been approved in writing by the Engineer.

### **524.3.02 Equipment**

Use excavation and drilling equipment with a rated capacity (including power, torque and downward thrust) to excavate a caisson of the maximum specified diameter to a depth of 30 feet (9.1 meters) or 20 percent deeper than the deepest caisson indicated on the Plans, as measured from the ground or water surface elevation, whichever is higher.

### **524.3.03 Casing**

Use casing that is a metal shell of a thickness to withstand handling, internal and external pressures, and that is watertight, smooth and clean. If the elevation of the top of the caisson is below ground level or water level at the time of concrete placement, use an oversize casing from ground elevation to a point below the top of the caisson to prevent caving into the fresh

concrete. Do not allow the top of the permanent casing, if required, to extend above the top of the drilled caisson. Use casing in all materials that do not have sufficient strength to safely remain open and stable during and after excavation.

When casing is used, do not use casing with an outside diameter less than the specified diameter of the caisson. That portion of the caisson below the casing may be slightly smaller than the normal outside diameter of the caisson. However, use drilling tools to excavate the caisson below the casing that are no smaller than the outside diameter of the casing minus 2 inches (51 mm). Do not leave casing in place unless permitted by the Engineer, and cut off any permanent casing as shown on the Plans.

Provide adequate equipment during concrete placement to prevent pulling up the reinforcing cage during casing extraction. The casing may be pulled in partial stages. Maintain a sufficient head of concrete above the bottom of the casing to overcome hydrostatic pressure. Extract the casing at a slow uniform rate with pull in line with the center of the caisson.

#### **524.3.04 Protection of Existing Structures**

Monitor structures for settlement that are within a distance of ten shaft diameters or the estimated shaft depth, whichever is greater, in a manner approved by the Engineer. Record elevations to an accuracy of 0.01 foot (3 mm). Record elevations before construction begins, during the driving of any required casings, during excavation or blasting, or as directed by the Engineer.

Document thoroughly the condition of the structures with descriptions and photographs made both before and after drilled caissons are constructed. Document all existing cracks, and provide copies of all documentation to the Engineer.

At any time settlement of 0.05 foot (15 mm) or damage to the structure is detected, immediately stop the source of vibrations, backfill any open drilled shaft excavations and contact the Engineer for instructions.

#### **524.3.05 Excavation**

Drill and excavate all caissons through whatever substances and to the elevations required. Excavate near the tip elevation in the presence of the Engineer. The Engineer may adjust the tip elevations depending on the quality of the bearing material found. Embed the caisson tips 5 feet (1.5 meters) into and on top of sound rock in accordance with Plan requirements and as determined by the Engineer. Sound rock is indicated by material that cannot be drilled with a conventional earth auger, and requires the use of special rock augers, core barrels, air tools, blasting and/or other methods of hand excavation. Sound rock is defined as material on which the rock auger penetration is equal to or less than 2 inches (51 mm) per five minutes of drilling with the auger subjected to a torque of 600,000 inch-pounds (67,791 kN-m) with a down thrust of 37,000 pounds (165 kN). There will be no additional compensation for removal of rock.

The Engineer will inspect the bottom of each caisson prior to setting the reinforcing cage and placing concrete. Obtain the Engineer's approval prior to placing the reinforcing cage. Remove water, sediment and debris from the bottom of the caissons to allow for a down-hole inspection. Bore the bottom of the caisson excavation a minimum of 6 feet (1.8 meters) into rock as outlined in Specification 211.3.05.C, "Boring of Foundations and Seals". The Engineer will make a determination of the soundness and consistency of the rock and may adjust the tips of the caissons based on this information.

Where drilled caissons are located in other than open water areas, use casings or other methods approved by the Engineer to stabilize the excavation and control the hole size. When casing is not specifically required on the plans, fill in any over-excavations with Class AA concrete at no additional cost to the Department. Dispose of excess concrete, grout, displaced water and materials removed from the caisson excavation in areas approved by the Engineer, and in accordance with any Federal, State, or local code or ordinance. Verify the accuracy and existence of all applicable codes, ordinances or other regulations prior to disposing materials.

#### **524.3.06 Reinforcing Steel**

Assemble a cage of reinforcing steel and place it as a unit immediately prior to concrete placement. Assemble the cage so that the clearance between the cage and side of the caisson will be at least 5 inches (127 mm), and the clearance between the cage and bottom of the caisson will be 3 inches (76 mm).

If the caisson is lengthened, extend all reinforcement to within 3 inches (76 mm) of the bottom. If a splice is required, place it in the lower one-third of the caisson, or as shown on the Plans. Tie hoops or spirals to the caisson and column steel (vertical bars) at 100% of the junctions with double wire figure-eight ties. Do not weld the reinforcing steel. Support the cage from the top in a concentric manner to minimize its slumping downward during concrete placement and/or extracting the casing.

Check the elevation of the top of the steel cage before and after casing extraction. Any upward movement of the steel not exceeding 2 inches (51 mm) or any downward movement thereof not exceeding 6 inches (152 mm) will be acceptable. Any upward movement of the concrete or displacement of the steel beyond the above limits will be cause for rejection. Tie and support the reinforcing steel in the caisson so that the reinforcing steel will remain within allowable tolerances. In uncased caissons, use only heavy-duty plastic rollers (wheels). In cased caissons, use heavy-duty non-corrosive plastic rollers (wheels) or steel chairs. Place rollers at maximum intervals of 8 feet (2.4 meters) along the cage to ensure concentric spacing for the entire cage length. Use one roller for each one foot (305 mm) of diameter of the cage, with a minimum of four rollers at each interval. Do not use concrete spacer blocks. Use rollers that are constructed of a material approved by the Engineer and that have sufficient bearing surface to provide lateral support to the reinforcing cage.

Use rollers of adequate dimension to provide the annular spacing between the outside of the reinforcing cage and the side of the excavated hole or casing as shown on the Plans. If an oversize casing is used, use rollers that will provide concentric spacing. Use pre-cast concrete or heavy-duty plastic bottom supports (feet/boots) to provide a spacing of 3 inches (76 mm) between the cage and caisson bottom.

### **524.3.07 Concrete**

Mix and place all concrete in accordance with Section 500 of the Specifications where applicable and the requirements herein stated.

Place concrete as soon as possible after all excavation is completed and reinforcing placed and supported. Place concrete continuously in the caisson to the top elevation of the caisson. The Engineer may allow free falling of concrete to a maximum of 60 feet (18.3 meters), if satisfactory methods are demonstrated.

If ground water is encountered and the hole can not be pumped dry, or if the Engineer does not approve free fall of concrete, place concrete using a gravity feed watertight tremie. Use a tremie pipe of at least 8 inches (203 mm) in diameter with a concrete hopper at the top. The Engineer may allow concrete to be placed by pumping through a supply line if satisfactory methods are demonstrated. If this method is allowed, use pump supply lines with watertight couplings. Seal the end of the pump line with a foam plug or other device approved by the Engineer to prevent concrete within the tremie or pump supply line from mixing with fluid in the excavation.

If a tremie is used, place it on the bottom of the excavation at the beginning of concrete placement, and keep it there until the tremie pipe and hopper are filled with concrete. Then raise the tremie only enough to induce concrete flow and do not lift the tremie further until the discharge end is immersed at least 10 feet (3.1 meters) into the deposited concrete. If concrete placement by pumping is used, secure the supply line in place so that the discharge end will not lift off the bottom of the excavation more than 6 inches (152 mm) until at least 10 feet (3.1 meters) of concrete has been placed. Embed the discharge end of the tremie or pump supply line a minimum of 10 feet (3.1 meters) in the concrete throughout the remainder of the concrete pour.

Complete the placement of all concrete in the caisson in two hours. Adjusted the retarder or water reducing agent as approved by the Engineer for the conditions encountered on the job so the concrete remains in a workable plastic state throughout the pour.

Prepare and cure the top surface of the construction joint in accordance with the requirements of Section 500. Locate construction joints as indicated on the Plans.

Do not place concrete under water in the caisson excavation without the permission of the Engineer. When permission is granted, place the concrete in accordance with the requirements of Section 500. Provide a sump to channel displaced water away from the caisson. Contain all displaced water to prevent water from entering into any body of water.

During the twenty-four hour period immediately following the completion of the placement of concrete in the caisson, do not install or extract casing within 50 feet (15.2 meters) of the completed caisson, and do not excavate any caissons within 15 feet (4.6 meters) of the completed caisson. If the Engineer determines that any construction adversely affects the recently constructed caisson, cease such activities immediately.

Protect any portion of drilled caissons exposed to a body of water from the action of water by leaving the forms in place for a minimum of seven days after pouring the concrete. Remove the forms prior to 7 days only if the concrete strength has reached 3000 psi (20.7 Mpa) or greater as tested by cylinder breaks.

### **524.3.08 Inspection and Safety**

1. Check the dimensions and alignment of the caisson excavation under the observation of the Engineer.
2. Provide, use and maintain in good working order the following safety devices for the purpose of entering the caisson excavation for cleaning or inspection work:
  - a. A safety harness attached to a separate safety line.
  - b. OSHA-approved personnel lifting devices. Do not suspend any crane weights, blocks or other heavy weights above the head of any person entering the caisson excavation.
  - c. Approved gas-testing equipment that tests for both oxygen level and percent explosion level. Provide and use an approved blower for fresh air if the testing equipment indicates the need.
  - d. Casing of adequate thickness, size and depth to safely support the excavation.
  - e. Non-electric pump(s) to adequately remove water from the excavation.

In addition, prior to entering the excavation, remove all loose and unnecessary objects from around the top of the caisson. Secure any caissons that will not be immediately poured after inspection and approval to prevent persons or objects from falling into the excavation.

### **524.3.08 Tolerances**

Adhere to the following construction tolerances for drilled caissons:

1. Construct the drilled caisson to within 3 inches (76 mm) of the plan position plane, at the top-of-caisson elevation. Adhere to a vertical alignment tolerance of ¼-inch per 12 inches (6 mm per 305 mm) of depth.
2. Place reinforcement in accordance with the requirements of Section 511 of the Standard Specifications and Sub-section 524.3.06. Tie column steel (vertical bars) to hoops and spirals at 100% of the junctions with double wire figure-eight ties.



3. Placed vertical caisson reinforcing bars, including bars extending into columns or footings to within ½-inch (13 mm) of plan location. Place hoops or spirals to within 1 inch (25 mm) of their specified location. Adhere to a side form clearance of within ¼-inch (6 mm) of plan requirements.
4. Place the construction joint of the top of caissons used as caisson/column intermediate bents to within a tolerance of plus or minus 3 inches (76 mm) of the plan elevation.

#### **524.4 Acceptability**

In the event that significant voids are suspected in the concrete that were created during placement, verify the integrity of the caisson using a method that has been approved by the Engineer. If the caisson in question is found to be structurally deficient or out of tolerance in any way, the caisson will not be accepted unless corrective measures as approved by the Engineer are accomplished. Furnish additional materials and work necessary to effect corrections at no cost to the Department and with no increase in contract time.

#### **524.5 Measurement and Payment**

No separate measurement for payment purposes shall be made for constructing drilled caissons. All costs for excavation, furnishing and placement of reinforcing steel and concrete in the caisson, all temporary casing, disposal of excavated materials, and the cost of furnishing all tools, safety devices, labor, equipment and all other necessary items to complete the work shall be included in the price bid for CONSTRUCTION COMPLETE.

#### **Office of Materials and Research**

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SPECIAL PROVISION**

**PROJECT: CSNHS-0008-00(232), TROUP COUNTY**

**P.I. NO. 0008232**

**Section 603—Rip Rap**

---

*Delete Subsection 603.4 and substitute the following:*

**603.4 Measurement**

No separate measurement will be included for this item.

**603.4.01 Limits**

General Provisions 101 through 150.

*Delete Subsection 603.5 and substitute the following:*

**603.5 Payment**

Payment will be made under CONSTRUCTION COMPLETE.

**603.5.01 Adjustments**

General Provisions 101 through 150

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**P.I. NO. 0008232**

**Section 615—Jacking or Boring Pipe**

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*Delete Subsection 615.4 and substitute the following:*

**615.4 Measurement**

No separate measurement will be included for this item.

**615.4.01 Limits**

General Provisions 101 through 150.

*Delete Subsection 615.5 and substitute the following:*

**615.5 Payment**

Payment will be made under CONSTRUCTION COMPLETE. Includes full compensation for furnishing the pipe of type, size, and class required and the incidentals to complete the Item. Excavation will not be paid for separately but will conform to Section 205 and Section 208.

**615.5.01 Adjustments**

General Provisions 101 through 150

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**SPECIAL PROVISION**

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**P.I. NO. 0008232**

**Section 621—Concrete Barrier**

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*Delete Subsection 621.4 and substitute the following:*

**621.4 Measurement**

No separate measurement will be included for this item.

**621.4.01 Limits**

General Provisions 101 through 150.

*Delete Subsection 621.5 and substitute the following:*

**621.5 Payment**

Payment will be made under CONSTRUCTION COMPLETE. Includes full compensation for providing materials, forms, and equipment; preparing subgrade and base; and providing labor, incidentals, and direction to complete the work.

**621.5.01 Adjustments**

General Provisions 101 through 150

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**P.I. NO. 0008232**

**Section 634—Monuments and Road Markers**

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*Delete Subsection 634.4 and substitute the following:*

**634.4 Measurement**

No measurement to be included for this item. Includes monuments, name plaques—special designs, road markers, Right-of-Way markers, and county line markers placed, completed, and accepted.

**634.4.01 Limits**

General Provisions 101 through 150.

*Delete Subsection 634.5 and substitute the following:*

**634.5 Payment**

Payment will be made under CONSTRUCTION COMPLETE.

**634.5.01 Adjustments**

General Provisions 101 through 150.

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**Section 639—Strain Poles for Overhead Sign and Signal  
Assemblies**

---

*Delete Subsection 639.4 and substitute the following:*

**639.4 Measurement**

No measurement to be included for these items.

**639.4.01 Limits**

General Provisions 101 through 150.

*Delete Subsection 639.5 and substitute the following:*

**639.5 Payment**

Payment will be made under CONSTRUCTION COMPLETE.

**A. Treated Timber Poles**

Includes poles, concrete encasements, excavation for pole and anchor holes, temporary pole alignment, bracing, guys, and items to complete the Work.

**B. Steel Strain Poles**

Includes backfill, erection, and necessary regrassing.

**C. Prestressed Concrete Strain Poles**

Includes backfill, erection, and necessary regrassing.

**D. Steel Cable**

Includes furnishing and erecting the cable and providing hardware including thimbles, but not hardware that is a part of the pole.

**639.5.01 Adjustments**

General Provisions 101 through 150.

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**SECTION 641 – Guardrail**

*Delete Sub-section 641.4 and substitute the following:*

**641.4 Measurement**

The item will not be measured separately.

*Includes:*

- A. Guardrail .**
- B. Guardrail Anchorage Assembly**
- C. Guardrail Posts**

**641.4.01 Limits**

General Provisions 101 through 150.

*Delete Sub-section 641.5 and substitute the following:*

**641.5 Payment**

This item will be paid for under CONSTRUCTION COMPLETE

Includes posts, offset blocks, and hardware, furnishing the posts, offset block, hardware, and Work to complete the Item. Also includes:

- Embankment material for shoulders as shown on the Standard Details or Plans
- Compacting embankment material for shoulders to the approximate density of the surrounding soils
- Removing existing vegetation and obstructions before placing the embankment
- Grassing the reconstructed area according to [Section 700](#)

Payment will not be increased or decreased when wood offset blocks are added to or substituted for steel or plastic offset blocks.

**641.5.01 Adjustments**

General Provisions 101 through 150.





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**SECTION 643 – Fence**

*Delete Sub-section 643.4 and substitute the following:*

**643.4 Measurement**

This item shall not be measured separately.

Includes posts, post assemblies, pull, corner, and gate posts, and gates.

**643.4.01 Limits**

General Provisions 101 through 150.

*Delete Sub-section 643.5 and substitute the following:*

**643.5 Payment**

This item will be paid for under CONSTRUCTION COMPLETE.

Includes posts and hardware, locks, keys, and other incidentals, clearing and grubbing, grading, excavating, backfilling, disposing of surplus materials, and furnishing materials and incidentals such as molten lead or cement filler on concrete walls, slabs, or solid rock to complete the work.

Materials salvaged from temporary field fence remain the Contractor's property.

Includes all necessary clearing, installation of fence including hardware and other incidentals, and removal of the fence. The barrier fence, posts, and all incidentals become the property of the Contractor upon removal.

**643.5.01 Adjustments**

General Provisions 101 through 150.



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**SECTION 654 – Raised Pavement Markers**

*Delete Sub-section 654.4 and substitute the following:*

**654.4 Measurement**

This item will not be measured separately.

**654.4.01 Limits**

General Provisions 101 through 150.

*Delete Sub-section 654.5 and substitute the following:*

**654.5 Payment**

This item will be paid for under CONSTRUCTION COMPLETE.

Includes furnishing and installing each marker, and recessing as needed.

**654.5.01 Adjustments**

General Provisions 101 through 150.

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**SECTION 655 – Pavement Arrow and Raised Reflectors**

*Delete Sub-section 655.4 and substitute the following:*

**655.4 Measurement**

This item will not be measured separately.

**655.4.01 Limits**

General Provisions 101 through 150.

*Delete Sub-section 655.5 and substitute the following:*

**655.5 Payment**

This item will be paid for under CONSTRUCTION COMPLETE.

Includes furnishing materials, cleaning, and installing the completed arrow with raised reflectors.

**655.5.01 Adjustments**

General Provisions 101 through 150.

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**SECTION 668 – Miscellaneous Drainage Structures**

*Delete Sub-section 668.4 and substitute the following:*

**668.4 Measurement**

This item will not be measured separately.

Includes:

**A. Catch Basins and Drop Inlets**

- Group 1: Structures connected to pipe 36 in (900 mm) or less in diameter, regardless of the pipe skew
- Group 2: Structures connected to pipe over 36 in (900 mm) diameter regardless of the pipe skew

Each catch basin or drop inlet deeper than 6 ft (2m) will not be measured for additional payment.

**B. Manholes**

Sanitary and Storm Sewer Manholes

- Type 1: Structures connected to pipe 42 in (1050 mm) or less in diameter regardless of the pipe skew
- Type 2: Structures connected to pipe 48 in to 84 in (1200 mm to 2100 mm) diameter regardless of the pipe skew

Manhole Additional Depth – not measured separately.

**C. Junction Boxes, Spring Boxes, and Drain Inlets**

**D. Safety Grates**

**E. Special Inlets for Safety Grates**

**F. Vertical Tee Sections (or Saddles)**

**668.4.01 Limits**

General Provisions 101 through 150.

*Delete Sub-section 668.5 and substitute the following:*

## **668.5 Payment**

This item will be paid for under CONSTRUCTION COMPLETE.

Includes:

### **A. Catch Basins and Drop Inlets**

- Furnishing castings
- Making pipe connections regardless of skew
- Providing materials, making forms, and disposing of surplus material

### **B. Manholes**

- Furnishing castings, fittings, and other appurtenances called for on the Plans to complete the Item
- Making pipe connections regardless of skew
- Providing materials, making forms, and disposing of surplus material

<b>NOTE: No additional payment will be made for connecting manholes to existing or new sewer lines. Include costs related to connections in the price bid for CONSTRUCTION COMPLETE.</b>
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### **C. Junction Boxes, Spring Boxes, and Drain Inlets**

- Furnishing castings, fittings, and other appurtenances called for on the Plans to complete the Item
- Making pipe connections regardless of skew
- Providing materials, making forms, and disposing of surplus material

### **D. Pipe**

### **E. Sand Bedding Material for Precast Structures**

### **F. Excavation and Normal Backfill**

### **G. Safety Grates**

### **H. Inlets for Safety Grates**

Includes reinforcing steel.

### **I. Vertical Tee Sections (or Saddles)**

No separate payment will be made for excavation, backfill, and disposal of surplus material.

## **668.5.01 Adjustments**

General Provisions 101 through 150.

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**SECTION 681 – Lighting Standards and Luminaires**

*Delete Sub-section 681.4 and substitute the following:*

**681.4 Measurement**

This item will not be measured separately..

**681.4.01 Limits**

General Provisions 101 through 150.

*Delete Sub-section 681.5 and substitute the following:*

**681.5 Payment**

This item will be paid for under CONSTRUCTION COMPLETE.

**681.5.01 Adjustments**

General Provisions 101 through 150.

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**SECTION 682 – Electrical Wire, Cable, and Conduit**

*Delete Sub-section 682.4 and substitute the following:*

**682.4 Measurement**

This item will not be measured separately.

**682.4.01 Limits**

General Provisions 101 through 150.

*Delete Sub-section 682.5 and substitute the following:*

**682.5 Payment**

This item will be paid for under CONSTRUCTION COMPLETE.

**682.5.01 Adjustments**

General Provisions 101 through 150.

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**SECTION 683 – High Level Lighting System**

*Delete Sub-section 683.4 and substitute the following:*

**683.4 Measurement**

This item will not be measured separately.

**683.4.01 Limits**

General Provisions 101 through 150.

*Delete Sub-section 683.5 and substitute the following:*

**683.5 Payment**

The item will be paid for under CONSTRUCTION COMPLETE.

**683.5.01 Adjustments**

General Provisions 101 through 150.

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Revised: February 28, 2007

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**SPECIAL PROVISION**

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P.I. NO. 0008232**

**SECTION 715 – Bituminous Treated Roving**

*Delete Sub-section 715.4 and substitute the following:*

**715.4 Measurement**

This item will not be measured separately.

**715.4.01 Limits**

Treated slopes and waterways are not measured separately.

*Delete Sub-section 715.5 and substitute the following:*

**715.5 Payment**

The item will be paid for under CONSTRUCTION COMPLETE.

**715.5.01 Adjustments**

General Provisions 101 through 150.

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P.I. NO. 0008232**

**SECTION 716 – Erosion Control Mats (Slopes)**

*Delete Sub-section 716.4 and substitute the following:*

**716.4 Measurement**

This item will not be measured separately.

**716.4.01 Limits**

General Provisions 101 through 150.

*Delete Sub-section 716.5 and substitute the following:*

**716.5 Payment**

This item will be paid for under CONSTRUCTION COMPLETE.

Includes constructing the mat (blanket) and providing materials, equipment, tools, labor, and incidentals needed to maintain mats (blankets) for the life of the Contract or until a stand of grass has developed enough to prevent erosion.

**716.5.01 Adjustments**

General Provisions 101 through 150.

Office of Urban Design

**DEPARTMENT OF TRANSPORTATION  
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**SPECIAL PROVISION**

**PROJECT NO. CSNHS-0008-00(232) TROUP COUNTY  
P.I. NO. 0008232**

**Section 851—Structural Steel**

*Delete Section 851 and substitute the following:*

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**Section 851—ASTM A 709/ASTM A 709M Structural Steel**

---

**851.1 General Description**

This section applies to the requirements for fabrication of ASTM A 709 (A 709M) structural steel which includes HPS 70W (HPS 485W) steel plates furnished in one of the following conditions: as-rolled, controlled rolled, thermo-mechanical-controlled-processed (TMCP) with or without accelerated cooling. Designs may be exclusively HPS 70W (HPS 485W), or may be hybrid/mixed design using high performance steel plates in combination with high strength, low alloy steel plates and shapes, for welded or bolted applications in bridge construction.

Provide HPS 70W (HPS 485W) steel plate full length, as shown in the plans, without intermediate splices.

**851.1.01 Definitions**

HPS Steel—High performance structural weathering steel that has a yield strength of 70 ksi (485 MPa).

Hybrid Design—A bridge or girder designed and fabricated with different grades of steel.

**851.1.02 Related References**

**A. Standard Specifications**

Section 106—Control of Materials

Section 501—Steel Structures

**B. Referenced Documents**

Guide Specification for Highway Bridge Fabrication with HPS 70W Steel, 2<sup>nd</sup> Edition.  
(referred to hereafter as HPS Fab Guide)

AASHTO/AWS D1.5M/D1.5:2002 Bridge Welding Code.

ASTM A 673 (A 673M)

ASTM A 709 (A 709M)

ASTM A 709-01 for Grade HPS 70W (HPS 485W)

ASTM E 23

AASHTO M-270 (M-270M)

## 851.2 Materials

### 851.2.01 Structural Steel

#### A. Requirements

1. Type

Use the structural steel specified in the Plans. Ensure the steel meets all requirements of the governing ASTM or AASHTO specification, this Specification, and Plan requirements.

Ensure that all steel submitted as main load-carrying member components subject to tensile stress meets either S83, Non-Fracture Critical Materials Toughness Tests and marking, or S84, Fracture Critical Materials Toughness Tests and marking, as appropriate, of ASTM A 709 (A 709M).

2. Certification

Certify that the steel meets the requirements according to Subsection 106.05, "Materials Certification".

#### B. Fabrication

1. General Provisions 101 through 150.

2. Conform to the edition, as noted on the Plans, of the AASHTO/AWS D1.5/D1.5M:2002 Bridge Welding Code, except as modified in Section 501 and by the HPS Fab Guide.

3. Do not exceed 1100°F (600°C) for short-term application of heat for purposes of heat curving, heat straightening, or camber and sweep adjustment. All applications of heating must be done by procedures approved by the Engineer.

4. Welding:

- a. Only use submerged arc (SAW) or shielded metal arc (SMAW) welding processes when welding high performance steel. Perform consumable handling in accordance with AWS D1.5, Sections 12.6.5 and 12.6.6, and the HPS Fab Guide. SAW consumables and SMAW consumables are required to meet the diffusible hydrogen control levels of H4 or H8. The use of consumables meeting H8 further requires the higher preheat and interpass temperatures as noted in Table 3 of the HPS Fab Guide.

Use matching consumables for all complete penetration groove welds connecting HPS 70W (HPS 485W) base metal to HPS 70W (HPS 485W) base metal as follows:

Submerged Arc Welding	Wire	LA85 by Lincoln Electric Company
	Flux	MIL800-HPNi by Lincoln Electric Company
Shielded Metal Arc Welding	Electrodes	E9018-M-H4-R (Reduced Preheat per Table 3 allowed) E9018-M-H8-R (Standard Preheat required)

- b. The use of alternate consumables for matching strength welds may be requested for approval. The request for approval must include documentation of successful welding in accordance with AWS D1.5, and include diffusible hydrogen tests as described in AWS D1.5, Article 12.6.2 indicating the deposited weld metal has a diffusible hydrogen level equivalent to H<sub>8</sub> or less.

- c. Use undermatched consumables for all fillet weld connections to HPS 70W (HPS 485W) base metal as follows:

Submerged Arc Welding	AWS Electrode Specification	F7A0-EXXX-H4 F7A0-EXXX-H8 F8A0-EXXX-H4 F8A0-EXXX-H8
Shielded Metal Arc Welding	AWS Electrode Specification	E7018-M-H4-R (Reduced Preheat per Table 3 allowed) E8018-M-H4-R (Reduced Preheat per Table 3 allowed)  E7018-M-H8-R (Reduced Preheat required) E8018-M-H8-R (Reduced Preheat required)

- d. Use weld backing and run-off tabs manufactured from steel meeting the requirements of ASTM A 709, Grade 50W (ASTM A 709M, Grade 345W) except that the sulfur content is limited to a maximum of 0.025%.
- e. Qualify all welding procedures in accordance with AWS D1.5, Section 5.
- f. Ultrasonically test all procedure qualification tests in conformance with the requirements of AWS D1.5, Section 6, Part C. Evaluation will be in accordance with AWS D1.5, Table 6.3, Ultrasonic Acceptance – Rejection Criteria – Tensile Stress. Indications found at the interface of the backing bar may be disregarded, regardless of the defect rating.
- g. Submit the procedure qualification test record (PQR) and proposed welding procedure specification (WPS) to the Engineer for review and approval. If post weld heat treatment is required by the Contract or proposed for production or repair welding, include it in the procedure qualification testing, or prequalified by additional PQR's, as necessary.
- h. Only fabricators that meet the requirements of the AISC Quality Certification Program, Major Steel Bridges (Cbr) with Fracture Critical Endorsement (F), or Engineer approved equal, may fabricate with HPS 70W steel.

**B. Acceptance**

1. Toughness Tests

Charpy V-Notch tests are mandatory for materials designated on the Plans as main load-carrying member components subject to tensile stress.

- a. Sample the steel according to ASTM A 673 (A 673M).
- b. Perform the Charpy V-Notch test according to ASTM E 23.

2. Whenever magnetic particle testing is done, only use the yoke technique as described in Section 6.7.6.2 of AWS D1.5, modified to test using alternating current only. The prod technique will not be allowed.

**C. Materials Warranty**

General Provisions 101 through 150.

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SUPPLEMENTAL SPECIFICATION**

**Project Number: CSNHS-0008-00(232)**

**P.I. Number: 0008232**

**Troup County**

**Section 861—Piling and Round Timber**

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*Delete Section 861 and substitute the following:*

**861.1 General Description**

This section includes the requirements for timber piles and timber poles.

**861.1.01 Related References**

**A. Standard Specifications**

Section 863—Preservative Treatment of Timber Products

**B. Referenced Documents**

ANSI 05.1

National Electrical Safety Code (National Institute of Standards and Technology)

QPL 50

**861.2 Materials**

**A. Definition and Limitation of Defects**

Decay: Disintegration of the wood substance due to wood-destroying fungi. The words “dote” and “rot” mean the same as decay. Red heart is a form of decay.

Compression Wood: An abnormal, dense, hard growth frequently occurring on the underside of limbs and leaning trunks of coniferous trees. It is characterized by very wide and eccentric annual growth rings and includes what appears to be an exceptional proportion of summerwood growth.

The contrast in color between springwood and summerwood, however, is usually less in compression wood than in normal wood.

Turpentine Butt: A scar caused from bleeding the trees to obtain turpentine.

Scar: A damaged surface caused from injury to the tree during growth.

Sweep: Deviation of a piece or stick from a straight line measured from the center of one end to the center of the other end. A straight line from the center of the butt to the center of the tip shall lie entirely within the body of the pile.

Short Crook: A crook in which the direction of the piece or stick changes in a very short distance measured lengthwise.

Burst Check: A crack approximately at right angles to the annual rings, usually radial cracks in sticks from the center or from near the center to the outside, or a combination of this crack and a ring shake caused through either seasoning, exposure to high temperature, or the process of preservative treatment.

Unsound Knot: A knot solid across the face, but containing incipient decay.

Cluster Knot: Two or more knots grouped together, the fibers of the wood being deflected around the entire unit.

A group of single knots with fibers deflected around each knot separately is not a cluster, even though the knots may be close together.

Punk Knot: A fungus decay that extends from the interior of the piece of pile to the outside, which when prodded is usually found to contain a snuff-like substance.

Ring Knots: Three or more knots appearing in the same line of circumference, or any foot of length.

## 861.2.01 Timber Piles

### A. Requirements

1. Use round timber piles of any species of wood that will withstand driving and support the load specified. Use plants listed on QPL 50.

2. Soundness

Use piles of sound wood, free from decay, red heart, or insect attack.

a. Cedar and Cypress: The butt ends may have a pipe or stump rot hole not more than 1-1/2 in (40 mm) in diameter. Cypress piles may have peck aggregating not more than 1-1/2 in (40 mm) in diameter.

b. Southern Pine: Piles may have unsound knots less than half the permitted size of a sound knot, providing that the unsoundness does not extend more than 1-1/2 in (40 mm) deep and that the adjacent areas of the trunk are not affected.

3. Density

a. All piles shall be dense with at least 6 annual rings per 1 in (25 mm) and 1-1/2 in (40 mm) or more of summerwood (the darker, harder portion of the annual ring), as measured over the outer 3 in (75 mm) of butt diameter on a radial line from the pith.

The contrast in color between summerwood and springwood shall be sharp and the summerwood shall be darker in color.

b. Piles excluded by the above rule may be accepted provided they have at least four annual rings per 1 in (25 mm) and 1/3 or more summerwood, as measured over the outer 3 in (75 mm) of butt diameter on a radial line from the pith.

4. Knots

a. Sound knots:

For piles 50 ft (15 m) long or less, and in 3/4 of the length of piles over 50 ft (15 m), measured from the butt	Sound knots less than 4 in (100 mm) or 1/3 the diameter of the pile, whichever is smaller.
For the top 1/4 length of piles over 50 ft (15 m) long	Sound knots less than 5 in (125 mm) or 1/2 the diameter of the pile, whichever is smaller
The size of a knot shall be its diameter measured at right angles to the length of the pile.	

b. Unsound knots are not permitted except in Southern Pine piles as specified in Subsection 861.2.01.A.2.b.

c. The sum of sizes of all knots in any 12 in (300 mm) of the pile shall not exceed twice the size of the largest permitted single knot.

5. Holes

Allow holes that average less than 1/2 inch (15 mm) in diameter if the sum of the average diameter of all holes in any 1 ft<sup>2</sup> (0.1m<sup>2</sup>) of pile surface is less than 1-1/2 in (40 mm).

6. Splits and Shakes

Splits shall not be longer than the butt diameter of the pile.



The length of any shake or combination of shakes in the outer half of the radius of butt of the pile, when measured along the curve of the annual ring, shall not exceed 1/3 the circumference of the butt of the pile.

7. Sapwood

Piles to be treated with preservative shall have at least 1 in (25 mm) of sapwood at the butt end.

8. Heartwood

- a. In untreated piles for use in exposed work, the diameter of the heartwood at the butt shall be at least 8/10 of the diameter of the pile at the butt.
- b. If high heartwood content is required for untreated foundation piles, the Plans will specify the ratio of heartwood to total diameter.

9. Peeling

- a. Peel piles by removing all of the outer bark and at least 80 percent of the inner bark, well distributed over the surface of the pile.
- b. If piles will be treated with preservative, do not leave inner bark wider than 1/2 in (15 mm).
- c. Do not remove more than three annual rings of the solid wood.

10. Cutting and Trimming

- a. Saw butts and tips square with the axis of the pile.
- b. Trim or smoothly cut all knots and limbs flush with the surface of the pile or the surface of the swell surrounding the knot.

11. Straightness

In general, a straight line from the center of the butt to the center of the tip shall lie entirely within the body of the pile.

If specified, the Department can accept long piles for foundations (but not for trestles) if the straight line lies partly outside the body of the pile. The maximum distance between the line and the pile shall not exceed 0.5 percent of the length of the pile or 3 in (75 mm), whichever is smaller.

12. Taper

Cut piles above the butt swell so it has a continuous taper from the point of butt measurement to the tip.

13. Twist of Grain

Do not allow spiral grain to exceed 180 degrees of twist when measured over any 20 ft (6 m) section of the pile.

14. Limits of Defects

- a. Piles shall not have short crooks that deviate more than 2-1/2 in (65 mm) from straightness in any 5 ft (1.5 m) length.
- b. Burst checks in piles shall be less than 1 in (25 mm) wide, measured at the outside, and shall not extend over 12 in (300 mm) long.

15. Circumferences, Diameters, and Lengths

- a. The circumferences of piles measured under the bark shall have the minimum and maximum values in Table 1 (metric Table 1) for the class specified. No more than 10 percent of the piles in any shipment may have circumferences 2 in (50 mm) less than the tabulated minimum values.

**NOTE: Requirements for tip circumference of piles that are longer than the required length may be applied at the tip end of the required length.**

- b. The ratio of the maximum to the minimum diameter at the butt of any pile shall not exceed 1.2.
- c. Individual piles may vary from the length specified by  $\pm 12$  in (300 mm) in piles shorter than 40 ft (12 m), and  $\pm 2$  ft (600 mm) in piles 40 ft (12 m) or longer.
- d. The average length of all piles of a specified length in each lot shall not be less than the length specified.

**Table 1  
Circumferences and Diameters of Timber Piles**

Length Feet (meter)	3 ft (900 mm) from butt				At tip, minimum	
	Minimum		Maximum		Circumference In (mm)	Dia. (approx.) In (mm)
	Circumference In (mm)	Dia. (approx.) In (mm)	Circumference In (mm)	Dia. (approx.) In (mm)		
	Douglas Fir, Hemlock, Larch, Pine, Spruce, or Tamarack					
Under 40 (12)	38 (950)	12 (300)	63 (1575)	20 (500)	25 (625)	8 (200)
40 to 50 (12 to 15)	38 (950)	12 (300)	63 (1575)	20 (500)	22 (550)	7 (175)
51 to 70 (15.1 to 21.4)	41 (1025)	13 (325)	63 (1575)	20 (500)	22 (550)	7 (175)
71 to 90 (21.5 to 27.5)	41 (1025)	13 (325)	63 (1575)	20 (500)	19 (475)	6 (150)
Over 90 (27.5)	41 (1025)	13 (325)	63 (1575)	20 (500)	16 (400)	5 (125)
	Oak and Other Hardwoods, Cypress					
Under 30 (9)	38 (950)	12 (300)	57 (1425)	18 (450)	25 (625)	8 (200)
30 to 40 (9 to 12)	41 (1025)	13 (325)	63 (1575)	20 (500)	22 (550)	7 (175)
Over 40 (12)	41 (1025)	13 (325)	63 (1575)	20 (500)	19 (475)	6 (150)
	Cedars					
Under 30 (9)	38 (950)	12 (300)	69 (1725)	22 (550)	25 (625)	8 (200)
30 to 40 (9 to 12)	41 (1025)	13 (325)	69 (1725)	22 (550)	25 (625)	8 (200)
Over 40 (12)	41 (1025)	13 (325)	69 (1725)	22 (550)	22 (550)	7 (175)

**NOTE: If the pile length is 25 feet (7.6 m) or less, a minimum circumference of 34 in (850 mm) and minimum diameter of 11 in (275 mm) at a point 3 ft (900 mm) from the butt are required.**

16. Branding and Inspection

- a. Ensure the pile length and the diameter of the butt and tip are branded in the butts of the piles.
- b. Legibly brand the Preliminary inspection date in the tips.

**B. Fabrication**

Seasoning and Preservative Treatment: Where required, season and treat according to Section 863.

**C. Acceptance**

The Department will reject the pile based on any of the following defects:

- Decay
- Deep scars

- Unsound knots
- Punk knots
- Ring knots
- Cluster knots
- Compression wood (if readily identifiable based on ordinary visual inspection)

The Department may accept piles with sound turpentine scars undamaged by insects, provided they meet all other requirements.

**D. Materials Warranty**

General Provisions 101 through 150.

**861.2.02 Timber Poles**

**A. Requirements**

1. Select timber poles from plants listed on QPL 50.
2. Ensure that the poles that meet the requirements of the latest revision of ANSI 05.1, in the National Electrical Safety Code published by the National Institute of Standards and Technology, with the following exceptions:
  - a. Section 2 Definitions—Modify the “Short Crook” definition as follows:  
 “Any localized deviation from straightness within any section 5 ft (1.5 m) or less in length shall not be more than 1 in (25 mm) when measured with a straightedge parallel to the long axis of the pole.”
  - b. Section 4 Material Requirements, 4.4.9 Shape (1), (a)—shall read as follows:  
 “For poles 50 ft (15 m) and shorter, of all species except northern white cedar, a straight line joining the edge of the pole at the butt and the edge of the pole at the top, in 90 percent or more of those poles supplied, shall not be distant from the surface of the pole at any point by more than 1 in (25 mm) for each 10 ft (3 m) of length between these points. In the remainder of those poles supplied (10 percent), the poles may have a deviation of 1 in (25 mm) for each 6 ft (1.8 m) of length when measured as above.”
  - c. Section 4 Material Requirements, 4.4.9 Shape (2)—shall read as follows:  
 “Sweep in two planes (double sweep) - NOT PERMITTED.”
3. Use the class and length specified on the Plans.
4. You may peel poles by machine, except that poles more than 55 ft (17 m) long may be debarked and trimmed by hand in lieu of machine peeling. Trim so that you preserve the buttressing effects of all overgrown knots.
5. Unless otherwise specified or indicated on the Plans, frame poles with flat roofs and slab grains.
6. Frame, drill, and machine poles as necessary before preservative treatment.

**B. Fabrication**

Seasoning and Preservative Treatment: Where required, season and treat according to Section 863.

**C. Acceptance**

General Provisions 101 through 150.

**D. Materials Warranty**

General Provisions 101 through 150.

**Georgia Department of Transportation**

**State of Georgia**

**Special Provision**

**PROJECT NO.: CSNHS-0008-00(232), TROUP COUNTY**

**P.I. NO.: 0008232**

**Section 865—Manufacture of Prestressed Concrete Bridge Members**

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*Delete Subsection 865.1 and substitute the following:*

This section includes the following requirements for precast-prestressed concrete bridge members and piling using High Performance Portland cement concrete as shown in the Plans:

- Manufacturing
- Inspecting
- Testing
- Marking
- Painting
- Rubbing as specified
- Plant handling
- Storing
- Shipping

The term “precast-prestressed concrete” is referred to as “prestressed concrete” in the rest of this Section.

*Add the following to Subsection 865.2:*

<b>Material</b>	<b>Section</b>
Concrete, Class AAA HPC	500

*Add the following to the end of Subsection 865.2.01.B.7.a.6:*

Optional Method of Curing for Release Strengths with HPC: Temperature match curing (“Sure Cure” or equivalent methods) is allowed for specimens used to determine when stress may be transferred to the concrete for High Performance Concrete Units.

**DEPARTMENT OF TRANSPORTATION**  
**STATE OF GEORGIA**  
**SPECIAL PROVISION**  
**PROJECT NO. CSNHS-0008-00(232)**  
**P.I. NO. 0008232**  
**SECTION 999 – DESIGN-BUILD**

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**999.1 General Description**

**999.1.01 Project Location**

The location of the construction work included in this Project is shown in the plans package in the costing plans. This project is located in Troup County. Any reference to Webb Road shall also be deemed to mean Webb-Bartley Road.

**999.1.02 Design-Build Concept**

In the Design-Build concept, the Design-Build Firm (see [www.dot.state.ga.us/specialstudies/designbuild/](http://www.dot.state.ga.us/specialstudies/designbuild/)) will work to design and build the Project. Any reference to Contractor shall also mean Design-Build Firm and any reference to Design-Build Firm shall also mean Contractor. A design consultant will either be acting as a subcontractor to the Contractor or as a joint-venture member with whom this agreement has been executed. The Department will have oversight responsibilities only, and will perform official reviews and approvals of design work as noted. Design and engineering work shall be conducted under the supervision of those entities prequalified to do such work.

The Contractor shall not begin work until the following have been approved by the Engineer:

- QC/QA Plan.
- Proof of no UST involvement or hazardous materials within project limits.
- Basis of the design and concept.
- Erosion and Sediment Control Plan along with Construction Activities Schedule w/NOI
- Traffic Control Plan for approved work.
- Utility Agreements, Encroachment Permits, Relocation Plans, and Contractor Certification of “No-Conflict.”
- Nighttime Sensitive Receptors (NSR) within 500 feet of proposed construction shall be identified.

Throughout this document, alternative proposals are mentioned. Bids on this project shall reflect designing and constructing the project as shown in the Scope (999.1.03) and applicable portions of the Plans Package. No exceptions shall be assumed by the Contractor. However, alternative proposals on portions of the work will be entertained once the project is awarded. The VE Specification, including procedures, in which the Contractor and Department have a share in the savings, is included in this contract. Alternative proposals shall not conflict with the overall completion date of the project or intermediate completion dates unless otherwise approved by the Department.

The Contractor shall use those entities prequalified in related disciplines (design, traffic analysis, geotechnical, etc.) as presented in the Statement of Qualifications. Revisions to the team and/or the proposed assignments reflected in the Statement of Qualifications must be approved by the Engineer. Additional disciplines needed to meet the requirements of this

special provision that were not identified in the Statement of Qualifications shall meet GDOT prequalifications as required and any applicable standards, policies or guidelines of the local agencies or utility owners. Please be aware that this project is known to fall under the State of Georgia, Troup County, and the City of West Point jurisdictions.

All proposal materials shall become the property of the Department and may be used by the Department without exception. Ideas originating with qualified proposers may be used by the proposer awarded the project.

Coordinate with other contractors whose project limits penetrate the project limits of this project. Do not restrict access to the West Point Economic Development Site by Contractors currently on site or attempting to get on site during the construction of project. Maintain all access roads within the limits of right of way at all times.

Where specifications differ with this proposal, the Special Provision 999 Design-Build shall take precedence unless otherwise revised through the amendment process. Prescriptive provisions found in the Specifications shall be followed for this project.

### **999.1.03 Project Scope**

#### **A. General**

This Project will consist of, but is not limited to the following major roadway and bridge construction as shown in these specification and Plans Package: relocating Gabbettville Road (to be named KIA Boulevard) from the existing Sandtown Road intersection on the west side of I-85 to Warner Road on the east side of I-85, improvements to Warner Road, Sandtown Road, Webb Road and SR 18, construction of a frontage road (KIA Parkway) adjacent to I-85 on the west side from SR 18 to Relocated Gabbettville Road (KIA Boulevard), construction of a truck access roadway to the West Point Economic Development Site, construction of driveways, construction of retaining walls, construction of two bridges (Relocated Gabbettville Road (KIA Boulevard) over I-85 and Frontage Road (KIA Parkway) over Long Cane Creek), multiple culverts, milling I-85 (for filter fabric only), construction of the ramps, ramp tapers (associated with a diamond interchange with Relocated Gabbettville Road (KIA Boulevard) and I-85), construction of lighting facilities, construction of drainage conveyance systems, construction of required signage (for interstate and local roads), signals (6 separate locations – SR 18 and KIA Pkwy, Webb Road and KIA Pkwy, KIA Blvd at KIA Pkwy, both ramps, and Warner Road (4 total on KIA Blvd)), striping, coordination with utility relocation, pedestrian amenities and landscaping in accordance with the plans, special provisions, and compliance with current ADA requirements. Final design and construction shall be consistent with and commensurate with the design and proposed construction of all facilities (hard and soft) shown in the Costing Plans.

The work covered under this Specification includes the furnishing of all materials, labor, tools, equipment, and other incidental items for the designing, detailing, and construction of the roadway, bridges, and all other items contained in the Project Scope and Plans Package. The Contractor shall construct all items such as, but not limited to, roadway items, bridge items, lighting items, temporary and permanent erosion control items, temporary grassing items, signing, marking, and signal items, and landscaping items to the limits of the construction plans as designed by the Contractor and approved by the Department. All advanced signing relative to proposed work, to be placed outside the limits shown on the provided plans package, and/or subsequent approved Contractor's plan, shall be included in the work and paid for under CONSTRUCTION COMPLETE.

The Truck Road alignment located in the Costing Plans will be revised once the project is awarded. The final alignment (including an additional connection to the West Point Economic Development Site) of the Truck Road serving the West Point Economic Development Site is unknown at this time. The right of way flares (starting from the West Point Economic Development Site and moving northward) to accommodate a possible split in the proposed Truck Road to provide both a four-lane, two-way entrance/exit, and a two-lane, two-way entrance/exit. The exact configuration will be determined after the project is awarded. Also, the Truck Road alignment may tie in as much as 50 feet to the west of its current tie-in with Relocated Gabbettville Road (KIA Boulevard). Beyond what is shown in the costing plans, the Contractor shall include the design and construction of an additional 1600 feet of two-lane two-way facilities matching the Truck Road typical section found in the Plans Package. This additional 1600 feet of facilities shall include, but not be limited to, materials, labor, transportation and storage of materials required for the earthwork (and any needed stabilization), pavement, signing and marking, drainage, etc. The Contractor shall work with the Engineer (or designee) as to progress towards and coordinate the final alignment (and additional connection mentioned above) of the Truck Road. This will include up to three iterations of alignments (including that level of detail necessary to determine viable options and consequential effects to the currently proposed project found in the Plans Package). Meetings with the Engineer, and others, will be required. The Contractor shall assume that a final alignment and environmental clearance

will be complete by June 30, 2007. Collateral changes to any portion of the project, made necessary by the acceptance of the final Truck Road alignment, will be included in the overall price bid for CONSTRUCTION COMPLETE or DESIGN COMPLETE. No construction shall be conducted on the Truck Road until the final alignment is available. Note: Wetland impacts have been approved for the proposed alignment as shown in the Plans Package. As such, any revision may require a reevaluation. While working with the Contractor, the Department will make that determination and will be responsible for any environmental reevaluations associated with a change on the Truck Road. Any reevaluation will be complete June 30, 2007. Supporting information (reports and layouts shall be made available to the Department, by the Contractor, for use in any reevaluation efforts. Unless otherwise determined by the Engineer, information shall be available to the Department within 3 business days. The Contractor's schedule shall include these parameters. In the event that this additional 1600 feet of facilities is not needed (as directed by the Engineer), the Contractor shall give the Department an acceptable credit (as determined by the Engineer) for the costs proposed by the Contractor for design, coordination and construction.

The Contractor shall work with the Engineer (or designee) to establish the final location of the driveways along KIA Pkwy that is proposed to serve the West Point Economic Development Site. The Contractor's bid shall include that "design and construction" effort that would accommodate said driveways at any location between Relocated Gabbettville Road (KIA Boulevard) and the West Point Economic Development Site.

Where grading or clearing and grubbing occur up to, or within 5 feet of, the existing limited access fence along I-85, the existing fence shall be replaced with field fence including 2-strand barbed wire. Construction of fence shall occur within existing right of way as shown in the Plans Packages, or from the interstate right of way. All costs associated with placing said fence, included necessary clearing, are included in the price bid for CONSTRUCTION COMPLETE.

A Cell Tower existing along Frontage Road (KIA Parkway) will not be relocated until July 31, 2007. The Contractor shall schedule his work as to include this parameter. Access for crews to remove the tower shall remain open at all times until July 31, 2007.

The Contractor shall construct all work, including bridge substructure and superstructure (only that which Contractor constructs from below the bridge) and all permanent safety features, along the mainline of I-85 northbound, within 75 feet outside the existing outside edge of pavement to a point halfway in the median (measured as ½ the distance from inside edge of pavement northbound to inside edge of pavement southbound) within 180 calendar days

The Contractor shall construct all work, including bridge substructure and superstructure (only that which Contractor constructs from below the bridge) and all permanent safety features, along the mainline of I-85 southbound, within 75 feet outside the existing outside edge of pavement to a point halfway in the median (measured as ½ the distance from inside edge of pavement northbound to inside edge of pavement southbound) within 180 calendar days.

Work referenced the above text may overlap, but the total time to complete the two may not exceed 270 calendar days.

The Contractor shall adhere to lane closure parameters found within the specifications, specifically on I-85.

Two-way public access along KIA Blvd, starting from the intersection of Gabbettville Road and Sandtown Road moving eastward to just east of the Truck Road, along with the final alignment(s) of the Truck Road from KIA Blvd to the West Point Economic Development Site shall be opened to traffic by December 31, 2007. Two-way public access from Webb Road to Sandtown Road shall be opened to traffic 365 calendar days after NTP for the project is given. Contractor shall include temporary signing, striping and marking in applicable asphalt sections in order for traffic to run on 19 mm asphalt coarse. Final surface course shall not be placed until final asphalt paving begins for remainder of project.

Construction, within those areas of proposed construction that are within 500 feet of NSRs, shall be limited to daylight hours. NSRs are defined as a residential dwelling.

Information related to "existing conditions", as reflected in the plans package, is for information only. The Contractor shall be aware that existing conditions found in the plans package have changed since the field survey work and associated design effort were completed. The plans package, along with the specifications, will attempt to highlight areas

of known changes in the existing conditions. These areas may or may not include all actual areas where existing conditions differ from those that currently exist in the field. The Contractor shall be responsible to verify all existing conditions. No claims will be considered due to decisions/assumptions made by the Contractor based on "existing conditions" reflected in the plans package.

The contractor may propose alternative methods/solutions to this requirement once the project is awarded, but must provide the same, or better, facilities as shown in the Plans Package and specifications and meet the following criteria:

- No additional or increased costs
- No extension in overall schedule (or specified milestones)
- No breach of secured commitments or MOUs included in this contract
- No exceptions to specifications included in this contract
- Alternatives must be approved by the Engineer

Note: Geometric design (including but not limited to horizontal and vertical alignments, radiuses, etc.) shall be as shown in Plans Package or may be revised as long as the design incorporates more conservative values.

**B. Right-of-Way**

All construction will occur within the existing right of way and easement and/or required right of way and easement as shown on the provided right of way plans.



### C. Utilities

The Contractor shall have the responsibility of coordinating the project construction with all utilities that may be affected. Coordinating responsibilities shall include but not be limited to the following:

1. The Contractor shall be responsible for the cost of utility coordination. Coordination shall include, but shall not be limited to, contacting each Utility Owner to advise of the proposed project; supplemental verification of the locations of existing utility facilities (including the employment of additional Overhead/Underground Subsurface Utility Engineering investigations (SUE) as described in section 999.3.B.1.k of this specification); and determining requirements for the relocation or adjustment of facilities.
2. The Department and/or the Utility Owner shall be responsible for the cost of utility relocation where they hold a property interest, and in accordance with the Department's "Utility Accommodation Policy and Standards Manual." Details are provided in the attached Memorandum of Understanding (MOU) executed between the Department and each Utility Owner.
3. The Contractor shall design the project to avoid conflicts with utilities when feasible, and minimize impacts where conflicts cannot be avoided (See Section 999.3.B.1.k). The Contractor shall submit to the Department a Utility Conflict Matrix in the Department's prescribed format within 180 days of notice to proceed.
4. The Contractor shall initiate early coordination with all Utility Owners located within the project limits.
5. The Contractor shall coordinate and conduct a preliminary review meeting with the Utility Owners to assess and explain the impact of the project. The Department's Project Manager, District Construction Engineer (or designee), and District Utilities Engineer (or designee) shall be included in this meeting. The Contractor shall record the minutes for this meeting and distribute to all attendees for their review and concurrence.
6. The Contractor shall research the property interests of each Utility Owner's facilities. If there is a dispute over property interests with a Utility Owner, the Contractor shall be responsible for resolving the dispute. The Contractor shall meet with the Department's District Utilities Engineer (or designee) to present the property interests information gathered. This information shall be sufficient for the District Utilities Engineer (or designee) to certify the extent of the Utility Owner's property interests. The Department shall have final approval authority as to the Contractor's determination of whether the Utility Owner has property interests.
7. The Contractor shall prepare and submit to the Department a Preliminary Utility Status Report within 90 days after the Notice to Proceed has been given for the contract. This report shall include a listing of all Utility Owners located within the project limits and a recommendation as to the extent of each Utility Owner's property interests. This report shall include copies of easements, plans, or other supporting documentation that substantiates any property interests of the Utility Owners. The report shall also include a preliminary assessment of the impact to each Utility Owner.
8. Depending on the provisions stipulated in the Memorandum of Understanding (MOU – See Attached) between the Department and each Utility Owner, the Contractor shall be responsible for one of the following Design Activities:
  - The Contractor shall provide Utility Owners with design plans and Preliminary Utility Plans as soon as the plans have reached a level of completeness adequate to allow them to fully understand the project impacts. The Utility Owner will use the Contractor's design plan for preparing Utility Relocation Plans, cost estimates, and respective Utility Adjustment Schedules (UAS). If a party other than the Utility Owner prepares Utility Relocation Plans, there shall be a concurrence box on the plans where the Utility Owner signs and accepts the Utility Relocation Plans as shown.
  - The Contractor shall prepare all engineering design, plans, technical specifications, cost estimates, and utility adjustment schedules required to perform the necessary utility relocations. The Contractor shall certify to the Department that the design package listed above has been reviewed and accepted by the each respective Utility Owner.

9. The Contractor shall be responsible for collecting the following from each Utility Owner that is located within the project limits: Certified Utility Relocation Plans including a letter of “no cost” where the Utility Owner does not have a prior right; Utility Agreements, certificates of eligibility, including cost estimate and Utility Relocation plans where the Utility Owner has a property interest; Letters of “no conflict” where the Utility Owner’s facilities will not be impacted by the Project.
10. The Contractor shall be responsible for determining if the Department has agreed to be pay for in-kind relocations according to any approved Utility-Aid assistance package for publicly (government) owned utilities found within the project’s limits (See the Department’s TOPPS Policy #6863-11 for additional information regarding Utility-Aid). If the Department has approved Utility-Aid; it is the Contractor’s responsibility to assemble the necessary information including any Utility Agreements in a final and complete form and in such a manner that the Department may approve the submittals with minimal review. Failure to submit such required Utility Agreements prior to the beginning of construction shall fully transfer the utility owner’s obligations, as stated in the subject Utility-Aid assistance package, to the Contractor. Deductions to reimburse the Department for such obligations may be made from any current partial payment of the Lump Sum price.
11. The Contractor shall review all Utility Relocation Plans and Utility Agreements and certificates of eligibility to ensure that relocations comply with the Departments “Utility Accommodation Policy and Standards Manual.” The Contractor shall also ensure that there are no conflicts with the proposed highway improvements, and ensure that there are no conflicts between each of the Utility Owner’s relocation plans.
12. The Contractor shall compile, and submit to the Department all Utility Relocation Plans, Utility Conflict Matrix, Utility Adjustment Schedules, Utility Agreements, Utility Estimates, and Letters of “no conflict,” as set forth above for the project. The Contractor is expected to assemble the information included in the Utility Agreements and Utility Relocation Plans in a final and complete form and in such a manner that the Department may approve the submittals with minimal review. The Contractor is expected to meet with the Department’s District Utilities Office within 30 days of the Notice to Proceed to gain a full understanding of what is required with each submittal. The Utility Owners shall not begin their Utility Relocation work until authorized in writing by the Department.
13. Each Utility Agreement and Utility Relocation Plan submitted shall be accompanied by a certification from the Contractor stating that the proposed relocation will not conflict with the proposed highway improvement and will not conflict with another Utility Owner’s relocation plan.
14. Depending on the provisions stipulated in the Memorandum of Understanding (MOU – See Attached) between the Department and each Utility Owner the Contractor shall be responsible for one of the following construction activities:
  - The Contractor shall be responsible for coordinating the work of its subcontractors and the various Utility Owners. The resolution of any conflicts between Utilities and the construction of the project shall be the responsibility of the Contractor. No additional compensation will be allowed for any delays, inconveniences, or damage sustained by the Contractor or its subcontractors due to interference from utilities or the operation of relocating utilities.
  - The Contractor shall be responsible for performing all utility removal, relocation, and adjustments required to accommodate the proposed project. This shall include any required inspection, permitting, testing and monitoring to ensure that the work is properly performed to the certified design package. The resolution of any conflicts between Utilities and the construction of the project shall be the responsibility of the Contractor. No additional compensation will be allowed for any delays, inconveniences, or damage sustained by the Contractor or its subcontractors due to interference from utilities or the operation of relocating utilities.
15. During the construction of the project, The Contractor shall designate, prior to beginning any work, a Worksite Utility Coordination Supervisor (WUCS) who shall be responsible for initiating and conducting utility coordination meetings and accurately recording and reporting the progress of utility relocations and adjustment work. Also, the WUCS shall prepare an Emergency Response Plan for the purpose of planning, training, and communicating among the agencies responding to the emergency. The WUCS shall be the primary point of contact between all of the Utility companies, the Contractor and the Department. The WUCS shall recommend the rate of reoccurrence for utility coordination meetings and the Engineer will have the final decision on the regularity for utility coordination meetings. In no case will utility coordination meetings occur less than monthly until controlling items of utility relocations and adjustment milestones are completed. The WUCS shall contact each of the utility companies for the

purpose of obtaining information including, but not limited to, a Utility Adjustment Schedule for the controlling items of utility relocations and adjustments. The WUCS shall notify the appropriate utility company and/or utility subcontractors and the Department of the status of controlling items of relocations and adjustment milestones as they are completed. The WUCS shall furnish the Engineer, for approval, a Progress Schedule Chart, immediately prior to beginning Construction unless otherwise specified, which includes the utility companies controlling items of work and other information in accordance with Section 108.03 or elsewhere in the Contract documents

**a. Qualifications**

The WUCS shall be an employee of the Prime Contractor, shall have at least one year experience directly related to highway and utility construction in a supervisory capacity and have a complete understanding of the Georgia Utilities Protection Center operations, and shall be knowledgeable of the High-voltage Safety Act and shall be trained on the Georgia Utility Facility Protection Act (GUFPA). The Department does not provide any training on GUFPA but will maintain a list of the Georgia Public Service Commission certified training programs developed by other agencies. Currently the following companies offer approved GUFPA training programs:

Associated Damage Consultants Phone:  
706.234.8218 or  
706.853.1362

Georgia Utility Contractors Association  
Phone: 404.362.9995

Georgia Utilities Protection Center  
Phone: 678.291.0631 or  
404.375.6209

H B Training & Consulting  
Phone: 706.619.1669 or  
877.442.4282 (Toll Free)

The Prime Contractor is responsible for obtaining the GUFPA training for their employees.

Questions concerning the Georgia Public Service Commission GUFPA training program should be directed to:

Georgia Public Service Commission  
244 Washington St. SW  
Atlanta, GA 30334-5701  
404.463.9784

**b. Ticket Status**

During the utility coordination meetings, the WUCS shall collect and maintain the Ticket Status information to determine the status of all locate requests within the project limits. This information will be used to assure those planning to use mechanized equipment to excavate or work within the project limits are prepared to begin work when they have reported or estimated beginning work. At points where the Contractor's or utility company's operations are adjacent to or conflict with overhead or underground utility facilities, or are adjacent to other property, damage to which might result in considerable expense, loss, or inconvenience, work shall not commence until all arrangements necessary for the protection thereof have been made.

**c. Notice**

The names of known utility companies and the location of known utility facilities will be shown on the Plans, or listed in the Subsurface Utility Engineering Investigation if performed or in the Special Provisions; and the WUCS shall give 24-hour notice to such utility companies before commencing work adjacent to said utility facilities which may result in damage thereto. The WUCS shall further notify utility companies of any changes in the Contractor's work schedules affecting required action by the utility company to protect or adjust their

facilities. Notice to the utility companies by the Department of the Award of Contract, under Subsection 105.06, shall not be deemed to satisfy the notice required by this paragraph. Furthermore, this 24-hour notice shall not satisfy or fulfill the requirements of the Contractor as stated in Chapter 9 of Title 25 of the Official Code of Georgia Annotated, known as the “Georgia Utility Facility Protection Act.”

**d. Agenda**

The WUCS shall cooperate with the companies of any underground or overhead utility facilities in their removal and relocations or adjustment work in order that these operations may progress in a reasonable manner, that duplication of their removal and relocations or adjustment work may be reduced to a minimum, and services rendered by those parties will not be unnecessarily interrupted. To promote this effort the WUCS shall prepare an agenda for the utility coordination meetings and circulate same in advance of the meeting to encourage input and participation from all of the utility companies. The agenda will be prepared by an examination of the project site and may include photographs of potential/actual utility conflicts.

**e. Emergency Response Plan**

The WUCS shall prepare and submit to the Department an Emergency Response Plan no later than 30 days prior to beginning construction. The WUCS shall clearly mark and highlight the gas, water and other pressurized pipeline shut-off valves and other utility services including overhead switch locations on the utility plans; and prepare a chart to indicate the location of each site (Street address or intersections), the utility company or operator of the facility with emergency contact information and the working condition of the device to facilitate prompt shut-off. The WUCS shall post the Emergency Response Plan in an area readily accessible to the Department. In the event of interruption to gas, water or other utility services as a result of accidental breakage or as a result of being exposed or unsupported, the WUCS shall promptly notify the appropriate emergency officials, the Georgia Utilities Protection Center and the appropriate utility facility company or operator, if known. Until such time as the damage has been repaired, no person shall engage in excavating or blasting activities that may cause further damage to the utility facility.

**f. Submission**

Provisions for reporting all utility coordination meetings, the progress of utility relocation and adjustment work milestones and ticket status information will be reported on a form developed by the WUCS and will be distributed by the WUCS to all of the utility companies as milestones are met and shall be included as part of the project records. These reports shall be delivered to the Engineer for review, on a monthly basis. The WUCS shall immediately report to the Engineer any delay between the utility relocation and adjustment work, the existing Utility Adjustment Schedule, or the proposed Utility Adjustment Schedule so that these differences can be reconciled.

**g. Utility Adjustment Schedule**

The purpose of the Utility Adjustment Schedule is to provide the Contractor with the pertinent information, including any utility staging required, dependent activities, or joint-use coordination that is required for the creation of a progress schedule chart that is feasible. A suitable Utility Adjustment Schedule form is available from the Department for the WUCS to circulate to utility companies for any proposed project construction staging. The WUCS shall submit the Progress Schedule Chart in accordance with Section 108.03 and the proposed Utility Adjustment Schedules from all utility companies to the Engineer for review and approval.

16. During the construction of the project, the Contractor shall be responsible to conduct monthly coordination meetings in order to identify and resolve utility issues/conflicts with project construction. The Department’s District Construction Engineer (or designee), District Utilities Engineer (or designee) and all Utility Owner’s shall be included in this meeting. The Contractor shall record the minutes for this meeting and distribute to all attendees for their review and concurrence.
17. At the time the Contractor notifies the Department that the Contractor deems the Project to have reached Final Completion, the Contractor shall certify to the Department that all Utilities have been identified and that those Utility Owners with property interests or other claims related to relocation or coordination with the project have been relocated or their claims otherwise satisfied or will be satisfied by the Contractor.

18. The Contractor shall accurately show the final location of all utilities on the as-built drawings for the project as stated in Section 999.3.A.12.
19. In addition to the above, the Contractor shall comply with all provisions set forth under subsection 107.21 found in the Georgia Department of Transportation's Specifications Construction of Transportation Systems, current edition.
20. The City of West Point will provide proposed water line plans. The current plan includes facilities in or near KIA Pkwy. The Contractor shall coordinated with the City (and/or designee) to facilitate the design and construction of the proposed water lines. The Contractor's schedule shall include the City's proposed implementation schedule for the water lines.

**D. Landscaping**

Design and construct any required landscaping for interchange and frontage road within the limits shown in the plans package and/or as approved by the Department. Landscaping shall adhere to the criteria found in the plans package.

Final location and maturation of landscaping shall not interfere with sight distance criteria (including site triangles at intersections)

**E. Lighting**

Design and construct any required lighting for the interchange (including any interchange signage that requires lighting) and frontage road within the limits shown in the plans package and/or approved by the Department. Lighting shall conform to the following:

1. Design and construct complete roadway lighting system for Kia Boulevard from Truck Road to Ramps A/B utilizing luminaires equal to Holophane Mongoose with 250W HPS lamps and medium roadway clear drop glass optics (TP3 - cutoff) on 39-foot high, round, tapered, galvanized steel roadway poles. Fixture tilt angles shall be adjusted to maximize uniformity.
2. Design and construct a complete highmast roadway lighting system for Kia Boulevard from Ramps A/B to Warner Road. Highmast luminaries shall be equal to Holophane HMST with 400W HPS lamps and asymmetric distribution optics (TP2) on 100-foot high, round, tapered, galvanized steel towers.
3. Design and construct complete roadway lighting system for Truck Road in its entirety utilizing luminaires equal to Holophane Mongoose with 250W HPS lamps and narrow roadway clear drop glass optics (TP2 - cutoff) on 39-foot high, round, tapered, galvanized steel roadway poles. Fixture tilt angles shall be adjusted to maximize uniformity.
4. Design and construct complete roadway lighting system for Kia Parkway in its entirety utilizing luminaires equal to Holophane Mongoose with 250W HPS lamps with wide roadway clear drop glass optics (TP3 - cutoff) on 39-foot high, round, tapered, galvanized steel roadway poles. Provide lighting above the Long Cane Creek Bridge utilizing the same roadway luminaires and poles located atop 4-foot extensions of selected bridge bents. Fixture tilt angles shall be adjusted to maximize uniformity.
5. Design and construct complete highmast roadway lighting system for the I-85 Interchange at CR 98 / Gabbettville Road. Interchange lighting shall include illumination of the four ramps in their entirety and underpass lighting below the bridge over I-85. Highmast luminaries shall be equal to Holophane HMST with 400W HPS lamps and asymmetric distribution optics (TP2) on 100-foot high, round, tapered, galvanized steel towers.
6. Coordinate with the Department of Aviation Programs to ensure that the design is compatible with all applicable Federal Aviation Administration requirements in the area.
7. All interchange lighting shall be in accordance with the AASHTO Roadway Lighting Design Guide October 2005 Edition AND the IES RP-8-00 Roadway Lighting Recommended Practices publications using the Illuminance Design method.
8. All pole locations shall be outside of the clearzone if possible. **ALL** roadway poles that are located within the clearzone require AASHTO compliant breakaway couplings.

9. All pole locations shall be a minimum of 20 feet from the edge of travel lane where not located on or behind concrete barrier walls.
10. Perform a Field Evaluation prior to commencing construction. Coordinate with Engineer and local designee.
11. Coordinate with local power utility to identify the best external power source location(s) for the lighting.
12. Evaluate the number of power metering points required.
13. Provide power service runs, power service poles, lighting controls and wiring to/from power company meter enclosure. Provide lighting controls per Typical Service Point Wiring Detail included in the preliminary Drawings. Service points shall contain a maximum of three 40A, 480V single-phase circuits.
14. Calculate electrical service loads and prepare wiring schematics.
15. Provide wiring between all luminaires and poles. Cable types are multiples of 2-#2-1-#4 or 2-#6-1-#8 in 2-inch or 1-inch Schedule 40 PVC or galvanized rigid steel conduit.
16. Wiring shall meet the requirements of the 2001 Edition of the State of Georgia Specifications for Construction of Transportation Systems and the 2005 Edition of NFPA 70: National Electrical Code.
17. Produce a set of construction plans for the detailed wiring of the lighting. These plans will include any and all wiring, conduit, power service locations and wiring diagrams not already included in the preliminary Drawings. This will entail producing a cover sheet, index, revision summary sheet, revised summary of quantities, revised detailed estimate, plan sheets, special details (if required), special provisions (if required) and including all applicable Georgia Standards and Details if not already included in the preliminary Drawings. Estimated quantities are provided in the preliminary Drawings.
18. Prepare all required special provisions in Microsoft Word format **AND** Adobe PDF formats.
19. Provide soil boring reports with footing design(s) for highmast light towers.
20. Provide footing design(s) for roadway light poles.
21. Prepare Cost Estimate(s) in Microsoft Word **AND** Adobe PDF formats.
22. Provide design values for light intensities and uniformity ratios with design computation documentation.
23. Provide manufacturer name, model number and cut sheets for **ALL** proposed luminaires used in the design.
24. Provide in hardcopy, MicroStation DGN **AND** Adobe PDF format a photometric layout including but not limited to the Illuminance Method design computations including: Road Classification, Pedestrian Conflict Area category, Roadway Surface Classification, Minimum Maintained Average Footcandle level, Uniformity Ratio avg/min and Veiling Luminance Ratio v<sub>max</sub>/avg as per Table 2, Page 8 of the IES RP-8-00 publication.
25. The limits of lighting coverage shall be in concordance with all the Department's requirements and details.
26. The road classifications shall be as follows:
27. I-85 Ramps: Interstate; R3; Low.
28. Kia Boulevard: Collector; R1; Low.
29. Truck Road: Collector; R1; Low.
30. Kia Parkway Local; R3; Low.
31. The minimum Illuminance shall be  $\geq 0.2$  foot-candles (fc).
32. The maintenance factor shall be 0.7 (70%).

33. All luminaries shall be High Pressure Sodium (HPS).
34. Coordinate lighting design with roadway design.
35. Coordinate lighting design with bridge design.
36. Coordinate lighting design with the Utility Office.
37. Coordinate Soil Boring Report with the Office of Materials and Research.
38. Coordinate all applicable Special Provisions with the appropriate offices in the Department.
39. Create final drawings.
40. Pole Data Legend Sheet shall include:
  - Circuit number
  - Roadway station and offset
  - Luminaire wattage and type
  - Mounting height
  - Mounting arrangement
41. Plan Sheets or Layout Sheet at same scale as GDOT proposed roadway plans (to be coordinated with the Department).
42. Including pole and service point location(s).
43. Identify utility owner, address and contact person with specific connection information.
44. Provide Construction Details.
45. Provide itemized quantities and detailed estimate.
46. Revise project lighting plans and Special Provisions as necessary
47. Review shop drawings, cut sheets and material submittals.
48. Prepare all required "Use on Construction" revisions.
49. The electrical circuit design and construction (including service points) for the interchange shall be separate from the electrical circuit(s) design and construction for the remainder of the project. The Contractor shall coordinate with the Engineer (and the City of West Point) on all aspects of the design and construction
50. Final location lighting shall not interfere with sight distance criteria (including site triangles at intersections).

**F. Deliverables**

The following items shall be delivered to the Department at the following address:

Alan Walker  
Georgia Department of Transportation  
Office of Road & Airport Design  
No. 2 Capitol Square – Room 444  
Atlanta, Georgia 30334

- 1. Preliminary Submittal – See Table 999-1.**
- 2. Highmast Light Tower Foundation Submittal(s) – See Table 999-1.**

**3. Final Submittal – See Table 999-1.**

**4. Revision Submittal(s)**

One set of necessary Use on Construction revisions (1 half size paper AND 1 set – individual electronic Adobe PDF per sheet).

**G. Existing Facilities**

Where existing facilities are damaged during the prosecution of The Work – *See Section 107.13*. The Contractor shall work with the City of West Point and Troup County as to minimize damage (related to Contractor activity) to the existing City and County road system. When existing pavement structures within the project limits are damaged as a result of the Contractor’s activities, it shall be repaired in kind or better and on a schedule as directed by the Engineer. This work shall be included in Section 107.13.

**H. Environmental**

The following pages include environmental commitments. Adhere and provide all material, labor, equipment and other incidentals required in the “Commitments/ Requirments” that apply to the Contractor. Key words such as “construction,” “contractor,” “work,” etc., point to the areas of responsibility by the Contractor. The Contractor shall provide the “qualified ecologist” mentioned in the table below.



		<b>Specialist Review</b>	
Project No.:	CSNHS-0008-00(232)	404	
County:	Troup	Air/Noise	
P.I. No.:	0008232	Archaeology	
Status:	Environmental Assessment	Ecology	
Date Updated:	February 14, 2007	History	

COMMITMENT/REQUIREMENT	DOCUMENT STIPULATED IN	RESPONSIBLE OFFICE (Concurrence date; if other than OEL)	PLACE ON PLANS? (Yes or No)	REQUIRES A SPECIAL PROVISION? (Yes or No)	STATUS
					(Pre-Construction: Complete/ Incomplete) (During Construction: ECB Signature upon completion) (Post Construction: Complete/Incomplete)

**Pre-Construction Commitments**

<i>Natural Resources</i>					
Obtain a stream buffer variance from the Georgia EPD	404 Permit	GDED*	No	No	Complete 9-2006
Obtain a 404 Individual permit for impacts to jurisdictional waters	EA	GDED	No	No	Complete 9-2006
Develop a compensatory mitigation plan for wetlands, streams and stream buffers that would generate suitable credit according to the SOP for Compensatory Mitigation, Savannah District, USACE. Stream buffer mitigation would comply with EPD standards.	404 Permit	GDED	Yes (for any on-site mitigation areas)	No	Complete 9-2006
Procedures for Coordinating Highway Encroachments on Floodplains with the Federal Emergency Management Agency (FEMA) will be completed prior to construction	EA	GDOT Roadway	Yes	No	Complete 1-2007

Section 7 coordination for bald eagle would be completed before project construction.	EA and Ecology Report	GDOT OEL	No	No	Complete 12-2006
Special Provision 107.23 G for the protection of the bald eagle and migratory birds will be forwarded to Design for inclusion in the construction contract.	EA and Ecology Report	GDOT OEL	No	Yes	Complete 2-2007
<b><i>Update to Section 404 Permit to capture the additional 3.2 acres of impacts at Wetland 1 will be completed by June, 2007. No work will take place between stations 480+00 and 485+00 to avoid impacting the additional wetland acreage until the permit is updated by GDED*.</i></b>	EA	GDED	No	No	Incomplete (Will be completed by June, 2007)
<b><i>Bridges shall be designed to prevent direct roadway water runoff discharge to all streams that would be crossed by the proposed project.</i></b>	EA	GDOT Roadway	Yes	No	Incomplete (Will be completed design/build contractor as part of final design plans)
<b><i>All culverts shall be embedded 15-20% of their width to allow natural substrate to colonize the structures bottom and encourage fish movement. Please see attached Special Provision 999, which identifies this requirement</i></b>	404 Permit	GDOT Roadway	No	Yes	Complete 3-2007

<i>Community Resources</i>					
Sensitive nighttime receptors shall be identified on the plans. Please see attached Special Provision 999, which identifies this requirement.	404 Permit	GDOT Roadway	Yes	Yes	Incomplete (Will be completed by July 1, 2007 or before construction begins in the area.)
<i>Cultural Resources</i>					
All NRHP eligible site boundaries shall be labeled on the plans, and identified as Environmentally Sensitive Areas (ESAs) to prohibit staging of equipment or materials thereon.	EA	GDOT Roadway	Yes	No	Complete 2-2007
<b><i>Update to Section 404 Permit to capture the additional area surveyed for cultural resources along Webb Road will be completed by June, 2007. No work will take place east of station 105+00 on Webb Road to avoid disturbing any area that is beyond the limits of the cultural resource survey area covered under the approved 404 permit until the permit is updated by GDED*.</i></b>	EA	GDED	No	No	Incomplete (Will be completed by June, 2007)
ESAs will be marked on the plans and restrictions will be set on construction, easements, staging and borrowing activities in the vicinity of the ESA. A copy of Special Provision 107.23, which identifies the requirements needed to protect the ESA's has been included in the contract specifications and is attached to this Commitment table.	EA and 404 Programmatic Agreement	GDOT OEL/GDED	Yes	Yes	Complete 2-2007

***\*GDED = Georgia Department of Economic Development***

COMMITMENT/REQUIREMENT	DOCUMENT STIPULATED IN	RESPONSIBLE OFFICE (Concurrence date; if other than OEL)	PLACE ON PLANS? (Yes or No)	REQUIRES A SPECIAL PROVISION? (Yes or No)	STATUS (Pre-Construction: Complete/ Incomplete) (During Construction: ECB Signature upon completion) (Post Construction: Complete/Incomplete)
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**During Construction Commitments**

<i>Natural Resources</i>					
To the greatest extent practicable clearing of vegetation shall be completed from September 1 to March 31. If clearing is to be completed between April 1 and August 31, clearing limits shall be surveyed by a qualified ecologist to verify the presence or absence of barn swallow breeding activities and determine the feasibility and need to relocate any nests.	EA	GDOT OEL	Yes	Yes	ECB signature upon completion
As per the 25-foot Vegetative Buffer variance granted by the Georgia Department of Natural Resources on September 26, 2006, specific activities to protect the stream and vegetative buffer (ESA) must be completed. A copy of Special Provision 107.23F, which identifies the requirements needed to protect the ESA has been included in the contract specifications and is attached to this Commitment table.	EA and 25-foot Vegetative Buffer Variance	GDOT/GDED	Yes	Yes	ECB signature upon completion
Stream buffer mitigation would occur as close to the project impacts as is practicable and within the same ecoregion and eight digit USGS Hydrologic Unit Catalogue Unit, according to regulatory agency guidelines for mitigation in Georgia. Mitigation would include on-site and off-site mitigation. On-site mitigation includes the restoration, enhancement, and preservation of existing wetlands and the preservation of the Long Cane Creek forested riparian zones with a restrictive covenant. Off-site mitigation would include preservation of stream	404 Permit	GDED	Yes (for any on-site mitigation areas)	No	Incomplete

buffer along Mud Creek and one of its tributaries in the Mud Creek Mitigation Area (MCMA).					
<b><i>Special Provision 107.23G for the protection of the bald eagle and barn swallows will be followed. The full provision is attached.</i></b>	EA and Ecology Report	GDED	No	Yes	ECB signature upon completion
Complete implementation of August 24, 2006 Compensatory Mitigation Plan by September 30, 2007	404 Permit and EA	GDED	No	No	Incomplete
<i>Community Resources</i>					
Construction shall be limited to daytime hours within 500 feet of nighttime sensitive receptors. Please see the attached Special Provision 999.	404 Permit	GDOT Roadway	Yes	Yes	ECB signature upon completion
<i>Cultural Resources</i>					
As part of the Programmatic Agreement between the USACE, SHPO, and GDED, there are several items to be implemented for the protection of Site 9TP990 (ESA). Please see A copy of Special Provision 107.23F for a listing of the requirements needed to protect this ESA, which has been included in the contract specifications and is attached to this Commitment table.	EA and 404 Programmatic Agreement	GDOT/GDED	Yes	Yes	ECB signature upon completion
In the vicinity of Site 9TP990, construction fencing would be constructed along the right of way to prevent any encroachment on the ESA, which would be fenced according to a Programmatic Agreement among the USACE, SHPO, and GDED* for the construction of the WPEDS. Please see A copy of Special Provision 107.23F, which identifies all requirements associated with this commitment.	EA	GDOT/GDED	Yes	Yes	ECB signature upon completion

COMMITMENT/REQUIREMENT	DOCUMENT STIPULATED IN	RESPONSIBLE OFFICE (Concurrence date; if other than OEL)	PLACE ON PLANS? (Yes or No)	REQUIRES A SPECIAL PROVISION? (Yes or No)	STATUS (Pre-Construction: Complete/ Incomplete) (During Construction: ECB Signature upon completion) (Post Construction: Complete/Incomplete)
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**Post Construction Commitments**

Evaluate area roadway network to determine other transportation improvement projects required as a result of the WPEDS construction/operation.	IJR	GDOT Roadway	No	No	Incomplete
Project completion procedures outlined in Special Provision 107.23G for the protection of the bald eagle and barn swallows will be followed. The full provision is attached.	EA and Ecology Report	GDED	No	Yes	Incomplete

## I. Highways for Life

The Department has applied to FHWA for this Highways for Life grant. Notification for the approval of this grant is expected in May 2007 which is after the anticipated letting date of this project. The Bidder shall include in the technical proposal a cost basis for all items under this Highways for Life item. If this Highway for Life grant is denied then GDOT may remove a portion or all of the items under this section. Any costs associated with the removal of these items will be deducted from the construction complete pay item at the cost basis provided in the awarded Bidder's technical proposal.

Details on this federal program can be found at <http://www.fhwa.dot.gov/hfl/>. Implementation of commitments will be the responsibility of the Department and the Contractor.

The Contractor shall provide the following:

### Safety:

- Construct permanent safety features in either direction of traffic on I-85 within 6 months of beginning work on I-85 as to require no more lane closures after this period. See lane closure requirement in specification 150.11. Provide methods to monitor speed bands during lane closures using work zone law enforcement. Provide elements, methods and processes to evaluate a goal of reaching a construction period speed band in which 75% of the traveling public through the construction zone will be within five (5) mph of the posted speed. Provide the elements, methods and processes to evaluate reaching a goal of less than 5% of drivers that will be traveling more than 20 mph over the posted speed limit during construction. GDOT will evaluate the daily reporting of traffic volumes and speeds provided by the design-build contractor and law enforcement monitoring. The Interstate 85 crash history for this rural section will be the baseline. See intermediate completion date in specification 108 regarding I-85.
- Propose a safety plan and include the method to be used to monitor and measure worker injury Incident Rate. Safety plan shall include the elements, method, and process to evaluate a goal of having a worker injury Incident Rate (IR) of less than 4.0 based on the OSHA 300 rate. GDOT, or its designated independent evaluator, will determine goal achievement.

### Construction Congestion:

- Provide plan to prioritize work elements as to minimize congestion. The project schedule for work involving lane closures shall have in-and-out construction activities on the Interstate arranged by staging plan sheets to minimize the duration of lane closure time needed.
- Provide methods for non-injury incident clearance time management. Propose performance measure methods to reach a goal during lane closures of clearing non-injury incidents from the construction zone travel lanes within 20 minutes. Note: GDOT will coordinate with the Contractor to establish protocols and define responsibilities with appropriate law enforcement agencies.
- Interstate lane closures will occur during the evening-night hours and off peak daytime hours of construction that will minimize rural area queue lengths and construction congestion.

### Quality:

- Provide a finished pavement that has an IRI less than or equal to 37.5 inch/mile, but in no way have a corrected finished pavement with an IRI exceeding 43.8 inch/mile. These criteria meet GDOT's current specifications.
- Use prefabricated columns and caps for Bents 2, 3, and 4 of the bridge on the KIA Blvd over Interstate 85 (Bridge 1). The Request for Proposal (RFP) will encourage the use of innovative and non-traditional items in construction of this project. The Contractor is encouraged to use innovative materials and technology such as prefabricated deck panels, prefabricated culverts and innovative roller compacted concrete (RCC) pavement on shoulders as allowed in the specifications or as proposed once the project is awarded.

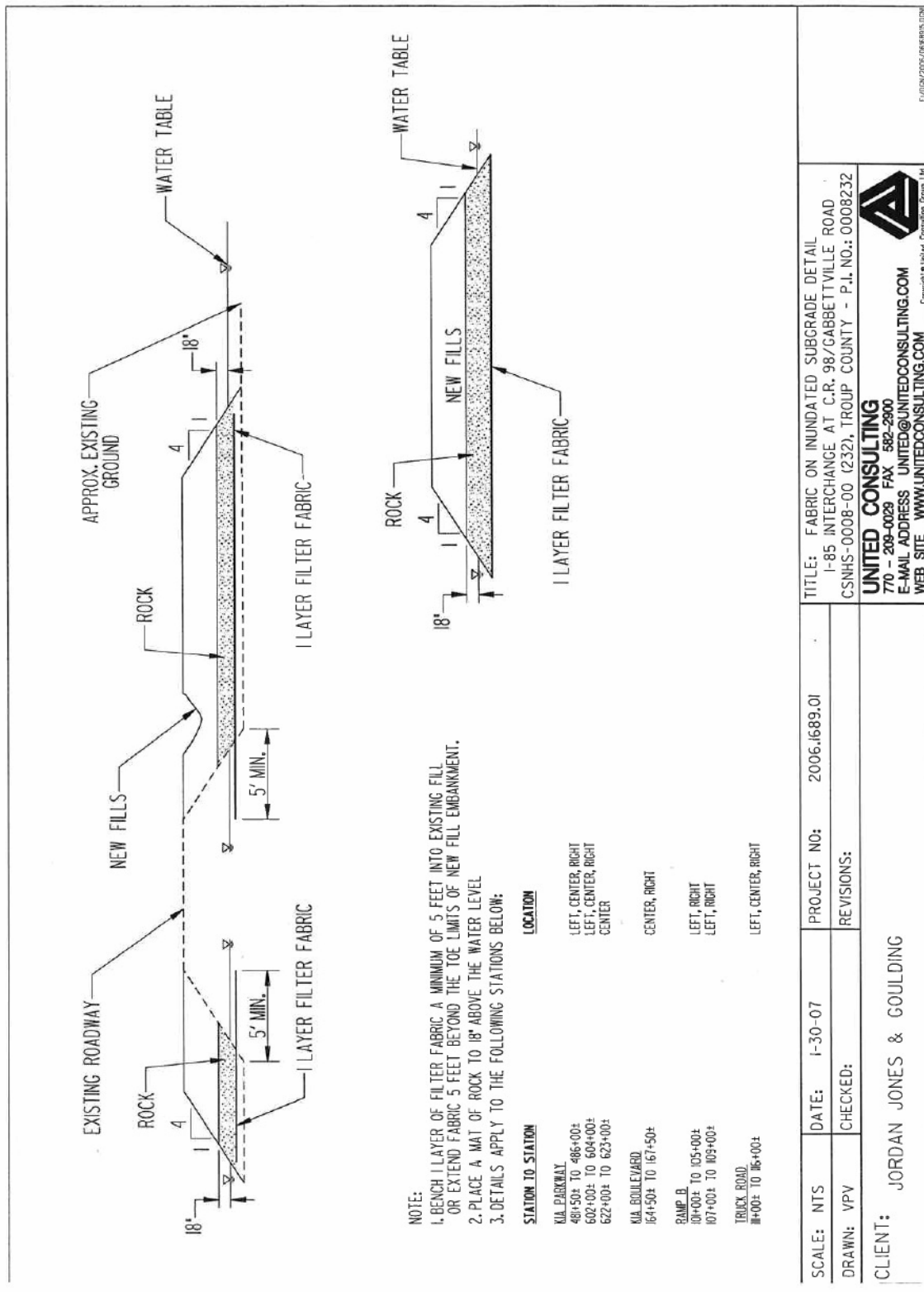
### User Satisfaction:

- During construction and upon completion of the project, the Contractor provides four Likert Scale user satisfaction surveys (at 25%, 50%, 75% and 100% of project completion). The GDOT will set an approval rating goal of 80% (i.e. 80% or more of our surveyed customers approve of the job we are doing in the construction work zone).
- The user satisfaction survey will ask how the user rates the methods used to minimize disruption during the construction of these new facilities.
- Monitor construction noise. GDOT's goal is to maintain construction work noise to less than 95 dBA 100 yards from the construction site. Provide the hourly, sound level measuring devices to be used. Performance will be evaluated by GDOT.
- Involve the community and traveling public by various forms of communications. Provide the methods of communication to be used and how issues that may arise will be resolved. Include submittals of a public involvement plan, a communications plan, and an emergency management and resolution plan, subject to GDOT approval.

Note: All reports (hard-copy and electronic) shall be included. Assume 4 hard copies and 1 electronic copy (.pdf and original format [MS Word, Excel, etc.]).

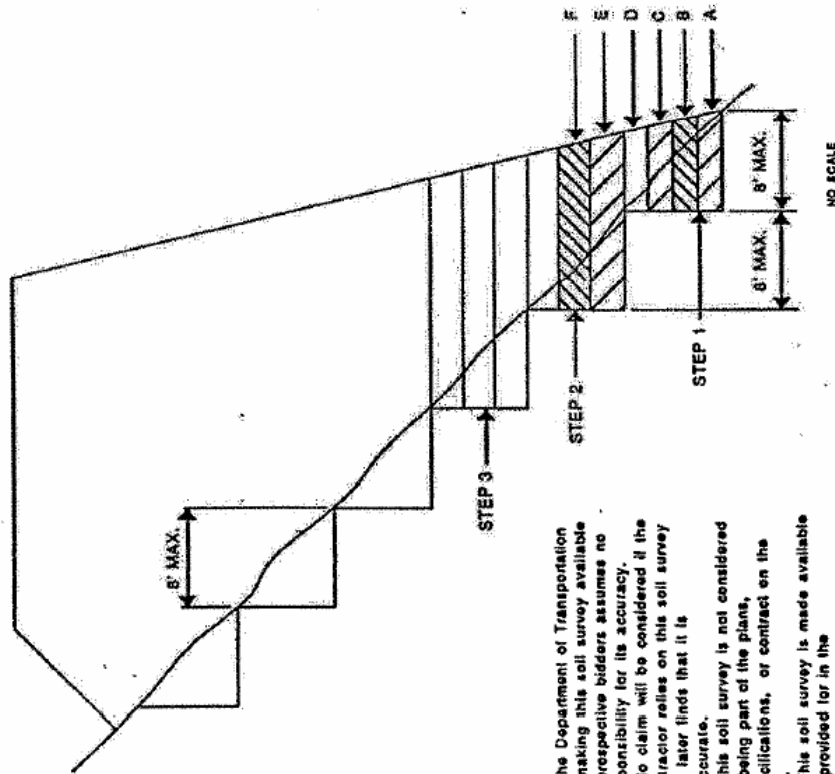


**J.Geotechnical** – Place Rock Embankment as shown in detail below at locations shown. Slopes shall be benched and serrated at shown in details also. Contractor shall note all areas in soil survey where soil support value is less than 2.0 and shall ensure areas have 2.0 soil support value prior to placing fill.



# BENCHING DETAIL

CSNHS-0008-00 (232)  
TROUP COUNTY  
P.I. NO.: 0008232



1. WHERE THE EMBANKMENT IS TO BE PLACED ON A HILLSIDE OR ANOTHER EXISTING EMBANKMENT HAVING A SLOPE OF 3 TO 1 OR STEEPER, THE FOUNDATION MUST BE BENCHED WHILE THE EMBANKMENT IS BEING MADE. (SEE DIAGRAM AT LEFT.)
2. THE DIAGRAM SHOWS THAT BEFORE LAYER "A" IS PLACED THE FIRST STEP (1) IS CUT INTO THE SLOPE A MAXIMUM DISTANCE OF ABOUT 8' (ABOUT 3/4 THE WIDTH OF THE USUAL D-8 BULLDOZER BLADE). SUCCESSIVE LAYERS B, C, AND D ARE THEN PLACED. BEFORE LAYER "E" IS PLACED, THE SECOND STEP IS CUT 8' INTO THE SLOPE AND SUCCESSIVE LAYERS ARE AGAIN PLACED. IF IT IS ANTICIPATED THAT THE VERTICAL PART OF THE STEP WILL EXCEED 4' IF AN 8' HORIZONTAL CUT IS MADE, THEN THE ACTUAL CUT STOPS WHEN THE VERTICAL PART REACHES A MAXIMUM OF 4' ALLOWING THE HORIZONTAL DISTANCE TO VARY.
3. THE PROCESS OF BENCHING IS CONSIDERED INCIDENTAL TO THE ITEM OF UNCLASSIFIED EXCAVATION AND BORROW IN CONSTRUCTION OF THE EMBANKMENT AND NO ADDITIONAL MEASUREMENT OF QUANTITY OR PAYMENT WILL BE MADE FOR BENCHING.

The Department of Transportation in making this soil survey available to prospective bidders assumes no responsibility for its accuracy. No claim will be considered if the contractor relies on this soil survey and later finds that it is inaccurate.

This soil survey is not considered as being part of the plans, specifications, or contract on the job.

This soil survey is made available as provided for in the specifications of the Department.

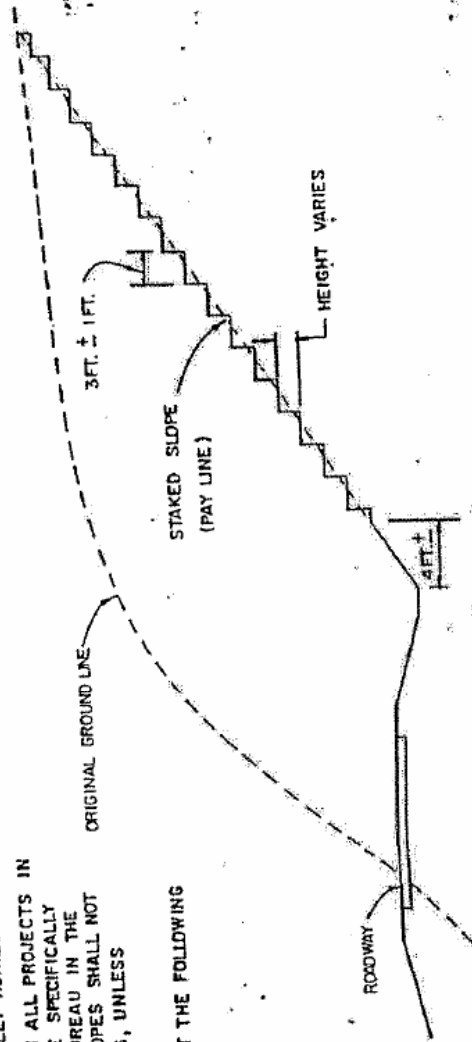
NOTES:

1. SLOPES STEEPER THAN 3:1 SHALL BE SERRATED. CUT SLOPES IN HARD AND COMPETENT ROCK WILL NOT REQUIRE SERRATIONS.
2. WIDTH OF STEP SHALL BE 3 FT. ± 1 FT.
3. HEIGHT OF STEP IS A FUNCTION OF WIDTH AND STAKED SLOPE.
4. TREAD OF STEP SHALL BE APPROXIMATELY HORIZONTAL.
5. SERRATED SLOPES SHALL BE USED ON ALL PROJECTS IN DISTRICTS 1, 6 AND 7, EXCEPT WHERE SPECIFICALLY EXCEPTED BY THE GEOTECHNICAL BUREAU IN THE SOIL SURVEY REPORT. SERRATED SLOPES SHALL NOT BE USED IN DISTRICTS 2, 3, 4 AND 5, UNLESS REQUIRED BY THE SOIL SURVEY
6. SERRATED SLOPES WILL BE REQUIRED AT THE FOLLOWING LOCATIONS ON THIS PROJECT:

STATION TO STATION LOCATION

As directed by the Engineer.

4.6.27



SERRATED SLOPE DETAIL

NO SCALE

**K. Other**

There are no known existing ITS, video detection, or CCTV surveillance cameras directly affected by this project. There are no ITS electronic message signs or ITS communications (fiber) planned for this project.

Right of way markers shall be installed throughout the project at all right of way corners/breaks as shown on the costing plans or Contractor's accepted plans.

**999.2 Plans Package**

The Plans Package prepared by the Department includes multiple resources listed below. They will be made available via CD and/or DVD. These resources are to be used in preparing the proposal for this project unless otherwise noted as "For Information Only." The Contractor shall make the Department aware on any resource that is in error or would cause the design (in the Plans Package) to not be constructible.

Those items labeled as for information only are not part of the plans and specifications or contract for this Project. The Georgia Department of Transportation, in making this information available to contractors, assumes no responsibility for its accuracy. No claim will be considered if the contractor relies on this information in its bidding or in its construction operations and finds that it is inaccurate. The Contractor's attention is directed to Specifications 101.16 – CONTRACT and 102.05 – EXAMINATIONS OF PLANS, SPECIFICATIONS, SPECIAL PROVISIONS, AND SITE OF THE WORK.

**999.2.01 Costing Plans**

1. Cover Sheet
2. Typical Sections
3. Plan and Profile Sheets
4. Cross Sections
5. Drainage Profiles and Cross Sections
6. Erosion Control Plans – Plans are approved and on file with EPD
7. Preliminary Bridge Layout Sheets – Preliminary Plans are approved.
8. Wall Envelopes – Envelopes are approved.
9. Signal Plans – Warrants are approved. Contractor responsible for complete signal design
10. Signing and Marking Plans – Plans are approved - The lane configurations shown in the Plans Package shall be included in the Contractor’s design.
11. Existing Overhead/Subsurface Utility Engineering Investigation Plans (See Section 999.03.B.1.k for details) – Approved as of 12-4-07.
12. Conceptual Landscaping Plans
13. Conceptual Lighting Plans

**999.2.02 Right-of-Way Plans**

**999.2.03 CAiCE Files**

**999.2.04 Survey Control Package**

**999.2.05 Environmental Documents**

**999.2.06 Drainage Calculations – For Information Only**

**999.2.07 Hydraulic Studies – For Information Only**

**999.2.08 Soil Survey, BFIs and WFIs – For Information Only** (with the exception of Erosion Index values which may be used for estimating purposes. Geotechnical investigation is the responsibility of the Contractor. Actual materials placed shall be consistent with the Contractor’s geotechnical investigations.

A soil survey, BFIs and WFIs are included for this project for information only. Please note that stationing of actual locations of borings may vary slightly since they were obtained before the alignments and structure locations had been finalized. The existing ground in and around the proposed KIA Pkwy (Frontage Road) has been modified by the ongoing project to construct the West Point Economic Development Site.

**999.2.09 Traffic Diagrams**

Traffic diagrams provided in this package shall be used to develop approved design.

**999.2.10 Pavement Structures**

The pavement structures have been determined for this project and are included in the plans package. See Section 999.04.

The resources shown above shall be used in the design and construction of this project.

**999.2.11 Record Plans – For Information Only**

1. I-85
2. I-85 Bridge over Webb Road
3. SR 18 near Exit 2 on I-85

**999.3 General Design**

**999.3.01 Ownership of Documents**

The Contractor agrees that all deliverables prepared in this contract, including but not limited to reports, drawings, studies, specifications, survey notes, estimates, maps, computations, computer files, and other data, under the terms of this agreement shall be delivered to, become and remain in the property of the Department upon termination or completion of the work. The Department shall have the right to use same without restriction or limitation and without compensation to the Contractor other than that provided for in this agreement.

Any use of these documents by the Department on any project other than this project will be done without warranty by the Contractor.

**999.3.02 Insurance**

In addition to the insurance requirements covered elsewhere in this Proposal, the Contractor shall have insurance coverage of the following types and amounts:

- Valuable Papers Insurance in an amount sufficient to assure the restoration of any plans, drawings, field notes, or other similar data relating to the work covered by the project. Insurance shall be maintained in full force and effect during the life of the agreement.
- Professional Liability (Errors and Omissions) Insurance in an amount of not less than one million dollars (\$1,000,000) per claim (with a maximum of \$250,000 deductible per claim) during the agreement term and for a period of at least five years after the agreement is closed. Such policy shall cover all of the Contractor’s professional liabilities, whether occasioned by the Contractor, his employees, subcontractors, or other agents, arising out of services performed under or in accordance with this agreement.

Errors and omissions are the responsibility of the Design / Build Contractor to correct and shall be solely at the Contractor’s expense.

**999.3.03 Publication and Publicity**

Articles, papers, bulletins, reports, or other materials reporting the plans, progress, analyses, or results and findings of the work conducted under this Agreement shall not be presented publicly or published without prior approval in writing of the Department. All releases of information, findings and recommendations shall include a disclaimer provision and that all published reports shall include the disclaimer on the cover and title page in the following form:

*“The opinions, findings and conclusions in this publication are those of the author(s) and not necessarily those of the Department of Transportation, State of Georgia, or the Federal Highway Administration.”*

If any information concerning the project, its conduct, results, or data gathered or processed is released by the Contractor without prior approval from the Department, the release of same shall constitute grounds for termination of this Agreement without indemnity to the Contractor, but shall any such information be released by the Department or by the Contractor with such prior written approval, the same shall be regarded as public information and no longer subject to the restrictions of this Agreement. Provided, however, shall such information be required to be released by the Department under the Georgia Open Records Act, Section 50-18-70, et seq., O.C.G.A., the restrictions and penalties set forth herein shall not apply. Any request for information directed to the Contractor, pursuant to the Georgia Open Records Act, by the public shall be redirected to the Department for further action.

### **999.3.04 Copyrighting**

The Contractor and the Department agree that any papers, interim reports, forms, and other material which are a part of work under this Agreement are to be deemed a “work made for hire,” as such term is defined in the Copyright Laws of the United States. As a “work made for hire,” all copyright interests in said works will vest in the Department upon creation of the copyrightable work. If any papers, interim reports, forms, or other material which are a part of work under this Agreement are deemed by law not to be a “work made for hire,” any copyright interests of the Contractor are hereby assigned completely and solely to the Department. Publication rights to any works produced under this Agreement are reserved by the Department.

### **999.3.05 Patent Rights**

If patentable discoveries or inventions should result from work described herein, all rights accruing from such discoveries or inventions will be the sole property of the Contractor. However, the Contractor agrees to and does hereby grant to the Department, an irrevocable, non-exclusive, non-transferable and royalty-free license to practice each invention in the manufacture, use and disposition according to law of any article or material and in use of any method that may be developed as a part of the work under this Agreement.

### **999.3.06 General Design Criteria**

Plans shall be prepared in accordance with the Georgia Department of Transportation’s instructions as to design criteria, procedures, and format as contained in this Special Provision and the following: 2003 Manual on Uniform Traffic Control Devices; Current Draft Georgia Manual on Drainage Design for Highways; Current Utility Accommodation Policy and Standards Manual; and the Department’s Current Plan Preparation Guide dated November 2002, 2004 AASHTO Geometric Design of Highways and Streets, 2002 Roadside Design Guide, AASHTO Roadway Lighting Design Guide October 2005 Edition AND the IES RP-8-00 Roadway Lighting Recommended Practices publications using the Illuminance Design method, and the 2001 Edition of the State of Georgia Specifications for Construction of Transportation Systems and the 2005 Edition of NFPA 70: National Electrical Code. The Contractor shall use an acceptable level of professional care when considering and synthesizing all elements of the design, including but not limited to roadway geometry, drainage requirements, traffic control during construction, erosion control, structural design, utility conflicts, signing and marking, lighting, landscaping and future maintenance requirements. Existing retention and/or detention ponds on the West Point Economic Development site shall be incorporated in the drainage design. Calculations for the site are included in the Plans Package. Contractor’s permanent construction will affect ponds. Ensure that design and construction address this parameter. Design and construction must remain within limits of the right of way. Any design and/or construction on the ponds needed as a result of this project is the responsibility of the Contractor.

### **999.3.07 Measuring Units**

The project shall be designed in English units of measurement.

### **999.3.08 Design Software**

Microstation and CAiCE software shall be used. All files shall conform to the criteria found in the Electronic Data Guidelines dated March 15, 2004. This information can be found at the Department’s website <http://www.dot.state.ga.us/dot/preconstruction/R-O-A-D-S/PPC/index.shtml>.

### **999.3.09 Reviews / Meetings**

The design shall be prepared under the direct supervision of licensed design professionals, and a member of the design-build firm, who is a Professional Engineer licensed to practice engineering in the State of Georgia, shall seal the final plans. Their seal on the drawing shall represent certification that the design meets all applicable codes, is of good engineering practice and standards, and includes no Design Exception or Design Variances. Check and certify all drawings, including intermediate submittals.

The Department may establish dates and times for cursory reviews, and may comment on design work, but will not require hold points, review periods, or comment responses, except as noted otherwise in the specifications. If the Department at any time determines that the design work is not in conformance with the Department’s standards, specifications, or good engineering practice, the Department reserves the right to stop work (or applicable portion of the work), at the Contractor’s

expense, until resolution of the issue(s) has occurred. Work stoppage(s), caused by the Contractor, that have an adverse affect on the project schedule will not be grounds for a claim(s).

Documents (reports, plans and specifications) relating to the construction of this project (shown in Table 999-1) shall be submitted to the Department for review. Department approval of these submittals is required. Approvals, disapprovals, or comments made by the Department will be provided, in writing, to the Contractor within the appropriate timeframes shown below Table 999-1. No construction shall begin prior to receiving approval from the Engineer. Additional detailed backup may be requested and shall be submitted to the Department as deemed appropriate by the Department.

Weekly progress meetings will be held on site (this frequency may be increased or decreased at the discretion of the Engineer at any time as needed to facility the completion of this project). Attendees shall include the Engineer, the contractor (including engineer(s) knowledgeable in regards to design proposed, issues to be settled, and with authority to make decisions needed to keep project on schedule and budget), and the Department's project engineer(s) knowledgeable in regards to design proposed, issues to be settled, and with authority to make decisions needed to keep project on schedule and budget), and others as deemed appropriate by the Engineer. Minutes shall be taken at the meeting (and all meetings at which Contractor is present) by the Contractor and shall be made available by the 4<sup>th</sup> business day after said meeting unless circumstances are deemed accepted to delay. Any delay shall be approved by the Engineer and shall be subject to the Engineer's interpretation. The location shall be determined by the Engineer and may include the general office in Atlanta. The Contractor shall bring a 3 month "look ahead" schedule that includes design and construction. GDOT (and others) review times shall be shown in schedule. Contractor shall be able to articulate the logic of assumed predecessors and successors at each weekly meeting. The Contractor shall develop a reviewer(s) list (personnel from the Department, other agencies, local governments, etc.) that will actually conduct reviews (the Engineer will work with the Contractor and approve this list) and a 7 to 14 calendar day advance notification shall be sent via email to all applicable reviewers noting the following: impending submittal description, format, quantity, scheduled delivery date, and review period (the advance notification only applies to submittals found in Table 999-1). The Engineer (and/or designee) shall be cc'd on all email correspondence. The notifications shall be consistent with the schedule. The most current schedule and all submittals (current and past) shall be available 24 hours a day, 7 days a week, every day of the year for access by the Department via the internet. **Submittals shall be Adobe .pdfs (no lower than Version 7.0) and shall be grouped as one file per submittal.** Access to the schedule shall be secure.

### 999.3.10 Field Surveys

The Contractor shall verify all provided surveying data. The Contractor shall provide terrain and drainage cross sections, pavement elevations, and drainage structure information for this project. All survey data shall be in English units. The following is only a guideline for data collection and is not intended to be comprehensive:

- A. Provide cross sections of the terrain and pavement at mainline and cross streets stations as follows:
  1. These cross sections shall be provided at intervals adequate enough to accurately design and construct the Project, but not to exceed 50 feet.
  2. The cross sections shall extend from the centerline to outer most edge of easement or right of way shown on the plans.
  3. In addition to all terrain breaks, the cross sections shall include all applicable edges of pavement (emergency, outside edges of travel lanes, and any curb and gutter sections).
- B. Use the Department feature codes when collecting the data in accordance with CAiCE Survey Data Guidelines.
- C. Locate all existing drainage structures (X, Y, and Z) within the right-of-way and provide their size, type, condition, and flow line elevations at each end.
- D. Inlet elevations for all drop inlets and catch basins.
- E. Terrain profile at each drainage structure showing the skew of the structure.
- F. Terrain profile of the drainage outfall from the end of each structure to the right-of-way.



### Contract Data Requirements List (CDRL) - Legend

AA	As Appropriate
AE	Accepted by Engineer
AR	As Required
c	Calendar Days
FS	Full-size paper – meets GDOT Plan Presentation Guide
HC	Hard Copy – 8 ½ x 11 unless otherwise noted
HS	Half-size paper – meets GDOT Plan Presentation Guide
m	Month = 30c
Monthly	Submitted monthly not later than the number of days at the end of that report month
MS	Microstation File - Electronic
MW	Microsoft Word - .doc
NTP	Notice to Proceed
PAS	Per Approved Schedule
PDF	Adobe PDF – One complete file
PDFI	Adobe PDF – Individual Sheets

**Table 999-1 – Contract Data Requirements List (CDRL)**

<b>Submittal Description</b>	<b>Format</b>	<b>Quantity</b>	<b>Delivery Date*</b>	<b>Review Period*</b>	<b>Review Type</b>	<b>Comment</b>
Basis of Design	HC	6	NTP+7	7	Accepted by Engineer	
Erosion Control Plan	FS, HS	3,3	Contractor Resp.	21	Plan reviewed by the Environmental Compliance Bureau	Acceptance of plans in Plan Package or Submission of Alternate Plan.
Schedule – including review times	MS Project or Primavera	6	NTP+14	14	Accepted by Engineer (includes Design Liaison and Construction Manager)	
QC/QA Plan	HC	6	NTP+14	14	Accepted by Engineer	See 999.3.A.
Construction Traffic Control Plan	FS, HS	3,3	As needed	21	See Specification 150	
Preliminary Structures <ul style="list-style-type: none"> <li>• Bridge Layouts</li> <li>• Hydraulics Reports</li> <li>• Wall Layouts</li> </ul>	FS, HS, HC, PDF	3,3,1,1	PAS	30	Accepted by Engineer	FHWA reviews will be concurrent. <del>See</del> Acceptance of Plans in Plan Package or Submission of Alternate Plan.
50% Structures <ul style="list-style-type: none"> <li>• Bridge Plans</li> <li>• Wall Plans</li> </ul>	FS, HS	3,3	PAS	30	Accepted by Engineer	FHWA reviews will be concurrent.
90% Structures <ul style="list-style-type: none"> <li>• Bridge Plans</li> <li>• Wall Plans</li> </ul>	FS, HS	3,3	PAS	30	Accepted by Engineer	FHWA reviews will be concurrent.

**Table 999-1 – Contract Data Requirements List (CDRL) – (Continued)**

<b>Submittal Description</b>	<b>Format</b>	<b>Quantity</b>	<b>Delivery Date*</b>	<b>Review Period*</b>	<b>Review Type</b>	<b>Comment</b>
Signing and Marking (Preliminary & Final)	FS,HS	3,3	PAS	21	Accepted by Engineer	
Signalization Plans (Preliminary & Final)	FS,HS	3,3	PAS	21	Accepted by Engineer	
Utility Plans/Agreements	Plans/Agreements	Agreements: 3 hard copy, 1 electronic pdf Plans: 1 for each Utility Owner + 3 for Dept. and Microstation files	Concurrently w/Construction Traffic Control Plans	Agreements: 30 days for Dept. + 120 days for each Utility Owner Plans: 30 days	Relocation Plans and Agreements reviewed by Department Utilities Office. Agreements also reviewed by Utility Owner.	681
Preliminary Utility Status Report	Report	3	NTP + 90	21	Accepted by Engineer	
Landscaping Plans (Preliminary & Final)	Plan	6	PAS	21	Accepted by Engineer	
<b>Lighting Plans – Preliminary</b>						
Photometric Layout	RP, PDF PDF, HC	1 1 and 2	PAS PAS	21 21	Accepted by Engineer Accepted by Engineer	
Luminaire Manufacturers Specifications including but not limited to Manufacturer, Model Number, and Cut Sheet for each proposed luminaire included in the proposed design.						
Pole Date and Legend Sheet(s) Plan Sheets	AA FS, HS, & PDF	3 3,2, and 1	PAS PAS	21 21	Accepted by Engineer Accepted by Engineer	

**Table 999-1 – Contract Data Requirements List (CDRL) – (Continued)**

Submittal Description	Format	Quantity	Delivery Date*	Review Period*	Review Type	Comment
<b>Lighting Plans – Highmast Light Tower Foundation Submittal(s)</b>  Soil Boring Reports with Footing Designs for Light Towers (as part of Roadway Plans) including:  Light Tower Foundation Design	HC, PDF          FS, HS, PDFI	4, 1          2, 1, 1	PAS          PAS	21          21	Accepted by Engineer          Accepted by Engineer	682
<b>Lighting Plans – Construction Plans Final Submittal</b>  Pole Data and Legend Sheet(s)  Plan Sheets, Foundation Design Sheet(s)  Cover Sheet, Detail Sheet(s), Summary of Quantities and Detailed Estimate  Special Provisions  Cost Estimate	FS, HS, MS, PDFI  FS, HS, MS, PDFI  FS, HS, MS, PDFI  HC(MW), PDF  HC(MW), PDF	1, 1, 1, 1  1, 1, 1, 1  1, 1, 1, 1  2, 1  2, 1				

**Table 999-1 – Contract Data Requirements List (CDRL) – (Continued)**

Submittal Description	Format	Quantity	Delivery Date*	Review Period*	Review Type	Comment
Relocated Utility Plans	HS	Plans: 1 for each Utility Owner +3 for Dept. and Microstation files	Concurrently w/Construction Traffic Control Plan	21	Accepted by Engineer	
Shop Drawings	FS, HS	1,2	PAS	30	Accepted by Engineer	
As Built Plans	FS	See spec	Project Completion (-30)	30	Accepted by Engineer	See 999.3.A.12 and 3.B.1.E
Progress Meetings / Reports	HC	TBD	TBD	TBD	Accepted by Engineer	Meetings to be weekly.

\*All days are "Calendar Days."

**All Submittals shall be concurrent submittals** in that they shall be made to the Engineer, applicable GDOT Office Reviewer and/or other applicable entities (including FHWA and local government(s) as directed by the Engineer. **The Contractor shall hand-deliver submittals.** In the event that concurrent submittals are required, the "receipt" date shall be date the last recipient receives the submittal and shall be the contractual begin date for the review. Unless a different review time is specified elsewhere in the contract, a period of **twenty one days (21) calendar days** from receipt to release of the submittal by the Department shall be allowed for the Department's review. Engineer acceptance is required for all reviews. All Contractors' schedules shall reflect the review times contained within the specifications and contract. All submittals shall be directly submitted to the Engineer. Engineer's receipt of submittals will mark the beginning of the review period. All submittals by the Contractor shall be required to contain a statement certifying that no unapproved design-exceptions have been incorporated in the submittal. Up to date half-size sets of plans with the most current design and construction plans shall be made available to a distribution list made up of up to 20 individuals/offices at all times during this project

- G. Provide any additional necessary survey control.
- H. The accuracy for all survey data shall be as follows:

Horizontal:	Additional control = 1:10,000
Topography	= 0.4'
Vertical:	Additional control = NOAA 3 <sup>rd</sup> Order
Pavement	= 0.03'
Ground Terrain	= 0.25'

**999.3.11 Quality Control / Quality Assurance for Design**

The Contractor shall employ only persons duly registered in Georgia in the appropriate category in responsible charge of supervision and design of the work; and further, shall employ only qualified, registered in Georgia land surveyors in responsible charge of any survey work.

The Contractor shall use those entities prequalified in related disciplines (design, traffic analysis, geotechnical, etc.) as presented in the Statement of Qualifications. Revisions to the team and/or the proposed assignments reflected in the Statement of Qualifications must be approved by the Department. Approval of any replacements in the team shall occur prior to the letting of the project. Failure to secure approval of replacements prior to letting may result in the disqualification of the bidder's bid.

The Contractor shall endorse all final reports, contract plans, and survey data. Such endorsements shall be made by a person(s) duly registered in the appropriate category by the Georgia State Board of Registration for Professional Engineers and Land Surveyors, being in the full employ of the Contractor and responsible for the work prescribed by this agreement.

Authorized representatives of the Department and Federal Highway Administration may at all reasonable times review and inspect the Project activities and data collected. All reports, drawings, studies, specifications, estimates, maps, and computations, prepared by or for the Contractor, shall be available to authorized representatives of the Department and representatives of the Federal Highway Administration for inspection and review in the General Offices of the Department or at another location as determined by the Department. The Department's review comments shall be incorporated into the plans by the Contractor or as agreed between the Engineer and contractor. Changes associated with incorporated review comments, and consistent with requirements within this contract, shall occur within the price bid for the contract.

Before the start of the contracted design effort, the Contractor will develop and gain the Department's approval for a QC/QA Plan to ensure that all design documents are prepared in accordance with the Department's Plans Presentation Guide (<http://www.dot.state.ga.us/dot/preconstruction/R-O-A-D-S/PPC/index.shtml>.) using good, prudent, and generally accepted design and engineering practice.

The QC/QA Plan shall include the following:

- A. The quality control and quality assurance procedures for design documents. These procedures shall specify measures to be taken by the Contractor (1) to ensure that appropriate quality standards are specified and included in the design documents and to control deviations from such standards, it being understood and agreed that no deviations from such standards shall be made unless they have been previously approved by the Department, and (2) for the selection of suitable materials, and elements of the Work that are included in the Project.
- B. Quality control and quality assurance procedures for preparing and checking all plans, calculations, drawings, and other items submitted, to ensure that they are independently checked and back-checked in accordance with generally accepted engineering practices, by experienced engineers. The originator, checker, and back-checker shall be clearly identified on the face of all submittals. Specific procedures for verifying computer programs used shall also be included. Plans, reports, and other documents shall be stamped, signed, and dated by the responsible Georgia registered engineer where required under the contract documents, under generally accepted engineering practices, or by applicable laws. Also, a statement from the Contractor that all the reviews have been accomplished is required.

- C. The Contractor shall review all associated shop drawings. Submit to the Department for approval shop drawings that have been approved and stamped by the Contractor's licensed engineer.
- D. Procedures for coordinating work performed by different persons in the same area, or in adjacent areas, or in related tasks to ensure that conflicts, omissions, or misalignments do not occur between drawings or between the drawings and the specifications, and to coordinate the review, approval, release, distribution, and revision of documents involving such persons. All the persons proposed to be responsible for design Quality Control and Assurance shall be listed as follows:
  - 1. Discipline
  - 2. Name
  - 3. Qualifications
  - 4. Duties
  - 5. Responsibilities
  - 6. Authorities

All key personnel performing quality control and quality assurance functions shall be exclusively designated to such and shall not be assigned to perform conflicting duties.

All documents shall be maintained by the Contractor for the duration of the Contract and shall be organized, indexed, and delivered to the Department (1) upon Final Acceptance or (2) even if incomplete, within fourteen (14) days of receipt of request from the Department. These documents shall include but not be limited to the following items: design criteria, reports and notes, calculations, drawings, schematics, supporting materials, statement regarding accomplishment of reviews, etc.

**999.3.12 As-Built Plans**

Upon completion of the Project, a complete as-built set of plans shall be provided to the Department in the following formats:

- A. Two (2) sets of CD-ROMs with all electronic design files.
- B. Design notes and calculations.
- C. Entire set of plans in one .pdf file and .tif file (per sheet).
- D. One (1) full-size set of paper prints.
- E. Ten (10) half-size set of paper prints.

In addition, paper prints will be required throughout the design period for the Department's reviews as noted herein. The Contractor will be responsible for all production and delivery of materials needed for Department review. Note materials required by other state agencies will be covered similarly by the Contractor. A member of the design team who is a Professional Engineer licensed to practice engineering in the State of Georgia shall seal the as-built plans. An estimated summary of quantities and detailed estimate shall be provided in the final as-built plans.

**999.4 Roadway**

**999.4.01 Preparation of Construction Plans**

**A. Criteria**

The Contractor shall become familiar with and use the latest, as determined by the Department, American Association of State Highway and Transportation Officials (AASHTO) Design Manuals for Arterial Streets, Rural, Urban and Interstate Highways, including those standards adopted by the AASHTO and approved by the Secretary of Commerce, as

provided by Title 23, United States Code, Section 109 (b), with the Department's Standards, Procedures, Plans, Specifications and Methods, with Federal Highway Administration (FHWA) procedures relating to plan review and approval, and shall produce plans in accordance therewith. The Project shall be designed and constructed utilizing minimum or greater than the values for 70 mph for interstate design on I-85, 45 mph for a rural collector on relocated Gabbettville Road (KIA Blvd) and the Frontage Road (KIA Pkwy), 45 mph for a rural local road on Warner Road and 35 mph for a rural local road on Webb Road, guidelines found in the 2004 American Association of State Highway and Transportation Officials (AASHTO) Design Manuals for Arterial Streets, Rural, Urban and Interstate Highways (including but not limited to the "Green Book"), unless otherwise approved by the Department.

## **B. Design Specifications and Guidelines**

Design for roadways, and intersections shall be in accordance with the AASHTO Design Specifications, current edition; AASHTO Standard Specifications for Structure Supports for Highway Signs, Luminaries and Traffic Signals dated 1994; and AASHTO Roadside Design Guide dated 2002. The lighting design shall be in accordance with the American National publication, "An IES RP-8-83," and the Department of Transportation Specifications for Construction of Roads and Bridges, 2001 edition, and Special Provisions, current editions. Design and plan preparation shall also be in accordance with the FHWA Federal-Aid Policy Guide. Plans and specifications shall conform to the requirements of the Highway Capacity Manual, current edition (T.R.B. Report No. 2). Design for work inside interstate rights of way shall conform to interstate standards. Design for work outside interstate right of way shall conform to AASHTO design standards for the appropriate classification and speed design. Any deviation will require prior approval in writing by the Department. On facilities where driveways are included, the Contractor shall become familiar with the Department's regulations and procedures and shall produce plans for upgrading driveway control. The Contractor shall strive to meet upper limit guidelines on all new work and reconstruction. Where this proves to be impracticable, the design shall meet or exceed "minimum" guidelines. Any deviation will require a written design exception or variance be approved prior to incorporating the deviation in the work. Exceptions and deviations shall include a typical review period as shown in the specification. Concurrent reviews by the FHWA and GDOT will occur where issues arise that involve their approval. The Contractor shall prepare the required design exception request for approval by Department and/or the FHWA. A design exception request will justify fully why the guideline cannot be reasonably met considering such items as right-of-way impacts, mitigation measures taken, accident history, utility impacts and other related costs. The Contractor shall meet the current ADA guidelines. In addition to the references listed above, the following references shall be used in the development of this project:

- Electronic Data Guidelines – Dated March 15, 2004.
- Plan Presentation Guide – Dated November 2002.
- Turning Vehicle Templates by Jack E. Leisch & Associates or Autoturn CAD program by Transoft Solutions.
- 2003 Edition of the Manual on Uniform Traffic Control Devices "MUTCD" by the U.S. Department of Transportation, Federal Highway Administration "FHWA."
- Draft Manual of Drainage Design for Highways by the Georgia Department of Transportation, "GDOT."
- Roadway and Bridge Standard Plans as of June 1, 2004 by the "GDOT" Road and Airport Design Office. Design and plan preparation shall also be in accordance with the Certification Acceptance Authorized by 23 USC 117(a) for Administering Federal Aid Projects Not on Interstate System, dated 6-1-90.
- Guidelines for Processing Design Data in CAiCE - <http://www.dot.state.ga.us> – search for keyword "CAiCE."
- Construction Details by the "GDOT" Road and Airport Design Office as of June 1, 2004.
- Bid Item Index by the "GDOT" State Transportation Office Engineer.
- Rules and Regulations for Driveway and Encroachment Control by the "GDOT."
- Utility Accommodation Policy and Standards by the "GDOT" Utilities Office.



This list is not intended to be all-inclusive. All references shall be current editions (accepted by the Department). Any current editions that are written in metric units shall be “soft converted” to U.S. Standard Units. Any rounding will be to the dimension that will increase safety.

### C. Plan Sizes

All plans shall be reproducible quality ink drawings on bond paper. Plan (full size plans shall be 36 x 24 and half sized plans shall be 11x17) shall meet the guidelines found in the GDOT Design Policy Manual unless otherwise stated in the specifications.

### D. Construction Plan Requirements and Scale

The plans shall be fully dimensioned in English units; all elevations necessary for construction shall be shown per guidelines found in GDOT Design Policy Manual. All plans shall be prepared on the scales listed below, unless otherwise approved by the Department. Drawings and lettering shall be such as to produce clear and legible reproductions when reduced to half-size. The scale of sheets shall be as follows:

1. 1" = 10'
  - a. Roadway cross sections 1" = 10' horizontal and 1" = 10' vertical. Note: Cross sections may have to be plotted lengthwise on the sheet to avoid folded sections.
  - b. Driveway profile sheets horizontal 1" = 10', vertical 1" = 20' (could be 10').
2. 1" = 50'
  - a. Roadway plan sheets.
  - b. Roadway profile sheets horizontal, 1" = 10' vertical.
  - c. Gore detail sheets.
  - d. Intersection detail sheets.
  - e. Drainage profile sheets 1" = 20' horizontal, 1" = 10' vertical (include location of existing and proposed utility crossings).
  - f. Detours and staging plans.
  - g. Utility relocation plans.
3. 1" = 100'
  - a. Cover sheet.
  - b. Stake out sheet.
  - c. Property map.
  - d. Drainage area map.

The Contractor shall check all details and dimensions shown on the plans before they are submitted to the Department for review. Topography shall remain fully legible when plans are reduced in size, but shall be less prominent and readily distinguishable from proposed work. Profile sheets shall have the existing ground line dashed and the required profile in a solid line. All other plan sheets (utility, erosion control, landscaping, lighting, signing & marking, signal, etc.) shall be the same scale as its corresponding roadway plan sheet.

## **E. Computations**

All design computations and computer printouts shall be neatly recorded on 8 ½" by 11" sheets, fully titled, numbered, indexed, dated, and signed by the designer/project manager and checker. Project quantity computations shall be done in electronic spreadsheet format or directly processed from the CAiCE software. The computer files and two copies of the computations fully checked and appropriately bound, shall be submitted to the Department with the plans. A complete tabulation of the drainage analysis along with the calculations used to determine the size of drainage structures shall be submitted to the Department with the construction plans.

## **F. Plan Print Requirements**

The CONTRACTOR shall furnish all the prints necessary for the development of the preliminary and final construction plans and specifications. All prints shall be clear and legible.

## **G. Traffic Flow Diagrams**

These sheets provide the traffic data information to determine design criteria. All traffic data information and diagrams are included in the plan package. The sheets are not required to be to a scale, but the drawing shall show and represent the alignment of the overall project and shall be included in the final as-built set of plans.

## **H. Typical Sections**

Typical sections shall meet the guidelines found in GDOT Design Policy Manual and Plan Presentation Guide (PPG). Criteria found in this specification shall take precedence.

1. Typical sections shall show exact dimensions (medians, travel-lanes, shoulders, slopes, ditches, etc.) from the construction centerline. Locate and label the roadway profile grade line (existing and proposed). Label appropriate items as to type and thickness. All slope controls shall be specified on each typical section.
2. Typical sections shall show exact dimensions (medians, travel-lanes, shoulders, slopes, ditches, etc.) from the construction centerline. Locate and label the roadway profile grade line (existing and proposed). Label appropriate items as to type and thickness. All slope controls shall be specified on each typical section.
3. Any special conditions shall be shown as details on the typical section sheets. However, if these items are covered by a Georgia Standard or a construction detail, then a note shall be included referring to the standard or detail.
4. The scale of each typical section may differ between the horizontal and the vertical in order to more clearly show the division between separate layers of the structure of the pavement.
5. Roadway plans shall meet the posted speed design for all intersections as shown in the 2002 Roadside Design Guide and the MUTCD.
6. Roadway reconstruction – the final reconstructed section shall meet the following requirements:
  - a. Mainline pavements shall slope to the outside at 2.00%, unless geometry requires superelevation.
  - b. The proposed shoulders shall be the same dimensions and slopes as shown in the plans package.
  - c. All PCC concrete and asphaltic concrete mixes shall meet the specifications of this proposal and applicable public documentation regarding the Department's current mix design criteria. Also, see letter from Preconstruction Division Director regarding "Guideline for Superpave and Other Mix Types Selection – Revision" dated January 30, 2006 at [www.dot.state.ga.us](http://www.dot.state.ga.us).
  - d. Materials and depths shall be as follows (note spread rates shall be 110 lb/sy/in). Contractor shall construct project as to deliver final dimensions as that shown in the Costing Plans. Contractor shall declare what alternates are selected at time of proposal submission:

**For:**

- Ramps
- KIA Blvd (west side of Truck Entrance to radius return of ramps on east side)
- Truck Road

Mainline		Outside Shoulders			
		Alt A		Alt B	
Material	Inches	Material	Inches	Material	Inches
PCC (w/ 1/ ¼ inch dowels)	12	PCC	12	RCC	12
19 mm SUPERPAVE	3	19 mm SUPERPAVE	3	19 mm SUPERPAVE	3
GAB	12	GAB	12	GAB	12

**Note:** Inside shoulders on ramps shall be same depths and materials as ramps.

**For:**

- KIA Pkwy

Mainline				Outside Shoulders	
Alt 1		Alt 2			
Material	Inches	Material	Inches	Material	Inches
PCC (w/ 1/ ¼ inch dowels)	10	12.5 mm SUPERPAVE	1.5	12.5 mm SUPERPAVE	1.5
19 mm SUPERPAVE	3	19mm SUPERPAVE	2	19mm SUPERPAVE	2
GAB	12	25mm SUPERPAVE	6	GAB	6
		GAB	12		

**For:**

- KIA Blvd - (Sandtown to west side of Truck Ent. & radius return of ramps on east side to Warner)
- Warner Road
- SR 18
- Webb Road
- All other pavement (note: where overlay is required, top two lifts shall be used)

Mainline		Outside Shoulders	
Material	Inches	Material	Inches
12.5 mm SUPERPAVE	1.5	12.5 mm SUPERPAVE	1.5
19mm SUPERPAVE	2	19mm SUPERPAVE	2
25mm SUPERPAVE	6	GAB	8
GAB	12		

- f. For superelevated sections, use 0.06 ft/ft maximum for all roads except I-85 and Interchange ramps. I-85 and Interchange ramps shall meet a 0.08 ft/ft maximum.
- g. Where shown on the plans, concrete curb and gutter shall have a 2' wide gutter and "v-gutter" shall be constructed as per applicable GDOT standard or details.

- h. Where existing culverts are to be extended and/or other existing structures within the right of way do not meet current GDOT standards, the Contractor shall reconstruct any portion thereof that does not meet current standards or is in poor working condition. All costs associated with this work (including traffic control) shall be included in the overall price bid for construction.
- i. Rumble stripes are not required on this project.
- j. The transition from the concrete to asphalt shall be constructed as shown on the Plans Package.
- k. Asphalt mixes shall be Superpave mixes and shall include hydrated lime. Surface courses shall be Group II only with no RAP.
- l. OGFC shall be used on ramps from gore area to the farthest point where the proposed ramp pavement ends adjacent to the existing I-85 outside edge of pavement.
- m. Filter fabric shall be placed between the existing I-85 mainline pavement and any proposed pavement for ramps. Contractor shall not remove (or cause damage to) any pavement from the I-85 mainline with the exception of the area needed to install the filter fabric. This shall be no greater than 12 inches (horizontally) and 2 inches vertically.
- n. Leveling (materials, labor, haulings, etc.) is included in price bid for project as needed to meet tolerances and requirements in specifications.
- o. An additional 2" of GAB shall be placed at stations shown in Special Provision 205.
- p. All temporary barrier used, reused, hauled and stored by the Contractor to fulfill any approved traffic control plans is the responsibility of the Contractor.
- q. The Truck Road Typical Section (listed as Truck Drive in the Costing Plans) will consist of four 12-foot lanes (two in each direction). The contractor shall provide all design, coordination, and construction (including but not limited to labor, materials, hauling, storage, etc.) necessary to lengthen the current alignment shown in the Costing Plans by 150 feet. The remaining details in the Truck Road (Drive) typical section shown in the Costing Plans will apply. The expanded receiving area on Truck Road (Drive) from the left hand turn off of KIA Blvd shall be included in the final design. The "additional 1600 feet of two-lane two-way facilities" stated in 999.1.03.A shall be designed and constructed as per the current two-way, two lane Truck Road (Drive) shown in the Costing Plans. Figure 999.4.H.6.q reflects the most up to date right of way in the area of the Truck Road (Drive) and the WPEDS.

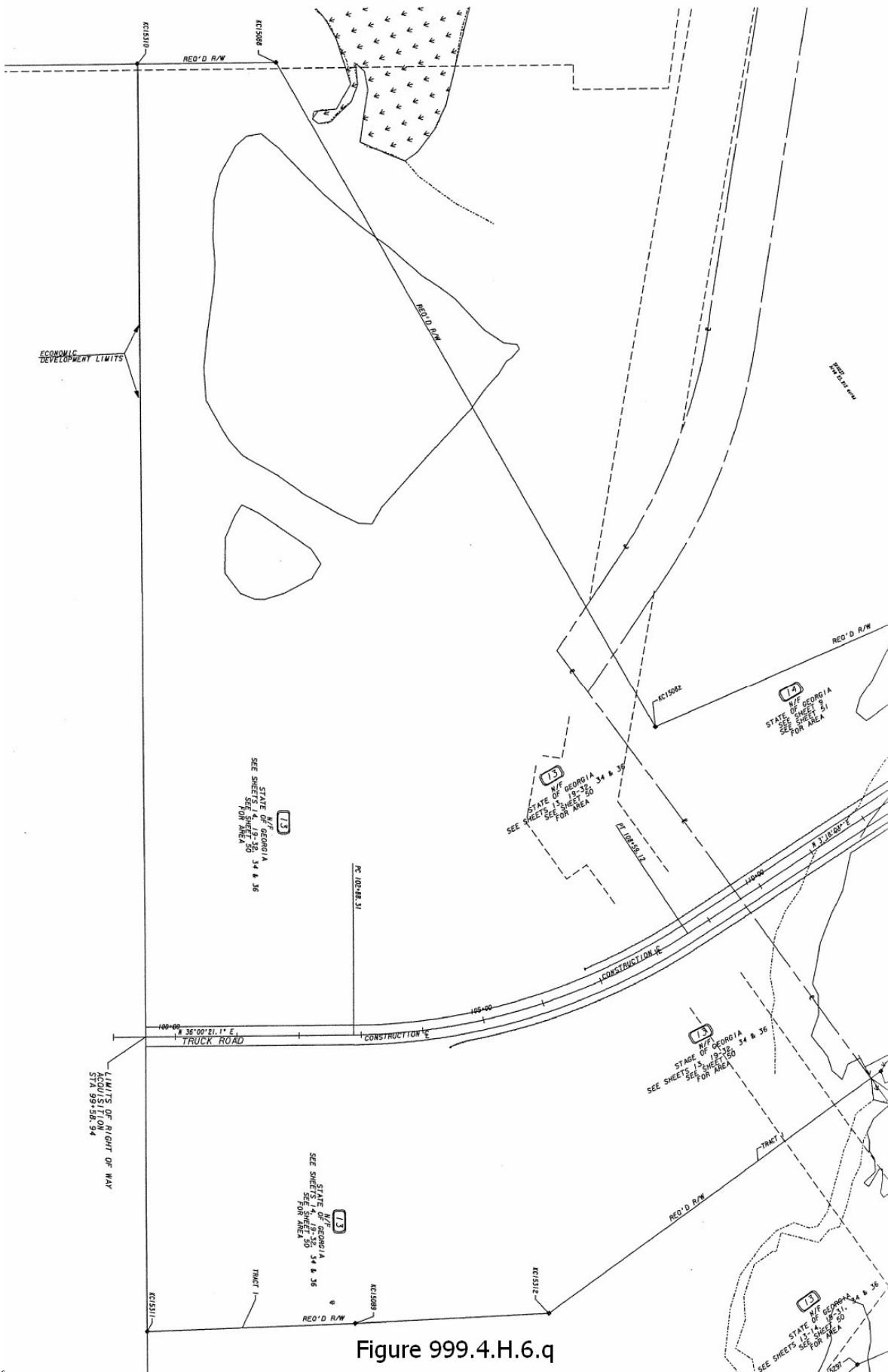


Figure 999.4.H.6.q

- r. All culverts shall be embedded 15 to 20% of their width.
- s. Access to the West Point Economic Development Site (WPEDS) at Webb Road shall not be closed to construction access by contractors working on the WPEDS until the two-way public access along KIA Blvd, starting from the intersection of Gabbettville Road and Sandtown Road moving eastward to just east of the Truck Road, along with the final alignment(s) of the Truck Road from KIA Blvd to the West Point Economic Development Site is opened.

#### **I. Erosion and Sediment Control Sheets**

Note: An approved Control of Soil Erosion and Sedimentation Plan is included in the plans package. The intent of the approved plans is to facilitate the earliest possible construction of the project. The Contractor must accept ownership of these plans by completing the NOI and any other applicable criteria associated with the NOI. If the Contractor's plans appreciably differ from the approved plans, the Contractor is responsible for revising the Control of Soil Erosion and Sedimentation Plan as required to be consistent with their proposal. At a minimum, the plan must be revised to include the Contractor's Level 2 certification of the plans and approval must be completed (including standard review time by EPD) prior to any construction activities. Note that minimum EPD acceptance times will occur if revised erosion control plans are submitted. Review time shall be included in schedule. The Contractor shall not begin construction activities until the NOI has been secured or the revised set of Control of Soil Erosion and Sedimentation Plans has been accepted and approved by the Engineer. See 999.1.A.2 and Specification 161.

Note: Sediment and Erosion Control Items will not be paid for under individual pay items. All Erosion Control required to construct and maintain this project is the responsibility of the Prime Contractor. The Contractor shall include 120% of all quantities of items shown in the approved Control of Soil Erosion and Sedimentation Plans in the price bid by this contract. The additional 20% shall be placed at the direction of the Engineer or as needed for the proper control of sediment and erosion on this job. Also, any additions or changes required beyond the approved Control of Soil Erosion and Sedimentation Plan will be the sole responsibility of the Contractor and shall be accounted for in the overall bid price. There will be no additional compensation for overruns in quantities."

#### **J. Signing and Marking, and Signalization Requirements**

Prepare signing, signalization, and marking plans in accordance with the Manual of Uniform Traffic Control Devices (MUTCD) and any applicable AASHTO or Department standards and guidelines.

Prepare plan sheets to show all permanent roadway signs and pavement markings as they appear upon completion of the project. Place emphasis on designing clear directional signage and coordinating sign placement with roadway features, structures, sight distances, and driver awareness. All signs within the project limits (unless shown otherwise within the plan package or specifications) shall be replaced unless they meet the current reflectivity and design policy requirements.

Signalization plans are not included in the plans package. Provide signalization plans for approval. Signals installed along KIA Blvd (4 total) shall be coordinated electronically and shall function together (not independently). All work shall comply with the Department's Specification Sections 647, 925 and for traffic signal equipment, Type B CCTV cameras and IVDS intersection video detection. The contractor will be responsible for all fees and permits necessary for establishing power and DSL communications to the traffic signal installations. The contractor will be responsible for all charges associated with monthly utility service to the device until the device has satisfactorily completed a test period of uninterrupted operation, of at least 30 days. Upon completion of the test period, the contractor will complete a transfer of monthly utility costs to Troup County or the City of West Point (as applicable). Prior to activating new signal equipment, the contractor will contact the District Three Traffic Signal shop at least 10 working days prior to activation to allow for preliminary inspection of the installation and development of signal timing. The Contractor will be responsible for providing variable message signs to be placed in advance of each signal installation with text advising motorists of traffic signal activation prior placing any new traffic signal into flashing operation.

Once placed into operation, the Contractor will be responsible for responding to all reports of traffic signal "trouble" or malfunction until each traffic signal has successfully completed a 30 day test period. During the test period, the contractor will be responsible for replacing all defective traffic signal equipment, until the traffic signal has completed the test period. If the signal is part of an operating traffic signal system whereby the signal operates in coordination with adjacent traffic signal installations, those traffic signals considered part of an operating traffic signal system, will

successfully complete a 30 day test period as part of a system test prior to District Three Signal staff assuming responsibility for maintenance and operations of the new signals.

## **K. Utilities**

### 1. General:

By Georgia Statutes, utilities whether public or privately owned, aerial or underground, are permitted by the Department and local governments to be accommodated within the public right of way. To this end, the Contractor needs to make every effort to design/build a project that will accommodate (and minimize impacts to) all existing utilities and new utilities to be constructed concurrently with the project.

The selection of typical section features, horizontal alignment, and location of storm sewer lines are design elements that can sometimes be varied without violating safety standards, and accepted design principles. Design/construction techniques that minimize or avoid utility conflicts may involve increased upfront costs; however, those costs are offset by savings during construction, in addition to the total cost savings for the project owner (the Department or local government) and the respective utility owners.

Additional guidance for accommodating utilities within the right of way are given in the AASHTO publications: *A Guide for Accommodating Utilities within Highway Right of Way, A Policy on Geometric Design of Highways and Streets*; the TRB publication: *Policies for Accommodation of Utilities on Highway Rights-of-Way*; and in GDOT's *Utility Accommodation Policy and Standards, current edition*.

Existing utility information shown on the Utility Plans for this project have been obtained from an Overhead / Subsurface Utility Engineering (SUE) Investigation (please refer to Section 2.C. for more information on SUE). This existing utility information has been provided by the Department for the Contractor's use in the design and construction of this project. However, the Contractor shall be responsible for supplementing this utility information for utilities that have been installed after the Overhead / Subsurface Utility Engineering (SUE) Investigation was performed. Known utilities and contacts are shown in the plans package. This information shall be verified by the Contractor.

Utility plan sheets are comprised of completed roadway plan sheets but will contain more detailed information featuring existing and proposed utility facilities. Specific requirements for Utility Plans are detailed below.

### 2. Required Information:

#### a. Preliminary Utility Plans

Preliminary Utility Plan sheets are typically comprised of preliminary roadway plan sheets with the inclusion of all existing utility facility locations (overhead & underground) found within a project's limits. Determining the location of the existing utilities was accomplished through an Overhead/Subsurface Utility Engineering Investigation. The "degree of effort" exerted on the part of the Department and the Utility Owner varies with the type and location of the utility. The Department has classified these "degrees of effort" into different Quality Levels of information. Please refer to Section 2.C. for definitions of these Quality Levels.

Preliminary Utility Plans shall be produced and used by the Contractor in the utility coordination/relocation design activities outlined here and under Section 999.1.3. The following minimum information shall be shown on the Preliminary Utility Plans:

- (1) Construction centerline with project stations and begin / end project limits.
- (2) Curb and gutter or edge of pavement (proposed and existing).
- (3) Road and street names.
- (4) Existing and required right-of-way limits, property lines, environmentally sensitive area limits, and property owners.
- (5) All proposed and existing easements (including existing utility easements).

- (6) Proposed and existing drainage structures/features (excluding drainage text).
- (7) Proposed construction limits (C/F lines).
- (8) Topographical planimetrics (i.e., existing buildings / structures, existing tree / vegetation limits).
- (9) All proposed bridges, walls, other structures and landscape hardscapes.
- (10) All proposed and existing strain poles (signal, sign, lighting).
- (11) Utilities legend.
- (12) Miscellaneous general notes.
- (13) Existing overhead and underground utilities found within the project's limits. Including size and material if known.
- (14) Sanitary sewer manhole top and invert elevations. Sanitary sewer pipe flow directions.
- (15) Railroad mainline and spur tracks with their respective property / easement limits.
- (16) Project survey control point locations.
- (17) SUE specific general notes.
- (18) Utility pole data table.
- (19) SUE Investigation Limit of Study.
- (20) SUE Quality Level A information.

b. Final Utility Plans

Final Utility Plans consist of all the elements provided for in the Preliminary Utility Plans, but also show all proposed utility adjustments required to accommodate the project.

The proposed utility information will either be provided to the Contractor by each of the respective Utility Owners, or included in the Design Scope for this project. Refer to Section 999.1.A.3 to determine how proposed utility relocation design information is to be provided. In either case, the Contractor shall compile and incorporate this information into the project's Final Utility Plans.

The proposed utility work for this project shall either be performed by the Utility Owner or their designated contractor, or included as part of the project's construction contract. Refer to Section 999.1.A.3 to determine who is responsible for the proposed utility relocation work for this project.

In either case, the Final Utility Plans shall clearly show all existing, proposed, temporary, and relocated utilities on the plans and clearly indicate the disposition of all existing utilities: for example, "To be Removed," "To be Adjusted," "To be Abandoned," "To Remain," "To be Relocated," etc. The plans shall also clearly define utility work as to which is to be done by the Contractor and which is to be done by others. Utilities to be relocated (or removed, or installed) prior to construction should be labeled on the plans as "To be relocated (or removed or installed) by others prior to project construction."

When proposed utility work is included as part of the project's contract, it is necessary for a Summary of Quantities to be included within the Final Utility Plans. The Summary of Quantities shown in the Final Utility plans shall be prepared in the same basic format as indicated in Section 999.3.B.1.q.

Where extensive or complex utility work is proposed to be performed, separate Utility Relocation Plan Sheets for that specific utility may be required to ensure plan legibility / constructability. The Contractor shall determine whether separate Utility Relocation Plans are needed. However, after review of the plans, the Engineer may require these additional sheets be included in the project plan package.



In addition to the information required for the Preliminary Utility Plans, the Final Utility Plans shall include the following:

- (1) All proposed and temporary utility facilities with annotation describing nature of work.
  - (2) Miscellaneous general notes required for coordination of utility facilities with roadway construction.
  - (3) Proposed water and sanitary sewer plan / profiles.
  - (4) Summary of quantities for contract items (if applicable).
  - (5) Any proposed utility easements.
  - (6) Any miscellaneous proposed utility details.
- c. Overhead / Subsurface Utility Engineering (SUE) Investigations (provided by the Department)

Employ an established engineering technology that can provide precise horizontal and vertical locations of underground and overhead utilities to produce an accurate picture of the underground and overhead utility infrastructure. The existing utility information provided in these investigations includes a description of what “degree of confidence” there is in its accuracy. The Department has classified these “degrees of confidence” into different Quality Levels of information:

Quality Level “D” Information - Information obtained solely from a review of utility records. The comprehensiveness and accuracy of such information is highly limited. Even when existing information for a utility in a particular area is accurate, there are often other underground systems that are not shown on any records. Quality Level “D” may be appropriately used early in the development of a project to determine the presence of utilities.

Quality Level “C” Information - Information obtained to augment Quality Level “D” information. This involves topographic surveying of visible, above-ground utility features (e.g., poles, hydrants, valve boxes, circuit breakers, etc.) and entering the topographic data into the CADD system. Since aerial utility lines are not surveyed, information provided for these facilities is considered Quality Level “C” also. Quality Level “C” may be appropriately used early in the development of a project and will provide better data than Quality Level “D” information alone. Designers must be very cautious when working on projects using information for underground utilities that is based only on Quality Levels “D” and “C” locates.

Quality Level “B” Information - Information obtained through the use of designating technologies (e.g., geophysical prospecting technologies). This is an application using scanning technologies, most of which have very specific capabilities. Applying a variety of techniques is essential to the process of preparing a comprehensive horizontal map of utilities and other underground structures on the site. Designating technologies are capable of providing good horizontal information.

Quality Level “A” (Test Hole) Information (not provided by the Department) - Provides the highest level of accuracy of utility locations in three dimensions. This level may apply manual, mechanical or nondestructive (e.g., vacuum excavation) methods to physically expose utilities for measurement and data recording. Quality Levels “B,” “C,” and “D” locates are incorporated in Quality Level “A” locates.

The Contractor shall identify all utility conflict points where verified existing utility information is necessary to avoid the respective utility conflict. The Contractor shall obtain Quality Level “A” locates at these project/utility conflict points, and shall coordinate with the Utility Owners and make every effort to avoid existing utility facilities and thereby reduce utility relocations.

This Quality Level “A” information shall be performed to GDOT standards by a prequalified firm in Subsurface Utility Engineering (SUE). Refer to the following website for a list of current prequalified firms:

<http://www.dot.state.ga.us/dot/preconstruction/consultantdesign/byclass/I508.htm>

### 3. Sheet Layout:

The Contractor needs to ensure that any information and graphic data that is not necessary to depict the disposition of utilities found within the project’s limits is removed by turning off the appropriate CADD levels(s) on which the data is stored. This will help ensure that information pertinent to utility facilities can be clearly seen in the Utility

Plan sheets. Examples of extraneous information would be items such as horizontal curve data, superelevation data, roadway dimensions, misc. text, etc. All background information such as pavement limits, existing structures, etc. should be screened back. Also, the Contractor must ensure all text, line work, details, and symbols are clear and legible when plans are reduced to 1/2 size.

In order to maintain plan clarity all applicable general notes, tables, Summary of Quantities, and the Utility Legend shall be placed separately from the Utility Plan sheets. This Utility Plan “Cover Sheet” shall be provided for both preliminary and final Utility Plans. A recommended example utility sheet schedule is provided below:

- Utility Sheet 1 (Cover Sheet) – Utility General Notes, Utility Legend, Miscellaneous Details.
- Utility Sheet 2 (required as needed) – Additional Miscellaneous Details, Summary of Quantities, Pole Data Table.
- Utility Plan Sheets – Utilities shown in plan view with respect to project.
- Utility Profile and Cross Sections Sheets – Proposed Utility facility profiles and cross sections (as required).
- Miscellaneous Utilities Sheets – Miscellaneous proposed utility details (as required).

The above sheet schedule should also be generally followed for all separate utility relocation plans (i.e., water and sewer plans) included in the project plans.

4. Miscellaneous Notes and Other Information:

State on the Utility Plans whose responsibility it is for utility adjustment. If the Contractor is to adjust utilities, those items are to be summarized and the appropriate pay items are to be included on the detailed estimate.

For bridge plans required, the Contractor is to make sure the plans have made accommodations for utility crossings and attachments, if applicable. Any new utility crossings requests must include the size, weight, and type of utility. In addition, the method of attachment to the bridge must be fully detailed. Such requests shall be reviewed by the Contractor to ensure adequacy and constructability and final approval shall be obtained by the Contractor from the Department. The Contractor shall follow the approval process within this specification.

The Contractor is responsible to ensure that all proposed and existing utilities are coordinated with the respective project’s Construction Staging and Erosion Control Plans.

Upon completion of the Utility Relocation Plans, the Contractor needs to ensure that any additional environmental impacts due to utilities are addressed in the project’s environmental document/permit.

**L. Crack Survey**

A survey will be conducted by the Department. Notify the Engineer 30 days prior to any construction activities in order to facilitate survey.

**M. Pond Survey**

A survey will be conducted by the Department. Notify the Engineer 30 days prior to any construction activities in order to facilitate survey.

**N. Staging**

The Contractor must address staging and all final and staging related drainage issues. Contractor shall make the Engineer aware and shall notify all Emergency and Public Services (including local schools) of proposed road closures.

## 999.5 Structures

### 999.5.01 General

#### A. Design Specifications and Guidelines

Design bridges and retaining walls in accordance with the AASHTO Standard Specifications for Highway Bridges, 17<sup>th</sup> Edition, 2002. Use the Design Memos for information regarding bridge design practice located at the internet address: <http://www.dot.state.ga.us/dot/preconstruction/bridgedesign/index.shtml>. Use the Bridge & Structural Design Manual available on the R-O-A-D-S website: <http://www.dot.state.ga.us/dot/preconstruction/R-O-A-D-S/DesignPolicies/index.shtml>. Use “Basic Drawings” where possible. Basic drawings and cells can be downloaded at the following internet address: <http://www.dot.state.ga.us/dot/preconstruction/adds/bridge/drawings.shtml>. Use MicroStation/J to prepare plans in accordance with the Office of Bridge and Structural Design’s MicroStation Customization. These files include a folder structure that is required to be on C:\Drive along with the “Bentley” folder. Access the Bridge MicroStation Customization files at the internet address: <http://www.dot.state.ga.us/dot/preconstruction/adds/microstation/customization.shtml>.

Bridge over I-85 should be able to accommodate possible future placement of water and gas line.

#### B. Bridge and Wall Foundation Investigation

The Department is supplying preliminary bridge and wall foundation investigations for information only. Should the contractor choose to perform additional foundation investigations to be utilized in the bridge and wall design, the investigation and reporting shall be prepared in accordance with the following:

##### 1. General:

Perform field and laboratory testing and analysis, and prepare a report with foundation recommendations for the bridges and walls. Work is to be performed by qualified and experienced firms that are pre-qualified with the Georgia DOT in Area Class 6.02.

Perform work in accordance with AASHTO Standards and in general conformance with the Department’s Geotechnical Engineering Bureau Foundation Drilling and Sampling Guidelines. Comply with all applicable Federal and State requirements.

##### 2. Field Investigation:

Drill a minimum of one boring at each bent line and at each wall. Drill additional borings as necessary. Perform the following, as applicable:

- Notify property owners prior to accessing their properties.
- Obtain locations and clearance for all utilities within the area of the borings.
- Provide traffic control and lane closures in accordance with the Georgia DOT Specifications.
- Clearing and preparation of the boring site.
- Obtaining and transporting water to the site.
- Foundation drilling and sampling of soil and rock.
- Obtaining accurate survey elevations.
- Site clean up, erosion control, and restoration.

Fill portions of all drill holes with drill cuttings after completion of drilling that are not subject to excavation for construction. Top off all drill holes through pavements with cold mix asphalt (unless subject to excavation) to the same depth as the existing pavement. Remove all drill cuttings, muddy water, slurry, and other debris deposited on

pavements, paved shoulders, and other travel ways immediately when the areas will be subject to traffic after the completion of this project. Calculate elevations to an accuracy of one tenth (0.1) of a foot.

Do not provide copies of boring logs, plans, or field test reports to property owners or other parties without the permission of the State Geotechnical Engineer.

3. Laboratory Testing:

Perform laboratory testing on samples obtained from the field in accordance with applicable methods of AASHTO, ASTM, or GDT test procedures. Use a laboratory that possesses current AASHTO certification.

Furnish laboratory results as part of the Final Report.

4. Final Analysis and Report:

Perform a geotechnical analysis for this project and prepare geotechnical recommendations in the form of a final report to the Department's State Geotechnical Engineer for review, prior to foundation construction. Base the final report on the information collected from the field investigation, the plans, specifications, results of laboratory tests, and the analysis of all other available information.

Stamp and sign the final reports by a Professional Engineer registered in the State of Georgia. Provide copies of the final report to the State Geotechnical Engineer.

Prepare the reports in general conformance to the Department's Geotechnical Engineering Bureau Report Preparation Guidelines, Georgia DOT Specifications, and in conformance with good engineering practice. Incorporate the following recommendations and additional recommendations as applicable

- Foundation types and allowable loads.
- Footing elevations.
- Pile minimum and estimated tip elevations.
- Drilled caisson tip elevations.
- Small diameter micropile tip elevations.
- Foundation installations in rock.
- Embankment construction, settlement, and slope angles.
- Treatment of groundwater conditions.
- Treatment of poor soil conditions.
- Construction effects on adjacent structures and remedies for any potential problems.

In the Final Report, include (as applicable) copies of boring logs, field notes, laboratory and field test results or summaries, photographs, special provisions, details and drawings, and other related information. Correct final reports with errors and omissions, as determined by the State Geotechnical Engineer. Resubmit the corrected report at no additional cost to the Department.

Acceptance of the work by the Department will not relieve the Contractor of the responsibility for subsequent correction of errors or for the costs associated with work caused by negligent errors or omissions from work performed by the Contractor.

**C. Plan Submittals**

1. Preliminary Plans.

2. Construction Plans.

Submit complete bridge and wall construction plans for the following:

- Wall 1
  - Walls 2 and 3
  - Bridge No. 1
  - Bridge No. 2
3. Submit two (2) full size paper copies and two (2) half size paper copies of Plans and one (1) copy of the calculations for each scheduled submittal.
4. Do not proceed with the final design of bridge and wall plans until the preliminary plans have been approved by the Department.

### 999.5.02 Preliminary Bridge and Wall Plans

#### A. Preliminary Bridge Plans

The Contractor shall check the bridge preliminary layouts supplied by the Department in the plans package. This check shall verify all dimensions and clearances based on field measurements. The Contractor shall notify the Department in writing of the acceptability of the layouts or of any discrepancies that may be present. Upon the Contractor's acceptance of the layouts, the Department will authorize the Contractor to proceed with final design of the bridges. Should the Contractor wish to change the supplied bridge preliminary layouts, the Contractor shall submit these changes to the Department based on the following guidelines:

1. Design the bridges with Standard Reinforced Concrete Deck Girders, AASHTO or Prestressed Concrete Institute Bulb-Tee shapes for prestressed concrete beams, or with structural steel I shapes. Use only one type of beam per bridge in the bridge superstructure, i.e., only concrete beams or only steel I girders.
2. At Bridge No. 1, a grade separation structure, design spill-through end bents/abutments, intermediate bents with concrete columns, caps, or walls with footings having their top a minimum of two feet below ground or finished grade and sufficiently deep to be below retained and proposed drainage structures along I-85.
3. At Bridge No. 2, a stream crossing structure, design spill-through end bents/abutments, intermediate bents with pile bents or intermediate bents with concrete columns, caps or walls with drilled caissons. The intermediate bents supporting the span over the stream shall be concrete columns and caps with drilled caisson foundations. Piles and drilled caissons shall be set at a depth to protect the structure from collapse during a 500 year scour event.

Contractor shall stake out endrolls and intermediate bents. Piles, columns, caissons and footings of intermediate bents shall be no closer than five (5) feet from the top of stream bank. The toe of endrolls shall be no closer than ten (10) feet from top of stream bank.

4. Where end bents and intermediate bents are founded on piling in Bridges No. 1 and 2, piling shall be Steel-H Piling.
5. Outline on the preliminary layout for Bridge 1 the construction scheme for the structure. Address the proposed staging of construction, traffic handling requirements, construction access for delivering materials, erection and construction activities, location of any temporary bents, location of transverse expansion joints and construction joints in the bridge.
6. For Bridge 1, provide a minimum vertical clearance from bottom of superstructure to roadway beneath of 17'-0".
7. Provide a typical section which indicates the following information:
  - Center to center spacing of girders, limited to a maximum spacing of 9'-6".

- Distance from outside edge of slab to center of exterior girder. This distance (overhang) is limited to a maximum of 4'-7 1/2".
- Deck thickness between girders and thickness of centerline of girder from top surface of deck to top of the flange
- Provide a slab with a minimum thickness determined by attached chart, Service Load Design of Concrete Bridge Slabs proportioned to provide 2 ¼ inches of concrete cover over the top mat of reinforcing and 1 inch cover over the bottom mat of reinforcement. Use the slab thickness determined for the portion of the bridge supporting the highway loading at all locations.
- Thickness of the top and bottom flange and depth of web for steel girders or the type of prestressed girder used for determining vertical clearance.

8. In addition to the requirements above, provide the following:

- A plan view of the proposed structure indicating beginning and end bridge stations, skew angles, joint locations, station and skew of roadways crossing under the structure, width of roadways beneath the structure, taper control station(s), offset and rate, location of point of minimum vertical clearance, and location and magnitude of the horizontal clearances from edge of travelway beneath the structure to the face of intermediate bents and abutments.
- An elevation view of the proposed structure indicating the span length, location of fixed and expansion joints, profile of roadways beneath structures, vertical clearance from bottom of structure to roadway beneath (both north bound and south bound), proposed bent locations, and existing ground profile.
- All horizontal and vertical curve data for the bridge and the roadway beneath the bridge.
- The location and elevation of the nearest bench mark.
- A brief description of the proposed structure indicating span lengths, and type of end bents.

Any drawing and/or narrative description of the construction scheme necessary to indicate how the bridge is to be built, including traffic handling sketches.

9. If Bridge 2 is changed from the provided bridge preliminary layout including span lengths, intermediate bent and end bent locations or superstructure depth, a supplemental Bridge Hydrologic/Hydraulic Study may be required, as determined by the Department, in accordance with the Draft Georgia Drainage Manual and approved in writing by the Department. No bents may be placed in the channel. Spans on pile bents shall not exceed 50-ft in length. The total length of Bridge No. 2 shall not be less than the total length shown in the provided preliminary layout.

**B. Preliminary Wall Plans**

1. Prepare the following for each wall:

- a. An elevation view or wall envelope of the proposed wall drawn to a scale of 1:10 and indicating the following data:
  - Beginning and end wall stations.
  - Elevations on top of wall parapet, coping, or traffic barrier at the beginning and end of wall, at profile break points, and at least every 50 feet along the wall.
  - Bottom of wall (top of footing) elevation necessary to maintain minimum berm requirements.

SERVICE LOAD DESIGN OF BRIDGE SLAB  
Minimum slab thickness is 7 inches.

Georgia Department of Transportation 4-OCT-06  
Office of Bridge and Structural Design 16:43:17  
October 2006

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WHEEL          fc          fs          n          SLAB          FUTURE          CONTINUITY
LOAD           (ksi)       (ksi)       (in)       COVER         PAVING          FACTOR
(Kips)                                     (in)       (Kips/Ft^2)
16.00         1.400       24.000     9          2.250         0.030          0.8
=====
    
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EFFECTIVE          SIZE AND          DISTRIBUTION
SPAN              SLAB THICKNESS   SPACING OF MAIN   REINFORCEMENT
LENGTH           MINIMUM ACTUAL   REINFORCEMENT    MIDDLE OUTER
(ft-in)         (in)            (in)              HALF  QUARTERS

3- 6            6.3150  7.000    # 5 at 9.625    3-# 4  2-# 4
3- 7            6.3463  7.000    # 5 at 9.500    3-# 4  2-# 4
3- 8            6.3774  7.000    # 5 at 9.375    3-# 4  2-# 4
3- 9            6.4083  7.000    # 5 at 9.250    3-# 4  2-# 4
3-10           6.4391  7.000    # 5 at 9.000    3-# 4  2-# 4
3-11           6.4698  7.000    # 5 at 8.875    3-# 4  2-# 4
4- 0           6.5003  7.000    # 5 at 8.750    3-# 4  2-# 4
4- 1           6.5307  7.000    # 5 at 8.625    3-# 4  2-# 4
4- 2           6.5610  7.000    # 5 at 8.500    4-# 4  2-# 4
4- 3           6.5911  7.000    # 5 at 8.375    4-# 4  2-# 4
4- 4           6.6211  7.000    # 5 at 8.250    4-# 4  2-# 4
4- 5           6.6509  7.000    # 5 at 8.125    4-# 4  2-# 4
4- 6           6.6807  7.000    # 5 at 8.000    4-# 4  2-# 4
4- 7           6.7103  7.000    # 5 at 7.875    4-# 4  2-# 4
4- 8           6.7398  7.000    # 5 at 7.750    4-# 4  2-# 4
4- 9           6.7692  7.000    # 5 at 7.625    4-# 4  2-# 4
4-10           6.7984  7.000    # 5 at 7.500    4-# 4  2-# 4
4-11           6.8276  7.000    # 5 at 7.375    5-# 4  4-# 4
5- 0           6.8567  7.000    # 5 at 7.250    5-# 4  4-# 4
5- 1           6.8856  7.000    # 5 at 7.125    5-# 4  4-# 4
5- 2           6.9144  7.000    # 5 at 7.000    5-# 4  4-# 4
5- 3           6.9432  7.000    # 5 at 6.875    5-# 4  4-# 4
5- 4           6.9718  7.000    # 5 at 6.750    5-# 4  4-# 4
5- 5           7.0028  7.125    # 5 at 6.625    5-# 4  4-# 4
5- 6           7.0313  7.125    # 5 at 6.500    5-# 4  4-# 4
5- 7           7.0597  7.125    # 5 at 6.375    5-# 4  4-# 4
5- 8           7.0880  7.125    # 5 at 6.250    6-# 4  4-# 4
5- 9           7.1162  7.125    # 5 at 6.125    6-# 4  4-# 4
5-10           7.1471  7.250    # 5 at 6.000    6-# 4  4-# 4
5-11           7.1752  7.250    # 5 at 5.875    6-# 4  4-# 4
6- 0           7.2032  7.250    # 5 at 5.750    6-# 4  4-# 4
6- 1           7.2311  7.250    # 5 at 5.625    6-# 4  4-# 4
6- 2           7.2619  7.375    # 5 at 5.500    6-# 4  4-# 4
6- 3           7.2998  7.375    # 5 at 5.375    6-# 4  4-# 4
6- 4           7.3175  7.375    # 5 at 5.250    6-# 4  4-# 4
6- 5           7.3452  7.375    # 5 at 5.125    7-# 4  4-# 4
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SERVICE LOAD DESIGN OF BRIDGE SLAB  
Minimum slab thickness is 7 inches.

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WHEEL LOAD (Kips)	fc (ksi)	fs (ksi)	n	SLAB COVER (in)	FUTURE PAVING (kips/ft^2)	CONTINUITY FACTOR
16.00	1.400	24.000	9	2.250	0.030	0.8

EFFECTIVE SPAN LENGTH (ft-in)	SLAB THICKNESS		SIZE AND SPACING OF MAIN REINFORCEMENT		DISTRIBUTION REINFORCEMENT	
	MINIMUM (in)	ACTUAL (in)	SIZE	SPACING (in)	MIDDLE HALF	OUTER QUARTERS
6- 6	7.3728	7.375	# 5	at 6.375	7-# 4	4-# 4
6- 7	7.4036	7.500	# 5	at 6.500	7-# 4	4-# 4
6- 8	7.4311	7.500	# 5	at 6.375	7-# 4	4-# 4
6- 9	7.4586	7.500	# 5	at 6.250	7-# 4	4-# 4
6-10	7.4859	7.500	# 5	at 6.250	7-# 4	4-# 4
6-11	7.5168	7.625	# 5	at 6.250	7-# 4	4-# 4
7- 0	7.5441	7.625	# 5	at 6.250	7-# 4	4-# 4
7- 1	7.5713	7.625	# 5	at 6.125	8-# 4	4-# 4
7- 2	7.5985	7.625	# 5	at 6.125	8-# 4	4-# 4
7- 3	7.6294	7.750	# 5	at 6.125	8-# 4	4-# 4
7- 4	7.6565	7.750	# 5	at 6.125	8-# 4	4-# 4
7- 5	7.6835	7.750	# 5	at 6.000	8-# 4	4-# 4
7- 6	7.7105	7.750	# 5	at 6.000	8-# 4	4-# 4
7- 7	7.7374	7.750	# 5	at 5.875	8-# 4	4-# 4
7- 8	7.7684	7.875	# 5	at 6.000	8-# 4	4-# 4
7- 9	7.7953	7.875	# 5	at 5.875	9-# 4	6-# 4
7-10	7.8221	7.875	# 5	at 5.875	9-# 4	6-# 4
7-11	7.8489	7.875	# 5	at 5.750	9-# 4	6-# 4
8- 0	7.8800	8.000	# 5	at 5.875	9-# 4	6-# 4
8- 1	7.9067	8.000	# 5	at 5.875	9-# 4	6-# 4
8- 2	7.9333	8.000	# 5	at 5.750	9-# 4	6-# 4
8- 3	7.9599	8.000	# 5	at 5.750	9-# 4	6-# 4
8- 4	7.9865	8.000	# 5	at 5.625	10-# 4	6-# 4
8- 5	8.0178	8.125	# 5	at 5.750	10-# 4	6-# 4
8- 6	8.0443	8.125	# 5	at 5.625	10-# 4	6-# 4
8- 7	8.0708	8.125	# 5	at 5.625	10-# 4	6-# 4
8- 8	8.0972	8.125	# 5	at 5.500	10-# 4	6-# 4
8- 9	8.1235	8.125	# 5	at 5.500	10-# 4	6-# 4
8-10	8.1550	8.250	# 5	at 5.500	10-# 4	6-# 4
8-11	8.1813	8.250	# 5	at 5.500	10-# 4	6-# 4
9- 0	8.2076	8.250	# 5	at 5.500	11-# 4	6-# 4
9- 1	8.2339	8.250	# 5	at 5.375	11-# 4	6-# 4
9- 2	8.2655	8.375	# 5	at 5.500	11-# 4	6-# 4
9- 3	8.2918	8.375	# 5	at 5.375	11-# 4	6-# 4
9- 4	8.3180	8.375	# 5	at 5.375	11-# 4	6-# 4
9- 5	8.3441	8.375	# 5	at 5.250	11-# 4	6-# 4

SERVICE LOAD DESIGN OF BRIDGE SLAB  
 Minimum slab thickness is 7 inches.

Georgia Department of Transportation 4-CCT-06  
 Office of Bridge and Structural Design 16:43:17  
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WHEEL          SLAB      FUTURE    CONTINUITY
LOAD           COVER     PAVING     FACTOR
(Kips)         (in)      (kips/ft^2)
16.00         2.250     0.030      0.8
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EFFECTIVE      SLAB THICKNESS    SIZE AND      DISTRIBUTION
SPAN           MINIMUM ACTUAL    SPACING OF MAIN  REINFORCEMENT
LENGTH        (in)              REINFORCEMENT    MIDDLE OUTER
(ft-in)       (in)              (in)             HALF  QUARTERS

9- 6          8.3702  8.375    # 5 at 5.250  12-# 4  6-# 4
9- 7          8.4021  8.500    # 5 at 5.375  12-# 4  6-# 4
9- 8          8.4282  8.500    # 5 at 5.250  12-# 4  6-# 4
9- 9          8.4542  8.500    # 5 at 5.250  12-# 4  6-# 4
9-10         8.4803  8.500    # 5 at 5.125  12-# 4  6-# 4
9-11         8.5123  8.625    # 5 at 5.250  12-# 4  6-# 4
10- 0        8.5383  8.625    # 5 at 5.125  12-# 4  6-# 4
10- 1        8.5643  8.625    # 5 at 5.125  13-# 4  8-# 4
10- 2        8.5903  8.625    # 5 at 5.125  13-# 4  8-# 4
10- 3        8.6162  8.625    # 5 at 5.000  13-# 4  8-# 4
10- 4        8.6485  8.750    # 5 at 5.125  13-# 4  8-# 4
10- 5        8.6744  8.750    # 5 at 5.000  13-# 4  8-# 4
10- 6        8.7003  8.750    # 5 at 5.000  13-# 4  8-# 4
10- 7        8.7261  8.750    # 5 at 5.000  14-# 4  8-# 4
10- 8        8.7587  8.875    # 5 at 5.000  14-# 4  8-# 4
10- 9        8.7845  8.875    # 5 at 5.000  14-# 4  8-# 4
10-10        8.8728  8.875    # 6 at 7.000   9-# 5  6-# 5
10-11        8.9056  9.000    # 6 at 7.000   9-# 5  6-# 5
11- 0        8.9314  9.000    # 6 at 7.000   9-# 5  6-# 5
11- 1        8.9572  9.000    # 6 at 6.875   9-# 5  6-# 5
11- 2        8.9830  9.000    # 6 at 6.875  10-# 5  6-# 5
11- 3        9.0159  9.125    # 6 at 6.875  10-# 5  6-# 5
11- 4        9.0417  9.125    # 6 at 6.875  10-# 5  6-# 5
11- 5        9.0675  9.125    # 6 at 6.750  10-# 5  6-# 5
11- 6        9.0932  9.125    # 6 at 6.750  10-# 5  6-# 5
11- 7        9.1189  9.125    # 6 at 6.750  10-# 5  6-# 5
11- 8        9.1522  9.250    # 6 at 6.750  10-# 5  6-# 5
11- 9        9.1779  9.250    # 6 at 6.750  10-# 5  6-# 5
11-10        9.2036  9.250    # 6 at 6.625  10-# 5  6-# 5
11-11        9.2293  9.250    # 6 at 6.625  10-# 5  6-# 5
12- 0        9.2628  9.375    # 6 at 6.625  10-# 5  6-# 5
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- Original ground profile.
  - Proposed ground profile.
- b. Roadway cross-sections in the vicinity of the wall that will indicate the existing and final slope behind the wall.
  - c. Typical sections associated with the wall.
  - d. Project Plan and Profile sheets which indicate the following:
    - Limits of right-of-way.
    - Superelevation data.
    - Horizontal and vertical alignment data.
    - Horizontal offsets to face of retaining wall.
    - Location and type of overhead signs which may be near retaining walls.
    - Location of roadway lighting which may be near or attached to the retaining wall.
    - Location and size of any drainage structures which will affect the retaining walls.
  - e. Any construction sequence requirements that will affect the construction of the walls and which will have to be accounted for in the preparation of retaining wall plans.
2. Use a special design cast-in-place wall tie-back wall in accordance with section 617 for Wall 1.
  3. Use L-shape cast-in-place walls for Walls 2 and 3. These walls shall be designed with consideration to the adjacent pile footing and piles.

**999.5.03 Final Bridge and Wall Plans**

**A. Additional Bridge Design Requirements**

1. The Contractor's design professionals, in designing the bridge in this project, shall utilize the Department Bridge Geometric and Design Software to the maximum extent possible. Upon prior written approval by the Department, the Contractor's design professionals may be authorized to utilize its computer capabilities. The contractor's design professionals are required to verify results to obtain final design accuracy.
2. Use ASTM A 615 Gr 60 reinforcement.
3. Use concrete with a minimum 28 day concrete strength as follows:
  - 3,500 psi in the bridge deck, reinforced concrete deck girders, concrete intermediate bents, and barriers.
  - 3,000 psi in the pile end bents cap and the pile intermediate bents cap substructure.
3. For Bridge No. 1, all intermediate bent caps and columns are to be precast.
  - Use class AAA concrete with a minimum 28 day concrete strength of 4,500 psi in fabrication of these precast units.
  - In addition to requirements provided in this special provision, the design and construction of the precast columns and caps shall meet requirements of AASHTO Guide Specifications for Design and Construction of Segmental Concrete Bridges, Second Edition.
  - Caps and columns may be precast as single elements.

- If caps or columns are cast as two or more segments, advancing segments shall be match-cast to previous segments.
  - Caps and columns shall be square or rectangular in shape.
  - Continuity between individual segments shall be achieved by closure pours and/or through post-tensioning.
  - Construction joints between segments shall be epoxied joints in accordance with the design requirements; dry joints will not be allowed
  - See Special Provision Section 509 – Prestressing Concrete by Post Tensioning for grouting of tendons if post tensioning is utilized.
  - External or un-bonded tendons will not be allowed.
  - If hollow-core columns are constructed, completely fill annulus with Class A concrete prior to installation of cap.
4. Include 30 pounds per square foot in the design loads to allow for future paving.
  5. If metal deck forms are used, include 16.0 pounds per square foot in the non-composite design loads.
  6. Design the bridge for seismic performance category “A.”
  7. Design and detail edge beams where the deck is to be discontinuous and extend them a minimum of 18 inches below the bottom of the top slab and a minimum of 12 inches wide. Place slab transverse and longitudinal reinforcing steel 2 inches from the edge of the slab and place the top mat of the edge beam bars below the top mat of the deck steel. Do not use truss shaped bars in the edge beam. Extend stirrups from the edge beam into the slab.
  8. To accommodate deck planning, neglect ¼ inch of the top slab for strength calculations. However, include the ¼ inch in the dead load calculations.
  9. For reinforced concrete deck girders, meet the following criteria:
    - Stems shall be 1’-6” wide.
    - Depth including slab shall be 2’-9”.
    - Neoprene pads will be used under the beams.
    - Pile bents not to be used with spans longer than 50’-0”.
  10. For prestressed beams, meet the following criteria:
    - Design prestressed concrete beams with conventional strength concrete up to a maximum 28 day compressive strength of 9,000 psi.
    - Design prestressed concrete beams with high performance concrete (HPC) for a maximum 56 day compressive strength over 9,000 psi up to 10,000 psi. The maximum design compressive strengths shall not exceed 10,000 psi.
    - Design prestressed beams as simple spans.
    - In calculation of prestressed girders section properties, do not utilize transformed area of bonded reinforcement.
    - Use neoprene bearing pads at each end of the prestressed beams. Design the pads to account for transverse and longitudinal expansion and contraction.
    - Use anchorage beds set for horizontal and vertical strand patterns of two inches center to center. Detail all straight and draped strands utilizing two inch spacings.

- Provide the minimum amount of reinforcing steel at beam ends as required by AASHTO specifications, Article 9.22.
- Detail beam lengths to 1/16 inch increments.
- Provide prestressed beam sheets with all the applicable details as shown on the “basic drawings.”
- Require the use of 10 inch wide concrete diaphragms or galvanized structural steel diaphragms.

11. For structural steel I girders, meet the following:

- Use ASTM A 709 Grade 36 or Grade 50 structural steel.
- Use ASTM A 709 Grade 70 structural steel that meets the requirements of high performance steel; see special provision section 851 for additional requirements.
- Design girders as simple span beams or as continuous beams.
- If simple spans are used, provide concealment plates attached to the exterior girders exposed to traffic at the intermediate bent.
- Provide bearing assemblies at the girder ends and if the girder is continuous, provide bearing assemblies at the girder ends, and at the intermediate bent. Design bearing assemblies that are a combination of neoprene and steel plates or pot bearings that account for transverse and longitudinal expansion and contraction.
- Indicate on the plans the main load carrying members that are subject to tension and state that they shall meet Charpy V-notch test requirements found in the Georgia DOT Specifications.
- For fatigue, design all welds for Category C or better as defined by the AASHTO Specifications.
- Do not place web stiffeners closer than twelve inches from web splices. Provide web stiffeners at all field web splices.
- For bolted splices, use two plates, one each side, of each flange and web splice to be bolted.
- Bolt gusset plates attaching lateral bracing to the webs of girders. Provide a support system for the crossing of the lateral bracing diagonals to limit deflection of the bracing system.
- For welded splices, see Basic Drawings, WELD.DGN.
- All field splices shall be welded with full-penetration butt welds.

12. Design and detail the bridge ends with a paving rest to accommodate full width approach slabs.

13. Use H-piles, or drilled caissons in the foundations.

- For H-piles:
  - a. For H-piles driven and installed to a maximum allowable stress of  $.25F_y$ :
 

Minimum pile embedment will be 10 feet. Pile embedment is measured from the bottom of the footing to the bottom of the pile.
  - b. For H-piles driven and installed to a maximum allowable stress of  $.33F_y$ :
    - i. One Pile Load Test and two Pile Driving Analyzer (PDA) Tests will be required. The Department’s Geotechnical Bureau will determine the location of each Load Test.
    - ii. Minimum pile embedment will be 15 feet.

- c. Maximum batter is 4 horizontal on 12 vertical.
  - For drilled caissons, do not exceed a bearing of 150 kips per square foot.

14. Steel H-piles in pile intermediate bents shall be encased in concrete from 2-ft below ground to 2-ft above normal pool or 2-ft above ground, whichever is higher. Encasement shall be in accordance with section 547 of the Georgia DOT Specifications.
15. See Section H, Highways for Life, for additional bridge commitments.

**B. Bridge Construction Plans**

1. Meet with the Department and discuss how the plans will be prepared prior to beginning plan preparation on the project.
2. Prepare construction plans with all dimensions, notes and details necessary to construct the structure. As a minimum, include the following sheets:
  - Plan and Elevation sheets that include:
    - a. Plan view of the bridge,
    - b. Elevation view of the bridge,
    - c. Beginning and ending stations,
    - d. North arrow,
    - e. Location of fixed and expansion bearings,
    - f. Location of the minimum vertical clearance above the north bound and south bound traffic,
    - g. If applicable, existing Bridge Serial No., Existing Bridge ID No., Project No., Project PI No., and Construction ID No. supplied by the Department.
    - h. Grade data for bridge and roadways below, if applicable.
  - General Notes sheets that include:
    - a. Notes for the following: Specifications, Reinforcing Steel, Chamfer, Existing Bridge Plans, Welding, Salvage Material, and others as necessary (use GDOT Bridge Notes, BRNOTES05),
    - b. Bridge Design Data,
    - c. A summary of Bridge Consists of (for information),
    - d. A summary of Traffic Data,
    - e. A summary of Quantities (for information only),
    - f. A list of Existing Utilities (if applicable),
    - g. A list of Utilities (if applicable)

- Deck Plan sheets,
- Deck Cross-Section sheets,
- Bearing Assembly sheets,
- Beam sheets,
- Miscellaneous sheets,
- Framing Plan and Substructure Layout sheets,
- End Bent / Abutment sheets,
- Intermediate Bent sheets,
- As-Built Foundation sheets, and
- Bar Bending Detail sheets.

Additional sheets may be necessary to show the details required for construction. Provide additional sheets at no additional cost when deemed necessary by the Department.

In the Deck Section sheets, provide one full-width section across the structure which indicates, at least, all the horizontal dimensions necessary to construct the bridge. Provide sufficient deck cross-sections to indicate the staging, location of the existing structure and location of any temporary barriers on the structure.

Show as many sections as are necessary to detail the placement of reinforcing in the deck and barrier. Also, draw deck sections indicating edge beams, backwalls, diaphragms or cross-frames, and end walls. Cut sections radially across the structure.

Detail Deck Plan sheets with all longitudinal and transverse dimensions necessary to construct the bridge, including edge beam width, expansion joint widths, backwall or end wall locations, location of construction and expansion joints, and any other items that are necessary to construct the structure.

All details except those shown on beam/girder sheets shall be drawn to scale. Draw deck cross-sections and intermediate bent sheets "Looking Ahead." If the end bents or abutments are drawn separately, draw bent/abutment one "Looking Back," and draw the other end bent/abutment "Looking Ahead."

All details on the Plans shall be clear and legible. The Department will have the final say as to how a Project is to be drawn and will have the right to require additional drawings at no increase in Contract cost. Fully check the plans for completeness of content and accuracy before submittal to the Department for review.

3. Provide for the installation of utilities on the bridges as required. Consider the installation of utilities in staging the construction of the bridge.
4. Groove the bridge deck in accordance with Georgia DOT Specifications Sub-Section 500.3.05.T.9.c.
5. Meet the riding quality requirements for the bridge deck as specified in Sub-Section 500.3.06.E of the Georgia DOT Specifications for state routes with four or more lanes.

### **C. Wall Construction Plans**

Walls shall be special design cast in place concrete walls or tieback walls.

1. Design and detail tie-back walls in accordance with Georgia DOT Specifications Section 617.
  - Use soldier piles,
  - Use cast-in-place concrete for the wall facing. Do not use pneumatically applied concrete (shotcrete) for the permanent wall facing.
  - Use 1'-0" maximum spacing for shear studs connecting soldier piles and cast-in-place wall facing.
  - Tie-back walls shall be designed with consideration to the adjacent pile caps and piles.
  - Tie-backs shall be placed such that they clear the edges of the footings by a minimum of 1'-0".
  - Allow 2'-0" minimum between the edge of the footing and the face of the tie-back wall.
  - Finish concrete face with Type III bridge finish or special surface coating.
  - Submit joint pattern for approval by the Department.
2. Design and detail L-shape cast-in-place walls. See Special Design Retaining Wall detail sheets provided in the plans.

#### **D. Shop Drawings**

Provide shop drawings in accordance with Georgia DOT Specifications. The Contractor's Design Engineer shall review and stamp approved all shop drawings as the Engineer of Record. After being stamped by the Contractor's Design Engineer, the Department will review the shop drawings for conformance with the plans and specifications. Allow the Department a 30 day review period upon receipt of the shop drawings for each submittal.

### **999.6 Construction**

The Contractor shall construct the project as per the project scope and as per the approved final plans in accordance with Specifications.

Construction includes, but is not limited to the following:

- A. All clearing and grubbing and grading required in accordance with Sections 201, 202, 205, 206, 208, 209 and 210.
- B. All necessary grading and drainage (see attached chart for allowable Pipe Culvert Materials) to construction the subgrades, including the removal and replacement of unsuitable material, shoulders, and incidental work, including furnishing borrow pits, waste disposal areas and hauling borrow and waste materials as required. The removal and replacement of unsuitable material is the responsibility of the Contractor.
  - All necessary base construction, milling, and paving to construct the Pavement Structure.
  - Removal of all curbs, drainage structures, pavements, bases, and subbases, or other obstructions within the rights of way as necessary to construct the roadway section.
  - All signing, signalization, pavement marking, raised pavement markers, and guardrail.
- C. All Equipment and Materials stored on the project shall be stored outside the clear zone.
- D. Granular embankment shall be placed where culverts and pipes 46" or larger are extended, as per Specification Section 212. 12" of Type II Backfill shall be placed under all culverts 48" or larger.
- E. The Contractor shall install outlet ditch protection, Type 3 Rip Rap, 18" thick, at all 42" or larger pipes and culverts. The ditch protection shall extend 2' greater than the width of the existing creek / ditch and at a minimum to the right-of-way line.



- F. No construction shall occur outside of the existing and/or proposed right-of-way as reflected in the preliminary layouts.
- G. Errors and omissions are the responsibility of the Contractor to correct and at the expense of the Contractor.
- H. All salvageable material from the project shall be the property of the Contractor except as follows:  
  
Guardrail (not including the posts). Deliver guardrail to Thomaston. The contact will be Ken Robinson, District Maintenance Engineer @ 706 646-6514. Contact shall be called at least 7 business days prior to delivery.
- I. See below for Allowable Pipe Chart.
- J. Include 4 portable variable message signs to be used as directed by the Engineer.
- K. All materials shall meet applicable Georgia DOT Specifications.
- L. Provide protective platforms at bridge 1, see section 510 of the Georgia DOT Specifications. Maintain a minimum vertical clearance of 17'-0" above I-85.
- m. Landscaping and Lighting plans consistent and commensurate with provided conceptual plans.

pH 5.84

Resistance 42158

Project No.: CSNHS-0008-00 (232)

County: TROUP

P.I. No.: 0008232

## Pipe Culvert Material Alternates For Piedmont/Blue Ridge Region

TYPE OF PIPE INSTALLATION			CONCRETE	CORRUGATED STEEL AASHTO M-36		CORRUGATED ALUMINUM AASHTO M-196	PLASTIC				
				ALUMINUM COATED (TYPE 2) CORR. STEEL	PLAIN ZINC COATED		PLAIN UNCOATED ALUMINUM	CORR. POLY-ETHYLENE AASHTO M-252	CORR. POLY-ETHYLENE SMOOTHED LINED AASHTO M-294 TYPE "S"	POLY VINYL CHLORIDE (PVC) PROFILE WALL AASHTO M-304	POLY VINYL CHLORIDE (PVC) CORRUGATED SMOOTH INTERIOR ASTM F-949
<b>STORM DRAIN</b>	LONGITUDINAL INTERSTATE AND TRAVEL BEARING		X								
	LONGITUDINAL NON-INTERSTATE AND NON-TRAVEL BEARING		X	X		X		X	X	X	
	<b>CROSS DRAIN</b>	GRADE ≤ 10%	ADT < 250	X	X		X		X	X	X
			250 < ADT < 1500	X	X*		X		X	X	X
			ADT > 1500	X							
		GRADE > 10%	ADT < 250		X		X		X	X	X
			ADT > 250				X		X	X	X
	<b>SIDE DRAIN</b>			X	X		X		X	X	X
<b>PERMANENT SLOPE DRAIN</b>				X	X	X		X	X	X	
<b>PERFORATED UNDERDRAIN</b>				X	X	X	X	X		X	

\* This type pipe can be used if the addition of Type "B" Coating (AASHTO M-190, Half Bituminous Coated with Paved Invert) is utilized.

**NOTES:**

1. Allowable materials are indicated by an "X".
2. Structural requirements of storm drain pipe will be in accordance with Georgia Standard 1030-D or 1030-P, whichever is applicable, and the Standard Specifications.
3. Graded aggregate backfill shall be used in cross drain applications for all plastic pipes (AASHTO M-294, HDPE pipe; AASHTO M-304, PVC pipe; ASTM F-949, PVC pipe).

**999.7 Measurement and Payment**

The Work required under the Specification will not be measured separately for payment unless pay items are otherwise specified within this proposal. Payment for the items listed below, complete and accepted, will be made at the Lump Sum price bid. Payment shall be full compensation for furnishing all materials, labor, tools, equipment, superintendence, mailing charges, removal and replacement of unsuitable material, and other incidentals, and for performing all work specified, including but not limited to, designing, detailing, producing construction plans (preliminary and final, electronic and hard copy), meetings with the Department (and others as needed or required), processing NOI, and complete construction as required in the Plans Package and Specifications.. For all asphalt concrete, when materials or construction are not within the tolerances specified in Section 400, deductions will be made in accordance with the applicable requirements of Sub-Sections 106.03 and 400.5. For all Portland cement concrete, when materials or construction are not within the tolerances specified in Sections 500 and 430, deductions will be made in accordance with the applicable requirements of Sub-Sections 106.3 and 430.5.

Partial payments of the Lump Sum price will be made on monthly statements based on an approved Schedule of Payment. The Contractor shall develop a Schedule for Payment for each of the following items:

- DESIGN COMPLETE
- CONSTRUCTION COMPLETE

The Schedule for Payment shall include a rational basis for partial payments of the Lump Sum price bid based on the completed portion of the item and definitive activities. The schedule for payment shall be submitted to the Engineer, and no payments will be made until the plan is approved. No construction shall begin prior to said schedule being approved by the Engineer.

Note: Contractor shall work with the Engineer to establish estimated earthwork, asphalt, and concrete quantities, as this will determine the frequency of required testing by the Department.

At the end of each calendar month, the Contractor shall provide the Department with a certification showing the percent complete for each Pay Item. The Contractor shall include a breakdown and supporting documents in sufficient detail to substantiate the percent complete certified.

Payment will be made under:

- Item 999, DESIGN COMPLETE ..... per Lump Sum
- Item 999, CONSTRUCTION COMPLETE ..... per Lump Sum

April 2, 2007

AMENDMENT TO ADVERTISED CONTRACT

CONTRACT I.D. NUMBER: B12829-07-000-0  
GEORGIA PROJECT NUMBER: CSNHS-0008-00(232)01  
PCN: 0008232010000  
COUNTY: TROUP  
AMENDMENT NUMBER: 1  
LETTING DATE: APRIL 20, 2007  
LETTING NUMBER: 001

THE FOLLOWING CHANGES ARE HEREBY MADE TO THIS CONTRACT. THE BIDDER IS RESPONSIBLE FOR MAKING ANY NECESSARY CHANGES IN INK IN THE PROPOSAL. BIDDER SHALL ACKNOWLEDGE THIS AMENDMENT BY CHECKING THE APPROPRIATE SPACE ON THE PROPOSAL SIGNATURE PAGE.

- \*\*\*\*\*
1. Proposal Page 76, Special Provision Section 102-Bidding Requirements and Conditions, Subsection 102.06; **Add** the following below the second paragraph:  
  
"The items listed above are the minimum requirements of the required information to be included in the technical proposal. The technical proposal is to provide the Contractor's approach both with schedule and with the assumed quantities and costs used to formulate the bid. As noted in section 999.1.02 "Bids on this project shall reflect designing and constructing the project as shown in the Scope (999.1.03) and applicable portions of the Plans Package. No exceptions shall be assumed by the Contractor. However, alternative proposals on portions of the work will be entertained once the project is awarded." Therefore, no deviations shall be included in the bid or technical proposal."
  2. Proposal Pages 78 and 79, Special Provision Section 102-Bidding Requirements and Conditions, **Delete** Subsection 102.07.I from the proposal **and Substitute** the following as Subsection 102.07.I: The Proposal will be rejected if the Bidder fails to submit or properly complete the Pavement Alternate Selection Declaration shown in Detail "A" on page 79A.
  3. Proposal Page 79, Special Provision Section 102-Bidding Requirements and Conditions, Subsection 102.07.J.; **Add** the following:  
  
"The technical proposal may be considered non-responsive if the bid or technical proposal contains any deviations from those items shown in the Scope (999.1.03) and applicable portions of the Plans Package."

4. **Add** the attached revised/added Page 79A to the proposal.
5. Proposal Pages 249 and 250, Special Provision Section 509-Prestressing Concrete by Post Tensioning, Subsection 509.1.03.C; **Delete** "Figure 1" from the proposal, **and Substitute** the attached "revised/added Figure 1" dated March 30, 2007 in the proposal.
6. Proposal Page 652, Special Provision Section 999-Design Build, Subsection 999.1.03.A.; **Delete** the wording "Filter Fabric", and **Substitute** the wording "Pavement Reinforcing Fabric" in the first paragraph.
7. Proposal Page 653, Special Provision Section 999-Design Build, Subsection 999.1.03.A.; **Add** the following: "Mitigation will not be included as a part of the Contractor's responsibility."
8. **Delete** Proposal pages 663 through 668 from the proposal, **and Substitute** the attached revised proposal pages 663 through 668, dated March 26, 2007 in the proposal.
9. Proposal Page 678, Special Provision Section 999-Design Build, Subsection 999.3.10; **Add** the following above the first paragraph:

As noted on the cover sheet of the costing plans, "The data, together with all other information shown on these plans, or in any way indicated thereby, whether by drawings or notes, or in any other manner, are based upon field conditions. However, the same are shown as information only, are not guaranteed, and do not bind the Department of Transportation in any way. The attention of the bidder is specifically directed to articles 102.04, 102.05 and 104.03 of the Specifications of the Department of Transportation, State of Georgia, for the Construction of Transportation Systems, Current Edition, and any modifications thereof, which will be a part of this contract."

10. Proposal Page 689, Special Provision Section 999-Design Build, Subsection 999.4.01.H.6.d.; **Delete** the wording "PCC (w/ 1/1/4 inch dowels)" in the first two tables **and Substitute** the wording "PCC (w/ 1-1/2 inch dowels)" in the first two tables.
11. Proposal Page 690, Special Provision Section 999-Design Build, Subsection 999.4.01.H.6.m.; **Delete** the wording "Filter Fabric" **and Substitute** the wording "Pavement Reinforcing Fabric".

DAVID E. HOGE  
STATE TRANSPORTATION OFFICE ENGINEER

# DETAIL "A"

## PAVEMENT ALTERNATE SELECTION

**Instructions:** List the pavement alternate for the Outside Shoulders for:

- Ramps
- KIA Blvd (west side of Truck Entrance to radius return of ramps on east side)
- Truck Road

(See Special Provision 999.4.01.H.6.d.)

Indicate chosen alternate below with mark in box.

Alternate "A"

Alternate "B"

**Instructions:** List the pavement alternate for the Mainline Pavement for:

- KIA Pkwy

(See Special Provision 999.4.01.H.6.d.)

Indicate chosen alternate below with mark in box.

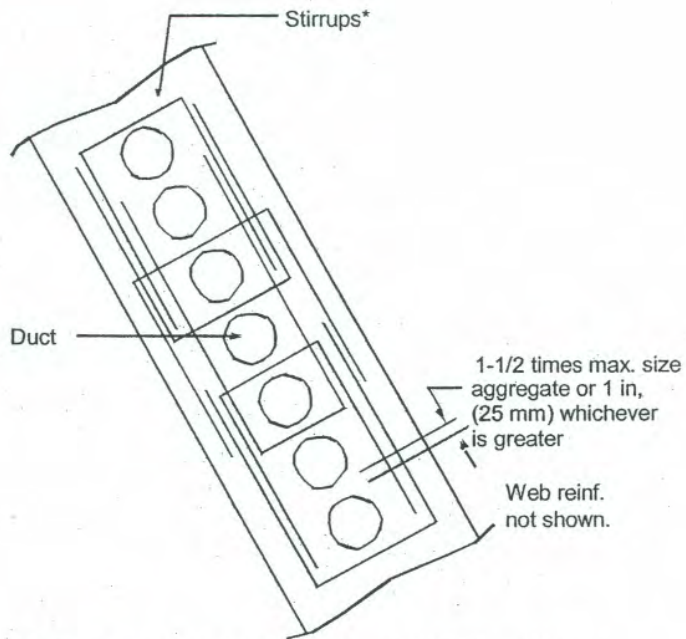
Alternate "1"

Alternate "2"

REVISED/ADDED

79A

MARCH 30, 2007



- \* A stirrup group is one pair of overlapping "U" shaped bars.
- Stirrups shall enclose vertical web reinforcement.
- No more than 3 ducts shall be enclosed by a stirrup group.
- Min. bar size: No. 4 (No. 13 M) bar.
- Max. longitudinal bar spacing: 24 in. (600 mm)

REVISED/ADDED

FIGURE 1



March 26, 2007

**ENVIRONMENTAL COMMITMENTS/REQUIREMENTS**

Project No. :	CSNHS-0008-00(232)	Specialist Review
County :	Troup	404
P.I. No. :	0008232	Air/Noise
Status:	Environmental Assessment	Archaeology
Date Updated:	March 5, 2007	Ecology
		History

COMMITMENT/REQUIREMENT	DOCUMENT STIPULATED IN	RESPONSIBLE OFFICE (Concurrence date; if other than OEL)	PLACE ON PLANS? (Yes or No)	REQUIRES A SPECIAL PROVISION? (Yes or No)	STATUS (Pre-Construction: Complete/ Incomplete) (During Construction: ECB Signature upon completion) (Post Construction: Complete/Incomplete)
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**Pre-Construction Commitments**

COMMITMENT/REQUIREMENT	DOCUMENT STIPULATED IN	RESPONSIBLE OFFICE (Concurrence date; if other than OEL)	PLACE ON PLANS? (Yes or No)	REQUIRES A SPECIAL PROVISION? (Yes or No)	STATUS (Pre-Construction: Complete/ Incomplete) (During Construction: ECB Signature upon completion) (Post Construction: Complete/Incomplete)
<i>Natural Resources</i> Obtain a stream buffer variance from the Georgia EPD	404 Permit	GDED*	No	No	Complete 9-2006
Obtain a 404 Individual permit for impacts to jurisdictional waters	EA	GDED	No	No	Complete 9-2006
Develop a compensatory mitigation plan for wetlands, streams and stream buffers that would generate suitable credit according to the SOP for Compensatory Mitigation, Savannah District, USACE. Stream buffer mitigation would comply with EPD standards.	404 Permit	GDED	Yes (for any on-site mitigation areas)	No	Complete 9-2006
Procedures for Coordinating Highway Encroachments on Floodplains with the Federal Emergency Management Agency (FEMA) will be completed prior to construction	EA	GDOT Roadway	Yes	No	Complete 1-2007
Section 7 coordination for bald eagle would be completed before project construction.	EA and Ecology Report	GDOT OEL	No	No	Complete 12-2006
Special Provision 107.23 G for the protection of the bald eagle and migratory birds will be forwarded to Design for inclusion in the construction contract.	EA and Ecology Report	GDOT OEL	No	Yes	Complete 2-2007

\*GDED = Georgia Department of Economic Development



March 26, 2007

### ENVIRONMENTAL COMMITMENTS/REQUIREMENTS

<p>Update to Section 404 Permit to capture the additional 3.2 acres of impacts at Wetland 1 will be completed by June, 2007. No work will take place between stations 480+00 and 485+00 to avoid impacting the additional wetland acreage until the permit is updated by GDED*.</p>	EA	GDED	No	No	Incomplete (Will be completed by June, 2007)
<p>Bridges shall be designed to prevent direct roadway water runoff discharge to all streams that would be crossed by the proposed project.</p>	EA	GDOT Roadway	Yes	No	Incomplete (Will be completed design/build contractor as part of final design plans)
<p>All culverts shall be embedded 15-20% of their width to allow natural substrate to colonize the structures bottom and encourage fish movement. Please see attached Special Provision 999, which identifies this requirement</p>	404 Permit	GDOT Roadway	No	Yes	Complete 3-2007

ECB – Please Return Signed Green Sheet to OEL upon completion.

March 26, 2007

## ENVIRONMENTAL COMMITMENTS/REQUIREMENTS

<i>Community Resources</i> Sensitive nighttime receptors shall be identified on the plans. Please see attached Special Provision 999, which identifies this requirement.	404 Permit	GDOT Roadway	Yes	Yes	Incomplete (Will be completed by July 1, 2007 or before construction begins in the area.)
<i>Cultural Resources</i>					
All NRHP eligible site boundaries shall be labeled on the plans, and identified as Environmentally Sensitive Areas (ESAs) to prohibit staging of equipment or materials thereon.	EA	GDOT Roadway	Yes	No	Complete 2-2007
Update to Section 404 Permit to capture the additional area surveyed for cultural resources along Webb Road will be completed by June, 2007. No work will take place east of station 105+00 on Webb Road to avoid disturbing any area that is beyond the limits of the cultural resource survey area covered under the approved 404 permit until the permit is updated by GDED*.	EA	GDED	No	No	Incomplete (Will be completed by June, 2007)
ESAs will be marked on the plans and restrictions will be set on construction, easements, staging and borrowing activities in the vicinity of the ESA. A copy of Special Provision 107.23, which identifies the requirements needed to protect the ESA's has been included in the contract specifications and is attached to this Commitment table.	EA and 404 Programmatic Agreement	GDOT OEL/GDED	Yes	Yes	Complete 2-2007
<i>Other</i>					
A Reevaluation would be completed after the Section 404 Permit is complete/GEDE document revised.	EA	OEL	No	No	Incomplete (will be completed following the Permit/GEDE revised document in June, 2007)

ECB – Please Return Signed Green Sheet to OEL upon completion.



ENVIRONMENTAL COMMITMENTS/REQUIREMENTS

COMMITMENT/REQUIREMENT	DOCUMENT STIPULATED IN	RESPONSIBLE OFFICE (Concurrence date; if other than OEL)	PLACE ON PLANS? (Yes or No)	REQUIRES A SPECIAL PROVISION? (Yes or No)	STATUS (Pre-Construction: Complete/ Incomplete) (During Construction: ECB Signature upon completion) (Post Construction: Complete/Incomplete)
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During Construction Commitments

<p><i>Natural Resources</i> As per the 25-foot Vegetative Buffer variance granted by the Georgia Department of Natural Resources on September 26, 2006, specific activities to protect the stream and vegetative buffer (ESA) must be completed. A copy of Special Provision 107.23F, which identifies the requirements needed to protect the ESA has been included in the contract specifications and is attached to this Commitment table.</p>	EA and 25-foot Vegetative Buffer Variance	GDOT/GDED	Yes	Yes	ECB signature upon completion
<p>Stream buffer mitigation would occur as close to the project impacts as is practicable and within the same ecoregion and eight digit USGS Hydrologic Unit Catalogue Unit, according to regulatory agency guidelines for mitigation in Georgia. Mitigation would include on-site and off-site mitigation. On-site mitigation includes the restoration, enhancement, and preservation of existing wetlands and the preservation of the Long Cane Creek forested riparian zones with a restrictive covenant. Off-site mitigation would include preservation of stream buffer along Mud Creek and one of its tributaries in the Mud Creek Mitigation Area (MCMA).</p>	404 Permit	GDED	Yes (for any on-site mitigation areas)	No	Incomplete
<p>Special Provision 107.23G for the protection of the bald eagle and barn swallows will be followed. The full provision is attached.</p>	EA and Ecology Report	GDOT OEL	No	Yes	ECB signature upon completion
<p>Complete implementation of August 24, 2006 Compensatory Mitigation Plan by September 30, 2007</p>	404 Permit and EA	GDED	No	No	Incomplete

ECB – Please Return Signed Green Sheet to OEL upon completion.

March 26, 2007

ENVIRONMENTAL COMMITMENTS/REQUIREMENTS

<i>Community Resources</i>	404 Permit	GDOT Roadway	Yes	Yes	ECB signature upon completion
<p>Construction shall be limited to daytime hours within 500 feet of nighttime sensitive receptors. Please see the attached Special Provision 999.</p>					
<p><i>Cultural Resources</i> As part of the Programmatic Agreement between the USACE, SHPO, and GDED, there are several items to be implemented for the protection of Site 9TP990 (ESA). Please see A copy of Special Provision 107.23F for a listing of the requirements needed to protect this ESA, which has been included in the contract specifications and is attached to this Commitment table.</p>	EA and 404 Programmatic Agreement	GDOT/GDED	Yes	Yes	ECB signature upon completion
<p>In the vicinity of Site 9TP990, construction fencing would be constructed along the right of way to prevent any encroachment on the ESA, which would be fenced according to a Programmatic Agreement among the USACE, SHPO, and GDED* for the construction of the WPEDS. Please see A copy of Special Provision 107.23F, which identifies all requirements associated with this commitment.</p>	EA	GDOT/GDED	Yes	Yes	ECB signature upon completion

ECB – Please Return Signed Green Sheet to OEL upon completion.

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Page 17 of 6  
Page 17 of 6



March 26, 2001

**ENVIRONMENTAL COMMITMENTS/REQUIREMENTS**

COMMITMENT/REQUIREMENT	DOCUMENT STIPULATED IN	RESPONSIBLE OFFICE (Concurrence date; if other than OEL)	PLACE ON PLANS? (Yes or No)	REQUIRES A SPECIAL PROVISION? (Yes or No)	STATUS (Pre-Construction: Complete/Incomplete) (During Construction: ECB Signature upon completion) (Post Construction: Complete/Incomplete)
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**Post Construction Commitments**

Evaluate area roadway network to determine other transportation improvement projects required as a result of the WPEDS construction/operation.	IIR	GDOT Roadway	No	No	Incomplete
Project completion procedures outlined in Special Provision 107.23G for the protection of the bald eagle and barn swallows will be followed. The full provision is attached.	EA and Ecology Report	GDOT OEL	No	Yes	Incomplete

ECB – Please Return Signed Green Sheet to OEL upon completion.

April 11, 2007

AMENDMENT TO ADVERTISED CONTRACT

CONTRACT I.D. NUMBER: B12829-07-000-0  
GEORGIA PROJECT NUMBER: CSNHS-0008-00(232)01  
PCN: 0008232010000  
COUNTY: TROUP  
AMENDMENT NUMBER: 2  
LETTING DATE: APRIL 20, 2007  
LETTING NUMBER: 001

THE FOLLOWING CHANGES ARE HEREBY MADE TO THIS CONTRACT. THE BIDDER IS RESPONSIBLE FOR MAKING ANY NECESSARY CHANGES IN INK IN THE PROPOSAL. BIDDER SHALL ACKNOWLEDGE THIS AMENDMENT BY CHECKING THE APPROPRIATE SPACE ON THE PROPOSAL SIGNATURE PAGE.

- \*\*\*\*\*
1. **Add** the attached Special Provision Section 628-Permanent Soil Nailed Walls, 11 pages, with a revised date of April 9, 2007, to the proposal.
  2. Proposal Page 705, Special Provision Section 999-Design Build, Subsection 999.5.02.B.2.; **Revise** the Subsection to read as follows:  
  
"Use a special design cast-in-place wall for Wall No. 1. In lieu of a special design cast-in-place wall, use a Soil Nail wall in accordance with Special Provision 628 - PERMANENT SOIL NAILED WALLS."
  3. Proposal Page 709, Special Provision Section 999-Design Build, Subsection 999.5.02.C.2.; **Revise** the sentence to read as follows:  
  
"Walls shall be special design cast-in-place concrete, soil nail or tieback as shown in the plans or in accordance with the specifications."
  4. Proposal Page 710, Special Provision Section 999-Design Build, Subsection 999.5.03.C.2.; **Revise** the Subsection to read as follows:  
  
"Design and detail L-shape cast-in-place."

DAVID E. HOGE  
STATE TRANSPORTATION OFFICE ENGINEER

**DEPARTMENT OF TRANSPORTATION  
STATE OF GEORGIA**

**SPECIAL PROVISION**

**PROJECT NO.: CSNHS-0008-00(232) TROUP COUNTY  
P.I. NO.: 0008232**

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**SECTION 628—PERMANENT SOIL NAILED WALLS**

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**628.1 General Description**

This work includes furnishing materials, labor, tools, equipment, and other incidental items to design, detail, and construct a soil nailed wall. This Specification also applies to any Contractor-proposed alternate design of Department-furnished plans.

**628.1.01 Definitions**

Soil Nail - Synonymous with nail or soil reinforcing

The term Soil Nailed Wall includes the following items:

- Soil nails
- Nails
- Shotcrete (pneumatically applied concrete) – for temporary facing
- Cast-in-place reinforced concrete facing – for permanent facing
- Drainage

**628.1.02 Related References**

**A. Standard Specifications**

Section 500 - Concrete Structures  
Section 511 - Reinforcement Steel  
Section 853 - Reinforcement and Tensioning Steel

**B. Referenced Documents**

General Provisions 101 through 150.

**628.1.03 Submittals**

**A. Proof of Ability**

Submit the following proof of ability (or ability of the subcontractor) when requested by the Department to design or construct soil nailed walls:

- Evidence of successfully completing at least 5 projects similar in concept and scope to the proposed wall.
- Resumes of foremen, nail testing personnel, and drilling operators to be employed on this project. Show the type, length, and number of soil nails each has installed or tested within the past 5 years.
- Evidence of experience in nail testing. Persons performing nail testing shall prove experience by performing sample tests supervised by the Engineer.

The Department is the sole judge of the qualifications of the foreman, drilling operator, and testing personnel. Do not begin wall construction until the Engineer has approved proof of ability.



**B. Design Criteria for Alternate Design**

If the department receives more than 2 submittals of the Plans and calculations for review, the Contractor will be assessed \$60 per hour of engineering time for reviews in excess of the 2 submittals.

**C. Construction Drawings and Design Notes**

Submit construction drawings and design notes within 28 days of the award of the Contract. The Design Engineer shall prepare and stamp the submission. Include design notes and reproducible drawings in the submission concerning the following:

- Details, dimensions, and schedules of reinforcing steel including dowels and/or studs for attaching the facing to the soil nailed wall.
- Details of the shotcrete installation and nails, including the thickness of shotcrete and spacing and angle of installation of nails.
- Detailed plans for testing of nails showing loading and measuring devices to be used and procedures to be followed.

**D. Final Wall Plans and Calculations**

Submit final wall plans and calculations to the Department for review and approval before beginning construction on the wall. The time required for Plan and calculation review will be charged to the allowable Contract time. The Department has 30 days for Plan and calculation review per item after receiving the structure calculations and drawings.

New submittals from the Contractor showing corrections from the Department's review or changes to ease construction or to correct field errors have a 30-day review. The Department is the sole judge of information adequacy.

The Department's review and acceptance of the final Plans and construction methods do not relieve the Contractor from successfully completing the work. Time extensions are not granted for Contractor delays from untimely submissions or insufficient information.

**E. Admixture Literature**

Before using an admixture, submit the manufacturer's literature to the Engineer. Indicate the admixture type and the manufacturer's recommendations for mixing the admixtures with grout.

**628.2 Materials**

**A. Concrete**

Use concrete conforming to Section 500.

**B. Reinforcing Steel**

Use reinforcing steel conforming to Section 511. Reinforcing steel used as soil nails shall be full length. Couplers will not be allowed.

**C. Structural Steel**

Use structural steel shapes or plates conforming to Section 501. Use ASTM A 709 Grade 36 (Grade 250) structural steel unless otherwise specified on the plans.

**D. Cement Grout**

Produce cement grout using Portland cement conforming to AASHTO M-85, Type I, II, or III, and potable water. Use cement that is fresh and free of lumps and hydration.

Follow these restrictions if using admixtures:

1. Do not use admixtures with chemicals that may harm the soil nail, reinforcing steel, or cement.
2. Do not use admixtures that cause air bubbles in the grout.
3. If approved by the Engineer, use admixtures imparting low water content, flowability, and minimum bleeding in the cement grout.

**E. Plastic**

Use Polyethylene conforming to AASHTO M-252 with a minimum wall thickness of 30 mils (0.76 mm) for corrosion protection.



## F. Shotcrete

Use shotcrete conforming to the following:

1. Cement – Section 830.2.01 Type I, II or III.
2. Fine Aggregate – Section 801.2.02.
3. Coarse Aggregate – Section 800.2.01.
4. Fly Ash – Section 831.2.03
5. Silica Fume – AASHTO M-307.
6. Air Entraining Admixtures for wet mix – Section 831.2.01.
7. Plasticizers – AASHTO M-194, Type A, D, F, G.
8. Use accelerating admixtures that are compatible with the cement, are non-corrosive to steel and do not promote other detrimental effects such as cracking and excessive shrinkage and do not contain calcium chloride. Use admixtures in accordance with the manufacturer's recommendations. Silica fume, if used, shall not exceed 10 percent of the cement weight and shall be an admixture with a minimum of 90 percent SiO<sub>2</sub> with a proven record of performance in shotcrete.
9. Use water in shotcrete that is potable, clean, free from substances which may be injurious to concrete and steel, and is free of elements which would cause staining.
10. Provide premixed and prepackaged concrete products specifically manufactured as a shotcrete product for on-site mixed shotcrete, if approved by the engineer. The packages shall contain cement and aggregates conforming to Section 500.

## G. Corrosion Inhibitor

Use corrosion inhibitor (grease) conforming to the following:

1. Drop point 300 degrees F (149 degrees C) minimum by ASTM D-566.
2. Flash point 300 degrees F (149 degrees C) minimum by ASTM D-92.
3. Water content 0.1% maximum by ASTM D-95.
4. Rust test – Rust Grade 7 or better after 720 hours, aggressive conditions: Rust Grade 7 or better after 1000 hours by ASTM B-117 and ASTM D-610.
5. Water soluble ions.

Chlorides	10 ppm maximum	by ASTM D-512
Nitrates	10 ppm maximum	by ASTM D-3867
Sulfates	10 ppm maximum	by APHA 427D (15 <sup>th</sup> ED)
6. Oil separation – 0.5% by weight maximum at 160 degrees F (71 degrees C) by FIMS 719B, Method 321.2.
7. Soak test – 5% Salt Fog at 100 degrees F (38 degrees C), 5 mils (0.13 mm) (Q Panel Type S), immerse panels in 50% salt solution and expose to 5% Salt Fog – no emulsification after 720 hours by ASTM B117 Modified.

## 628.2.01 Delivery, Storage, and Handling

### A. Protection Systems

Protect soil nails against corrosion by properly storing, fabricating, and handling the nail components before inserting them into the borehole. Avoid prolonged exposure of the nail components to the elements, and avoid mechanical or physical damage that reduces or impairs the component's ability to resist adverse conditions during service. Nail components will be rejected for heavy corrosion or pitting, but not for a light coating of rust.

Use the protection systems as follows:

#### 1. Soil Nail

Protect the entire length of the soil nail from the anchor plate to the end of the nail from corrosion.

- a. Encase the nail in a corrugated plastic tube.
- b. Use cement grout to fill the voids between the tube and the nail and the tube and the soil. Place cement grout between the soil and the tube to at least ¾ in (20 mm) thick and extend the entire length of the nail. Cement grout between the tube and the nail shall be a minimum of ½ in (12 mm) thick
- c. Provide centralizers spaced at a maximum of 5 feet (1.5 m) center-to-center throughout the nail length. Do not use wood or material harmful to the soil nail or the corrugated plastic tubing as centralizers.
- d. Provide a smooth piece of plastic sheath to encapsulate the entire free length. Do not splice the sheath. Ensure that the sheath is at least 0.05 in (1.27 mm) thick. Provide a void space between the sheath and the steel as shown on the plans and maintain that space with centralizers. Fill visible void space with grease and seal the bottom to prevent grout intrusion.



2. Area Underneath Anchorage

Protect the area immediately behind the stressing anchorage.

- a. Weld a pipe sleeve to the bearing plate and seal the pipe sleeve to the anchor sheath at the other end of the sleeve.
- b. Clean the pipe sleeve to remove dirt, rust, or other harmful material before inserting the soil nail into the pipe sleeve.
- c. If a seal is not provided at the lower end of the pipe sleeve, during installation and grouting, fill the lower end of the pipe sleeve with grout. Keep the pipe sleeve free of harmful material until the upper portion of the pipe sleeve and anchor head are filled with grout.
- d. Fill the void inside the sleeve and anchor head with anti-bleed expansion grout after the nails have been stressed.

3. Anchorage

Encase the anchorage system head into a corrosion protective system before proceeding to the next lift. Install the protective system for each lift within 30 days after installing the nails for that lift. Ensure that the anchorage system has a cover of at least 3 in (75 mm) once the wall face is placed.

## 628.3 Construction Requirements

### 628.3.01 Personnel

#### A. Contractor Qualifications

The Contractor and Subcontractor shall be experienced in constructing permanent soil nailed walls. Provide at least one Registered Professional Engineer licensed to perform work in the State of Georgia and a supervising Engineer for the Project with at least 5 years of experience in constructing permanent soil nailed walls.

Furnish verification of these qualifications to the Engineer before beginning operations.

#### B. Design Engineer

The Design Engineer shall:

- Be registered as a Professional Engineer in the State of Georgia
- Have considerable knowledge and experience designing and constructing soil nailed walls
- Be available at any time during the Contract to discuss the design of the walls with the Department.

#### C. Registered Professional Engineer

Retain the services of a second Professional Engineer licensed to perform work in the State of Georgia and prequalified by the Department. The Engineer shall operate independently from the Professional Engineer of Subsection 628.3.01.B, "Design Engineer."

This Engineer will independently check the design calculations and Plan details for the permanent soil nailed wall before submitting them to the Department.

### 628.3.02 Equipment

Use anchorage and hardware suitable for the type of soil nails used. Ensure that the anchorage and hardware are capable of the following:

- Developing 75 percent of the yield capacity of the nails when tested in the unbonded state and without failure of the nail
- Holding the soil nail at a load producing a stress of not less than 75 percent of the yield capacity of the nail without exceeding the anticipated set and without causing anchorage or soil nail failure
- Test nails shall be capable of lifting-off, detensioning, or retensioning a nail before secondary grouting to fill voids at the top of the pipe sleeve.

### 628.3.03 Preparation

Before beginning the work, survey the condition of the adjoining properties. Keep records and photograph settlement or cracking of adjacent structures that may become the subject of possible damage claims. Deliver the report to the Department before beginning work at the site.



Obtain a Foundation Investigation Report from the Geotechnical/Environmental Bureau of the Department to assist in evaluating existing conditions for design and construction.

### 628.3.04 Fabrication

#### A. Soil Nails

Fabricate the soil nails according to the approved details.

1. Keep the nails free of dirt, rust, and other harmful substances.
2. Use a plastic sheath that is a single piece without splices.
3. Before installation, handle and store the nails so as to avoid corrosion and physical damage. Nails will be rejected for damage such as abrasions, cuts, nicks, welds, weld splatters, or heavy corrosion and pitting. Replace the nails at the Contractor's expense for material replacements or time delays.

### 628.3.05 Construction

#### A. Design Criteria

The design criteria for a proposed design or design include:

1. Design soil nails according to this Specification.
2. Use reinforced concrete facing according to the latest AASHTO Standard Specifications for Highway Bridges, including interims. Ensure that the structural thickness is at least 9 in (230 mm). Provide architectural facing treatment as shown on the Department drawings.
3. Ensure that the concrete strength is at least 3000 psi (20 MPa) 28-day strength. Extend the facing 2 ft (600 mm) below the gutterline or, if applicable, the ground line adjacent to the wall unless otherwise indicated on the Department Plans.
4. Design and install permanent drainage systems behind the wall. Connect the drainage systems to the nearest drop inlet using pipe or free drainage through traffic barriers or other obstructions. Ensure that holes through traffic barriers and/or facing are no higher than 3 in (75 mm) above the gutterline or ground line.
5. Ensure that the wall is compatible with the horizontal and vertical criteria indicated in the Department Plans.
6. Provide a wall design that is adequate to resist sliding, overturning and bearing forces. Safety factors shall be as follows:

Sliding	1.50
Overturning	2.00
Bearing	1.00

Design the wall for the design condition shown in Figure 1.

7. See Figure 3 for typical section of permanent soil nail wall.

#### B. Ground Movements and Load Transfer Instruments

During construction of the wall, the Department may install devices to monitor ground movements and load transfers during or after construction. The Department will schedule installation to minimize interference with the Contractor's operations. Cooperate with the instrumentation installers. Anticipate delays of two to four hours per instrumented nail.

Although the Instrumentation Specialist maintains the instruments, assume responsibility for damage to the instruments, connections or readouts from operations. Replace and install damaged equipment at the Department's approval and at the Contractor's expense.

#### C. Soil Nail Installation

Install the soil nails as follows:

1. Before installation, visit the site to observe existing conditions that may affect the work or design, if applicable, and to review the geotechnical data available for the Project.
2. Drive or drill the holes for the soil nails by core drilling, rotary drilling, auger drilling, or percussion drilling. If using water in the drilling operation, dispose of the water to minimize wall erosion. Repair water erosion damage to the site at no cost to the Department.
3. If the hole will not stand open, install casing to maintain a clean and open hole. Ensure that the hole diameter is at least 3 in (75 mm) if no pressure grouting is used. Pressure grouting is grouting with a pressure greater than 60 psi (415 kPa).
4. Ensure that the drill bit diameter is not more than 1/8 in (3 mm) smaller than the specified hole diameter.
5. Start soil nail holes within an angle tolerance of 3 degrees from the inclination specified on the approved design Plans. Do not allow the holes to deviate from a straight line by more than 2 in (50 mm) in 10 ft. (3 m). Do not allow the holes to extend outside the Right-of-Way limits. Thoroughly clean the holes of all dust, grease, or other deleterious material before inserting the nail.



6. Install the nail in the casing or the hole drilled for the nail. Ensure that the nail's corrosion protection is not damaged during handling or installation.
7. Install the nail in the bond length to achieve at least 1½ in (38 mm) of grout cover.
8. Do not use nails to ground electric equipment and do not subject the nails to sharp bends.
9. Provide centralizers spaced a maximum of 5 ft (1.5 m) center to center throughout the nail length. Do not use spacers of wood or other material harmful to the nail or corrosion protection.
10. Inject grout at the lowest point of the nail and place over the entire length of the nail.
  - a. Ensure that the grouting equipment can continuously mix and produce lump-free grout. Equip the grout pump nozzle with a grout pressure gauge capable of measuring pressure of at least 150 psi (1 MPa) or twice the actual pressure used.
  - b. Base the material proportions used in the grout on grout tests made before beginning grouting; or select the proportions based on prior documented experience with similar materials and equipment under comparable field conditions.
  - c. Use the minimum water content necessary for proper placement and do not exceed a water-cement ratio of 0.45. Do not leave the grout in the mixer longer than 45 minutes.
11. After grouting, do not disturb the nail until the grout has reached a cube strength of 3500 psi (25 MPa). Keep the mouth of the hole clean after grouting. Record the following data in a Project field book during the grouting operation:
  - Type of mixer
  - Water-cement ratio
  - Type of additives
  - Grout pressure
  - Type of cement
  - Test sample strengths (before stressing)
  - Volume placed in bond and free lengths
12. If using pressure grouting, choose whether to perform a water-tightness test. However, if injecting grout with a pressure of 60 psi (415 kPa) or less, always perform a water-tightness test. Perform the test as follows:
  - a. Fill the entire hole in the rock with water and subject it to a pressure of 5 psi (35 kPa) in excess of the hydrostatic head as measured at the top of the hole.
  - b. If after 10 minutes the leakage rate from the hole exceeds 0.001 gal per inch diameter per foot of depth per minute (0.5 ml per mm diameter per meter of depth per minute), consolidate grout, redrill, and retest the hole. If the second water-tightness test fails, repeat the entire process.
  - c. During the tests, observe holes adjacent to the hole being tested for water-tightness to detect and seal inter-hole connections.
  - d. If artesian or flowing water is encountered in the drilled hole, maintain the pressure on the consolidation grout until the grout has initially set.

#### **D. Temporary Shotcrete Facing**

Provide temporary shotcrete facing.

1. Shotcrete Quality - Produce the shotcrete by the wet mix process and achieve a minimum compressive strength of 3000 psi (20 MPa) in seven (7) days and 4600 psi (32 MPa) in 28 days.
2. Mixture Proportions - Submit for acceptance the recommended mixture proportions, strength results, water cement ratio, and source of materials. Select the mixture proportions based on compressive strength tests of specimens continuously moist cured until tested at 28 days in accordance with AASHTO T-22. Use a maximum water cement ratio of 0.40, air content of 6.5% ± 1.5%, slump of 1.5 to 3 inches (38 to 50 mm). The mixture is acceptable if the average core compressive strength is at least 1.2 times the required compressive strength in 628.4.07.A above.
3. Batching and Mixing - Batch aggregate and cement by weight or by volume. Provide mixing equipment capable of thoroughly mixing the materials in sufficient quantity to maintain placing continuity. Provide ready-mix shotcrete complying with AASHTO M-157.
4. Delivery Equipment - Provide equipment capable of delivering the premixed materials accurately, uniformly and continuously through the delivery hose. Follow the recommendations of the equipment manufacturer on the type and size of nozzle to be used, and on cleaning, inspecting and maintaining the equipment. Deliver ready-mix shotcrete in transit mixers that comply with AASHTO M-157. Provide a supply of clean, dry air adequate for maintaining sufficient nozzle velocity for all parts of the work and, if required, for simultaneous operation of a suitable blow pipe for clearing away rebound. Provide a compressor capable of providing a minimum of 315 cfm (8.9 m<sup>3</sup>/min) per operating nozzle.
5. Curing:



- a. Keep shotcrete continuously moist for 24 hours after completion by one of the following methods or materials:
    - Continuous sprinkling
    - Absorptive mat or fabric, or other covering kept continuously moist
    - Curing compounds in accordance with Section 500.3.05.Z. On natural gun or flash finishes, apply one gallon per 100 square feet (0.4 l per square meter). Do not use curing compounds on any surfaces against which additional shotcrete or other cementitious finishing materials are to be bonded unless positive measures, such as sandblasting, are taken to completely remove curing compounds prior to application of such additional materials.
  - b. Provide final curing immediately following the initial curing and before the shotcrete has dried by one of the following materials or methods:
    - Continuation of the method used in the initial curing
    - Application of impervious sheet material conforming to AASHTO M-171.
  - c. Continue curing for the first seven days after shotcreting or until the required seven-day strength is obtained. During the curing period, maintain the shotcrete above 38 degrees F (3.3 degrees C) and in a moist condition as specified.
6. Construction Testing - Cut cores from the structure and test in accordance with AASHTO T-24. Take a minimum of three cores from each 1000 square feet (93 square meters) of completed facing. Alternatively, construct a test panel with minimum dimensions of 18 X 18 X 4 in (450 X 450 X 100 mm) gunned in the same position as the work represented for each 1000 square feet (93 square meters) of completed facing. The Contractor's regular nozzle men shall gun the panels during the course of the work. Field cure the panels in the same manner as the work, except that the test panels shall be soaked for a minimum of 40 hours prior to testing. Cut a minimum of three cores from each panel for testing in accordance with AASHTO T-24. The average compressive strength of each core of a set of three cores must equal or exceed 85 percent of the compressive strength specified in 628.3.05.A.

#### E. Permanent Cast-In-Place Facing

Provide permanent cast-in-place reinforced concrete facing in accordance with the requirements of this specification, as shown in the plans and the following:

1. Provide vertical expansion joints at a maximum spacing of 90'-0"
2. Provide vertical contraction or construction joints at a maximum spacing of 30'-0"
3. Form vertical rustication grooves at a maximum spacing of 10'-0". Rustication grooves are to be equally spaced between expansion joints and coincide with construction joints.

### 628.3.06 Quality Acceptance

#### A. Nail Testing and Acceptance

Perform testing according to this subsection.

Perform load tests on at least 5% of the nails in each row to verify the soil-to-grout bond stress used in the design.

Provide separate nails specifically for the purpose of testing. Test nail locations shall be approved by the Engineer. Test nails will not be considered part of the permanent support system. Install the test nails in accordance with Figure 2.

Grout only the bonded length of the nail prior to testing. Provide and use the following testing equipment:

- A dial gauge that can measure elongation to the nearest 0.001 in (0.025 mm)
- A hydraulic jack and pump with a pressure gauge graduated in increments of 100 psi (690 kPa) or less.

Test by incrementally loading the nail according to the following schedule:

AL  
 0.25P  
 0.50P  
 0.75P  
 1.00P  
 1.25P  
 1.50P

where:

AL = minimum load required to support the jacking system tightly against the bearing surface = 2 kips (8.9 kN).

P = design load

Measure the nail movement with the dial gauge fixed to an independent reference point. Apply the load with a hydraulic jack and measure it with a hydraulic pressure gauge. Increase the load from one increment to the next immediately after the nail movement is recorded.

Hold the maximum test load for ten (10) minutes. Start the load hold period as soon as the maximum test load is applied, and measure the nail movements at one (1), two (2), three (3), four (4), five (5), six (6), and ten (10) minutes. The nail test is acceptable if the nail carries the maximum test load with less than 0.08 in (2 mm) of movement between one (1) and ten (10) minutes.

If the nail fails the test, determine the cause. If the failure indicates that the nails will not achieve the design soil-to-grout bond stress, then modify the design and/or construction procedures. These modifications may include, but are not limited to, installing replacement nails, reducing the design bond stress by increasing the number of soil nails or by lengthening the nails, or modifying the installation methods. After modifications, test the nails for acceptance of the new design.

Make the modifications of the design and/or construction procedures at no cost to the Department unless the modifications are due to changed conditions.

After completion of testing and determination of acceptance, detension all test nails and all nails shall be tensioned to 200 ft-lb (270 N-m) of torque.

#### **628.4 Measurement**

This item will not be measured separately.

#### **628.5 Payment**

This item will be paid for under CONSTRUCTION COMPLETE.

##### **628.5.01 Adjustments**

General Provisions 101 through 150.



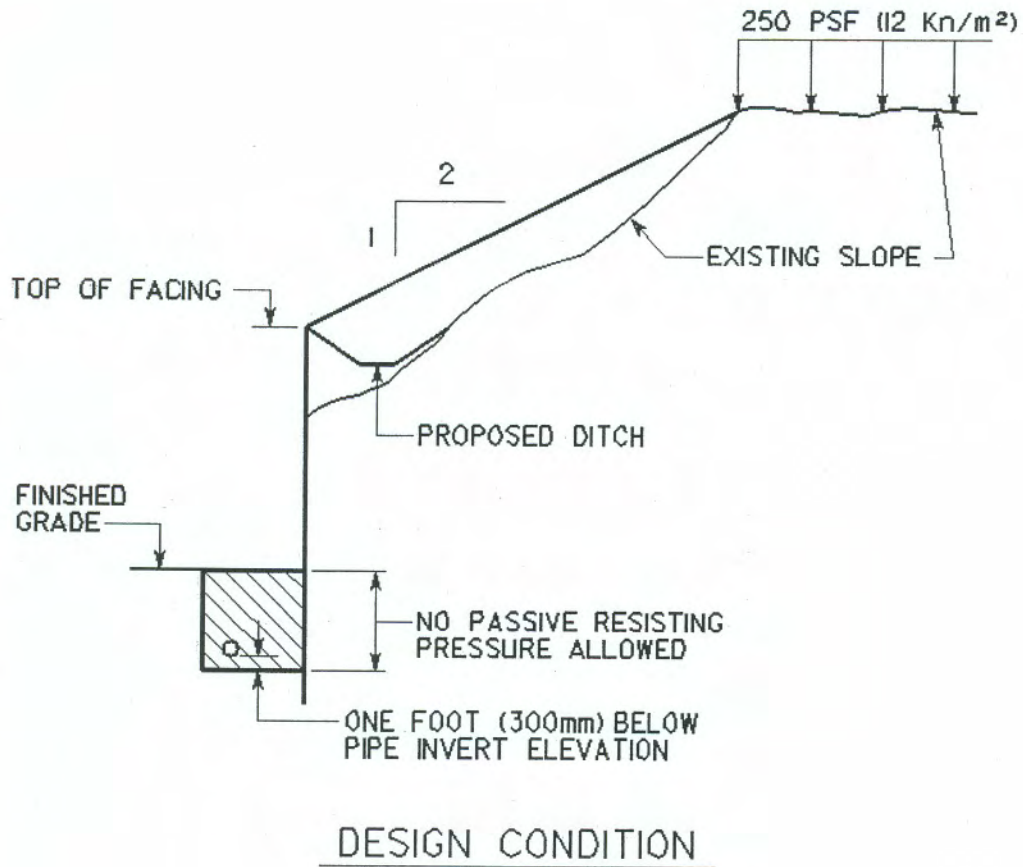
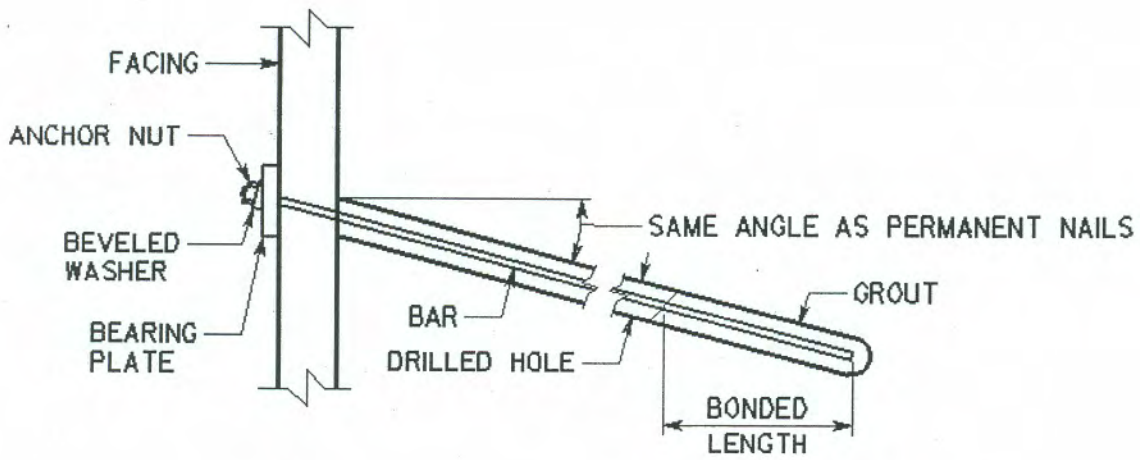


FIGURE 1



TEST NAIL DETAIL  
NO SCALE

FIGURE 2



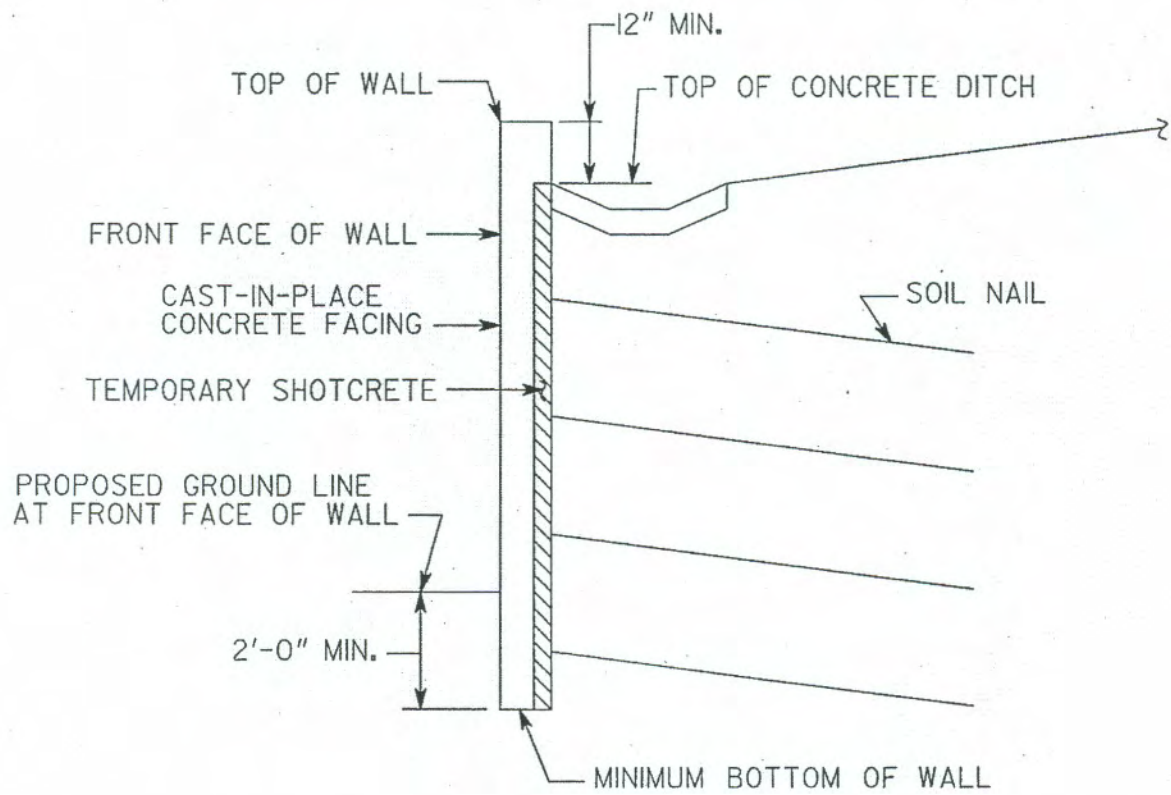


FIGURE NO. 3

April 12, 2007

AMENDMENT TO ADVERTISED CONTRACT

CONTRACT I.D. NUMBER: B12829-07-000-0

GEORGIA PROJECT NUMBER: CSNHS-0008-00(232)01

PCN: 0008232010000

COUNTY: TROUP

AMENDMENT NUMBER: 3

LETTING DATE: APRIL 20, 2007

LETTING NUMBER: 001

THE FOLLOWING CHANGES ARE HEREBY MADE TO THIS CONTRACT. THE BIDDER IS RESPONSIBLE FOR MAKING ANY NECESSARY CHANGES IN INK IN THE PROPOSAL. BIDDER SHALL ACKNOWLEDGE THIS AMENDMENT BY CHECKING THE APPROPRIATE SPACE ON THE PROPOSAL SIGNATURE PAGE.

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1. Proposal page 79, Special Provision Section 102-Bidding Requirements and Conditions, **Delete** Subsection 102.09 **and Substitute** the following: "The Bidder's Proposal and the Proposal Guaranty, unless submitted electronically, shall be submitted in a sealed envelope so marked as to identify its contents without being opened. Six (6) copies of the Bidder's technical proposal shall be submitted in a sealed envelope so marked as to identify its contents without being opened. Proposal forms are not transferable. Proposals will be received until the time and date set in the Notice To Contractors and shall be in the hands of the officials indicated by that time. Proposals received after the advertised cutoff time established for submission of Proposals will be returned unopened to the Bidder."
2. Proposal Page 221, Special Provision Section 400-Hot Mix Asphaltic Concrete Construction, **Delete** the Table under Subsection 400.5.01.G **and Substitute** the following table:

Material	Assumed Unit Price/Ton
OGFC (Poly Mod)	\$110.00

3. Proposal Page 226, Special Provision Section 402-Hot Mix Recycled Asphaltic Concrete, **Delete** the Table under Subsection 402.5.01.G **and Substitute** the following table:

Material	Assumed Unit Price/Ton
Asphaltic Concrete Leveling	\$74.00
Asphaltic Concrete 12.5 mm Superpave	\$73.00
Asphaltic Concrete 19 mm Superpave	\$79.00
Asphaltic Concrete 25 mm Superpave	\$76.00

4. Proposal Page 578, Special Provision Section 108.08.C.3-Prosecution and Progress, **Add** the following: "The two-way access as described from existing Webb Road to Sandtown Road consists of the segment of KIA Parkway north to KIA Blvd and the segment of KIA Blvd west to Sandtown Road."
5. Proposal Page 652, Special Provision Section 999-Design Build, Subsection 999.1.03.A; **Delete** the third paragraph **and Substitute** the following paragraphs:

"A new road off of Truck Road, to serve a container yard at the West Point Economic Development Site (WPEDS) shall be included in the design and construction bid. The new road's alignment will have an at-grade, unsignalized intersection with the Truck Road at a location determined by the Contractor and approved by the Engineer. The new road is expected tie to a container yard at the WPEDS approximately 300 to 500 ft west of where the Truck Road is shown tying to the WPEDS in the Costing Plans. Note: The Truck Road alignment may tie in as much as 50 feet to the west of its current tie-in, as shown in the Costing Plans, with Relocated Gabbettville Road (KIA Boulevard).

The Truck Road typical section will now consist of four 12-foot lanes, two lanes in each direction, with no median. The new road typical section will consist of two 16-foot lanes. The shoulder widths for the Truck Road and new road will be as depicted in Typical Section No. 10 and 11 of the Costing Plans. The pavement section for the Truck Road and the new road will be as depicted in section 999.4.01.H.6.d on page 689.

The Contractor shall include in the design and construction 1600 feet as the length of the new road. In his bid 1600 feet of roadway for the new road shall include, but is not be limited to, materials, labor, transportation and storage of materials required for the earthwork (and any needed stabilization), pavement, signing and marking, drainage, etc. No lighting, signing, signalization, or special landscaping shall be included on the new road. In addition, the Contractor shall provide all design, coordination, and construction (including but not limited to labor, materials, hauling, storage, etc.) necessary to lengthen the current alignment shown in the Costing Plans for the Truck Road by 150 feet in order to tie to a designated point at the WPEDS.

The Contractor shall coordinate with the Engineer (or designee) as to final alignments for the Truck Road and new road. This will include up to three iterations of alignments (including the level of detail necessary to determine viable options and consequential effects to the currently proposed project found in the Plans Package). Meetings with the Engineer, and others, will be required. The Contractor shall assume a final alignment and environmental clearance will be completed by June 30, 2007 provided, an expedited submission of necessary plan documents and an expedited review and approval by the Department on an alignment. Collateral changes to any portion of the project, made necessary by the acceptance of the final Truck Road alignment, will be included in the overall price bid for CONSTRUCTION COMPLETE or DESIGN COMPLETE. No construction shall be conducted on the Truck Road or new road until the final alignments are available. Note: Wetland impacts have been approved for the proposed alignment as shown in the Plans Package. As such, any revision may require a reevaluation. While working with the Contractor, the Department will make the determination and will be responsible for any environmental reevaluations associated with a change on the Truck Road and addition of the new road. Supporting information (reports and layouts shall be made available to the Department, by the Contractor, for use in any reevaluation efforts. Unless otherwise determined by the Engineer, information shall be provided to the Department within 3 business days. The Contractor's schedule shall include these parameters. In the event any length of this additional 1600 feet of new road is not needed (as directed by the Engineer), the Contractor shall give the Department an acceptable credit (as determined by the Engineer) for the costs proposed by the Contractor for design, coordination and construction."

6. Proposal Page 653, Special Provision Section 999-Design Build, Subsection 999.1.03.A; **Add** the following to the fifth paragraph: "The Contractor shall plan the design and construction for four driveways along KIA Parkway to the West Point Economic Development site. One such driveway will be located at the intersection of KIA Parkway and Webb Road as shown in the costing plans."
7. Proposal Page 653, Special Provision Section 999-Design Build, Subsection 999.1.03.A; **Delete** the sixth paragraph which reads "A Cell Tower existing along Frontage Road (KIA Parkway) will not be relocated until July 31, 2007. The Contractor shall schedule his work as to include this parameter. Access for crews to remove the tower shall remain open at all times until July 31, 2007." **and Substitute** "The Cell Tower existing along Frontage Road (KIA Parkway) will remain in place."
8. Proposal Page 653, Special Provision Section 999-Design Build, Subsection 999.1.03.A; **Delete** the wording "Work referenced the above text may overlap, but the total time to complete the two may not exceed 270 calendar days." **and Substitute** the following wording: "Work referenced in the above text may overlap, but the total time to complete the two may

not exceed 270 calendar days. The 75 feet referenced above and in section 108.08 shall not include those items associated with the construction of KIA Parkway."

9. Proposal Page 653, Special Provision Section 999-Design Build, Subsection 999.1.03.A; **Add** the following:

"The Contractor shall shift KIA Parkway alignment and profile currently shown in the Costing Plans so the construction limits of the roadway avoid the existing cell tower facility shown at the approximate station of 575+00. Any work necessary for this item such as the design, revising the applicable construction plan sheets, revising the Erosion Control Plans, and obtaining the necessary approval(s) from the Engineer shall be paid for under DESIGN COMPLETE. Access to the cell tower will be maintained at all times and an access road to the cell tower facility shall be provided. A power feed to the cell tower facility shall be maintained at all times. The Contractor shall work to minimize the alignment shift while meeting all appropriate design parameters for the roadway. The Department will obtain the necessary right-of-way. Supporting information (reports and layouts) for this alignment shift shall be made available to the Department, by the Contractor, for use in any environmental reevaluation efforts.

The Contractor shall use all appropriate measures to protect four pecan trees located along KIA Blvd station 104+00 to 108+00 right. This includes, but is not limited to, maintaining a tree save fence just outside the drip line of each tree and not disturbing the area inside this tree save fence. The trees are located just outside the construction limits in this area.

The asphalt paving requirements with asphalt header curb at the guardrail sections shall be constructed in accordance with GDOT Detail S-4. The Contractor shall use concrete flumes to drain the asphalt header curb as necessary. The asphalt header curb shall be used at all locations where guardrail exists or as approved by Engineer. The asphalt paving shall be constructed at the full depth shoulder section up to the back of the asphalt curb. In the case where the shoulder section is RCC the asphalt paving shall be 12.5 mm SUPERPAVE at 1.5", 19 mm SUPERPAVE at 2" and GAB at 8"."

10. Proposal Page 669, Special Provision Section 999-Design Build, Subsection 999.1.03.I; **Add** the following as the second sentence under the first bullet under Safety: "Note: Work may overlap for I-85 northbound and I-85 southbound, but the total time to complete the work may not exceed 270 days."
11. Proposal Page 681, Special Provision Section 999-Design Build; **Add** The following to Table 999-1 under the Review Period column for the Utility Plans/Agreements row:

Agreements (strictly for the section of KIA Blvd, starting from the intersection of Gabbettville Road and Sandtown Road, moving eastward to

just east of the Truck Road, along with the final alignment(s) of the Truck Road from KIA Blvd to the West Point Economic Development Pad as noted in Section 108.08.C.6 on page 579): 30 days for Dept. + 60 days for each Utility Owner.

12. Proposal Page 690, Special Provision Section 999-Design Build, Subsection 999.4.01.H.6.1; **Add** the following: "The pavement section for the area of the I-85 ramps shall be as shown on page 689 in section 999.4.H.6.d for "KIA Blvd -(Sandtown to west side of Truck Ent. & radius return of ramps on east side to Warner)."
13. Proposal Page 690, Special Provision Section 999-Design Build, **Delete** Subsection 999.4.01.H.6.q; **and Substitute** the following: "Figure 999.4.H.6.q reflects the most up to date right of way in the area of the Truck Road and the WPEDS."
14. Proposal Page 698, Special Provision Section 999-Design Build, Subsection 999.5.01.A; **Delete** the following wording: "Bridge over I-85 should be able to accommodate possible future placement of water and gas line."

DAVID E. HOGE  
STATE TRANSPORTATION OFFICE ENGINEER

April 12, 2007

AMENDMENT TO ADVERTISED CONTRACT

CONTRACT I.D. NUMBER: B12829-07-000-0  
GEORGIA PROJECT NUMBER: CSNHS-0008-00(232)01  
PCN: 0008232010000  
COUNTY: TROUP  
AMENDMENT NUMBER: 4  
LETTING DATE: APRIL 20, 2007  
LETTING NUMBER: 001

THE FOLLOWING CHANGES ARE HEREBY MADE TO THIS CONTRACT. THE BIDDER IS RESPONSIBLE FOR MAKING ANY NECESSARY CHANGES IN INK IN THE PROPOSAL. BIDDER SHALL ACKNOWLEDGE THIS AMENDMENT BY CHECKING THE APPROPRIATE SPACE ON THE PROPOSAL SIGNATURE PAGE.

\*\*\*\*\*

1. Proposal Page 705, Special Provision Section 999-Design Build, Subsection 999.5.02.B.2.; **Revise** the Subsection to read as follows:

"Use a special design cast-in-place wall for Wall No. 1. As an alternate, use a soil nail wall in accordance with Special Provision 628 - PERMANENT SOIL NAILED WALLS or a tieback wall in accordance with Section 617 of the Georgia DOT Specifications."

DAVID E. HOGE  
STATE TRANSPORTATION OFFICE ENGINEER

April 13, 2007

AMENDMENT TO ADVERTISED CONTRACT

CONTRACT I.D. NUMBER: B12829-07-000-0  
GEORGIA PROJECT NUMBER: CSNHS-0008-00(232)01  
PCN: 0008232010000  
COUNTY: TROUP  
AMENDMENT NUMBER: 5  
LETTING DATE: APRIL 20, 2007  
LETTING NUMBER: 001

THE FOLLOWING CHANGES ARE HEREBY MADE TO THIS CONTRACT. THE BIDDER IS RESPONSIBLE FOR MAKING ANY NECESSARY CHANGES IN INK IN THE PROPOSAL. BIDDER SHALL ACKNOWLEDGE THIS AMENDMENT BY CHECKING THE APPROPRIATE SPACE ON THE PROPOSAL SIGNATURE PAGE.

- \*\*\*\*\*
1. Proposal Page 579, Special Provision Section 108-Prosecution and Progress, Subsection 108.08.C.6.; **Revise** the Subsection to read as follows:

"Failure to open two-way access along KIA Blvd, starting from the intersection of Gabbettville Road and Sandtown Road, moving eastward to just east of the Truck Road, along with the Truck Road from KIA Blvd to the West Point Economic Development Site (WPEDS), and the proposed 1600 ft road off of the Truck Road to serve a container yard at the WPEDS by December 31, 2007 as specified in Subsection 999.1.03.A will result in the assessment of liquidated damages at the rate of \$5,000.00 per day."

2. Proposal Page 651, Special Provision Section 999-Design Build, Subsection 999.1.02.; **Make** the following changes:
  - A. **Delete** the sixth bullet which states "Utility Agreements, Encroachment Permits, Relocation Plans, and Contractor Certification of "No-Conflict"".
  - B. **Add** the following heading and bullet to the Subsection:

The Contractor shall not begin construction in areas affecting utilities until one of the following, for each respective affected utility in the area, has been approved by the Engineer:

- Utility Agreements, Encroachment Permits, Relocation Plans, and Contractor Certification of "No-Conflict."



**AMENDMENT TO ADVERTISED CONTRACT (continued):**











3. Proposal Page 653, Special Provision Section 999-Design Build, Subsection 999.1.03.A.; **Revise** the eleventh paragraph to read as follows:

"Two-way access along KIA Blvd, starting from the intersection of Gabbettville Road and Sandtown Road moving eastward to just east of Truck Road, along with the Truck Road from KIA Blvd to the West Point Economic Development Site (WPEDS), and the proposed 1600 ft road off of the Truck Road to serve a container yard at the WPEDS shall be opened to traffic by December 31, 2007. Two-way public access from Webb Road to Sandtown Road, which consists of the segment of KIA Parkway from Webb Road north to KIA Blvd and then the segment of KIA Blvd west to Sandtown Road, shall be opened to traffic 365 calendar days after NTP for the project is given. Contractor shall include temporary signing, striping and marking in applicable asphalt sections in order for traffic to run on 19 mm asphalt course. Final surface course shall not be placed until final asphalt paving begins for remainder of project. Note that the final PCC pavement section to provide two-way access for the Truck Road from KIA Blvd to the WPEDS, and the PCC pavement section for the proposed 1600 ft road off of the Truck Road to serve a container yard at the WPEDS shall be completed by December 31, 2007."

4. **Add** the attached revised/added page 713A to proposal.

DAVID E. HOGE  
STATE TRANSPORTATION OFFICE ENGINEER

PLANT LEGEND:

	BOTANICAL NAME COMMON NAME	SIZE	SPACING	QTY.	NOTES
	<u>ACER RUBRUM 'RED SUNSET'</u> RED SUNSET MAPLE	4" CAL.	AS INDICATED	76	MATCHING
	<u>ACER SACCHARUM 'GREEN MOUNTAIN'</u> GREEN MOUNTAIN MAPLE	4" CAL.	AS INDICATED	33	MATCHING
	<u>ILEX CORNUTA 'CARISSA'</u> CARISSA HOLLY	3 GAL.	5' O.C.	726	
	<u>ILEX X ATTENUATA 'FOSTERI'</u> FOSTER'S HOLLY	5 GAL.	15' O.C.	165	
	<u>LAGERSTROEMIA INDICA 'NATCHEZ'</u> NATCHEZ CRAPE MYRTLE	2" CAL.	AS INDICATED	268	MULTI STEM
	<u>LAGERSTROEMIA INDICA 'SIOUX'</u> SIOUX CRAPE MYRTLE	2" CAL.	AS INDICATED	159	MULTI STEM
	<u>LIRIOPE MUSCARI 'BIG BLUE'</u> LIRIOPE	4" POT	12" O.C.	11,033	
	<u>PRUNUS X YEDOENSIS</u> YOSHINO CHERRY	2" CAL.	25' O.C.	34	MATCHING
	<u>QUERCUS NUTALLII</u> NUTTALL OAK	4" CAL.	AS INDICATED	64	MATCHING
	<u>QUERCUS PHELLOS</u> WILLOW OAK	4" CAL.	AS INDICATED	187	MATCHING

REVISED/ADDED 713A

April 16, 2007

AMENDMENT TO ADVERTISED CONTRACT

CONTRACT I.D. NUMBER: B12829-07-000-0

GEORGIA PROJECT NUMBER: CSNHS-0008-00(232)01

PCN: 0008232010000

COUNTY: TROUP

AMENDMENT NUMBER: 6

LETTING DATE: APRIL 20, 2007

LETTING NUMBER: 001

THE FOLLOWING CHANGES ARE HEREBY MADE TO THIS CONTRACT. THE BIDDER IS RESPONSIBLE FOR MAKING ANY NECESSARY CHANGES IN INK IN THE PROPOSAL. BIDDER SHALL ACKNOWLEDGE THIS AMENDMENT BY CHECKING THE APPROPRIATE SPACE ON THE PROPOSAL SIGNATURE PAGE.

\*\*\*\*\*

1. Proposal Page 221, Special Provision Section 400-Hot Mix Asphaltic Concrete Construction; **Delete** Subsection 400.5.01.G.
2. Proposal Page 226, Special Provision Section 402-Hot Mix Recycled Asphaltic Concrete; **Delete** Subsection 402.5.01.G.
3. Proposal Page 653, Special Provision Section 999-Design Build, Subsection 999.1.03A.; **Add** the following to the Subsection:

"Parcel 2 (Owner Harrell Landreth shown on Drawing No. 13-03 in the Costing Plans) to be located at the approximate stations on KIA Blvd of 123+30 left and 123+70 right; Parcel 11 (Pyne Woodyard shown on Drawing No. 14-34 of the Costing Plans) to be located on Warner Road at approximate station 130+00 left; Parcel 12 (Ralph W. & Stephen H. Warner shown on Drawing No. 14-32 of the Costing Plans) to be located on Warner Road at approximate station 112+30 left; and Parcel 23 (Oscar C. Godfrey shown on Drawing No. 14-34 of the Costing Plans) to be located on Warner Road at approximate station 135+50 left. The Contractor shall assume that the driveways will tie to the proposed right-of-way line. The Contractor shall also design and construct the necessary drainage and erosion control measures for these driveways.

The Contractor shall replace fencing for parcels 33 (Edith K. Webb, ETAL shown on Drawing No. 14-21 of the Costing Plans) and 34 (Edith K. Webb, ETAL shown on Drawing No. 14-21 of the Costing Plans) on Webb Road with woven wire fence."

**AMENDMENT TO ADVERTISED CONTRACT (continued):**

4. Proposal Page 690, Special Provision Section 999-Design Build, Subsection 999.4.01.H.6.1; **Delete** the following:

"The pavement section for the area of the I-85 ramps shall be as shown on page 689 in section 999.4.H.6.d for "KIA Blvd -(Sandtown to west side of Truck Ent. & radius return of ramps on east side to Warner)."

5. Proposal Page 690, Special Provision Section 999-Design Build, Subsection 999.4.01.H.6.1; **Add** the following:

"The asphaltic concrete pavement section **for both the accel/decel lane(s) and shoulder** for this area of the I-85 ramps shall be: 12.5 mm OGFC shall be applied at a rate of 90 lb/sy on the travel-way and will extend 18 inches onto the shoulder; 1.5 inches of 12.5 mm SUPERPAVE; 2 inches of 19 mm SUPERPAVE; 6 inches of 25 mm SUPERPAVE; and 12 inches of GAB. The normal shoulder width in this area shall be 10 foot paved and 2 foot grassed."

DAVID E. HOGE  
STATE TRANSPORTATION OFFICE ENGINEER

April 17, 2007

AMENDMENT TO ADVERTISED CONTRACT

CONTRACT I.D. NUMBER: B12829-07-000-0

GEORGIA PROJECT NUMBER: CSNHS-0008-00(232)01

PCN: 0008232010000

COUNTY: TROUP

AMENDMENT NUMBER: 7

LETTING DATE: APRIL 20, 2007

LETTING NUMBER: 001

THE FOLLOWING CHANGES ARE HEREBY MADE TO THIS CONTRACT. THE BIDDER IS RESPONSIBLE FOR MAKING ANY NECESSARY CHANGES IN INK IN THE PROPOSAL. BIDDER SHALL ACKNOWLEDGE THIS AMENDMENT BY CHECKING THE APPROPRIATE SPACE ON THE PROPOSAL SIGNATURE PAGE.

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1. Proposal Page 653, Special Provision Section 999-Design Build, Subsection 999.1.03.A.; **Add** the following to the Subsection:

"A hydraulic study for the box culvert proposed under the Truck Road will be required. The Contractor is responsible for developing this study, and for obtaining all necessary approvals prior to beginning construction of the culvert."

2. Proposal Page 677, Special Provision Section 999-Design Build, Subsection 999.3.06.; **Add** the following to the Subsection:

"The Contractor is responsible for verifying the detention/retention ponds have adequate capacity, and the Contractor is responsible for any design and construction necessary to re-grade the ponds if it is determined that this is required. The Contractor shall adjust the ditches shown in the Costing Plans, as required, in order to provide adequate drainage to the respective discharge points."

DAVID E. HOGE  
STATE TRANSPORTATION OFFICE ENGINEER