

Control	0045-11-045, ETC.
Project	STP 2022(800)HES, ETC.
Highway	US 82, ETC.
County	LAMAR, ETC.

## ADDENDUM ACKNOWLEDGMENT

**Each bidder is required to acknowledge receipt of an addendum issued for a specific project. This page is provided for the purpose of acknowledging an addendum.**

FAILURE TO ACKNOWLEDGE RECEIPT OF AN ADDENDUM WILL RESULT IN THE BID NOT BEING READ.

In order to properly acknowledge an addendum place a mark in the box next to the respective addendum.

- ADDENDUM NO. 1
- ADDENDUM NO. 2
- ADDENDUM NO. 3
- ADDENDUM NO. 4
- ADDENDUM NO. 5

In addition, the bidder by affixing their signature to the signature page of the proposal is acknowledging that they have taken the addendum(s) into consideration when preparing their bid and that the information contained in the addendum will be included in the contract, if awarded by the Commission or other designees.

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# PROPOSAL TO THE TEXAS TRANSPORTATION COMMISSION

## 2014 SPECIFICATIONS

### WORK CONSISTING OF HAZARD ELIMINATION & SAFETY LAMAR COUNTY, TEXAS, Etc.

The quantities in the proposal are approximate. The quantities of work and materials may be increased or decreased as considered necessary to complete the work as planned and contemplated.

This project is to be completed in 183 working days and will be accepted when fully completed and finished to the satisfaction of the Executive Director or designee.

Provide a proposal guaranty in the form of a Cashier's Check, Teller's Check (including an Official Check) or Bank Money Order on a State or National Bank or Savings and Loan Association, or State or Federally chartered Credit Union made payable to the Texas Transportation Commission in the following amount:

TWENTY-FOUR THOUSAND (Dollars) ( \$24,000 )

A bid bond may be used as the required proposal guaranty. The bond form may be detached from the proposal for completion. The proposal may not be disassembled to remove the bond form. The bond must be in accordance with Item 2 of the specifications.

Any addenda issued amending this proposal and/or the plans that have been acknowledged by the bidder, become part of this proposal.

By signing the proposal the bidder certifies:

1. the only persons or parties interested in this proposal are those named and the bidder has not directly or indirectly participated in collusion, entered into an agreement or otherwise taken any action in restraint of free competitive bidding in connection with the above captioned project.
2. in the event of the award of a contract, the organization represented will secure bonds for the full amount of the contract.
3. the signatory represents and warrants that they are an authorized signatory for the organization for which the bid is submitted and they have full and complete authority to submit this bid on behalf of their firm.
4. that the certifications and representations contained in the proposal are true and accurate and the bidder intends the proposal to be taken as a genuine government record.

• **Signed:** \*\*

(1) \_\_\_\_\_ (2) \_\_\_\_\_ (3) \_\_\_\_\_

**Print Name:**

(1) \_\_\_\_\_ (2) \_\_\_\_\_ (3) \_\_\_\_\_

**Title:**

(1) \_\_\_\_\_ (2) \_\_\_\_\_ (3) \_\_\_\_\_

**Company:**

(1) \_\_\_\_\_ (2) \_\_\_\_\_ (3) \_\_\_\_\_

- Signatures to comply with Item 2 of the specifications.

\*\*Note: Complete (1) for single venture, through (2) for joint venture and through (3) for triple venture.

\* **When the working days field contains an asterisk (\*) refer to the Special Provisions and General Notes.**

## **NOTICE TO CONTRACTORS**

**ANY CONTRACTORS INTENDING TO BID ON ANY WORK TO BE AWARDED BY THIS DEPARTMENT MUST SUBMIT A SATISFACTORY “AUDITED FINANCIAL STATEMENT” AND “EXPERIENCE QUESTIONNAIRE” AT LEAST TEN DAYS PRIOR TO THE LETTING DATE.**

**UNIT PRICES MUST BE SUBMITTED IN ACCORDANCE WITH ITEM 2 OF THE STANDARD SPECIFICATIONS OR SPECIAL PROVISION TO ITEM 2 FOR EACH ITEM LISTED IN THIS PROPOSAL.**

# TEXAS DEPARTMENT OF TRANSPORTATION

## BID BOND

KNOW ALL PERSONS BY THESE PRESENTS,

That we, (Contractor Name) \_\_\_\_\_  
\_\_\_\_\_

Hereinafter called the Principal, and (Surety Name) \_\_\_\_\_  
\_\_\_\_\_

a corporation or firm duly authorized to transact surety business in the State of Texas, hereinafter called the Surety, are held and firmly bound unto the Texas Department of Transportation, hereinafter called the Oblige, in the sum of not less than two percent (2%) of the department's engineer's estimate, rounded to the nearest one thousand dollars, not to exceed one hundred thousand dollars (\$100,000) as a proposal guaranty (amount displayed on the cover of the proposal), the payment of which sum will and truly be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the principal has submitted a bid for the following project identified as:

<b>Control</b>	<b>0045-11-045, ETC.</b>
<b>Project</b>	<b>STP 2022(800)HES, ETC.</b>
<b>Highway</b>	<b>US 82, ETC.</b>
<b>County</b>	<b>LAMAR, ETC.</b>

NOW, THEREFORE, if the Oblige shall award the Contract to the Principal and the Principal shall enter into the Contract in writing with the Oblige in accordance with the terms of such bid, then this bond shall be null and void. If in the event of failure of the Principal to execute such Contract in accordance with the terms of such bid, this bond shall become the property of the Oblige, without recourse of the Principal and/or Surety, not as a penalty but as liquidated damages.

Signed this \_\_\_\_\_ Day of \_\_\_\_\_ 20\_\_\_\_\_

By: \_\_\_\_\_  
(Contractor/Principal Name)

\_\_\_\_\_  
(Signature and Title of Authorized Signatory for Contractor/Principal)

\*By: \_\_\_\_\_  
(Surety Name)

\_\_\_\_\_  
(Signature of Attorney-in-Fact)

Impressed  
Surety Seal  
Only

\*Attach Power of attorney (Surety) for Attorney-in-Fact

**This form may be removed from the proposal.**

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# BIDDER'S CHECK RETURN

## IMPORTANT

The space provided for the return address must be completed to facilitate the return of your bidder's check. Care must be taken to provide a legible, accurate, and complete return address, including zip code. A copy of this sheet should be used for each different return address.

## NOTE

Successful bidders will receive their guaranty checks with the executed contract.

RETURN BIDDERS CHECK TO (PLEASE PRINT):


<b>Control</b>	<b>0045-11-045, ETC.</b>
<b>Project</b>	<b>STP 2022(800)HES, ETC.</b>
<b>Highway</b>	<b>US 82, ETC.</b>
<b>County</b>	<b>LAMAR, ETC.</b>

## IMPORTANT

### PLEASE RETURN THIS SHEET IN ITS ENTIRETY

Please acknowledge receipt of this check(s) at your earliest convenience by signing below in longhand, in ink, and returning this acknowledgement in the enclosed self addressed envelope.

Check Received By: \_\_\_\_\_ Date: \_\_\_\_\_

Title: \_\_\_\_\_

For (Contractor's Name): \_\_\_\_\_

Project \_\_\_\_\_ County \_\_\_\_\_

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## NOTICE TO THE BIDDER

In the space provided below, please enter your total bid amount for this project. Only this figure will be read publicly by the Department at the public bid opening.

It is understood and agreed by the bidder in signing this proposal that the total bid amount entered below is not binding on either the bidder or the Department. It is further agreed that **the official total bid amount for this proposal will be determined by multiplying the unit bid prices for each pay item by the respective estimated quantities shown in this proposal and then totaling all of the extended amounts.**

\$ \_\_\_\_\_

**Total Bid Amount**

Control 0001-03-030  
 Project STP 2000(938)HES  
 Highway SH 20  
 County EL PASO

ALT	ITEM	DESC	SP	Bid Item Description	Unit	Quantity	Bid Price	Amount	Seq
	I04	509	X	REMOV CONC (SDWLK)	MSY	266.400	\$10.000	\$2,664.00	1
Total Bid Amount							\$2,664.00		

Signed \_\_\_\_\_  
 Title \_\_\_\_\_  
 Date \_\_\_\_\_

Additional Signature for Joint Venture:

Signed \_\_\_\_\_  
 Title \_\_\_\_\_  
 Date \_\_\_\_\_

**EXAMPLE OF BID PRICES SUBMITTED BY COMPUTER PRINTOUT**

EXAMPLE

EXAMPLE

EXAMPLE

EXAMPLE

# EXAMPLES

## BID PRICES SUBMITTED BY HAND WRITTEN FORMAT

ALT	ITEM-CODE			UNIT BID PRICE <u>ONLY</u> WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC NO	S.P. NO.				
	190	026		RED OAK 1 1/2 - 1 3/4 GAL BB	EA	9.000	1
					L	E	

**Unit price for each plant in place**

	249	014		FLEX BASE(DEL)(DENSOT)(TY A GR4 CL2)	TON	56,787.00	14
					L	E	

**Unit price for each ton of Flexible Base**

	430	001	001	CL A CONC FOR EXT STR (CULV)	CY	45.000	27
					L	E	

**Unit price for each cubic yard of Concrete**

	610	007	001	RDWY ILL ASSEM(TY ST 50T-8-8)(.4 KW)S	EA	13.000	7
					L	E	

**Unit price of each Roadway Illumination Assembly**

EXAMPLE

EXAMPLE

EXAMPLE

EXAMPLE

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ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	105	6137		REMOVE TRT BASE & ASPH PAV (12"-20") DOLLARS and CENTS	SY	233.700	1
	132	6019		EMBANKMENT (VEHICLE)(ORD COMP)(TY B) DOLLARS and CENTS	CY	84.400	2
	416	6029		DRILL SHAFT (RDWY ILL POLE) (30 IN) DOLLARS and CENTS	LF	368.000	3
	416	6032		DRILL SHAFT (TRF SIG POLE) (36 IN) DOLLARS and CENTS	LF	66.500	4
	432	6001		RIPRAP (CONC)(4 IN) DOLLARS and CENTS	CY	16.100	5
	432	6003		RIPRAP (CONC)(6 IN) DOLLARS and CENTS	CY	38.900	6
	500	6001		MOBILIZATION DOLLARS and CENTS	LS	1.000	7
	502	6001	008	BARRICADES, SIGNS AND TRAFFIC HAN- DLING DOLLARS and CENTS	MO	12.000	8
	506	6038	002	TEMP SEDMT CONT FENCE (INSTALL) DOLLARS and CENTS	LF	750.000	9
	506	6039	002	TEMP SEDMT CONT FENCE (REMOVE) DOLLARS and CENTS	LF	750.000	10
	529	6008		CONC CURB & GUTTER (TY II) DOLLARS and CENTS	LF	390.000	11

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	531	6002		CONC SIDEWALKS (5")  DOLLARS and CENTS	SY	4.000	12
	610	6214		IN RD IL (TY SA) 40T-8 (250W EQ) LED  DOLLARS and CENTS	EA	44.000	13
	618	6023		CONDT (PVC) (SCH 40) (2")  DOLLARS and CENTS	LF	360.000	14
	618	6029		CONDT (PVC) (SCH 40) (3")  DOLLARS and CENTS	LF	140.000	15
	618	6030		CONDT (PVC) (SCH 40) (3") (BORE)  DOLLARS and CENTS	LF	235.000	16
	618	6034		CONDT (PVC) (SCH 40) (4") (BORE)  DOLLARS and CENTS	LF	65.000	17
	618	6046		CONDT (PVC) (SCH 80) (2")  DOLLARS and CENTS	LF	150.000	18
	618	6075		CONDT (RM) (3") (BORE)  DOLLARS and CENTS	LF	1,777.000	19
	620	6010		ELEC CONDR (NO.6) INSULATED  DOLLARS and CENTS	LF	970.000	20
	621	6002		TRAY CABLE (3 CONDR) (12 AWG)  DOLLARS and CENTS	LF	1,290.000	21
	622	6002		DCT CBL (3 NO.8) (2 INSULATED 1 BARE)  DOLLARS and CENTS	LF	7,468.000	22
	624	6010		GROUND BOX TY D (162922)W/APRON  DOLLARS and CENTS	EA	6.000	23

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	628	6033		ELC SRV TY A 240/480 060(NS)AL(E)SP(O) DOLLARS and CENTS	EA	11.000	24
	628	6144		ELC SRV TY D 120/240 060(NS)SS(E)PS(U) DOLLARS and CENTS	EA	1.000	25
	628	6145		ELC SRV TY D 120/240 060(NS)SS(E)SP(O) DOLLARS and CENTS	EA	1.000	26
	644	6001		IN SM RD SN SUP&AM TY10BWG(1)SA(P) DOLLARS and CENTS	EA	11.000	27
	644	6076		REMOVE SM RD SN SUP&AM DOLLARS and CENTS	EA	4.000	28
	666	6047	007	REFL PAV MRK TY I (W)24"(SLD)(090MIL) DOLLARS and CENTS	LF	349.000	29
	666	6048	007	REFL PAV MRK TY I (W)24"(SLD)(100MIL) DOLLARS and CENTS	LF	55.000	30
	666	6168	007	REFL PAV MRK TY II (W) 4" (DOT) DOLLARS and CENTS	LF	64.000	31
	666	6178	007	REFL PAV MRK TY II (W) 8" (SLD) DOLLARS and CENTS	LF	400.000	32
	666	6182	007	REFL PAV MRK TY II (W) 24" (SLD) DOLLARS and CENTS	LF	94.000	33
	666	6184	007	REFL PAV MRK TY II (W) (ARROW) DOLLARS and CENTS	EA	4.000	34
	666	6192	007	REFL PAV MRK TY II (W) (WORD) DOLLARS and CENTS	EA	4.000	35

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	677	6001		ELIM EXT PAV MRK & MRKS (4") DOLLARS and CENTS	LF	270.000	36
	677	6003		ELIM EXT PAV MRK & MRKS (8") DOLLARS and CENTS	LF	347.000	37
	677	6007		ELIM EXT PAV MRK & MRKS (24") DOLLARS and CENTS	LF	246.000	38
	677	6008		ELIM EXT PAV MRK & MRKS (ARROW) DOLLARS and CENTS	EA	4.000	39
	677	6012		ELIM EXT PAV MRK & MRKS (WORD) DOLLARS and CENTS	EA	4.000	40
	678	6008		PAV SURF PREP FOR MRK (24") DOLLARS and CENTS	LF	404.000	41
	680	6001	006	INSTALL HWY TRF SIG (FLASH BEACON) DOLLARS and CENTS	EA	1.000	42
	680	6002	006	INSTALL HWY TRF SIG (ISOLATED) DOLLARS and CENTS	EA	1.000	43
	680	6004	006	REMOVING TRAFFIC SIGNALS DOLLARS and CENTS	EA	1.000	44
	682	6001		VEH SIG SEC (12")LED(GRN) DOLLARS and CENTS	EA	8.000	45
	682	6002		VEH SIG SEC (12")LED(GRN ARW) DOLLARS and CENTS	EA	4.000	46
	682	6003		VEH SIG SEC (12")LED(YEL) DOLLARS and CENTS	EA	12.000	47



ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	682	6004		VEH SIG SEC (12")LED(YEL ARW) DOLLARS and CENTS	EA	4.000	48
	682	6005		VEH SIG SEC (12")LED(RED) DOLLARS and CENTS	EA	12.000	49
	682	6006		VEH SIG SEC (12")LED(RED ARW) DOLLARS and CENTS	EA	8.000	50
	682	6018		PED SIG SEC (LED)(COUNTDOWN) DOLLARS and CENTS	EA	8.000	51
	682	6049		BACKPLATE W/REFL BRDR(4 SEC) DOLLARS and CENTS	EA	4.000	52
	682	6060		BACKPLATE W/REFL BRDR(3 SEC) DOLLARS and CENTS	EA	8.000	53
	684	6008		TRF SIG CBL (TY A)(12 AWG)(3 CONDR) DOLLARS and CENTS	LF	4,018.000	54
	684	6010		TRF SIG CBL (TY A)(12 AWG)(5 CONDR) DOLLARS and CENTS	LF	4,285.000	55
	684	6012		TRF SIG CBL (TY A)(12 AWG)(7 CONDR) DOLLARS and CENTS	LF	232.000	56
	684	6014		TRF SIG CBL (TY A)(12 AWG)(9 CONDR) DOLLARS and CENTS	LF	630.000	57
	686	6020	002	INS TRF SIG PL AM (S)STR(TY D)LUM DOLLARS and CENTS	EA	2.000	58
	686	6039	002	INS TRF SIG PL AM(S)1 ARM(36')LUM DOLLARS and CENTS	EA	1.000	59

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	686	6043	002	INS TRF SIG PL AM(S)1 ARM(40')LUM DOLLARS and CENTS	EA	3.000	60
	687	6001		PED POLE ASSEMBLY DOLLARS and CENTS	EA	8.000	61
	688	6001		PED DETECT PUSH BUTTON (APS) DOLLARS and CENTS	EA	8.000	62
	688	6003		PED DETECTOR CONTROLLER UNIT DOLLARS and CENTS	EA	1.000	63
	690	6007		REPLACE OF GROUND BOXES DOLLARS and CENTS	EA	7.000	64
	690	6009		REMOVAL OF CABLES DOLLARS and CENTS	LF	1,630.000	65
	690	6029		INSTALL OF SIGNAL RELATED SIGNS DOLLARS and CENTS	EA	8.000	66
	690	6045		REPLACE OF FLASHER CABINET DOLLARS and CENTS	EA	2.000	67
	752	6022		TREE TRIMMING AND BRUSH REMOVAL DOLLARS and CENTS	LF	50.000	68
	6004	6031		ITS COM CBL (ETHERNET) DOLLARS and CENTS	LF	120.000	69
	6056	6001		PREFORMED IN-LANE(TRANS) RUMBLE STRIP DOLLARS and CENTS	LF	160.000	70
	6058	6001		BBU SYSTEM (EXTERNAL BATT CABINET) DOLLARS and CENTS	EA	1.000	71

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	6062	6034		ITS RADIO (DUAL)(5 GHZ/5 GHZ)-I-U DOLLARS and CENTS	EA	1.000	72
	6083	6001		VIDEO IMAGING AND RAD VEH DETEC- TION SYS DOLLARS and CENTS	EA	1.000	73
	6146	6001		INSTALLATION OF BLUETOOTH READER DOLLARS and CENTS	EA	1.000	74
	6185	6002	002	TMA (STATIONARY) DOLLARS and CENTS	DAY	18.000	75
	6350	6001		LEAD LED CHEVRON DOLLARS and CENTS	EA	4.000	76
	6350	6002		LED CHEVRON DOLLARS and CENTS	EA	14.000	77
	6498	6001		SOLAR POWERED LED ROADWAY LUM ASSEM DOLLARS and CENTS	EA	2.000	78

# **CERTIFICATION OF INTEREST IN OTHER BID PROPOSALS FOR THIS WORK**

By signing this proposal, the bidding firm and the signer certify that the following information, as indicated by checking "Yes" or "No" below, is true, accurate, and complete.

- A. Quotation(s) have been issued in this firm's name to other firm(s) interested in this work for consideration for performing a portion of this work.

\_\_\_\_\_ YES

\_\_\_\_\_ NO

- B. If this proposal is the low bid, the bidder agrees to provide the following information prior to award of the contract.

1. Identify firms which bid as a prime contractor and from which the bidder received quotations for work on this project.
2. Identify all the firms which bid as a prime contractor to which the bidder gave quotations for work on this project.

# DISCLOSURE OF LOBBYING ACTIVITIES

Complete this form to disclose lobbying activities pursuant to 31 U.S.C. 1352 (See reverse for public burden disclosure.)

<p>1. Type of Federal Action:</p> <ul style="list-style-type: none"> <li>a. contract</li> <li>b. grant</li> <li>c. cooperative agreement</li> <li>d. loan</li> <li>e. loan guarantee</li> <li>f. loan insurance</li> </ul>	<p>2. Status of Federal Action:</p> <ul style="list-style-type: none"> <li>a. bid/offer/application</li> <li>b. initial award</li> <li>c. post-award</li> </ul>	<p>3. Report Type:</p> <ul style="list-style-type: none"> <li>a. initial filing</li> <li>b. grant</li> </ul> <p style="text-align: right;">For material change only:  year _____ quarter _____  date of last report _____</p>
<p>4. Name and Address of Reporting Entity:</p> <p>? Prime                      ? Subawardee</p> <p style="text-align: center;">Tier _____, if known:</p> <p><b>Congressional District</b>, if known:</p>		<p>5. <b>If Reporting Entity in No. 4 is Subawardee</b>, Enter Name and Address of Prime:</p> <p><b>Congressional District</b>, if known:</p>
<p>6. <b>Federal Department/Agency:</b></p>	<p>7. <b>Federal Program Name/Description:</b></p> <p>CFDA Number, if applicable: _____</p>	
<p>8. <b>Federal Action Number</b>, if known:</p>	<p>9. <b>Award Amount</b>, if known:</p> <p>\$ _____</p>	
<p>10. a. Name and Address of Lobbying Entity (if individual, last name, first name, MI):</p>		<p>b. Individuals Performing Services (including address if different from No. 10a) (last name, first name, MI):</p>
<p>(attach Continuation Sheet(s) SF-LLL-A, if necessary)</p>		
<p>11. Amount of Payment (check all that apply):</p> <p>\$ _____ actual                      planned</p>	<p>13. Type of Payment (check all that apply):</p> <ul style="list-style-type: none"> <li>a. retainer</li> <li>b. one-time fee</li> <li>c. commission</li> <li>d. contingent fee</li> <li>e. deferred</li> <li>f. other; specify: _____</li> </ul>	
<p>12. Form of Payment (check all that apply)</p> <ul style="list-style-type: none"> <li>a. cash</li> <li>b. in-kind; specify:                      nature _____ value _____</li> </ul>		
<p>14. Brief Description of Services Performed or to be Performed and Date(s) of Service, including officer(s), employee(s), or Member(s) contacted, for Payment Indicated in Item 11:</p> <p>(attach Continuation Sheet(s) SF-LLL-A, if necessary)</p>		
<p>15. <b>Continuation Sheet(s) SF-LLL-A attached:</b>                      ? Yes                      ? No</p>		
<p>16. Information requested through this form is authorized by title 31 U.S.C. section 1352. This disclosure of lobbying activities is a material representation of fact upon which reliance was placed by the tier above when this transaction was made or entered into. This disclosure is required pursuant to 31 U.S.C. 1352. This information will be reported to the Congress semi-annually and will be available for public inspection. Any person who fails to file the required disclosure shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.</p>	<p>Signature: _____</p> <p>Print Name: _____</p> <p>Title: _____</p> <p>Telephone No: _____ Date: _____</p>	
<p>FEDERAL USE ONLY</p>		<p>Authorized for Local Reproduction Standard Form - LLL</p>

## **INSTRUCTIONS FOR COMPLETION OF SF-LLL, DISCLOSURE OF LOBBYING ACTIVITIES**

This disclosure form shall be completed by the reporting entity, whether subawardee or prime Federal recipient, at the initiation or receipt of a covered Federal action, or a material change to a previous filing, pursuant to title 31 U.S.C section 1352. The filing of a form is required for each payment or agreement to make payment to any lobbying entity for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with a covered Federal action. Use the SF-LLL-A Continuation Sheet for additional information if the space on the form is inadequate. Complete all items that apply for both the initial filing and material change report. Refer to the implementing guidance published by the Office of Management and Budget for additional information.

1. Identify the type of covered Federal action for which lobbying activity is and/or has been secured to influence the outcome of a covered Federal action.
2. Identify the status of the covered Federal action.
3. Identify the appropriate classification of this report. If this is a follow-up report caused by a material change to the information previously reported, enter the year and quarter in which the change occurred. Enter the date of the last previously submitted report by this reporting entity or this covered Federal action.
4. Enter the full name, address, city, state and zip code of the reporting entity. Include Congressional District, if known. Check the appropriate classification of the reporting entity that designates if it is, or expects to be, a prime or subaward recipient. Identify the tier of the subawardee, e.g., the first subawardee of the prime is the 1st tier. Subawards include but are not limited to subcontracts, subgrants and contract awards under grants.
5. If the organization filing the report in item 4 checks "Subawardee", then enter the full name, address, city, state and zip code of the prime Federal recipient. Include Congressional District, if known.
6. Enter the name of the Federal agency making the award or loan commitment. Include at least one organizational level below agency name, if known. For example, Department of Transportation, United States Coast Guard.
7. Enter the Federal program name or description for the covered Federal action (item 1). If known, enter the full Catalog of Federal Domestic Assistance (CFDA) number for grants, cooperative agreements, loans, and loan commitments.
8. Enter the most appropriate Federal identifying number available for the Federal action identified in item 1 (e.g., Request for Proposal (RFP) number; Invitation for Bid (IFB) number; grant announcement number, the contract, grant, or loan award number; the application/proposal control number assigned by the Federal agency). Include prefixes, e.g., "RFP-DE-90-001."
9. For a covered Federal action where there has been an award or loan commitment by the Federal agency, enter the Federal amount of the award/loan commitment for the prime entity identified in item 4 or 5.
10. (a) Enter the full name, address, city, state and zip code of the lobbying entity engaged by the reporting entity identified in item 4 to influence the covered Federal action.  
(b) Enter the full names of the individual(s) performing services, and include full address if different from 10(a). Enter Last Name, First Name, and Middle Initial (MI).
11. Enter the amount of compensation paid or reasonably expected to be paid by the reporting entity (item 4) to the lobbying entity (item 10). Indicate whether the payment has been made (actual) or will be made (planned). Check all boxes that apply. If this is a material change report, enter the cumulative amount of payment made or planned to be made.
12. Check the appropriate box(es). Check all boxes that apply. If payment is made through an in-kind contribution, specify the nature and value of the in-kind payment.
13. Check the appropriate box(es). Check all boxes that apply. If other, specify nature.
14. Provide a specific and detailed description of the services that the lobbyist has performed, or will be expected to perform, and the date(s) of any services rendered. Include all preparatory and related activity, not just time spent in actual contact with Federal officials. Identify the Federal official(s) or employee(s) contacted or the officer(s), employee(s), or Member(s) of Congress that were contacted.
15. Check whether or not a SF-LLL-A Continuation Sheet(s) is attached.
16. The certifying official shall sign and date the form, print his/her name, title, and telephone number.

Public reporting burden for this collection of information is estimated to average 30 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0046), Washington, D.C. 20503.

# DISCLOSURE OF LOBBYING ACTIVITIES

Approved by OMB

0348-0046

## CONTINUATION SHEET

Reporting Entity: \_\_\_\_\_ Page \_\_\_\_\_ of \_\_\_\_\_

# CONTRACTOR'S ASSURANCE

(Subcontracts-Federal Aid Projects)

By signing this proposal, the contractor is giving assurances that all subcontract agreements will incorporate the Standard Specification and Special Provisions to Section 9.9., Payment Provisions for Subcontractors, all subcontract agreements exceeding \$2,000 will incorporate the applicable Wage Determination Decision, and all subcontract agreements will incorporate the following:

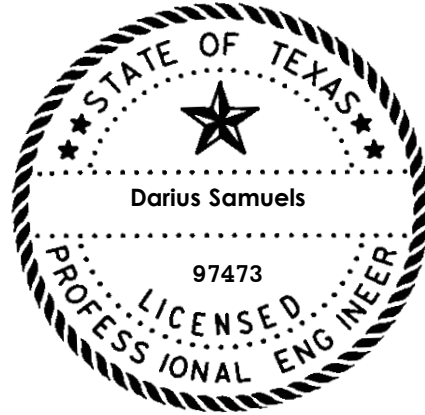
Special Provision	Certification of Nondiscrimination in Employment
Special Provision	Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity (Executive Order 11246)
Special Provision	Standard Federal Equal Employment Opportunity
Construction	Construction Specifications (Executive Order 11246)
Form FHWA 1273	Required Contract Provisions Federal-aid Construction Contracts (Form FHWA 1273 must also be physically attached to subcontracts and all lower-tier subcontracts)
Special Provision	Nondiscrimination (Include provisions of Sections 3.1 – 3.6 in all subcontracts and agreements for materials)
Special Provision	Cargo Preference Act Requirements in Federal-Aid Contracts
Special Provision	Disadvantaged Business Enterprise in Federal-Aid Contracts



# ENGINEER SEAL

Control 0045-11-045, ETC.  
Project STP 2022(800)HES, ETC.  
Highway US 82, ETC.  
County LAMAR, ETC.

The enclosed Texas Department of Transportation Specifications, Special Specifications, Special Provisions, General Notes and Specification Data in this document have been selected by me, or under my responsible supervision as being applicable to this project. Alteration of a sealed document without proper notification to the responsible engineer is an offense under the Texas Engineering Practice Act.



The seal appearing on this document was authorized by  
*Darius Samuels, P.E.*  
MARCH 01, 2023

**County:** LAMAR, ETC.

**Control:** 0045-11-045

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**Sheet:**

## GENERAL NOTES

### General:

Install lighting system, Flashing LED Chevrons, Improve School Zone, Flashing Beacon, traffic signal, and pedestrian push buttons (APS) in accordance with the current Texas Manual on Uniform Traffic Control Devices and the current National Electrical Code unless otherwise specified on the plans.

Electrical licenses and certifications for this project will be as per Item 7 of the current Texas Standard Specifications and any special provisions to Item 7.

Contractor questions on this project are to be addressed to the following individual(s):

#### Sulphur Springs Area Office

Jesse Herrera, P.E. – [Jesse.Herrera@txdot.gov](mailto:Jesse.Herrera@txdot.gov)

Dustin Lyday, P.E. - [Dustin.Lyday@txdot.gov](mailto:Dustin.Lyday@txdot.gov)

#### Traffic Operations

Darius Samuels – [Darius.Samuels@txdot.gov](mailto:Darius.Samuels@txdot.gov)

Contractor questions will be accepted through email, phone, and in person by the above individuals.

Questions may be submitted via the Letting Pre-Bid Q&A web page. This webpage can be accessed from the Notice to Contractors dashboard located at the following Address:

<https://tableau.txdot.gov/views/ProjectInformationDashboard/NoticetoContractors>

All contractor questions will be reviewed by the Engineer. All questions and any corresponding responses that are generated will be posted through the same Letting Pre-Bid Q&A web page.

The Letting Pre-Bid Q&A web page for each project can be accessed by using the dashboard to navigate to the project you are interested in by scrolling or filtering the dashboard using the controls on the left. Hover over the blue hyperlink for the project you want to view the Q&A for and click on the link in the window that pops up.

On Contractor request, construction timelines will be posted to TxDOT's Public FTP at the following Address:

<https://ftp.dot.state.tx.us/pub/txdot-info/Pre-Letting%20Responses/>

The site is organized by District, Project Type (Construction or Maintenance), Letting Date, CCSJ/Project Name.

Dispose of waste materials at an approved site. Furnish written approval from the property owner before disposal of waste materials.

Locate equipment a minimum of 30 feet from roadway when possible. Place signs and barricades as approved.

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Stockpile sites for construction materials must be approved. Give at least 48 hours notification prior to stockpiling material.

Furnish all materials and repair any sod, pavement, sidewalk, or other property damaged during the course of the construction, this is according to Article 7.15 of the standard specification. Ensure that all materials furnished are corrosion resistant and exhibit no rust.

Verify actual location of utilities and take adequate precautions to prevent damage to utilities, storm sewers, and existing signal equipment.

**Item 6 Control of Materials:**

To comply with the latest provisions of Build America, Buy America Act (BABA Act) of the Bipartisan Infrastructure Law, the contractor must submit a notarized original of the TxDOT Construction Material Buy America Certification Form for all items classified as construction materials. This form is not required for materials classified as a manufactured product.

Refer to the Buy America Material Classification Sheet for clarification on material categorization. The Buy America Material Classification Sheet is located at the below link.

<https://www.txdot.gov/business/resources/materials/buy-america-material-classification-sheet.html>

**Item 7 Legal Relations and Responsibilities:**

No significant traffic generator events identified.

**Item 8 Prosecution and Progress:**

Before beginning work on this project submit in writing, for approval, a plan of construction operations outlining in detail a sequence of work to be followed.

Provide a Bar Chart progress schedule for this project.

This project includes SP 008---003 which allows up to a 90-day delay to begin work on the project to acquire materials such as illumination poles, LED Flashing Chevrons, traffic signal poles, ITS and Video Equipment.

Working days will be computed and charged in accordance with Article 8.3.1.4 Standard Work Week.

**Item 9 Measurement and Payment:**

Items of work for the Monthly Estimate will be cut off on the 25<sup>th</sup> of each month. Items of work performed after the 25<sup>th</sup> will be processed and paid on the following month's estimate. Material On Hand (MOH) will cut off on the 20<sup>th</sup> of each month. Special circumstances will be considered on a case-by-case basis.

Maintain all new equipment on the project until accepted by TxDOT.

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**Item 105 Removing Treated and Untreated Base and Asphalt Pavement:**

The contractor will retain all removed material.

**Item 416 Drill shaft foundations:**

The locations shown on the plans for pole foundations are approximate. Achieve the correct signal head placement and clearance before drilling and pouring signal pole foundations. Extend all traffic signal pole foundations at least ten feet below ground.

Dispose of all excavated material off right-of-way at an approved location.

Concrete riprap is required for drill shaft foundations for Roadway Illumination Assemblies as shown on standard sheet RID (2-20).

Provide single pole watertight breakaway electrical connectors shown on the TxDOT's Material Producer List (MPL) in the file "Roadway Illumination and Electrical Supplies." See the latest RID (1-20) standard for additional details.

**Item 502 Barricades, Signs and Traffic Handling:**

The Contractor Force Account "Safety Contingency" that has been established for this project is intended to be utilized for work zone enhancements, to improve the effectiveness of the Traffic Control Plan, that could not be foreseen in the project planning and design stage. These enhancements will be mutually agreed upon by the Engineer and the Contractor's Responsible Person based on weekly or more frequent traffic management reviews on the project. The Engineer may choose to use existing bid items if it does not slow the implementation of enhancement.

The following items will be required for flagger on this project:

1. Flaggers are required to wear a white hard hat while performing flagging operations.
2. Flaggers will be required at the intersection of all State maintained roadways.
3. Flaggers may be required at other high traffic generating intersections as deemed necessary by the Area Engineer.

The traffic control plan for this contract consists of the installation and maintenance of warning signs and other traffic control devices shown in the plans, specification data which may be included in the general notes, applicable provisions of the Texas Manual on Uniform Traffic Control Devices (TMUTCD), traffic control plan sheets included in the plans, standard BC sheets and Item 502 of the Standard Specifications.

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Do not begin Item 502, Barricades, Signs, and Traffic Handling, on the roadway until both of the following conditions are met:

1. The work schedule is approved.
2. No more than 5 workdays will pass between the beginning of Item 502 and the actual commencement of roadway work bid items.

Signing and traffic control for traffic signal work is in accordance with standard sheets WZ (BTS-1)-13, WZ (BTS-2)-13, BC (1)-21 thru BC (12)-21, and the current Texas Manual on Uniform Traffic Control Devices. The standard sheets WZ (BTS-1)-13 and WZ (BTS-2)-13 govern when they conflict with BC (1)-21 – BC (12)-21 sheets. Use major street Traffic Control on all on-system approaches.

\*Furnish and place portable 48" x 48" stop signs with an all-way placard at the intersection when signal is placed in flash or power is off. Portable signs will not be paid for directly but will be considered subsidiary to various bid items. All signing must be approved by the Engineer before work begins.

Cover all signal heads with satisfactory material specified or point down when not in operation.

Furnish a phone number reachable 24 hours a day. Be available to return call within two hours.

Ensure that all travel lanes are open at night.

The final estimate will be withheld until all disturbed areas are covered with at least 70% perennial vegetative cover.

Correct all deficiencies within the time frame noted on the Traffic Control Device Inspection Form 599. Failure to make corrections within time frame specified may result in no payment for this Item for the month of the noted deficiency.

Provide shadow vehicles equipped with Truck Mounted Attenuators (TMA) as shown on Traffic Control Plan (TCP) standards.

### **Item 506 Temporary Erosion, Sedimentation & Environmental Controls:**

The Storm Water Pollution Prevention Plan (SWP3) consists of temporary erosion control measures needed and provided for under this Item. The disturbed area is less than one acre and use of erosion control measures is not anticipated. If physical conditions encountered at the job site require necessary controls, BMP installation, maintenance, and removal will be paid as extra work on a force account basis per Articles 4.4 and 9.7. (Total project: 750 LF TEMP SEDMT CONT FENCE)

It is the intent of this contract that no disturbance of vegetation occurs as a result of the roadway operations. However, if vegetation is disturbed, treat the disturbed area as follows at no additional costs to the department.

***Item 506 Temporary Erosion, Sedimentation & Environmental Controls (Cont.):***

Place temporary sediment control fence, or an alternative material as approved, to minimize and control the amount of sediment that might enter receiving waters from the disturbed area(s). Maintain the sediment controls in a satisfactory manner until the disturbed area(s) is stabilized. After the area(s) has been stabilized, remove the sediment controls. The location and length of the sediment controls will be determined.

The work performed, materials furnished, equipment, labor, tools, and incidentals will not be measured or paid for directly but will be considered subsidiary to the various bid items.

**Item 529 Concrete Curb, Gutter, And Combined Curb and Gutter:**

Reinforcing steel shall be required in all curb/curb and gutter unless otherwise directed by the Engineer.

**Item 531 Sidewalks:**

Joints shall be tooled or saw-cut every 4' to a depth of 1 1/2" unless otherwise directed. All expansion joints shall consist of fiberboard and sealed with a Class 7 silicone sealant according to DMS-6310.

All longitudinal joints adjacent to curb shall have fiberboard and sealed with a Class 7 silicone sealant according to DMS-6310.

The surfaces of sloped areas shall be broomed to provide a slip resistant finish.

**Item 610 Roadway Illumination Assemblies:**

Luminaries are located as shown on plans.

Label each luminaire pole and controller cabinet with a number according to the plans. Provide 4 in. black vinyl characters or stenciled painted characters.

Fabricate steel roadway illumination poles in accordance with TxDOT RIP standard sheets. Poles fabricated according to the RIP Standards require no shop drawings.

Alternate designs to RIP 2019 or the use of aluminum to fabricate poles will require the submission of shop drawings electronically. For instructions on submitting shop drawings electronically go to TxDOT home page, Business with TxDOT, Bridge information, Shop drawings. File is titled: "Guide to Electronic Shop Drawing Submittal."

After construction is complete, all circuits are checked, and it is determined that the luminaires are ready to turn on, notify District Transportation Operations to perform a preliminary check of all illumination plan details. When District Transportation Operations deem the system is complete, begin the test period.

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**Item 618 Conduit:**

Use rigid metal sweep ells for all conduits entering the controller base.

Rigid metallic conduit elbows that are required to be installed on conduit system will not be paid for directly but will be considered subsidiary to the various bid items.

Where the rigid metal conduit is exposed at any point, and where rigid metal conduit extends into ground boxes, bond the metal conduit to the grounding conductor with grounding type bushings or by other UL listed grounding connectors as approved.

Attach all conduits to any type pole with conduit straps spaced at maximum intervals of five feet and within three feet of each side of any enclosure.

Provide boring equipment capable of tracking location and depth of bore head at all times. Bore head must be able to change bore direction without removing bore head. Mark depth of conduit at ten feet intervals along the length of bore and provide a copy of depth and location information.

Make all threaded conduit and conduit fittings wrench tight.

Shore pits for jacking or boring conduit when closer than five feet to the back of the curb. Consider shoring subsidiary to this item.

Maintain a minimum vertical cover of 24 inches on all conduits except when it crosses flow line at which point it is a minimum of 36 inches.

Maximum depth of sweep ells will be 36 inches unless otherwise shown.

**Item 620 Electric Conductor:**

Install a continuous #6 AWG XHHW green ground wire throughout the traffic signal system. Bond grounding conductors that share the same conduit, junction box, ground box or structure at every accessible point in accordance with the current National Electric Code and TxDOT Standard Sheets.

**Item 621 Tray Cable:**

Identify signal system luminaire wiring at the fuse holder in the pole base as to line side, load side, and luminaire number.

Label tray Cable in the load center within 2 inches of termination as to what they serve. (FB A, FB C, ILLUM A, ILLUM B, etc.)

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**Item 628 Electrical services:**

Install according to utility company requirements. Coordinate service with Engineer.

**Item 644 Small Roadside Sign Support and Assemblies:**

Use the Southern Plains style triangular slip base for all post types.  
Stake proposed sign locations and obtain Engineer's approval of locations prior to placing foundations.

Contact the Engineer to obtain updated curve travel speeds before manufacture of curve speed warning signs.

Upon removal of sign assemblies, deliver sign faces to TxDOT office at 3904 US 75 South, Sherman TX. Dispose of foundations, posts, and hardware.

**Item 666 Reflectorized Pavement Markings:**

No stripe will be placed unless the inspector is present and at least 24 hours advance notice has been given by the Contractor.

Lay out pilot lines for approval 24 hours prior to all final pavement marking applications

**Item 680 Installation of Highway Traffic Signals:**

Send all signal related material submittals to District Traffic Operations for approval.

Use pre-qualified materials and products from the TxDOT "Material Producer List" on the TxDOT website.

Traffic Signal Cabinet, Flasher Cabinet, Bluetooth Reader, and cellular modem will be supplied by the Department. Install as shown on the plans or as directed by engineer.

All signal control equipment furnished has been shop tested. The contractor must sign for the equipment received from TxDOT Signal Shop.

Electrical licenses and certifications for this project will be as per Item 7 of the current Texas Standard Specifications and any special provisions to Item 7.

Furnish all materials and repair any sod, pavement, sidewalk, or other property damaged during the course of the construction, this is according to Article 7.15 of the standard specification.

Ensure that all materials furnished are corrosion resistant and exhibit no rust.

Verify actual location of utilities and take adequate precautions to prevent damage to utilities, storm sewers, and existing signal equipment.



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Return removed material to TxDOT unless otherwise approved by engineer.

Pick up all TxDOT furnished equipment at one time at the District Signal Shop located at 1365 North Main Street in Paris for the intersection location. Assume responsibility for all such equipment until final acceptance of the project.

After all signal construction is complete and the equipment is ready to turn on, District Transportation Operation will perform a preliminary check of all signal plan details. When the installation is complete, all safety related items on the punch list are completed, the equipment will be activated. This will start the thirty-day test period.

**Item 682 Vehicle and Pedestrian Signal Heads:**

Mount vehicle heads horizontal except where noted on plans.

All vehicle heads are Type A (vertical) for traffic signals and Type C for Flashing Beacons unless otherwise noted on plans.

Mount signal heads so that the bottom of the head is between eighteen and nineteen feet above the pavement surface. Mount at the same elevation when there are two or more heads on the same support.

Mount each signal head plumb and aim parallel with the lane it is controlling, unless otherwise directed.

Adjust the location of signal heads as needed so that one head does not block the view of another head.

**Item 684 Traffic Signal Cable:**

Expose no cables unless shown on plans.

Do not strip back the outer jacket of Type A signal cable entering the head until it is inside the signal head. Terminate all field wiring in the bottom section of the signal head.

Strip back the outer jacket of Type A signal cable to within two inches above conduit in the controller cabinet.

Leave an extra length of five feet coiled in the controller cabinet for each cable run to the controller cabinet.

Label all cables going to signal heads in the hand hole according to phase, direction and position (ex: 02 NB RT). Label field wiring terminated in the cabinet within two inches of termination by phase and direction.

Tie together and bond all wires in pole access compartments colored solid green to pole ground.

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***Item 684 Traffic Signal Cable (Cont.):***

All exposed cables shown on plans have a drip loop of two or more five to six-inch diameter turns.

Test conductors for continuity. Reject any conductor testing more than ten-ohms resistance.

**Item 686 Traffic Signal Pole Assemblies (Steel):**

Plug all holes in signal poles and mast arms with metal plugs or caps colored to match poles. Replace terminal strips with marathon type strips and fuse blocks.

**Item 687 Pedestal Pole Assemblies:**

Furnish each pedestal pole with one 12-position terminal block of the same type furnished with mast arm poles.

Pedestrian foundations must be flush with finished grade. The locations shown on the plans for pole foundations are approximate.

Dispose of all excavated material off right-of-way at an approved location.

**Item 688 Pedestrian Detectors:**

Install Accessible (Audible) Pedestrian Signal (APS) systems as shown on the plans or as directed by the engineer. Contractor shall do a site survey to verify proper APS for each location and get approval for each APS prior to purchase and installation. Any wiring necessary in the signal pole and cabinet will not be paid for directly but will be considered subsidiary to the pay item.

To maintain clearance to button, use mounting extender iNavigator PBS or PBF2 either 6" or 12". To maintain close to the original button height, use the iN-EXTANG-XX extender. These extenders will be considered subsidiary to the pay item.

**Item 690 Maintenance of Traffic Signals:**

Replace of Flasher Cabinet – Replace current school zone flasher controller equipment with supplied school zone flasher controller equipment (2 each) inside existing school zone flasher cabinet.

School zone flasher cabinet and controller will be furnished by TXDOT.

**Item 6058 Battery Backup System (BBU):**

Install battery backup system as called for and, in a manner, as directed by Engineer. The BBU enclosure shall have an external locking generator access door with a L5-30 F1 plug, be a

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minimum of 21" wide, and include a remote battery management system (example Myers MP2000E-TBE UPS, PTS-722535-G PTS/MBPS with generator option, and ICBM Battery Manager Kit for 48v 1 string in a minimum 21" wide cabinet or equal).

Cat 5e cable shall be installed to connect the BBU to the switch in the signal cabinet and any wire/material needed to connect existing service conductors to the BBU and back to the signal cabinet are to be installed and are considered subsidiary to the pay item.

**Item 6083 Video Imaging and Radar Vehicle Detection System (VIRVDS):**

Leave an extra 5 ft. of cable inside controller cabinet. Secure the drip loop using cable ties suitable for outdoor use. Seal VIRVDS cable ends at all times to prevent moisture contamination. Identify VIRVDS communications cable runs by color tape on both ends of the runs and at hand holes. Use different color tape for each run.

Detection areas are in accordance to TTI guidelines (or as directed by engineer). Detection zones shown on plans are for informational purposes only.

Furnish documentation as to how the detection zones are setup, (example: where the detector is mapped to, how the detection cards are identified, if there are any extends or delays on the detection zones or in the VIRVDS system, etc.)

The VIRVDS system will transmit and receive all information needed for detection setup, monitoring vehicle detection while viewing traffic flow and interrogating all required stored data. This information will be accessible at any remote location by any new or existing computer that has Windows 10 Professional software.

Provide an Ethernet device in the controller cabinet for remote communications with each VIRVDS system. Communications with VIRVDS will be made by Ethernet connection with no additional hardware. The system shall display 4 camera views simultaneously with overlays on each camera view without having to select another camera view. The system will view video with detection zones overlaid on the same field of view including radar operations while monitoring actual operation, during setup and while editing detection zones.

Minimum signal cabinet VIRVDS monitor size is 10".

A managed Ethernet switch shall be included with each VIRVDS system and is considered subsidiary to ITEM 6083. The switch shall consist of a minimum of eight 10/100 Ethernet ports and two gigabit ports (8+2G) and shall be an all-in-one firewall/NAT/VPN/router/switch (example MOXA EDR-810-VPN-2GSFP or equal) as well as any other equipment needed for remote communication.

Any items not specifically listed in the table below or described in the General notes needed for connection and communication will be required and are considered subsidiary to ITEM 6083.

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**Required Items for Item 6083:**

Description	Not Required	Required
Central Control Workstation (Described in General Notes)	X	
TS-2 interface		X
Camera adjustment. Furnish adjustment module. (1 per project)	X	
Field Communications Link Cat5e as specified by manufacture		X
System Set-Up: Video Monitor with interface software (1 for each intersection)		X
Field setup computer (Tablet as described in General Notes.) (1- per project)		X
Operation from Control. System will transmit and receive all information needed for detector setup, monitor the vehicle detection, view the vehicle traffic flow and interrogate all required stored data from any desktop or laptop that has the operating software on it.		X

Field setup computer (12" Rugged Tablet) must meet the following minimum requirements:

Intel Core i7-8650U Processor

16 GB 1866MHz LPDDR3 Memory

M.2 512 GB PCIe NVMe Class 40 Opal 2.0 SED Drive

Active Pen for 12" Rugged Tablet

Desktop Dock for 12" Rugged Tablet

Keyboard Cover with Kickstand for Rugged Tablet

Intel 8265 Wi-Fi + BT 4.2 Wireless Card (2x2)

2-cell (34Wh) Lithium Ion Primary Battery

2-cell (34Wh) Lithium Ion Secondary Battery

45-Watt AC Adaptor

Battery Charger for Rugged Tablet

Windows 10 Professional 64bit with Recovery USB

WLAN Chassis 11.6 FHD Outdoor-Readable Glove-Capable Touchscreen w/Gorilla Glass

Micro Serial Port

USB to Serial (9 pin) Adaptor

USB to Ethernet Adaptor

Field setup computer configuration will be submitted to the District Signal Shop to verify it meets the minimum requirements prior to purchase and the computer to be provided at the start of construction.

Supply Iteris Vantage Next Video Imaging and Radar Vehicle Detection system (VIRVDS) with SPM as one unit in accordance with Item 6083 and includes but not limited to:

Location	Vector camera/radar units	Vantage Next shelf-mount CCU's	10" Color Monitors	Cat5e Cable as specified by manufacture and as shown (LF) *	System Set-up
US 69 at SH 11/SH 160	4**	1	1	On plans	1

\*Length is estimated. \*\*May need mounting bracket.

Install VIRVDS cameras directly to the mast arm in accordance with the details shown in the plans and shall be capable of monitoring 3 to 4 lanes of oncoming traffic. Provide a mounting bracket to mount VIRVDS cameras if needed which is subsidiary to the installation of this item.

The VIRVDS will be tested in a typical intersection application.

Provide ample personnel, equipment, and any necessary incidentals to perform testing for detection accuracy, count and flow rate accuracy, speed accuracy, occupancy accuracy and classification accuracy of the VIRVDS in accordance with this item and as directed by the Engineer.

**Item 6185 Truck Mounted Attenuators:**

Use TMAs for in situations where work vehicles may encroach active traffic lanes or as directed.

Shadow vehicles with truck mounted attenuator (TMA) are required on the traffic control plan and TCP standards for this project. The contractor will be responsible for determining if one or more of these traffic control operations will be ongoing at the same time to determine the total number of TMAs needed for the project.

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**Item 6350 – Dynamic LED Curve Warning System:**

Provide 30” X 36” Chevron Signs (W1-8 Sign) with LED Curve Warning System. Refer to Summary of Small Signs for sign assembly type.

**Item 6498 Solar-Powered LED Roadway Luminaire Assemblies:**

Supply a Greenshine solar luminaire assembly which includes 60-Watt Type II NSB Pro Luminaire or equivalent. Supply luminaire pole that complies with item 610. The complete solar luminaire assembly and luminaire pole will be paid for under this item.

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HIGHWAY : US 82, ETC  
COUNTY : LAMAR, ETC

TEXAS DEPARTMENT OF TRANSPORTATION

**GOVERNING SPECIFICATIONS AND SPECIAL PROVISIONS**

ALL SPECIFICATIONS AND SPECIAL PROVISIONS APPLICABLE TO THIS PROJECT ARE IDENTIFIED AS FOLLOWS:

STANDARD SPECIFICATIONS: ADOPTED BY THE TEXAS DEPARTMENT OF  
----- TRANSPORTATION NOVEMBER 1, 2014.  
STANDARD SPECIFICATIONS ARE INCORPORATED  
INTO THE CONTRACT BY REFERENCE.

ITEMS 1 TO 9 INCL., GENERAL REQUIREMENTS AND COVENANTS  
ITEM 105 REMOVING TREATED AND UNTREATED BASE AND ASPHALT PAVEMENT  
ITEM 132 EMBANKMENT (100) (160) (204) (210) (216) (260) (400)  
ITEM 416 DRILLED SHAFT FOUNDATIONS (405) (420) (421) (423) (440) (448)  
ITEM 432 RIPRAP (247) (420) (421) (431) (440)  
ITEM 500 MOBILIZATION  
ITEM 502 BARRICADES, SIGNS, AND TRAFFIC HANDLING  
ITEM 506 TEMPORARY EROSION, SEDIMENTATION, AND ENVIRONMENTAL  
CONTROLS (161) (432) (556)  
ITEM 529 CONCRETE CURB, GUTTER, AND COMBINED CURB AND GUTTER (360)  
(420) (421) (440)  
ITEM 531 SIDEWALKS (104) (360) (420) (421) (440) (530)  
ITEM 610 ROADWAY ILLUMINATION ASSEMBLIES (416) (421) (432) (441) (442)  
(445) (449) (614) (616) (618) (620) (622) (624) (628)  
ITEM 618 CONDUIT (400) (476)  
ITEM 620 ELECTRICAL CONDUCTORS (610) (628)  
ITEM 621 TRAY CABLE (620)  
ITEM 622 DUCT CABLE (400) (620)  
ITEM 624 GROUND BOXES (420) (421) (432) (440) (618) (620)  
ITEM 628 ELECTRICAL SERVICES (441) (445) (449) (618) (620) (627) (656)  
ITEM 644 SMALL ROADSIDE SIGN ASSEMBLIES (421) (440) (441) (442) (445)  
(636) (643) (656)  
ITEM 666 RETROREFLECTORIZED PAVEMENT MARKINGS (316) (502) (662) (677)  
(678) <6438>  
ITEM 677 ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS (300)  
(302) (316) <3096>  
ITEM 678 PAVEMENT SURFACE PREPARATION FOR MARKINGS (677)  
ITEM 680 HIGHWAY TRAFFIC SIGNALS (416) (610) (618) (624) (625) (627)  
(628) (636) (656) (682) (684) (686) (688)  
ITEM 682 VEHICLE AND PEDESTRIAN SIGNAL HEADS

ITEM 684 TRAFFIC SIGNAL CABLES  
 ITEM 686 TRAFFIC SIGNAL POLE ASSEMBLIES (STEEL) (416) (421) (441)  
 (442) (445) (449)  
 ITEM 687 PEDESTAL POLE ASSEMBLIES (445) (449) (656) (682)  
 ITEM 688 PEDESTRIAN DETECTORS AND VEHICLE LOOP DETECTORS (618)  
 (624) (682) (684)  
 ITEM 690 MAINTENANCE OF TRAFFIC SIGNALS (416) (421) (476) (610) (618)  
 (620) (622) (624) (625) (627) (628) (636) (656) (680) (682) (684)  
 (685) (686) (687) (688)  
 ITEM 752 TREE AND BRUSH REMOVAL

SPECIAL PROVISIONS: SPECIAL PROVISIONS WILL GOVERN AND TAKE  
 ----- PRECEDENCE OVER THE SPECIFICATIONS ENUMERATED  
 HEREON WHEREVER IN CONFLICT THEREWITH.

REQUIRED CONTRACT PROVISIONS, FEDERAL-AID CONSTRUCTION CONTRACTS  
 (FORM FHWA 1273)

WAGE RATES

SPECIAL PROVISION "NONDISCRIMINATION" (000---002)  
 SPECIAL PROVISION "CERTIFICATION OF NONDISCRIMINATION IN EMPLOYMENT"  
 (000---003)  
 SPECIAL PROVISION "NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO  
 ENSURE EQUAL EMPLOYMENT OPPORTUNITY (EXECUTIVE  
 ORDER 11246" (000---004)  
 SPECIAL PROVISION "STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY  
 CONSTRUCTION CONTRACT SPECIFICATIONS" (000---005)  
 SPECIAL PROVISION "ONTHEJOB TRAINING PROGRAM" (000---006)  
 SPECIAL PROVISION "CERTIFICATE OF INTERESTED PARTIES (FORM 1295)"  
 (000--1019)  
 SPECIAL PROVISION "SCHEDULE OF LIQUIDATED DAMAGES" (000--1243)  
 SPECIAL PROVISION "CARGO PREFERENCE ACT REQUIREMENTS IN FEDERAL AID  
 CONTRACTS" (000---241)  
 SPECIAL PROVISION "DISADVANTAGED BUSINESS ENTERPRISE IN FEDERAL AID  
 CONTRACTS" (000---394)  
 SPECIAL PROVISION "IMPORTANT NOTICE TO CONTRACTORS" (000---395)  
 SPECIAL PROVISION "NOTICE OF CONTRACTOR PERFORMANCE EVALUATIONS"  
 (000---659)  
 SPECIAL PROVISIONS TO ITEM 2 (002---009) (002---011) (002---013)  
 SPECIAL PROVISIONS TO ITEM 3 (003---011) (003---013)  
 SPECIAL PROVISIONS TO ITEM 5 (005---002) (005---003)  
 SPECIAL PROVISIONS TO ITEM 6 (006---012) (006---030)  
 SPECIAL PROVISIONS TO ITEM 7 (007---004) (007---008) (007---010)  
 (007---011)  
 SPECIAL PROVISIONS TO ITEM 8 (008---003) (008---030) (008---033)  
 SPECIAL PROVISIONS TO ITEM 9 (009---010) (009---011)  
 SPECIAL PROVISION TO ITEM 247 (247---003)  
 SPECIAL PROVISION TO ITEM 300 (300---020)  
 SPECIAL PROVISION TO ITEM 302 (302---003)  
 SPECIAL PROVISION TO ITEM 316 (316---002)  
 SPECIAL PROVISION TO ITEM 420 (420---001)  
 SPECIAL PROVISION TO ITEM 421 (421---010)  
 SPECIAL PROVISION TO ITEM 440 (440---004)



SPECIAL PROVISION TO ITEM 441 (441---004)  
 SPECIAL PROVISION TO ITEM 442 (442---001)  
 SPECIAL PROVISION TO ITEM 448 (448---001)  
 SPECIAL PROVISION TO ITEM 449 (449---002)  
 SPECIAL PROVISION TO ITEM 502 (502---008)  
 SPECIAL PROVISION TO ITEM 506 (506---002)  
 SPECIAL PROVISION TO ITEM 636 (636---001)  
 SPECIAL PROVISION TO ITEM 643 (643---001)  
 SPECIAL PROVISION TO ITEM 656 (656---001)  
 SPECIAL PROVISION TO ITEM 666 (666---007)  
 SPECIAL PROVISION TO ITEM 680 (680---006)  
 SPECIAL PROVISION TO ITEM 686 (686---002)  
 SPECIAL PROVISION TO SPECIAL SPECIFICATION ITEM 6185 (6185--002)

SPECIAL SPECIFICATIONS:

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ITEM 3096 ASPHALTS, OILS, AND EMULSIONS <300>  
 ITEM 6004 NETWORKING INTELLINGENT TRANSPORTATION SYSTEM (ITS)  
 COMMUNICATIONS CABLE  
 ITEM 6056 PREFORMED IN-LANE (TRANSVERSE)/CENTERLINE RUMBLE STRIPS  
 ITEM 6058 BATTERY BACK-UP SYSTEM FOR SIGNAL CABINETS (420)(620)  
 ITEM 6062 INTELLIGENT TRANSPORTATION SYSTEM (ITS) RADIO  
 ITEM 6083 VIDEO IMAGING AND RADAR VEHICLE DETECTION SYSTEM  
 ITEM 6146 BLUETOOTH READER  
 ITEM 6185 TRUCK MOUNTED ATTENUATOR (TMA) AND TRAILER ATTENUATOR (TA)  
 ITEM 6350 DYNAMIC LED CURVE WARNING SYSTEM  
 ITEM 6438 MOBILE RETROREFLECTIVITY DATA COLLECTION FOR PAVEMENT  
 MARKINGS  
 ITEM 6498 SOLAR POWERED LED ROADWAY LUMINAIRE ASSEMBLIES

GENERAL: THE ABOVE-LISTED SPECIFICATION ITEMS ARE THOSE UNDER WHICH  
 ----- PAYMENT IS TO BE MADE. THESE, TOGETHER WITH SUCH OTHER  
 PERTINENT ITEMS, IF ANY, AS MAY BE REFERRED TO IN THE ABOVE-  
 LISTED SPECIFICATION ITEMS, AND INCLUDING THE SPECIAL  
 PROVISIONS LISTED ABOVE, CONSTITUTE THE COMPLETE SPECIFI-  
 CATIONS FOR THIS PROJECT.

**Control**     **0045-11-045, ETC.**  
**Project**     **STP 2022(800)HES, ETC.**  
**Highway**    **US 82, ETC.**  
**County**     **LAMAR, ETC.**

**DISADVANTAGED BUSINESS ENTERPRISE  
REQUIREMENTS**

The following goal for disadvantaged business enterprises is established:

**DBE  
3.0%**

**Certification of DBE Goal Attainment**

**By signing the proposal, the Bidder certifies that the above DBE goal will be met by committing to DBE participation that meets or exceeds the goal or providing adequate documentation of good faith efforts (GFE) to achieve the goal.**

**The DBE participation or GFE must be submitted within five (5) calendar days after bid opening. If the fifth day falls on a weekend or a day when TxDOT offices are closed, the deadline moves to the next business day.**

**The Department may impose remedies as defined by state or local law if a bidder fails to submit required documentation, including forfeiting the bid proposal guaranty and exclusion from rebidding on the contract if it is re-advertised.**

## **CHILD SUPPORT STATEMENT**

**Under Section 231.006, Family Code, the vendor or applicant certifies that the individual or business entity named in this contract, bid, or application is not ineligible to receive the specified grant, loan, or payment and acknowledges that this contract may be terminated and payment may be withheld if this certification is inaccurate.**

## CONFLICT OF INTEREST CERTIFICATION

Pursuant to Texas Government Code Section 2261.252(b), the Department is prohibited from entering into contracts in which Department officers and employees have a financial interest.

By signing the Contract, the Contractor certifies that it is not prohibited from entering into a Contract with the Department as a result of a financial interest as defined under Texas Government Code Section 2261.252(b), and that it will exercise reasonable care and diligence to prevent any actions or conditions that could result in a conflict of interest with the Department.

The Contractor also certifies that none of the following individuals, nor any of their family members within the second degree of affinity or consanguinity, owns 1% or more interest or has a financial interest as defined under Texas Government Code Section 2261.252(b) in the Contractor:

- Any member of the Texas Transportation Commission; and
- The Department's Executive Director, General Counsel, Chief of Procurement and Field Support Operations, Director of Procurement, and Director of Contract Services.

Violation of this certification may result in action by the Department.

## E-VERIFY CERTIFICATION

Pursuant to Texas Transportation Code §223.051, all TxDOT contracts for construction, maintenance, or improvement of a highway must include a provision requiring Contractors and subcontractors to use the U.S. Department of Homeland Security's E-Verify system to determine employment eligibility. By signing the contract, the Contractor certifies that prior to the award of the Contract:

- the Contractor has registered with and will, to the extent permitted by law, utilize the United States Department of Homeland Security's E-Verify system during the term of the Contract to determine the eligibility of all persons hired to perform duties within Texas during the term of the agreement; and
- the Contractor will require that all subcontractors also register with and, to the extent permitted by law, utilize the United States Department of Homeland Security's E-Verify system during the term of the subcontract to determine the eligibility of all persons hired to perform duties within Texas during the term of the agreement.

Violation of this requirement constitutes a material breach of the Contract, subjects a subcontractor to removal from the Contract, and subjects the Contractor or subcontractors to possible sanctions in accordance with Title 43, Texas Administrative Code, Chapter 10, Subchapter F, "Sanctions and Suspension for Ethical Violations by Entities Doing Business with the Department."

## Certification Regarding Disclosure of Public Information

Pursuant to Subchapter J, Chapter 552, Texas Government Code, contractors executing a contract with a governmental body that results in the expenditure of at least \$1 million in public funds must:

- 1) preserve all contracting information\* as provided by the records retention requirements applicable to Texas Department of Transportation (TxDOT) for the duration of the contract,
- 2) on request of TxDOT, promptly provide any contracting information related to the contract that is in the custody or possession of the entity, and
- 3) on completion of the contract, either:
  - A. provide, at no cost to TxDOT, all contracting information related to the contract that is in the custody or possession of the entity, or
  - B. preserve the contracting information related to the contract as provided by the records retention requirements applicable to TxDOT

The requirements of Subchapter J, Chapter 552, Government Code, may apply to this contract, and the contractor or vendor agrees that the contract can be terminated if the contractor or vendor knowingly or intentionally fails to comply with a requirement of that subchapter.

By entering into Contract, the Contractor agrees to:

- provide, or make available, to TxDOT and any authorized governmental investigating or auditing agency all records, including electronic and payment records related to the contract, for the same period provided by the records retention schedule applicable to TxDOT, and
- ensure that all subcontracts include a clause requiring the same.

\* As defined in Government Code §552.003, “Contracting information” means the following information maintained by a governmental body or sent between a governmental body and a vendor, contractor, potential vendor, or potential contractor:

- 1) information in a voucher or contract relating to the receipt or expenditure of public funds by a governmental body;
- 2) solicitation or bid documents relating to a contract with a governmental body;
- 3) communications sent between a governmental body and a vendor, contractor, potential vendor, or potential contractor during the solicitation, evaluation, or negotiation of a contract;
- 4) documents, including bid tabulations, showing the criteria by which a governmental body evaluates each vendor, contractor, potential vendor, or potential contractor responding to a solicitation and, if applicable, an explanation of why the vendor or contractor was selected; and
- 5) communications and other information sent between a governmental body and a vendor or contractor related to the performance of a final contract with the governmental body or work performed on behalf of the governmental body.

## CERTIFICATION TO NOT BOYCOTT ISRAEL

Pursuant to Texas Government Code §2271.002, the Department must include a provision requiring a written verification affirming that the Contractor does not boycott Israel, as defined in Government Code §808.001, and will not boycott Israel during the term of the contract. This provision applies to a contract that:

- 1) is with a Contractor that is not a sole proprietorship,
- 2) is with a Contractor with 10 or more full-time employees, and
- 3) has a value of \$100,000 or more.

By signing the contract, the Contractor certifies that it does not boycott Israel and will not boycott Israel during the term of this contract. "Boycott" means refusing to deal with, terminating business activities with, or otherwise taking any action that is intended to penalize, inflict economic harm on, or limit commercial relations specifically with Israel, or with a person or entity doing business in Israel or in an Israeli-controlled territory, but does not include an action made for ordinary business purposes.

Violation of this certification may result in action by the Department.

## CERTIFICATION TO NOT BOYCOTT ENERGY COMPANIES

Pursuant to Texas Government Code §2274.002, the Department must include a provision requiring a written verification affirming that the Contractor does not boycott energy companies, as defined in Government Code §809.001, and will not boycott energy companies during the term of the contract. This provision applies to a contract that:

- 1) is with a Contractor that is not a sole proprietorship,
- 2) is with a Contractor with 10 or more full-time employees, and
- 3) has a value of \$100,000 or more.

By signing the contract, the Contractor certifies that it does not boycott energy companies and will not boycott energy companies during the term of this contract. "Boycott" means taking any action that is intended to penalize, inflict economic harm on, or limit commercial relations with a company because the company: (1) engages in the exploration, production, utilization, transportation, sale, or manufacturing of fossil fuel-based energy and does not commit or pledge to meet environmental standards beyond applicable federal and state law; or (2) does business with a company described by (1).

Violation of this certification may result in action by the Department.



## CERTIFICATION TO NOT DISCRIMINATE AGAINST FIREARM ENTITIES OR FIREARM TRADE ASSOCIATIONS

Pursuant to Texas Government Code §2274.002, the Department must include a provision requiring a written verification affirming that the Contractor:

- 1) does not have a practice, policy, guidance, or directive that discriminates against a firearm entity or firearm trade association, as defined in Government Code §2274.001, and
- 2) will not discriminate against a firearm entity or firearm trade association during the term of the contract.

This provision applies to a contract that:

- 1) is with a Contractor that is not a sole proprietorship,
- 2) is with a Contractor with 10 or more full-time employees, and
- 3) has a value of \$100,000 or more.

By signing the contract, the Contractor certifies that it does not discriminate against a firearm entity or firearm trade association as described and will not do so during the term of this contract. "Discriminate against a firearm entity or firearm trade association" means, with respect to the entity or association, to: (1) refuse to engage in the trade of any goods or services with the entity or association based solely on its status as a firearm entity or firearm trade association; (2) refrain from continuing an existing business relationship with the entity or association based solely on its status as a firearm entity or firearm trade association; or (3) terminate an existing business relationship with the entity or association based solely on its status as a firearm entity or firearm trade association. "Discriminate against a firearm entity or firearm trade association" does not include: (1) the established policies of a merchant, retail seller, or platform that restrict or prohibit the listing or selling of ammunition, firearms, or firearm accessories; (2) a company's refusal to engage in the trade of any goods or services, decision to refrain from continuing an existing business relationship, or decision to terminate an existing business relationship to comply with federal, state, or local law, policy, or regulations or a directive by a regulatory agency, or for any traditional business reason that is specific to the customer or potential customer and not based solely on an entity's or association's status as a firearm entity or firearm trade association.

Violation of this certification may result in action by the Department.

# PROHIBITION ON CERTAIN TELECOMMUNICATIONS EQUIPMENT OR SERVICES

The Federal Register Notice issued the Final Rule and states that the amendment to 2 CFR 200.216 is effective on August 13, 2020. The new 2 CFR 200.471 regulation provides clarity that the telecommunications and video surveillance costs associated with 2 CFR 200.216 are unallowable for services and equipment from these specific providers. OMB's Federal Register Notice includes the new 2 CFR 200.216 and 2 CFR 200.471 regulations.

<https://www.federalregister.gov/documents/2020/08/13/2020-17468/guidance-for-grants-and-agreements>

Per the Federal Law referenced above, use of services, systems, or services or systems that contain components produced by any of the following manufacturers is strictly prohibited for use on this project. Therefore, for any telecommunications, CCTV, or video surveillance equipment, services or systems cannot be manufactured by, or have components manufactured by:

- Huawei Technologies Company,
- ZTE Corporation (any subsidiary and affiliate of such entities),
- Hytera Communications Corporation,
- Hangzhou Hikvision Digital Technology Company,
- Dahua Technology Company (any subsidiary and affiliate of such entities).

Violation of this prohibition will require replacement of the equipment at the contractor's expense.

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

- I. General
- II. Nondiscrimination
- III. Non-segregated Facilities
- IV. Davis-Bacon and Related Act Provisions
- V. Contract Work Hours and Safety Standards Act Provisions
- VI. Subletting or Assigning the Contract
- VII. Safety: Accident Prevention
- VIII. False Statements Concerning Highway Projects
- IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
- X. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion
- XI. Certification Regarding Use of Contract Funds for Lobbying
- XII. Use of United States-Flag Vessels:

**ATTACHMENTS**

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

**I. GENERAL**

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under title 23, United States Code, as required in 23 CFR 633.102(b) (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services). 23 CFR 633.102(e).

The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider. 23 CFR 633.102(e).

Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services) in accordance with 23 CFR 633.102. The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

Contracting agencies may reference Form FHWA-1273 in solicitation-for-bids or request-for-proposals documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract). 23 CFR 633.102(b).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work

performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract. 23 CFR 633.102(d).

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. 23 U.S.C. 114(b). The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors. 23 U.S.C. 101(a).

**II. NONDISCRIMINATION** (23 CFR 230.107(a); 23 CFR Part 230, Subpart A, Appendix A; EO 11246)

The provisions of this section related to 23 CFR Part 230, Subpart A, Appendix A are applicable to all Federal-aid construction contracts and to all related construction subcontracts of \$10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR Part 60, 29 CFR Parts 1625-1627, 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), and related regulations including 49 CFR Parts 21, 26, and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding \$10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41 CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR Part 60, and 29 CFR Parts 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with 23 U.S.C. 140, Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. 794), and Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d et seq.), and related regulations including 49 CFR Parts 21, 26, and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR Part 230, Subpart A, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

**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 (see 28 CFR Part 35, 29 CFR Part 1630, 29 CFR Parts 1625-1627, 41 CFR Part 60 and 49 CFR Part 27) 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 provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR Part 35 and 29 CFR Part 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract. 23 CFR 230.409 (g)(4) & (5).

b. The contractor will accept as its operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, sexual orientation, gender identity, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training."

**2. EEO Officer:** The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

**3. Dissemination of Policy:** All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action or 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 or other knowledgeable company official.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

**4. Recruitment:** When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

c. The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

**5. Personnel Actions:** Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to ensure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action

within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

#### **6. Training and Promotion:**

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs (i.e., apprenticeship and on-the-job training programs for the geographical area of contract performance). In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

**7. Unions:** If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. 23 CFR 230.409. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide

sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

**8. Reasonable Accommodation for Applicants / Employees with Disabilities:** The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established thereunder. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

**9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment:** The contractor shall not discriminate on the grounds of race, color, religion, sex, sexual orientation, gender identity, national origin, age, or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors, suppliers, and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

#### **10. Assurances Required:**

a. The requirements of 49 CFR Part 26 and the State DOT's FHWA-approved Disadvantaged Business Enterprise (DBE) program are incorporated by reference.

b. The contractor, subrecipient 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 recipient deems appropriate, which may include, but is not limited to:

- (1) Withholding monthly progress payments;
- (2) Assessing sanctions;
- (3) Liquidated damages; and/or
- (4) Disqualifying the contractor from future bidding as non-responsible.

c. The Title VI and nondiscrimination provisions of U.S. DOT Order 1050.2A at Appendixes A and E are incorporated by reference. 49 CFR Part 21.

**11. Records and Reports:** The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minorities and women.

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on [Form FHWA-1391](#). The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

### III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of more than \$10,000. 41 CFR 60-1.5.

As prescribed by 41 CFR 60-1.8, the contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, sexual orientation, gender identity, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location under the contractor's control where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

### IV. DAVIS-BACON AND RELATED ACT PROVISIONS

This section is applicable to all Federal-aid construction projects exceeding \$2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size), in accordance with 29 CFR 5.5. The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. 23 U.S.C. 113. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. 23 U.S.C. 101. Where applicable law requires that projects be treated as a project on a Federal-aid highway, the provisions of this subpart will apply regardless of the location of the project. Examples include: Surface Transportation Block Grant Program projects funded under 23 U.S.C. 133 [excluding recreational trails projects], the Nationally Significant Freight and Highway

Projects funded under 23 U.S.C. 117, and National Highway Freight Program projects funded under 23 U.S.C. 167.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

#### 1. Minimum wages (29 CFR 5.5)

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

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b.(1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(i) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(ii) The classification is utilized in the area by the construction industry; and

(iii) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The 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.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

## **2. Withholding (29 CFR 5.5)**

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics,

including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

## **3. Payrolls and basic records (29 CFR 5.5)**

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b.(1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency.

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or

subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(i) That the payroll for the payroll period contains the information required to be provided under 29 CFR 5.5(a)(3)(ii), the appropriate information is being maintained under 29 CFR 5.5(a)(3)(i), and that such information is correct and complete;

(ii) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in 29 CFR part 3;

(iii) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under 18 U.S.C. 1001 and 31 U.S.C. 231.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

#### 4. Apprentices and trainees (29 CFR 5.5)

##### a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State

Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

##### b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the



corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).

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. 23 CFR 230.111(e)(2). The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

**5. Compliance with Copeland Act requirements.** The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract as provided in 29 CFR 5.5.

**6. Subcontracts.** The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

**7. Contract termination: debarment.** A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

**8. Compliance with Davis-Bacon and Related Act requirements.** All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract as provided in 29 CFR 5.5.

**9. Disputes concerning labor standards.** As provided in 29 CFR 5.5, disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor

set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

#### **10. Certification of eligibility (29 CFR 5.5)**

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

#### **V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT**

Pursuant to 29 CFR 5.5(b), the following clauses apply to any Federal-aid construction contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

**1. Overtime requirements.** No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek. 29 CFR 5.5.

**2. Violation; liability for unpaid wages; liquidated damages.** In the event of any violation of the clause set forth in paragraph 1 of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph 1 of this section, in the sum currently provided in 29 CFR 5.5(b)(2)\* for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph 1 of this section. 29 CFR 5.5.

\* \$27 as of January 23, 2019 (See 84 FR 213-01, 218) as may be adjusted annually by the Department of Labor; pursuant to the Federal Civil Penalties Inflation Adjustment Act of 1990).

### **3. Withholding for unpaid wages and liquidated damages.**

The FHWA or the contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph 2 of this section. 29 CFR 5.5.

**4. Subcontracts.** The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraphs 1 through 4 of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs 1 through 4 of this section. 29 CFR 5.5.

## **VI. SUBLETTING OR ASSIGNING THE CONTRACT**

This provision is applicable to all Federal-aid construction contracts on the National Highway System pursuant to 23 CFR 635.116.

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 contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

a. The term "perform work with its own organization" in paragraph 1 of Section VI refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions: (based on longstanding interpretation)

- (1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;
- (2) the prime contractor remains responsible for the quality of the work of the leased employees;
- (3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and
- (4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or

equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract as a whole and in general are to be limited to minor components of the overall contract. 23 CFR 635.102.

2. Pursuant to 23 CFR 635.116(a), the contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. Pursuant to 23 CFR 635.116(c), the contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract. (based on long-standing interpretation of 23 CFR 635.116).

5. The 30-percent self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements. 23 CFR 635.116(d).

## **VII. SAFETY: ACCIDENT PREVENTION**

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR Part 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract. 23 CFR 635.108.

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 Part 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704). 29 CFR 1926.10.

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance

with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

### **VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS**

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR Part 635) in one or more places where it is readily available to all persons concerned with the project:

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

"Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of 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 11, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined under this title or imprisoned not more than 5 years or both."

### **IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT (42 U.S.C. 7606; 2 CFR 200.88; EO 11738)**

This provision is applicable to all Federal-aid construction contracts in excess of \$150,000 and to all related subcontracts. 48 CFR 2.101; 2 CFR 200.326.

By submission of this bid/proposal or the execution of this contract or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, subcontractor, supplier, or vendor agrees to comply with all applicable standards, orders

or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251-1387). Violations must be reported to the Federal Highway Administration and the Regional Office of the Environmental Protection Agency. 2 CFR Part 200, Appendix II.

The contractor agrees to include or cause to be included the requirements of this Section in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements. 2 CFR 200.326.

### **X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION**

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost \$25,000 or more – as defined in 2 CFR Parts 180 and 1200. 2 CFR 180.220 and 1200.220.

#### **1. Instructions for Certification – First Tier Participants:**

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

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction. 2 CFR 180.320.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default. 2 CFR 180.325.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances. 2 CFR 180.345 and 180.350.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180, Subpart I, 180.900-180.1020, and 1200. "First Tier Covered Transactions" refers to any covered transaction between a recipient or subrecipient of Federal funds and a participant (such as the prime or general contract). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant

who has entered into a covered transaction with a recipient or subrecipient of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction. 2 CFR 180.330.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold. 2 CFR 180.220 and 180.300.

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. 2 CFR 180.300; 180.320, and 180.325. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. 2 CFR 180.335. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the System for Award Management website (<https://www.sam.gov/>). 2 CFR 180.300, 180.320, and 180.325.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default. 2 CFR 180.325.

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## **2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:**

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency, 2 CFR 180.335;.

(2) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property, 2 CFR 180.800;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification, 2 CFR 180.700 and 180.800; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default. 2 CFR 180.335(d).

(5) Are not a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(6) Are not a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability (USDOT Order 4200.6 implementing appropriations act requirements).

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant should attach an explanation to this proposal. 2 CFR 180.335 and 180.340.

## **3. Instructions for Certification - Lower Tier Participants:**

(Applicable to all subcontracts, purchase orders, and other lower tier transactions requiring prior FHWA approval or estimated to cost \$25,000 or more - 2 CFR Parts 180 and 1200). 2 CFR 180.220 and 1200.220.

a. By signing and submitting this proposal, the prospective lower tier participant 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. 2 CFR 180.365.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180, Subpart I, 180.900 – 180.1020, and 1200. You may contact the person to which this proposal is

submitted for assistance in obtaining a copy of those regulations. "First Tier Covered Transactions" refers to any covered transaction between a recipient or subrecipient of Federal funds and a participant (such as the prime or general contractor). "Lower Tier Covered Transactions" refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). "First Tier Participant" refers to the participant who has entered into a covered transaction with a recipient or subrecipient of Federal funds (such as the prime or general contractor). "Lower Tier Participant" refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated. 2 CFR 1200.220 and 1200.332.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the \$25,000 threshold. 2 CFR 180.220 and 1200.220.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the System for Award Management website (<https://www.sam.gov/>), which is compiled by the General Services Administration. 2 CFR 180.300, 180.320, 180.330, and 180.335.

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. 2 CFR 180.325.

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

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals:

(a) is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency, 2 CFR 180.355;

(b) is a corporation that has been convicted of a felony violation under any Federal law within the two-year period preceding this proposal (USDOT Order 4200.6 implementing appropriations act requirements); and

(c) is a corporation with any unpaid Federal tax liability that has been assessed, for which all judicial and administrative remedies have been exhausted, or have lapsed, and that is not being paid in a timely manner pursuant to an agreement with the authority responsible for collecting the tax liability. (USDOT Order 4200.6 implementing appropriations act requirements)

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant should attach an explanation to this proposal.

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

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000. 49 CFR Part 20, App. A.

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier

subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

## **XII. USE OF UNITED STATES-FLAG VESSELS:**

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, or any other covered transaction. 46 CFR Part 381.

This requirement applies to material or equipment that is acquired for a specific Federal-aid highway project. 46 CFR 381.7. It is not applicable to goods or materials that come into inventories independent of an FHWA funded-contract.

When oceanic shipments (or shipments across the Great Lakes) are necessary for materials or equipment acquired for a specific Federal-aid construction project, the bidder, proposer, contractor, subcontractor, or vendor agrees:

1. To utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels. 46 CFR 381.7.
2. To furnish within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, a legible copy of a rated, 'on-board' commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (b)(1) of this section to both the Contracting Officer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Office of Cargo and Commercial Sealift (MAR-620), Maritime Administration, Washington, DC 20590. (MARAD requires copies of the ocean carrier's (master) bills of lading, certified onboard, dated, with rates and charges. These bills of lading may contain business sensitive information and therefore may be submitted directly to MARAD by the Ocean Transportation Intermediary on behalf of the contractor). 46 CFR 381.7.

**ATTACHMENT A - EMPLOYMENT AND MATERIALS  
PREFERENCE FOR APPALACHIAN DEVELOPMENT  
HIGHWAY SYSTEM OR APPALACHIAN LOCAL ACCESS  
ROAD CONTRACTS** (23 CFR 633, Subpart B, Appendix B)

This provision is applicable to all Federal-aid projects funded under the Appalachian Regional Development Act of 1965.

1. During the performance of this contract, the contractor undertaking to do work which is, or reasonably may be, done as on-site work, shall give preference to qualified persons who regularly reside in the labor area as designated by the DOL wherein the contract work is situated, or the subregion, or the Appalachian counties of the State wherein the contract work is situated, except:

a. To the extent that qualified persons regularly residing in the area are not available.

b. For the reasonable needs of the contractor to employ supervisory or specially experienced personnel necessary to assure an efficient execution of the contract work.

c. For the obligation of the contractor to offer employment to present or former employees as the result of a lawful collective bargaining contract, provided that the number of nonresident persons employed under this subparagraph (1c) shall not exceed 20 percent of the total number of employees employed by the contractor on the contract work, except as provided in subparagraph (4) below.

2. The contractor shall place a job order with the State Employment Service indicating (a) the classifications of the laborers, mechanics and other employees required to perform the contract work, (b) the number of employees required in each classification, (c) the date on which the participant estimates such employees will be required, and (d) any other pertinent information required by the State Employment Service to complete the job order form. The job order may be placed with the State Employment Service in writing or by telephone. If during the course of the contract work, the information submitted by the contractor in the original job order is substantially modified, the participant shall promptly notify the State Employment Service.

3. The contractor shall give full consideration to all qualified job applicants referred to him by the State Employment Service. The contractor is not required to grant employment to any job applicants who, in his opinion, are not qualified to perform the classification of work required.

4. If, within one week following the placing of a job order by the contractor with the State Employment Service, the State Employment Service is unable to refer any qualified job applicants to the contractor, or less than the number requested, the State Employment Service will forward a certificate to the contractor indicating the unavailability of applicants. Such certificate shall be made a part of the contractor's permanent project records. Upon receipt of this certificate, the contractor may employ persons who do not normally reside in the labor area to fill positions covered by the certificate, notwithstanding the provisions of subparagraph (1c) above.

5. The provisions of 23 CFR 633.207(e) allow the contracting agency to provide a contractual preference for the use of mineral resource materials native to the Appalachian region.

6. The contractor shall include the provisions of Sections 1 through 4 of this Attachment A in every subcontract for work which is, or reasonably may be, done as on-site work.

The wage rates listed herein are those predetermined by the Secretary of Labor and State Statute and listed in the United States Department of Labor's (USDOL) General Decisions dated **01-06-2023** and are the minimum wages to be paid accordingly for each specified classification. To determine the applicable wage rate zone, a list entitled "TEXAS COUNTIES IDENTIFIED BY WAGE RATE ZONES" is provided in the contract. Any wage rate that is not listed herein and not in the USDOL's general decision, must be submitted to the Engineer for approval. **IMPORTANT NOTICE FOR STATE PROJECTS:** only the controlling wage rate zone applies to the contract. Effective 01-06-2023.

CLASS. #	CLASSIFICATION DESCRIPTION	ZONE TX02 *(TX20230002)	ZONE TX03 *(TX20230003)	ZONE TX04 *(TX20230004)	ZONE TX05 *(TX20230005)	ZONE TX06 *(TX20230006)	ZONE TX07 *(TX20230007)	ZONE TX08 *(TX20230008)	ZONE TX24 *(TX20230024)	ZONE TX25 *(TX20230025)	ZONE TX27 *(TX20230027)	ZONE TX28 *(TX20230028)	ZONE TX29 *(TX20230029)	ZONE TX30 *(TX20230030)	ZONE TX37 *(TX20230037)	ZONE TX38 *(TX20230038)	ZONE TX42 *(TX20230042)
1428	Agricultural Tractor Operator						\$12.69					\$12.35			\$11.75		
1300	Asphalt Distributor Operator	\$14.87	\$13.48	\$13.88	\$15.72	\$15.58	\$15.55	\$15.72	\$13.28	\$15.32	\$15.62	\$14.36	\$14.25	\$14.03	\$13.75	\$14.06	\$14.40
1303	Asphalt Paving Machine Operator	\$13.40	\$12.25	\$12.35	\$13.87	\$14.05	\$14.36	\$14.20	\$13.26	\$13.99	\$14.68	\$12.92	\$13.44	\$12.53	\$14.00	\$14.32	\$12.99
1106	Asphalt Raker	\$12.28	\$10.61	\$12.02	\$14.21	\$11.65	\$12.12	\$11.64	\$11.44	\$12.69	\$12.05	\$11.34	\$11.67	\$11.40	\$12.59	\$12.36	\$11.78
1112	Batching Plant Operator, Asphalt																
1115	Batching Plant Operator, Concrete																
1214	Blaster																
1615	Boom Truck Operator						\$18.36										
1444	Boring Machine Operator																
1305	Broom or Sweeper Operator	\$11.21	\$10.33	\$10.08	\$11.99		\$11.04	\$11.62		\$11.74	\$11.41	\$10.30		\$10.23	\$10.60	\$12.68	\$11.05
1144	Communications Cable Installer																
1124	Concrete Finisher, Paving and Structures	\$13.55	\$12.46	\$13.16	\$12.85	\$12.64	\$12.56	\$12.77	\$12.44	\$14.12	\$13.04	\$13.38	\$12.64	\$12.80	\$12.79	\$12.98	\$13.32
1318	Concrete Pavement Finishing Machine Operator				\$16.05			\$15.48		\$16.05		\$19.31				\$13.07	
1315	Concrete Paving, Curing, Float, Texturing Machine Operator											\$16.34					\$11.71
1333	Concrete Saw Operator				\$14.67					\$14.48	\$17.33						\$13.99
1399	Concrete/Gunite Pump Operator																
1344	Crane Operator, Hydraulic 80 tons or less				\$18.22		\$18.36			\$18.12	\$18.04	\$20.21			\$18.63	\$13.86	
1345	Crane Operator, Hydraulic Over 80 Tons																
1342	Crane Operator, Lattice Boom 80 Tons or Less	\$16.82	\$14.39	\$13.85	\$17.27		\$15.87			\$17.27		\$14.67			\$16.42	\$14.97	\$13.87
1343	Crane Operator, Lattice Boom Over 80 Tons				\$20.52		\$19.38			\$20.52		\$17.49			\$25.13	\$15.80	
1306	Crawler Tractor Operator	\$13.96	\$16.63	\$13.62	\$14.26		\$15.67			\$14.07	\$13.15	\$13.38			\$14.60	\$13.68	\$13.50
1351	Crusher or Screen Plant Operator																
1446	Directional Drilling Locator						\$11.67										
1445	Directional Drilling Operator				\$20.32		\$17.24										
1139	Electrician	\$20.96		\$19.87	\$19.80		\$26.35		\$20.27	\$19.80		\$20.92				\$27.11	\$19.87
1347	Excavator Operator, 50,000 pounds or less	\$13.46	\$12.56	\$13.67	\$17.19		\$12.88	\$14.38	\$13.49	\$17.19		\$13.88			\$14.09	\$12.71	\$14.42
1348	Excavator Operator, Over 50,000 pounds		\$15.23	\$13.52	\$17.04		\$17.71			\$16.99	\$18.80	\$16.22				\$14.53	\$13.52
1150	Flagger	\$9.30	\$9.10	\$8.50	\$10.28	\$8.81	\$9.45	\$8.70		\$10.06	\$9.71	\$9.03	\$8.81	\$9.08	\$9.90	\$10.33	\$8.10
1151	Form Builder/Setter, Structures	\$13.52	\$12.30	\$13.38	\$12.91	\$12.71	\$12.87	\$12.38	\$12.26	\$13.84	\$12.98	\$13.07	\$13.61	\$12.82	\$14.73	\$12.23	\$12.25
1160	Form Setter, Paving & Curb	\$12.36	\$12.16	\$13.93	\$11.83	\$10.71	\$12.94			\$13.16	\$12.54	\$11.33	\$10.69		\$13.33	\$12.34	\$13.93
1360	Foundation Drill Operator, Crawler Mounted				\$17.99					\$17.99							\$17.43
1363	Foundation Drill Operator, Truck Mounted		\$16.86	\$22.05	\$21.51		\$16.93			\$21.07	\$20.20	\$20.76		\$17.54	\$21.39	\$15.89	\$22.05
1369	Front End Loader Operator, 3 CY or Less	\$12.28	\$13.49	\$13.40	\$13.85		\$13.04	\$13.15	\$13.29	\$13.69	\$12.64	\$12.89			\$13.51	\$13.32	\$12.17
1372	Front End Loader Operator, Over 3 CY	\$12.77	\$13.69	\$12.33	\$14.96		\$13.21	\$12.86	\$13.57	\$14.72	\$13.75	\$12.32			\$13.19	\$13.17	\$13.02
1329	Joint Sealer																
1172	Laborer, Common	\$10.30	\$9.86	\$10.08	\$10.51	\$10.71	\$10.50	\$10.24	\$10.58	\$10.72	\$10.45	\$10.30	\$10.25	\$10.03	\$10.54	\$11.02	\$10.15
1175	Laborer, Utility	\$11.80	\$11.53	\$12.70	\$12.17	\$11.81	\$12.27	\$12.11	\$11.33	\$12.32	\$11.80	\$11.53	\$11.23	\$11.50	\$11.95	\$11.73	\$12.37
1346	Loader/Backhoe Operator	\$14.18	\$12.77	\$12.97	\$15.68		\$14.12			\$15.18	\$13.58	\$12.87		\$13.21	\$14.13	\$14.29	\$12.90
1187	Mechanic	\$20.14	\$15.47	\$17.47	\$17.74	\$17.00	\$17.10			\$17.68	\$18.94	\$18.58	\$17.00	\$16.61	\$18.46	\$16.96	\$17.47
1380	Milling Machine Operator	\$15.54	\$14.64	\$12.22	\$14.29		\$14.18			\$14.32	\$14.35	\$12.86			\$14.75	\$13.53	\$12.80



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1390	Motor Grader Operator, Fine Grade	\$17.49	\$16.52	\$16.88	\$17.12	\$18.37	\$18.51	\$16.69	\$16.13	\$17.19	\$18.35	\$17.07	\$17.74	\$17.47	\$17.08	\$15.69	\$20.01
1393	Motor Grader Operator, Rough	\$16.15	\$14.62	\$15.83	\$16.20	\$17.07	\$14.63	\$18.50		\$16.02	\$16.44	\$15.12	\$16.85	\$14.47	\$17.39	\$14.23	\$15.53
1413	Off Road Hauler			\$10.08	\$12.26		\$11.88			\$12.25		\$12.23			\$13.00	\$14.60	
1196	Painter, Structures Pavement Marking Machine Operator	\$16.42		\$13.10	\$13.55		\$19.17	\$12.01		\$13.63	\$14.60	\$13.17		\$16.65	\$10.54	\$11.18	\$13.10
1443	Percussion or Rotary Drill Operator																
1202	Piledriver																\$14.95
1205	Pipelayer		\$11.87	\$14.64	\$13.17	\$11.17	\$12.79		\$11.37	\$13.24	\$12.66	\$13.24	\$11.17	\$11.67		\$12.12	\$14.64
1384	Reclaimer/Pulverizer Operator	\$12.85			\$11.90		\$12.88			\$11.01		\$10.46					
1500	Reinforcing Steel Worker	\$13.50	\$14.07	\$17.53	\$16.17		\$14.00			\$16.18	\$12.74	\$15.83		\$17.10		\$15.15	\$17.72
1402	Roller Operator, Asphalt	\$10.95		\$11.96	\$13.29		\$12.78	\$11.61		\$13.08	\$12.36	\$11.68			\$11.71	\$11.95	\$11.50
1405	Roller Operator, Other	\$10.36		\$10.44	\$11.82		\$10.50	\$11.64		\$11.51	\$10.59	\$10.30		\$12.04	\$12.85	\$11.57	\$10.66
1411	Scraper Operator	\$10.61	\$11.07	\$10.85	\$12.88		\$12.27		\$11.12	\$12.96	\$11.88	\$12.43		\$11.22	\$13.95	\$13.47	\$10.89
1417	Self-Propelled Hammer Operator																
1194	Servicer	\$13.98	\$12.34	\$14.11	\$14.74		\$14.51	\$15.56	\$13.44	\$14.58	\$14.31	\$13.83		\$12.43	\$13.72	\$13.97	\$14.11
1513	Sign Erector																
1708	Slurry Seal or Micro-Surfacing Machine Operator																
1341	Small Slipform Machine Operator									\$15.96							
1515	Spreader Box Operator	\$12.60		\$13.12	\$14.71		\$14.04			\$14.73	\$13.84	\$13.68		\$13.45	\$11.83	\$13.58	\$14.05
1705	Structural Steel Welder															\$12.85	
1509	Structural Steel Worker						\$19.29									\$14.39	
1339	Subgrade Trimmer																
1143	Telecommunication Technician																
1145	Traffic Signal/Light Pole Worker						\$16.00										
1440	Trenching Machine Operator, Heavy						\$18.48										
1437	Trenching Machine Operator, Light																
1609	Truck Driver Lowboy-Float	\$14.46	\$13.63	\$13.41	\$15.00	\$15.93	\$15.66			\$16.24	\$16.39	\$14.30	\$16.62	\$15.63	\$14.28	\$16.03	\$13.41
1612	Truck Driver Transit-Mix				\$14.14					\$14.14							
1600	Truck Driver, Single Axle	\$12.74	\$10.82	\$10.75	\$13.04	\$11.61	\$11.79	\$13.53	\$13.16	\$12.31	\$13.40	\$10.30	\$11.61		\$11.97	\$11.46	\$10.75
1606	Truck Driver, Single or Tandem Axle Dump Truck	\$11.33	\$14.53	\$11.95	\$12.95		\$11.68		\$14.06	\$12.62	\$11.45	\$12.28		\$13.08	\$11.68	\$11.48	\$11.10
1607	Truck Driver, Tandem Axle Tractor with Semi Trailer	\$12.49	\$12.12	\$12.50	\$13.42		\$12.81	\$13.16		\$12.86	\$16.22	\$12.50			\$13.80	\$12.27	\$12.50
1441	Tunneling Machine Operator, Heavy																
1442	Tunneling Machine Operator, Light																
1706	Welder		\$14.02		\$14.86		\$15.97		\$13.74	\$14.84					\$13.78		
1520	Work Zone Barricade Servicer	\$10.30	\$12.88	\$11.46	\$11.70	\$11.57	\$11.85	\$10.77		\$11.68	\$12.20	\$11.22	\$11.51	\$12.96	\$10.54	\$11.67	\$11.76

Notes:

\*Represents the USDOL wage decision.

Any worker employed on this project shall be paid at the rate of one and one half (1-1/2) times the regular rate for every hour worked in excess of forty (40) hours per week.

For reference, the titles and descriptions for the classifications listed here are detailed further in the AGC of Texas' *Standard Job Classifications and Descriptions for Highway, Heavy, Utilities, and Industrial Construction in Texas* posted on the AGC's Web site for any contractor.

**TEXAS COUNTIES IDENTIFIED BY  
WAGE RATE ZONES: 2, 3, 4, 5, 6, 7, 8, 24, 25, 27, 28, 29, 30, 37, 38, 42**

County Name	Zone	County Name	Zone	County Name	Zone	County Name	Zone
Anderson	28	Donley	37	Karnes	27	Reagan	37
Andrews	37	Duval	30	Kaufman	25	Real	37
Angelina	28	Eastland	37	Kendall	7	Red River	28
Aransas	29	Ector	2	Kenedy	30	Reeves	8
Archer	25	Edwards	8	Kent	37	Refugio	27
Armstrong	2	El Paso	24	Kerr	27	Roberts	37
Atascosa	7	Ellis	25	Kimble	37	Robertson	7
Austin	38	Erath	28	King	37	Rockwall	25
Bailey	37	Falls	28	Kinney	8	Runnels	37
Bandera	7	Fannin	28	Kleberg	27	Rusk	4
Bastrop	7	Fayette	27	Knox	37	Sabine	28
Baylor	37	Fisher	37	Lamar	28	San Augustine	28
Bee	27	Floyd	37	Lamb	37	San Jacinto	38
Bell	7	Foard	37	Lampasas	7	San Patricio	29
Bexar	7	Fort Bend	38	LaSalle	30	San Saba	37
Blanco	27	Franklin	28	Lavaca	27	Schleicher	37
Borden	37	Freestone	28	Lee	27	Scurry	37
Bosque	28	Frio	27	Leon	28	Shackelford	37
Bowie	4	Gaines	37	Liberty	38	Shelby	28
Brazoria	38	Galveston	38	Limestone	28	Sherman	37
Brazos	7	Garza	37	Lipscomb	37	Smith	4
Brewster	8	Gillespie	27	Live Oak	27	Somervell	28
Briscoe	37	Glasscock	37	Llano	27	Starr	30
Brooks	30	Goliad	29	Loving	37	Stephens	37
Brown	37	Gonzales	27	Lubbock	2	Sterling	37
Burleson	7	Gray	37	Lynn	37	Stonewall	37
Burnet	27	Grayson	25	Madison	28	Sutton	8
Caldwell	7	Gregg	4	Marion	28	Swisher	37
Calhoun	29	Grimes	28	Martin	37	Tarrant	25
Callahan	25	Guadalupe	7	Mason	27	Taylor	2
Cameron	3	Hale	37	Matagorda	27	Terrell	8
Camp	28	Hall	37	Maverick	30	Terry	37
Carson	2	Hamilton	28	McCulloch	37	Throckmorton	37
Cass	28	Hansford	37	McLennan	7	Titus	28
Castro	37	Hardeman	37	McMullen	30	Tom Green	2
Chambers	38	Hardin	38	Medina	7	Travis	7
Cherokee	28	Harris	38	Menard	37	Trinity	28
Childress	37	Harrison	42	Midland	2	Tyler	28
Clay	25	Hartley	37	Milam	28	Upshur	4
Cochran	37	Haskell	37	Mills	37	Upton	37
Coke	37	Hays	7	Mitchell	37	Uvalde	30
Coleman	37	Hemphill	37	Montague	37	Val Verde	8
Collin	25	Henderson	28	Montgomery	38	Van Zandt	28
Collingsworth	37	Hidalgo	3	Moore	37	Victoria	6
Colorado	27	Hill	28	Morris	28	Walker	28
Comal	7	Hockley	37	Motley	37	Waller	38
Comanche	37	Hood	28	Nacogdoches	28	Ward	37
Concho	37	Hopkins	28	Navarro	28	Washington	28
Cooke	37	Houston	28	Newton	28	Webb	3
Coryell	7	Howard	37	Nolan	37	Wharton	27
Cottle	37	Hudspeth	8	Nueces	29	Wheeler	37
Crane	37	Hunt	25	Ochiltree	37	Wichita	5
Crockett	8	Hutchinson	37	Oldham	37	Wilbarger	37
Crosby	2	Irion	2	Orange	38	Willacy	30
Culberson	8	Jack	28	Palo Pinto	28	Williamson	7
Dallam	37	Jackson	27	Panola	28	Wilson	7
Dallas	25	Jasper	28	Parker	25	Winkler	37
Dawson	37	Jeff Davis	8	Parmer	37	Wise	25
Deaf Smith	37	Jefferson	38	Pecos	8	Wood	28
Delta	25	Jim Hogg	30	Polk	28	Yoakum	37
Denton	25	Jim Wells	27	Potter	2	Young	37
DeWitt	27	Johnson	25	Presidio	8	Zapata	30
Dickens	37	Jones	25	Rains	28	Zavala	30
Dimmit	30			Randall	2		

# Special Provision to Item 000

## Nondiscrimination



### 1. DESCRIPTION

All recipients of federal financial assistance are required to comply with various nondiscrimination laws including Title VI of the Civil Rights Act of 1964, as amended, (Title VI). Title VI forbids discrimination against anyone in the United States on the grounds of race, color, or national origin by any agency receiving federal funds.

Texas Department of Transportation, as a recipient of Federal financial assistance, and under Title VI and related statutes, ensures that no person shall on the grounds of race, religion (where the primary objective of the financial assistance is to provide employment per 42 U.S.C. § 2000d-3), color, national origin, sex, age or disability be excluded from participation in, be denied the benefits of, or otherwise be subjected to discrimination under any Department programs or activities.

### 2. DEFINITION OF TERMS

Where the term “contractor” appears in the following six nondiscrimination clauses, the term “contractor” is understood to include all parties to contracts or agreements with the Texas Department of Transportation.

### 3. NONDISCRIMINATION PROVISIONS

During the performance of this contract, the contractor agrees as follows:

- 3.1. **Compliance with Regulations.** The Contractor shall comply with the Regulations relative to nondiscrimination in Federally-assisted programs of the Department of Transportation (hereinafter, “DOT”) Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time, (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract.
- 3.2. **Nondiscrimination.** The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor shall not participate either directly or indirectly in the discrimination prohibited by section 21.5 of the Regulations, including employment practices when the contract covers a program set forth in Appendix B of the Regulations.
- 3.3. **Solicitations for Subcontracts, Including Procurements of Materials and Equipment:** In all solicitations either by competitive bidding or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, or national origin.
- 3.4. **Information and Reports:** The contractor shall provide all information and reports required by the Regulations or directives issued pursuant thereto, and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Recipient or the Texas Department of Transportation to be pertinent to ascertain compliance with such Regulations, orders and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information the contractor shall so certify to the Recipient, or the Texas Department of Transportation as appropriate, and shall set forth what efforts it has made to obtain the information.

- 3.5. **Sanctions for Noncompliance.** In the event of the contractor's noncompliance with the nondiscrimination provisions of this contract, the Recipient shall impose such contract sanctions as it or the Texas Department of Transportation may determine to be appropriate, including, but not limited to:
- withholding of payments to the contractor under the contract until the contractor complies, and/or
  - cancellation, termination or suspension of the contract, in whole or in part.
- 3.6. **Incorporation of Provisions.** The contractor shall include the provisions of paragraphs (1) through (6) in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations, or directives issued pursuant thereto. The contractor shall take such action with respect to any subcontract or procurement as the Recipient or the Texas Department of Transportation may direct as a means of enforcing such provisions including sanctions for non-compliance: Provided, however, that, in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the contractor may request the Recipient to enter into such litigation to protect the interests of the Recipient, and, in addition, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

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# Special Provision to Item 000

## Certification of Nondiscrimination in Employment

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### 1. GENERAL

By signing this proposal, the Bidder certifies that he has participated in a previous contract or subcontract subject to the equal opportunity clause, as required by Executive Orders 10925, 11114, or 11246, or if he has not participated in a previous contract of this type, or if he has had previous contract or subcontracts and has not filed, he will file 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.

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

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

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

## Special Provision to Item 000

# Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity (Executive Order 11246)



### 1. GENERAL

In addition to the affirmative action requirements of the Special Provision titled "Standard Federal Equal Employment Opportunity Construction Contract Specifications" as set forth elsewhere in this proposal, the Bidder's attention is directed to the specific requirements for utilization of minorities and females as set forth below.

### 2. GOALS

2.1. Goals for minority and female participation are hereby established in accordance with 41 CFR 60-4.

2.2. The goals for minority and female participation expressed in percentage terms for the Contractor's aggregate work force in each trade on all construction work in the covered area are as follows:

Goals for minority participation in each trade, %	Goals for female participation in each trade, %
See Table 1	6.9

2.3. These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it will apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its federally involved and non-federally involved construction. The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 will be based on its implementation of the Standard Federal Equal Employment Opportunity Construction Contract Specifications Special Provision and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the Contract, and in each trade, and the Contractor must make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority and female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals will be a violation of the Contract, the Executive Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

2.4. A Contractor or subcontractor will be considered in compliance with these provisions by participation in the Texas Highway-Heavy Branch, AGC, Statewide Training and Affirmative Action Plan. Provided that each Contractor or subcontractor participating in this plan must individually comply with the equal opportunity clause set forth in 41 CFR 60-1.4 and must make a good faith effort to achieve the goals set forth for each participating trade in the plan in which it has employees. The overall good performance of other Contractors and subcontractors toward a goal in an approved plan does not excuse any covered Contractor's or subcontractor's failure to make good faith efforts to achieve the goals contained in these provisions. Contractors or subcontractors participating in the plan must be able to demonstrate their participation and document their compliance with the provisions of this Plan.

### 3. SUBCONTRACTING

The Contractor must provide written notification to the Department within 10 working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the Contract resulting from this solicitation pending concurrence of the Department in the award. The notification will list the names,

address and telephone number of the subcontractor; employer identification number; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the Contract is to be performed.

#### 4. COVERED AREA

As used in this special provision, and in the Contract resulting from this solicitation, the geographical area covered by these goals for female participation is the State of Texas. The geographical area covered by these goals for other minorities are the counties in the State of Texas as indicated in Table 1.

#### 5. REPORTS

The Contractor is hereby notified that he may be subject to the Office of Federal Contract Compliance Programs (OFCCP) reporting and record keeping requirements as provided for under Executive Order 11246 as amended. OFCCP will provide direct notice to the Contractor as to the specific reporting requirements that he will be expected to fulfill.

**Table 1**  
**Goals for Minority Participation**

County	Participation, %	County	Participation, %
Anderson	22.5	Chambers	27.4
Andrews	18.9	Cherokee	22.5
Angelina	22.5	Childress	11.0
Aransas	44.2	Clay	12.4
Archer	11.0	Cochran	19.5
Armstrong	11.0	Coke	20.0
Atascosa	49.4	Coleman	10.9
Austin	27.4	Collin	18.2
Bailey	19.5	Collingsworth	11.0
Bandera	49.4	Colorado	27.4
Bastrop	24.2	Comal	47.8
Baylor	11.0	Comanche	10.9
Bee	44.2	Concho	20.0
Bell	16.4	Cooke	17.2
Bexar	47.8	Coryell	16.4
Blanco	24.2	Cottle	11.0
Borden	19.5	Crane	18.9
Bosque	18.6	Crockett	20.0
Bowie	19.7	Crosby	19.5
Brazoria	27.3	Culberson	49.0
Brazos	23.7	Dallam	11.0
Brewster	49.0	Dallas	18.2
Briscoe	11.0	Dawson	19.5
Brooks	44.2	Deaf Smith	11.0
Brown	10.9	Delta	17.2
Burleson	27.4	Denton	18.2
Burnet	24.2	DeWitt	27.4
Caldwell	24.2	Dickens	19.5
Calhoun	27.4	Dimmit	49.4
Callahan	11.6	Donley	11.0
Cameron	71.0	Duval	44.2
Camp	20.2	Eastland	10.9
Carson	11.0	Ector	15.1
Cass	20.2	Edwards	49.4
Castro	11.0	Ellis	18.2

County	Participation, %	County	Participation, %
El Paso	57.8	Kenedy	44.2
Erath	17.2	Kent	10.9
Falls	18.6	Kerr	49.4
Fannin	17.2	Kimble	20.0
Fayette	27.4	King	19.5
Fisher	10.9	Kinney	49.4
Floyd	19.5	Kleberg	44.2
Foard	11.0	Knox	10.9
Fort Bend	27.3	Lamar	20.2
Franklin	17.2	Lamb	19.5
Freestone	18.6	Lampasas	18.6
Frio	49.4	LaSalle	49.4
Gaines	19.5	Lavaca	27.4
Galveston	28.9	Lee	24.2
Garza	19.5	Leon	27.4
Gillespie	49.4	Liberty	27.3
Glasscock	18.9	Limestone	18.6
Goliad	27.4	Lipscomb	11.0
Gonzales	49.4	Live Oak	44.2
Gray	11.0	Llano	24.2
Grayson	9.4	Loving	18.9
Gregg	22.8	Lubbock	19.6
Grimes	27.4	Lynn	19.5
Guadalupe	47.8	Madison	27.4
Hale	19.5	Marion	22.5
Hall	11.0	Martin	18.9
Hamilton	18.6	Mason	20.0
Hansford	11.0	Matagorda	27.4
Hardeman	11.0	Maverick	49.4
Hardin	22.6	McCulloch	20.0
Harris	27.3	McLennan	20.7
Harrison	22.8	McMullen	49.4
Hartley	11.0	Medina	49.4
Haskell	10.9	Menard	20.0
Hays	24.1	Midland	19.1
Hemphill	11.0	Milam	18.6
Henderson	22.5	Mills	18.6
Hidalgo	72.8	Mitchell	10.9
Hill	18.6	Montague	17.2
Hockley	19.5	Montgomery	27.3
Hood	18.2	Moore	11.0
Hopkins	17.2	Morris	20.2
Houston	22.5	Motley	19.5
Howard	18.9	Nacogdoches	22.5
Hudspeth	49.0	Navarro	17.2
Hunt	17.2	Newton	22.6
Hutchinson	11.0	Nolan	10.9
Irion	20.0	Nueces	41.7
Jack	17.2	Ochiltree	11.0
Jackson	27.4	Oldham	11.0
Jasper	22.6	Orange	22.6
Jeff Davis	49.0	Palo Pinto	17.2
Jefferson	22.6	Panola	22.5
Jim Hogg	49.4	Parker	18.2
Jim Wells	44.2	Parmer	11.0
Johnson	18.2	Pecos	18.9
Jones	11.6	Polk	27.4
Karnes	49.4	Potter	9.3
Kaufman	18.2	Presidio	49.0
Kendall	49.4	Randall	9.3



<b>County</b>	<b>Participation, %</b>	<b>County</b>	<b>Participation, %</b>
Rains	17.2	Reagan	20.0
Real	49.4	Throckmorton	10.9
Red River	20.2	Titus	20.2
Reeves	18.9	Tom Green	19.2
Refugio	44.2	Travis	24.1
Roberts	11.0	Trinity	27.4
Robertson	27.4	Tyler	22.6
Rockwall	18.2	Upshur	22.5
Runnels	20.0	Upton	18.9
Rusk	22.5	Uvalde	49.4
Sabine	22.6	Val Verde	49.4
San Augustine	22.5	Van Zandt	17.2
San Jacinto	27.4	Victoria	27.4
San Patricio	41.7	Walker	27.4
San Saba	20.0	Waller	27.3
Schleicher	20.0	Ward	18.9
Scurry	10.9	Washington	27.4
Shackelford	10.9	Webb	87.3
Shelby	22.5	Wharton	27.4
Sherman	11.0	Wheeler	11.0
Smith	23.5	Wichita	12.4
Somervell	17.2	Wilbarger	11.0
Starr	72.9	Willacy	72.9
Stephens	10.9	Williamson	24.1
Sterling	20.0	Wilson	49.4
Stonewall	10.9	Winkler	18.9
Sutton	20.0	Wise	18.2
Swisher	11.0	Wood	22.5
Tarrant	18.2	Yoakum	19.5
Taylor	11.6	Young	11.0
Terrell	20.0	Zapata	49.4
Terry	19.5	Zavala	49.4

# Special Provision to Item 000

## Standard Federal Equal Employment Opportunity Construction Contract Specifications (Executive Order 11246)



### 1. GENERAL

1.1. As used in these specifications:

- "Covered area" means the geographical area described in the solicitation from which this Contract resulted;
- "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;
- "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.
- "Minority" includes:
  - Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
  - Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);
  - 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
  - American Indian or Alaskan Native (all persons having origins in any of the original peoples of North American and maintaining identifiable tribal affiliations through membership and participation or community identification).

1.2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it will 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.

1.3. 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) will 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 equal employment opportunity (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.

1.4. The Contractor will implement the specific affirmative action standards provided in Section 1.7.1. through Section 1.7.16. 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. Covered construction Contractors performing Contracts in geographical areas where they do not have a Federal or federally assisted construction Contract will apply the minority and female goals established for the geographical area where the Contract is being performed. Goals are published periodically in the Federal Register in notice form and such notices may be obtained from any Office of Federal Contract Compliance Programs office or any Federal procurement contracting officer. The

Contractor is expected to make substantially uniform progress toward its goals in each craft during the period specified.

- 1.5. 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 will excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.
- 1.6. In order for the nonworking 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.
- 1.7. The Contractor will take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications will be based upon its effort to achieve maximum results from its actions. The Contractor will document these efforts fully, and will implement affirmative action steps at least as extensive as the following:
  - 1.7.1. 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 will 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.
  - 1.7.2. 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 organizations' responses.
  - 1.7.3. 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 will be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.
  - 1.7.4. 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.
  - 1.7.5. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor will provide notice of these programs to the sources compiled under 7b above.
  - 1.7.6. Disseminate the Contractor's EEO policy by providing 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.
  - 1.7.7. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other

employment decisions including specific review of these items with on-site supervisory personnel such as Superintendents, General Foremen, etc., before the initiation of construction work at any job site. A written record must be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

- 1.7.8. 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.
- 1.7.9. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month before the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor will send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.
- 1.7.10. 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.
- 1.7.11. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.
- 1.7.12. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.
- 1.7.13. 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 ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.
- 1.7.14. Ensure that all facilities and company activities are non-segregated except that separate or single-user toilet and necessary changing facilities will be provided to assure privacy between the sexes.
- 1.7.15. 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.
- 1.7.16. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.
- 1.8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (Section 7.1. through Section 7.16.). 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 Section 7.1. through Section 7.16. of these Specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female 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 will not be a defense for the Contractor's noncompliance.
- 1.9. 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).

- 1.10. 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.
- 1.11. The Contractor will not enter into any Subcontract with any person or firm debarred from Government Contracts pursuant to Executive Order 11246.
- 1.12. The Contractor will 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 Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties will be in violation of these specifications and Executive Order 11246, as amended.
- 1.13. The Contractor, in fulfilling its obligations under these specifications, will 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 will proceed in accordance with 41 CFR 60-4.8.
- 1.14. The Contractor will 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 must 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 must 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.
- 1.15. Nothing herein provided will 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).
- 1.16. In addition to the reporting requirements set forth elsewhere in this Contract, the Contractor and the subcontractors holding subcontracts, not including material suppliers, of \$10,000 or more, will submit for every month of July during which work is performed, employment data as contained under Form PR 1391 (Appendix C to 23 CFR, Part 230), and in accordance with the included instructions.

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# Special Provision to Item 000

## On-the-Job Training Program

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### 1. DESCRIPTION

The primary objective of this Special Provision is the training and advancement of minorities, women and economically disadvantaged persons toward journeyworker status. Accordingly, make every effort to enroll minority, women and economically disadvantaged persons to the extent that such persons are available within a reasonable area of recruitment. This training commitment is not intended, and will not be used to discriminate against any applicant for training, whether or not he/she is a member of a minority group.

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### 2. TRAINEE ASSIGNMENT

Training assignments are based on the past volume of state-let highway construction contracts awarded with the Department. Contractors meeting the selection criteria will be notified of their training assignment at the beginning of the reporting year by the Department's Office of Civil Rights.

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### 3. PROGRAM REQUIREMENTS

Fulfill all of the requirements of the On-the-Job Training Program including the maintenance of records and submittal of periodic reports documenting program performance. Trainees will be paid at least 60% of the appropriate minimum journeyworker's rate specified in the Contract for the first half of the training period, 75% for the third quarter, and 90% for the last quarter, respectively.

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### 4. REIMBURSEMENT

If requested, Contractors may be reimbursed \$0.80 per training hour at no additional cost to the Department. Training may occur on this project, all other Department contracts, or local-administered federal-aid projects with concurrence of the local government entity. However, reimbursement for training is not available on projects to the extent that such projects that do not contain federal funds.

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### 5. COMPLIANCE

The Contractor will have fulfilled the contractual responsibilities by having provided acceptable training to the number of trainees specified in their goal assignment. Noncompliance may be cause for corrective and appropriate measures pursuant to Article 8.7., "Abandonment of Work or Default of Contract," which may be used to comply with the sanctions for noncompliance pursuant to 23 CFR Part 230.

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## Special Provision 000

### Certificate of Interested Parties (Form 1295)

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Submit a notarized Form 1295, "Certificate of Interested Parties," in the following instances:

- at Contract execution for Contracts awarded by the Commission;
- at Contract execution for Contracts awarded by the District Engineer or Chief Engineer with an award amount of \$1,000,000 or more; at any time an existing Contract awarded by the District Engineer or Chief Engineer increases in value to \$1,000,000 or more due to changes in the Contract; at any time there is an increase of \$1,000,000 or more to an existing Contract (change orders, extensions, and renewals); or
- at any time there is a change to the information in Form 1295, when the form was filed for an existing Contract.

Form 1295 and instructions on completing and filing the form are available on the Texas Ethics Commission website.

# Special Provision 000

## Important Notice to Contractors



For Dollar Amount of Original Contract		Dollar Amount of Daily Contract Administration Liquidated Damages per Working Day
From More Than	To and including	
0	1,000,000	618
1,000,000	3,000,000	832
3,000,000	5,000,000	940
5,000,000	15,000,000	1317
15,000,000	25,000,000	1718
25,000,000	50,000,000	2411
50,000,000	Over 50,000,000	4265

In addition to the amount shown in Table 1, the Liquidated Damages will be increased by the amount shown in Item 8 of the General Notes for Road User Cost (RUC), when applicable.



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# Special Provision 000

## Cargo Preference Act Requirements in Federal Aid Contracts

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### 1. DESCRIPTION

All recipients of federal financial assistance are required to comply with the U.S. Department of Transportation's (DOT) Cargo Preference Act Requirements, 46 CFR Part 381, Use of United States-Flag Vessels.

This requirement applies to material or equipment that is acquired specifically for a Federal-aid highway project. It is not applicable to goods or materials that come into inventories independent of a Federal Highway Administration (FHWA) funded contract.

When oceanic shipments are necessary for materials or equipment acquired for a specific Federal-aid construction project, the contractor agrees to:

- Utilize privately owned United States-flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this contract, to the extent such vessels are available at fair and reasonable rates for United States-flag commercial vessels.
- Furnish a legible copy of a rated, on-board commercial ocean bill-of-lading in English for each shipment of cargo described in paragraph (b) (1) of 46 CFR Part 381 Section 7, "Federal Grant, Guaranty, Loan and Advance of Funds Agreements," within 20 days following the date of loading for shipments originating within the United States or within 30 working days following the date of loading for shipments originating outside the United States, to both the Engineer (through the prime contractor in the case of subcontractor bills-of-lading) and to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590.
- Insert the substance of the provisions of this clause in all subcontracts issued pursuant to this contract.

# Special Provision to Item 000

## Disadvantaged Business Enterprise in Federal-Aid Contracts



### 1. DESCRIPTION

The purpose of this Special Provision is to carry out the U.S. Department of Transportation's (DOT) policy of ensuring nondiscrimination in the award and administration of DOT-assisted Contracts and creating a level playing field on which firms owned and controlled by individuals who are determined to be socially and economically disadvantaged can compete fairly for DOT-assisted Contracts.

### 2. DISADVANTAGED BUSINESS ENTERPRISE IN FEDERAL-AID CONTRACTS

2.1. **Policy.** It is the policy of the DOT and the Texas Department of Transportation (Department) that DBEs, as defined in 49 CFR Part 26, Subpart A, and the Department's DBE Program, will have the opportunity to participate in the performance of Contracts financed in whole or in part with federal funds. The DBE requirements of 49 CFR Part 26, and the Department's DBE Program, apply to this Contract as follows.

The Contractor will solicit DBEs through reasonable and available means, as defined in 49 CFR Part 26, Appendix A, and the Department's DBE Program, or show a good faith effort to meet the DBE goal for this Contract.

The Contractor, subrecipient, or subcontractor will not discriminate on the basis of race, color, national origin, or sex in the performance of this Contract. Carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted Contracts. Failure 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.

The requirements of this Special Provision must be physically included in any subcontract.

By signing the Contract proposal, the Bidder is certifying that the DBE goal as stated in the proposal will be met by obtaining commitments from eligible DBEs or that the Bidder will provide acceptable evidence of good faith effort to meet the commitment.

#### 2.2. Definitions.

2.2.1. **Administrative Reconsideration.** A process by which the low bidder may request reconsideration when the Department determines the good faith effort (GFE) requirements have not been met.

2.2.2. **Commercially Useful Function (CUF).** A CUF occurs when a DBE has the responsibility for the execution of the work and carrying out such responsibilities by actually performing, managing, and supervising the work.

2.2.3. **Disadvantaged Business Enterprise (DBE).** A for-profit small business certified through the Texas Unified Certification Program in accordance with 49 CFR Part 26, that is at least 51% owned by one or more socially and economically disadvantaged individuals, or in the case of a publicly owned business, in which is at least 51% of the stock is owned by one or more socially and economically disadvantaged individuals, and whose management and daily business operations are controlled by one or more of the individuals who own it.

2.2.4. **DBE Joint Venture.** An association of a DBE firm and one or more other firms to carry out a single business enterprise for profit for which purpose they 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.

- 2.2.5. **DOT.** The U.S. Department of Transportation, including the Office of the Secretary, the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), and the Federal Aviation Administration (FAA).
- 2.2.6. **Federal-Aid Contract.** Any Contract between the Department and a Contractor that is paid for in whole or in part with DOT financial assistance.
- 2.2.7. **Good Faith Effort.** All necessary and reasonable steps to achieve the contract goal which, by their scope, intensity, and appropriateness to the objective, could reasonably be expected to obtain sufficient DBE participation, even if not fully successful. Good faith efforts are evaluated prior to award and throughout performance of the Contract. For guidance on good faith efforts, see 49 CFR Part 26, Appendix A.
- 2.2.8. **North American Industry Classification System (NAICS).** A designation that best describes the primary business of a firm. The NAICS is described in the North American Industry Classification Manual—United States, which is available on the Internet at the U.S. Census Bureau website: <http://www.census.gov/eos/www/naics/>.
- 2.2.9. **Race-Conscious.** A measure or program that is focused specifically on assisting only DBEs, including women-owned businesses.
- 2.2.10. **Race-Neutral DBE Participation.** Any participation by a DBE through customary competitive procurement procedures.
- 2.2.11. **Texas Unified Certification Program (TUCP) Directory.** An online directory listing all DBEs currently certified by the TUCP. The Directory identifies DBE firms whose participation on a Contract may be counted toward achievement of the assigned DBE Contract goal.
- 2.3. **Contractor's Responsibilities.**
- 2.3.1. **DBE Liaison Officer.** Designate a DBE liaison officer who will administer the Contractor's DBE program and who will be responsible for maintenance of records of efforts and contacts made to subcontract with DBEs.
- 2.3.2. **Compliance Tracking System (CTS).** This Contract is subject to electronic Contract compliance tracking. Contractors and DBEs are required to provide any noted and requested Contract compliance-related data electronically in the Department's tracking system. This includes commitments, payments, substitutions, and good faith efforts. Contractors and DBEs are responsible for responding by any noted response date or due date to any instructions or request for information, and to check the system on a regular basis. A Contractor is responsible for ensuring all DBEs have completed all requested items and that their contact information is accurate and up-to-date. The Department may require additional information related to the Contract to be provided electronically through the system at any time before, during, or after contract award. The system is web-based and can be accessed at the following Internet address: <https://txdot.txdotcms.com/>.
- In its sole discretion, the Department may require that contract compliance tracking data be submitted by Contractors and DBEs in an alternative format prescribed by the Department.
- 2.3.3. **Apparent Low Bidder.** The apparent low bidder must submit DBE commitments to satisfy the DBE goal or submit good faith effort Form 2603 and supporting documentation demonstrating why the goal could not be achieved, in whole or part, no later than 5 calendar days after bid opening. The means of transmittal and the risk of timely receipt of the information will be the bidder's responsibility and no extension of the 5-calendar-day timeframe will be allowed for any reason.

2.3.4. **DBE Contractor.** A DBE Contractor may receive credit toward the DBE goal for work performed by its own forces and work subcontracted to DBEs. In the event a DBE subcontracts to a non-DBE, that information must be reported monthly.

2.3.5. **DBE Committal.** Only those DBEs certified by the TUCP are eligible to be used for goal attainment. The Department maintains the TUCP DBE Directory. The Directory can be accessed at the following Internet address: <https://txdot.txdotcms.com/FrontEnd/VendorSearchPublic.asp?TN=txdot&XID=2340>.

A DBE must be certified on the day the commitment is considered and at time of subcontract execution. It is the Contractor's responsibility to ensure firms identified for participation are approved certified DBE firms.

The Bidder is responsible to ensure that all submittals are checked for accuracy. Any and all omissions, deletions, and/or errors that may affect the end result of the commitment package are the sole liabilities of the bidder.

Commitments in excess of the goal are considered race-neutral commitments.

2.3.6. **Good Faith Effort Requirements.** A Contractor who cannot meet the Contract goal, in whole or in part, must make adequate good faith efforts to obtain DBE participation as so stated and defined in 49 CFR Part 26, Appendix A.

2.3.6.1. **Administrative Reconsideration.** If the Department determines that the apparent low bidder has failed to satisfy the good faith efforts requirement, the Department will notify the Bidder of the failure and will give the Bidder an opportunity to provide written documentation or argument concerning the issue of whether it met the goal or made adequate good faith efforts to do so..

The Bidder must request an administrative reconsideration of that determination within 3 days of the date of receipt of the notice. The request must be submitted directly to the Texas Department of Transportation, Civil Rights Division, 125 East 11th Street, Austin, Texas 78701-2483.

If a request for administrative reconsideration is not filed within the period specified the determination made is final and further administrative appeal is barred.

If a reconsideration request is timely received, the reconsideration decision will be made by the Department's DBE liaison officer or, if the DBE liaison officer took part in the original determination, the Department's executive director will appoint a department employee to perform the administrative reconsideration. The employee will hold a senior leadership position and will report directly to the executive director.

The meeting or written documentation must be provided or held within 7 days of the date the request was submitted.

The Department will provide to the Bidder a written decision if the Bidder did or did not make adequate good faith efforts to meet the Contract goal. The reconsideration decision is final and is not administratively appealed to DOT.

2.3.7. **Determination of DBE Participation.** The work performed by the DBE must be reasonably construed to be included in the work area and NAICS work code identified by the Contractor in the approved commitment.

Participation by a DBE on a Contract will not be counted toward DBE goals until the amount of the participation has been paid to the DBE.

Payments made to a DBE that was not on the original commitment may be counted toward the Contract goal if that DBE was certified as a DBE before the execution of the subcontract and has performed a Commercially Useful Function.

The total amount paid to the DBE for work performed with its own forces is counted toward the DBE goal. 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 subcontractor is itself a DBE.

DBE Goal credit for the DBE subcontractors leasing of equipment or purchasing of supplies from the Contractor or its affiliates is not allowed. Project materials or supplies acquired from an affiliate of the Contractor cannot directly or indirectly (second or lower tier subcontractor) be used for DBE goal credit.

If a DBE firm is declared ineligible due to DBE decertification after the execution of the DBE's subcontract, the DBE firm may complete the work and the DBE firm's participation will be counted toward the Contract goal. If the DBE firm is decertified before the DBE firm has signed a subcontract, the Contractor is obligated to replace the ineligible DBE firm or demonstrate that it has made good faith efforts to do so.

The Contractor may count 100% of its expenditure to a DBE manufacturer. According to 49 CFR 26.55(e)(1)(i), a DBE 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.

The Contractor may count only 60% of its expenditure to a DBE regular dealer. According to 49 CFR 26.55(e)(2)(i), a DBE 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 firm 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 if the firm both owns and operates distribution equipment for the products. Any supplementing of regular dealers' own distribution equipment must be by a long-term lease agreement and not on an ad hoc or contract-by-contract basis. A long-term lease with a third-party transportation company is not eligible for 60% goal credit.

With respect to materials or supplies purchased from a DBE that is neither a manufacturer nor a regular dealer, the Contractor may 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 site.

A Contractor may count toward its DBE goal a portion of the total value of the Contract amount paid to a DBE joint venture equal to the distinct, clearly defined portion of the work of the Contract performed by the DBE.

2.3.8. **Commercially Useful Function.** It is the Contractor's obligation to ensure that each DBE used on federal-assisted contracts performs a commercially useful function on the Contract.

The Department will monitor performance during the Contract to ensure each DBE is performing a CUF.

Under the terms established in 49 CFR 26.55, a DBE performs a CUF 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.

With respect to material and supplies used on the Contract, a DBE must be responsible for negotiating price, determining quality and quantity, ordering the material, installing the material, if applicable, and paying for the material itself.

With respect to trucking, the DBE trucking firm must own and operate at least one fully licensed, insured, and operational truck used on the Contract. The DBE may lease trucks from another DBE firm, including an owner-operator who is certified as a DBE. The DBE who leases trucks from another DBE receives credit for the total value of the transportation services the lessee DBE provides on the Contract. The DBE may also lease trucks from a non-DBE firm, including from an owner-operator. The DBE that leases trucks equipped with drivers from a non-DBE is entitled to credit for the total value of transportation services provided by non-DBE leased trucks equipped with drivers not to exceed the value of transportation services on the Contract.

provided by DBE-owned trucks or leased trucks with DBE employee drivers. Additional participation by non-DBE owned trucks equipped with drivers receives credit only for the fee or commission it receives as a result of the lease arrangement.

A DBE does not perform a CUF when 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. The Department will evaluate similar transactions involving non-DBEs in order to determine whether a DBE is an extra participant.

If a DBE does not perform or exercise responsibility for at least 30% of the total cost of its Contract with its own work force, or the DBE subcontracts a greater portion of the work than would be expected on the basis of normal industry practice for the type of work involved, the Department will presume that the DBE is not performing a CUF.

If the Department determines that a DBE is not performing a CUF, no work performed by such DBE will count as eligible participation. The denial period of time may occur before or after a determination has been made by the Department.

In case of the denial of credit for non-performance of a CUF, the Contractor will be required to provide a substitute DBE to meet the Contract goal or provide an adequate good faith effort when applicable.

- 2.3.8.1. **Rebuttal of a Finding of No Commercially Useful Function.** Consistent with the provisions of 49 CFR 26.55(c)(4)&(5), before the Department makes a final finding that no CUF has been performed by a DBE, the Department will notify the DBE and provide the DBE the opportunity to provide rebuttal information.

CUF determinations are not subject to administrative appeal to DOT.

- 2.3.9. **Joint Check.** The use of joint checks between a Contractor and a DBE is allowed with Department approval. To obtain approval, the Contractor must submit a completed Form 2178, "DBE Joint Check Approval," to the Department.

The Department will closely monitor the use of joint checks to ensure that such a practice does not erode the independence of the DBE nor inhibit the DBE's ability to perform a CUF. When joint checks are utilized, DBE credit toward the Contract goal will be allowed only when the subcontractor is performing a CUF in accordance with 49 CFR 26.55(c)(1).

Long-term or open-ended joint checking arrangements may be a basis for further scrutiny and may result in the lack of participation towards the Contract goal requirement if DBE independence cannot be established.

Joint checks will not be allowed simply for the convenience of the Contractor.

If the proper procedures are not followed or the Department determines that the arrangements result in a lack of independence for the DBE involved, no credit for the DBE's participation as it relates to the material cost will be used toward the Contract goal requirement, and the Contractor will need to make up the difference elsewhere on the project.

- 2.3.10. **DBE Termination and Substitution.** No DBE named in the commitment submitted under Section 2.3.5. will be terminated for convenience, in whole or part, without the Department's approval. This includes, but is not limited to, instances in which a Contractor seeks to perform work originally designated for a DBE subcontractor with its own forces or those of an affiliate, a non-DBE firm, or with another DBE firm.

Unless consent is provided, the Contractor will not be entitled to any payment for work or material unless it is performed or supplied by the listed DBE.

The Contractor, prior to submitting its request to terminate, must first give written notice to the DBE of its intent to terminate and the reason for the termination. The Contractor will copy the Department on the Notice of Intent to terminate.

The DBE has 5 calendar days to respond to the Contractor's notice and will advise the Contractor and the Department of the reasons, if any, why it objects to the proposed termination of its subcontract and why the Department should not approve the prime Contractor's request for termination.

The Department may provide a shorter response time if required in a particular case as a matter of public necessity.

The Department will consider both the Contractor's request and DBE's stated position prior to approving the request. The Department may provide a written approval only if it agrees, for reasons stated in its concurrence document, that the Contractor has good cause to terminate the DBE. If the Department does not approve the request, the Contractor must continue to use the committed DBE firm in accordance with the Contract. For guidance on what good cause includes, see 49 CFR 26.53.

Good cause does not exist if the Contractor seeks to terminate, reduce, or substitute a DBE it relied upon to obtain the Contract so that the Contractor can self-perform the work for which the DBE firm was engaged.

When a DBE subcontractor is terminated, make good faith efforts to find, as a substitute for the original DBE, another DBE to perform, at least to the extent needed to meet the established Contract goal, the work that the original DBE was to have performed under the Contract.

Submit the completed Form 2228, "DBE Termination Substitution Request," within seven (7) days, which may be extended for an additional 7 days if necessary at the request of the Contractor. The Department will provide a written determination to the Contractor stating whether or not good faith efforts have been demonstrated. If the Department determines that good faith efforts were not demonstrated, the Contractor will have the opportunity to appeal the determination to the Civil Rights Division.

- 2.3.11. **Reports and Records.** By the 15th of each month and after work begins, report payments to meet the DBE goal and for DBE race-neutral participation on projects with or without goals. These payment reports will be required until all DBE subcontracting or material supply activity is completed. Negative payment reports are required when no activity has occurred in a monthly period.

Notify the Area Engineer if payment to any DBE subcontractor is withheld or reduced.

Before receiving final payment from the Department, the Contractor must indicate a final payment on the compliance tracking system. The final payment is a summary of all payments made to the DBEs on the project.

All records must be retained for a period of 3 years following completion of the Contract work, and must be available at reasonable times and places for inspection by authorized representatives of the Department or the DOT. Provide copies of subcontracts or agreements and other documentation upon request.

- 2.3.12. **Failure to Comply.** If the Department determines the Contractor has failed to demonstrate good faith efforts to meet the assigned goal, the Contractor will be given an opportunity for reconsideration by the Department.

A Contractor's failure to comply with the requirements of this Special Provision will constitute a material breach of this Contract. In such a case, the Department reserves the right to terminate the Contract; to deduct the amount of DBE goal not accomplished by DBEs from the money due or to become due the Contractor; or to secure a refund, not as a penalty but as liquidated damages, to the Department or such other remedy or remedies as the Department deems appropriate.

- 2.3.13. **Investigations.** The Department may conduct reviews or investigations of participants as necessary. All participants, including, but not limited to, DBEs and complainants using DBE Subcontractors to meet the

Contract goal, are required to cooperate fully and promptly with compliance reviews, investigations, and other requests for information.

2.3.14.

**Falsification and Misrepresentation.** If the Department determines that a Contractor or subcontractor was a knowing and willing participant in any intended or actual subcontracting arrangement contrived to artificially inflate DBE participation or any other business arrangement determined by the Department to be unallowable, or if the Contractor engages in repeated violations, falsification, or misrepresentation, the Department may:

- refuse to count any fraudulent or misrepresented DBE participation;
- withhold progress payments to the Contractor commensurate with the violation;
- reduce the Contractor's prequalification status;
- refer the matter to the Office of Inspector General of the US Department of Transportation for investigation; and/or
- seek any other available contractual remedy.



# Special Provision Item 000

## Important Notice to Contractors



The contractor's attention is directed to the fact that there are experience requirements associated with the Intelligent Transportation Systems (ITS) items contained on this project. The contractor or its subcontractor must provide information to the Engineer that they meet these requirements with the initial submittals for the associated bid items and before installing or testing ITS items. Following are the ITS items and requirements that must be met if the item is on this project.

### Category A. Pulling Fiber Optic Cable.

Contractor or subcontractor must meet the following experience requirements:

- Three years continuous existence offering services in the installation of fiber optic cable through an outdoor conduit system and terminating in ground boxes, field cabinets or enclosures, or buildings; and
- Three completed projects where the personnel pulled fiber optic cable, minimum 5-mile in length, through an outdoor conduit system for each project. The completed fiber optic cable systems must have been in continuous satisfactory operation for a minimum of 1 year.

### Category B. Splicing and Testing of Fiber Optic Cable.

Contractor or subcontractor must meet the following experience requirements:

- Three years continuous existence offering services in the fields of fusion splicing and testing of fiber optic cable installed through a conduit system and terminating in ground boxes, field cabinets or enclosures, or buildings. Experience must include the following:
  - termination of a minimum of 48 fibers within a fiber distribution frame,
  - optical time-domain reflectometer (OTDR) testing and measurement of end to end attenuation of single mode and multimode fibers,
  - system troubleshooting and maintenance,
  - training of personnel in system maintenance,
  - use of water-tight splice enclosures, and
  - fusion splicing of fiber optic cable which meet the tolerable dB losses listed in Table 1 below; and

**Table 1**  
**Sample Table**

Mode	dB Loss Range
Single mode	0.05–0.10
Multimode	0.20–0.30

- Three completed projects where the personnel performed fiber optic cable splicing and terminations, system testing, system troubleshooting and maintenance during the course of the project and provided training on system maintenance. Each project must have consisted of a minimum 5-mile length of fiber optic cable. The completed fiber optic cable systems must have been in continuous satisfactory operation for a minimum of 1 year.

### Category C. System Integration.

Contractor or subcontractor must meet the following experience requirements:

- Three years of providing system integration on wire line and wireless projects including, but not limited to, programming of layer-2 Ethernet switches, integrating into existing systems and coordination with traffic management centers; and
- Three completed projects requiring system integration and configuration of hardware including but not limited to Ethernet switches, video encoders and decoders, and radios.

#### **Category D. Dynamic Message Sign (DMS) Installation.**

Contractor or subcontractor must meet the following experience requirements:

- Three years continuous existence offering services in the installation of DMS signs; and
- Three completed projects consisting of a minimum of 2 signs in each project where the personnel installed, integrated, and tested DMS on outdoor, permanently mounted overhead structure(s) and related sign control equipment. The completed sign system installations must have been in continuous satisfactory operation for a minimum of 1 year; and
- One project (may be 1 of the 3 projects in the preceding paragraph) in which the personnel worked in cooperation with technical representatives of the equipment supplier to perform the installation, integration, or acceptance testing of the work. The Contractor will not be required to furnish equipment on this project from the same supplier who was referenced in the qualification documentation.

#### **Category E. Closed Circuit Television (CCTV) Equipment Installation.**

Contractor or subcontractor must meet the following experience requirements:

- Three years continuous existence offering services in the installation of CCTV camera systems;
- Three completed projects consisting of a minimum of 5 cameras in each project where the personnel installed, tested, and integrated CCTV cameras on outdoor, permanently mounted structure(s) and related camera control and transmission equipment. The completed CCTV camera system installations must have been in continuous satisfactory operation for a minimum of 1 year; and
- One project (may be 1 of the 3 projects in the preceding paragraph) in which the personnel worked in cooperation with technical representatives of the equipment supplier to perform installation, integration, or acceptance testing of the work. The Contractor will not be required to furnish equipment on this project from the same supplier who was referenced in the qualification documentation.

#### **Category F. Wireless Communications.**

Contractor or subcontractor must meet the following experience requirements:

- Three years continuous existence offering services in the installation of wireless communications. Experience must include the following:
  - Conducting radio installation studies, which include signal noise studies, spectrum analysis, antenna gain and radio power calculations, system attenuation, and measurement of standing wave ratios;
  - Installation, troubleshooting, and repair of broadband radio systems, which include equipment installation, configuration of radios, antenna calibration, and cabling; and
  - Installation, troubleshooting, and repair of interconnected Ethernet networks (LAN and WAN), which include cabling, switch or router configuration, and network analysis; and
- Three projects consisting of wireless communications installation, troubleshooting, and repair. Each project must include transmitting signals over a minimum of 1-mile distance and installation of a minimum of 3 devices; and
- One project (may be 1 of the 3 projects in the preceding paragraph) in which the personnel worked in cooperation with technical representatives of the equipment supplier to perform installation, integration, or acceptance testing of the work. The Contractor will not be required to furnish equipment on this project from the same supplier who was referenced in the qualification documentation.

**Category G. Radar Detection Systems.**

Contractor or subcontractor must meet the following experience requirements:

- Three years continuous existence offering services in the installation of radar detection systems. Experience must include the following:
  - freeway and arterial management,
  - forward fire and side fire applications,
  - single zone and dual beam detection, and
  - equipment setup, testing, and troubleshooting; and
- Three projects consisting of installation, configuration, and setup of radar detection systems; and
- One project (may be 1 of the 3 projects in the preceding paragraph) in which the personnel worked in cooperation with technical representatives of the equipment supplier to perform installation, integration, or acceptance testing of the work. The Contractor will not be required to furnish equipment on this project from the same supplier who was referenced in the qualification documentation.

Should the contractor have subcontractors which meet the above requirements, and should these subcontractors be unable to complete the ITS items contained within the project, the contractor must resubmit qualification material on alternate subcontractors for approval before the applicable category of work can be continued.

# Special Provision 000

## Notice of Contractor Performance Evaluations



### 1. GENERAL

In accordance with Texas Transportation Code §223.012, the Engineer will evaluate Contractor performance based on quality, safety, and timeliness of the project.

### 2. DEFINITIONS

- 2.1. **Project Recovery Plan (PRP)**—a formal, enforceable plan developed by the Contractor, in consultation with the District, that documents the cause of noted quality, safety, and timeliness issues and specifies how the Contractor proposes to correct project-specific performance deficiencies.

In accordance with Title 43, Texas Administrative Code (TAC), §9.23, the District will request a PRP if the Contractor's performance on a project is below the Department's acceptable standards and will monitor the Contractor's compliance with the established plan.

- 2.2. **Corrective Action Plan (CAP)**—a formal, enforceable plan developed by the Contractor, and proposed for adoption by the Construction or Maintenance Division, that documents the cause of noted quality, safety, and timeliness issues and specifies how the Contractor proposes to correct statewide performance deficiencies.

In accordance with 43 TAC §9.23, the Division will request a CAP if the average of the Contractor's statewide final evaluation scores falls below the Department's acceptable standards for the review period and will monitor the Contractor's compliance with the established plan.

### 3. CONTRACTOR EVALUATIONS

In accordance with Title 43, Texas Administrative Code (TAC) §9.23, the Engineer will schedule evaluations at the following intervals, at minimum:

- Interim evaluations—at or within 30 days after the anniversary of the notice to proceed, for Contracts extending beyond 1 yr., and
- Final evaluation—upon project closeout.

In case of a takeover agreement, neither the Surety nor its performing Contractor will be evaluated.

In addition to regularly scheduled evaluations, the Engineer may schedule an interim evaluation at any time to formally communicate issues with quality, safety, or timeliness. Upon request, work with the Engineer to develop a PRP to document expectations for correcting deficiencies.

Comply with the PRP as directed. Failure to comply with the PRP may result in additional remedial actions available to the Engineer under Item 5, "Control of the Work." Failure to meet a PRP to the Engineer's satisfaction may result in immediate referral to the Performance Review Committee for consideration of further action against the Contractor.

The Engineer will consider and document any events outside the Contractor's control that contributed to the failure to meet performance standards or comply with a PRP, including consideration of sufficient time.

Follow the escalation ladder if there is a disagreement regarding an evaluation or disposition of a PRP. The Contractor may submit additional documentation pertaining to the dispute. The District Engineer's decision

on a Contractor's evaluation score and recommendation of action required in a PRP or follow up for non-compliance is final.

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#### **4. DIVISION OVERSIGHT**

Upon request of the Construction or Maintenance Division, develop and submit for Division approval a proposed CAP to document expectations for correcting deficiencies in the performance of projects statewide.

Comply with the CAP as directed. The CAP may be modified at any time up to completion or resolution after written approval of the premise of change from the Division. Failure to meet an adopted or revised adopted CAP to the Division's satisfaction within 120 days will result in immediate referral to the Performance Review Committee for consideration of further action against the Contractor.

The Division will consider and document any events outside the Contractor's control that contributed to the failure to meet performance standards or comply with a CAP, including consideration of sufficient time and associated costs as appropriate.

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#### **5. PERFORMANCE REVIEW COMMITTEE**

The Performance Review Committee, in accordance with 43 TAC §9.24, will review at minimum all final evaluations, history of compliance with PRPs, any adopted CAPs including agreed modifications, any information about events outside a Contractor's control contributing to the Contractor's performance, and any documentation submitted by the Contractor and may recommend one or more of the following actions:

- take no action,
- reduce the Contractor's bidding capacity,
- prohibit the Contractor from bidding on one or more projects,
- immediately suspend the Contractor from bidding for a specified period of time, by reducing the Contractor's bidding capacity to zero, or
- prohibit the Contractor from being awarded a Contract on which they are the apparent low bidder.

The Deputy Executive Director will determine any further action against the Contractor.

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#### **6. APPEALS PROCESS**

In accordance with 43 TAC §9.25, the Contractor may appeal remedial actions determined by the Deputy Executive Director.

## Special Provision to Item 2

### Instructions to Bidders



Item 2, "Instructions to Bidders," of the Standard Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

**Article 2.3., "Issuing Proposal Forms,"** second paragraph, is supplemented by the following.

The Department will not issue a proposal form if one or more of the following apply:

- the Bidder or affiliate of the Bidder that was originally determined as the apparent low Bidder on a project, but was deemed nonresponsive for failure to submit a DBE commitment as specified in Article 2.14., "Disadvantaged Business Enterprise (DBE)," is prohibited from rebidding that specific project.

**Article 2.7., "Nonresponsive Bid,"** is supplemented by the following:

The Department will not accept a nonresponsive bid. A bid that has one or more of the deficiencies listed below is considered nonresponsive:

- the Bidder failed to submit a DBE commitment as specified in Article 2.14., "Disadvantaged Business Enterprise (DBE)."

**Article 2.14., "Disadvantaged Business Enterprise (DBE),"** is added.

The apparent low bidder must submit DBE commitment information on federally funded projects with DBE goals within 5 calendar days (as defined in 49 CFR Part 26, Subpart A) of bid opening. For a submission that meets the 5-day requirement, administrative corrections will be allowed.

If the apparent low Bidder fails to submit their DBE information within the specified timeframe, they will be deemed nonresponsive and the proposal guaranty will become the property of the State, not as a penalty, but as liquidated damages. The Bidder forfeiting the proposal guaranty will not be considered in future proposals for the same work unless there has been a substantial change in the design of the work. The Department may recommend that the Commission:

- reject all bids, or
- award the Contract to the new apparent low Bidder, if the new apparent low Bidder submits DBE information within one calendar day of notification by the Department.

If the new apparent low Bidder is unable to submit the required DBE information within one calendar day:

- the new apparent low Bidder will not be deemed nonresponsive,
- the new apparent low Bidder's guaranty will not be forfeited,
- the Department will reject all bids, and
- the new apparent low Bidder will remain eligible to receive future proposals for the same project.

## Special Provision to Item 2

### Instructions to Bidders



Item 2, "Instructions to Bidders," of the Standard Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

**Article 2.3., "Issuing Proposal Forms,"** is supplemented by the following:

- the Bidder or affiliate of the Bidder that was originally determined as the apparent low Bidder on a project, but was deemed nonresponsive for failure to register or participate in the Department of Homeland Security's (DHS) E-Verify system as specified in Article 2.15., "Department of Homeland Security (DHS) E-Verify System," is prohibited from rebidding that specific project.

**Article 2.7., "Nonresponsive Bid,"** is supplemented by the following:

- the Bidder failed to participate in the Department of Homeland Security's (DHS) as specified in Article 2.15., "Department of Homeland Security (DHS) E-Verify System."

**Article 2.15., "Department of Homeland Security (DHS) E-Verify System,"** is added.

The Department will not award a Contract to a Contractor that is not registered in the DHS E-Verify system. Remain active in E-Verify throughout the life of the contract. In addition, in accordance with paragraph six of Article 8.2, "Subcontracting," include this requirement in all subcontracts and require that subcontractors remain active in E-Verify until their work is completed.

If the apparent low Bidder does not appear on the DHS E-Verify system prior to award, the Department will notify the Contractor that they must submit documentation showing that they are compliant within 5-business days after the date the notification was sent. A Contractor who fails to comply or respond within the deadline will be declared non-responsive and the Department will execute the proposal guaranty. The proposal guaranty will become the property of the State, not as a penalty, but as liquidated damages. The Bidder forfeiting the proposal guaranty will not be considered in future proposals for the same work unless there has been a substantial change in the scope of the work.

The Department may recommend that the Commission:

- reject all bids, or
- award the Contract to the new apparent low Bidder, if the Department is able to verify the Bidder's participation in the DHS E-verify system. For the Bidder who is not registered in E-Verify, the Department will allow for one business day after notification to provide proof of registration.

If the Department is unable to verify the new apparent low Bidder's participation in the DHS E-Verify system within one calendar day:

- the new apparent low Bidder will not be deemed nonresponsive,
- the new apparent low Bidder's guaranty will not be forfeited,
- the Department will reject all bids, and
- the new apparent low Bidder will remain eligible to receive future proposals for the same project.

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## Special Provision to Item 2

### Instructions to Bidders

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Item 2, "Instructions to Bidders" of the Standard Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

**Article 3., "Issuing Proposal Forms,"** is supplemented by the following:

The Electronic State Business Daily (ESBD), the Integrated Contractor Exchange (iCX) system, and the project proposal are the official sources of advertisement and bidding information for the State and Local Lettings. Bidders should bid the project using the information found therein, including any addenda. These sources take precedence over information from other sources, including TxDOT webpages, which are unofficial and intended for informational purposes only.



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## Special Provision to Item 3 Award and Execution Contract

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Item 3, Award and Execution of Contract," of the Standard Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

**Section 4.3, "Insurance."** The first sentence is voided and replaced by the following:

For construction and building Contracts, submit a certificate of insurance showing coverages in accordance with Contract requirements. For routine maintenance Contracts, refer to Article 8, "Beginning of Work."

**Article 8, "Beginning of Work."** The first sentence is supplemented by the following:

For a routine maintenance Contract, do not begin work until a certificate of insurance showing coverages in accordance with the Contract requirements is provided and accepted.

## Special Provision to Item 3

### Award and Execution of Contract



Item 3, "Award and Execution of Contract" of the Standard Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

**Section 4.3 "Insurance" is being amended by the following:**

**Table 2**  
**Insurance Requirements**

<b>Type of Insurance</b>	<b>Amount of Coverage</b>
Commercial General Liability Insurance	Not Less Than: \$600,000 each occurrence
Business Automobile Policy	Not Less Than: \$600,000 combined single limit
Workers' Compensation	Not Less Than: Statutory
All Risk Builder's Risk Insurance (For building-facilities contracts only)	100% of Contract Price

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## Special Provision to Item 5

### Control of the Work

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Item 5, "Control of the Work," of the Standard Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

**Article 5.1, "Authority of Engineer,"** is voided and replaced by the following.

The Engineer has the authority to observe, test, inspect, approve, and accept the work. The Engineer decides all questions about the quality and acceptability of materials, work performed, work progress, Contract interpretations, and acceptable Contract fulfillment. The Engineer has the authority to enforce and make effective these decisions.

The Engineer acts as a referee in all questions arising under the terms of the Contract. The Engineer's decisions will be final and binding.

The Engineer will pursue and document actions against the Contractor as warranted to address Contract performance issues. Contract remedies include, but are not limited to, the following:

- conducting interim performance evaluations requiring a Project Recovery Plan, in accordance with Title 43, Texas Administrative Code (TAC) §9.23,
- requiring the Contractor to remove and replace defective work, or reducing payment for defective work,
- removing an individual from the project,
- suspending the work without suspending working day charges,
- assessing standard liquidated damages to recover the Department's administrative costs, including additional project-specific liquidated damages when specified in the Contract in accordance with 43 TAC §9.22,
- withholding estimates,
- declaring the Contractor to be in default of the Contract, and
- in case of a Contractor's failure to meet a Project Recovery Plan, referring the issue directly to the Performance Review Committee for consideration of further action against the Contractor in accordance with 43 TAC §9.24.

The Engineer will consider and document any events outside the Contractor's control that contributed to the failure to meet performance standards, including consideration of sufficient time.

Follow the issue escalation ladder if there is disagreement regarding the application of Contract remedies.

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## Special Provision to Item 5

### Control of the Work

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Item 5, "Control of the Work" of the Standard Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

**Article 5.4, "Coordination of Plans, Specifications, and Special Provisions," the last sentence of the last paragraph is replaced by the following:**

Failure to promptly notify the Engineer will constitute a waiver of all contract claims against the Department for misunderstandings or ambiguities that result from the errors, omissions, or discrepancies.

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## Special Provision to Item 6

### Control of Materials

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Item 6, "Control of Materials" of the Standard Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

**Article 6.10., "Hazardous Materials,"** is voided and replaced by the following:

Comply with the requirements of Article 7.12., "Responsibility for Hazardous Materials."

Notify the Engineer immediately when a visual observation or odor indicates that materials on sites owned or controlled by the Department may contain hazardous materials. Except as noted herein, the Department is responsible for testing, removing, and disposing of hazardous materials not introduced by the Contractor. The Engineer may suspend work wholly or in part during the testing, removing, or disposing of hazardous materials, except in the case where hazardous materials are introduced by the Contractor.

Use materials that are free of hazardous materials. Notify the Engineer immediately if materials are suspected to contain hazardous materials. If materials delivered to the project by the Contractor are suspected to contain hazardous materials, have an approved commercial laboratory test the materials for the presence of hazardous materials as approved. Remove, remediate, and dispose of any of these materials found to contain hazardous materials. The work required to comply with this section will be at the Contractor's expense if materials are found to contain hazardous materials. Working day charges will not be suspended and extensions of working days will not be granted for activities related to handling hazardous material introduced by the Contractor. If suspected materials are not found to contain hazardous materials, the Department will reimburse the Contractor for hazardous materials testing and will adjust working day charges if the Contractor can show that this work impacted the critical path.

**10.1. Painted Steel Requirements.** Coatings on existing steel contain hazardous materials unless otherwise shown on the plans. Remove paint and dispose of steel coated with paint containing hazardous materials in accordance with the following:

**10.1.1. Removing Paint From Steel** For contracts that are specifically for painting steel, Item 446, "Field Cleaning and Painting Steel" will be included as a pay item. Perform work in accordance with that item.

For projects where paint must be removed to allow for the dismantling of steel or to perform other work, the Department will provide for a separate contractor (third party) to remove paint containing hazardous materials prior to or during the Contract. Remove paint covering existing steel shown not to contain hazardous materials in accordance with Item 446, "Field Cleaning and Painting Steel."

**10.1.2. Removal and Disposal of Painted Steel.** For steel able to be dismantled by unbolting, paint removal will not be performed by the Department. The Department will remove paint, at locations shown on the plans or as agreed, for the Contractor's cutting and dismantling purposes. Utilize Department cleaned locations for dismantling when provided or provide own means of dismantling at other locations.

Painted steel to be retained by the Department will be shown on the plans. For painted steel that contains hazardous materials, dispose of the painted steel at a steel recycling or smelting facility unless otherwise shown on the plans. Maintain and make available to the Engineer invoices and other records obtained from the facility showing the received weight of the steel and the facility name. Dispose of steel that does not contain hazardous material coatings in accordance with federal, state and local regulations.

**10.2. Asbestos Requirements.** The plans will indicate locations or elements where asbestos containing materials (ACM) are known to be present. Where ACM is known to exist or where previously unknown ACM has been found, the Department will arrange for abatement by a separate contractor prior to or during the Contract. Notify the Engineer of proposed dates of demolition or removal of structural elements with ACM at least 60 days before beginning work to allow the Department sufficient time for abatement.

The Department of State Health Services (DSHS), Asbestos Programs Branch, is responsible for administering the requirements of the National Emissions Standards for Hazardous Air Pollutants, 40 CFR Part 61, Subpart M and the Texas Asbestos Health Protection Rules (TAHPR). Based on EPA guidance and regulatory background information, bridges are considered to be a regulated "facility" under NESHAP. Therefore, federal standards for demolition and renovation apply.

The Department is required to notify the DSHS at least 10 working days (by postmarked date) before initiating demolition or renovation of each structure or load bearing member shown on the plans. If the actual demolition or renovation date is changed or delayed, notify the Engineer in writing of the revised dates in sufficient time to allow for the Department's notification to DSHS to be postmarked at least 10 days in advance of the actual work.

Failure to provide the above information may require the temporary suspension of work under Article 8.4., "Temporary Suspension of Work or Working Day Charges," due to reasons under the control of the Contractor. The Department retains the right to determine the actual advance notice needed for the change in date to address post office business days and staff availability.

**10.3. Lead Abatement.** Provide traffic control as shown on the plans, and coordinate and cooperate with the third party and the Department for managing or removing hazardous materials. Work for the traffic control shown on the plans and coordination work will not be paid for directly but will be subsidiary to pertinent Items.

# Special Provision to Item 006

## Control of Materials



Item 6, “Control of Materials” of the Standard Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

**Section 1.1, “Buy America,”** The section is removed and replaced by the following:

Comply with the latest provisions of Build America, Buy America Act (BABA Act) of the Bipartisan Infrastructure Law which restricts funds being made available from Federal financial assistance programs unless all the iron products, steel products, manufactured products, and construction materials used in the project are produced in the United States. Use steel or iron products, manufactured products, or construction materials produced in the United States except when:

- a waiver exists exempting the material from Buy America compliance
- the cost of materials, including delivery, does not exceed 0.1% of the total Contract cost or \$2,500, whichever is greater,
- the Contract contains an alternate item for a foreign source product and the Contract is awarded based on the alternate item, or
- the materials are temporarily installed.

For construction materials submit a notarized original of TxDOT Construction Material Buy America Certification Form (Department Form 2806) with the proper attachments for verification of compliance.

Construction Materials are classified as an article, material, or supply—other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives—that is or consists primarily of:

- Non-ferrous metals,
- plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables),
- Glass (including optic glass)
- Lumber, or
- Drywall.

Details shown on the plans provide additional clarification on Buy America requirements for this project.

For steel or Iron materials submit a notarized original of the FORM D-9-USA-1 (Department Form 1818) with the proper attachments for verification of compliance. For Steel or Iron materials the manufacturing process includes any process that modifies the chemical content, physical shape or size, or final finish of a product. The manufacturing process begins with initial melting and mixing and continues through fabrication (cutting, drilling, welding, bending, etc.) and coating (paint, galvanizing, epoxy, etc.).

**Article 4., “Sampling, Testing, and Inspection,”** is supplemented by the following:

Meet with the Engineer and choose either the Department or a Department-selected Commercial Lab (CL) for conducting the subset of project-level sampling and testing shown in Table 1, “Select Guide Schedule Sampling and Testing.” Selection may be made on a test by test basis. CLs will meet the testing turnaround times shown (includes test time and time for travel and sampling and reporting) and in all cases issue test reports as soon as possible.

If the Contractor chooses a Department-selected CL for any Table 1 sampling and testing:

- notify the Engineer, District Lab, and the CL of project scheduling that may require CL testing;
- provide the Engineer, District Lab, and CL at least 24 hours' notice by phone or e-mail;
- reimburse the Department for CL Table 1 testing using the contract fee schedule for the CL (including mileage, travel, and stand ime) at the minimum guide schedule testing frequencies;
- reimburse the Department for CL Table 1 testing above the minimum guide schedule frequencies for retesting when minimum frequency testing results in failures to meet specification limits;
- agree with the Engineer and CL upon a policy regarding notification for testing services;
- give any cancellation notice to the Engineer, District Lab, and CL by phone or e-mail;
- reimburse the Department a \$150 cancellation fee to cover technician time and mileage charges for previously scheduled work cancelled without adequate notice, which resulted in mobilization of technician and/or equipment by the CL; and
- all CL charges will be reimbursed to the Department by a deduction from the Contractor's monthly pay estimate.

If the CL does not meet the Table 1 turnaround times, testing charge to the Contractor will be reduced by 50% for the first late day and an additional 5% for each succeeding late day.

Approved CL project testing above the minimum testing frequencies in the Guide Schedule of Sampling and Testing, and not as the result of failing tests, will be paid by the Department.

Other project-level Guide Schedule sampling and testing not shown on Table 1 will be the responsibility of the Department.

**Table 1  
Select Guide Schedule Sampling and Testing (Note 1)**

TxDOT Test	Test Description	Turn-Around Time (Calendar days)
<b>SOILS/BASE</b>		
<a href="#">Tex-101-E</a>	Preparation of Soil and Flexible Base Materials for Testing (included in other tests)	
<a href="#">Tex-104-E</a>	Liquid Limit of Soils (included in 106-E)	
<a href="#">Tex-105-E</a>	Plastic Limit of Soils (included in 106-E)	
<a href="#">Tex-106-E</a>	Calculating the Plasticity Index of Soils	7
<a href="#">Tex-110-E</a>	Particle Size Analysis of Soils	6
<a href="#">Tex-113-E</a>	Moisture-Density Relationship of Base Materials	7
<a href="#">Tex-114-E</a>	Moisture-Density Relationship of Subgrade and Embankment Soil	7
<a href="#">Tex-115-E</a>	Field Method for In-Place Density of Soils and Base Materials	2
<a href="#">Tex-116-E</a>	Ball Mill Method for the Disintegration of Flexible Base Material	5
<a href="#">Tex-117-E, Part II</a>	Triaxial Compression Tests For Disturbed Soils and Base Materials (Part II)	6
<a href="#">Tex-113-E</a> w/ <a href="#">Tex-117-E</a>	Moisture-Density Relationship of Base Materials <b>with</b> Triaxial Compression Tests For Disturbed Soils and Base Materials (Part II)	10
<a href="#">Tex-140-E</a>	Measuring Thickness of Pavement Layer	2
<a href="#">Tex-145-E</a>	Determining Sulfate Content in Soils - Colorimetric Method	4
<b>HOT MIX ASPHALT</b>		
<a href="#">Tex-200-F</a>	Sieve Analysis of Fine and Coarse Aggregate (dry, from ignition oven with known correction factors)	1 (Note 2)
<a href="#">Tex-203-F</a>	Sand Equivalent Test	3
<a href="#">Tex-206-F</a> , w/ <a href="#">Tex-207-F</a> , Part I, w/ <a href="#">Tex-227-F</a>	<b>(Lab-Molded Density of Production Mixture – Texas Gyrotory)</b> Method of Compacting Test Specimens of Bituminous Mixtures <b>with</b> Density of Compacted Bituminous Mixtures, Part I - Bulk Specific Gravity of Compacted Bituminous Mixtures, <b>with</b> Theoretical Maximum Specific Gravity of Bituminous Mixtures	1 (Note 2)
<a href="#">Tex-207-F</a> , Part I &/or Part VI	<b>(In-Place Air Voids of Roadway Cores)</b> Density of Compacted Bituminous Mixtures, Part I - Bulk Specific Gravity of Compacted Bituminous Mixtures <b>&amp;/or</b> Part VI - Bulk Specific Gravity of Compacted Bituminous Mixtures Using the Vacuum Method	1 (Note 2)



<a href="#">Tex-207-F</a> , Part V	Density of Compacted Bituminous Mixtures, Part V - Determining Mat Segregation using a Density-Testing Gauge	3
<a href="#">Tex-207-F</a> , Part VII	Density of Compacted Bituminous Mixtures, Part VII - Determining Longitudinal Joint Density using a Density-Testing Gauge	4
<a href="#">Tex-212-F</a>	Moisture Content of Bituminous Mixtures	3
<a href="#">Tex-217-F</a>	Deleterious Material and Decantation Test for Coarse Aggregate	4
<a href="#">Tex-221-F</a>	Sampling Aggregate for Bituminous Mixtures, Surface Treatments, and LRA (included in other tests)	
<a href="#">Tex-222-F</a>	Sampling Bituminous Mixtures (included in other tests)	
<a href="#">Tex-224-F</a>	Determination of Flakiness Index	3
<a href="#">Tex-226-F</a>	Indirect Tensile Strength Test (production mix)	4
<a href="#">Tex-235-F</a>	Determining Draindown Characteristics in Bituminous Materials	3
<a href="#">Tex-236-F</a> (Correction Factors)	Asphalt Content from Asphalt Paving Mixtures by the Ignition Method (Determining Correction Factors)	4
<a href="#">Tex-236-F</a>	Asphalt Content from Asphalt Paving Mixtures by the Ignition Method (Production Mixture)	1 (Note 2)
<a href="#">Tex-241-F</a> w/ <a href="#">Tex-207-F</a> , Part I, w/ <a href="#">Tex-227-F</a>	<b>(Lab-Molded Density of Production Mixture – Superpave Gyrotory)</b> Superpave Gyrotory Compacting of Specimens of Bituminous Mixtures (production mixture) <b>with</b> Density of Compacted Bituminous Mixtures, Part I- Part I - Bulk Specific Gravity of Compacted Bituminous Mixtures, <b>with</b> Theoretical Maximum Specific Gravity of Bituminous Mixtures	1 (Note 2)
<a href="#">Tex-242-F</a>	Hamburg Wheel-Tracking Test (production mix, molded samples)	3
<a href="#">Tex-244-F</a>	Thermal Profile of Hot Mix Asphalt	1
<a href="#">Tex-246-F</a>	Permeability of Water Flow of Hot Mix Asphalt	3
<a href="#">Tex-280-F</a>	Flat and Elongated Particles	3
<a href="#">Tex-530-C</a>	Effect of Water on Bituminous Paving Mixtures (production mix)	4
<b>AGGREGATES</b>		
<a href="#">Tex-400-A</a>	Sampling Flexible Base, Stone, Gravel, Sand, and Mineral Aggregates	3
<a href="#">Tex-410-A</a>	Abrasion of Coarse Aggregate Using the Los Angeles Machine	5
<a href="#">Tex-411-A</a>	Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate	12
<a href="#">Tex-461-A</a>	Degradation of Coarse Aggregate by Micro-Deval Abrasion	5
<b>CHEMICAL</b>		
<a href="#">Tex-612-J</a>	Acid Insoluble Residue for Fine Aggregate	4
<b>GENERAL</b>		
HMA Production Specialist [TxAPA – Level 1-A] (\$/hr)		
HMA Roadway Specialist [TxAPA – Level 1-B] (\$/hr)		
Technician Travel/Standby Time (\$/hr)		
Per Diem (\$/day – meals and lodging)		
Mileage Rate (\$/mile from closest CL location)		
<b>Note 1– Turn-Around Time includes test time and time for travel/sampling and reporting.</b>		
<b>Note 2 – These tests require turn-around times meeting the governing specifications. Provide test results within the stated turn-around time. CL is allowed one additional day to provide the signed and sealed report.</b>		

# Special Provision to Item 7

## Legal Relations and Responsibilities



Item 7, "Legal Relations and Responsibilities," of the Standard Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

**Section 7.7.2., "Texas Pollutant Discharge Elimination System (TPDES) Permits and Storm Water Pollution Prevention Plans (SWP3)," is voided and replaced by the following:**

**7.2. Texas Pollution Discharge Elimination System (TPDES) Permits and Storm Water Pollution Prevention Plans (SWP3).**

**7.2.1. Projects with less than one acre of soil disturbance including required associated project specific locations (PSL's) per TPDES GP TXR 150000.**

No posting or filing will be required for soil disturbances within the right of way. Adhere to the requirements of the SWP3.

**7.2.2. Projects with one acre but less than five acres of soil disturbance including required associated PSL's per TPDES GP TXR 150000.**

The Department will be considered a primary operator for Operational Control Over Plans and Specifications as defined in TPDES GP TXR 150000 for construction activity in the right of way. The Department will post a small site notice along with other requirements as defined in TPDES GP TXR 150000 as the entity of having operational control over plans and specifications for work shown on the plans in the right of way.

The Contractor will be considered a Primary Operator for Day-to-Day Operational Control as defined in TPDES GP TXR 150000 for construction activity in the right of way. In addition to the Department's actions, the Contractor will post a small site notice along with other requirements as defined in TPDES GP TXR 150000 as the entity of having day-to-day operational control of the work shown on the plans in the right of way. This is in addition to the Contractor being responsible for TPDES GP TXR 150000 requirements for on- right of way and off- right of way PSL's. Adhere to all requirements of the SWP3 as shown on the plans. The Contractor will be responsible for Implement the SWP3 for the project site in accordance with the plans and specifications, TPDES General Permit TXR150000, and as directed.

**7.2.3. Projects with 5 acres or more of soil disturbance including required associated PSL's per TPDES GP TXR 150000.**

The Department will be considered a primary operator for Operational Control Over Plans and Specifications as defined in TPDES GP TXR 150000 for construction activities in the right of way. The Department will post a large site notice, file a notice of intent (NOI), notice of change (NOC), if applicable, and a notice of termination (NOT) along with other requirements per TPDES GP TXR 150000 as the entity having operational control over plans and specifications for work shown on the plans in the right of way.

The Contractor will be considered a primary operator for Day-to-Day Operational Control as defined in TPDES GP TXR 150000 for construction activities in the right of way. In addition to the Department's actions, the Contractor shall file a NOI, NOC, if applicable, and NOT and post a large site notice along with other requirements as the entity of having day-to-day operational control of the work shown on the plans in the right of way. This is in addition to the Contractor

being responsible for TPDES GP TXR 150000 requirements for on- right of way and off- right of way PSL's. Adhere to all requirements of the SWP3 as shown on the plans.

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## Special Provision to Item 7

### Legal Relations and Responsibilities

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Item 7, "Legal Relations and Responsibilities" of the Standard Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

**Section 19.1., Minimum Wage Requirements for Federally Funded Contracts.** The second paragraph is voided and replaced by the following:

Submit electronic payroll records to the Engineer using the Department's payroll system.

**Section 19.2., Minimum Wage Requirements for State Funded Contracts.** The second paragraph is voided and replaced by the following:

Submit electronic payroll records to the Engineer using the Department's payroll system.

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## Special Provision to Item 7

# Legal Relations and Responsibilities

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Item 7, "Legal Relations and Responsibilities," of the Standard Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

**Section 7.2.4., "Public Safety and Convenience."** The first paragraph is deleted and replaced by the following.

Ensure the safety and convenience of the public and property as provided in the Contract and as directed. Keep existing roadways open to traffic or construct and maintain detours and temporary structures for safe public travel. Manage construction to minimize disruption to traffic. Maintain the roadway in a good and passable condition, including proper drainage and provide for ingress and egress to adjacent property.

If the construction of the project requires the closing of a highway, as directed, coordinate the closure with the Engineer and work to ensure all lanes and ramps possible are available during peak traffic periods before, during, and after significant traffic generator events to avoid any adverse economic impact on the municipalities during:

- dates or events as shown on the plans, and
- other dates as directed.

# Special Provision to Item 007

## Legal Relations and Responsibilities



Item 7, "Legal Relations and Responsibilities," of the Standard Specifications is amended with respect to the clauses cited below.

**Section 2.6., "Barricades, Signs, and Traffic Handling,"** the first paragraph is voided and replaced by the following:

- 2.6. **Barricades, Signs, and Traffic Handling.** Comply with the requirements of Item 502 "Barricades, Signs, and Traffic Handling," and as directed. Provide traffic control devices that conform to the details shown on the plans, the TMUTCD, and the Department's Compliant Work Zone Traffic Control Device List maintained by the Traffic Safety Division. When authorized or directed, provide additional signs or traffic control devices not required by the plans.

**Section 2.6.1., "Contractor Responsible Person and Alternative,"** is voided and replaced by the following:

- 2.6.1. **Contractor Responsible Person and Alternative.** Designate in writing, a Contractor's Responsible Person (CRP) and an alternate to be the representative of the Contractor who is responsible for taking or directing corrective measures regarding the traffic control. The CRP or alternate must be accessible by phone 24 hr. per day and able to respond when notified. The CRP and alternate must comply with the requirements of Section 2.6.5., "Training."

**Section 2.6.2, "Flaggers,"** the first paragraph is voided and replaced by the following:

- 2.6.2. **Flaggers.** Designate in writing, a flagger instructor who will serve as a flagging supervisor and is responsible for training and assuring that all flaggers are qualified to perform flagging duties. Certify to the Engineer that all flaggers will be trained and make available upon request a list of flaggers trained to perform flagging duties.

**Section 2.6.5, "Training,"** is voided and replaced by the following:

- 2.6.5. **Training.** Train workers involved with the traffic control using Department-approved training as shown on the "Traffic Control Training" Material Producer List.

Coordinate enrollment, pay associated fees, and successfully complete Department-approved training or Contractor-developed training. Training is valid for the period prescribed by the provider. Except for law enforcement personnel training, refresher training is required every 4 yr. from the date of completion unless otherwise specified by the course provider. The Engineer may require training at a frequency instead of the period prescribed based on the Department's needs. Training and associated fees will not be measured or paid for directly but are considered subsidiary to pertinent Items.

Certify to the Engineer that workers involved in traffic control and other work zone personnel have been trained and make available upon request a copy of the certification of completion to the Engineer. Ensure the following is included in the certification of completion:

- name of provider and course title,
- name of participant,
- date of completion, and
- date of expiration.

Where Contractor-developed training or a Department-approved training course does not produce a certification, maintain a log of attendees. Make the log available upon request. Ensure the log is legible and includes the following:

- printed name and signature of participant,
- name and title of trainer, and
- date of training.

2.6.5.1. **Contractor-developed Training.** Develop and deliver Contractor-developed training meeting the minimum requirements established by the Department. The outline for this training must be submitted to the Engineer for approval at the preconstruction meeting. The CRP or designated alternate may deliver the training instead of the Department-approved training. The work performed and materials furnished to develop and deliver the training will not be measured or paid for directly but will be considered subsidiary to pertinent Items.

2.6.5.1.1. **Flagger Training Minimum Requirements.** A Contractor's certified flagging instructor is permitted to train other flaggers.

2.6.5.1.2. **Optional Contractor-developed Training for Other Work Zone Personnel.** For other work zone personnel, the Contractor may provide training meeting the curriculum shown below instead of Department-approved training.

Minimum curriculum for Contractor-provided training is as follows:

Contractor-developed training must provide information on the use of personnel protection equipment, occupational hazards and health risks, and other pertinent topics related to traffic management. The type and amount of training will depend on the job duties and responsibilities. Develop training applicable to the work being performed. Develop training to include the following topics.

- The Life You Save May Be Your Own (or other similar company safety motto).
- Purpose of the training.
  - It's the Law.
  - To make work zones safer for workers and motorist.
  - To understand what is needed for traffic control.
  - To save lives including your own.
- Personal and Co-Worker Safety.
  - **High Visibility Safety Apparel.** Discuss compliant requirements; inspect regularly for fading and reduced reflective properties; if night operations are required, discuss the additional and appropriate required apparel in addition to special night work risks; if moving operations are underway, discuss appropriate safety measures specific to the situation and traffic control plan.
  - **Blind Areas.** A blind area is the area around a vehicle or piece of construction equipment not visible to the operators, either by line of sight or indirectly by mirrors. Discuss the "Circle of Safety" around equipment and vehicles; use of spotters; maintain eye contact with equipment operators; and use of hand signals.
  - **Runovers and Backovers.** Remain alert at all times; keep a safe distance from traffic; avoid turning your back to traffic and if you must then use a spotter; and stay behind protective barriers, whenever possible. Note: It is not safe to sit on or lean against a concrete barrier, these barriers can deflect four plus feet when struck by a vehicle.
  - Look out for each other, warn co-workers.
  - Be courteous to motorists.
  - Do not run across active roadways.
  - Workers must obey traffic laws and drive courteously while operating vehicles in the work zones.
  - Workers must be made aware of company distracted driving policies.
- **Night Time Operations.** Focus should be placed on projects with a nighttime element.

- **Traffic Control Training.** Basics of Traffic Control.
  - Identify work zone traffic control supervisor and other appropriate persons to report issues to when they arise.
  - Emphasize that work zone traffic control devices must be in clean and in undamaged condition. If devices have been hit but not damaged, put back in their correct place and report to traffic control supervisor. If devices have been damaged, replace with new one and report to traffic control supervisor. If devices are dirty, faded or have missing or damaged reflective tape clean or replace and report to traffic control supervisor. Show examples of non-acceptable device conditions. Discuss various types of traffic control devices to be used and where spacing requirements can be found.
  - **Channelizing Devices and Barricades with Slanted Stripes.** Stripes are to slant in the direction you want traffic to stay or move to; demonstrate this with a device.
  - **Traffic Queuing.** Workers must be made aware of traffic queuing and the dangers created by it. Workers must be instructed to immediately notify the traffic control supervisor and other supervisory personnel if traffic is queuing beyond advance warning sign and devices or construction limits.
  - **Signs.** Signs must be straight and not leaning. Report problems to the traffic control supervisor or other as designated for immediate repair. Covered signs must be fully covered. If covers are damaged or out of place, report to traffic control supervisor or other as designated.



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## Special Provision to Item 8 Prosecution and Progress

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Item 8, "Prosecution and Progress" of the Standard Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

**Article 8.1., "Prosecution of Work."** The first sentence of the first paragraph is voided and replaced by the following:

Begin work 90 calendar days after the authorization date to begin work. Do not begin work before or after this period unless authorized in writing by the Engineer.

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## Special Provision to Item 8 Prosecution and Progress

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Item 8, "Prosecution and Progress" of the Standard Specification is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

**Article 8.2., "Subcontracting,"** is supplemented by the following paragraph, which is added as paragraph six to this article:

The Contractor certifies by signing the Contract that the Contractor will not enter into any subcontract with a subcontractor that is not registered in the Department of Homeland Security's (DHS) E-Verify system. Require that all subcontractors working on the project register and require that all subcontractors remain active in the DHS E-Verify system until their work is complete on the project.

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## Special Provision to Item 8 Prosecution and Progress

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Item 8, "Prosecution and Progress" of the Standard Specifications is amended with respect to the clause cited below. No other clauses or requirements of this Item are waived or changed.

**Article 8.7.2., "Wrongful Default,"** is revised and replaced by the following:

If it is determined after the Contractor is declared in default, that the Contractor was not in default, the rights and obligations of all parties will be the same as if termination had been issued for the convenience of the public as provided in Article 8.8 "Termination of Contract."

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## Special Provision to Item 009

### Measurement and Payment

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Item 009 "Measurement and Payment" of the Standard Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

**Article 9.5., "PROGRESS PAYMENTS" is supplemented with the following:**

It is the Department's desire to pay a Contractor for work through the last working day of the month; however, the use of early cut-off dates for monthly estimates and MOH is a project management practice to manage workload at the Area Office level. Approval for using early cut-off dates is at the District's discretion. The earliest cut-off date for estimates is the 25<sup>th</sup> of the month.

**Article 9.6., "PAYMENT FOR MATERIAL ON HAND (MOH)" first paragraph is amended as follows:**

If payment for MOH is desired, request compensation for the invoice cost of acceptable nonperishable materials that have not been used in the work before the request, and that have been delivered to the work location or are in acceptable storage places. Nonperishable materials are those that do not have a shelf life or whose characteristics do not materially change when exposed to the elements. Include only materials that have been sampled, tested, approved, or certified, and are ready for incorporation into the work. Only materials which are completely constructed or fabricated on the Contractor's order for a specific Contract and are so marked and on which an approved test report has been issued are eligible. Payment for MOH may include the following types of items: concrete traffic barrier, precast concrete box culverts, concrete piling, reinforced concrete pipe, and illumination poles. Any repairs required after fabricated materials have been approved for storage will require approval of the Engineer before being made and will be made at the Contractor's expense. Include only those materials and products, when cumulated under an individual item or similar bid items, that have an invoice cost of at least \$1,000 in the request for MOH payment (e.g. For MOH eligibility, various sizes of conductor are considered similar bid items and may be cumulated to meet the threshold; for small roadside signs, the sign supports, mounting bolts, and the sign face is considered one bid item or similar bid items for more than one pay item for sign supports.) Requests for MOH are to be submitted at least two days before but not later than the estimate cutoff date unless otherwise agreed. If there is a need to request MOH after the established cut-off date, the district can make accommodation as the need arises. This needed accommodation is to be the exception, though, and not the rule.

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## Special Provision to Item 9 Measurement and Payment

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Item 9, "Measurement and Payment" of the Standard Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

**Section 9.7.1.4.3., "Standby Equipment Costs,"** is voided and replaced by the following:

7.1.4.3. **Standby Equipment Costs.** Payment for standby equipment will be made in accordance with Section 9.7.1.4., "Equipment," except that the 15% markup will not be allowed and that:

**Section 7.1.4.3.1., "Contractor-Owned Equipment,"** is voided and replaced by the following:

7.1.4.3.1. **Contractor-Owned Equipment.** For Contractor-owned equipment:

- Standby will be paid at 50% of the monthly Equipment Watch rate after the regional and age adjustment factors have been applied. Operating costs will not be allowed. Calculate the standby rate as follows.

$$\text{Standby rate} = (\text{FHWA hourly rate} - \text{operating costs}) \times 50\%$$

- If an hourly rate is needed, divide the monthly *Equipment Watch* rate by 176.
- No more than 8 hr. of standby will be paid during a 24-hr. day period, nor more than 40 hr. per week.
- Standby costs will not be allowed during periods when the equipment would have otherwise been idle.

# Special Provision to Item 247

## Flexible Base



Item 247, "Flexible Base" of the Standard Specifications, is hereby amended with respect to the clauses cited below, and no other clauses or requirements of this Item are waived or changed hereby.

**Section 2.4., "Certification."** This section is added.

Personnel certified by the Department-approved soils and base certification program must conduct all sampling, field testing, and laboratory testing required by the following:

- Section 2.1, "Aggregate,"
- Section 2.1.3.2, "Recycled Material (Including Crushed Concrete) Requirements,"
- Section 4.3, "Compaction," for measuring flexible base depth, and
- Section 4.3.2, "Density Control," for determining the roadway density and moisture content.

Supply the Engineer with a list of certified personnel and copies of their current certificates before laboratory and field testing is performed and when personnel changes are made. At any time during the project, the Engineer may perform production tests as deemed necessary in accordance with Item 5, "Control of the Work."

**Section 2.5., "Reporting and Responsibilities."** This section is added.

Use Department-provided templates to record and calculate all test data. Obtain the current version of the templates at <http://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/forms/site-manager.html> or from the Engineer. The Engineer and the Contractor will provide any available test results to the other party when requested. Record and electronically submit all test results and pertinent information on Department-provided templates.

**Section 2.6., "Sampling."** This section is added.

The Engineer will sample flexible base from stockpiles located at the production site or at the project location in accordance with [Tex-400-A](#), Section 5.3. The Engineer will label the sample containers as "Engineer," "Contractor" or "Supplier," and "CST/M&P." Witness the sampling and take immediate possession of the sample containers labeled "Contractor" or "Supplier." The Engineer will maintain custody of the samples labeled "CST/M&P" until testing and reporting is completed.

**Section 2.7., "Referee Testing."** This section is added.

CST/M&P is the referee laboratory. The Contractor may request referee testing when the Engineer's test results fail to meet any of the material requirements listed in Table 1. Make the request via email within 5 working days after receiving test results from the Engineer. Submit test reports signed and sealed by a licensed professional engineer from a commercial laboratory listed on the Department's Material Producer List (MPL) of laboratories approved to perform compaction and triaxial compression testing located at <http://ftp.dot.state.tx.us/pub/txdot-info/cmd/mpl/complabs.pdf>. Submit completed test reports electronically on Department-provided templates in their original format. The referee laboratory will report test results to the Engineer within the allowable number of working days listed in Table 2 from the time the referee laboratory receives the samples. It is at the discretion of the Engineer or the referee laboratory to deny a referee request upon review of the test reports provided by the Contractor.

**Table 2**  
**Number of Allowable Working Days to Report Referee Test Results**

Material Property	Test Method	Working Days
Gradation	Tex-110-E, Part I	5
Liquid Limit (Multi-Point Method)	Tex-104-E, Part I	5
Plasticity Index	Tex-106-E	5
Wet Ball Mill Value	Tex-116-E, Parts I and II	5
Wet Ball Mill, % Increase passing #40 sieve		
Compressive Strength <sup>1</sup>	Tex-117-E, Part II	6
Compressive Strength <sup>2</sup>	Tex-117-E	12

1. Moisture-Density curve provided by the District
2. Moisture-Density curve determined by the referee laboratory

**Section 4.6., "Ride Quality."** This section is voided and replaced by the following.

Measurement of ride quality only applies to the final travel lanes that receive a 1- or 2-course surface treatment for the final riding surface, unless otherwise shown on the plans. Measure the ride quality of the base course either before or after the application of the prime coat, as directed, and before placement of the surface treatment. Use a certified profiler operator from the Department's MPL. When requested, furnish the Engineer documentation for the person certified to operate the profiler.

Provide all profile data to the Engineer in electronic data files within 3 days of measuring the ride quality using the format specified in [Tex-1001-S](#). The Engineer will use Department software to evaluate longitudinal profiles to determine areas requiring corrective action. Correct 0.1-mi.sections for each wheel path having an average international roughness index (IRI) value greater than 100 in. per mile to an IRI value of 100 in. per mile or less, unless otherwise shown on the plans.

Re-profile and correct sections that fail to maintain ride quality, as directed. Correct re-profiled sections until specification requirements are met, as approved. Perform this work at no additional expense to the Department.

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## Special Provision to Item 300 Asphalt, Oils, and Emulsions

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Item 300, "Asphalt, Oils, and Emulsions" of the Standard Specifications is replaced by Special Specification [3096](#), "Asphalts, Oils, and Emulsions." All Item 300 Special Provisions are no longer available, beginning with the April 2022 letting.



# Special Provision to Item 302

## Aggregates for Surface Treatments



Item 302, "Aggregates for Seal Coats," of the Standard Specifications, is hereby amended with respect to the clauses cited below, and no other clauses or requirements of this Item are waived or changed hereby.

Section 2.1., "Aggregate." Tables 2 and 3 are voided and replaced by the following.

**Table 2**  
**Aggregate Gradation Requirements (Cumulative % Retained<sup>1</sup>)**

Sieve	Grade								
	1	2	3S <sup>2</sup>	3		4S <sup>2</sup>	4	5S <sup>2</sup>	5
				Non-Lightweight	Lightweight				
1"	-	-	-	-	-	-	-	-	-
7/8"	0-2	0	-	-	-	-	-	-	-
3/4"	20-35	0-2	0	0	0	-	-	-	-
5/8"	85-100	20-40	0-5	0-5	0-2	0	0	-	-
1/2"	-	80-100	55-85	20-40	10-25	0-5	0-5	0	0
3/8"	95-100	95-100	95-100	80-100	60-80	60-85	20-40	0-5	0-5
1/4"	-	-	-	95-100	95-100	-	-	65-85	-
#4	-	-	-	-	-	95-100	95-100	95-100	50-80
#8	99-100	99-100	99-100	98-100	98-100	98-100	98-100	98-100	98-100

1. Round test results to the nearest whole number.
2. Single-size gradation.

**Table 3**  
**Aggregate Quality Requirements**

Property	Test Method	Requirement <sup>1</sup>	
		Minimum	Maximum
SAC	<a href="#">AQMP</a>	As shown on the plans	
Deleterious Material <sup>2</sup> , %	<a href="#">Tex-217-F</a> , Part I	-	2.0
Decantation, %	<a href="#">Tex-406-A</a>	-	1.5
Flakiness Index, %	<a href="#">Tex-224-F</a>	-	17
Gradation	<a href="#">Tex-200-F</a> , Part I	Table 2 Requirements	
Los Angeles Abrasion, %	<a href="#">Tex-410-A</a>	-	35
Magnesium Sulfate Soundness, 5 Cycle, %	<a href="#">Tex-411-A</a>	-	25
Micro-Deval Abrasion, %	<a href="#">Tex-461-A</a>	Note 3	
Coarse Aggregate Angularity <sup>4</sup> , 2 Crushed Faces, %	<a href="#">Tex-460-A</a> , Part I	85	-
Additional Requirements for Lightweight Aggregate			
Dry Loose Unit Wt., lb./cu. ft.	<a href="#">Tex-404-A</a>	35	60
Pressure Slaking, %	<a href="#">Tex-431-A</a>	-	6.0
Freeze-Thaw Loss, %	<a href="#">Tex-432-A</a>	-	10.0
Water Absorption, 24hr., %	<a href="#">Tex-433-A</a>	-	12.0

1. Material requirements are listed below, unless otherwise shown on the plans.
2. Not required for lightweight aggregate.
3. Used to estimate the magnesium sulfate soundness loss in accordance with Section 2.1.1.
4. Only required for crushed gravel.

**Section 2.1.1., “Micro-Deval Abrasion,”** is added.

The Engineer will perform a minimum of one Micro-Deval abrasion test in accordance with [Tex-461-A](#) for each coarse aggregate source per project that has a Rated Source Soundness Magnesium (RSSM) loss value greater than 15 as listed in the BRSQC. The Engineer may waive all Micro-Deval testing based on a satisfactory test history of the same aggregate source.

The Engineer will estimate the magnesium sulfate soundness loss for each coarse aggregate source, when tested, using the following formula.

$$Mg_{est.} = (RSSM)(MD_{act.}/RSMD)$$

where:

$Mg_{est.}$  = magnesium sulfate soundness loss

$MD_{act.}$  = actual Micro-Deval percent loss

$RSMD$  = Rated Source Micro-Deval

When the estimated magnesium sulfate soundness loss is greater than the maximum magnesium sulfate soundness loss specified, the coarse aggregate source will not be allowed for use unless otherwise approved by the Engineer. The Engineer may require additional testing before granting approval.

**Section 2.2., “Precoating.”** The third paragraph is voided and replaced by the following.

The Engineer retains the right to remove precoat material from aggregate samples in accordance with [Tex-210-F](#), or as recommended by the Construction Division, and test the aggregate to verify compliance with Table 2 and Table 3 requirements. Gradation testing may be performed with precoat intact.

**Section 2.3., “Sampling,”** is added.

Personnel who conduct sampling and witnessing of sampling must be certified by the Department-approved certification program. Supply the Engineer with a list of certified personnel and copies of their current certificates before beginning construction and when personnel changes are made. At any time during the project, the Engineer may perform production tests as deemed necessary in accordance with Item 5, “Control of the Work.”

The Engineer will sample aggregate from stockpiles located at the production site, intermediate distribution site, or project location in accordance with [Tex-221-F](#), Section 3.2.3. The Engineer will split each sample into 2 equal portions in accordance with [Tex-200-F](#), Section 3.3, and label these portions “Engineer” and “Contractor” or “Supplier.” Witness the sampling and splitting, and take immediate possession of the samples labeled “Contractor” or “Supplier”.

**Section 2.4., “Reporting and Responsibilities,”** is added.

The Engineer will provide test results to the Contractor and Supplier within 10 working days from the date the stockpile was sampled for sources listed on the Department’s Bituminous Rated Source Quality Catalog (BRSQC), unless otherwise directed. The Engineer will provide test results for the LA Abrasion ([Tex-410-A](#)) and Magnesium Sulfate Soundness ([Tex-411-A](#)) tests within 30 calendar days for sources not listed on the BRSQC, or for sources not meeting the requirements of Section 2.1.1., “Micro-Deval Abrasion.” The Engineer will report to the other party within 24 hours when any test result does not meet the requirements listed in Table 2 or Table 3.

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## Special Provision to Item 316

### Seal Coat

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Item 316, "Seal Coat" of the Standard Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

**Section 4.8, "Asphalt Placement"** is supplemented by the following:

4.8.5. Collect all samples in accordance with Tex-500-C, "Sampling Bituminous Materials, Pre-Molded Joint Fillers, and Joint Sealers" from the distributor and with witness by the Engineer.

At least once per project, collect split samples of each binder grade and source used. The Engineer will submit one split sample to MTD for testing and retain the other split sample.

In addition, collect one sample of each binder grade and source used on the project for each production day. The Engineer will retain these samples.

The Engineer will keep all retained samples for one yr., for hot-applied binders and cutback asphalts; or for two mo., for emulsified asphalts. The Engineer may submit retained samples to MTD for testing as necessary or as requested by MTD.

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## Special Provision to Item 420

### Concrete Substructure

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Item 420, "Concrete Substructures" of the Standard Specifications is amended with respect to the clause cited below. No other clauses or requirements of this Item are waived or changed.

**Article 420.6., "Payment."** The first paragraph is replaced by the following:

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for the class of concrete and element identified and by the special designation when appropriate. This price is full compensation for furnishing, hauling, and mixing concrete materials; furnishing, bending, fabricating, splicing, welding and placing the required reinforcement; clips, blocks, metal spacers, ties, wire, or other materials used for fastening reinforcement in place; placing, finishing, and curing concrete; mass placement controls; applying ordinary surface finish; furnishing and placing drains, metal flashing strips, and expansion-joint material; excavation, subgrade preparation; and forms and falsework, equipment, labor, tools, and incidentals.

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## Special Provision to Item 421

### Hydraulic Cement Concrete

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Item 421, "Hydraulic Cement Concrete" of the Standard Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

**Article 421.2., "Materials,"** the second sentence of the first paragraph is voided and replaced by the following.

Provide aggregates from sources listed in the Department's Concrete Rated Source Quality Catalog (CRSQC).

**Article 421.2.2., Supplementary Cementing Materials (SCM),** is voided and replaced with the following.

Supplementary Cementing Materials (SCM).

- **Fly Ash.** Furnish fly ash, Modified fly ash (MFA), and Ground Bottom Ash (GBA) conforming to [DMS-4610](#), "Fly Ash."
- **Slag Cement.** Furnish Slag Cement conforming to [DMS-4620](#), "Slag Cement."
- **Silica Fume.** Furnish silica fume conforming to [DMS-4630](#), "Silica Fume."
- **Metakaolin.** Furnish metakaolin conforming to [DMS-4635](#), "Metakaolin."

**Article 421.3.1.3., "Agitators and Truck and Stationary Mixers,"** the first paragraph is voided and replaced by the following.

Provide stationary and truck mixers capable of combining the ingredients of the concrete into a thoroughly mixed and uniform mass and capable of discharging the concrete so that the requirements of [Tex-472-A](#) are met.

**Article 421.3.1.3., "Agitators and Truck and Stationary Mixers,"** is supplemented with the following.

Truck mixers with automated water and chemical admixture measurement and slump and slump flow monitoring equipment meeting the requirement of ASTM C 94 will be allowed. Provide data every 6 mo. substantiating the accuracy of slump, slump flow, temperature, water, and chemical admixture measurements. The slump measured by the automated system must be within 1 in. of the slump measured in accordance with [Tex-415-A](#). The concrete temperature measured by the automated system must be within 1°F of concrete temperature measured in accordance with [Tex-422-A](#). The Engineer will not use the automated measurements for acceptance.

Article 421.4.2, "Mix Design Proportioning," Table 8 is voided and replaced by the following.

**Table 8**  
**Concrete Classes**

Class of Concrete	Design Strength, <sup>1</sup> Min $f'_c$ (psi)	Max w/cm Ratio	Coarse Aggregate Grades <sup>2,3,4</sup>	Cement Types	Mix Design Options	Exceptions to Mix Design Options	General Usage <sup>5</sup>
A	3,000	0.60	1-4, 8	I, II, I/II, IL, IP, IS, IT, V	1, 2, 4, & 7	When the cementitious material content does not exceed 520 lb./cu. yd., any fly ash listed in the MPL may be used at a cement replacement of 20% to 50%.	Curb, gutter, curb & gutter, conc. retards, sidewalks, driveways, back-up walls, anchors, non-reinforced drilled shafts
B	2,000	0.60	2-7				Riprap, traffic signal controller foundations, small roadside signs, and anchors
C <sup>6</sup>	3,600	0.45	1-6	I, II, I/II, IP, IL, IS, IT, V	1-8		Drilled shafts, bridge substructure, traffic rail, culverts except top slab of direct traffic culverts, headwalls, wing walls, inlets, manholes, traffic barrier
E	3,000	0.50	2-5	I, II, I/II, IL, IP, IS, IT, V	1-8	When the cementitious material content does not exceed 520 lb./cu. yd., any fly ash listed in the MPL may be used at a cement replacement of 20% to 50%.	Seal concrete
F <sup>6</sup>	Note <sup>7</sup>	0.45	2-5	I, II, I/II, IP, IL, IS, IT, V			Railroad structures; occasionally for bridge piers, columns, bents, post-tension members
H <sup>6</sup>	Note <sup>7</sup>	0.45	3-6	I, II, I/II, III, IP, IL, IS, IT, V	1-4, 8	Mix design options 1-8 allowed for cast-in-place concrete and the following precast elements unless otherwise stated in the plans: <ul style="list-style-type: none"> <li>■ Bridge Deck Panels,</li> <li>■ Retaining Wall Systems,</li> <li>■ Coping,</li> <li>■ Sound Walls,</li> <li>■ Wall Columns,</li> <li>■ Traffic Rail,</li> <li>■ Traffic Barrier,</li> <li>■ Long/Arch Span Culverts, and</li> <li>■ precast concrete products included in Items 462, 464, and 465.</li> </ul> Do not use Type III cement in mass placement concrete. Up to 20% of blended cement may be replaced with listed SCMs when Option 4 is used for precast concrete. Options 6, & 7 allowed for cast-in-place Class H concrete.	Precast concrete, post-tension members
S <sup>6</sup>	4,000	0.45	2-5	I, II, I/II, IP, IL, IS, IT, V	1-8		Bridge slabs, top slabs of direct traffic culverts, approach slabs
P	See Item 360, "Concrete Pavement."	0.50	2-3	I, II, I/II, IL, IP, IS, IT, V	1-8	When the cementitious material content does not exceed 520 lb./cu. yd., any fly ash listed in the MPL may be used at a cement replacement of 20% to 50%.	Concrete pavement

Class of Concrete	Design Strength, <sup>1</sup> Min $f_c$ (psi)	Max w/cm Ratio	Coarse Aggregate Grades <sup>2,3,4</sup>	Cement Types	Mix Design Options	Exceptions to Mix Design Options	General Usage <sup>5</sup>
CO <sup>6</sup>	4,600	0.40	6		1-8		Bridge deck concrete overlay
LMC <sup>6</sup>	4,000	0.40	6-8				Latex-modified concrete overlay
SS <sup>6</sup>	3,600	0.45	4-6	I, II, I/II, IP, IL, IS, IT, V	1-8	Use a minimum cementitious material content of 658 lb./cu. yd. of concrete. Limit the alkali loading to 4.0 lbs./cu. yd. or less when using option 7.	Slurry displacement shafts, underwater drilled shafts
K <sup>6</sup>	Note <sup>7</sup>	0.40	Note <sup>7</sup>	I, II, I/II, III, IP, IL, IS, IT, V	1-8		Note <sup>7</sup>
HES	Note <sup>7</sup>	0.45	Note <sup>7</sup>	I, IL, II, I/II, III		Mix design options do not apply. 700 lb. of cementitious material per cubic yard limit does not apply.	Concrete pavement, concrete pavement repair
"X" (HPC) <small>6,8,9</small>	Note <sup>10</sup>	0.45	Note <sup>10</sup>	I, II, I/II, III, IP, IL, IS, IT, V	1-4, & 8	Maximum fly ash replacement for Option 3 may be increased to 50%. Up to 20% of a blended cement may be replaced with listed SCMs for Option 4. Do not use Option 8 for precast concrete.	
"X" (SRC) <small>6,8,9</small>	Note <sup>10</sup>	0.45	Note <sup>10</sup>	I/II, II, IP, IL, IS, IT, V	1-4, & 7	When using fly ash, only use fly ashes allowed for SRC as listed in the Fly Ash MPL. Type III-MS may be used where allowed. Type I and Type III cements may be use when fly ashes allowed for SRC as listed in the Fly Ash MPL are used, and with a maximum w/cm of 0.40. Up to 20% of blended cement may be replaced with listed SCMs when Option 4 is used for precast concrete. Use Option 7 for precast concrete where allowed.	

- Design strength must be attained within 56 days.
- Do not use Grade 1 coarse aggregate except in massive foundations with 4 in. minimum clear spacing between reinforcing steel bars, unless otherwise permitted. Do not use Grade 1 aggregate in drilled shafts.
- Use Grade 8 aggregate in extruded curbs unless otherwise approved.
- Other grades of coarse aggregate maybe used in non-structural concrete classes when allowed by the Engineer.
- For information only.
- Structural concrete classes.
- As shown on the plans or specified.
- "X" denotes class of concrete shown on the plans or specified.
- (HPC): High Performance Concrete, (SRC): Sulfate Resistant Concrete.
- Same as class of concrete shown on the plans.

**Article 421.4.2.2., "Aggregates,"** is supplemented by the following.

Use the following equation to determine if the aggregate combination meets the sand equivalency requirement when blending fine aggregate or using an intermediate aggregate:

$$\frac{(SE_1 \times P_1) + (SE_2 \times P_2) + (SE_{ia} \times P_{ia})}{100} \geq 80\%$$

where:

$SE_1$  = sand equivalency (%) of fine aggregate 1

$SE_2$  = sand equivalency (%) of fine aggregate 2

$SE_{ia}$  = sand equivalency (%) of intermediate aggregate passing the 3/8 in. sieve

$P_1$  = percent by weight of fine aggregate 1 of the fine aggregate blend

$P_2$  = percent by weight of fine aggregate 2 of the fine aggregate blend

$P_{ia}$  = percent by weight of intermediate aggregate passing the 3/8 in. sieve

**Article 421.4.2.3., “Chemical Admixtures,”** the second paragraph is voided and replaced with the following.

Use a 30% calcium nitrite solution when a corrosion-inhibiting admixture is required. Dose the admixture at the rate of gallons of admixture per cubic yard of concrete shown on the plans. Use set retarding admixtures, as needed, to control setting time to ensure concrete containing corrosion inhibiting admixtures remain workable for the entire duration of the concrete placement. Perform setting time testing and slump loss testing during trial batch testing.

**Article 421.4.2.5., “Slump,”** the second paragraph is voided and not replaced. Table 9 is voided and replaced with below:

**Table 9**  
**Placement Slump Requirements**

General Usage	Placement Slump Range, <sup>1,2</sup> in.
Walls (over 9 in. thick), caps, columns, piers	3 to 7
Bridge slabs, top slabs of direct traffic culverts, approach slabs, concrete overlays, latex-modified concrete for bridge deck overlays	3 to 6
Inlets, manholes, walls (less than 9 in. thick), bridge railing, culverts, concrete traffic barrier, concrete pavement (formed)	4 to 6
Precast concrete	4 to 9
Underwater concrete placements	6 to 8-1/2
Drilled shafts, slurry displaced and underwater drilled shafts	See Item 416, “Drilled Shaft Foundations.”
Curb, gutter, curb and gutter, concrete retards, sidewalk, driveways, seal concrete, anchors, riprap, small roadside sign foundations, concrete pavement repair, concrete repair	As approved

1. Maximum slump values may be increase above these values shown using chemical admixtures, provided the admixture treated concrete has the same or lower water-to-cementitious ratio and does not exhibit segregation or excessive bleeding. Request approval to increase slump limits in advance for proper evaluation by the Engineer.
2. For fiber reinforced concrete, perform slump before addition of fibers.

**Article 421.4.2.6., “Mix Design Options”**, is voided and replaced with the following.

**Option 1.** Replace cement with at least the minimum dosage listed in the Fly Ash MPL for the fly ash used in the mixture. Do not replace more than 50% of the cement with fly ash.

**Option 2.** Replace 35% to 50% of the cement with slag cement.

**Option 3.** Replace 35% to 50% of the cement with a combination of fly ash, slag cement, MFA, metakaolin, or at least 3% silica fume; however, no more than 35% may be fly ash, and no more than 10% may be silica fume.

**Option 4.** Use Type IP, Type IS, or Type IT cement as allowed in Table 8 for each class of concrete. Up to 10% of a Type IP, Type IS, or Type IT cement may be replaced with fly ash, slag cement, or silica fume. Use no more than 10% silica fume in the final cementitious material mixture if the Type IT cement contains silica fume, and silica fume is used to replace the cement.

**Option 5.** Option 5 is left intentionally blank.



**Option 6.** Use a lithium nitrate admixture at a minimum dosage determined by testing conducted in accordance with Tex-471-A. Before use of the mix, provide an annual certified test report signed and sealed by a licensed professional engineer, from a laboratory on the Department's MPL, certified by the Construction Division as being capable of testing according to Tex-471-A.

**Option 7.** Ensure the total alkali contribution from the cement in the concrete does not exceed 3.5 lb. per cubic yard of concrete when using hydraulic cement not containing SCMs calculated as follows:

$$\text{lb. alkali per cu. yd.} = \frac{(\text{lb. cement per cu. yd.}) \times (\% \text{ Na}_2\text{O equivalent in cement})}{100}$$

In the above calculation, use the maximum cement alkali content reported on the cement mill certificate.

**Option 8.** Use Table 10 when deviating from Options 1–3 or when required by the Fly Ash MPL. Perform required testing annually and submit results to the Engineer. Laboratories performing ASTM C1260, ASTM C1567, and ASTM C1293 testing must be listed on the Department's MPL. Before use of the mix, provide a certified test report signed and sealed by a licensed professional engineer demonstrating the proposed mixture conforms to the requirements of Table 10.

Provide a certified test report signed and sealed by a licensed professional engineer, when HPC is required, and less than 20% of the cement is replaced with SCMs, demonstrating ASTM C1202 test results indicate the permeability of the concrete is less than 1,500 coulombs tested immediately after either of the following curing schedules:

- Moisture cure specimens 56 days at 73°F.
- Moisture cure specimens 7 days at 73°F followed by 21 days at 100°F.

**Table 10**  
**Option 8 Testing and Mix Design Requirements**

Scenario	ASTM C1260 Result		Testing Requirements for Mix Design Materials or Prescriptive Mix Design Options
	Mix Design Fine Aggregate	Mix Design Coarse Aggregate	
<b>A</b>	> 0.10%	> 0.10%	Determine the dosage of SCMs needed to limit the 14-day expansion of each aggregate <sup>1</sup> to 0.10% when tested individually in accordance with ASTM C1567.
<b>B</b>	≤ 0.10%	≤ 0.10%	Use the minimum replacement listed in the Fly Ash MPL, or When Option 8 is listed on the MPL, use a minimum of 40% fly ash with a maximum CaO <sup>2</sup> content of 25%, or Use any ternary combination which replaces 35% to 50% of cement.
	≤ 0.10%	ASTM C1293 1 yr. Expansion ≤ 0.04%	Use a minimum of 20% of any fly ash; or Use any ternary combination which replaces 20% to 50% of cement.
<b>C</b>	≤ 0.10%	> 0.10%	Determine the dosage of SCMs needed to limit the 14-day expansion of coarse and intermediate <sup>1</sup> aggregate to 0.10% when tested individually in accordance with ASTM C1567.
<b>D</b>	> 0.10%	≤ 0.10%	Use the minimum replacement listed in the Fly Ash MPL, or When Option 8 is listed on the MPL, use a minimum of 40% fly ash with a maximum CaO <sup>2</sup> content of 25%, or Use any ternary combination which replaces 35% to 50% of cement.
	> 0.10%	ASTM C1293 1 yr. Expansion ≤ 0.04%	Determine the dosage of SCMs needed to limit the 14-day expansion of each fine aggregate to 0.10% when individually tested in accordance with ASTM C1567.

1. Intermediate size aggregates will fall under the requirements of mix design coarse aggregate.
2. Average the CaO content from the previous ten values as listed on the test certificate.

**Article 421.4.2.7., "Optimized Aggregate Gradation (OAG) Concrete,"** the first sentence of the first paragraph is voided and replaced by the following.

The gradations requirements in Table 4 and Table 6 do not apply when OAG concrete is specified or used by the Contractor unless otherwise shown on the plans.

The fineness modulus for fine aggregate listed in Table 5, does not apply when OAG Concrete is used,

**Article 421.4.6.2., “Delivering Concrete,”** the third paragraph is supplemented by the following.

When truck mixers are equipped with automated water or chemical admixture measurement and slump or slump flow monitoring equipment, the addition of water or chemical admixtures during transit is allowed. Reports generated by this equipment must be submitted to the Engineer daily.

**Article 421.4.6.2., “Delivering Concrete,”** the fifth paragraph is voided and replaced with the following. Begin the discharge of concrete delivered in truck mixers within the times listed in Table 14. Concrete delivered after these times, and concrete that has not begun to discharge within these times will be rejected

**Article 421.4.8.3., “Testing of Fresh Concrete,”** is voided and replaced with the following.

**Testing Concrete.** The Engineer, unless specified in other Items or shown on the plans, will test the fresh and hardened concrete in accordance with the following methods:

- Slump. [Tex-415-A](#);
- Air Content. [Tex-414-A](#) or [Tex-416-A](#);
- Temperature. [Tex-422-A](#);
- Making and Curing Strength Specimens. [Tex-447-A](#);
- Compressive Strength. [Tex-418-A](#);
- Flexural Strength. [Tex-448-A](#); and
- Maturity. [Tex-426-A](#).

Flexural strength and maturity specimens will not be made unless specified in other items or shown on the plans.

Concrete with slump less than minimum required after all addition of water withheld will be rejected, unless otherwise allowed by the Engineer. Concrete with slump exceeding maximum allowed may be used at the contractor’s option. If used, Engineer will make, test, and evaluate strength specimens as specified in Article 421.5., “Acceptance of Concrete.” Acceptance of concrete not meeting air content or temperature requirements will be determined by Engineer. Fresh concrete exhibiting segregation and excessive bleeding will be rejected.

**Article 421.4.8.3.1. “Job-Control Testing,”** is voided and not replaced.

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## Special Provision to Item 440

### Reinforcement for Concrete

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Item 440, "Standard Specification Title" of the Standard Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

**Article 440.2., "Materials"** is supplemented with the following:

- 2.14. Provide zinc-coated, hot-dip galvanized Class I or II steel reinforcement conforming to ASTM A767, Grades 60 or 75 when shown on the plans and as allowed.
- 2.15. Provide continuously hot-dip galvanized reinforcement (CGR) conforming to ASTM A1094 steel reinforcement, Grades 60 or 75 when shown on the plans and as allowed.

**Article 440.2.5., "Weldable Reinforcing Steel"** is supplemented with the following:

All welding operations must be performed prior to hot-dip galvanizing.

**Article 440.2.8., "Mechanical Couplers"** is supplemented with the following:

Provide hot-dipped or mechanically galvanized couplers when splicing galvanized reinforcing or continuously galvanized reinforcing.

**Article 440.2.11., "Low-Carbon, Chromium Reinforcing Steel."** The first sentence is voided and replaced by the following:

Provide deformed steel bars conforming to ASTM A1035, Grade 100, Type CS when low-carbon, chromium reinforcing steel is required on the plans. Type CM will only be permitted if specified on the plans.

**Article 440.3.1., "Bending"** is supplemented with the following:

Do not bend hot-dip galvanized reinforcement. Only minor positioning adjustments are permitted.

Bending of continuously galvanized reinforcement is permitted after galvanizing.

**Article 440.3.5, "Placing"** the following will be added to paragraph four.

Use Class 1 or 1A supports with continuously galvanized reinforcing. Provide epoxy or plastic-coated tie wires and clips for use with epoxy coated reinforcing steel.

**Article 440.3.6.3., "Repairing Coating"** is supplemented with the following:

Repair damaged galvanized surfaces in accordance with Article 445.3.5.2. "Repair Processes."

# Special Provision to Item 441

## Steel Structures



Item 441, "Steel Structures" of the Standard Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

**Section 441.2.2., "Approved Electrodes and Flux-Electrode Combinations,"** is voided and replaced with the following:

Use only electrodes and flux-electrode combinations conforming to AWS A5 specifications, and pertinent classifications for the applicable welding processes. When requested, submit a current Certificate of Conformance (COC) containing all test results as required by the applicable AWS A5 specification and welding code. Provide proof of Buy America compliance for welding consumables when requested. For bridge main member fabrication, submit the COC annually.

**Section 441.2.3., "High-Strength Bolts,"** is revised and replaced by the following:

Use fasteners that meet Item 447, "Structural Bolting." Use galvanized fasteners on field connections of bridge members when ASTM F3125-Grade A325 bolts are specified, and steel is painted.

**Section 441.3.1.5.1., "Plants,"** The second and third paragraphs are voided and replaced with the following:

Fabrication plants that produce the following non-bridge steel members must be approved in accordance with DMS-7380, "Steel Non-Bridge Member Fabrication Plant Qualification."

- Item 610, "Roadway Illumination Poles"
- Item 613, "High Mast Illumination Poles"
- Item 614, "High Mast Rings and Support Assemblies"
- Item 650, "Overhead Sign Support Structures"
- Item 654, "Sign Walkways"
- Item 686, "Traffic Signal Poles"
- Special Specification 6064, "Intelligent Transportation System (ITS) Poles."

The Materials and Tests Division (MTD) maintains a list of approved non-bridge fabrication plants on the Department MPL that produce these members.

**Section 441.3.1.6.1., "Erection Drawings,"** the third paragraph is voided and replaced with the following:

Perform erection engineering evaluation of the structural adequacy and stability of constructing the bridge system for each step of the steel erection.

**Section 441.3.1.5.3., "Nondestructive Testing (NDT),"** is voided and replaced with the following:

Personnel performing NDT must be qualified in accordance with the applicable AWS code and the employer's Written Practice. Level III personnel who qualifies Level I and Level II technicians must be certified by ASNT for which the NDT Level III is qualified. In addition, NDT technicians must pass hands-on tests that MTD administers. This will remain current provided they continue to perform testing on Department materials as evidenced by test reports requiring their signature. A technician who fails any of the hands-on tests must wait 3 mo. or as approved otherwise before retesting. Qualification to perform NDT will be revoked when the technician's employment is terminated or when the technician goes 6 mo. without performing a test on a Department project. The technician must pass a new hands-on test to be re-certified. Testing of similar weld joints for non-Department projects may be considered by the Engineer instead of re-testing provided enough documentation is submitted with the signature of the project's Engineer. These requirements also apply to testing agencies, and individual third-party contractors.

**Section 441.3.1.5.4., “Welding Procedure Specification Qualification Testing,”** is voided and replaced by the following:

For Fabricators qualified in accordance with DMS-7370, DMS-7380, or DMS-7395, laboratories performing procedure qualification testing for welding procedure specifications (WPSs) must be accredited by a nationally recognized agency that performs testing in accordance with ISO/International Electrotechnical Commission (IEC) 17025 in the mechanical field of testing.

**Section 441.3.1.9., “Material Identification,”** is amended to include the following paragraph:

Low-stress stencil marks must have a radius instead of a sharp point. Acceptable stencils include dot, vibration, and rounded-V stencils. Label these stencils so that they are easily distinguishable from other stencils that are not low-stress.

**Section 441.3.2.4.1., “Flange Tilt,”** the last sentence is voided and replaced with the following:

Minor jacking that does not deform the material will be permitted.

**Section 441.3.2.5.3., “Magnetic Particle Testing,”** is voided and replaced with the following:

Use alternating current (AC) when using the yoke method unless otherwise approved. Welds may be further evaluated with half-wave rectified DC for subsurface indications. Centerline cracking may be detected with aluminum prod method when approved.

**Section 441.3.5.8., “Hammering,”** is added to state the following:

Do not perform hammering on any portion of the member that causes the material to permanently deform. Avoid damage to the material by measures such as use of brass or aluminum hammers or by padding the area to be hammered.

**Section 441.3.8.1., “Shop Painting,”** is amended to include with the following paragraph:

Measure the anchor profile after blast cleaning at random locations along the thermal cut surfaces. If specified anchor profile is not achieved over the entire flame cut surface, grind the edges and re-blast to achieve the required anchor pattern.

**Section 441.3.9., “Handling and Storage of Materials,”** The second sentence of the second paragraph is replaced by the following:

Keep materials clean and avoid damaging of the applied coating.

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## Special Provision to Item 442

### Metal for Structures

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Item 442, "Metal for Structures" of the Standard Specifications is amended with respect to the clause cited below. No other clauses or requirements of this Item are waived or changed.

**Section 442.2.1.3.3., "Fasteners."** The first sentence of the first paragraph is replaced by the following:

**Fasteners.** Provide high-strength bolts that meet ASTM F3125-Grade A325 unless otherwise shown on the plans.

**Section 442.2.1.3.3., "Fasteners."** The third paragraph is deleted and not replaced.

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## Special Provision to Item 448

### Structural Field Welding

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Item 448, "Structural Field Welding" of the Standard Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

**Article 448.2., "Materials,"** the third paragraph is voided and replaced with the following:

Use only electrodes and flux-electrode combinations conforming to AWS A5 specifications and pertinent classifications for the applicable welding processes. When requested, submit a current Certificate of Conformance (COC) containing acceptable wording indicating Buy America compliance and all tests required by the applicable AWS specifications and welding codes. Tests must be conducted on electrodes of the same class, size, and brand; and manufactured by the same process and with the same materials as the electrodes to be furnished.

# Special Provision to Item 449

## Anchor Bolts



Item 449, "Anchor Bolts" of the Standard Specifications is amended with respect to the clause cited below. No other clauses or requirements of this Item are waived or changed.

**Section 449.2.1., "Bolts and Nuts."** Table 1 is replaced by the following:

Table 1  
Bolt and Nut Standards

Specified Anchor Bolt Category	Bolt Standards	Nut Standards
Mild steel	ASTM A307 Gr. A, F1554 Gr. 36, or A36	ASTM A563
Medium-strength, mild steel	ASTM F1554 Gr. 55 with supplementary requirement S1	ASTM A194 Gr. 2 or A563 Gr. D or better
High-strength steel	ASTM F3125-Grade A325 or ASTM A449 <sup>1</sup>	ASTM A194 or A563, heavy hex
Alloy steel	ASTM A193 Gr. B7 or F1554 Gr. 105	ASTM A194 Gr. 2H or A563 Gr. DH, heavy hex

1. If headed bolts are specified, ASTM A449 bolts must be heavy hex head.

**Section 449.3.3.1, "Anchor Bolt Thread Lubricant Coating,"** The first sentence of the first paragraph is voided and replaced by the following.

Coat anchor bolt threads before installing nuts with an electrically conducting lubricant compound described in Section 449.3.3.2.1., "Definitions," for traffic signal poles, roadway illumination poles, high mast illumination poles, intelligent transportation system poles, overhead sign support structures, and steel electrical service supports.

**Section 449.3.3.2, "Anchor Bolt Tightening Procedure,"** The first sentence of the first paragraph is voided and replaced by the following.

Tighten anchor bolts for traffic signal poles, shoe base and concrete traffic barrier base roadway illumination poles, high mast illumination poles, intelligent transportation system poles, and overhead sign support structures in accordance with this Section.



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## Special Provision to Item 502

### Barricades, Signs and Traffic Handling

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Item 502, "Barricades, Signs and Traffic Handling" of the Standard Specifications, is hereby amended with respect to the clauses cited below, and no other clauses or requirements of this Item are waived or changed hereby.

**Article 502.1., "Description,"** is supplemented by the following:

Temporary work-zone (TWZ) traffic control devices manufactured after December 31, 2019, must have been successfully tested to the crashworthiness requirements of the 2016 edition of the Manual for Assessing Safety Hardware (MASH). Such devices manufactured on or before this date and successfully tested to NCHRP Report 350 or the 2009 edition of MASH may continue to be used throughout their normal service lives. An exception to the manufacture date applies when, based on the project's date of letting, a category of MASH-2016 compliant TWZ traffic control devices are not approved, or are not self-certified after the December 31, 2019, date. In such case, devices that meet NCHRP-350 or MASH-2009 may be used regardless of the manufacture date.

Such TWZ traffic control devices include: portable sign supports, barricades, portable traffic barriers designated exclusively for use in temporary work zones, crash cushions designated exclusively for use in temporary work zones, longitudinal channelizers, truck and trailer mounted attenuators. Category I Devices (i.e., lightweight devices) such as cones, tubular markers and drums without lights or signs attached however, may be self-certified by the vendor or provider, with documentation provided to Department or as are shown on Department's Compliant Work Zone Traffic Control Device List.

**Article 502.4., "Payment,"** is supplemented by the following:

Truck mounted attenuators and trailer attenuators will be paid for under Special Specification, "Truck Mounted Attenuator (TMA) and Trailer Attenuator (TA)." Portable Changeable Message Signs will be paid for under Special Specification, "Portable Changeable Message Sign." Portable Traffic Signals will be paid for under Special Specification, "Portable Traffic Signals."

# Special Provision to Item 506

## Temporary Erosion, Sedimentation, and Environmental Controls



For this project, Item 506, "Temporary Erosion, Sedimentation, and Environmental Controls," of the Standard Specifications, is hereby amended with respect to the clauses cited below, and no other clauses or requirements of this Item are waived or changed hereby.

**Article 506.1., "Description,"** is voided and replaced by the following:

Install, maintain, and remove erosion, sedimentation, and environmental control measures to prevent or reduce the discharge of pollutants in accordance with the Storm Water Pollution Prevention Plan (SWP3) or as directed. Ensure the installation and maintenance of control measures is performed in accordance with the manufacturer's or designer's specifications. Erosion and sediment control devices must be selected from the "Erosion Control Approved Products" or "Sediment Control Approved Products" lists. Perform work in a manner to prevent degradation of receiving waters, facilitate project construction, and comply with applicable federal, state, and local regulations.

**Article 506.3., "Qualifications, Training, and Employee Requirements,"** is voided and not replaced.

**Section 506.4.1., "Contractor Responsibilities," Section 506.4.2., "Implementation," and Section 506.4.3., "General,"** are voided and replaced by the following:

4.1. **Contractor Responsibilities.** Implement the SWP3 for the project site in accordance with the plans and specifications, and as directed. Coordinate storm water management with all other work on the project. Develop and implement an SWP3 for project-specific material supply plants within and outside of the Department's right of way in accordance with the specific or general storm water permit requirements. Prevent water pollution from storm water associated with construction activity from entering any surface water or private property on or adjacent to the project site.

4.2. **Implementation.**

4.2.1. **Commencement.** Implement the SWP3 as shown and as directed. Contractor proposed recommendations for changes will be allowed as approved. Do not implement changes until approval has been received and changes have been incorporated into the plans by the Engineer. Minor adjustments to meet field conditions are allowed and will be recorded by the Engineer in the SWP3.

Implement control measures before the commencement of activities that result in soil disturbance. Phase and minimize the soil disturbance to the areas shown on the plans. Coordinate temporary control measures with permanent control measures and all other work activities on the project to assure economical, effective, safe, continuous water pollution prevention. Provide control measures that are appropriate to the construction means, methods, and sequencing allowed by the Contract.

Do not prolong final grading and shaping. Preserve vegetation where possible throughout the project and minimize clearing, grubbing, and excavation within stream banks, bed, and approach sections.

4.3. **General.**

4.3.1. **Temporary Alterations or Control Measure Removal.** Altering or removal of control measures is allowed when control measures are restored within the same working day.

- 4.3.2. **Stabilization.** Initiate stabilization for disturbed areas no more than 14 days after the construction activities in that portion of the site has temporarily or permanently ceased. Establish a uniform vegetative cover or use another stabilization practice as approved.
- 4.3.3. **Finished Work.** Upon the Engineer's acceptance of vegetative cover or other stabilization practice, remove and dispose of all temporary control measures unless otherwise directed. Complete soil disturbing activities and establish a uniform perennial vegetative cover. A project will not be considered for acceptance until a vegetative cover of 70% density of existing adjacent undisturbed areas is obtained or equivalent permanent stabilization is obtained as approved.
- 4.3.4. **Restricted Activities and Required Precautions.** Do not discharge onto the ground or surface waters any pollutants such as chemicals, raw sewage, fuels, lubricants, coolants, hydraulic fluids, bitumens, or any other petroleum product. Operate and maintain equipment on site in a manner as to prevent actual or potential water pollution. Manage, control, and dispose of litter on site such that no adverse impacts to water quality occur. Prevent dust from creating a potential or actual unsafe condition, public nuisance, or condition endangering the value, utility, or appearance of any property. Wash out concrete trucks only in approved contained areas. Use appropriate controls to minimize the offsite transport of suspended sediments and other pollutants if it is necessary to pump or channel standing water (i.e. dewatering). Prevent discharges that would contribute to a violation of Edwards Aquifer Rules, water quality standards, the impairment of a listed water body, or other state or federal law.

**Section 506.4.4., "Installation, Maintenance, and Removal Work."** The first paragraph is voided and replaced by the following.

Perform work in accordance with the SWP3, and according to the manufacturers' guidelines. Install and maintain the integrity of temporary erosion and sedimentation control devices to accumulate silt and debris until soil disturbing activities are completed and permanent erosion control features are in place or the disturbed area has been adequately stabilized as determined by the Engineer.

**Section 506.4.5., "Monitoring and Documentation,"** is voided and not replaced.

**Section 506.6.5.2., "Maintenance Earthwork for Erosion and Sediment Control for Cleaning and/or Restoring Control Measures,"** is voided and replaced by the following:

Earthwork needed to remove and obliterate of erosion-control features will not be paid for directly but is subsidiary to pertinent Items unless otherwise shown on the plans.

Sprinkling and rolling required by this Item will not be paid for directly but will be subsidiary to this Item.

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# Special Provision to Item 636

## Signs

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Item 636, "Signs" of the Standard Specifications, is hereby amended with respect to the clauses cited below, and no other clauses or requirements of this Item are waived or changed hereby.

**Section 636.3.1, "Fabrication."** is deleted.

**Section 636.3.1.2, "Sheeting Application."** The last sentence of the fourth paragraph is voided and replaced by the following.

Do not splice sheeting or overlay films for signs fabricated with ink or with colored transparent films.

# Special Provision to Item 643

## Sign Identification Decals



Item 643, "Sign Identification Decals," of the Standard Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

**Article 2. "Materials."** The sign identification decal design shown in Figure 1 and the description for each row in Table 1 are supplemented by the following.

<b>Texas Department of Transportation</b>													
<b>C</b>	<b>Fabrication Date</b>											<b>T</b>	<b>1</b>
J	F	M	A	M	J	J	A	S	O	N	D	<b>2</b>	
	201		202		203		204		205			<b>3</b>	
	0	1	2	3	4	5	6	7	8	9		<b>4</b>	
<b>Sheeting MFR - Substrate</b>													
A	B	C	D	E	F	G	H	J	K	L	M	<b>5</b>	
<b>Film MFR</b>													
A	B	C	D	E	F	G	H	J	K	L	M	<b>6</b>	
<b>Sheeting MFR - Legend</b>													
A	B	C	D	E	F	G	H	J	K	L	M	<b>7</b>	
<b>Installation Date</b>													
				0	1	2	3					<b>8</b>	
	0	1	2	3	4	5	6	7	8	9		<b>9</b>	
J	F	M	A	M	J	J	A	S	O	N	D	<b>10</b>	
	201		202		203		204		205			<b>11</b>	
	0	1	2	3	4	5	6	7	8	9		<b>12</b>	
<b>Name of Sign Fabricator Physical Address City, State, Zip Code</b>													<b>13</b>

**Figure 1**  
**Decal Design (Row numbers explained in Table 1)**

**Table 1**  
**Decal Description**  
**Row Explanation**

<b>1</b>	Sign fabricator
<b>2</b>	Month fabricated
<b>3</b>	First 3 digits of year fabricated
<b>4</b>	Last digit of year fabricated
<b>5</b>	Manufacturer of the sheeting applied to the substrate
<b>6</b>	Film (colored transparent or non-reflective black) manufacturer
<b>7</b>	Manufacturer of the sheeting for the legend
<b>8</b>	Tens digit of date installed
<b>9</b>	Ones digit of date installed
<b>10</b>	Month installed
<b>11</b>	First 3 digits of year installed
<b>12</b>	Last digit of year installed
<b>13</b>	Name of sign fabricator and physical location of sign shop

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## Special Provision to Item 656

### Foundations for Traffic Control Devices

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Item 656, "Foundations for Traffic Control Devices" of the Standard Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

**Article 3. "Construction,"** the first paragraph is supplemented by the following:

Ensure the top of the foundation and anchor bolts meet specified requirements in relation to the final grade.

# Special Provision to Item 666

## Retroreflectorized Pavement Markings



Item 666, "Retroreflectorized Pavement Markings," of the Standard Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

**Section 2.3., "Glass Traffic Beads."** The first paragraph is voided and replaced by the following:

Furnish drop-on glass beads in accordance with DMS-8290, "Glass Traffic Beads," or as approved. Furnish a double-drop of Type II and Type III drop-on glass beads for longitudinal pavement markings where each type bead is applied separately in equal portions (by weight), unless otherwise approved. Apply the Type III beads before applying the Type II beads. Furnish Type II beads for work zone pavement markings and transverse markings or symbols.

**Section 4.3.1., "Type I Markings.,"** is supplemented by the following:

**4.3.1.3. Spot Striping.** Perform spot striping on a callout basis with a minimum callout quantity as shown on the plans.

**Section 4.3.2., "Type II Markings.,"** is supplemented by the following:

**4.3.2.1. Spot Striping.** Perform spot striping on a callout basis with a minimum callout quantity as shown on the plans.

**Section 4.4., "Retroreflectivity Requirements.,"** is voided and replaced by the following.

Type I markings for Contracts totaling more than 20,000 ft. of pavement markings must meet the following minimum retroreflectivity values for all longitudinal edgeline, centerline or no passing barrier-line, and lane line markings when measured any time after 3 days, but not later than 10 days after application.

- White markings: 250 millicandelas per square meter per lux (mcd/m<sup>2</sup>/lx)
- Yellow markings: 175 mcd/m<sup>2</sup>/lx

Retroreflectivity requirements for Type I markings are not required for Contracts with less than 20,000 ft. of pavement markings or Contracts with callout work, unless otherwise shown on the plans.

**Section 4.5., "Retroreflectivity Measurements.,"** is voided and replaced by the following:

Use a mobile retroreflectometer to measure retroreflectivity for Contracts totaling more than 50,000 ft. of pavement markings, unless otherwise shown on the plans. For Contracts with less than 50,000 ft. of pavement markings, mobile or portable retroreflectometers may be used at the Contractor's discretion. Coordinate with and obtain authorization from the Engineer before starting any retroreflectivity data collection.

**Section 4.5.1., "Mobile Retroreflectometer Measurements."** The last paragraph is voided and replaced by the following.

Restripe again at the Contractor's expense with a minimum of 0.060 in. (60 mils) of Type I marking material if the average of these measurements falls below the minimum retroreflectivity requirements. Take measurements every 0.1 miles a minimum of 10 days after this third application within that mile segment for that series of markings. If the markings do not meet minimum retroreflectivity after this third application, the Engineer may require removal of all existing markings, a new application as initially specified, and a repeat of the application process until minimum retroreflectivity requirements are met.



**Section 4.5.2., "Portable Retroreflector Measurements."** The first and second paragraphs are voided and replaced by the following.

Provide portable measurement averages for every 1.0 mile unless otherwise specified or approved. Take a minimum of 20 measurements for each 1-mi. section of roadway for each series of markings (e.g., edgeline, center skip line, each line of a double line) and direction of traffic flow when using a portable reflectometer. Measure each line in both directions for centerlines on two-way roadways (i.e., measure both double solid lines in both directions and measure all center skip lines in both directions). The spacing between each measurement must be at least 100 ft. The Engineer may decrease the mileage frequency for measurements if the previous measurements provide satisfactory results. The Engineer may require the original number of measurements if concerns arise.

Restripe at the Contractor's expense with a minimum of 0.060 in. (60 mils) of Type I marking material if the averages of these measurements fail. Take a minimum of 10 more measurements after 10 days of this second application within that mile segment for that series of markings. Restripe again at the Contractor's expense with a minimum of 0.060 in. (60 mils) of Type I marking material if the average of these measurements falls below the minimum retroreflectivity requirements. If the markings do not meet minimum retroreflectivity after this third application, the Engineer may require removal of all existing markings, a new application as initially specified, and a repeat of the application process until minimum retroreflectivity requirements are met.

**Section 4.6. "Performance Period."** The first sentence is voided and replaced by the following:

All longitudinal markings must meet the minimum retroreflectivity requirements within the time frame specified. All markings must meet all other performance requirements of this specification for at least 30 calendar days after installation.

**Article 6. "Payment."** The first two paragraphs are voided and replaced by the following.

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Pavement Sealer" of the size specified; "Retroreflectorized Pavement Markings" of the type and color specified and the shape, width, size, and thickness (Type I markings only) specified, as applicable; "Retroreflectorized Pavement Markings with Retroreflective Requirements" of the types, colors, sizes, widths, and thicknesses specified; "Retroreflectorized Profile Pavement Markings" of the various types, colors, shapes, sizes, and widths specified; or "Reflecterized Pavement Marking (Call Out)" of the shape, width, size, and thickness (Type I markings only) specified, as applicable; or "Pavement Sealer (Call Out)" of the size specified.

This price is full compensation for materials, application of pavement markings, equipment, labor, tools, and incidentals.

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## Special Provision to Item 680 Highway Traffic Signals

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Item 680, "Highway Traffic Signals" of the Standard Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

**Article 680.3.1.1.2,"Conduit,"** The fourth sentence of the first paragraph is voided and replaced by the following.

Seal the ends of each conduit with approved sealant, after all cables and conductors are installed.

# Special Provision to Item 686

## Traffic Signal Pole Assemblies



Item 686, "Traffic Signal Pole Assemblies" of the Standard Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

**Section 686.3.2., "Fabrication,"** is voided and replaced with the following:

**Fabrication.** Fabricate and weld in accordance with Item 441, "Steel Structures," AWS D1.1, *Structural Welding Code—Steel*, and the requirements of this Item. Fabrication tolerances are given in Table 1.

**Table 1**  
**Fabrication Tolerances**

Part	Dimension	Tolerance (in.)
Pole and mast arm shaft	Length	±1
	Thickness	+0.12, -0.02
	Difference between flats or diameter	±3/16
	Straightness	1/8 in 10 ft.
	Attachment locations	±1
Base and mast arm mounting plates	Overall	±3/16
	Thickness	+1/4, -0
	Deviations from flat <sup>1</sup>	3/16 in 24 in.
	Spacing between holes	±1/8
	Bolt hole size	±1/16
Anchor bolts	Length	±1/2
	Threaded Length	±1/2
	Galvanized Length	-1/4
Assembled shafts	Angular Orientation	1/16 in 12 in. <sup>2</sup>
	Centering	±3/16
	Twist	3° in 50 ft.

1. For long mast arm assembly (LMA) structures, refer to plan sheets for mast arm mounting plate tolerance.
2. **One-eighth in 12 in.** between mounting plates and between mounting plates and base plates.

Fabrication plants that produce steel traffic signal pole assemblies must be approved in accordance with [DMS-7380](#), "Steel Non-Bridge Member Fabrication Plant Qualification." The Department maintains a [Material Producer List \(MPL\)](#) of approved traffic signal pole assembly fabrication plants.

Provide properly fitting components. Provide round or octagonal shafts for poles and mast arms tapered as shown on the plans. Fabricate mast arms straight in the unloaded condition unless otherwise shown on the plans. The Department will accept bolted slip joints overlapping by at least 1.5 diameters in mast arms 40 ft. and longer.

Provide circumferential welds only at the ends of the shafts. Provide no more than two longitudinal seam welds in shaft sections. Provide 100% penetration within 6 in. of circumferential base welds and 60% minimum penetration at other locations along the longitudinal seam welds. Provide longitudinal seam weld and fit-up that will minimize acid entrapment during later galvanizing.

For long mast arm assembly (LMA) structures, perform at least 10% ultrasonic testing (UT) of longitudinal seam welds on the arm and pole shafts. Use a Department approved UT procedure to ensure 60% minimum penetration where specified. Perform testing at a minimum of three locations on each shaft (at both ends and middle). The minimum length of each test area must be 10 in. If minimum penetration is not achieved in any of the tested areas, test an additional 24 in. beyond the originally selected test areas requiring 60% penetration. Test the entire arm or pole shaft seam weld if any locations within the additional 24 in. test areas does not achieve 60% penetration. Repair the deficient areas with a Department approved repair procedure and retest.

Hot-dip galvanize all fabricated parts in accordance with Item 445, "Galvanizing." Provide punched, drilled, or mechanically guided thermal-cut holes in steel parts or members, when allowed, before galvanizing. Mechanically guided thermal-cut hole quality should be per Item 445, "Galvanizing."

Connect the luminaire arm to the pole with simplex fittings. Ensure the fittings have no defects affecting strength or appearance.

Permanently mark, at a visible location when erected, pole base plates and mast arm mounting plates with the design wind speed.

Permanently mark, at a visible location when erected, pole base plates and fixed mast arm mounting plates with the fabrication plant's insignia. Place the mark on the pole base plate adjacent to the hand-hole access compartment.

Deliver each traffic signal pole assembly with fittings and hardware either installed or packaged with its associated components.

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# Special Provision to Special Specification 6185

## Truck Mounted Attenuator (TMA) and Trailer Attenuator (TA)

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Item 6185, "Truck Mounted Attenuator (TMA) and Trailer Attenuator (TA)" of the Standard Specifications, is hereby amended with respect to the clauses cited below, and no other clauses or requirements of this Item are waived or changed hereby.

**Article 4. "Measurement"**, is voided and replaced by the following:

- 4.1. **Truck Mounted Attenuator/Trailer Attenuator (Stationary).** This Item will be measured by the day. TMA/TAs must be set up in a work area and operational before a calendar day can be considered measurable. A day will be measured for each TMA/TA set up and operational on the worksite.
- 4.2. **Truck Mounted Attenuator/Trailer Attenuator (Mobile Operation).** This Item will be measured by the hour or by the day. The time begins once the TMA/TA is ready for operation at the predetermined site and stops when notified by the Engineer. When measurement by the hour is specified, a minimum of 4 hr. will be paid each day for each operating TMA/TA used in a mobile operation. When measurement by the day is specified, a day will be measured for each TMA/TA set up and operational on the worksite.

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# Special Specification 3096

## Asphalts, Oils, and Emulsions

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### 1. DESCRIPTION

Provide asphalt cements, cutback and emulsified asphalts, performance-graded asphalt binders, and other miscellaneous asphalt materials as specified on the plans.

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### 2. MATERIALS

Provide asphalt materials that meet the stated requirements when tested in conformance with the referenced Department, AASHTO, and ASTM test methods. Use asphalt containing recycled materials only if the recycled components meet the requirements of Article 6.9., "Recycled Materials." Provide asphalt materials that the Department has preapproved for use in accordance with [Tex-545-C](#), "Asphalt Binder Quality Program."

Inform the Department of all additives or modifiers included in the asphalt binder as part of the facility quality plan, as required by [Tex-545-C](#), "Asphalt Binder Quality Program," and provide that information to Department personnel. The Department reserves the right to prohibit the use of any asphalt additive or modifier.

Limit the use of polyphosphoric acid to no more than 0.5% by weight of the asphalt binder.

The use of re-refined engine oil bottoms is prohibited.

Acronyms used in this Item are defined in Table 1.

**Table 1**  
**Acronyms**

Acronym	Definition
Test Procedure Designations	
Tex T or R D	Department AASHTO ASTM
Polymer Modifier Designations	
P SBR or L SBS TR	polymer-modified styrene-butadiene rubber (latex) styrene-butadiene-styrene block co-polymer tire rubber (from ambient temperature grinding of truck and passenger tires)
AC	asphalt cement
AE	asphalt emulsion
AE-P	asphalt emulsion prime
A-R	asphalt-rubber
C	cationic
EAP&T	emulsified asphalt prime and tack
EBL	emulsified bonding layer
FDR	full depth reclamation
H-suffix	harder residue (lower penetration)
HF	high float
HY	high yield
MC	medium-curing
MS	medium-setting
PCE	prime, cure, and erosion control
PG	performance grade
RC	rapid-curing
RS	rapid-setting
S-suffix	stockpile usage
SCM	special cutback material
SS	slow-setting
SY	standard yield
TRAIL	tracking resistant asphalt interlayer

2.1.

**Asphalt Cement.** Provide asphalt cement that is homogeneous, water-free, and nonfoaming when heated to 347°F, and meets the requirements in Table 2.

**Table 2**  
**Asphalt Cement**

Property	Test Procedure	Viscosity Grade									
		AC-0.6		AC-1.5		AC-3		AC-5		AC-10	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Viscosity 140°F, poise 275°F, poise	T 202	40	80	100	200	250	350	400	600	800	1,200
		0.4	–	0.7	–	1.1	–	1.4	–	1.9	–
Penetration, 77°F, 100g, 5 sec.	T 49	350	–	250	–	210	–	135	–	85	–
Flash point, C.O.C., °F	T 48	425	–	425	–	425	–	425	–	450	–
Solubility in trichloroethylene, %	T 44	99.0	–	99.0	–	99.0	–	99.0	–	99.0	–
Spot test	<a href="#">Tex-509-C</a>	Neg.		Neg.		Neg.		Neg.		Neg.	
Tests on residue from RTFOT:											
Viscosity, 140°F, poise	T 240 T 202	–	180	–	450	–	900	–	1,500	–	3,000
Ductility, <sup>1</sup> 77°F 5 cm/min., cm	T 51	100	–	100	–	100	–	100	–	100	–

1. If AC-0.6 or AC-1.5 ductility at 77°F is less than 100 cm, material is acceptable if ductility at 60°F is more than 100 cm.

- 2.2. **Polymer-Modified Asphalt Cement.** Provide polymer-modified asphalt cement that is smooth, homogeneous, and meets the requirements Table 3. Supply samples of the base asphalt cement and polymer additives if requested.

Table 3  
Polymer-Modified Asphalt Cement

Property	Test Procedure	Polymer-Modified Viscosity Grade											
		AC-12-5TR		NT-HA <sup>1</sup>		AC-15P		AC-20XP		AC-10-2TR		AC-20-5TR	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Polymer		TR		-		SBS		SBS		TR		TR	
Polymer content, % (solids basis)	<a href="#">Tex-533-C</a> or <a href="#">Tex-553-C</a>	5.0	-	-	-	3.0	-	-	-	2.0	-	5.0	-
Dynamic shear, G*/sinδ, 82°C, 10 rad/s, kPa	T 315			1.0	-								
Dynamic shear, G*/sinδ, 64°C, 10 rad/s, kPa	T 315	-	-	-	-	-	-	1.0	-	-	-	1.0	-
Dynamic shear, G*/sinδ, 58°C, 10 rad/s, kPa	T 315	1.0	-	-	-	-	-	-	-	1.0	-	-	-
Viscosity 140°F, poise	T 202	1,200	-			1,500	-	2,000	-	1,000	-	2,000	-
275°F, poise	T 202			-	4,000	-	8.0	-	-	-	8.0	-	10.0
Penetration, 77°F, 100 g, 5 sec.	T 49	110	150	-	25	100	150	75	115	95	130	75	115
Ductility, 5cm/min., 39.2°F, cm	T 51					-	-	-	-	-	-	-	-
Elastic recovery, 50°F, %	<a href="#">Tex-539-C</a>	55	-			55	-	55	-	30	-	55	-
Softening point, °F	T 53	113	-	170	-	-	-	120	-	110	-	120	-
Polymer separation, 5 hr.	<a href="#">Tex-540-C</a>	None				None		None		None		None	
Flash point, C.O.C., °F	T 48	425	-	425	-	425	-	425	-	425	-	425	-
Tests on residue from RTFOT aging and pressure aging:	T 240 and R 28												
Creep stiffness S, -18°C, MPa	T 313	-	300	-	-	-	300	-	300	-	300	-	300
m-value, -18°C		0.300	-	-	-	0.300	-	0.300	-	0.300	-	0.300	-

1. Non-Tracking Hot Applied Tack Coat - TRAIL product

- 2.3. **Cutback Asphalt.** Provide cutback asphalt that meets the requirements of Tables 4, 5, and 6, for the specified type and grade. Supply samples of the base asphalt cement and polymer additives if requested.



**Table 4**  
**Rapid-Curing Cutback Asphalt**

Property	Test Procedure	Type-Grade					
		RC-250		RC-800		RC-3000	
		Min	Max	Min	Max	Min	Max
Kinematic viscosity, 140°F, cSt	T 201	250	400	800	1,600	3,000	6,000
Water, %	D95	–	0.2	–	0.2	–	0.2
Flash point, T.O.C., °F	T 79	80	–	80	–	80	–
Distillation test:	T 78						
Distillate, percentage by volume of total distillate to 680°F							
to 437°F		40	75	35	70	20	55
to 500°F		65	90	55	85	45	75
to 600°F		85	–	80	–	70	–
Residue from distillation, volume %		70	–	75	–	82	–
Tests on distillation residue:							
Viscosity, 140°F, poise	T 202	600	2,400	600	2,400	600	2,400
Ductility, 5 cm/min., 77°F, cm	T 51	100	–	100	–	100	–
Solubility in trichloroethylene, %	T 44	99.0	–	99.0	–	99.0	–
Spot test	<a href="#">Tex-509-C</a>	Neg.		Neg.		Neg.	

**Table 5**  
**Medium-Curing Cutback Asphalt**

Property	Test Procedure	Type-Grade							
		MC-30		MC-250		MC-800		MC-3000	
		Min	Max	Min	Max	Min	Max	Min	Max
Kinematic viscosity, 140°F, cSt	T 201	30	60	250	500	800	1,600	3,000	6,000
Water, %	D95	–	0.2	–	0.2	–	0.2	–	0.2
Flash point, T.O.C., °F	T 79	95	–	122	–	140	–	149	–
Distillation test:	T 78								
Distillate, percentage by volume of total distillate to 680°F									
to 437°F		–	35	–	20	–	–	–	–
to 500°F		30	75	5	55	–	40	–	15
to 600°F		75	95	60	90	45	85	15	75
Residue from distillation, volume %		50	–	67	–	75	–	80	–
Tests on distillation residue:									
Viscosity, 140°F, poise	T 202	300	1,200	300	1,200	300	1,200	300	1,200
Ductility, 5 cm/min., 77°F, cm	T 51	100	–	100	–	100	–	100	–
Solubility in trichloroethylene, %	T 44	99.0	–	99.0	–	99.0	–	99.0	–
Spot test	<a href="#">Tex-509-C</a>	Neg.		Neg.		Neg.		Neg.	

**Table 6**  
**Special-Use Cutback Asphalt**

Property	Test Procedure	Type-Grade					
		MC-2400L		SCM I		SCM II	
		Min	Max	Min	Max	Min	Max
Kinematic viscosity, 140°F, cSt	T 201	2,400	4,800	500	1,000	1,000	2,000
Water, %	D95	–	0.2	–	0.2	–	0.2
Flash point, T.O.C., °F	T 79	150	–	175	–	175	–
Distillation test:	T 78						
Distillate, percentage by volume of total distillate to 680°F							
to 437°F		–	–	–	–	–	–
to 500°F		–	35	–	0.5	–	0.5
to 600°F		35	80	20	60	15	50
Residue from distillation, volume %		78	–	76	–	82	–
Tests on distillation residue:							
Polymer		SBR		–		–	
Polymer content, % (solids basis)	<a href="#">Tex-533-C</a>	2.0	–	–	–	–	–
Penetration, 100 g, 5 sec., 77°F	T 49	150	300	180	–	180	–
Ductility, 5 cm/min., 39.2°F, cm	T 51	50	–	–	–	–	–
Solubility in trichloroethylene, %	T 44	99.0	–	99.0	–	99.0	–

- 2.4. **Emulsified Asphalt.** Provide emulsified asphalt that is homogeneous, does not separate after thorough mixing, and meets the requirements for the specified type and grade in Tables 7, 8, 9, 10, and 10A-C.

**Table 7**  
**Emulsified Asphalt**

Property	Test Procedure	Type-Grade									
		Rapid-Setting		Medium-Setting				Slow-Setting			
		HFRS-2		MS-2		AES-300		SS-1		SS-1H	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Viscosity, Saybolt Furol 77°F, sec. 122°F, sec.	T 72	-	-	-	-	75	400	20	100	20	100
Sieve test, %	T 59	-	0.1	-	0.1	-	0.1	-	0.1	-	0.1
Miscibility	T 59	-		-		-		Pass		Pass	
Cement mixing, %	T 59	-	-	-	-	-	-	-	2.0	-	2.0
Coating ability and water resistance: Dry aggregate/after spray Wet aggregate/after spray	T 59	-		-		Good/Fair Fair/Fair		-		-	
Demulsibility, 35 mL of 0.02 N CaCl <sub>2</sub> , %	T 59	50	-	-	30	-	-	-	-	-	-
Storage stability, 1 day, %	T 59	-	1	-	1	-	1	-	1	-	1
Freezing test, 3 cycles <sup>1</sup>	T 59	-		Pass		-		Pass		Pass	
Distillation test: Residue by distillation, % by wt. Oil distillate, % by volume of emulsion	T 59	65	-	65	-	65	-	60	-	60	-
		-	0.5	-	0.5	-	5	-	0.5	-	0.5
Tests on residue from distillation: Penetration, 77°F, 100 g, 5 sec. Solubility in trichloroethylene, % Ductility, 77°F, 5 cm/min., cm Float test, 140°F, sec.	T 49 T 44 T 51 T 50	100 97.5 100 1,200	140 - - -	120 97.5 100 -	160 - - -	300 97.5 - 1,200	- - - -	120 97.5 100 -	160 - - -	70 97.5 80 -	100 - - -

1. Applies only when the Engineer designates material for winter use.

**Table 8**  
**Cationic Emulsified Asphalt**

Property	Test Procedure	Type-Grade											
		Rapid-Setting		Medium-Setting				Slow-Setting					
		CRS-2		CRS-2H		CMS-2		CMS-2S		CSS-1		CSS-1H	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Viscosity, Saybolt Furol 77°F, sec. 122°F, sec.	T 72	-	-	-	-	-	-	-	-	20	100	20	100
Sieve test, %	T 59	-	0.1	-	0.1	-	0.1	-	0.1	-	0.1	-	0.1
Cement mixing, %	T 59	-	-	-	-	-	-	-	-	-	2.0	-	2.0
Coating ability and water resistance: Dry aggregate/after spray Wet aggregate/after spray	T 59	-		-		Good/Fair Fair/Fair		Good/Fair Fair/Fair		-		-	
Demulsibility, 35 mL of 0.8% Sodium dioctyl sulfosuccinate, %	T 59	70	-	70	-	-	-	-	-	-	-	-	-
Storage stability, 1 day, %	T 59	-	1	-	1	-	1	-	1	-	1	-	1
Particle charge	T 59	Positive		Positive		Positive		Positive		Positive		Positive	
Distillation test: Residue by distillation, % by wt. Oil distillate, % by volume of emulsion	T 59	65	-	65	-	65	-	65	-	60	-	60	-
		-	0.5	-	0.5	-	7	-	5	-	0.5	-	0.5
Tests on residue from distillation: Penetration, 77°F, 100 g, 5 sec. Solubility in trichloroethylene, % Ductility, 77°F, 5 cm/min., cm	T 49 T 44 T 51	120 97.5 100	160 - -	70 97.5 80	110 - -	120 97.5 100	200 - -	300 97.5 -	- - -	120 97.5 100	160 - -	70 97.5 80	110 - -

**Table 9**  
**Polymer-Modified Emulsified Asphalt**

Property	Test Procedure	Type-Grade									
		Rapid-Setting		Medium-Setting				Slow-Setting			
		HFRS-2P		AES-150P		AES-300P		AES-300S		SS-1P	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Viscosity, Saybolt Furol 77°F, sec. 122°F, sec.	T 72	-	-	75	400	75	400	75	400	30	100
Sieve test, %	T 59	-	0.1	-	0.1	-	0.1	-	0.1	-	0.1
Miscibility	T 59	-		-		-		-		Pass	
Coating ability and water resistance: Dry aggregate/after spray Wet aggregate/after spray	T 59	-		Good/Fair Fair/Fair		Good/Fair Fair/Fair		Good/Fair Fair/Fair		-	
Demulsibility, 35 mL of 0.02 N CaCl <sub>2</sub> , %	T 59	50	-	-	-	-	-	-	-	-	-
Storage stability, 1 day, %	T 59	-	1	-	1	-	1	-	1	-	1
Breaking index, g	<a href="#">Tex-542-C</a>	-	-								
Distillation test: <sup>1</sup> Residue by distillation, % by wt. Oil distillate, % by volume of emulsion	T 59	65	-	65	-	65	-	65	-	60	-
		-	0.5	-	3	-	5	-	7	-	0.5
Tests on residue from distillation: Polymer content, wt. % (solids basis)	<a href="#">Tex-533-C</a>	3.0	-	-	-	-	-	-	-	3.0	-
Penetration, 77°F, 100 g, 5 sec.	T 49	90	140	150	300	300	-	300	-	100	140
Solubility in trichloroethylene, %	T 44	97.0	-	97.0	-	97.0	-	97.0	-	97.0	-
Viscosity, 140°F, poise	T 202	1,500	-	-	-	-	-	-	-	1,300	-
Float test, 140°F, sec	T 50	1,200	-	1,200	-	1,200	-	1,200	-	-	-
Ductility, <sup>2</sup> 39.2°F, 5 cm/min., cm	T 51	50	-	-	-	-	-	-	-	50	-
Elastic recovery, 2 50°F, %	<a href="#">Tex-539-C</a>	55	-	-	-	-	-	-	-	-	-
Tests on RTFO curing of distillation residue Elastic recovery, 50°F, %	T 240 <a href="#">Tex-536-C</a>	-	-	50	-	50	-	30	-	-	-

1. Exception to T 59: Bring the temperature on the lower thermometer slowly to 350°F ±10°F. Maintain at this temperature for 20 min. Complete total distillation in 60 min. (±5 min.) from the first application of heat.

2. HFRS-2P must meet one of either the ductility or elastic recovery requirements.

**Table 10**  
**Polymer-Modified Cationic Emulsified Asphalt**

Property	Test Procedure	Type-Grade											
		Rapid-Setting						Medium-Setting				Slow-Setting	
		CRS-2P		CHFRS-2P		CRS-2TR		CMS-1P <sup>3</sup>		CMS-2P <sup>3</sup>		CSS 1P	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Viscosity, Saybolt Furol 77°F, sec. 122°F, sec.	T 72	-	-	-	-	-	-	10	100	-	-	20	100
		150	400	100	400	150	500	-	-	50	400	-	-
Sieve test, %	T 59	-	0.1	-	0.1	-	0.1	-	0.1	-	0.1	-	0.1
Demulsibility, 35 ml of 0.8% sodium dioctyl sulfosuccinate, %	T 59	70	-	60	-	40	-	-	-	-	-	-	-
Storage stability, 1 day, %	T 59	-	1	-	1	-	1	-	1	-	1	-	1
Breaking index, g	<a href="#">Tex-542-C</a>	-	-	-	-	-	-	-	-	-	-	-	-
Particle charge	T 59	Positive		Positive		Positive		Positive		Positive		Positive	
Distillation test <sup>1</sup> :	T 59												
Residue by distillation, % by weight		65	-	65	-	65	-	30	-	60	-	62	-
Oil distillate, % by volume of emulsion		-	0.5	-	0.5	-	3	-	0.5	-	0.5	-	0.5
Tests on residue from distillation:													
Polymer content, wt. % (solids basis)	<a href="#">Tex-533-C</a>	3.0	-	3.0	-	5.0 <sup>7</sup>	-	-	-	-	-	3.0	-
Penetration, 77°F, 100 g, 5 sec.	T 49	90	150	80	130	90	150	30	-	30	-	55	90
Viscosity, 140°F, poise	T 202	1,300	-	1,300	-	1,000	-	-	-	-	-	-	-
Solubility in trichloroethylene, %	T 44	97.0	-	95.0	-	98	-	-	-	-	-	97.0	-
Softening point, °F	T 53	-	-	-	-	-	-	-	-	-	-	135	-
Ductility, 77°F, 5 cm/min., cm	T 51	-	-	-	-	40	-	-	-	-	-	70	-
Float test, 140°F, sec.	T 50	-	-	1,800	-	-	-	-	-	-	-	-	-
Ductility, <sup>2</sup> 39.2°F, 5 cm/min., cm	T 51	50	-	-	-	-	-	-	-	-	-	-	-
Elastic recovery, <sup>2</sup> 50°F, %	<a href="#">Tex-539-C</a>	55	-	55	-	-	-	-	-	-	-	-	-
Tests on residue from evaporative recovery:	R 78, Procedure B												
Nonrecoverable creep compliance of residue, 3.2 kPa, 52°C, kPa <sup>-1</sup>	T 350	-	-	-	-	-	-	-	2.0	-	4.0	-	-
Tests on rejuvenating agent:													
Viscosity, 140°F, cSt	T 201	-	-	-	-	-	-	50	175	50	175	-	-
Flash point, C.O.C., °F	T 48	-	-	-	-	-	-	380	-	380	-	-	-
Saturates, % by weight	D 2007	-	-	-	-	-	-	-	30	-	30	-	-
Solubility in n-pentane, % by weight	D 2007	-	-	-	-	-	-	99	-	99	-	-	-
Tests on rejuvenating agent after RTFO	T 240												
Weight Change, %		-	-	-	-	-	-	-	6.5	-	6.5	-	-
Viscosity Ratio		-	-	-	-	-	-	-	3.0	-	3.0	-	-
Tests on latex <sup>4</sup> :													
Tensile strength, die C dumbbell, psi	D 412 <sup>5</sup>	-	-	-	-	-	-	800	-	800	-	-	-
Change in mass after immersion in rejuvenating agent, %	D 471	-	-	-	-	-	-	-	40 <sup>6</sup>	-	40 <sup>6</sup>	-	-

- Exception to T 59: Bring the temperature on the lower thermometer slowly to 350°F (±0°F). Maintain at this temperature for 20 min. Complete total distillation in 60 min. (±5 min.) from the first application of heat.
- CRS-2P must meet one of either the ductility or elastic recovery requirements.
- With all precertification samples of CMS-1P or CMS-2P, submit certified test reports showing that the rejuvenating agent and latex meet the stated requirements. Submit samples of these raw materials if requested by the Engineer.
- Preparation of latex specimens: use any substrate and recovery method which produces specimens of uniform dimensions and which delivers enough material to achieve desired residual thickness.
- Cut samples for tensile strength determination using a crosshead speed of 20 in. per minute.
- Specimen must remain intact after exposure and removal of excess rejuvenating agent.
- Modifier type is tire rubber.

**Table 10A**  
**Non-Tracking Tack Coat Emulsion<sup>1</sup>**

Property	Test Procedure	NT-HRE		NT-RRE		NT-SRE	
		Min	Max	Min	Max	Min	Max
Viscosity, Saybolt Furol 77° F, sec.	T 72	15	–	15	–	10	100
Storage stability, 1 Day, %	T 59	–	1	–	1	–	1
Settlement, 5-day, %	T 59	–	5	–	5	–	5
Sieve test, %	T 59	–	0.30	–	0.30	–	0.1
Distillation test: <sup>2</sup> Residue by distillation, % by wt. Oil distillate, by volume of emulsion	T 59	50	–	58	–	50	–
Test on residue from distillation: Penetration, 77°F, 100 g, 5 sec. Solubility in trichloroethylene, % Softening point, °F Dynamic shear, G*/sin(δ), 82°C, 10 rad/s, kPa	T 49 T 44 T 53 T 315	– 97.5 150 1.0	20 – – –	15 97.5 – –	45 – – –	40 97.5 – –	90 – – –

1. Due to the hardness of the residue, these emulsions should be heated to 120-140°F before thoroughly mixing as the emulsion is being prepared for testing.
2. Exception to T 59: Bring the temperature on the lower thermometer slowly to 350°F ± 10°F. Maintain at this temperature for 20 min. Complete total distillation in 60 ± 5 min. from first application of heat.

**Table 10B**  
**Spray Applied Underseal Membrane Polymer-Modified Emulsions (EBL)**

Property	Test Procedure	Min	Max
Viscosity @ 77°F, SSF	T 72	20	100
Storage Stability <sup>1</sup> , %	T 59	–	1
Demulsibility <sup>2</sup> Anionic emulsions – 35 mL of 0.02 N CaCl <sub>2</sub> , % Cationic emulsions – 35 mL of 0.8% sodium dioctyl sulfosuccinate, %	T 59	55	–
Sieve Test <sup>3</sup> , %	T 59	–	0.05
Distillation Test <sup>4</sup> Residue by distillation, % by wt. Oil portion of distillate, % by vol.	T 59	63	0.5
Test on Residue from Distillation Elastic Recovery @ 50°F, 50 mm/min., % Penetration @ 77°F, 100 g, 5 sec., 0.1 mm	<a href="#">Tex-539-C</a> T 49	60 80	– 130

1. After standing undisturbed for 24 hr., the surface must be smooth, must not exhibit a white or milky colored substance, and must be a homogeneous color throughout.
2. Material must meet demulsibility test for emulsions.
3. May be required by the Engineer only when the emulsion cannot be easily applied in the field.
4. The temperature on the lower thermometer should be brought slowly to 350°F ± 10°F and maintained at this temperature for 20 min. The total distillation should be completed in 60 ± 5 min. from the first application of heat.

**Table 10C**  
**Full-Depth Reclamation Emulsion (FDR EM)**

Property	Test Procedure	Standard Yield (SY)		High Yield (HY)	
		Min	Max	Min	Max
Sieve test, %	T 59	–	0.1	–	0.1
Viscosity Saybolt Furol @ 77°F, sec.	T 59	20	100	20	100
Distillation test <sup>1</sup> : Residue by distillation, % by wt. Oil portion of distillate, % by vol.	T 59	60	–	63	–
Test on residue from distillation: Penetration @ 77°F, dmm	T 49	55	95	120	–
Test on rejuvenating agent: BWOA, % <sup>2</sup> Viscosity @ 140°F, cSt Flash Point, COC, °F Solubility in n-pentane, % by wt.	*** T 201 T 48 D2007	– – – –	– – – –	2 50 380 99	– 175 – –

1. The temperature on the lower thermometer should be brought slowly to 350°F ± 10°F and maintained at this temperature for 20 min. The total distillation should be completed in 60 ± 5 min. from the first application of heat.
2. BWOA = By weight of asphalt. Provide a manufacturer's certificate of analysis (COA) with the percent of rejuvenator added.

2.5.

**Specialty Emulsions.** Provide specialty emulsion that is either asphalt-based or resin-based and meets the requirements of Table 11 or Table 11A.

**Table 11**  
**Specialty Emulsions**

Property	Test Procedure	Type-Grade					
		Medium-Setting				Slow-Setting	
		AE-P		EAP&T		PCE <sup>1</sup>	
		Min	Max	Min	Max	Min	Max
Viscosity, Saybolt Furol 77°F, sec. 122°F, sec.	T 72	–	–	–	–	10	100
Sieve test, %	T 59	–	0.1	–	0.1	–	0.1
Miscibility <sup>2</sup>	T 59	–	–	Pass	–	Pass	–
Demulsibility, 35 mL of 0.10 N CaCl <sub>2</sub> , %	T 59	–	70	–	–	–	–
Storage stability, 1 day, %	T 59	–	1	–	1	–	–
Particle size, <sup>5</sup> % by volume < 2.5 μm	<a href="#">Tex-238-F<sup>3</sup></a>	–	–	90	–	90	–
Asphalt emulsion distillation to 500°F followed by Cutback asphalt distillation of residue to 680°F: Residue after both distillations, % by wt. Total oil distillate from both distillations, % by volume of emulsion	T 59 & T 78	40	–	–	–	–	–
		25	40	–	–	–	–
Residue by distillation, % by wt.	T 59	–	–	60	–	–	–
Residue by evaporation, <sup>4</sup> % by wt.	T 59	–	–	–	–	60	–
Tests on residue after all distillations:							
Viscosity, 140°F, poise	T 202	–	–	800	–	–	–
Kinematic viscosity, <sup>5</sup> 140°F, cSt	T 201	–	–	–	–	100	350
Flash point C.O.C., °F	T 48	–	–	–	–	400	–
Solubility in trichloroethylene, %	T 44	97.5	–	–	–	–	–
Float test, 122°F, sec.	T 50	50	200	–	–	–	–

1. Supply with each shipment of PCE:

- a copy of a lab report from an approved analytical lab, signed by a lab official, indicating the PCE formulation does not meet any characteristics of a Resource Conservation Recovery Act (RCRA) hazardous waste;
  - a certification from the producer that the formulation supplied does not differ from the one tested and that no listed RCRA hazardous wastes or Polychlorinated Biphenyls (PCBs) have been mixed with the product; and
  - a Safety Data Sheet.
2. Exception to T 59: In dilution, use 350 mL of distilled or deionized water and a 1,000-mL beaker.
  3. Use [Tex-238-F](#), beginning at "Particle Size Analysis by Laser Diffraction," with distilled or deionized water as a medium and no dispersant, or use another approved method.
  4. Exception to T 59: Leave sample in the oven until foaming ceases, then cool and weigh.
  5. PCE must meet either the kinematic viscosity requirement or the particle size requirement.

**Table 11A**  
**Hard Residue Surface Sealant**

Property	Test Procedure	Min	Max
Viscosity, Krebs unit, 77°F, Krebs units	D 562	45	75
Softening point, °F	<a href="#">Tex-505-C</a> <sup>1</sup>	250	–
Uniformity	D 2939	Pass <sup>2</sup>	
Resistance to heat	D 2939	Pass <sup>3</sup>	
Resistance to water	D 2939	Pass <sup>4</sup>	
Wet flow, mm	D 2939	–	0
Resistance to Kerosene (optional) <sup>5</sup>	D 2939	Pass <sup>6</sup>	
Ultraviolet exposure, UVA-340, 0.77 W/m <sup>2</sup> , 50°C chamber, 8 hr. UV lamp, 5 min. spray, 3 hr. 55 min. condensation, 1,000 hr. total exposure <sup>7</sup>	G 154	Pass <sup>8</sup>	
Abrasion loss, 1.6 mm thickness, liquid only, %	ISSA TB-100	–	1.0
Residue by evaporation, % by weight	D 2939	33	–
Tests on residue from evaporation: Penetration, 77°F, 100 g, 5 sec. Flash point, Cleveland open cup, °F	T 49 T 48	15 500	30
Tests on base asphalt before emulsification Solubility in trichloroethylene, %	T 44	98	–

1. Cure the emulsion in the softening point ring in a 200°F ± 5°F oven for 2 hr.
2. Product must be homogenous and show no separation or coagulation that cannot be overcome by moderate stirring.
3. No sagging or slippage of film beyond the initial reference line.
4. No blistering or re-emulsification.
5. Recommended for airport applications or where fuel resistance is desired.
6. No absorption of Kerosene into the clay tile past the sealer film. Note sealer surface condition and loss of adhesion.
7. Other exposure cycles with similar levels of irradiation and conditions may be used with Department approval.
8. No cracking, chipping, surface distortion, or loss of adhesion. No color fading or lightening.

2.6.

**Recycling Agent.** Recycling agent and emulsified recycling agent must meet the requirements in Table 12. Additionally, recycling agent and residue from emulsified recycling agent, when added in the specified proportions to the recycled asphalt, must meet the properties specified on the plans.



**Table 12**  
**Recycling Agent and Emulsified Recycling Agent**

Property	Test Procedure	Recycling Agent		Emulsified Recycling Agent (ARA-1)		Polymer Modified Emulsified Recycling Agent (ARA-1P)	
		Min	Max	Min	Max	Min	Max
Viscosity, Saybolt Furol, 77°F, sec.	T 72	–	–	15	100	15	110
Sieve test, %	T 59	–	–	–	0.1	–	0.1
Miscibility <sup>1</sup>	T 59	–		No coagulation			
Residue by evaporation, <sup>2</sup> % by wt.	T 59	–	–	60	–	–	–
Distillation test: Residue by distillation, % by wt. Oil distillate, % by volume of emulsion	T 59					60 –	65 2
Penetration of Distillation Residue at 39.2°F, 100 g, 5 sec.	T 49					110	190
Tests on recycling agent or residue from evaporation: Flash point, C.O.C., °F Kinematic viscosity, 140°F, cSt 275°F, cSt	T 48 T 201	400 75 –	– 200 10.0	400 75 –	– 200 10.0	400	–

1. Exception to T 59: Use 0.02 N CaCl<sub>2</sub> solution in place of water.
2. Exception to T 59: Maintain sample at 300°F until foaming ceases, then cool and weigh.

2.7. **Crumb Rubber Modifier.** Crumb rubber modifier (CRM) consists of automobile and truck tires processed by ambient temperature grinding.

CRM must be:

- free from contaminants including fabric, metal, and mineral and other nonrubber substances;
- free-flowing; and
- nonfoaming when added to hot asphalt binder.

Ensure rubber gradation meets the requirements of the grades in Table 13 when tested in accordance with [Tex-200-F](#), Part I, using a 50-g sample.

**Table 13**  
**CRM Gradations**

Sieve Size (% Passing)	Grade A		Grade B		Grade C		Grade D	Grade E
	Min	Max	Min	Max	Min	Max		
#8	100	–	–	–	–	–	As shown on the plans	As approved
#10	95	100	100	–	–	–		
#16	–	–	70	100	100	–		
#30	–	–	25	60	90	100		
#40	–	–	–	–	45	100		
#50	0	10	–	–	–	–		
#200	–	–	0	5	–	–		

2.8. **Crack Sealer.** Provide polymer-modified asphalt-emulsion crack sealer meeting the requirements of Table 14. Provide rubber-asphalt crack sealer meeting the requirements of Table 15.

**Table 14**  
**Polymer-Modified Asphalt-Emulsion Crack Sealer**

Property	Test Procedure	Min	Max
Rotational viscosity, 77°F, cP	D 2196, Method A	10,000	25,000
Sieve test, %	T 59	–	0.1
Storage stability, 1 day, %	T 59	–	1
Evaporation	<a href="#">Tex-543-C</a>		
Residue by evaporation, % by wt.		65	–
Tests on residue from evaporation:			
Penetration, 77°F, 100 g, 5 sec.	T 49	35	75
Softening point, °F	T 53	140	–
Ductility, 39.2°F, 5 cm/min., cm	T 51	100	–

**Table 15**  
**Rubber-Asphalt Crack Sealer**

Property	Test Procedure	Class A		Class B	
		Min	Max	Min	Max
CRM content, Grade A or B, % by wt.	<a href="#">Tex-544-C</a>	22	26	–	–
CRM content, Grade B, % by wt.	<a href="#">Tex-544-C</a>	–	–	13	17
Virgin rubber content, <sup>1</sup> % by wt.		–	–	2	–
Flash point, <sup>2</sup> C.O.C., °F	T 48	400	–	400	–
Penetration, <sup>3</sup> 77°F, 150 g, 5 sec.	T 49	30	50	30	50
Penetration, <sup>3</sup> 32°F, 200 g, 60 sec.	T 49	12	–	12	–
Softening point, °F	T 53	–	–	170	–
Bond Test, non-immersed, 0.5 in specimen, 50% extension, 20°F <sup>4</sup>	D5329	–	–	–	Pass

1. Provide certification that the Min % virgin rubber was added.
2. Agitate the sealing compound with a 3/8- to 1/2 in. (9.5- to 12.7 mm) wide, square-end metal spatula to bring the material on the bottom of the cup to the surface (i.e., turn the material over) before passing the test flame over the cup. Start at one side of the thermometer, move around to the other, and then return to the starting point using 8 to 10 rapid circular strokes. Accomplish agitation in 3 to 4 sec. Pass the test flame over the cup immediately after stirring is completed.
3. Exception to T 49: Substitute the cone specified in D 217 for the penetration needle.
4. Allow no crack in the crack sealing materials or break in the bond between the sealer and the mortar blocks over 1/4 in. deep for any specimen after completion of the test.

- 2.9. **Asphalt-Rubber Binders.** Provide asphalt-rubber (A-R) binders that are mixtures of asphalt binder and CRM, which have been reacted at elevated temperatures. Provide A-R binders meeting D6114 and containing a minimum of 15% CRM by weight. Provide Types I or II, containing CRM Grade C, for use in hot-mixed aggregate mixtures. Provide Types II or III, containing CRM Grade B, for use in surface treatment binder. Ensure binder properties meet the requirements of Table 16.

**Table 16**  
**A-R Binders**

Property	Test Procedure	Binder Type					
		Type I		Type II		Type III	
		Min	Max	Min	Max	Min	Max
Apparent viscosity, 347°F, cP	D2196, Method A	1,500	5,000	1,500	5,000	1,500	5,000
Penetration, 77°F, 100 g, 5 sec.	T 49	25	75	25	75	50	100
Penetration, 39.2°F, 200 g, 60 sec.	T 49	10	–	15	–	25	–
Softening point, °F	T 53	135	–	130	–	125	–
Resilience, 77°F, %	D5329	25	–	20	–	10	–
Flash point, C.O.C., °F	T 48	450	–	450	–	450	–
Tests on residue from Thin-Film Oven Test:	T 179						
Retained penetration ratio, 39.2°F, 200 g, 60 sec., % of original	T 49	75	–	75	–	75	–

- 2.10. **Performance-Graded Binders.** Provide PG binders that are smooth and homogeneous, show no separation when tested in accordance with [Tex-540-C](#), and meet the requirements of Table 17.

Separation testing is not required if:

- a modifier is introduced separately at the mix plant either by injection in the asphalt line or mixer,
- the binder is blended on site in continuously agitated tanks, or
- binder acceptance is based on field samples taken from an in-line sampling port at the hot-mix plant after the addition of modifiers.

**Table 17**  
**Performance-Graded Binders**

Property and Test Method	Performance Grade																	
	PG 58			PG 64				PG 70				PG 76				PG 82		
	-22	-28	-34	-16	-22	-28	-34	-16	-22	-28	-34	-16	-22	-28	-34	-16	-22	-28
Average 7-day max pavement design temperature, °C <sup>1</sup>	58			64				70				76				82		
Min pavement design temperature, °C <sup>1</sup>	-22	-28	-34	-16	-22	-28	-34	-16	-22	-28	-34	-16	-22	-28	-34	-16	-22	-28
<b>Original Binder</b>																		
Flash point, T 48, Min, °C	230																	
Viscosity, T 316 <sup>2,3</sup> : Max, 3.0 Pa s, test temperature, °C	135																	
Dynamic shear, T 315 <sup>4</sup> : G*/sin(δ), Min, 1.00 kPa, Max, 2.00 kPa <sup>7</sup> , Test temperature @ 10 rad/sec., °C	58			64				70				76				82		
Elastic recovery, D6084, 50°F, % Min <sup>8</sup>	-	-	30	-	-	30	50	-	30	50	60	30	50	60	70	50	60	70
<b>Rolling Thin-Film Oven (Tex-506-C)</b>																		
Mass change, T 240, Max, %	1.0																	
Dynamic shear, T 315: G*/sin(δ), Min, 2.20 kPa, Max, 5.00 kPa <sup>7</sup> , Test temperature @ 10 rad/sec., °C	58			64				70				76				82		
MSCR, T350, Recovery, 0.1 kPa, High Temperature, % Min <sup>8</sup>	-	-	20	-	-	20	30	-	20	30	40	20	30	40	50	30	40	50
<b>Pressure Aging Vessel (PAV) Residue (R 28)</b>																		
PAV aging temperature, °C	100																	
Dynamic shear, T 315: G*/sin(δ), Max, 5,000 kPa Test temperature @ 10 rad/sec., °C	25	22	19	28	25	22	19	28	25	22	19	28	25	22	19	28	25	22
Creep stiffness, T 313 <sup>5,6</sup> : S, max, 300 MPa, m-value, Min, 0.300 Test temperature @ 60 sec., °C	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18
Direct tension, T 314 <sup>6</sup> : Failure strain, min, 1.0% Test temperature @ 1.0 mm/min., °C	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18

- Pavement temperatures are estimated from air temperatures and using an algorithm contained in a Department-supplied computer program, may be provided by the Department, or by following the procedures outlined in AASHTO MP 2 and PP 28.
- This requirement may be waived at the Department's discretion if the supplier warrants that the asphalt binder can be adequately pumped, mixed, and compacted at temperatures that meet all applicable safety, environmental, and constructability requirements. At test temperatures where the binder is a Newtonian fluid, any suitable standard means of viscosity measurement may be used, including capillary (T 201 or T 202) or rotational viscometry (T 316).
- Viscosity at 135°C is an indicator of mixing and compaction temperatures that can be expected in the lab and field. High values may indicate high mixing and compaction temperatures. Additionally, significant variation can occur from batch to batch. Contractors should be aware that variation could significantly impact their mixing and compaction operations. Contractors are therefore responsible for addressing any constructability issues that may arise.
- For quality control of unmodified asphalt binder production, measurement of the viscosity of the original asphalt binder may be substituted for dynamic shear measurements of G\*/sin(δ) at test temperatures where the asphalt is a Newtonian fluid. Any suitable standard means of viscosity measurement may be used, including capillary (T 201 or T 202) or rotational viscometry (T 316).
- Silicone beam molds, as described in AASHTO TP 1-93, are acceptable for use.
- If creep stiffness is below 300 MPa, direct tension test is not required. If creep stiffness is between 300 and 600 MPa, the direct tension failure strain requirement can be used instead of the creep stiffness requirement. The m value requirement must be satisfied in both cases.
- Maximum values for unaged and RTFO aged dynamic shear apply only to materials used as substitute binders, as described in Item 340, "Dense-Graded Hot-Mix Asphalt (Small Quantity)", Item 341, "Dense-Graded Hot-Mix Asphalt, and Item 344, "Superpave Mixtures."
- Elastic Recovery (ASTM D6084) is not required unless MSCR (AASHTO T 350) is less than the minimum % recovery. Elastic Recovery must be used for the acceptance criteria in this instance.

### 3. EQUIPMENT

Provide all equipment necessary to transport, store, sample, heat, apply, and incorporate asphalts, oils, and emulsions.

#### 4. CONSTRUCTION

**Typical Material Use.** Use materials shown in Table 18, unless otherwise determined by the Engineer.

**Table 18**  
**Typical Material Use**

Material Application	Typically Used Materials
Hot-mixed, hot-laid asphalt mixtures	PG binders, A-R binders Types I and II
Surface treatment	AC-5, AC-10, AC-15P, AC-20XP, AC-10-2TR, AC-20-5TR, HFRS-2, MS-2, CRS-2, CRS-2H, CRS-2TR, CMS-2P HFRS-2P, CRS-2P, CHFRS-2P, A-R binders Types II and III
Surface treatment (cool weather)	AC12-5TR, RC-250, RC-800, RC-3000, MC-250, MC-800, MC-3000, MC-2400L, CMS-2P
Precoating	AC-5, AC-10, PG 64-22, SS-1, SS-1H, CSS-1, CSS-1H
Tack coat	PG Binders, SS-1H, CSS-1H, EAP&T, TRAIL, EBL
Fog seal	SS-1, SS-1H, CSS-1, CSS-1H, CMS-1P
Hot-mixed, cold-laid asphalt mixtures	AC-0.6, AC-1.5, AC-3, AES-300, AES-300P, CMS-2, CMS-2S
Patching mix	MC-800, SCM I, SCM II, AES-300S
Recycling	AC-0.6, AC-1.5, AC-3, AES-150P, AES-300P, recycling agent, emulsified recycling agent
Crack sealing	SS-1P, polymer mod AE crack sealant, rubber asphalt crack sealers (Class A, Class B)
Microsurfacing	CSS-1P
Prime	MC-30, AE-P, EAP&T, PCE
Curing membrane	SS-1, SS-1H, CSS-1, CSS-1H, PCE
Erosion control	SS-1, SS-1H, CSS-1, CSS-1H, PCE
FDR -Foaming	PG 64-22, FDR EM-SY, FDR EM-HY

- 4.1. **Storage and Application Temperatures.** Use storage and application temperatures in accordance with Table 19. Store and apply materials at the lowest temperature yielding satisfactory results. Follow the manufacturer's instructions for any agitation requirements in storage. Manufacturer's instructions regarding recommended application and storage temperatures supersede those of Table 19.

**Table19**  
**Storage and Application Temperatures**

Type-Grade	Application		Storage Max (°F)
	Recommended Range (°F)	Max Allowable (°F)	
AC-0.6, AC-1.5, AC-3	200–300	350	350
AC-5, AC-10	275–350	350	350
AC-15P, AC-20-5TR, AC12-5TR and AC10-2TR	300–375	375	360
RC-250	125–180	200	200
RC-800	170–230	260	260
RC-3000	215–275	285	285
MC-30, AE-P	70–150	175	175
MC-250	125–210	240	240
MC-800, SCM I, SCM II	175–260	275	275
MC-3000, MC-2400L	225–275	290	290
HFRS-2, MS-2, CRS-2, CRS-2H, HFRS-2P, CRS-2P, CMS-2, CMS-2S, AES-300, AES-300S, AES-150P, AES-300P, CRS-2TR	120–160	180	180
SS-1, SS-1H, CSS-1, CSS-1H, PCE, EAP&T, SS-1P, RS-1P, CRS-1P, CSS-1P, recycling agent, emulsified recycling agent, polymer mod AE crack sealant	50–130	140	140
PG binders	275–350	350	350
Rubber asphalt crack sealers (Class A, Class B)	350–375	400	–
A-R binders Types I, II, and III	325–425	425	425

## 5. MEASUREMENT AND PAYMENT

The work performed, materials furnished, equipment, labor, tools, and incidentals will not be measured or paid for directly but is subsidiary or is included in payment for other pertinent items.

# Special Specification 6004

## Networking Intelligent Transportation System (ITS) Communications Cable



### 1. DESCRIPTION

Furnish, install, and test twisted-pair cable for networking and telecommunication uses in the field environment.

### 2. MATERIALS

2.1. **General Requirements.** Provide new cable and connectors that are in conformance with the details shown on the plans and in the specifications. The cable must be free of deformations, holes, splits and splices.

ITS networking copper cables must be constructed for installation in an outdoor underground conduit environment. All cable provided for underground installation must contain the Outside Plant designation for outdoor usage and must be rated Non-Plenum.

Provide cable in compliance with the most current version of the following industry standards:

- NFPA National Electric Code (NEC),
- Rural Electrification Administration (REA) -PE-22 (7 CFR 1755.403), PE-39 (7 CFR 1755.390),
- ANSI /TIA-568-C, EIA/TIA-568-B.2-2001 (Category 5E Cable),
- EIA-232, EIA-422, EIA-485,
- TSB-36, and
- Underwriters Laboratory (UL).

Included in this Item are the ITS cable types listed in Table 1.

**Table 1**  
**Common Networking ITS Communication Cable Types**

Cable Type	Nominal AWG Gauge	Application
Category 5e Ethernet Cable	#24 AWG	Standard 100Base-Tx, Gigabit Ethernet, up to 100 MHz bandwidth performance
Category 6 Ethernet Cable	#24 AWG	Gigabit Ethernet; up to 250MHz bandwidth performance
Category 7 Ethernet Cable	#24 AWG	10-Gigabit Ethernet, up to 600 MHz bandwidth performance. <u>Category 7 cable is not typically utilized for ITS device applications.</u> Category 7 cable applications include high bandwidth performance at network layer switches with 10 Gigabit connections.
Serial Communications Cable (RS-232, RS-422, RS-485)	#22, #24 AWG	Serial port applications, low bandwidth and small data rate transmission (<100 kb/s)
Shielded Twisted Pair Cable	#18-24 AWG	Telephone communications, below 16 MHz bandwidth performance
Unshielded Twisted Pair (UTP) Cable	#18-24 AWG	

Included in this Item are all terminating connectors and associated equipment required for installation and testing in a field environment.

Provide cable conforming to the gauge, type, and length shown on the plans. Ensure the cable gauge supplied meets the bandwidth requirements specific to the cable application and run length.

Provide signal amplification or repeater locations for communications cable runs as shown on the plans and in the specifications.

When selecting serial communications cable for longer cable runs, verify the conductor gauge to be provided will meet signal loss requirements for cable application. Refer to Table 2 for typical cable distance limitations for ITS serial communications cable.

**Table 2**  
**Typical Network Communications Cable**  
**Distance Limitations**

Cable Type	Recommended Maximum Cable Run <sup>1</sup>
RS-232	50 ft.
RS-422 (4 wire system)	500 ft.
RS-485 (2 wire system)	500 ft.
Category 5e	300 ft.
Category 6	300 ft.

1. Cable distance limitation to be verified according to manufacturer for the cable application.

All cable provided must be manufactured with permanent markings at approximate 2 ft. intervals on the outer jacket according to manufacturer name, serial number, type, UL list and classification for identification purposes. All pairs must be color coded using standard North American communication industry colors to uniquely identify each pair in the cable.

- 2.2. **Physical Requirements.** Provide networking communications cable meeting the following physical requirements.
- 2.2.1. **Conductor.** All networking cable must be constructed of solid bare copper conductor.
- 2.2.2. **Insulation.** All networking cable must be of foamed, cellular dielectric construction. Dielectric material must adhere to and support the center cable conductor.
- 2.2.2.1. **Insulation Material.** Serial communications cable insulation must be high-density polyethylene (HDPE) or equivalent. Ethernet networking cable insulation must be polyolefin or HDPE. UTP cable insulation must be polyethylene, polyolefin, polypropylene, or fluorinated ethylene propylene.
- 2.2.3. **Shielding.** Serial communications cable shielding must contain combination foil-polyester and copper braid shield to reduce EMI interference. Ethernet networking cable must contain a combination foil-polyester shield.
- 2.2.3.1. **Coverage.** Serial communications cable must be constructed of 100% effective foil coverage, minimum 65% braided coverage. Ethernet networking cable (Category 5e, 6, 7) must contain 100% effective foil cover.
- 2.2.4. **Outer Jacket.** Outer jacket must be rated for heavy duty ultraviolet (UV) exposure, sunlight, oil, and weather resistance necessary for outdoor installation.
- 2.2.4.1. **Jacket Material.** All networking cable outer jackets must be of PVC or polyethylene construction.
- 2.2.5. **Connectors.** Connectors must be matching, weather resistant, water and moisture proof, and outdoor-rated hardware that meet cable operating voltage, temperature, and impedance characteristics. Connectors must prevent the entry and collection of moisture to the cable and electrical connection point. Provide cable sealant during installation to seal connections from moisture and corrosion.



- 2.3. **Electrical and Mechanical Requirements.** Ethernet networking cable as shown on the plans must conform to the TIA/EIA-568-C standard, and according to performance characteristics defined in TIA/EIA-568-C.4-1. All Ethernet networking cable provided must meet IEEE 802.3af and IEEE 802.3at for Power over Ethernet (PoE) applications.

Serial communications cable and UTP must conform to the following requirements:

- 2.3.1. **Capacitance.** Serial communications cable capacitance must not exceed 35 picofarads (pF) per foot of cable. UTP cable capacitance must not exceed 15 pF per foot of cable.
- 2.3.2. **Inductance.** Serial communications cable inductance must not exceed 0.30 microhenry's ( $\mu$ H) per foot of cable.
- 2.3.3. **Impedance.** Provide 100 ohm nominal impedance for UTP cables and according to the manufacturer recommendation for cable application.
- 2.3.4. **Attenuation.** Attenuation of the cable must be compliant with requirements of the proposed application.
- 2.3.5. **Resistance.** The DC resistance of the serial communications cable inner conductor must not exceed 20 ohms per 1000 ft.

2.4. **Environmental Design Requirements.**

- 2.4.1. **Installation Temperature Rating.** Cable must be rated for an outside ambient temperature range of -20°F to 165°F.
- 2.4.2. **Storage Temperature Rating.** Cable must be rated for a storage temperature range of -40°F to 165°F.

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### 3. CONSTRUCTION METHODS

- 3.1. **General.** Cable must be installed in accordance with the following industry procedures:
- ANSI/TIA -568-C,
  - BICSI Telecommunications Distribution Methods Manual (TDMM) and Information Transport Systems Installation (ITSIM),
  - NFPA National Electric Code (NEC),
  - USDA Construction of Direct Buried Plant, and
  - ICEA Standard for Aerial Service Wire - ANSI/ICEA 5-89-648.
- 3.1.1. **Cable Storage.** All uninstalled cable must be stored according to manufacturer recommended bend radius and cable reel requirements.
- 3.1.2. **Cable Labeling.** All cable must be labeled using pre-laminated labels with UV protection according to usage at all terminations. Provide weatherproof labels rated for outdoor use.
- 3.1.3. **Installation Procedure.** All cable must be inspected and tested for continuity when received, with results compared with factory pre-shipping tests. Inspect the cable nomenclature to make certain that the correct product has been received. Notify the supplier (or manufacturer) of all discrepancies for immediate correction.

Install the network cable routed as shown on the plans and follow the manufacturer recommendations for installation.

Ensure that all exposed cable ends are covered and protected against moisture and dust penetration at all times during installation. Protect cable ends during storage, cable pulls, and post-installation.

- 3.1.4. **Conduit Fill Requirements.** Install cable as shown on the plans and ensure that NEC and TIA/EIA fill requirements must be met for all cable runs.
- 3.1.5. **Cable Slack Requirements.** Provide 25 ft. cable slack maximum in pull boxes and per manufacturer requirements.
- 3.1.6. **Spacing Requirements.** Provide minimum 12 in. spacing between electrical power cable and communications cable types as described for underground installations within NEC Sections 840.44 and 840.47.
- 3.2. **Testing.** Procedures for the tests noted below are to be in accordance with industry standard practice and recorded in accordance with ANSI/TIA/EIA rules for documentation for the cable type. Perform tests in accordance with testing requirements in this Item. For all tests, provide test forms to be used that compare measured results with threshold values. The following tests must be performed, recorded, and submitted to verify the cable performance and installation:
- 3.2.1. **Cable Continuity.** Perform cable continuity test for center conductor and shield continuity and record results. The test must be performed on received cable reels to identify any discrepancies and upon final installed cable interconnections. Test continuity of each pair to show a resistance of not more than 8 ohms per 1000 ft. of conductor. Use meter with a minimum input resistance measurement to comply with RUS 7 CFR 1755.403 Copper Cable Telecommunications Plant Measurements. .
- 3.2.2. **Time Domain Reflectometry (TDR).** Perform TDR test for impedance continuity per manufacturer recommendations in coaxial cable interconnections and record results.
- 3.2.3. **Ground Resistance.** Use a Megohmmeter to perform ground resistance testing of all conductors including the shield, and conductor-to-conductor, including all individual conductors to the shield. Ensure that all conductor tests, including the shield, read infinity to ground, and from conductor to conductor and all individual conductors to the shield, read infinity. Replace cable not meeting the infinity test result at no expense to the department, whether one or multiple readings per cable are defective.
- 3.2.4. **Visual Inspection.** Where cable installation is visible, perform visual inspection (with a Department representative) to verify any evidence of the following:
  - cable damage (cracks, shield damage, kinks, knots, jacket damage, crushed cable),
  - bend radius violations (at conduit fittings, cabinet locations), and
  - cable crimping method—use of manufacturers specified cable crimp tool only (use of pliers not permitted).
- 3.3. **Documentation.** Submit 3 copies of the following materials for each cable type provided for approval prior item supply:
  - manufacturer cutsheets and complete specifications (physical, electrical, mechanical, and environmental),
  - manufacturer warranty information,
  - independent test lab certification, and
  - blank test forms.

Submit 3 copies of the following materials for each cable run provided for approval post installation:
  - test results,
    - completed test forms,

- cable continuity test,
- TDR test,
- “as-built” documentation for cable path as shown on the plans,
- complete maintenance and trouble-shooting procedures, and
- furnish additional information as shown on the plans.

3.4. **Warranty.** Warrant all cable against defects or failure in design, materials, and workmanship in accordance with the manufacturer’s standard warranty.

Supply cable with no less than 95% of the manufacturer’s warranty remaining on the date that equipment invoices are submitted for final payment. Any material with less than 95% warranty remaining will be rejected.

Warrant all cable furnished and installed to perform according to the manufacturer published specifications for a period of 1 year after final acceptance of the project by the Department. Provide for “on-site” repair or replacement within 2 working days and at no cost to the Department. Repair or replace any defective cable, at the manufacturer’s option, at no cost to the Department.

#### 4. **MEASUREMENT**

This Item will be measured by the linear foot of cable.

#### 5. **PAYMENT**

The work performed and materials furnished in accordance with this Item and measured as provided under “Measurement” will be paid for at the unit price bid for “ITS Communications Cable (Ethernet)” and “ITS Communication Cable (Serial).” For twisted pair communications cable runs, work performed and materials furnished in accordance with this Item and measured as provided under “Measurement” will be paid for at the unit price bid for “ITS Communications Cable” of the type, size, and number of pairs specified. The price is full compensation for furnishing, installing, splicing and testing cable and connectors, as well as for installation equipment, materials, tools, and incidentals.

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# Special Specification 6056

## Preformed In-Lane (Transverse)/Centerline Rumble Strips



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### 1. DESCRIPTION

Furnish and install preformed in-lane (transverse) or preformed centerline rumble strips as shown on the plans.

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### 2. MATERIALS

Provide rumble strips from manufacturers prequalified by the Department. The Traffic Operations Division maintains a list of prequalified rumble strip manufacturers.

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### 3. CONSTRUCTION

Install the in-lane (transverse) rumble strips in locations shown in the plans. Install centerline rumble strips in the gaps between broken centerline pavement marking stripes as shown in the plans. Install the rumble strips in accordance to manufacturer's recommendations.

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### 4. MEASUREMENT

This Item will be measured transversely by the foot across the roadway on which the rumble strip is installed. Measurement shall include all strips of materials placed across the roadway surface.

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### 5. PAYMENT

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Preformed In-Lane (Transverse) Rumble Strips" or "Preformed Centerline Rumble Strips." This price shall be full compensation for all labor, equipment, tools and incidentals necessary to complete the work.

# Special Specification 6058

## Battery Back-Up System for Signal Cabinets



### 1. DESCRIPTION

Install a Battery Back-Up System (BBU System) for traffic signals that will provide reliable emergency power in the event of utility power failure or interruption. The system will also function as a power conditioner and/or voltage regulation device.

A BBU System consists of inverter/charger, manual bypass switch, power transfer switch or automatic bypass switch, batteries, battery monitoring device, wiring, external cabinet or stand-alone cabinet, concrete pad, all necessary hardware and software, and all associated equipment required to operate in a field environment.

The BBU System shall be capable of operating an "LED only" signalized intersection (700W load) for 4 hours of full runtime when utility power is disabled and under ambient temperatures of 25oC. The BBU System shall switch the intersection to flash mode of operation when approximately 40% of battery charge is remaining, via relay contact connection points on the front panel of the unit. The BBU system shall operate the intersection in the flash mode of operation (300W load) for an additional 2 hours. BBU system components shall be rated for a minimum 1400W load capacity.

The BBU shall be designed for outdoor applications in accordance with NEMA TS2-2003, Section 2. All components of the BBU system shall be rated to operate under temperature extremes of -34oC to +74oC.

### 2. DEFINITIONS

- 2.1. **Automatic Bypass Switch.** A unit connected between the utility power supply and the inverter/charger which can automatically switch power to the controller cabinet service panel from inverter output power to utility line power.
- 2.2. **Battery Back-Up System (BBU System).** The battery back-up system includes, but is not limited to, a manual bypass switch, automatic bypass switch or power transfer switch, inverter/charger, batteries, battery monitoring device, wiring, external cabinet and all necessary hardware for system operation.
- 2.3. **Battery Back-Up System Software.** All software associated with operation, programming and functional requirements of the BBU system.
- 2.4. **Battery Monitoring Device.** The device which monitors battery temperatures and charge rate of the batteries used in the BBU system.
- 2.5. **Batteries.** Standard 12V batteries wired in series to create a 36VDC to 96VDC voltage storage.
- 2.6. **Boost.** When enabled, the BBU inverter/charger shall automatically switch into this mode to raise the utility line voltage when it drops below a preset limit. The limit may be user defined or use manufacturer default settings (typically 100V AC).
- 2.7. **Buck.** When enabled, the unit shall automatically switch into this mode to reduce the utility line voltage when it rises above a preset limit. The limit may be user defined or use manufacturer default settings (typically 135V AC).
- 2.8. **External or Stand-Alone Cabinet.** The structure which houses the system components and/or batteries for the BBU System.

- 2.9. **Inverter/Charger.** The unit which converts the DC voltage input into 120 VAC output for the traffic signal cabinet to operate. As a minimum the inverter/charger shall be rated for 1400 watts.
- 2.10. **Inverter Line Voltage.** The power supplied from the BBU system to the traffic signal cabinet from the BBU System inverter.
- 2.11. **Manual Bypass.** Manual switch that allows user to bypass BBU power to service system equipment. Manual bypass switch switches utility line power directly to cabinet.
- 2.12. **Power Transfer Switch.** A unit connected between the utility power supply and the inverter/charger which can automatically switch from utility line power to inverter output power. The power transfer relay may be a separate unit or combined with the manual bypass switch. In the event of battery voltage loss, the power transfer switch will automatically return to utility line power.
- 2.13. **Signal Operation Mode.** A signalized intersection generating a 700W load when running in normal operation.
- 2.14. **Signal Flash Mode.** A signalized intersection generating a 300W load when running in the flash mode of operation.
- 2.15. **Utility Line Voltage.** The 120V AC power supplied to the BBU system.

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### 3. EQUIPMENT

Ensure electrical materials and construction methods conform to the current NEC and additional local utility requirements. Furnish battery back-up systems prequalified by the Department. The Traffic Operations Division maintains a Material Producer List (MPL) of prequalified battery back-up systems. Ensure all materials and construction methods conform to the details shown on the plans, the requirements of this Item, and the pertinent requirements of the following Items:

- Item 420, "Concrete Substructures"
- Item 620, "Electrical Conductors"

Provide and install a BBU system that is able to fulfill the following requirements:

- 3.1. **Method of Operation.** The BBU system shall operate using one or more of the following methods:
- 3.1.1. **Buck and Boost Method.** When the buck and boost functions are enabled they shall set the upper and lower control limit allowable for the utility line voltage.
- If the utility line voltage fluctuates above or below the buck and boost values, the BBU system shall raise or lower the voltage by approximately 10-15% of the utility line voltage in an attempt to bring the voltage back into the upper and lower control limits. Buck and boost shall have preset manufacturer defaults.
- If the utility line voltage falls above or below the functional capabilities of buck and boost, then the BBU system will transfer power from the utility line voltage to the inverter line voltage.
- 3.1.2. **Stand-by Method.** The stand-by method shall set upper and lower control limits for the utility line power. If the utility line voltage falls above or below the upper or lower control limits, then the BBU system will transfer power from the utility line voltage to the inverter line voltage.
- 3.1.3. **Continuous Operating Mode, Double Conversion Method.** The continuous method supplies the cabinet with inverter line voltage at all times. This method requires the disabling of buck and boost functions.
- 3.2. **System Capabilities.** The BBU system shall be capable of providing 1400W peak load, with a minimum of 80% inverter efficiency, for at least 10 seconds.

The BBU system shall be capable of providing 700W signal operation load for a minimum of 4 hours, and then switching to and providing 300W signal flash load for an additional 2 hours minimum, when batteries are fully charged.

When the BBU system is running on battery power, the inverter/charger shall be capable of allowing the voltage at which the transition from normal operating load to flash mode occurs (usually 47.5V) to be selected by a user, via relay contacts and connection points on the front panel of the inverter/charger.

The transfer time allowed, from disruption of normal utility line voltage to stabilized inverter line voltage from batteries, shall be less than 65 milliseconds. The same allowable transfer time shall also apply when switching from inverter line voltage to utility line voltage.

The BBU system shall bypass utility line voltage whenever the utility line voltage is outside of the manufacturer's default, or a user-programmed voltage range,  $\pm 2\text{VAC}$ .

When the utility line power has been restored to a normal operating voltage for more than a user defined setting (default 30 seconds), the BBU system shall transfer from inverter line voltage to utility line voltage. The BBU system shall be equipped to prevent a malfunction feedback to the cabinet or from feeding back to the utility service.

The BBU system shall be compatible with TS1, TS2 and Model 170/2070 controllers and cabinet components for full run-time operation.

Unless the plans indicate otherwise, provide a BBU in an external battery cabinet. When indicated by the plans, provide a BBU system that can be shelf-mounted in NEMA TS-1 and TS-2 cabinets, or rack-mounted for Model 170/2070 332 cabinets. Provide a manual bypass that is capable of shelf mounting or that can be attached to the side of the signal cabinet. Provide interconnect cables that are no less than 10 ft. in length.

Relay contact wiring for each set of NO/NC relay contact closure terminals shall be no less than 6 feet long and #18 AWG wire. Use manufacturer recommendations for size of wire for any cables lengths greater than 10 feet.

The BBU system shall have lightning surge protection compliant with IEEE/ANSI C.62.41 latest edition and meeting all current UL1449 standards. Lightning surge protection shall be provided to the utility line voltage coming into the inverter/charger. The surge protection device shall be easily accessible and mounted externally from the inverter/charger.

The BBU system, including batteries and hardware, shall be easily replaceable and shall not require any special tools for installation.

The BBU system shall operate in automatic "fail-safe" mode. Should a breaker trip on the inverter/charger and/or the power transfer switch, the system will automatically operate from utility line power and bypass the BBU system.

As stated above, in addition to the inverter/charger, the BBU shall be provided with both an external manual bypass switch and either an external automatic transfer switch or external automatic bypass switch.

The BBU system shall be capable of logging up to 100 events. Events shall date- and time-stamp faults with utility line voltage and battery voltages. At the minimum, the BBU system shall log an event when:

- the utility line voltage falls above or below the upper or lower control limits,
- the BBU system automatically switches to battery power, and
- when self-monitoring BBU system components fail.

3.3. **Displays, Controls, Diagnostics and Maintenance.** The BBU system shall include a front panel display. All applicable programmable functions of the operational methods described in this specification shall be viewable from the front panel display.

All events described in Section 3.2, "System Capabilities" shall be viewable from the front panel display.

The BBU system software shall be programmable from the front panel of the inverter/charger by means of a keyboard or momentary buttons allowing user to step through menu driven software.

A 10/100 Ethernet port shall be provided on the front panel of the inverter/charger.

A RS232 port shall be provided on the front panel of the inverter/charger.

The BBU system software shall be provided for the operational needs of the BBU system. The user/operator shall be able to access all system software via the Ethernet and RS232 ports on the front panel of the inverter/charger. The user shall be able to read logged events and change programmable parameters from the keyboard, laptop or local area network via the Ethernet port.

System software shall be upgradeable via the RS232 port on the front panel of the inverter/charger.

- 3.4. **Inverter/Charger.** The inverter/charger is the unit that provides the voltage regulation; power conditioning of utility line power; convert the DC voltage input into 120 VAC output for the traffic signal cabinet to operate; provides emergency backup power upon loss of utility power and provides for temperature compensated battery charging. As a minimum the inverter/charger shall be rated for 1400 watts. Provide a minimum of 6 sets of normally open (NO) and normally closed (NC) single-pole double-throw dry contact relay closures on the front face of the inverter/charger and labeled so as to identify each contact. The relay closures shall consist a set of NO/NC contact closures that shall be energized whenever the unit switches to battery power (contact shall be labeled or marked as "On Battery" or equivalent) and a second set of NO/NC contact closures shall be energized whenever the battery approaches 40% remaining capacity (contact shall be labeled or marked as "Low battery" or equivalent), which will determine when the unit will switch from normal operation to flash. A third set of NO/NC contact closures shall be energized after a user settable time after the unit switches to battery power. The contact may be labeled "Timer. The remaining relays shall be user definable.

Operating temperature range for both the inverter/charger and power transfer relay shall be -34°C to +74°C. When battery power is used, the BBU system output voltage shall be between 110VAC and 125VAC, pure sine wave output,  $\leq 3\%$  THD, 60Hz  $\pm 3$ Hz.

- 3.5. **Manual Bypass Switch.** The manual bypass switch shall be provided as a separate unit external to the inverter/charger unit. The manual bypass switch shall consist of housing, two position switch, terminal blocks, internal wiring, service outlet, circuit breakers and mounting hardware. All components shall be rated at a minimum of 240VAC / 30 amp. Provide the manual bypass switch with # 8 terminal blocks. The manual bypass switch shall be 2 position and allow the user to switch utility line power directly to the cabinet service panel. The switch positions will provide the following functions. In the "Bypass" position the inverter is bypassed, utility power is removed from the BBU and passed directly to the signal power panel. In the "UPS" position the inverter / switch is powered and the signal circuits are supplied by the output of the inverter. When the manual bypass switch is in the "Bypass" position the user may replace the automatic bypass switch (or transfer switch) and the inverter/charger without interrupting power to the intersection. Provide the manual bypass switch with over current protection (20 Amp circuit breaker).

- 3.6. **Power Transfer Switch.** These requirements are for BBU systems provided with a power transfer switch. The power transfer switch will operate such that the inverter/charger input and cabinet power panel are supplied with power from the utility line, in the event that the utility line power is lost or requires conditioning (buck or boost) the power transfer switch will automatically connect the inverter/charger output to the cabinet power panel such that the inverter/charger output provides the power. In the event of inverter/charger failure, battery failure, or complete battery discharge, the power transfer shall revert to the NC (de-energized) state, where utility line power is connected to the cabinet service panel.

All wire to the power transfer switch from the manual bypass switch, to and from the inverter/ charger and from the manual bypass switch to utility power service shall be sized accordingly with system requirements.

- 3.7. **Automatic Bypass Switch.** These requirements are for BBU systems provided with an automatic bypass switch. The automatic bypass switch will operate such that the inverter/charger input is supplied with power



from the utility line and the cabinet power panel is supplied with power from the output of the inverter/charger. In the event of inverter/charger failure, battery failure, or complete battery discharge, or other loss of power from the output of the inverter/charger, the automatic bypass switch shall revert to the NC (de-energized) state, where utility line power is connected to the cabinet service panel.

3.8. **Batteries.** Provide batteries from the same manufacturer/vendor of the BBU system.

Individual batteries shall be 12V type, and shall be easily replaceable and commonly available for purchase by common off-the-shelf equivalent.

Batteries shall be sized and rated to operate a 700W load for 4 hours (normal operation) followed by a 300W load for 2 hours (flash operation) for a total of 6 hours.

Battery configuration shall consist of 12V batteries arranged for total voltages of 36V, 48V, 60V, 72V, 84V or 96V.

Batteries shall be deep-discharge, sealed prismatic lead-calcium based, valve-regulated maintenance-free batteries.

Batteries shall operate over a temperature range of -34°C to +74°C.

Batteries shall indicate maximum recharge data and recharging cycles, and manufacturer defaults on the inverter/charger shall not allow the recharging process to exceed the batteries maximum values.

Battery interconnect wiring shall connect to the inverter unit via modular harness with red and black cabling that terminates into a typical power pole style connector. Harness shall be equipped with mating power flag style connectors for batteries and a single insulated plug-in style connection to inverter/charger unit. Harness shall allow batteries to be quickly and easily connected in any order and shall be keyed to ensure proper polarity and circuit configuration. A fusible link or device sized accordingly with system requirements and to protect against currents exceeding each battery current rating shall be provided within 3 inches of the negative and positive leads of each battery. Fusible links shall be insulated stranded wire.

Insulated covers shall be provided at the connection points (post) as to prevent accidental shorting.

Battery cables provided to connect battery to battery harness main cable shall be a minimum of 18 in. or long enough to accommodate the battery covers provided with the battery ground box, whichever is longer. Battery harness shall be sized accordingly with system requirements.

3.9. **Battery Monitoring System.** The BBU system shall use a temperature-compensated battery charging system. The charging system shall compensate over a range of 2.5 – 4.0 mV/°C per cell.

The temperature sensor shall be used to monitor the temperature and regulate the charge rate of the batteries. Unless required otherwise by the plans the temperature sensor wire shall be as follows:

- 8 feet long if external side-mounted cabinet is attached to existing controller cabinet.
- 8 feet long if batteries are housed in traffic signal base used for cabinet foundation and batteries are stored on shelf within base.
- 8 feet long if stand-alone cabinet is used.

Should the temperature sensor fail, the inverter/charger shall not allow the BBU system to overcharge the batteries. The BBU system shall provide an alarm should the temperature sensor fail.

Recharge time for the batteries to obtain 80% or more of full battery charge capacity shall not exceed 20 hours at 21°C (70°F).

Batteries shall not be charged when battery temperature exceeds 50°C.

The BBU system shall monitor battery strings within a system and set a fault indicator if battery voltage falls below normal operating voltage.

- 3.10. **Battery Housing.** Unless plans require otherwise, project an external battery cabinet or stand-alone BBU/battery cabinet as specified below.

- 3.10.1. **External Battery Cabinet.** The external cabinet shall be NEMA type 3R all-aluminum with stainless-steel hardware, or approved equivalent. The external cabinet shall be designed to attach on the side of a TS2 size 6 base-mount cabinet. The batteries, inverter, transfer switches, manual bypass and all associated hardware shall be housed in the external cabinet.

The external cabinet shall be equipped with proper ventilation, electric fan, and air filter in accordance with TS2 standards.

External cabinets will be equipped with a door opening to the entire cabinet. The door shall be attached to the cabinet with a full length stainless steel piano hinge or four, two-bolts per leaf, hinges. The door shall be provided with the same latch and lock mechanism as required for standard traffic signal cabinet. In addition, a padlock clasp will be provided.

When using battery ground boxes, an external cabinet is required for the non-battery components. .

- 3.10.2. **Stand-Alone BBU/Battery Cabinet.** When required for installation by the plans a stand-alone cabinet in accordance with the following shall be provided.

The stand-alone cabinet shall conform to all the specifications of the External BBU/Battery Cabinet, except that it will not mount to the controller cabinet. The stand-alone cabinet shall be designed to attach to a concrete pad.

- 3.11. **Concrete Pad.** Provide a Class B concrete pad as a foundation for stand-alone cabinets of the size shown in the plans. For external cabinets, extend the controller foundation to provide a class B concrete pad under the external cabinet of the size shown in the plans.

- 3.12. **Documentation.** Operation and maintenance manuals shall be provided. The operation manual shall include a block diagram schematic of all system hardware components. The manual shall include instructions for programming and viewing software features. The manual shall include all uploading/downloading (communications protocol) requirements via RS232 or Ethernet port.

Board level schematics shall be provided when requested.

Battery documentation and replacement information shall be provided.

- 3.13. **Testing.** The Department reserves the right to do testing on BBU systems to ensure Quality Assurance on unit before installation and random sampling of units being provided to the State. BBU systems that fail will be taken off the Qualified Products List (QPL).

Department QPL testing procedures will check compliance with all the criteria of this specification including the following:

- Event logging for fault/alarm conditions
- Demonstrated use of one or more of the operating methods described in Section 3.1., "Method of Operation."
- Testing of ability to power a 700W load for 4 hours, transfer to flash mode and power a 300W load for 2 additional hours, at an ambient temperature of +25°C.
- Testing of all components in environmental chamber (temperature ranges from -30°C to +74°C) following NEMA TS2 2003 standards, Section 2.

- 3.14. **Warranty, Maintenance and Support.** Provide a BBU containing a warranty that requires the manufacturer to replace failed BBUs when non-operable due to defect in material or workmanship within five years of date of purchase from manufacturer. Supply a BBU with no less than 95% of the manufacturer's warranty remaining on the date that the BBU is installed and begins operating. The replacement BBU must meet requirements of this specification. The Contractor will handle all warranty issues until the date of final acceptance.

Batteries shall be warranted for full replacement for 5 years. Batteries shall be defined as bad if they are not able to deliver 80% of battery rating.

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**4. MEASUREMENT**

This Item will be measured by each BBU system installed.

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**5. PAYMENT**

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "BBU System" of the type (type of BBU cabinet) specified. This price is full compensation for furnishing, installing, and testing the completed installation, BBU system and associated equipment, mounting hardware, class B concrete pad, software, conduit, conductors; and equipment, labor, tools; and incidentals.

# Special Specification 6062

## Intelligent Transportation System (ITS) Radio



### 1. DESCRIPTION

Furnish, install, remove, or relocate an Intelligent Transportation System (ITS) radio at locations shown on the plans, or as directed.

### 2. MATERIALS

Provide new materials that comply with the details shown on the plans and the requirements of this Item. Supply all equipment and hardware needed for a complete functioning system. Materials for equipment to be relocated will be "as-is". The Contractor will protect the existing equipment from further wear or damage.

### 3. EQUIPMENT

3.1. **General.** The ITS radio consists of a radio, power supply, antenna, antenna cables, lightning protection, grounding, all necessary mounting hardware, and radio configuration software.

Utilize the latest industry practiced techniques in equipment design and construction of parts, subassemblies, circuits, cards, and modules. Design equipment for ease of maintenance. Ensure that all component parts are readily accessible for inspection and maintenance, using hand tools. Provide test points for checking essential voltages, waveforms, signals, and similar data.

Ensure that all external screws, nuts, and locking washers are made of corrosion resistant material. Do not use self-tapping screws unless specifically approved by the Engineer.

Provide parts made of corrosion resistant material such as plastic, stainless steel, anodized aluminum, or brass.

Protect all materials used in construction from fungus growth and moisture deterioration.

Separate dissimilar metals by an inert dielectric material.

3.2. **Radio.** Each radio will be a point-to-point or point-to-multi-point single-band or dual-band radio operating in the license-free frequency as shown on the plans or as directed by the Engineer. Provide a radio that meets all of the following minimums:

3.2.1. **Frequency.** FCC unlicensed, 900 MHz, 2.4 GHz, or 5 GHz, as specified on the plans, or as directed;

3.2.2. **Channel Selection.** Dynamic Frequency Selection, with a manual override option;

3.2.3. **Minimum Range.** 15 mi., line of sight;

3.2.4. **Transmit Power.** User selectable, up to the maximum allowed by FCC rules, to at least 21 dBm, in 1 dBm steps (maximum step size). Maximum output power limited by FCC Part 15 rules for unlicensed frequencies;

3.2.5. **Receive Sensitivity.** Adaptive;

3.2.6. **Modulation.** Adaptive modulation and space diversity to provide maximum throughput;

- 3.2.7. **Forward Error Correction.** Provide forward error correction.
- 3.2.8. **Security.** Minimum security for the point-to-point backhaul network is the Advanced Encryption Standard, 128 bit block size (AES-128). Meet ISO/IEC 18033-3 standards. Minimum security for communications with Wi-Fi units is WPA2;
- 3.2.9. **Throughput.** Minimum out-of-the-box throughput of 100 Mbps for frequencies between 2.4 and 5 GHz. Minimum out-of-the-box throughput of 1 Mbps for the 900 Mhz frequency. Minimum measured throughput in the field of 50 Mbps for frequencies between 2.4 and 5 GHz;
- 3.2.10. **Networking Standards.** Provide at least the following:
- IEEE 802.1d – Ethernet Bridging,
  - IEEE 802.1p – Traffic Prioritization,
  - IEEE 802.1q – Virtual Local Area Network (VLAN),
  - IEEE 802.3 – 2012 Ethernet, and
  - IEEE 802.11-2009 – Wi-Fi (a/b/g/n) or most current version.
- 3.2.11. **Network Interface.** Minimum of one functional 10/100 Base-T RJ-45 port;
- 3.2.12. **On-Board Alignment Tools.** Provide a radio with on-board alignment tools for use aligning the antenna. These could be external LED indicators, audible indicators, or other approved mechanism; and
- 3.2.13. **FCC Certification.** Provide at least the following:
- FCC Part 15.400 (U-NII),
  - FCC Part 15.247 (ISM) 20 Mbps, and
  - FCC Part 15, Class B.

- 3.3. **Power.** Provide ITS radios meeting all specified requirements when the input power is 115 VAC  $\pm$  20%, 60 Hz  $\pm$  3 Hz, and that maximum power required does not exceed 35 W, including optional equipment.

Provide appropriate voltage conversion, power injectors, or other power supply hardware if the radio equipment or any radio-related ancillary devices require operating voltages other than 115 VAC or rely on Power over Ethernet (PoE or PoE+). Appropriate voltage converters or injectors must accept an input voltage of 115 VAC as noted above. Provide any required Power over Ethernet (PoE or PoE+) devices that are 802.3af-2003 or 802.3at-2009 compliant, meeting the power requirements of the radio equipment.

The Contractor will verify with the local power service provider to ensure that the provided equipment is compatible with the installed equipment. The Contractor will supply and install any additional equipment required for proper operation of the Radio System per the design.

Every numbered table and figure must be referenced in the accompanying text. Tables and figures should appear in the order they are referred to, no matter how fleeting the reference.

- 3.4. **Antennas.** Furnish and install radio antennas of the number and type specified on the plans, or as directed. These may include, but are not limited to:
- connectorized omni;
  - yagi;
  - sectorized (i.e. 45, 60, 90, 120 etc. degree increments);
  - parabolic antennas; and
  - integrated flat panel antennas.

Meet the following specifications:

- antenna gain as specified in the plans;

- minimum wind rating of 110 mph;
- Voltage Standing Wave Ratio (VSWR) value not exceeding 1.5 for the radio frequency specified on the plans;
- reflection coefficient value not exceeding 0.20;
- reflected power value not exceeding 4 %; and
- impedance matched to the impedance of the system so that voltage is in phase with the current.  
(Typically 50 ohms.)

3.5. **Antenna Coaxial Cables.**

3.5.1. **Nominal impedance.** Matched to the antenna's impedance to minimize the Voltage Standing Wave Ratio (VSWR). Typically 50 ohms.

3.5.2. **Maximum Attenuation.** 5 dB/100 ft. at the frequency specified on the plans.

3.5.3. **Maximum Cable Length.** 10 feet maximum length from radio to antenna when radio is mounted on an external structure. 100 feet maximum length from radio to antenna when radio is mounted in the cabinet and the antenna is mounted on the structure. Select external cable so that maximum cable attenuation is less than 5 dB total.

3.6. **Network Cable.** Provide Cat 5e shielded wire that meets the following minimum requirements:

- shielded twisted pair with drain wire;
- AWG24 solid bare copper;
- CMX outdoor rated for direct bury;
- outdoor UV rated jacket; and
- TIA/EIA-568B.2 and ISO/IEC 11801 standards.

Maximum run length for Cat 5e cable is 250 feet, or per the manufacturer's specifications.

3.7. **Lightning Protection.** Furnish and install surge protection on all coaxial cables mounted adjacent to and bonded to the cabinet ground bus. Include all mounting hardware necessary.

3.8. **Power Service Protection.** Provide equipment with readily accessible circuit protection devices (i.e. circuit breakers or fuses) for equipment and power source protection. Circuit protection devices may be resettable or replaceable.

Provide circuit breakers or fuses sized such that no wire, component, connector, PC board, or assembly will be subjected to sustained current in excess of their respective design limits upon the failure of any single circuit element of wiring.

Provide UL Listed Type 1 or Type 2 Surge Protection Device (SPD) and labeled to UL1449 Third Edition, posted at UL.com, under Certifications UL Category Code VZCA, and have a 20kA I-nominal rating. Provide SPD rated as NEMA 4. Provide a SPD with integral EMI/RFI line filtering if shown on the plans.

Provide automatic recovery from power failure within 30 sec. after resumption of power.

Provide a GFCI duplex outlet for ITS radio equipment at existing locations as shown on the plans. Provide this outlet in addition to the existing outlets within the cabinet.

3.9. **Maximum Weight.** Provide equipment with a weight not exceeding 25 lbs.

3.10. **Maximum Dimensions.**

3.10.1. **Outdoor Units.** 16 in. x 16 in. x 9 in. for integrated units, not including antenna.

- 3.10.2. **Used in Cabinets.** Provide equipment that easily fits on a single shelf without cabinet modifications.
- 3.11. **Modular Design.** Provide a modular ITS radio System design to allow components to be readily replaced in the field.  
Label with UV resistant methods to identify all modules and assemblies with name, model number, serial number and any other pertinent information required to facilitate equipment maintenance.
- 3.12. **Network Topologies.** Point-to-Point or Point-to-Multi-Point, as shown on the plans, or as directed.
- 3.13. **Connectors and Harnesses.** All external connections will be made of connectors that are keyed uniquely to preclude improper hookups. Color code and label all cables to and from the connectors on both ends.  
Provide connecting harnesses of appropriate length and terminated with matching connectors for interconnection with the communications system equipment.  
Plate all pins and mating connectors with a minimum of 20 microns of metallic native element gold (Au). Use heat shrink tubing for all solder type connections to insure that it protects the connection from short circuiting.  
Label with UV resistant methods to identify all assemblies with name, model number, serial number and any other pertinent information required to facilitate equipment maintenance.  
Provide external waterproof connections that conform to IEC 60529 Section 14.2.7, or latest revision, for IP 66 or greater rating.
- 3.14. **Mechanical Requirements.** Provide equipment that is modular in design such that it can be easily replaced in the field.  
Label with UV resistant methods to identify each unit with name, model number, serial number and any other pertinent information required to facilitate equipment maintenance.  
Coat all printed circuit boards with a clear-coat moisture and fungus resistant material (conformal coating).
- 3.15. **Environmental Requirements.** Ensure that equipment conforms to NEMA TS2-2003 (R2008), International Electrotechnical Commission (IEC) 60529, and NEMA 250-2008, or most current version, for the following categories:
- 3.15.1. **Temperature and Humidity.** Provide equipment that conforms to NEMA TS2 Section 2.1.5.1, or latest revision, and meets all the specified requirements during and after being subjected to any combination of the following conditions:
- ambient temperature range of -30 to 165°F;
  - temperature shock not exceeding 30°F per hour;
  - relative humidity of 0% to 100%; and
  - moisture condensation on all exterior surfaces caused by temperature changes.
- 3.15.2. **Vibration.** Provide equipment that conforms to NEMA TS2 Section 2.1.9 and Section 2.2.3, or most current version, and meets all the specified requirements during and after being subjected to a vibration of 5 Hz to 30 Hz up to 0.5 g applied in each of 3 mutually perpendicular planes for 30 min.
- 3.15.3. **Shock.** Provide equipment that conforms to NEMA TS2 Section 2.1.10 and Section 2.2.4, or latest revision, and does not yield permanent mechanical deformation or any damage that renders the unit inoperable when subjected to a shock of 10 g applied in each of 3 mutually perpendicular planes for 30 min.
- 3.15.4. **Environmental Contaminants.** Provide equipment that conforms to IEC 60529 Section 14.2.6, or latest revision, for IP 66 or greater rating when providing a pressurized unit.

Provide equipment that conforms to IEC 60529 Section 14.2.7, or latest revision, for IP 66 or greater rating when providing a non-pressurized unit.

- 3.15.5. **External Icing.** Provide equipment that is tested to conform to NEMA 250-2003 Section 5.6, or latest revision.
- 3.15.6. **Corrosion.** Provide equipment that is tested to conform to NEMA 250-2003 Section 5.10, or latest revision, when located in coastal Districts. Coastal Districts are Beaumont (BMT), Corpus Christi (CRP), Houston (HOU), Pharr (PHR), and Yoakum (YKM).
- 3.16. **Radio Configuration and Management Software.** Provide any and all programming and software required to make operational and support the radio system. The programming and software will be installed in the appropriate equipment at the time of acceptance testing, and will be used in the acceptance testing. Provide operations manuals, installation requirements, and licenses. Provide software with at least the following features:
- 3.16.1. **Radio Configuration.** Configuration is achieved through the following:
- a comprehensive configuration menu allowing the user to control all programmable radio settings;
  - a network tree which automatically discovers, organizes, displays, and searches for a radio; and
  - the ability to save individual radio configurations in a file that can be used to program replacement radios.
- 3.16.2. **Diagnostic Routines.** Provide the following diagnostic routines:
- 3.16.2.1. **Bandwidth Test.** For all communication links to a specific radio, including transmit and receive characteristics at the remote radios. Display signal strengths for transmit and receive. Provide client connection quality (CCQ);
- 3.16.2.2. **Spectrum Scan.** Determine the amount of background signal noise present for the specified frequency. Detect specific channels which experience interference to the extent that they are not adequate for the transmission or receipt of data. Include an option to exclude these frequencies from use; and
- 3.16.2.3. **Ping Test.** Measure and display the time it takes a packet of data to travel to and from another device in milliseconds and percent packet loss. Measure and display the variance in a minimum of seven successive ping tests (jitter).
- 3.16.3. **Networking Tools.** Provide the following network tools:
- provide a firewall configuration tool to manage multicast and broadcast traffic,
  - provide user selection of Spanning Tree Protocol (STP) and Rapid Spanning Tree Protocol (RSTP) options,
  - provide Virtual Local Area Network (VLAN) configuration tools;, and
  - provide Quality of Service (QoS) selection and configuration tools.
- 3.16.4. **Alarms.** Provide the following alarm features:
- provide 24 hr. monitoring of user selected alarms; and
  - provide option of sending email and text messages of triggered alarms.

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## 4. CONSTRUCTION AND WORK METHODS

- 4.1. **General.** Provide and install all materials, including support, calibration and test equipment, to ensure an operating and functional wireless radio system. This includes installation of power and data cables, and the power grounding and lightning suppression systems. Prior to beginning installation, inspect each site to verify suitability of the design for installation, grounding and lightning protection. Provide written documentation to the Engineer for approval prior to installation. Utilize the latest available industry standard construction



techniques with a minimum number of parts, subassemblies, circuits, cards, and modules to maximize standardization and commonality. Design equipment for ease of maintenance and orient component parts to be readily accessible for inspection and maintenance.

- 4.2. **Radio Mounting.** Provide and install all necessary radio mounts, standoffs, brackets, hardware, and grounding assemblies for the mounting surface shown in the plans. Install all radios at specified locations as shown on the plans. Any deviation between actual mounting location and those specified must be pre-approved by the Engineer.
- 4.3. **Antenna Mounts.** Provide and install all antenna mounts, standoffs, brackets, hardware, transmission line, hanger kits, grounding kits, and lightning suppressors for the mounting surface shown in the plans. Install all antennas at specified center lines. Perform antenna alignment for each path and compare with path calculations. Any variation between calculated and actual values must be brought to the attention of the Engineer.
- 4.4. **System Power and Grounding.** Prior to installation, provide a written description of the proposed grounding and lightning protection design. Connect the equipment to the 115 V circuits provided in the equipment cabinets at the sites. Bond all equipment racks in accordance with the approved manufacturer's installation specification. Ground all equipment racks to the single-point ground for the site. Provide grounding and lightning protection for all cable runs at the top of the support structure and at the equipment cabinet entry port. If the equipment cabinet and associated entry port is not collocated on the support structure, the grounding and lightning protection will also be provided at the bottom of the support structure.
- 4.5. **System Optimization.** Optimize equipment alignment and settings at each site to provide a complete, operational system.
- 4.6. **Conductors.** Provide conductors that meet the requirements of the most current version of the National Electrical Code (NEC) Provide conductors that are cut to proper length before assembly. It is not permissible to "double-back" conductors to take up slack inside the cabinet. Lace conductors neatly with nylon lacing or plastic straps. Organize conductors neatly inside the cabinet and secure cables with clamps. When connecting to hardware inside the cabinet, provide service loops at connection points. No splicing of cables or exposed conductors are allowed. Label with UV resistant methods to identify all conductors.
- 4.7. **Relocation.** Perform the relocation in strict conformance with the requirements herein and as shown on the plans. Completion of the work will present a neat, workmanlike, and finished appearance. Maintain safe construction practices during relocation.

Inspect the existing radio equipment, with a representative from the Department, and document any evidence of damage prior to removal. Conduct a pre-removal test in accordance with the testing requirements contained in this Item to document operational functionality. Remove and deliver to the Department existing radio equipment that fail inspection.

Prior to removal of existing radio equipment, disconnect and isolate the power cables from the electric power supply and disconnect all communication cabling from the equipment located inside the cabinet. Coil and store power and communication cabling inside the cabinet until such time that it can be relocated. Remove existing radio equipment as shown on the plans only at such time as authorized by the Engineer.

Use care to prevent damage to any support structures. Any components of the radio equipment or support structure damaged or lost will be replaced by the Contractor at no cost to the Department. Contractor to document and report to the Engineer any existing damage to equipment prior to removal.

Make all arrangements for connection to the power supply and communication source including any permits required for the work to be done under the Contract. Provide wire for the power connection at least the minimum size indicated on the plans and insulated for 600 volts. The power connection will meet the requirements of the most current version of the NEC.

- 4.8. **Removal.** Disconnect and isolate any existing electrical power supply prior to removal of existing radio equipment.

Perform removal in strict conformance with the requirements herein stated and the lines, grades, details and dimensions shown on the plans. Completion of the work will present a neat, workmanlike, and finished appearance.

Any components of the radio equipment damaged or lost will be replaced by the Contractor (with items requiring the approval of the Engineer) at no cost to the Department.

All materials not designated for reuse or retention by the Department will become the property of the Contractor and be removed from the project site at the Contractor's expense. Deliver items to be retained by the Department to a location designated on the plan sheets or general notes. The Contractor is fully responsible for any removed equipment until released by the Engineer.

- 4.9. **Contractor Experience Requirements.** Utilize installers, testers, and integrators with at least the following requirements:

- 4.9.1. **Minimum Experience.** Three years continuous existence offering services in the installation of wireless communications. Experience must include the following:

- 4.9.1.1. Conducting radio installation studies consisting of:

- signal noise studies,
- spectrum analysis,
- antenna gain / radio power calculations,
- system attenuation, and
- measurement of standing wave ratios.

- 4.9.1.2. Installation, troubleshooting and repair of broadband radio systems consisting of:

- equipment installation,
- configuration of radios,
- antenna calibration, and
- cabling.

- 4.9.1.3. Installation, troubleshooting, and repair of interconnected Ethernet networks (LAN and WAN) consisting of:

- cabling,
- switch / router configuration, and
- network analysis.

- 4.9.2. **Completed Projects.** Three projects consisting of wireless communications installation, troubleshooting and repair. Each project must include transmitting signals over a minimum of 1 mile distance and installation of a minimum of 3 devices.

- 4.9.3. **Equipment Experience.** One project (may be one of the three in the preceding paragraph) in which the personnel worked in cooperation with technical representatives of equipment suppliers to perform specific stages of work. Contractor will not be required to furnish equipment on this project from the supplier who furnished documentation demonstrating this experience.

Submit the names, addresses and telephone numbers of the references that can be contacted to verify the experience requirements given above.

- 4.10. **Documentation.**

Provide all licenses, where required, for any software or hardware in the system.

Provide a medical statement as to the safety of the unit to the general public (example: Pacemakers, etc.).

Provide proof of installer qualifications.

Provide all documentation described in this specification, including written reports for:

- verification of the suitability of the design for installation, grounding and lightning protection,
- communication link throughput tests,
- equipment grounding tests,
- system level test results to include: performance charts, link summaries, climatic factors, losses and standards, and
- wiring connection diagrams for the field installation and central installation.

#### 4.11. **Testing.**

4.11.1. **New Installations.** Unless otherwise shown on the plans, perform the following tests on the applicable equipment or systems.

4.11.1.1. **Test Procedures Documentation.** Provide 5 copies of the test plan procedures and target values, as well as blank data forms 60 days prior to testing for each test required in this specification. Include the sequence of the tests in the procedures. The Engineer will approve test procedures prior to submission of equipment for tests. Conduct all tests in accordance with the approved test procedures.

Record test data on the data forms, as well as quantitative results. No bid item measurement or payment will be made until the Engineer has verified the test results meet the minimum requirements of the specification. The data forms for all tests, except design approval tests, must be signed by an authorized representative of the Contractor.

Provide written notice to the Engineer within 48 hr. of discovery of any testing discrepancy performed in testing by the contractor. Furnish data forms containing the acceptable range of expected results as well as the measured values.

4.11.1.2. **Design Approval Test.** Conduct a design approval test on randomly selected units from the prototype design manufacturing run. If only 1 design prototype is manufactured, perform this test on that unit. If supplying multiple types of the equipment, provide and test a sample of each type.

Certification from an independent testing laboratory of a successfully completed design approval test is acceptable. Ensure that the testing by this laboratory is performed in accordance with the requirements of this specification. Failure of independent tests to comply with the requirements of this specification will be grounds for rejection of any certification.

Provide a copy of the certification to the District in which this equipment is installed. The data forms for the design approval tests must be signed by an authorized representative (company official) of the equipment manufacturer or by an authorized representative of an independent testing facility.

Notify the Engineer 10 working days before conducting this testing. The Department may witness all the tests. Perform the following tests:

4.11.1.2.1. **Power Service Transients.** Provide UL Listed Type 1 or Type 2 SPD and labeled to UL1449 Third Edition, posted at UL.com, under Certifications UL Category Code VZCA, and have a 20kA I-nominal rating. Provide SPD rated as NEMA 4. SPD with integral EMI/RFI line filtering may be required if shown on the plans.

4.11.1.2.2. **Temperature and Condensation.** Meet the performance requirements, specified in this Item, when subjected to the following conditions in the order specified below:

- stabilize the equipment at -30°F and test as specified in the NEMA TS2 standard, Sections 2.2.7.3, "Low-Temperature Low-Voltage Tests" and 2.2.7.4, "Low-Temperature High-Voltage Tests", or most current version,
- allow the equipment to warm up to room temperature in an atmosphere having relative humidity of at least 40%. Operate the equipment for 2 hr., while wet, without degradation or failure, and
- stabilize the equipment at 165°F and test as specified in the NEMA TS2 standard, Sections 2.2.7.5, "High-Temperature High Voltage Tests" and 2.2.7.6, "High-Temperature Low-Voltage Tests", or most current version.

- 4.11.1.2.3. **Relative Humidity.** Meet the performance requirements, specified in this Item, within 30 min. of being subjected to a temperature of 165°F and a relative humidity of 18% for 48 hr.
- 4.11.1.2.4. **Vibration.** Show no degradation of mechanical structure, soldered components, or plug-in components, and operate in accordance with the manufacturer's equipment specifications after being subjected to the vibration tests as described in the NEMA TS2 standard, Section 2.2.8, "Vibration Test", or most current version.
- 4.11.1.2.5. **Power Interruption.** Provide automatic recovery from power failure within 305 sec. after resumption of power.
- 4.11.1.3. **Demonstration Test.** Conduct a demonstration test on applicable equipment at an approved Contractor facility. The Contractor may submit procedures and results from previous projects in the same District as this project, provided the materials and equipment are identical. Provide previous procedures and results not more than 5 yr. old. Notify the Engineer 10 working days before conducting this testing. The Department may witness all the tests. Perform the following tests:
- 4.11.1.3.1. **Examination of Product.** Examine each unit carefully to verify that the materials, design, construction, markings and workmanship comply with the requirements of this Item,
- 4.11.1.3.2. **Continuity Tests.** Check the wiring to determine conformance with the requirements of the appropriate paragraphs in this Item, and
- 4.11.1.3.3. **Operational Test.** Operate each unit for at least 15 min. to permit equipment temperature stabilization and an adequate number of performance characteristics to ensure compliance with the requirements of this Item.
- 4.11.1.4. **Field Acceptance Test.** Following completion of equipment installation and operational optimization, submit an acceptance test plan to the Engineer for review and approval. During the official acceptance testing, provide the technical staff to conduct the measurements and adjustments called for in the testing. The Engineer will participate in the testing as the official test witness. Each page of the acceptance test document will provide for data recording of the test results, and the name of Contractor's representative conducting the test as well as a suitable field for the test date and signature of the Department's test witness. Upon the Engineer's approval of the test plan and the test schedule, the acceptance testing may begin.
- Conduct a field acceptance test for each unit after installation as required by the Engineer in order to demonstrate compliance with the functional requirements with this Item. Exercise all stand-alone (non-network) functional operations. Provide a factory certified representative for installation and testing of the equipment. Notify the Engineer 5 working days before conducting this test. The field acceptance test will consist of at least the following:
- 4.11.1.4.1. **Physical Construction.** Verify physical construction is completed in accordance with the plans and specification.
- 4.11.1.4.2. **Electrical Connections.** Verify that all connectors for grounding, surge suppression, and electrical distribution are tightened correctly and are quality connectors. Verify all power supplies and circuits are operating under the proper voltages. Verify all power and communications cables are terminated correctly, secured inside the cabinet, and fitted with appropriate connectors.

- 4.11.1.4.3. **Grounding.** Field test equipment grounding for all ITS radio equipment installed in the field and provide written documentation to the engineer. Where earth ground resistance values exceed 5 ohms, develop mitigation measures for consideration. Once mitigation measures are installed, re-test that ground and update the documentation.
- 4.11.1.4.4. **Interference.** Conduct a test site survey and interference analysis prior to the installation of the equipment. Measure the existing signal noise levels at each installation site for the proposed radio frequency, identify potential sources of interference, and document the findings in a written report to the engineer. The purpose of this survey is to verify that the parameters measured during the design process have not substantially changed. If the new survey indicates that the proposed radio system will not function as designed, develop proposed mitigation strategies. Adjust antenna polarities and channel plans on equipment to minimize interference from other sources.
- 4.11.1.4.5. **Communication Link Quality.** Conduct signal tests for each communication link, including data throughput, transmit power and frequency, receiver performance and frequency, proper operation of switch over, proper operation of alarm and switches, and bit error rate (BER). Document results in a written report to the engineer. Where measured throughput drops below 50 Mbps on any link, develop mitigation measures for consideration. Once mitigation measures, if any, are implemented on a communications link, re-test that link and update the documentation.
- 4.11.1.4.6. **System Paths.** Include the following in testing of the installed system paths:
- measure and record the transmitter/receiver channel frequency and polarity;
  - measure and record the transmitter power,
  - measuring and recording the receiver fade margin, perform a one hour Bit Error Rate Test (BERT) on the primary equipment and record results, and
  - verify the operation of all local alarm and control points using the alarm and monitoring equipment provided.
- 4.11.1.4.7. **Alarms.** Test and verify the operation of the alarms and monitor equipment in accordance with the acceptance test criteria.
- 4.11.1.5. **System Integration Test.** Conduct a system integration test on the complete functional system. Demonstrate all control and monitor functions for each system component for 72 hr. Notify the Engineer 10 working days before conducting this testing. The Department may witness all the tests.

Provide Systems Integration Test procedures for proper adjustment and calibration of subsystem components. Proper adjustment and calibration involves documenting settings used to meet functional requirements while providing a margin for adjustment when future conditions change. Utilize the Department's control software (when available) to perform subsystem testing. At a minimum, utilize this software to verify communication to the Department's equipment. The Contractor is responsible for being familiar with any existing Department equipment and software.

The failure of any one component material or equipment item in a system integration test is justification for rejecting the entire subsystem. Each subsystem component must function as a complete integrated subsystem

- 4.11.1.6. **Final Acceptance Test.** Following completion of the demonstration test, field acceptance test, and system integration test for all subsystems, provide completed data forms containing all of the data taken, including quantitative results for all tests, a set of "as built" working drawings, and a written request to begin a data communication and final acceptance test. Provide "as built" working drawings indicating the actual material, equipment, and construction of the various subsystem components.

Within 10 calendar days of the request, execute a data communications test using a Department supplied software program. The data communications test may be executed by the Engineer or the Contractor with the prior approval of the Engineer. The purpose of this test is to verify that the communications plan will

operate with application software provided by the Department or contractor supplied software approved by the Engineer.

Perform the data communications test for a period of 72 hr. Ensure that the test can be performed for a continuous 72 hr. during a normal work week. If a message error or component failure occurs anywhere in the network, restart the 72 hr. test once repairs are completed. All components of the communications network must operate as an integral system for the duration of the test.

A message error is defined as the occurrence of a parity error, framing error, or data error in any component of the message. The error-free message rate is defined as the ratio of the number of messages in which no message error occurs to the number of messages transmitted. The error-free message rate must exceed 99.99% for acceptable transmission quality, both for the system as a whole, and for each component of the network.

Provide all additional test results to the Engineer for review once a successful data communications test has been completed. If all the requirements of this special provision have been satisfied, contract time will be suspended and all subsystems will be placed into operation and operate as a complete ITS radio communication system as intended for at least 30 calendar days.

Notify the Engineer of any defects suspected in integration or function of material or equipment. Investigate any suspected defects and correct if necessary. Provide a report of findings within 2 calendar days of notice of any suspected defects. Describe the nature of the any defects reported and any corrective action taken in the report. The integrated subsystems must operate defect free as a single complete system for at least 72 continuous hours during the 30 calendar day review period. If the number of defects or frequency of failures prevents all subsystems from operating as described above, the Engineer may reject the entire system integration test results and resume contract time. Provide any necessary corrections and resubmit system integration test results and a request to begin a final acceptance test which may include "as built" plans and a data communications test.

The project will not be accepted, notwithstanding other provisions in the Contract, until the system, inclusive of all subsystems, has operated satisfactorily for a period of 90 days and in full compliance with the plans and specifications after approval of all submitted test results and reports.

- 4.11.1.7. **Consequences of Test Failure.** If a unit fails a test, submit a report describing the nature of the failure and the actions taken to remedy the situation prior to modification or replacement of the unit. If a unit requires modification, correct the fault and repeat the test until successfully completed. Correct minor discrepancies within 30 days of written notice to the Engineer. If a unit requires replacement, provide a new unit and then repeat the test until successfully completed. Malfunctions that will substantially delay receipt and acceptance of the unit will be sufficient cause for rejection of the unit.

Failure to satisfy the requirements of any test is considered a defect and the equipment is subject to rejection by the Engineer. The rejected equipment may be offered again for retest provided all noncompliance has been corrected.

If a failure pattern develops in similar units within the system, implement corrective measures, including modification or replacement of units, to all similar units within the system as directed. Perform the corrective measures at no additional cost to the Department or extension of time in contract period.

- 4.11.1.7.1. **Consequences of Design Approval Test Failure.** If the equipment fails the design approval test, correct the fault and repeat the design approval test until successfully completed.
- 4.11.1.7.2. **Consequences of Demonstration Test Failure.** If the equipment fails the demonstration test, correct the fault and repeat the demonstration test until successfully completed.
- 4.11.1.7.3. **Consequences of Field Acceptance Test Failure.** If the equipment fails the field acceptance test, correct the fault and repeat the field acceptance test until successfully completed.

- 4.11.1.7.4. **Consequence of System Integration Test Failure.** If the equipment fails the system integration test, correct the fault and repeat the systems integration test until successfully completed.
- 4.11.1.7.5. **Consequences of Final Acceptance Test Failure.** If a defect within the system is detected during the final acceptance test, document and correct the source of failure. Once corrective measures are taken, monitor the point of failure until a consecutive 30 day period free of defects is achieved.
- If after completion of the initial test period, the system downtime exceeds 72 hr. or individual points of failure have not operated for 30 consecutive days free of defects, extend the test period by an amount of time equal to the greater of the downtime in excess of 72 hr. or the number of days required to complete the performance requirement of the individual point of failure.
- 4.11.2. **Relocation and Removal.**
- 4.11.2.1. **Pre-Test.** Conduct performance testing prior to removal of radio equipment. Test all functional operations, identified in this Item, of the equipment in the presence of representatives of the Contractor and the Department. Ensure that both representatives sign the test report indicating that the equipment has passed or failed each function. Once removed, the equipment becomes the responsibility of the Contractor until accepted by the Engineer. Compare test data prior to removal and test data after installation. The performance test results after relocation must be equal to or better than the test results prior to removal. Repair or replace those components within the system which failed after relocation but which passed prior to removal.
- 4.11.2.2. **Post Test.** Testing of the radio equipment is for the purpose of relieving the Contractor of maintenance of the system. The Contractor will be relieved of the responsibility for maintenance of the system in accordance with Item 7, "Legal Relations and Responsibilities", after a successful test period. The Contractor will not be required to pay for electrical energy consumed by the system.
- After all existing radio equipment has been installed, conduct approved continuity, stand alone, and equipment system tests. Furnish test data forms containing the sequence of tests including all of the data recorded as well as quantitative results for all tests. Submit the test data forms to the Engineer at least 30 days prior to the day the tests are to begin. Obtain Engineer's approval of test procedures prior to submission of equipment for tests. Provide at least 1 copy of the data forms to the Engineer.
- Conduct an approved stand-alone test of the equipment installation at the field site(s). At a minimum, exercise all stand-alone (non-network) functional operations of the field equipment with all of the equipment installed per the plans as directed by the Engineer. Complete the approved data forms with test results and provide to the Engineer for review and either acceptance or rejection of equipment. Provide at least 30 working days notice prior to all tests to permit the Engineer or his representative to observe each test.
- The Department will conduct approved radio system tests on the field equipment with the Department's central control software. The tests will, as a minimum, exercise all remote control functions and display the return status codes from the equipment.
- If any unit fails to pass a test, prepare a report and deliver the report to the Engineer. Describe in the report the nature of the failure and the corrective action needed. If the failure is the result of improper installation or damage during reinstallation, reinstall or replace the unit and repeat the test until the unit passes successfully, at no additional cost to the Department or extension of time to the contract period.
- 4.12. **Training.** Conduct a training class (minimum of 8 hr., unless otherwise noted in the plans) for up to 10 representatives designated by the Department on procedures of installation, operations, testing, maintenance and repair of all equipment specified within this specification. Submit to the Engineer for approval, 10 copies of the training material at least 30 days before the training begins. Conduct training within the local area unless otherwise authorized by the Engineer.
- 4.13. **Warranty.** Warrant the equipment against defects or failure in design, materials, and workmanship for a minimum of 3 years or in accordance with the manufacturer's standard warranty if that warranty period is

greater. The start date of the manufacturer's standard warranty will begin after the equipment has successfully passed all tests contained in the final acceptance test plan. Any ITS radio equipment with less than 100% of its warranty remaining after the final acceptance test is completed will not be accepted by the Department. Guarantee that equipment furnished and installed for this project performs according to the manufacturer's published specifications. Assign, to the Department, all manufacturer's normal warranties or guarantees on all electronic, electrical, and mechanical equipment, materials, technical data, and products furnished for and installed on the project.

Repair or replace any malfunctioning ITS radio equipment at the Contractor's expense prior to beginning the final acceptance test plan.

Repair or replace, at the manufacturer's option, defective equipment during the warranty period at no cost to the Department. Any replaced units will inherit the remainder of the failed unit's warranty period.

Furnish replacement parts and all equipment, with transportation prepaid, within 10 business days of notification of failure by the Department.

During the warranty period, provide technical support from the supplier. Provide this support within 4 hr. of request, and provided by factory certified personnel or factory certified installers of the equipment.

Provide ongoing software and firmware updates during the warranty period at no cost to the Department. All updates will be tested and approved by the Department prior to installation by the Department.

The Manufacture or the Contractor will maintain an inventory of parts to support maintenance and repair of all ITS radio equipment based on the terms of the warranty.

## 5. MEASUREMENT

This Item will be measured by each ITS radio furnished and installed, installed, relocated, or removed, of the types specified, to provide communication and functionality.

## 6. PAYMENT

- 6.1. **Furnish and Install.** The work performed and materials furnished in accordance with this Item and measured as provided for under "Measurement" will be paid for at the unit price bid for "ITS Radio" of the various types specified.

Types are defined as ITS RADIO X1 (X2/ X3) X4 (X5) where:

- X1 = Sngl (Single Band) or Dual (Dual Band)
- (X2/X3) = Frequencies Used (i.e. 5 GHz for single or 2.4 GHz or 5 GHz for dual)
- X4 = Antenna Configuration = I (Integrated) or C (Connectorized)
- (X5) = Antenna Type = O (Omnidirectional), U (Unidirectional), S (Sector), or P (Parabolic)

This price is full compensation for making fully operational an ITS radio at locations shown on the plans; all radio equipment, voltage converters or injectors, mounting brackets, hardware, cables and connectors; and all testing, training, software, equipment, labor, materials, tools, and incidentals.

- 6.2. **Install Only.** The work performed and materials furnished in accordance with this Item and measured as provided for under "Measurement" will be paid for at the unit price bid for "ITS Radio (Install Only)." This price is full compensation for making fully operational an ITS radio furnished by the Department at locations shown on the plans; and all testing, training, software, equipment, labor, materials, tools, and incidentals.
- 6.3. **Relocate.** The work performed and materials furnished in accordance with this Item and measured as provided for under "Measurement" will be paid for at the unit price bid for "Relocate ITS Radio." This price is



full compensation for relocating and making fully operational an existing an ITS radio as shown on the plans; and all testing, training, software, equipment, labor, materials, tools, , and incidentals.

- 6.4. **Remove.** The work performed and materials furnished in accordance with this Item and measured as provided for under "Measurement" will be paid for at the unit price bid for "Remove ITS Radio." This price is full compensation for removing an existing ITS radio as shown on the plans; and all testing, training, software, equipment, labor, materials, tools, and incidentals.

# Special Specification 6083

## Video Imaging and Radar Vehicle Detection System



### 1. DESCRIPTION

This specification sets forth the minimum requirements for a system that detects vehicles on a roadway using a multi-sensor detection system.

The multi-sensor system must utilize 2 different sensors of different technologies, video imaging and radar, to detect and track licensed and unlicensed vehicles at distances up to 600 ft. The sensor system must fuse vehicle information from the 2 sensors to provide highly accurate and precise detection for special or advanced applications.

The multi-sensor system must use a primary detector rack mounted processor to interface with the traffic control cabinet. The module must process information from both video imaging and radar sensors simultaneously in real-time.

- 1.1. **System Configurations.** The multi-sensor detection system (MSDS) must consist of up to 2 video cameras and radar units, detection processors (DP) capable of processing from 1 to 2 intersection approaches, output extension modules, surge suppressors, a setup tool and a pointing device.

- 1.2. **Available System Configurations.** The MSDS will be deployed at locations where site conditions and roadway geometry vary. The MSDS system may also be deployed at locations where existing cabinets or equipment exist. Existing site configurations will dictate the availability of cabinet space and MSDS usage.

The proposed MSDS must be available in various configurations to allow maximum deployment flexibility. Each configuration must have an identical user interface for system setup and configuration. The communications protocol to each configuration must be identical and must be hardware platform independent. The proposed MSDS must have multiple configurations available for deployment in accordance with Table 1.

**Table 1**  
**MSDS Configuration**

Description	No. of Multi-Sensor Inputs	No. Video Outputs	Mounting Configuration	Power Supply Requirements
Single-Channel Rack Mounted	1	1	Rack Mount (Type 170 or NEMA TS-1, TS-2 Racks)	12 or 24 VDC Power from Rack
Dual-Channel Rack Mounted	2	1	Rack Mount (Type 170 or NEMA TS-1, TS-2 Racks)	12 or 24 VDC Power from Rack

- 1.3. **System Software.** The system must include software that detects vehicles in multiple lanes. Video imaging detection zones must be defined using only an on-board video menu and a pointing device to place the zones on a video image. Up to 24 video detection zones per camera view must be available. Two additional trigger zones for the radar sensor must be available and be configurable by using the same system setup menu on the DP. A separate computer must not be required to program the detection zones. A portable setup tool must be available for sensor alignment and adjustment of camera's field of view and focus menu on the DP. A separate computer must not be required to program the detection zones. A portable setup tool must be available for sensor alignment and adjustment of camera's field of view and focus.

### 2. MATERIALS

- 2.1. **Multi-Sensor Detection System Hardware.**

The MSDS hardware must consist of the following 4 elements:

- Video imaging camera sensor
- Radar sensor
- Sensor data combiner
- Detection processor

The MSDS must be made in the U.S.A. in compliance with FTA "Buy America" regulations.

- 2.2. **Video Imaging Camera Sensor.** To accommodate deployment flexibility, the MSDS camera sensor must be compatible with all DP platforms identified in Table 1. The MSDS camera sensor must be supplied by the MSDS manufacturer.

The advanced camera enclosure must utilize Indium Tin Oxide (ITO) technology for the heating element of the front glass. The transparent coating must not impact the visual acuity and must be optically clear.

Cable terminations at the data combiner for video and power must not require crimping or special tools.

The camera sensor must allow the user to set the focus and field of view via Wi-Fi connectivity.

The camera must produce a useable video image of the bodies of vehicles under all roadway lighting conditions, regardless of time of day. The minimum range of scene luminance over which the camera must produce a useable video image must be the minimum range from nighttime to daytime, but not less than the range of 1.0 to 10,000 lux.

The camera electronics must include automatic gain control (AGC) to produce a satisfactory image at night.

The imager luminance signal to noise ratio (S/N) must be more than 50 dB with the automatic gain control (AGC) disabled.

The imager must employ 3 dimensional dynamic noise reduction (3D-DNR) to remove unwanted image noise.

The camera imager must employ wide dynamic range (WDR) technology to compensate for wide dynamic outdoor lighting conditions. The dynamic range must be greater than 100 dB.

The camera must be digital signal processor (DSP) based and must use a CCD sensing element and must output color video with resolution of not less than 550 TV lines.

The camera sensor must include an electronic shutter control based upon average scene luminance and must be equipped with an auto-iris lens that operates in tandem with the electronic shutter. The electronic shutter must operate within the range of 1/1 to 1/10,000th sec.

The camera sensor must utilize automatic white balance.

The camera sensor must include a variable focal length lens with variable focus that can be adjusted, without opening up the camera housing, to suit the site geometry by means of a portable interface device designed for that purpose and manufactured by the detection system supplier.

The horizontal field of view must be adjustable from 4.6° to 53.6°. This camera configuration may be used for the majority of detection approaches in order to minimize the setup time and spares required by the user. The lens must be a 12x zoom lens with a focal length of 3.7 to 44.0 mm.

The lens must also have an auto-focus feature with a manual override to facilitate ease of setup.

The camera must incorporate the use of preset positioning that store zoom and focus positioning information. The camera must have the capability to recall the previously stored preset upon application of power.

The camera must be housed in a weather-tight sealed enclosure conforming to IP-67 specifications. The housing must allow the camera to be rotated to allow proper alignment between the camera and the traveled road surface.

The camera enclosure must be equipped with a sunshield. The sunshield must include a provision for water diversion to prevent water from flowing in the camera's field of view.

The camera enclosure must be design so that the pan, tilt and rotation of the camera assembly can be accomplished independently without affecting the other settings.

The camera enclosure must include a proportionally controlled Indium Tin Oxide heater design that maximizes heat transfer to the lens. The output power of the heater must vary with temperature, to assure proper operation of the lens functions at low temperatures and prevent moisture condensation on the optical faceplate of the enclosure.

The glass face on the front of the enclosure must have an anti-reflective coating to minimize light and image reflections.

When mounted outdoors in the enclosure, the camera must operate in a temperature range from -34°C to +74°C and a humidity range from 0 to 100% RH. Measurement of satisfactory video must be based upon DP system operation.

The camera sensor must acquire its power from the sensor data combiner.

Recommended camera placement height must be between 18 and 33 ft. (or 6 and 10 m) above the roadway, and over the traveled way on which vehicles are to be detected. For optimum detection the camera must be centered above the traveled roadway. The camera must view approaching vehicles at a distance not to exceed 350 ft. for reliable detection (height to distance ratio of 10:100). Camera placement and field of view (FOV) must be unobstructed and as noted in the installation documentation provided by the supplier.

The video signal must be fully isolated from the camera enclosure and power cabling

A weather-proof protective cover must be provided to protect all terminations at the camera.

2.3. **Radar Sensor.** The radar sensor must operate in the 24 GHz frequency band and must operate on 1 of 7 available enumerated channels that is user selectable.

The radar detection range must be 600 ft. minimum, +/- 5%.

The radar sensor must be able to track up to 20 independent objects simultaneously.

Object speed detection must be within the range of 0 and 150 mph +/- 1.0 mph.

The radar sensor must be able to detect vehicles in 1 to 4 traffic lanes.

The radar sensor must be housed in a weather-tight sealed enclosure conforming to IP-67 specifications. The housing must allow the radar to be adjusted to allow proper alignment between the sensor and the traveled road surface.

When mounted outdoors in the enclosure, the radar must operate in a temperature range of -34°C to +74°C and a humidity range from 0 to 100% RH.

The radar sensor must communicate with the sensor data combiner.

The radar sensor must acquire its power from the sensor data combiner.

- 2.4. **Multi-Sensor Assembly.** Both camera and radar sensors must be housed in an overall, single enclosure assembly.
- The overall size of the multi-sensor enclosure must not exceed 14 in. x 15 in. x 17 in.
- The overall weight of the multi-sensor unit must not exceed 11 lb.
- The effective projected area (EPA) must not exceed 2.0 sq. ft.
- The maximum power consumption for the multi-sensor assembly must be less than 10W typical, 20W peak.
- 2.5. **Sensor Data Combiner.** A sensor data combiner that combines sensor information from both video and radar sensors must be employed.
- The sensor data combiner must supply primary power to each sensor unit.
- The sensor data combiner must facilitate digital communications between the sensor data combiner and each of the sensor units.
- The sensor data combiner must get its primary power from an AC power source using industry standard 3-conductor cabling.
- The sensor data combiner must communicate with the detection processor using a single coax cable. Both video imaging and radar data must use the single coax cable.
- The sensor data combiner must also employ industry standard Wi-Fi connectivity for remote sensor system setup using a mobile programming device such as a netbook or tablet computer. Video camera and radar sensor must be able to be configured independently.
- The sensor data signal must be fully isolated from the mechanical enclosure and power cabling.
- Cable terminations at the sensor data combiner must not require crimping tools.
- The sensor data combiner must be housed in a weather-tight sealed enclosure conforming to IP-67 specifications.
- 2.6. **Detection Processor (DP).** Each sensor input must accept RS170 (NTSC) or CCIR (PAL) signals from an external video source. The interface connector must be BNC type and must be located on the front of the processing unit. The sensor input must have the capability to be terminated into 75 ohms or high impedance (Hi-Z) using dip switches or software control from the user menu. The sensor input must also facilitate the data from the radar sensor.
- A LED indicator must be provided to indicate the presence of the sensor signal. The LED must illuminate upon valid sensor synchronization and turn off when the presence of a valid sensor signal is removed.
- One video output must be provided. The video output must be RS170 or CCIR compliant and must pass through the input video signal.
- For multi-channel video input configurations, a momentary push-button must be provided on the front panel to cycle through each input video channel. In the absence of a valid sensor signal, the channel must be skipped and the next valid sensor signal must be switched. The real time video output must have the capability to show text and graphical overlays to aid in system setup. The overlays must display real-time actuation of detection zones upon vehicle detection or presence. Overlays must be able to be turned off by the user. Control of the overlays and sensor switching must also be provided through the serial communications port. The video output interface connector must be positive locking BNC type. Friction type (e.g. RCA type) connectors must not be allowed.

A serial communications port must be provided on the front panel. The serial port must be compliant with EIA232 electrical interfaces and must use a DB9 type connector mounted on the front panel of the DP. The serial communications interface must allow the user to remotely configure the system and to extract calculated vehicle and roadway information. The interface protocol must be documented or interface software must be provided. The interface protocol must support multi-drop or point-to-multipoint communications. Each MSDS must have the capability to be addressable. The DP must support data rates of 1200 to 230,400 bps, inclusive.

Open collector (contact closure) outputs must be provided. Four open collector outputs must be provided for the single or dual channel rack-mount configuration. Additionally, the DP must allow the use of extension modules to provide up to 24 open collector contact closures per camera input. Each open collector output must be capable of sinking 30 mA at 24 VDC. Open collector outputs will be used for vehicle detection indicators as well as discrete outputs for alarm conditions. The DP outputs must be compatible with industry standard detector racks assignments.

Logic inputs such as delay/extend or delay inhibit must be supported through the appropriate detector rack connector pin or front panel connector in the case of the I/O module. For DPs and extension modules, 4 inputs must be supported via detector rack interface. The I/O module must accommodate 8 inputs through a 15-pin "D" connector.

Detection status LEDs must be provided on the front panel. The LEDs must illuminate when a contact closure output occurs. Rack-mounted detection processors must have a minimum of 4 LEDs. Rack-mounted extension modules must have 2, 4 or 8 LEDs (depending upon extension module type) to indicate detection.

The front panel of the DP must have detector test switches to allow the user to manually place calls on each DP output channel. The test switch must be able to place either a constant call or a momentary call depending on the position of the switch.

A USB mouse port must be provided on the front panel of the rack mount detection processing unit. The mouse port must not require special mouse software drivers. The mouse port must be used as part of system setup and configuration. A mouse must be provided with each detection processor.

Extension modules must be connected to the DP by an 8-wire twisted-pair cable with modular RJ45 connectors. DP and EM communications must be accommodated by methods using differential signals to reject electrically coupled noise.

Extension modules (EM) must be available to eliminate the need of rewiring the detector rack, by enabling the user to plug an extension module into the appropriate slot in the detector rack to provide additional open collector outputs. The extension module must be available in both 2 and 4 channel configurations. EM configurations must be programmable from the DP. A separate I/O module with 32 outputs through a 37-pin "D" connector on the front panel and 8 inputs through a 15-pin "D" connector using an external wire harness for expanded flexibility must also be available.

The DP and EM must be specifically designed to mount in a standard detector rack, using the edge connector to obtain power, provide contact closure outputs and accept logic inputs (e.g. delay, extend). No adapters must be required to mount the DP or EM in a standard detector rack. Detector rack rewiring must not be required.

The DP must utilize non-volatile memory technology to store on-board firmware and operational data.

The DP must enable the loading of modified or enhanced software through the EIA232 or USB port (using a USB thumb drive) and without modifying the DP hardware.

The DP and EM must be powered by 12 or 24 VDC. DP and EM modules must automatically compensate for either 12 or 24 VDC operation. DP power consumption must not exceed 7.5W. The EM power consumption must not exceed 3W.

The DP must operate satisfactorily in a temperature range from -34°C to +74°C and a humidity range from 0 to 95% RH, non-condensing as set forth in NEMA specifications.

An Edco CX-06M video surge suppresser must be provided for each sensor input. The surge suppresser must be appropriately grounded to the cabinet ground rod using 14 AWG minimum.

2.7.

**System Software.** Detection zones must be programmed via an on board menu displayed on a video monitor and a pointing device connected to the DP. The menu must facilitate placement of detection zones and setting of zone parameters or to view system parameters. A separate computer must not be required for programming detection zones or to view system operation.

The DP must store up to 3 different detection zone patterns in non-volatile memory. The DP can switch to any one of the 3 different detection patterns within 1 sec. of user request via menu selection with the pointing device. Each configuration must be uniquely labeled and able to be edited by the user for identification. The currently active configuration indicator must be displayed on the monitor.

The DP must detect vehicles in real time as they travel across each detection zone.

The DP must accept new detection patterns from an external computer through the EIA232 port when the external computer uses the correct communications protocol for downloading detection patterns. A Windows™-based software designed for local or remote connection and providing video capture, real-time detection indication and detection zone modification capability must be provided with the system.

The DP system must have the capability to automatically switch to any one of the stored configurations based on the time of day which must be programmable by the user.

The DP must send its detection patterns to an external computer through the EIA232 port when requested when the external computer uses the appropriate communications protocol for uploading detection patterns.

The DP must default to a safe condition, such as a constant call on each active detection channel, in the event of unacceptable interference or loss of the sensor signal.

The system must be capable of automatically detecting a low-visibility condition such as fog and respond by placing all effected detection zones in a constant call mode. A user-selected alarm output must be active during the low-visibility condition that can be used to modify the controller operation if connected to the appropriate controller input modifier(s). The system must automatically revert to normal detection mode when the low-visibility condition no longer exists.

Up to 24 detection zones per camera input must be supported and each detection zone can be sized to suit the site and the desired vehicle detection region.

The DP must support 2 independent trigger points for radar outputs for dilemma zone applications.

The DP must provide up to 24 open collector output channels per sensor input using one or more extension modules.

A single detection zone must be able to replace multiple inductive loops and the detection zones must be OR'ed as the default or may be AND'ed together to indicate vehicle presence on a single approach of traffic movement.

Placement of detection zones must be done by using only a pointing device, and a graphical interface built into the DP and displayed on a video monitor, to draw the detection zones on the video image from each video camera. No separate computer must be required to program the detection zones.

When a vehicle is detected within a detection zone, a visual indication of the detection must activate on the video overlay display to confirm the detection of the vehicle for the zone.

Detection must be at least 98% accurate in good weather conditions, with slight degradation possible under adverse weather conditions (e.g. rain, snow, or fog) which reduce visibility.

Detection accuracy is dependent upon site geometry, camera placement, camera quality and detection zone location, and these accuracy levels do not include allowances for occlusion or poor video due to camera location or quality.

The DP must provide dynamic zone reconfiguration (DZR). DZR enables normal operation of existing detection zones when one zone is being added or modified during the setup process. The new zone configuration must not go into effect until the configuration is saved by the operator.

Detection zone setup must not require site specific information such as latitude and longitude to be entered into the system.

The DP must process the video input from each camera at 30 frames per second. Multiple camera processors must process all video inputs simultaneously.

The DP must output a constant call during the background learning period of no more than 3 min.

Detection zone outputs must be configurable to allow the selection of presence, pulse, extend, and delay outputs. Timing parameters of pulse, extend, and delay outputs must be user definable between 0.1 to 25 sec.

Up to 6 video detection zones per sensor input must have the capability to count the number of vehicles detected. The count value must be internally stored for later retrieval through the EIA232 port. The zone must also have the capability to calculate and store average speed and lane occupancy at bin intervals of 10 sec., 20 sec., 1 min., 5 min., 15 min., 30 min. and 60 min. One radar sensor zone must also count vehicles, calculate, and store the average speed and lane occupancy across the approach.

In addition to the count type zone, the DP must be able to calculate and/or acquire average speed and lane occupancy using both video and radar sensors. These values must be stored in non-volatile memory for later retrieval.

The DP must have an "advance" zone type where detection outputs to the traffic controller is compensated for angular occlusion and distance.

The DP must employ color overlays on the video output.

The DP must have the ability to show phase status (green, yellow, or red) for up to 8 phases. These indications must also be color coded.

The user must have the ability to enable or disable the display of the phase information on the video output.

The DP must have the capability to change the characteristics of a detection zone based on external inputs such as signal phase. Each detection zone must be able to switch from one zone type (i.e. presence, extension, pulse, etc.) to another zone type based on the signal state. For example, a zone may be a "count" zone when the phase is green but change to a "presence" zone type when the phase is not green.

Another application would be zone type of "extension" when the signal phase is green and then "delay" when red.

For alpha numeric user inputs, the DP must utilize a virtual keyboard on the video overlay system to ease user input. The virtual keyboard must use the standard QWERTY keyboard layout.

The DP must aid the user in drawing additional detection zones by automatically drawing and placing zones at appropriate locations with only a single click of the mouse. The additional zone must utilize geometric



extrapolation of the parent zone when creating the child zone. The process must also automatically accommodate lane marking angles and zone overlaps.

When the user wishes to modify the location of a zone, the DP must allow the user move a single zone, multiple zones or all zones simultaneously.

When the user wishes to modify the geometric shape of the zone, the DP must allow the user to change the shape by moving the zone corner or zone sides.

On screen zone identifiers must be modifiable by the user. The user must be allowed to select channel output assignments, zone type, input status, zone labels or zone numbers to be the identifier.

For multiple camera input DPs, the user must have the ability to enable automatic video output switching. The dwell time for each sensor input must be user programmable.

For radar sensor zones, the output can be triggered by presence of a vehicle only or by presence of a vehicle above a user-defined speed threshold.

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### 3. CONSTRUCTION

The coaxial cable to be used between the multi-sensor assembly and the DP in the traffic cabinet must be Belden 8281. This cable must be suitable for installation in conduit or overhead with appropriate span wire. BNC plug connectors must be used where applicable. The coaxial cable, BNC connector, and crimping tool must be approved by the supplier of the MSDS, and the manufacturer's instructions must be followed to ensure proper connection.

The power cabling must be 16 AWG three-conductor cable with a minimum outside diameter of 0.325 in. and a maximum diameter of 0.490 in. The cabling must comply with the National Electric Code, as well as local electrical codes. Cameras may acquire power from the luminaire if necessary.

The MSDS must be installed by factory-certified installers as recommended by the supplier and documented in installation materials provided by the supplier. Proof of factory certification must be provided.

#### 3.1. Testing.

The installed assembly will be field tested prior to being placed into service to ensure all components are functioning as described herein.

The supplier must provide a limited 5 yr. warranty on the MSDS. During the warranty period, technical support must be available from the supplier via telephone within 4 hr. of the time a call is made by a user, and this support must be available from factory-certified personnel or factory-certified installers. During the warranty period, updates to DP software must be available from the supplier without charge.

The supplier must maintain an adequate inventory of parts to support maintenance and repair of the MSDS. These parts must be available for delivery within 30 days of placement of an acceptable order at the supplier's then current pricing and terms of sale for said parts.

The supplier must maintain an ongoing program of technical support for the MSDS. This technical support must be available via telephone, or via personnel sent to the installation site upon placement of an acceptable order at the supplier's then current pricing and terms of sale for onsite technical support services.

Installation or training support must be provided by a factory-authorized representative and must be a minimum IMSA-Level II Traffic Signal Technician certified.

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**4. MEASUREMENT**

This Item will be measured by each unit shown in the plans furnished, installed, made fully operational, and tested in accordance with this special specification or as directed.

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**5. PAYMENT**

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Video Imaging and Radar Vehicle Detection System." This price will be full compensation for furnishing, installing, internal electrical conductors, connectors and mounting hardware; and for all labor, tools, equipment, testing documentation and incidentals necessary to complete the work.

# Special Specification 6146

## Bluetooth Reader



### 1. DESCRIPTION

Transport, install and test Department-furnished Bluetooth Readers in designated enclosures as shown on the plans, as detailed in this Item, and as directed.

### 2. MATERIALS

Provide all materials not supplied by the Department necessary for the Bluetooth Reader installation. All materials provided by the Contractor must be new. Provide a minimum of 30-day's notice to the Department for pick-up of Department-furnished materials. Unless otherwise shown on the plans, Bluetooth Readers will be stored by the Department for pick up at location identified by the Engineer. Designate in writing, persons authorized to pick up Bluetooth readers units.

Upon completion of work and prior to final payment, return any unused or removed material deemed salvageable to the Department as directed.

Furnish, assemble, fabricate, and install materials under this Item in strict accordance with the details shown on the plans and in the specifications. All materials provided by the Contractor must be new and resistant to corrosion, moisture deterioration, and ultraviolet rays.

Ensure that all materials and construction methods necessary to complete the installation conform to the requirements of this Item, the plans and the pertinent requirements of the following Items:

- Item 618, "Conduit,"
- Item 620, "Electrical Conductors", and
- Special Specification 6005, Testing, "Training, Documentation, Final Acceptance and Warranty"

### 3. CONSTRUCTION

3.1. **Installation.** Install and make operational, the Bluetooth reader, antenna, and all associated components in equipment cabinets as shown on the plans.

3.2. **Working Drawings.** Prior to fabrication, submit for approval 5 prints of the working drawings for attachment of each Bluetooth Reader. Show the details of any additional brackets, connections, and methods of attachment.

3.3. **Testing.** Conduct testing in accordance with the Special Specification 6005, "Testing, Training, Documentation, Final Acceptance and Warranty." Furnish readers meeting the requirements included in the specifications when subjected to the following test procedures:

- 10 Trial Vehicle Runs;
- Sites connected to AWAM host software server to verify recordings;
- Vehicles used for testing will have 2 Bluetooth devices with discovery mode enabled. Record MAC addresses at the host software server before starting the test.
- Compute passing percentage using the following formula to find a weighted average percentage:
- $((\text{Total Positive Readings from the Antenna Runs } (n)) / \text{Total Runs } (T)) \times 100.$

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**4. MEASUREMENT**

This Item will be measured as each Bluetooth Reader installed, tested and made operational.

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**5. PAYMENT**

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Installation of Bluetooth Reader". This price is full compensation for installation of Bluetooth Reader; furnishing and installing any new mounting hardware; testing the Bluetooth Reader; replacement or repair of damaged components; disposal of unsalvageable material; and for all manipulations, labor, tools, working drawings, equipment and incidentals.

# Special Specification 6185

## Truck Mounted Attenuator (TMA) and Trailer Attenuator (TA)




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### 1. DESCRIPTION

Furnish, operate, maintain and remove upon completion of work, Truck Mounted Attenuator (TMA) or Trailer Attenuator (TA).

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### 2. MATERIALS

Furnish, operate and maintain new or used TMAs or TAs. Assure used attenuators are in good working condition and are approved for use. A list of approved TMA/TA units can be found in the Department's Compliant Work Zone Traffic Control Devices List. The host vehicle for the TMA and TA must weigh a minimum of 19,000 lbs. Host vehicles may be ballasted to achieve the required weight. Any weight added to the host vehicle must be properly attached or contained within it so that it does not present a hazard and that proper energy dissipation occurs if the attenuator is impacted from behind by a large truck. The weight of a TA will not be considered in the weight of the host vehicle but the weight of a TMA may be included in the weight of the host vehicle. Upon request, provide either a manufacturer's curb weight or a certified scales weight ticket to the Engineer.

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### 3. CONSTRUCTION

Place or relocate TMA/TAs as shown on the plans or as directed. The plans will show the number of TMA/TAs needed, for how many days or hours, and for which construction phases.

Maintain the TMA/TAs in good working condition. Replace damaged TMA/TAs as soon as possible.

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### 4. MEASUREMENT

4.1. **Truck Mounted Attenuator/Trailer Attenuator (Stationary).** This Item will be measured by the each or by the day. TMA/TAs must be set up in a work area and operational before a calendar day can be considered measurable. When measurement by the day is specified, a day will be measured for each TMA/TA set up and operational on the worksite.

4.2. **Truck Mounted Attenuator/Trailer Attenuator (Mobile Operation).** This Item will be measured by the hour. The time begins once the TMA/TA is ready for operation at the predetermined site and stops when notified by the Engineer. A minimum of 4 hr. will be paid each day for each operating TMA/TA used in a mobile operation.

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### 5. PAYMENT

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Truck Mounted Attenuators/Trailer Attenuators (Stationary)," or "Truck Mounted Attenuators/Trailer Attenuators (Mobile Operation)." This price is full compensation for furnishing TMA/TA: set up; relocating; removing; operating; fuel; and equipment, materials, tools, labor, and incidentals.

# Special Specification 6350

## Dynamic LED Curve Warning System



### 1. DESCRIPTION

Fabricate, furnish and erect dynamic curve warning system consisting of chevron signs with light emitting diode (LED) lights integrated in the system, solar panels for each sign, radar detection for each approach, communication transmitters and receivers. Dynamic curve warning system function is to warn and guide motorists through a curve once activated with radar by directing the chevrons to flash sequentially.

### 2. MATERIALS

Furnish and construct materials in accordance with the following:

- Item 636, "Signs"
- Item 644, "Small Roadside Sign Supports and Assemblies"

Provide signs that meet TMUTCD W1-8R(L) or W1-2R(L). Provide sign substrate that is a minimum 0.080 5052 alloy highway grade aluminum. Provide Type B<sub>FL</sub> or Type C<sub>FL</sub> reflective sheeting on all chevron signs. Provide signs with integrated LED lights. LEDs within the signs must be wired in a manner (parallel) that all LEDs continue to flash in the event of failure of an individual LED. Sign will output 550,000 millicandelas at daytime peak ensuring sign is daylight visible. Provide LEDs that have dimming capabilities and automatically adjust flash brightness to varying light conditions. Ensure that each system comes with 1 transmitter and additional receivers for each additional chevron. Ensure that communication between devices on a curve occurs wirelessly. Transmitter will be included with the Lead LED sign. Ensure the system works with either solar power or electrical service. Unless otherwise noted, system will be provided with solar panels by the manufacturer. Provide solar panels sized to allow system to work as needed 24/7 based on the 20 yr. projected traffic count of the facility. Unless otherwise noted, batteries will be provided by the manufacturer, and should be installed in a box mounted on a pole underneath the solar panel.

Provide a curve warning system capable of being monitored and controlled through a web based system. Ensure the system allows for management of device settings (such as solar and battery output and wireless signal), schedules (flash durations), and impact detection (# of activations and optional alerts via text or email if system is triggered and/or down).

### 3. CONSTRUCTION

Install sign posts in accordance to Item 644, "Small Roadside Sign Supports and Assemblies."

- 3.1. **Vehicle speed sensor activation.** Mount a low power draw digital signal processing based radar on the lead LED chevron in the curve warning system. Ensure curve warning system is capable of detecting a compact vehicle within 300 ft. of the chevron. Ensure the radar activates the LED system and wirelessly signals the LED chevrons in the curve to sequentially turn on. House the radar and transmitter in a control box mounted on the Lead LED chevron. LED chevrons in the system can flash in unison or sequentially depending on how the system is configured and flash duration is predetermined. The radar must provide real time vehicle detection (within 112 milliseconds of vehicle arrival).

Install each chevron sign as shown on plans and in accordance with D&OM (3).

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**4. WARRANTY**

The system as a whole will have a minimum 2 yr. warranty from the time of installation and acceptance of the system. Batteries must have a 5 yr. lifespan while operating 24/7. LED will operate at least 100,000 hours. Manufacturer will ship replacement parts at no cost as required during 2 yr. warranty period, except when installation has been damaged by outside forces.

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**5. MEASUREMENT**

This Item will be measured by each LED chevron or lead LED chevron. Each lead LED chevron must have a transmitter that will communicate with other chevron signs in the curve. Each chevron will have a receiver and will be paid for separately as each "LED Chevron." The Lead LED chevron will have the vehicle speed sensor. The Lead LED chevron will be paid for separately as each "Lead LED chevron."

Lead LED chevron will include cost of web-based device monitoring and control software. Software provides automated data analysis and reporting. Software also allows for data upload, incident detection, trend analysis, historic reviews, and interactive map with all similar devices.

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**6. PAYMENT**

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bids for "LED Chevron" and "Lead LED Chevron."

This price is full compensation for furnishing and installing complete LED chevrons/lead LED chevrons including sign connections and all hardware; attaching chevrons to the supports; washing and cleaning the chevrons; and equipment, materials, labor, tools, and incidentals. The price also includes testing of the LED curve warning system and making adjustments as needed. Price is full compensation for installing solar panels to ensure optimal recharging of batteries, solar powered batteries, solar powered batteries, interconnecting chevrons/lead chevrons so transmitter and receivers communicate with each other, to the satisfaction of the Engineer. A minimum of one day (8 hr.) of on-site training is included to train employees on setup of system, software installation, software control, and set up of alert notifications.

Installation of sign post and foundations will be paid for under Item 644, "Small Roadside Sign Supports and Assemblies."

# Special Specification 6438

## Mobile Retroreflectivity Data Collection for Pavement Markings



### 1. DESCRIPTION

Furnish mobile retroreflectivity data collection (MRDC) for pavement markings on roadways as shown on the plans or as designated by the Engineer. Conduct MRDC on dry pavement only. Provider is defined as the Contractor or Subcontractor who collects the MRDC data.

### 2. EQUIPMENT AND PERSONNEL

- 2.1. **Mobile Retroreflectometer.** Provide a self-propelled, mobile retroreflectometer certified by the Texas A&M Transportation Institute (TTI) Mobile Retroreflectometer Certification Program.
- 2.2. **Portable Retroreflectometer.** Provide a portable retroreflectometer that uses 30-meter geometry meeting the requirements described in ASTM E 1710. Maintain, service, and calibrate all portable retroreflectometers according to the manufacturer's instructions.
- 2.3. **Operating Personnel for Mobile Retroreflectometer.** Provide all personnel required to operate the mobile retroreflectometer and portable retroreflectometer. Ensure MRDC system operator has a current certification from the TTI Mobile Retroreflectometer Certification Program to conduct MRDC with the certified mobile retroreflectometer provided.
- 2.4. **Additional Personnel.** Provide any other personnel necessary to compile, evaluate, and submit MRDC.
- 2.5. **Safety Equipment.** Supply and operate all required safety equipment to perform this service.

### 3. MRDC DOCUMENTATION AND TESTING

Document all MRDC by county and roadway or as directed by the Engineer. Submit all data to the Department and to the TTI Mobile Retroreflectometer Certification Program no later than three working days after the day the data is collected. Submit all raw data collected in addition to all other data submitted. Provide data files in Microsoft Excel format or a format approved by the Engineer. Provide measurement notification and field tests as specified. Verification and referee testing may be conducted at the Department's discretion.

- 3.1. **Preliminary Documentation Sample.** Submit a sample data file, video, and map of MRDC data in the required format 10 working days before beginning any work. The format must meet specification and be approved by the Engineer before any work may begin.
- 3.2. **Initial Documentation Review and Approval.** The Department will review documentation submitted for the first day of MRDC, and if it does not meet specification requirements, will not allow further MRDC until deficiencies are corrected. The Department will inform the Provider no later than three working days after submittal if the first day of MRDC does not meet specification requirements. Time charges will continue unless otherwise directed by the Engineer.
- 3.3. **Data File.** Provide data files with the following:
  - date;
  - district number;



- county;
- Project CSJ number;
- name of mobile retroreflector operator;
- route number with reference markers or other reference information provided by the Engineer to indicate the location of beginning and end data collection points on that roadway;
- cardinal direction;
- line type (single solid, single broken, double solid, etc.);
- line color;
- file name corresponding to video;
- data for each centerline listed separately;
- average reading taken for each 0.1-mi. interval (or interval designated by the Engineer);
- accurate GPS coordinates (within 20 ft.) for each interval;
- color-coding for each interval indicating passing or failing, unless otherwise directed by the Engineer (passing and failing thresholds provided by the Engineer);
- graphical representation of the MRDC (y-axis showing retroreflectivity and x-axis showing intervals) corresponding with each data file;
- distance in miles driven while measuring the pavement markings;
- event codes (pre-approved by the Engineer) indicating problems with measurement;
- portable retroreflector field check average reading and corresponding mobile average reading for that interval when applicable; and
- upper validation threshold (may be included separately with the raw data but must be clearly identified with the data collected using that threshold).

3.4. **Map.** Provide a map in an electronic format approved by the Engineer with each MRDC submission that includes the following information:

- date;
- district number;
- county;
- color-coded 1-mi. intervals (or interval length designated by the Engineer) for passing and failing retroreflectivity values or retroreflectivity threshold values provided by the Engineer; and
- percentage of passing and failing intervals, if required by the Engineer.

3.5. **Video.** Provide a high-quality DVD or electronic video file with the following information:

- date and corresponding data file name on label;
- district number;
- county;
- route number with reference markers or other designated reference information to indicate the location of beginning and end collection points on that roadway; and
- retroreflectivity values presented on the same screen with the following information:
  - date;
  - location;
  - starting and ending mileage;
  - total miles;
  - retroreflectivity readings; and
  - upper validation thresholds (may be included separately with the raw data but must be clearly identified with the data collected using that threshold).

3.6. **Field Comparison Checks with a Portable Retroreflector.** Take a set of field comparison readings with the portable retroreflector at least once every 4 hr. while conducting MRDC or at the frequency designated by the Engineer. Take a minimum of 20 readings, spread out over the interval measured. List the average portable retroreflector reading next to the mobile average reading for that interval with the

reported MRDC data. Request approval from the Engineer to take field comparison readings on a separate roadway, when measuring a roadway where portable retroreflector readings are difficult to take. Take the off-location field comparison readings at no additional cost. Submit the portable retroreflector printout of all the readings taken for the field comparison check with the corresponding MRDC data submitted. The mobile average reading must be within  $\pm 15\%$  of the portable average reading. The Engineer may require new MRDC for some or all of the pavement markings measured in a 4-hr. interval before a field comparison check not meeting the  $\pm 15\%$  range. Provide the new MRDC at no extra cost to the Department. The Engineer may take readings with a Department portable retroreflector to ensure accuracy at any time. The Department's Materials and Tests Division (MTD) will take comparison readings and serve as the referee if there is a significant difference between the Engineer's portable readings and the Provider's mobile and handheld readings. For best results, take field comparison readings on a fairly flat and straight roadway when possible.

- 3.7. **Periodic Field Checks at Pre-Measured Locations.** When requested by the Engineer, measure with the mobile unit and report to the Engineer immediately after measurement the average retroreflectivity values for a designated pre-measured test location. The Engineer will have taken measurements at the test location within 10 days of the test. The test location will not include pavement markings less than 30 days old. If the measured averages do not fall within  $\pm 15\%$  of the pre-measured averages, further calibration and comparison measurements may be required before any further MRDC. Submit the results of the field check with the MRDC report for that day.
- 3.8. **Measurement Notification.** Provide notification via email to [Mobileretro@tamu.edu](mailto:Mobileretro@tamu.edu) with a carbon copy to the Engineer a minimum of 24 hr. before mobile retroreflectivity data collection to allow for scheduling verification testing when needed.
- 3.9. **Verification Testing.** The Engineer or a third party may perform retroreflectivity verification testing within seven days of the Provider's retroreflectivity readings. The Provider-submitted retroreflectivity data will be compared to the verification test data to determine acceptability of the Provider's mobile retroreflector data. Comparison of the data will result in one of the two scenarios below:
- Provider's Data is Validated – if the difference between Provider's and Engineer-third party data is 20% or less, then the Provider's data is validated. The Provider's data will be used for acceptance.
  - Provider's Data is not Validated – if the difference between Provider's and Engineer-third party data is more than 20%, then the Provider's data is not validated. The Engineer-third party data will be used for acceptance and the Provider will be required to take corrective action before additional Provider data collection and may require re-certification of the mobile retroreflector. If the Engineer determines that the Provider's data might be correct then, referee testing may be requested by the Engineer.
- 3.10. **Referee Testing.** MTD will perform referee testing using portable retroreflectometers to determine if the markings need to be restriped to meet the required retroreflectivity level. The referee test results will be final. Referee testing will be conducted on the verification test sections using the method for portable retroreflectometers specified in Item 666, "Reflectorized Pavement Markings."

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#### 4. FINAL REPORT

Submit a final report in the format specified by the Engineer to the Department's Traffic Engineering representative within one calendar week after the service is complete. The final report must contain a list of all problems encountered (pre-approved event codes) and the locations where problems occurred during MRDC.

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#### 5. MEASUREMENT

When mobile retroreflectivity data collection for pavement markings is specified on the plans to be a pay item, measurement will be by the mile driven while measuring pavement markings.

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**6. PAYMENT**

Unless otherwise specified on the plans, the work performed, materials furnished, equipment, labor, tools, and incidentals will not be paid for directly, but will be considered subsidiary to bid items of the Contract. When mobile retroreflectivity data collection for pavement markings is specified on the plans to be a pay item, the work performed in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Mobile Retroreflectivity Data Collection." This price is full compensation for providing summaries of readings to the Engineer, equipment calibration and prequalification, equipment, labor, tools, and incidentals.

# Special Specification 6498

## Solar-Powered LED Roadway Luminaire Assemblies



### 1. DESCRIPTION

Furnish, fabricate, and install solar-powered light-emitting diode (LED) roadway luminaire assemblies.

### 2. MATERIALS

Provide new materials as shown on the plans and in accordance with this Item and the following Items:

- Item 416, "Drilled Shaft Foundations"
- Item 421, "Hydraulic Cement Concrete"
- Item 441, "Steel Structures"
- Item 442, "Metal for Structures"
- Item 445, "Galvanizing"
- Item 449, "Anchor Bolts"
- Item 610, "Roadway Illumination Assemblies"
- Item 616, "Performance Testing of Lighting Systems"
- Item 618, "Conduit"
- Item 620, "Electrical Conductors."

- 2.1. **Light-Emitting Diode (LED) Fixtures.** Furnish light fixtures from new materials. Provide roadway luminaire consisting of a housing, LED light source, and power supply and driver. Power supply and driver may be located with the solar charge controller.

Provide a two-bolt or four-bolt slip-fitter mount capable of clamping on a nominal 2-in. pipe tenon. Slip-fitter mount must allow at least 4 in. of the pole bracket to be inserted into the luminaire-mounting assembly. The slip-fitter mount must be capable of leveling the luminaire horizontally ( $\pm 3^\circ$ ).

Provide luminaire capable of operating in a temperature range of  $-40^\circ\text{C}$ – $60^\circ\text{C}$  (approximately  $-40^\circ\text{F}$ – $140^\circ\text{F}$ ).

Luminaire must be suitable for use in wet conditions. Each luminaire must have an International Electrotechnical Commission 529 ingress protection (IP) rating of IP 66 or greater.

Provide heavy-duty cast aluminum housing. Housing must be designed to allow water shedding. All hardware on the exterior of the housing, including cover, latch, and exposed hinge parts, must be of a non-corrosive material such as stainless steel, zinc, or steel with zinc alloy electroplate and chromate topcoat.

Provide gaskets capable of filtering and sealing the fixture, and capable of withstanding the temperatures created by the luminaire.

Provide luminaire designed to withstand mechanical shock and vibration from high winds and other sources. Luminaires must be certified to withstand a 3G vibration test in accordance with IEEE C 136.31.

Provide a nominal corrected color temperature range of 4000K in accordance with NEMA C 78.377. The color-rendering index must be 70 or greater.

Provide luminaire with IESNA Type II distribution and at least 7,000 lumens. All LEDs must provide the same optical pattern such that catastrophic failures of individual LEDs will not constitute loss in the distribution pattern. Submit photometric data in IESNA format to the project manager for approval.

- 2.2. **Solar Panels.** Provide monocrystalline solar panels with 21% minimum efficiency to support the operation of solar lighting as shown on the plans. Solar panel EPA must meet the pole capacity.
- 2.3. **Solar Controller.** Provide controller capable of powering fixtures an entire night, from dusk to dawn.
- 2.4. **Batteries.** Provide sealed Gel, Absorbent Glass Mat, or LiPePO4 batteries with 5-yr. warranty. Wet spillable lead acid is not acceptable. Battery terminals must be IP-68 rated screw-type connectors and use fire-retardant material to UL94-V0. Provide system with 5-day autonomy to ensure reliable year-round system performance. Three nights of battery storage must be at least 100% lumens all night, from dusk to dawn. Number of batteries must support the circuit design.
- 2.5. **Battery Box and Battery Box Mount.** Provide NEMA 3R-rated battery box. The box may be aluminum or stainless-steel natural finish as shown on the plans. The battery box must be mounted at a height supported by the pole design and as shown on the plans. Battery box EPA must meet the pole capacity.
- 2.6. **Pole.** Provide 40-ft. pole with 10-ft. arm as shown on the plans in accordance with Item 610 and in conformance with the Roadway Illumination Poles standards.

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### 3. CONSTRUCTION

Perform work as shown on the plans and in accordance with this Item. Permanently mark roadway illumination pole base plates, at a visible location when erected, with the fabrication plant's insignia or trademark.

Use established industry and utility safety practices when installing, relocating, or removing poles or luminaires located near overhead or underground utilities. Consult with the appropriate utility company before beginning work.

Prevent scarring or marring of the poles, luminaire arms, and luminaires. Replace damaged components. Repair damaged galvanizing in accordance with Section 445.3.5., "Repairs." Repair damaged painted areas of a roadway illumination assembly in accordance with Item 441 or Item 445.

Stake, install, and align each solar LED roadway illumination assembly as shown on the plans.

The Engineer may shift an assembly's location, if necessary, to secure a more desirable location or avoid conflict with utilities.

Construct foundations for roadway illumination assemblies in accordance with Item 416 and as shown on the plans.

- 3.1. **Installation.** Furnish and install roadway illumination assembly components as shown on the plans. Do not use screw-in type foundations. Install anchor bolts and coat anchor bolt threads in accordance with Item 449. Erect structures after foundation concrete has attained its design strength as shown on the plans and in accordance with Item 421. Tighten anchor bolts for poles with shoe bases and concrete traffic barrier base poles in accordance with Item 449. Do not place grout between base plate and foundation. Test installed solar LED roadway illumination assemblies in accordance with Item 616.

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### 4. WARRANTY

The entire solar-powered lighting system, including materials, workmanship, photometrics, and labor, must have a minimum 5-yr. warranty on all system components from the date of acceptance.

The solar power lighting system must be free of defects in materials and workmanship and be in conformance with its specifications. The warranty commences 2 weeks from the date of invoice. During the warranty period, the manufacturer must provide repair and exchange service without charge (including freight). If a product does not function as warranted during the warranty period and the manufacturer is unable to either make it do so or replace it with one that is at least functionally equivalent, customer may return it for a refund less shipping and handling costs.

The LED solar-powered lighting system manufacturer must guarantee the purchaser that the lighting system will be free of defects in materials and workmanship. Manufacturer-repair or replace the system product that is defective within the stated warranty period.

## **5. MEASUREMENT**

This Item will be measured as each solar-powered LED roadway luminaire assembly installed.

## **6. PAYMENT**

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Solar LED Roadway Illumination Assembly" of the types specified.

This price is full compensation for furnishing, installing, and testing LED luminaires and solar assemblies; luminaire arms, brackets, poles, anchor bolt assemblies, templates, internal conductors, and connections; conducting system performance testing; and materials, equipment, labor, tools, and incidentals.

New drilled shaft foundations will be paid for under Item 416. New concrete riprap placed around foundations will be paid for under Item 432, "Riprap." New conduit will be paid for under Item 618. New conductors, except the conductors internal to the pole, will be paid for under Item 620. New duct cable will be paid for under Item 622, "Duct Cable." New ground boxes will be paid for under Item 624, "Ground Boxes." New electrical services will be paid for under Item 628, "Electrical Services."