

Control	1064-01-032
Project	C 1064-1-32
Highway	FM 676
County	HIDALGO

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 WIDEN ROAD - ADD LANES HIDALGO COUNTY, TEXAS

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 468 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:

ONE HUNDRED THOUSAND (Dollars) (\$100,000)

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:

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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):

Control	1064-01-032
Project	C 1064-1-32
Highway	FM 676
County	HIDALGO

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

Unit price for each plant in place

	249	014		FLEX BASE(DEL)(DENSOT)(TY A GR4 CL2) 	TON	56,787.00	14
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Unit price for each ton of Flexible Base

	430	001	001	CL A CONC FOR EXT STR (CULV) 	CY	45.000	27
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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
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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.				
	100	6002		PREPARING ROW DOLLARS and CENTS	STA	195.000	1
	104	6009		REMOVING CONC (RIPRAP) DOLLARS and CENTS	SY	727.000	2
	104	6015		REMOVING CONC (SIDEWALKS) DOLLARS and CENTS	SY	1,566.000	3
	104	6031		REMOVING CONC (HEADWALL) DOLLARS and CENTS	CY	41.000	4
	110	6001		EXCAVATION (ROADWAY) DOLLARS and CENTS	CY	35,883.000	5
	110	6002		EXCAVATION (CHANNEL) DOLLARS and CENTS	CY	88.000	6
	132	6006		EMBANKMENT (FINAL)(DENS CONT)(TY C) DOLLARS and CENTS	CY	889.000	7
	134	6001		BACKFILL (TY A) DOLLARS and CENTS	STA	7.200	8
	158	6005		SPEC EXCAV WORK (ORIGINAL) DOLLARS and CENTS	CY	1,255.000	9
	160	6005		FURNISHING AND PLACING TOPSOIL DOLLARS and CENTS	CY	2,973.000	10
	164	6005		BROADCAST SEED (PERM) (URBAN) (SANDY) DOLLARS and CENTS	SY	4,044.000	11

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	164	6025		CELL FBR MLCH SEED(PERM)(URBAN)(SANDY) DOLLARS and CENTS	SY	26,774.000	12
	164	6029		CELL FBR MLCH SEED(TEMP)(WARM) DOLLARS and CENTS	SY	37,681.000	13
	168	6001		VEGETATIVE WATERING DOLLARS and CENTS	MG	1,294.000	14
	169	6003		SOIL RETENTION BLANKETS (CL 1) (TY C) DOLLARS and CENTS	SY	1,229.000	15
	204	6003		SPRINKLING (DUST CONTROL) DOLLARS and CENTS	MG	727.000	16
	216	6001		PROOF ROLLING DOLLARS and CENTS	HR	10.000	17
	247	6225	003	FL BS (RDWY DEL)(TY E GR 4)(FNAL POS) DOLLARS and CENTS	CY	14,994.000	18
	251	6159		REWORK BS MATL (TY B)(10")(DC)(ORG POS) DOLLARS and CENTS	CY	27,005.000	19
	275	6001		CEMENT DOLLARS and CENTS	TON	2,666.000	20
	275	6005		CEMENT TREAT (EXIST MATL)(12") DOLLARS and CENTS	SY	138,130.000	21
	275	6012		CEMENT TRT (MX EXST MTL & NW BS)(10") DOLLARS and CENTS	SY	134,990.000	22
	305	6015		SALV, HAUL & STKPL RCL APH PV (1 1/2") DOLLARS and CENTS	SY	89,233.000	23

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	310	6009		PRIME COAT (MC-30) DOLLARS and CENTS	GAL	25,562.000	24
	316	6242	002	AGGR(TY-PD GR-5 SAC-B) DOLLARS and CENTS	CY	1,063.000	25
	316	6277	002	ASPH (SPG 73-19) DOLLARS and CENTS	GAL	40,894.000	26
	354	6013		PLAN & TEXT CONC PAV(0" TO 1/2") DOLLARS and CENTS	SY	3,041.000	27
	400	6003		STRUCT EXCAV (PIPE) DOLLARS and CENTS	CY	1,087.000	28
	400	6005		CEM STABIL BKFL DOLLARS and CENTS	CY	92.000	29
	400	6006		CUT & RESTORING PAV DOLLARS and CENTS	SY	390.000	30
	401	6001		FLOWABLE BACKFILL DOLLARS and CENTS	CY	189.000	31
	402	6001		TRENCH EXCAVATION PROTECTION DOLLARS and CENTS	LF	9,606.000	32
	403	6001		TEMPORARY SPL SHORING DOLLARS and CENTS	SF	765.000	33
	416	6030		DRILL SHAFT (TRF SIG POLE) (24 IN) DOLLARS and CENTS	LF	136.800	34
	416	6032		DRILL SHAFT (TRF SIG POLE) (36 IN) DOLLARS and CENTS	LF	294.400	35

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	423	6008		RETAINING WALL (CAST - IN - PLACE) DOLLARS and CENTS	SF	1,824.000	36
	432	6001		RIPRAP (CONC)(4 IN) DOLLARS and CENTS	CY	103.000	37
	432	6002		RIPRAP (CONC)(5 IN) DOLLARS and CENTS	CY	29.000	38
	462	6002	002	CONC BOX CULV (3 FT X 3 FT) DOLLARS and CENTS	LF	1,758.000	39
	462	6005	002	CONC BOX CULV (4 FT X 4 FT) DOLLARS and CENTS	LF	1,474.000	40
	462	6007	002	CONC BOX CULV (5 FT X 3 FT) DOLLARS and CENTS	LF	836.000	41
	462	6008	002	CONC BOX CULV (5 FT X 4 FT) DOLLARS and CENTS	LF	1,009.000	42
	462	6009	002	CONC BOX CULV (5 FT X 5 FT) DOLLARS and CENTS	LF	867.000	43
	462	6015	002	CONC BOX CULV (7 FT X 4 FT) DOLLARS and CENTS	LF	92.000	44
	462	6020	002	CONC BOX CULV (8 FT X 5 FT) DOLLARS and CENTS	LF	196.000	45
	464	6003	001	RC PIPE (CL III)(18 IN) DOLLARS and CENTS	LF	4,920.000	46
	464	6005	001	RC PIPE (CL III)(24 IN) DOLLARS and CENTS	LF	2,988.000	47

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	464	6007	001	RC PIPE (CL III)(30 IN) DOLLARS and CENTS	LF	1,442.000	48
	464	6008	001	RC PIPE (CL III)(36 IN) DOLLARS and CENTS	LF	2,336.000	49
	464	6009	001	RC PIPE (CL III)(42 IN) DOLLARS and CENTS	LF	96.000	50
	464	6010	001	RC PIPE (CL III)(48 IN) DOLLARS and CENTS	LF	756.000	51
	464	6021	001	RC PIPE (CL IV)(42 IN) DOLLARS and CENTS	LF	75.000	52
	464	6022	001	RC PIPE (CL IV)(48 IN) DOLLARS and CENTS	LF	450.000	53
	465	6002	001	MANH (COMPL)(PRM)(48IN) DOLLARS and CENTS	EA	5.000	54
	465	6003	001	MANH (COMPL)(PRM)(60IN) DOLLARS and CENTS	EA	4.000	55
	465	6004	001	MANH (COMPL)(PRM)(72IN) DOLLARS and CENTS	EA	14.000	56
	465	6013	001	INLET (COMPL)(PCO)(3FT)(NONE) DOLLARS and CENTS	EA	2.000	57
	465	6014	001	INLET (COMPL)(PCO)(3FT)(LEFT) DOLLARS and CENTS	EA	4.000	58
	465	6021	001	INLET (COMPL)(PCO)(5FT)(NONE) 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.				
	465	6025	001	INLET (COMPL)(PCO)(6FT)(NONE) DOLLARS and CENTS	EA	5.000	60
	465	6027	001	INLET (COMPL)(PCO)(6FT)(RIGHT) DOLLARS and CENTS	EA	4.000	61
	465	6029	001	INLET (COMPL)(PCU)(3FT)(NONE) DOLLARS and CENTS	EA	18.000	62
	465	6030	001	INLET (COMPL)(PCU)(3FT)(LEFT) DOLLARS and CENTS	EA	9.000	63
	465	6031	001	INLET (COMPL)(PCU)(3FT)(RIGHT) DOLLARS and CENTS	EA	11.000	64
	465	6033	001	INLET (COMPL)(PCU)(4FT)(NONE) DOLLARS and CENTS	EA	7.000	65
	465	6034	001	INLET (COMPL)(PCU)(4FT)(LEFT) DOLLARS and CENTS	EA	5.000	66
	465	6035	001	INLET (COMPL)(PCU)(4FT)(RIGHT) DOLLARS and CENTS	EA	9.000	67
	465	6041	001	INLET (COMPL)(PCU)(6FT)(NONE) DOLLARS and CENTS	EA	2.000	68
	465	6042	001	INLET (COMPL)(PCU)(6FT)(LEFT) DOLLARS and CENTS	EA	8.000	69
	465	6043	001	INLET (COMPL)(PCU)(6FT)(RIGHT) DOLLARS and CENTS	EA	11.000	70
	465	6076	001	INLET (COMPL)(PSL)(RC)(6FTX6FT) DOLLARS and CENTS	EA	10.000	71

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	465	6158	001	INLET(COMPL)(PAZD)(FG)(3FTX3FT-3FTX-3FT) DOLLARS and CENTS	EA	17.000	72
	466	6003		HEADWALL (CH - FW - 0) (DIA= 18 IN) DOLLARS and CENTS	EA	1.000	73
	466	6007		HEADWALL (CH - FW - 0) (DIA= 30 IN) DOLLARS and CENTS	EA	1.000	74
	466	6152		WINGWALL (FW - 0) (HW=5 FT) DOLLARS and CENTS	EA	2.000	75
	466	6182		WINGWALL (PW - 1) (HW=7 FT) DOLLARS and CENTS	EA	2.000	76
	467	6363		SET (TY II) (18 IN) (RCP) (6: 1) (P) DOLLARS and CENTS	EA	22.000	77
	496	6002		REMOV STR (INLET) DOLLARS and CENTS	EA	9.000	78
	496	6004		REMOV STR (SET) DOLLARS and CENTS	EA	124.000	79
	496	6007		REMOV STR (PIPE) DOLLARS and CENTS	LF	6,844.000	80
	496	6008		REMOV STR (BOX CULVERT) DOLLARS and CENTS	LF	90.000	81
	496	6042		REMOV STR (SMALL) DOLLARS and CENTS	EA	8.000	82
	500	6001		MOBILIZATION DOLLARS and CENTS	LS	1.000	83

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	502	6001	008	BARRICADES, SIGNS AND TRAFFIC HAN- DLING DOLLARS and CENTS	MO	29.000	84
	506	6003	005	ROCK FILTER DAMS (INSTALL) (TY 3) DOLLARS and CENTS	LF	243.000	85
	506	6011	005	ROCK FILTER DAMS (REMOVE) DOLLARS and CENTS	LF	243.000	86
	506	6020	005	CONSTRUCTION EXITS (INSTALL) (TY 1) DOLLARS and CENTS	SY	312.000	87
	506	6024	005	CONSTRUCTION EXITS (REMOVE) DOLLARS and CENTS	SY	312.000	88
	506	6025	005	EXCAV (EROSN & SEDMT CONT, IN PLACE) DOLLARS and CENTS	CY	637.000	89
	506	6026	005	EMBANK (EROSN & SEDMT CONT, IN PLACE) DOLLARS and CENTS	CY	637.000	90
	506	6031	005	FRNT END LOADER WORK (ERSN & SEDM CONT) DOLLARS and CENTS	HR	96.000	91
	506	6038	005	TEMP SEDMT CONT FENCE (INSTALL) DOLLARS and CENTS	LF	50.000	92
	506	6039	005	TEMP SEDMT CONT FENCE (REMOVE) DOLLARS and CENTS	LF	50.000	93
	506	6041	005	BIODEG EROSN CONT LOGS (INSTL) (12") DOLLARS and CENTS	LF	7,888.000	94

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	506	6043	005	BIODEG EROSN CONT LOGS (REMOVE) DOLLARS and CENTS	LF	7,888.000	95
	508	6001		CONSTRUCTING DETOURS DOLLARS and CENTS	SY	11,339.000	96
	512	6008		PORT CTB (FUR & INST)(F-SHAPE)(TY 4) DOLLARS and CENTS	LF	250.000	97
	512	6032		PORT CTB (MOVE)(F-SHAPE)(TY 4) DOLLARS and CENTS	LF	500.000	98
	512	6056		PORT CTB (REMOVE)(F-SHAPE)(TY 4) DOLLARS and CENTS	LF	250.000	99
	528	6004		LANDSCAPE PAVERS DOLLARS and CENTS	SY	80.000	100
	529	6029		CONC CURB & GUTTER (TY A) DOLLARS and CENTS	LF	24,968.000	101
	529	6030		CONC CURB & GUTTER (VALLEY GUTTER) DOLLARS and CENTS	LF	3,676.000	102
	529	6031		CONC CURB & GUTTER(VALLEY GUT- TER)(48") DOLLARS and CENTS	LF	787.000	103
	530	6004		DRIVEWAYS (CONC) DOLLARS and CENTS	SY	935.000	104
	530	6005		DRIVEWAYS (ACP) DOLLARS and CENTS	SY	6,092.000	105
	530	6010		INTRSCT, DRVWAYS, & TURNOUT (CONC) DOLLARS and CENTS	SY	240.000	106

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	530	6011		INTRSCT, DRVWAYS, & TURNOUT (ACP) DOLLARS and CENTS	SY	668.000	107
	531	6001		CONC SIDEWALKS (4") DOLLARS and CENTS	SY	12,882.000	108
	531	6004		CURB RAMPS (TY 1) DOLLARS and CENTS	EA	42.000	109
	531	6005		CURB RAMPS (TY 2) DOLLARS and CENTS	EA	4.000	110
	531	6008		CURB RAMPS (TY 5) DOLLARS and CENTS	EA	9.000	111
	531	6013		CURB RAMPS (TY 10) DOLLARS and CENTS	EA	22.000	112
	531	6016		CURB RAMPS (TY 21) DOLLARS and CENTS	EA	1.000	113
	531	6017		CURB RAMPS (TY 22) DOLLARS and CENTS	EA	4.000	114
	545	6003		CRASH CUSH ATTEN (MOVE & RESET) DOLLARS and CENTS	EA	6.000	115
	545	6005		CRASH CUSH ATTEN (REMOVE) DOLLARS and CENTS	EA	2.000	116
	545	6018		CRASH CUSH ATTEN (INSTL)(S)(N)(TL2) DOLLARS and CENTS	EA	2.000	117
	550	6001		CHAIN LINK FENCE (INSTALL) (6') DOLLARS and CENTS	LF	290.000	118

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	560	6011		MAILBOX INSTALL-S (TWW-POST) TY 4 DOLLARS and CENTS	EA	55.000	119
	560	6012		MAILBOX INSTALL-D (TWW-POST) TY 4 DOLLARS and CENTS	EA	11.000	120
	560	6013		MAILBOX INSTALL-M (TWW-POST) TY 4 DOLLARS and CENTS	EA	6.000	121
	560	6015		MAILBOX INSTALL-S (TIM-POST) TY 5 DOLLARS and CENTS	EA	6.000	122
	618	6016		CONDT (PVC) (SCH 40) (1") DOLLARS and CENTS	LF	553.000	123
	618	6023		CONDT (PVC) (SCH 40) (2") DOLLARS and CENTS	LF	4,865.000	124
	618	6033		CONDT (PVC) (SCH 40) (4") DOLLARS and CENTS	LF	865.000	125
	618	6058		CONDT (PVC) (SCH 80) (4") DOLLARS and CENTS	LF	1,950.000	126
	618	6059		CONDT (PVC) (SCH 80) (4") (BORE) DOLLARS and CENTS	LF	440.000	127
	620	6007		ELEC CONDR (NO.8) BARE DOLLARS and CENTS	LF	1,410.000	128
	620	6009		ELEC CONDR (NO.6) BARE DOLLARS and CENTS	LF	145.000	129
	620	6010		ELEC CONDR (NO.6) INSULATED DOLLARS and CENTS	LF	290.000	130

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	621	6005		TRAY CABLE (4 CONDR) (12 AWG) DOLLARS and CENTS	LF	1,695.000	131
	624	6002		GROUND BOX TY A (122311)W/APRON DOLLARS and CENTS	EA	80.000	132
	624	6010		GROUND BOX TY D (162922)W/APRON DOLLARS and CENTS	EA	6.000	133
	625	6002		ZINC-COAT STL WIRE STRAND (3/16") DOLLARS and CENTS	LF	545.000	134
	625	6003		ZINC-COAT STL WIRE STRAND (3/8") DOLLARS and CENTS	LF	4,470.000	135
	625	6004		ZINC-COAT STL WIRE STRAND (5/16") DOLLARS and CENTS	LF	1,090.000	136
	628	6301		ELC SRV TY T 120/240 000(NS)GS(L)TS(O) DOLLARS and CENTS	EA	4.000	137
	644	6027		IN SM RD SN SUP&AM TYS80(1)SA(P) DOLLARS and CENTS	EA	69.000	138
	644	6028		IN SM RD SN SUP&AM TYS80(1)SA(P-BM) DOLLARS and CENTS	EA	16.000	139
	644	6030		IN SM RD SN SUP&AM TYS80(1)SA(T) DOLLARS and CENTS	EA	11.000	140
	644	6070		RELOCATE SM RD SN SUP&AM TY S80 DOLLARS and CENTS	EA	4.000	141
	644	6076		REMOVE SM RD SN SUP&AM DOLLARS and CENTS	EA	72.000	142

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	662	6004		WK ZN PAV MRK NON-REMOV (W)4"(SLD) DOLLARS and CENTS	LF	35,351.000	143
	662	6012		WK ZN PAV MRK NON-REMOV (W)8"(SLD) DOLLARS and CENTS	LF	424.000	144
	662	6014		WK ZN PAV MRK NON-REMOV (W)12"(SLD) DOLLARS and CENTS	LF	517.000	145
	662	6016		WK ZN PAV MRK NON-REMOV (W)24"(SLD) DOLLARS and CENTS	LF	502.000	146
	662	6034		WK ZN PAV MRK NON-REMOV (Y)4"(SLD) DOLLARS and CENTS	LF	50,498.000	147
	662	6050		WK ZN PAV MRK REMOV (REFL) TY II-A-A DOLLARS and CENTS	EA	895.000	148
	662	6061		WK ZN PAV MRK REMOV (W)4"(DOT) DOLLARS and CENTS	LF	110.000	149
	662	6063		WK ZN PAV MRK REMOV (W)4"(SLD) DOLLARS and CENTS	LF	14,188.000	150
	662	6071		WK ZN PAV MRK REMOV (W)8"(SLD) DOLLARS and CENTS	LF	181.000	151
	662	6075		WK ZN PAV MRK REMOV (W)24"(SLD) DOLLARS and CENTS	LF	125.000	152
	662	6080		WK ZN PAV MRK REMOV (W)(ARROW) DOLLARS and CENTS	EA	2.000	153
	662	6094		WK ZN PAV MRK REMOV (Y)4"(DOT) DOLLARS and CENTS	LF	955.000	154

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	662	6095		WK ZN PAV MRK REMOV (Y)4"(SLD) DOLLARS and CENTS	LF	18,083.000	155
	662	6109		WK ZN PAV MRK SHT TERM (TAB)TY W DOLLARS and CENTS	EA	734.000	156
	662	6111		WK ZN PAV MRK SHT TERM (TAB)TY Y-2 DOLLARS and CENTS	EA	1,415.000	157
	666	6036	007	REFL PAV MRK TY I (W)8"(SLD)(100MIL) DOLLARS and CENTS	LF	7,080.000	158
	666	6042	007	REFL PAV MRK TY I (W)12"(SLD)(100MIL) DOLLARS and CENTS	LF	5,410.000	159
	666	6048	007	REFL PAV MRK TY I (W)24"(SLD)(100MIL) DOLLARS and CENTS	LF	1,140.000	160
	666	6054	007	REFL PAV MRK TY I (W)(ARROW)(100MIL) DOLLARS and CENTS	EA	57.000	161
	666	6078	007	REFL PAV MRK TY I (W)(WORD)(100MIL) DOLLARS and CENTS	EA	55.000	162
	666	6300	007	RE PM W/RET REQ TY I (W)4"(BRK)(100MIL) DOLLARS and CENTS	LF	6,330.000	163
	666	6303	007	RE PM W/RET REQ TY I (W)4"(SLD)(100MIL) DOLLARS and CENTS	LF	4,170.000	164
	666	6312	007	RE PM W/RET REQ TY I (Y)4"(BRK)(100MIL) DOLLARS and CENTS	LF	4,570.000	165
	666	6315	007	RE PM W/RET REQ TY I (Y)4"(SLD)(100MIL) DOLLARS and CENTS	LF	38,970.000	166

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	672	6007		REFL PAV MRKR TY I-C DOLLARS and CENTS	EA	988.000	167
	672	6009		REFL PAV MRKR TY II-A-A DOLLARS and CENTS	EA	1,427.000	168
	677	6001		ELIM EXT PAV MRK & MRKS (4") DOLLARS and CENTS	LF	24,618.000	169
	677	6007		ELIM EXT PAV MRK & MRKS (24") DOLLARS and CENTS	LF	505.000	170
	677	6008		ELIM EXT PAV MRK & MRKS (ARROW) DOLLARS and CENTS	EA	25.000	171
	677	6012		ELIM EXT PAV MRK & MRKS (WORD) DOLLARS and CENTS	EA	15.000	172
	680	6002	006	INSTALL HWY TRF SIG (ISOLATED) DOLLARS and CENTS	EA	6.000	173
	680	6004	006	REMOVING TRAFFIC SIGNALS DOLLARS and CENTS	EA	6.000	174
	681	6001		TEMP TRAF SIGNALS DOLLARS and CENTS	EA	5.000	175
	682	6001		VEH SIG SEC (12")LED(GRN) DOLLARS and CENTS	EA	65.000	176
	682	6002		VEH SIG SEC (12")LED(GRN ARW) DOLLARS and CENTS	EA	17.000	177
	682	6003		VEH SIG SEC (12")LED(YEL) DOLLARS and CENTS	EA	65.000	178

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	17.000	179
	682	6005		VEH SIG SEC (12")LED(RED) DOLLARS and CENTS	EA	65.000	180
	682	6018		PED SIG SEC (LED)(COUNTDOWN) DOLLARS and CENTS	EA	48.000	181
	682	6051		BACKPLATE W/REFL BRDR(3 SEC)ALUM DOLLARS and CENTS	EA	48.000	182
	682	6052		BACKPLATE W/REFL BRDR(4 SEC)ALUM DOLLARS and CENTS	EA	17.000	183
	684	6010		TRF SIG CBL (TY A)(12 AWG)(5 CONDR) DOLLARS and CENTS	LF	11,050.000	184
	684	6012		TRF SIG CBL (TY A)(12 AWG)(7 CONDR) DOLLARS and CENTS	LF	2,505.000	185
	684	6080		TRF SIG CBL (TY C)(14 AWG)(2 CONDR) DOLLARS and CENTS	LF	14,940.000	186
	685	6002		RELOCATE RDS D FLASH BEACON ASSEM- BLY DOLLARS and CENTS	EA	5.000	187
	685	6004		INSTL RDS D FLSH BCN ASSM (SOLAR PWRD) DOLLARS and CENTS	EA	4.000	188
	685	6006		REMOV RDS D FLSH BCN AM (SOLAR PWRD) DOLLARS and CENTS	EA	4.000	189

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	686	6007		INS TRF SIG PL AM (S)STR(TY B) DOLLARS and CENTS	EA	9.000	190
	686	6008		INS TRF SIG PL AM (S)STR(TY B)LUM DOLLARS and CENTS	EA	9.000	191
	686	6020		INS TRF SIG PL AM (S)STR(TY D)LUM DOLLARS and CENTS	EA	2.000	192
	687	6001		PED POLE ASSEMBLY DOLLARS and CENTS	EA	24.000	193
	688	6001		PED DETECT PUSH BUTTON (APS) DOLLARS and CENTS	EA	4.000	194
	688	6004		VEH LP DETECT (SAWCUT) DOLLARS and CENTS	LF	8,812.000	195
	1007	6001		IRRIGATION GATE (18") DOLLARS and CENTS	EA	1.000	196
	1007	6002		IRRIGATION GATE (30") DOLLARS and CENTS	EA	1.000	197
	1007	6003		IRRIGATION WELL (18") DOLLARS and CENTS	EA	3.000	198
	1007	6004		IRRIGATION WELL (24") DOLLARS and CENTS	EA	2.000	199
	1007	6005		IRRIGATION WELL (30") DOLLARS and CENTS	EA	3.000	200
	1008	6001		PRSSR IRRIG PVC PIPE (18") DOLLARS and CENTS	LF	541.000	201

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	1008	6002		PRSSR IRRIG PVC PIPE (24") DOLLARS and CENTS	LF	340.000	202
	3077	6065		SP MIXES SP-D SAC-A PG76-22 DOLLARS and CENTS	TON	21,853.000	203
	4024	6001		RC LOW HEAD PRSSR PIPE (CL III)(30") DOLLARS and CENTS	LF	254.000	204
	5145	6001		GATE (INSTALL)(TYPE 1)(OTU) DOLLARS and CENTS	EA	1.000	205
	5145	6002		GATE (INSTALL)(TYPE 2)(OTU) DOLLARS and CENTS	EA	3.000	206
	5145	6003		GATE (INSTALL)(TYPE 3)(OTU) DOLLARS and CENTS	EA	10.000	207
	5145	6004		GATE (INSTALL)(TYPE 4)(OTU) DOLLARS and CENTS	EA	2.000	208
	5145	6005		GATE (INSTALL)(TYPE 5)(OTU) DOLLARS and CENTS	EA	2.000	209
	5148	6001		RIPRAP CANAL LINER DOLLARS and CENTS	SF	8,331.000	210
	6001	6002		PORTABLE CHANGEABLE MESSAGE SIGN DOLLARS and CENTS	EA	4.000	211
	6027	6003		CONDUIT (PREPARE) DOLLARS and CENTS	LF	755.000	212
	6027	6008		GROUND BOX (PREPARE) DOLLARS and CENTS	EA	14.000	213

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	6054	6001		SPREAD SPECTRUM RADIO DOLLARS and CENTS	EA	6.000	214
	6054	6002		COAXIAL CABLE DOLLARS and CENTS	LF	319.000	215
	6061	6001		GPS COMMUNICATIONS UNIT DOLLARS and CENTS	EA	6.000	216

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

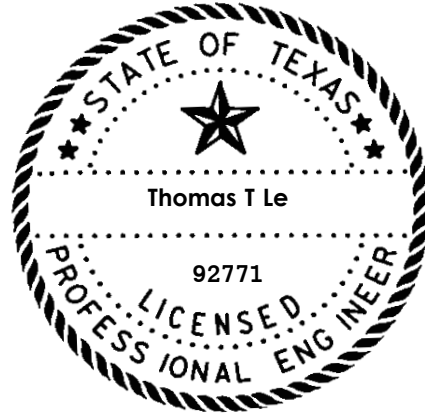
- B. If this proposal is the low bid, the bidder agrees to provide the following information prior to award of the contract.

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.

ENGINEER SEAL

Control 1064-01-032
Project C 1064-1-32
Highway FM 676
County HIDALGO

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
Thomas T Le, P.E.
DECEMBER 02, 2022

2014 SPECS GENERAL NOTES:

General Requirements and Covenants to ITEMS 1 thru 9:

For all pits or quarries, comply with the “Texas Aggregate Quarry and Pit Safety Act.”

Provide on a weekly basis a list of equipment, including idle equipment, utilized on the project that week.

The 1-800 call services for utility locations do not include TxDOT facilities. Contact the Pharr District Signal Section (956-702-6225) for coordination regarding TxDOT underground lines.

ITEM 2: Instructions to Bidders

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

Rene Garza, P.E., Pharr Area Engineer; Rene.Garza@txdot.gov
Jesus Noriega, P.E., Assist. Area Engineer; Jesus.Noriega@txdot.gov

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

All Contractor questions will be reviewed by the Engineer. Once a response is developed, it will be posted to TxDOT’s Public FTP at the following Address:

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

All questions submitted that generate a response will be posted through this site. The site is organized by District, Project Type (Construction or Maintenance), Letting Date, and CCSJ/Project Name.

ITEM 5: Control of the Work

The responsibility for the construction surveying on this contract will be in accordance with Article 5.9.1., “Method A.”

Prior to contract letting, bidders may obtain a free computerized transfer of files (from the Engineer’s office) that contains the earthwork information. If copies of the actual cross-sections in additional to, or instead of the electronic files are requested, they will be available at the Engineer’s office for borrowing by copying companies for the purpose of making copies for the bidder at the bidder’s expense.

ITEM 7: Legal Relations and Responsibilities

No significant traffic generator events identified.

ITEM 8: Prosecution and Progress

Where road closures or detours around structures are necessary to accomplish proposed work, the removal of existing structures and/or cutting of existing pavement will not be permitted until all precast members for the proposed structure have been cast, tested, and approved for use.

Prepare progress schedules using the Critical Path Method (CPM).

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

ITEM 100: Preparing Right of Way

Preparation of right of way will be done in accordance with the construction phasing shown on the Traffic Control Plans. Performance of this item will not be allowed outside of the project's current construction phase without prior approval by the Engineer.

Removal of all existing vegetation and trees within the ROW will be subsidiary to prep ROW.

ITEM 132: Embankment

Embankment (DENS CONT) shall be Type C with a max. PI of 40. Material used as embankment material in the top two feet below the bottom of Flexible Base shall meet the following requirements based on preliminary tests and such other tests found necessary by the Engineer.

1. The material shall be such as to produce a well-bonded embankment and shall have a minimum PI of 8 and a maximum PI of 30.

It is the Contractor's responsibility to advise the Engineer of the location of the source sufficiently in advance to avoid delay.

ITEM 134: Backfilling Pavement Edges

Areas to be backfilled shall extend approximately 3-ft out from the edges of the proposed overlay. Final slopes shall be uniform and smooth. The 100-foot station payment includes backfilling of both sides.

Backfill Ty A shall not contain particles more than two inches in size and shall have a minimum PI of 10 and a maximum PI of 20.

Any additional backfill material necessary due to pre-existing edge conditions or to replace existing fill removed during blading operations will not be paid for directly. It will be considered subsidiary to this bid Item.

ITEM 160: Topsoil

Use topsoil as needed and directed by the Project Engineer for select problem areas. Unless otherwise approved by the Project Engineer, use topsoil from approved sources outside the right of way as per standard specifications. Existing topsoil is to be salvaged and retained for re-use on the project as topsoil.

ITEM 164: Seeding for Erosion Control

During drill seeding operations, application methods shall be in accordance with the method shown in the Standard Specification Book.

SS-1 Tacking Agent shall be a ratio of 2:1, two (Emulsion) to one (water) and applied at a rate of 0.05 gallons per square yard. The SS-1 Tacking Agent required for Drill Seed operations, will not be paid for directly, but will be subsidiary to Item 164 "Drill Seeding." Watering shall not be used with the Drill Seed Method. A biodegradable tacking agent may be used in lieu of the SS-1 tacking agent in accordance with the manufacturer's recommendations when approved by the Engineer.

Cool Season or Warm Season Grasses shall be included as part of Item 164 (See Table 3 and/or Table 4 in the Standard Specification Book or dates and seed type).

Seed mixture shall be as specified under Item 164.

ITEM 166: Fertilizer

Fertilizer rate is based on a rate of 100 Lbs. of Nitrogen per acre. The Nitrogen-Phosphorous Potassium (NPK) ratio shall include a minimum of 5% Phosphorous and 5% Potassium.

Fertilizer shall be homogenized.

ITEM 169: Soil Retention Blankets

In areas designated for soil retention blankets (SRB) in the plans, furnish only spray-on products listed on the Approved Product List for Erosion Control Products based upon the Class and Type specified in the plans or from the following list: AEC Premier Straw Double Net Fibrenet,

American Excelsior Curlex I Fibrenet, Erosion Control Blanket S31BD, Curlex II Fibrenet, Koirmat 700, AEC Premier Coconut Fibrenet, and AEC Premier Straw-Coconut Fibrenet.

ITEM 247: Flexible Base

Flexible Base Type E will be composed of caliche (argillaceous Limestone, calcareous or calcareous clay particles) and may contain stone, conglomerate, gravel, sand, or granular materials when these materials are in situ with the caliche.

Flexible Base (TY E GR 4) caliche shall conform to the following requirements:

Retained on Sq. Sieve:	Percent Retained
2"	0
1/2"	20-60
No. 4	40-75
No. 40	70-90
Max. PI	15
Max. Wet Ball PI	15
Wet Ball Mill Max. Amount	50
Min. Comp. Strength PSI	150 at 15 PSI lateral pressure
Triaxial Test	Tex-117-E

The Wet Ball Test (Tex-116-E) shall be run and the Plasticity Index of the material passing the No.40 sieve shall be determined (Wet Ball PI).

The percent of density as determined by Compaction Ratio (Tex-113-E) for the new Flexible Base shall be a minimum of 98%.

The Contractor's attention is called to the fact that certain existing and/or proposed structures may be within the limits of the Flexible Base. It shall be the Contractor's responsibility to perform construction operations without damage to these structures.

Proof roll constructed flexible base in accordance with Item 216, "Proof Rolling." Correct soft spots as directed.

ITEM 251: Reworking Base Courses

Quantities of Flexible Base to be salvaged, shown on the typical sections, are for estimating purposes only. All acceptable base material encountered in existing base is to be salvaged as directed by the Engineer regardless of the quantities involved.

Salvaged base shall be used in the bottom course on any of the proposed roadway and/or turnout sections.

Salvaged base may be used on any of the proposed driveway sections.

All surplus salvage base not used on the project will remain the property of the Contractor, unless otherwise directed by Engineer.

All surplus millings not used on the project will remain the property of TxDOT and will be delivered to the TxDOT Mission maintenance yard in Mission, Texas.

ITEM 275: Cement Treatment (Road-Mixed)

The Contractor's attention is called to the fact that certain existing and/or proposed structures are within the limits of the cement-treated Subgrade. Unless otherwise directed by the Engineer, these structures shall be installed before the final rolling of this Subgrade. It shall be the Contractor's responsibility to perform the proper cement treating operation without damage to these structures.

The percent of density as determined by Tex-120-E for the new and salvage Flexible Base shall be a minimum of 98% for all courses.

Proof roll all constructed cement treated subgrade and bases courses in accordance with Item 216, "Proof Rolling." Correct soft spots as directed. Correction of soft spots in the subgrade or base courses will be at the Contractor's expense.

Contractor is to place an underseal and/or pavement course as indicated on plans within 14 calendar days of initial prime coat application. Otherwise, reapply prime coat as directed by the Engineer. Reapplication of the prime coat will be at the Contractor's expense.

ITEM 305: Salvaging, Hauling, and Stockpiling Reclaimable Asphalt Pavement

Stockpile 79,167 SY (@1 ½") of material generated from the project at designated site located at 1201 W. Expressway 83, Mission, TX 78572. Ensure this material meets the requirements of Item 305 when stockpiled at above specified location.

ITEM 310: Prime Coat

The Contractor shall exercise diligence in the application of asphalt by the use of flagging and rolling procedures to keep from spraying or splattering the traveling public with asphaltic material.

All existing Flexible Base, which may become exposed by the milling operation, shall be primed at the rate of 0.2 Gal/SY.

Do not apply subsequent courses over the initial prime coat no earlier than 12 hours after the prime coat was applied, unless otherwise authorized or directed by the Engineer.

ITEM 316: Seal Coat

In addition to cleaning by brooming of paved surfaces to be sealed as required by this Item, blading may also be necessary to clean dirt and grass from edges of the pavement and/or turnout areas. The cost of this blading will not be paid for directly but will be considered subsidiary to the various bid Items of the project.

When applying surface treatment at railroad crossings, a strip of paper shall be placed over the rail and flange areas across the pavement.

The type and grade of asphalt as shown on the plans and/or as directed by the Engineer, shall be used on these projects. Asphalt cement will be used during the warm season. An emulsified asphalt will be used during the cooler season if permitted in writing by the Engineer. The emulsified asphalt, if used, shall be HFRS 2P. Estimated quantities shown for the bid Item is based on an average of the estimated rates of application for asphaltic cement and emulsified asphalt. These rates should be used for estimating and comparison purposes only.

The one or two-course surface treatment shall be in place for a sufficient period of time in the opinion of the Engineer, for the surface treatment to properly dry and cure before placing the Asphaltic Concrete Pavement.

Traffic will not be permitted on the surface treatment unless authorized by the Engineer.

When emulsified asphalt is used, do not apply subsequent courses over the surface treatment any earlier than the day after the surface treatment was applied, unless otherwise authorized or directed by the Engineer.

ITEM 3077: Superpave Mixtures

The Contractor shall exercise diligence in the application of "Bonding Course" by the use of flagging and rolling procedures to keep from spraying or splattering the traveling public with asphaltic material.

Blading (not to exceed more than 3-ft from the pavement edge) may also be necessary to clean dirt and grass from pavement edges and turnout areas as work under this bid Item. The cost of this blading will not be paid for directly but shall be considered subsidiary to this bid Item.

RAP (recycled asphalt pavement) to be recycled will be stockpiled separately from other project sources and Contractor owned RAP. Each stockpile will be clearly marked by the Contractor indicating project source.

The Contractor shall exercise diligence during milling operations in order to avoid contamination.

The RAP stockpiles are subjected to PI and decantation requirements as specified under this Item.

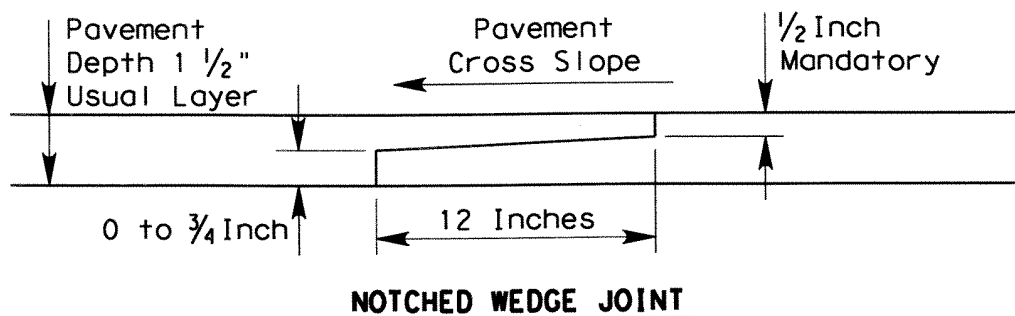
Recycled asphaltic pavement to be salvaged as shown in plans will be available for use as RAP in the hot mix for this project.

All surplus RAP from this project will remain the property of the Contractor.

Level-up will be placed before the surface course. An asphaltic concrete spreading and finishing machine and/or motor graders; when approved by the Engineer may be used to place the ACP level-up.

Aggregates used on shoulders and ramps are required to meet SAC requirements.

All unconfined longitudinal joints shall be constructed with a joint maker providing a maximum 1/2-inch vertical edge and a minimum 6:1 edge taper or as approved by the Engineer. The Engineer may waive this requirement when no impacts to the traveling public are foreseen.



The engineer may allow for variances to the dimensions shown.

Public and private driveways need to have a smooth vertical transition between the edge of pavement and the existing driveways. The Contractor is to add a vertical taper if needed which will be subsidiary to Item 3077.

Use a release agent from the Department’s MPL to clean and to coat the inside of truck beds for hauling equipment. Hauling equipment shall be cleaned prior to hauling material to job site. Submit a copy of the bill of lading to the Engineer as part of the QCP. Ensure the pavement is free from any spillage of hydraulic oil or diesel from construction equipment. The Department may reject trucks that contain any foreign material and suspend production if the pavement is contaminated by any pollutants mentioned above.

ITEM 3084 – Bonding Course

The minimum application rates are listed in Table BC.

The target shear bond strengths are listed in Table BCS. The informational test cores shall be taken once a shift for first 5 lots of placement or a change to placement method of bonding course, bonding material, or hot mix material. The remaining informational test cores shall be taken once every 3 lots for surface mix. Informational tests are not required for non-surface mix beyond the first 5 lots unless there is a change to placement method of bonding course, bonding material, or hot mix material. Results from these informational tests will not be used for specification compliance.

Table BC

Material	Minimum Application Rate (gal. per square yard)
<i>TRAIL – Emulsified Asphalt</i>	0.06
<i>TRAIL – Hot Asphalt</i>	0.12
<i>Spray Applied Underseal Membrane</i>	0.10

Table BCS (For Informational Tests)

Material	Target Shear Bond Strength (Tex-249-F psi)
<i>SMA – Stone-Matrix Asphalt</i>	60.0
<i>All Other Materials</i>	40.0

ITEM 354: Planing and Texturing Pavement

Contractor is to place seal coat or ACP layer(s) as indicated on plans within 14-calendar days of planing/milling operation unless otherwise directed by the Engineer.

All planing/milling operation drop offs greater than 1-inch need to have a 3:1 slope taper unless otherwise directed by the Engineer. The cost of the 3:1 slope taper is subsidiary to Item 354.

For full width planing/milling locations, Contractor is to place seal coat or ACP layer(s) as indicated on the plans within 2-calendar days of the planing/milling operation unless otherwise

County: Hidalgo**Control:** 1064-01-032**Highway:** FM 676

directed by the Engineer. Contractor will not be allowed to move onto the next planing/milling location or seal coat/ACP overlay location until the exposed area is covered as per above. Contractor cannot get paid for the planing/milling operation until exposed area is covered as per above.

ITEM 400: Excavation and Backfill for Structures

If the Contractor elects to cut pavement (existing/detour) for structural work beyond that required by the construction phasing shown in the plans and approved by the Engineer, it shall be restored at his expense and backfilled to its original condition or better in accordance with Item 400.

Unless shown otherwise in the plans, use a 1-ft depth for Item 400 Structural Excavation (Special) for gravel bedding needed below drainage structures with unstable material.

Structural Excavation Special (Gravel):

Use durable natural stone when tested in accordance with Tex-411-A, has weight loss of no more than 18% after 5 cycles of magnesium sulfate solution. Provide gravel conforming to an aggregate Grade No. 1 as shown on Table 4 of Article 421.2.

ITEM 416: Drilled Shaft Foundations

Payment for furnishing and installing anchor bolts mounted in drill shafts will be included in the unit price bid for the various diameter drill shafts.

The Contractor shall coordinate with the utility companies to verify utility locations before drilling foundations.

The Contractor shall form, or provide a smooth finish, the portions of drilled shaft that project above the ground line. Place a $\frac{3}{4}$ inch chamfer on the top edge of each pole foundation. This work will not be paid for directly but will be considered subsidiary to this bid Item.

All drilled shaft foundations will be based on the lengths shown on the plans or those established in writing. Adequate calculations for measurements of foundations have been made in accordance with Article 9.1. of the Standard Specifications. Increases or decreases in the quantities required by change in design will be measured as specified and the revised quantities will be the basis for payment.

In the presence of excess ground water and/or unstable conditions in sub-grade soils prevents excavation to the line and depths indicated on the plans for "Drilled Shaft Foundation", other proposed methods of foundation installation such as casing, etc. shall be submitted for review and approved by the Engineer.

ITEM 432: Riprap

Provide Class "A" concrete minimum for riprap aprons placed around all box culvert and pipe safety end treatments. Provide ¼-inch thick dummy joints at least every 15-ft for riprap aprons placed around box and pipe culverts.

Do not use fiber reinforced concrete RIPRAP on side slopes equal to or steeper than 6:1 unless approved by the Engineer.

ITEM 462: Concrete Box Culverts and Drains

Provide joints in pre-cast concrete box culverts using any of the methods specified in Item 464, except mortar joints.

Provide pre-cast concrete boxes to expedite traffic handling unless otherwise shown on the plans.

Provide the Area Engineer with the casting schedule of all pre-cast concrete boxes prior to beginning any fabrication.

ITEM 464: Reinforced Concrete Pipe

Use tongue and groove pipe where the RCP extends into the lime treated subgrade. The 4-foot depth restriction for heavy equipment passage over pipe structures is voided. The Contractor will be responsible for any construction damage to these facilities.

Do not use mortar joints.

All reinforced concrete pipe shall include rubber gaskets unless shown otherwise on the plans or directed by the Engineer.

ITEM 465: Junction Boxes, Manholes, and Inlets

For TY PSL with RG, FG, or SFG lid inlets, provide Class B concrete riprap with (6"x6" W3xW3

(No. 6 gauge) welded wire fabric) for any side that is touching the natural ground. The riprap will be 4-in thick and 3-ft wide with an 8-in deep by 6-in wide toe unless otherwise shown in the plans. The cost will be subsidiary to Item 465, unless otherwise shown in the plans.

For all inlet extensions, provide a temporary circular curb/inlet extension opening for drainage during construction. The circular opening will be a 4-in Diameter by 2-in deep slot that matches the statewide PCO standard. Fill curb circular curb/inlet extension opening with epoxy and mortar as per Item 429 Concrete Structure Repair specifications. Epoxy and mortar are subsidiary to Item 465.

ITEM 466: Headwalls and Wingwalls

Do not use pre-cast headwalls/wingwalls.

ITEM 467: Safety End Treatment

All Type II SET's shall have riprap, Class "A" minimum, aprons as shown on the plans. The Contractor may submit an alternate precast SET design for approval by the Engineer.

ITEM 471: Frames, Grates, Rings, and Covers

All grates will be tack welded to the frames in a manner satisfactory to the Engineer.

ITEM 496: Removing Structures

Store the following items to be salvaged at a location designated by the Engineer.

ITEM 502: Barricades, Signs, and Traffic Handling

Shadow vehicles equipped with Truck-Mounted Attenuators are required for traffic handling. See notes for Item 6185: Truck Mounted Attenuator/Trailer Attenuator, for additional references pertaining to the TMAs.

A pilot car and radio equipped flaggers shall be required for all undivided roadway locations as directed by the Engineer. The pilot car with necessary flaggers and/or radio equipped flaggers and all signs, equipment, labor, and incidentals required for this method of traffic control will not be paid for directly but shall be considered subsidiary to Item 502.

County: Hidalgo**Control:** 1064-01-032**Highway:** FM 676

Replace/relocate all regulatory signs removed due to construction operations with the same sign on fixed support(s) immediately upon its removal. First obtain Project Engineer approval before removing any regulatory roadway sign. Required flaggers are to be available to direct traffic during sign intermediate down time.

Relocate any Directional Sign Assemblies removed during construction operations immediately upon their removal.

These signs shall be relocated to a location in accordance with the Latest Version of the "Texas Manual on Uniform Traffic Control Devices". In no case will a sign be removed without a replacement sign and support(s) being readily available and a location established. Removal and relocation of these signs required for traffic control will not be paid for directly but shall be considered subsidiary to Item 502.

From the beginning to the end of the project, all traffic control devices need to be in acceptable condition as per the Texas Quality Guidelines for Work Zone Traffic Control Devices.

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 "Safety Contingency" is not intended to be used in lieu of bid Items established by the contract.

Remove and dispose of all litter, debris, objectionable material, excess materials that accumulate at the base of all traffic control devices as directed by the Engineer.

ITEM 504: Field Office and Laboratory

Furnish (1) Field Office (Type C).

The Contractor will furnish a Type D Structure (Asphalt Mix Laboratory) modified by the following.

Laboratory room:

The other room of this building will be used as a laboratory and will include access to a bathroom facility from the interior. The laboratory and bathroom facility will have the walls, ceiling and floor insulated such that the air temperature can always be maintained at 76 degrees Fahrenheit.

Furnish for the Department's use in the asphalt laboratory one (1) desktop computer.

ITEM 506: Temporary Erosion, Sedimentation, and Environmental Controls

Before starting each phase of construction, review with the Engineer the SW3P used for temporary erosion control as outlined on the plans. Before construction, place the temporary erosion and sedimentation control features as shown on the SW3P. Location of Construction Exits are to be approved by the Engineer. After completing earthwork operations, restore and reseed the disturbed areas in accordance with the Department's specifications for permanent or temporary erosion control. Before starting grading operations and during the project duration, place the temporary or permanent erosion control measures to prevent sediment from leaving the right of way.

The Contractor Force Account "Erosion Control Maintenance" that has been established for this project is intended to be utilized for work zone Best Management Practice (BMP) maintenance, to improve the effectiveness of the Environmental Controls that may need maintenance attention and/or require replacement while the project is still under the construction stage. These procedures will be mutually agreed upon by the Engineer and the Contractor's Responsible Person based on weekly or more frequent BMP management reviews on the project. The "Erosion Control Maintenance" is not intended to be used in lieu of bid Items established by the contract.

ITEM 508: Constructing Detours

Flexible Base, prime coat, and Asphaltic Concrete Pavement used for detours shall meet the requirements of Items 247, 310 and 3076 respectively, except for measurement and payment.

ITEM 512: Portable Traffic Barrier

During the various construction phases, provide drainage slots in every temporary concrete traffic barrier used for traffic control in order to handle temporary drainage. Provide any additional drainage measures needed as directed by the Engineer.

ITEM 529: Concrete Curb, Gutter, and Combined Curb and Gutter

Before final acceptance of the project, remove discoloration caused by tire marks, mud, asphalt, paint, or other similar material by any method satisfactory to the Engineer to achieve a uniform color and texture of the finished surface exposed to view.

Curb attached to the MBGF thrie-beam transition section will be subsidiary to the MBGF transition.

ITEM 530: Intersections, Driveways, and Turnouts

Prime coat shall meet the requirements of Item 310.

Public and private driveways need to have a smooth vertical transition tie-in between the proposed driveway and the existing driveway. The Contractor is to add a vertical taper if needed which will be subsidiary to Item 530.

ITEM 531: Sidewalks

Construct ¼-inch thick score joints at a maximum 6-foot spacing and expansion joints at a maximum 18 foot spacing. Construct a joint in the center of the sidewalk if it is over 15-foot wide. For steel reinforcement, use 6x6-inch spacing with #3 bars or 6x6 – D6 welded wire fabric.

ITEM 560: Mailbox Assemblies

Coordinate and verify final mailbox locations with TxDOT and the US Postmaster.

ITEM 585: Ride Quality for Pavement Surfaces

Diamond grinding shall be used to remove localized roughness.

Use Surface Test Type B pay adjustment schedule 1 to evaluate ride quality of the travel lanes in accordance with Item 585, “Ride Quality for Pavement Surfaces.” This includes ramps and service road travel lanes.

ITEM 610: Roadway Illumination Assemblies

Luminaires shown on the proposed Traffic Signal installation layout sheets may be shown at an angle for clarity. All luminaires shown shall be installed perpendicular to the main roadway under construction.

In addition to ED (3)-14, each cable for luminaires shall be identified in each ground box, pole base, or other accessible location with yellow electrical tape wrapped around the cable. The tape marking shall be at least 2 inches.

All luminaires on traffic signal poles shall be rated for 240 vac. All safety lighting poles shall be serviced for 480 vac.

Luminaires installed on traffic signal poles will not be paid for directly but shall be considered subsidiary to the various bid Items of the project.

ITEM 618: Conduit

All conduit ends in pole bases, controllers and ground boxes shall be plugged with 4 to 6 inches of polyurethane sealant or its equivalent after cables are in place.

Conduit shall be placed in a straight line not to exceed 2.0 feet in any direction. The depth of the conduit shall be 2.0 feet except when crossing a roadway where the depth shall not be more than 3.0 feet nor less than 1.0 foot below the bottom of the base material in the roadway when placed by the jacking or boring method. Any evidence of damage to the roadway during the jacking or boring operation shall be sufficient grounds to stop the method being used.

Conduit runs under paved roadways or driveways shall be jacked or bored and then pushed across. At these locations, galvanized rigid metal may be used. All other runs shall be made by trenching. Existing pavement which will be removed, reconstructed, or overlaid with new pavement may be trenched across. Trenches for conduit runs shall be a minimum 2 feet deep and 4 inches wide. The conduit shall be placed on a 2-inch sand cushion and then backfilled with a minimum of 6 inches sand fill. The remainder of the trench shall be backfilled with flexible base, soil or two-sack concrete as required by location of conduit on the project or as directed. The top 3 inches shall match the existing surface material.

All conduit elbows and rigid extensions required to be installed on PVC conduit systems will not be paid for separately but will be considered subsidiary to the various bid Items.

Use materials from prequalified Material Producer List as shown on the Texas Department of Transportation (TxDOT) - Construction Division's (CST) Material Producer List. Category is "Roadway Illumination and Electrical Supplies."

ITEM 628: Electrical Services

Arrange for and cooperate with the utility company to provide electrical power for the service(s) shown and as required by the plans. A meter will be required on all electrical services.

ITEMS 636: Signs

Complete sign blanks and panels shall be handled and stored at the job site in such a manner that corners, edges and faces are not damaged. Finished sign blanks shall be stored in either a weatherproof warehouse or outside and off the ground in a vertical position. All paper, cardboard and chemically treated separators and packaging shall be removed prior to outside storage.

ITEM 644: Small Roadside Sign Assemblies

All signs shall be installed as shown in the plans and in accordance with the current edition of the "Texas Manual on Uniform Traffic Control Devices" and the "Sign Crew Field Book" (SCFB).

All signs shall be erected according to the locations shown on the signing layout sheets except that a sign may be shifted in order to secure a more desirable location. All sign locations will be staked as shown in the plans and as approved. It is the intent of the plans to erect all roadside traffic signs with the sign edge a minimum of 6 feet from the edge of the shoulder, or if none, 12 feet from the edge of the travel lane. In curb and gutter sections, the sign edge shall be a minimum of 2 feet from the face of the curb.

For this project, aluminum type sign blanks as provided for under Item 636 will be required for all proposed signing installed under Item 644. Aluminum sign blanks less than 7.5 square feet shall be 0.08-inch-thick, sign blanks 7.5 to 15 square feet shall be 0.100-inch-thick and sign blanks greater than 15 square feet shall be 0.125 inch thick.

All excess excavation shall be spread uniformly inside the right of way as directed and shall be included in the price of these Items.

Sign types which design details are not shown on the plans shall conform with the latest edition of the Department's "Standard Highway Sign Design for Texas" Manual.

Signs shown to be removed shall include the complete sign installation and separate the sign post at the concrete foundation. The concrete foundation shall be disposed in accordance with this bid Item. Except for concrete foundations, all removed sign panels, sign posts, and hardware shall remain then property of the Department. All removed sign installations shall be completely disassembled. All salvageable sections of sign panels shall be recycled by TxDOT. The removed sign material will be required to be hauled to the maintenance yard closest to the project. No signs shall be removed without prior approval.

ITEM 656: Foundations for Traffic Control Devices

The dimensions shown on the plans for location of signal pole foundations, conduit and other items may be varied to meet existing conditions as approved.

The work area shall be cleaned up and all loose material resulting from the contract operations shall be removed from the work area each day before work is suspended.

No traffic signal pole shall be placed on the foundations prior to seven (7) days following placement of concrete.

ITEMS 662 and 666: Work Zone Pavement Markings and Retroreflectorized Pavement Markings

All permanent pavement markings and work zone pavement markings for this project under these Items shall be 0.100 inches (100 mil) thick thermoplastic.

Any permanent pavement markings or non-removal work zone pavement markings lacking reflectivity in accordance with the requirements of Tex 828-B, or that fail to meet minimum retro reflectivity requirements for longitudinal pavement markings when required, will be addressed per the requirements of the specification. The roadway will be re-striped at no additional compensation.

Pavement surface preparation for markings and markers will not be paid for directly but shall be considered subsidiary to Item 666.

Prior to any striping operations, an on-site coordination meeting between all the parties involved will be required to review striping details and requirements to ensure quality work.

The beads used on this project shall meet the requirements of Departmental Materials Specification DMS-8290, Glass Traffic Beads Texas Type II & III. Use a 50% Type II/ 50% Type III mix utilizing a double drop system with Type III beads dropped first.

ITEM 677: Eliminating Existing Pavement Markings and Markers

Asphalt and aggregate types and grades shall be as approved in writing when a surface treatment is used to eliminate existing pavement markings.

ITEM 680: Highway Traffic Signals

The installation of highway traffic signals shall consist of the following principal Items:

1. Furnishing and installing 16-phase full traffic actuated controllers, base mounted cabinets, conflict monitors, load switches and loop amplifiers.
2. Furnishing and installing either steel mast arm poles, or steel strain poles and span wire and pedestal poles (as shown on plans), electrical service, luminaires, signal heads, signal cables, pedestrian heads and pedestrian push buttons with signs that meet the "Americans with Disabilities Act" Standards, loop detectors, ground boxes, conduit runs and controller concrete foundations.
3. Removal and disposal of existing signal material specified in the plans.
4. All other Items not listed above which are needed to provide for complete traffic signal installations and for proper signal operation as called for in the plans and specifications shall be furnished and installed.

Any deviation of location for proposed signal work shall be as approved.

Signal controller

The signal installations shall be wired in accordance with the phase diagrams in the plans. The proposed base mounted cabinet shall contain 16-phase conflict monitor which display the "R-Y-G" and "Walk" phases. In addition to detecting phasing conflicts, the conflict monitor shall also be able to detect multiple signal head indications within every phase. The conflict monitor shall continue to operate in the event of a power supply failure in the timer and shall be able to retain in memory the time and date of the failure detection. Time changes shall be programmable in the field without replacing components or use of external devices. The full-actuated controller shall meet N.E.M.A. Specifications.

A controller manufacturer's technician shall be required to load initial timing programs into the controllers as called for in the plans. Once the traffic signals are turned on, the same technician shall monitor the signal operation and traffic movement and shall adjust settings for best signal operation. The technician shall provide the State with a certification that the timing plan and coordination has been established according to the plans. This certification shall include a record showing all settings and functions programmed into the timer and any related units.

The controller must be delivered with two sets of wiring diagrams and operating manuals enclosed in a weatherproof bag.

All wiring not covered by the plans and specifications shall be in accordance with the latest edition of the National Electrical Code.

Existing utilities

The exact location of existing underground utilities shall be verified with the utility companies prior to construction to avoid conflict with or damage to these utilities.

Coordination with the utility companies will be required to make any adjustments, due to utility conflicts, as defined in the specifications or deemed necessary.

Uniformity in Equipment

1. All traffic signal heads furnished shall be by the same manufacturer.
2. All signal fittings and pipe brackets shall be of an approved metallic material and of the same design and manufacturer.
3. All traffic signal poles furnished shall be by the same manufacturer.
4. All loop detector amplifiers furnished shall be by the same manufacturer.

Handling of Traffic

Roads and streets shall always be kept open to traffic. The setting of loop detectors shall be arranged so as to close only one lane of a roadway at a time. The installation of signal heads, poles and conduit shall also be arranged so as to permit the continuous movement of traffic in both directions at all times.

All construction operations shall be conducted to provide the least possible interference to traffic as shown on the plans, as provided for in the specifications and/or as directed. All signing, barricading, and handling of traffic shall conform to the current edition of the "Texas Manual on Uniform Traffic Control Devices".

Sequence of work

1. The existing traffic signal installations shall always remain in operation during construction of the proposed traffic signal installations or modifications.
2. The complete removal of the specified existing traffic signals or specified Items will be required when the proposed traffic signal installations are in place and operational.
3. All labor, tools, and materials used to remove the specified existing traffic signal material shall not be paid for directly but be considered subsidiary to the various items of work.
4. Final inspection shall be conducted in conjunction with the district signal shop.

ITEM 682: Vehicle and Pedestrian Signal Heads

All signal heads shall be covered with burlap from the time of installation until the signal is placed in operation. All signal heads shall be of polycarbonate material and yellow in color. Signal heads shall have standard detachable visors. LEDs shall be furnished for all traffic signal heads.

Signal heads shall be positioned carefully to provide the best view of signal indications to motorists. All signal heads shall be installed to a neat overall appearance. Nominal height for signal heads above pavement surface shall be 18 feet 6 inches, plus/minus 3 inches.

Pedestrian signal heads shall be positioned carefully to provide the best view to pedestrians.

ITEM 684: Traffic Signal Cables

All signal cable shall be #12 AWG; 2/c loop. Lead-In shall be #14 AWG shielded and loop wires in pavement.

ITEM 685: Roadside Flashing Beacon Assemblies

The roadside flashing beacons shall be installed at locations shown on the signing detail sheets and as shown on Standard Sheet RFBA-13.

All wiring not covered by the plans and specifications shall be in accordance with the latest edition of the National Electrical Code.

Grounding and bonding

A continuous bare or green insulated copper wire no. 8 or larger shall be installed in every conduit throughout the electrical and traffic signal system in accordance with Item 680, the Electrical Detail Sheets, and the latest edition of the National Electrical Code.

Existing utilities

The exact location of existing underground utilities shall be verified with the utility company prior to construction to avoid conflict with or damage to these utilities.

Coordination with the utility companies will be required to make any adjustments, due to utility conflicts, as defined in the specifications or deemed necessary.

Handling of traffic

All construction operations shall be conducted to provide the least possible interference to traffic as shown on the plans, as provided for in the specifications and/or as directed. All signing, barricading, and handling of traffic shall conform to the current edition of the "Texas Manual on Uniform Traffic Control Devices".

ITEM 686: Traffic Signal Pole Assemblies (Steel)

The locations for the proposed traffic signal poles are approximate. The exact locations will be determined in the field in coordination with the District Signal Shop.

Erection and/or removal of poles and luminaries located near any overhead electrical power lines shall be accomplished using established industry and utility safety practices. The appropriate utility company shall be consulted with prior to beginning such work.

ITEM 688: Pedestrian Detectors and Vehicle Loop Detectors

Loop detectors shall be installed to replace those damaged or destroyed due to construction operations.

Before milling operations begin, all existing loop detector locations shall be marked, and their configuration and orientation obtained for replacement with same size loop detectors.

Any deviation of location for proposed loop detector work shall be as approved.

Install loop vehicle detectors in accordance with plan Standard Sheet LD1-03 (Loop Detector Installation Details). All loop detectors shall be rectangular.

Use 2/c #14 AWG shielded for loop lead-ins and #14 AWG for loop wire in pavement.

Splices for loop wire will be permitted only at ground boxes or pole base with approved weatherproof splice kits.

A minimum length of 2 feet for each cable shall be left in each ground box.

All wiring not covered by the plans and specifications shall be in accordance with the latest edition of the National Electrical Code.

Handling of traffic

Roads and streets shall always be kept open to traffic. The setting of loop detectors shall be arranged so as to close only one lane of a roadway at a time and to permit the continuous movement of traffic in both directions at all times.

All construction operations shall be conducted to provide the least possible interference to traffic as shown on the plans, as provided for in the specifications and/or as directed. All signing, barricading, and handling of traffic lane closures shall conform to the current edition of the "Texas Manual on Uniform Traffic Control Devices".

Sequence of work

1. The existing traffic signal installation shall always remain in operation during construction of the proposed loop detector work.
2. Final inspection shall be performed in conjunction with the District Signal Shop.

ITEM 688: Pedestrian Detectors and Vehicle Loop Detectors

The Contractor shall install loop vehicle detectors in accordance with the Intersection layouts in the plans or as directed. Each loop detector Lead-In cable shall be tagged inside the controller cabinet with its loop number. The loop amplifiers shall indicate the loop and phase of control or direction of control. Loop wires in street shall be #14 AWG. Pedestrian detectors shall meet the minimum requirements called for by the "Americans with Disabilities Act".

Loop detector lead-in cable shall be continuous from ground box to the controller.

Splices for loop wire will be permitted only at ground boxes or pole base with approved weatherproof splice kits.

A minimum length of 2.0 feet for each cable shall be left in each ground box.

ITEM 1007: Irrigation Wells, Gates, and Valves

If the Contractor elects, a larger size item may be furnished and installed at no extra cost to the State.

ITEM 6185: Truck Mounted Attenuator/Trailer Attenuator

In addition to the shadow vehicles with truck mounted attenuator (TMA) that are specified as being required on the traffic control plan for the project, provide 2 additional shadow vehicle(s) with TMA as per TCP (1-1) -18 as detailed on General Note 5 of this standard sheet;
or as per TCP (1-2) -18 as detailed on General Note 6 of this standard sheet;
or as per TCP (1-3) -18 as detailed on General Note 7 of this standard sheet;
or as per TCP (1-4) -18 as detailed on General Note 5 of this standard sheet;
or as per TCP (2-1) -18 as detailed on General Note 5 of this standard sheet;
or as per TCP (2-2) -18 as detailed on General Note 7 of this standard sheet;
or as per TCP (2-3) -18 as detailed on General Note 8 of this standard sheet.
or as per TCP (2-4) -18 as detailed on General Note 6 of this standard sheet;
or as per TCP (2-5) -18 as detailed on General Note 4 of this standard sheet.

Therefore, 3 total shadow vehicles with TMA will be required on this project for the type of work as shown on the plans. The Contractor will be responsible for determining if one or more of his construction operations will be ongoing at the same time and thus determine the total number of TMAs needed for the project.

CONTROL : 1064-01-032
PROJECT : C 1064-1-32
HIGHWAY : FM 676
COUNTY : HIDALGO

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 100 PREPARING RIGHT OF WAY (103)
ITEM 104 REMOVING CONCRETE
ITEM 110 EXCAVATION (132)
ITEM 132 EMBANKMENT (100) (160) (204) (210) (216) (260) <275> (400)
ITEM 134 BACKFILLING PAVEMENT EDGES (162) (166) (168) (300) (314)
ITEM 158 SPECIALIZED EXCAVATION WORK (132)
ITEM 160 TOPSOIL (168)
ITEM 164 SEEDING FOR EROSION CONTROL (162) (166) (168)
ITEM 168 VEGETATIVE WATERING
ITEM 169 SOIL RETENTION BLANKETS
ITEM 204 SPRINKLING
ITEM 216 PROOF ROLLING (210)
ITEM 247 FLEXIBLE BASE (105) (204) (210) (216) (520)
ITEM 251 REWORKING BASE COURSES (204) (210) (216) (247) (520)
ITEM 260 LIME TREATMENT (ROAD-MIXED) (105) (132) (204) (210) (216)
(247) (300) (310) (520)
ITEM 275 CEMENT TREATMENT (ROAD-MIXED) (132) (204) (210) (216) (247)
(300) (310) (520)
ITEM 305 SALVAGING, HAULING, AND STOCKPILING RECLAIMABLE ASPHALT
PAVEMENT
ITEM 310 PRIME COAT (300) (316)
ITEM 316 SEAL COAT (210) (300) (302) (520)
ITEM 354 PLANING AND TEXTURING PAVEMENT
ITEM 400 EXCAVATION AND BACKFILL FOR STRUCTURES (110) (132) (401)
(402) (403) (416) (420) (421) (423)
ITEM 401 FLOWABLE BACKFILL (421)
ITEM 402 TRENCH EXCAVATION PROTECTION
ITEM 403 TEMPORARY SPECIAL SHORING (410) (411) (423)
ITEM 416 DRILLED SHAFT FOUNDATIONS (405) (420) (421) (423) (440) (448)

ITEM 423 RETAINING WALLS (110) (132) (216) (400) (416) (420) (421) (424)
 (440) (445) <458> <556>
 ITEM 432 RIPRAP (247) (420) (421) <427> (431) (440)
 ITEM 460 CORRUGATED METAL PIPE (400) (402) (403) (445) (467) (476)
 ITEM 462 CONCRETE BOX CULVERTS AND DRAINS (400) (402) (403) (420)
 (421) (422) (424) (440) (464) (476)
 ITEM 464 REINFORCED CONCRETE PIPE (400) (402) (403) (467) (476)
 ITEM 465 JUNCTION BOXES, MANHOLES, AND INLETS (400) (420) (421) (424)
 (440) (471)
 ITEM 466 HEADWALLS AND WINGWALLS (400) (420) (421) (432) (440) (464)
 ITEM 467 SAFETY END TREATMENT (400) (420) (421) (432) (440) (445) (460)
 (464)
 ITEM 471 FRAMES, GRATES, RINGS, AND COVERS (441) (445) (448) (465)
 ITEM 496 REMOVING STRUCTURES
 ITEM 500 MOBILIZATION
 ITEM 502 BARRICADES, SIGNS, AND TRAFFIC HANDLING
 ITEM 504 FIELD OFFICE AND LABORATORY
 ITEM 506 TEMPORARY EROSION, SEDIMENTATION, AND ENVIRONMENTAL
 CONTROLS (161) (432) (556)
 ITEM 508 CONSTRUCTING DETOURS
 ITEM 512 PORTABLE TRAFFIC BARRIER (420) (421) (424) (440) (442)
 ITEM 528 COLORED TEXTURED CONCRETE AND LANDSCAPE PAVERS (132) (247)
 (275) (401) (420) (421) (440)
 ITEM 529 CONCRETE CURB, GUTTER, AND COMBINED CURB AND GUTTER (360)
 (420) (421) (440)
 ITEM 530 INTERSECTIONS, DRIVEWAYS, AND TURNOUTS (247) (260) (263)
 (275) (276) (292) (316) (330) (334) (340) (360) (421) (440)
 ITEM 531 SIDEWALKS (104) (360) (420) (421) (440) (530)
 ITEM 545 CRASH CUSHION ATTENUATORS (421)
 ITEM 550 CHAIN LINK FENCE (421) (445)
 ITEM 560 MAILBOX ASSEMBLIES
 ITEM 618 CONDUIT (400) <445> (476) <622>
 ITEM 620 ELECTRICAL CONDUCTORS (610) (628)
 ITEM 621 TRAY CABLE (620)
 ITEM 624 GROUND BOXES (420) (421) (432) (440) (618) (620)
 ITEM 625 ZINC-COATED STEEL WIRE STRAND
 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 662 WORK ZONE PAVEMENT MARKINGS (666) (668) (672) (677)
 ITEM 666 RETROREFLECTORIZED PAVEMENT MARKINGS (316) <318> (502) (662)
 (677) (678)
 ITEM 672 RAISED PAVEMENT MARKERS (677) (678)
 ITEM 677 ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS (300)
 (302) (316)
 ITEM 680 HIGHWAY TRAFFIC SIGNALS (416) (610) (618) (624) (625) (627)
 (628) (636) (656) (682) (684) (686) (688)
 ITEM 681 TEMPORARY TRAFFIC SIGNALS (416) (610) (618) (620) (621) (622)
 (624) (625) (627) (628) (636) <644> (656) (680) (682) (684) (686)
 (687) (688) <690>
 ITEM 682 VEHICLE AND PEDESTRIAN SIGNAL HEADS
 ITEM 684 TRAFFIC SIGNAL CABLES
 ITEM 685 ROADSIDE FLASHING BEACON ASSEMBLIES (441) (442) (445) (449)
 (610) (620) (621) (624) (628) (656) (682) (684) (687) <4003>

ITEM 686 TRAFFIC SIGNAL POLE ASSEMBLIES (STEEL) (416) (421) (441)
(442) (445) (449)
ITEM 687 PEDESTAL POLE ASSEMBLIES (445) (449) (656) (682) <4003>
ITEM 688 PEDESTRIAN DETECTORS AND VEHICLE LOOP DETECTORS (618)
(624) (682) (684)

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

SPECIAL LABOR PROVISIONS FOR STATE PROJECTS (000---008)
SPECIAL PROVISION "NONDISCRIMINATION" (000---002)
SPECIAL PROVISION "SMALL BUSINESS ENTERPRISE IN STATE FUNDED PROJECTS
" (000---009)
SPECIAL PROVISION "AMERICANS WITH DISABILITIES ACT CURB RAMP WORKSHOP
" (000---025)
SPECIAL PROVISION "CERTIFICATE OF INTERESTED PARTIES (FORM 1295)"
(000--1019)
SPECIAL PROVISION "SCHEDULE OF LIQUIDATED DAMAGES" (000--1243)
SPECIAL PROVISION "NOTICE OF CONTRACTOR PERFORMANCE EVALUATIONS"
(000---659)
SPECIAL PROVISIONS TO ITEM 2 (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---001) (006---012)
SPECIAL PROVISIONS TO ITEM 7 (007---004) (007---008) (007---010)
(007---011)
SPECIAL PROVISIONS TO ITEM 8 (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 314 (314---001)
SPECIAL PROVISION TO ITEM 316 (316---002)
SPECIAL PROVISION TO ITEM 334 (334---003)
SPECIAL PROVISION TO ITEM 340 (340---004)
SPECIAL PROVISION TO ITEM 420 (420---001)
SPECIAL PROVISION TO ITEM 421 (421---010)
SPECIAL PROVISION TO ITEM 427 (427---003)
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 462 (462---002)
SPECIAL PROVISION TO ITEM 464 (464---001)
SPECIAL PROVISION TO ITEM 465 (465---001)
SPECIAL PROVISION TO ITEM 502 (502---008)
SPECIAL PROVISION TO ITEM 506 (506---005)
SPECIAL PROVISION TO ITEM 520 (520---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 SPECIFICATIONS:

ITEM 1007 IRRIGATION WELLS, GATES, AND VALVES <421><440><464>
ITEM 1008 PRESSURE IRRIGATION PVC PIPE <400><401><464><467><4024>
ITEM 3077 SUPERPAVE MIXTURES
ITEM 4003 TYPE CAC CONCRETE
ITEM 4024 REINFORCED CONCRETE LOW-HEAD PRESSURE PIPE <400><402>
<403><464>
ITEM 5145 GATE (INSTALL) <421><445>
ITEM 5148 RIPRAP CANAL LINER
ITEM 6001 PORTABLE CHANGEABLE MESSAGE SIGN
ITEM 6027 PREPARATION OF EXISTING CONDUITS, GROUND BOXES, OR
MANHOLES (465)(624)
ITEM 6054 SPREAD SPECTRUM RADIOS FOR TRAFFIC SIGNALS
ITEM 6061 GLOBAL POSITIONING SYSTEM (GPS) COMMUNICATION UNIT

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 1064-01-032

Project C 1064-1-32

Highway FM 676

County HIDALGO

SMALL BUSINESS ENTERPRISE REQUIREMENTS

The following goal for small business enterprises is established:

SBE
0.0%

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.

Special Provision to Item 000

Special Labor Provisions for State Projects



1. GENERAL

This is a "Public Works" Project, as provided under Government Code Title 10, Chapter 2258, "Prevailing Wage Rates," and is subject to the provisions of the Statute. No provisions in the Contract are intended to be in conflict with the provisions of the Statute.

The Texas Transportation Commission has ascertained and indicated in the special provisions the regular rate of per diem wages prevailing in each locality for each craft or type of worker. Apply the wage rates contained in the specifications as minimum wage rates for the Contract.

2. MINIMUM WAGES, HOURS AND CONDITIONS OF EMPLOYMENT

All workers necessary for the satisfactory completion of the work are within the purview of the Contract.

Whenever and wherever practical, give local citizens preference in the selection of labor.

Do not require any worker to lodge, board or trade at a particular place, or with a particular person as a condition of employment.

Do not charge or accept a fee of any from any person who obtains work on the project. Do not require any person who obtains work on the project to pay any fee to any other person or agency obtaining employment for the person on the project.

Do not charge for tools or equipment used in connection with the duties performed, except for loss or damage of property. Do not charge for necessary camp water.

Do not charge for any transportation furnished to any person employed on the project.

The provisions apply where work is performed by piece work, station work, etc. The minimum wage paid will be exclusive of equipment rental on any shipment which the worker or subcontractor may furnish in connection with his work.

Take responsibility for carrying out the requirements of this specification and ensure that each subcontractor working on the project complies with its provisions.

Any form of subterfuge, coercion or deduction designed to evade, reduce or discount the established minimum wage scales will be considered a violation of the Contract.

The Fair Labor Standards Acts (FLSA) established one and one-half (1-1/2) pay for overtime in excess of 40 hours worked in 1 week. Do not consider time consumed by the worker in going to and returning from the place of work as part of the hours of work. Do not require or permit any worker to work in excess of 40 hours in 1 week, unless the worker receives compensation at a rate not less than 1-1/2 times the basic rate of pay for all hours worked in excess of 40 hours in the workweek.

The general rates of per diem wages prevailing in this locality for each class and type of workers whose services are considered necessary to fulfill the Contract are indicated in the special provisions, and these rates govern as minimum wage rates on this Contract. A penalty of \$60.00 per calendar day or portion of a calendar day for each worker that is paid less than the stipulated general rates of per diem wages for any work done under the Contract will be deducted. The Department, upon receipt of a complaint by a worker,

will determine within 30 days whether good cause exists to believe that the Contractor or a subcontractor has violated wage rate requirements and notify the parties involved of the findings. Make every effort to resolve the alleged violation within 14 days after notification. The next alternative is submittal to binding arbitration in accordance with the provisions of the Texas General Arbitration Act (Art. 224 et seq., Revised Statutes).

Notwithstanding any other provision of the Contract, covenant and agree that the Contractor and its subcontractors will pay each of their employees and contract labor engaged in any way in work under the Contract, a wage not less than what is generally known as the "federal minimum wage" as set out in 29 U.S.C. 206 as that Statute may be amended from time to time.

Pay any worker employed whose position is not listed in the Contract, a wage not less than the per diem wage rate established in the Contract for a worker whose duties are most nearly comparable.

3. RECORD AND INSPECTIONS

Keep copies of weekly payrolls for review. Require subcontractors to keep copies of weekly payrolls for review. Show the name, occupation, number of hours worked each day and per diem wage paid each worker together with a complete record of all deductions made from such wages. Keep records for a period of 3 years from the date of completion of the Contract.

Where the piece-work method is used, indicate on the payroll for each person involved:

- Quantity of piece work performed.
- Price paid per piece-work unit.
- Total hours employed.

The Engineer may require the Contractor to file an affidavit for each payroll certifying that payroll is a true and accurate report of the full wages due and paid to each person employed.

Post or make available to employees the prevailing wage rates from the Contract. Require subcontractors to post or make available to employees the prevailing wage rates from the Contract.

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 **02-24-2022** 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 02-24-2022.

CLASS. #	CLASSIFICATION DESCRIPTION	ZONE TX02 *(TX20220002)	ZONE TX03 *(TX20220003)	ZONE TX04 *(TX20220004)	ZONE TX05 *(TX20220005)	ZONE TX06 *(TX20220006)	ZONE TX07 *(TX20220007)	ZONE TX08 *(TX20220008)	ZONE TX24 *(TX20220024)	ZONE TX25 *(TX20220025)	ZONE TX27 *(TX20220027)	ZONE TX28 *(TX20220028)	ZONE TX29 *(TX20220029)	ZONE TX30 *(TX20220030)	ZONE TX37 *(TX20220037)	ZONE TX38 *(TX20220038)	ZONE TX42 *(TX20220042)
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

CLASS. #	CLASSIFICATION DESCRIPTION	ZONE	ZONE	ZONE	ZONE	ZONE	ZONE	ZONE	ZONE	ZONE	ZONE	ZONE	ZONE	ZONE	ZONE	ZONE	ZONE	
		TX02 *(TX20220002)	TX03 *(TX20220003)	TX04 *(TX20220004)	TX05 *(TX20220005)	TX06 *(TX20220006)	TX07 *(TX20220007)	TX08 *(TX20220008)	TX24 *(TX20220024)	TX25 *(TX20220025)	TX27 *(TX20220027)	TX28 *(TX20220028)	TX29 *(TX20220029)	TX30 *(TX20220030)	TX37 *(TX20220037)	TX38 *(TX20220038)	TX42 *(TX20220042)	
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	
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					\$21.29	\$18.34						\$21.29			\$18.62		
1396	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.

Special Provision to Item 000

Small Business Enterprise in State Funded Projects



1. DESCRIPTION

The purpose of this Special Provision is to carry out the Texas Department of Transportation's policy of ensuring that Small Business Enterprise (SBE) has an opportunity to participate in the performance of contracts. If the SBE goal is greater than zero, Article A of this Special Provision shall apply to this Contract; otherwise, Article B of this Special Provision applies. The percentage goal for SBE participation in the work to be performed under this contract will be shown in the proposal.

2. DEFINITIONS

Small Business Enterprise (SBE) is a firm (including affiliates) certified by the Department whose annual gross receipts do not exceed the U.S. Small Business Administration's size standards for 4 consecutive years. Firms certified as Historically Underutilized Businesses (HUBs) by the Texas Comptroller of Public Accounts and as Disadvantaged Business Enterprises (DBEs) by the Texas Uniform Certification Program automatically qualify as SBEs.

2.1. Article A - SBE Goal is Greater than Zero.

2.1.1. **Policy.** The Department is committed to providing contracting opportunities for small businesses. In this regard, it is the Department's policy to develop and maintain a program in order to facilitate contracting opportunities for small businesses. Consequently, the requirements of the Department's Small Business Enterprise Program apply to this contract as follows:

2.1.1.1. The Contractor shall make a good faith effort to meet the SBE goal for this contract.

2.1.1.2. The Contractor and any Subcontractors shall not discriminate on the basis of race, color, national origin, age, disability or sex in the award and performance of this contract. These nondiscrimination requirements shall be incorporated into any subcontract and purchase order.

2.1.1.3. After a conditional award is made to the low bidder, the Department will determine the adequacy of a Contractor's efforts to meet the contract goal, as is outlined under Section 2, "Contractor's Responsibilities." If the requirements of Section 2 are met, the contract will be forwarded to the Contractor for execution.

The Contractor's performance, during the construction period of the contract in meeting the SBE goal, will be monitored by the Department.

2.1.2. **Contractor's Responsibilities.** These requirements must be satisfied by the Contractor. A SBE Contractor may satisfy the SBE requirements by performing at least 25% of the contract work with its own organization as defined elsewhere in the contract.

2.1.2.1. The Contractor shall submit a completed SBE Commitment Agreement Form for each SBE they intend to use to satisfy the SBE goal so as to arrive in the Department's Office of Civil Rights (OCR) in Austin, Texas not later than 5:00 p.m. on the 10th business day, excluding national holidays, after the conditional award of the contract. When requested, additional time, not to exceed 7 business days, excluding national holidays, may be granted based on documentation submitted by the Contractor.

2.1.2.2. A Contractor who cannot meet the contract goal, in whole or in part, shall document the good faith efforts taken to meet the SBE goal. The Department will consider as good faith efforts all documented explanations

that are submitted and that describe a Contractor's failure to meet a SBE goal or obtain SBE participation, including:

- 2.1.2.2.1. Advertising in general circulation, trade association, and/or minority/women focus media concerning subcontracting opportunities,
- 2.1.2.2.2. Dividing the contract work into reasonable portions in accordance with standard industry practices,
- 2.1.2.2.3. Documenting reasons for rejection or meeting with the rejected SBE to discuss the rejection,
- 2.1.2.2.4. Providing qualified SBEs with adequate information about bonding, insurance, plans, specifications, scope of work, and the requirements of the contract,
- 2.1.2.2.5. Negotiating in good faith with qualified SBEs, not rejecting qualified SBEs who are also the lowest responsive bidder, and;
- 2.1.2.2.6. Using the services of available minorities and women, community organizations, contractor groups, local, state and federal business assistance offices, and other organizations that provide support services to SBEs.
- 2.1.2.3. The good faith effort documentation is due at the time and place specified in Subarticle 2.(a). of this Special Provision. The Director of the DBE & SBE Programs Section will evaluate the Contractor's documentation. If it is determined that the Contractor has failed to meet the good faith effort requirements, the Contractor will be given an opportunity for reconsideration by the Department.
- 2.1.2.4. Should the bidder to whom the contract is conditionally awarded refuse, neglect or fail to meet the SBE goal and/or demonstrate to the Department's satisfaction sufficient efforts to obtain SBE participation, the proposal guaranty filed with the bid shall become the property of the State, not as a penalty, but as liquidated damages to the Department.
- 2.1.2.5. The Contractor must not terminate a SBE subcontractor submitted on a commitment agreement for a contract with an assigned goal without the prior written consent of the Department.
- 2.1.2.6. The Contractor shall designate a SBE contact person who will administer the Contractor's SBE program and who will be responsible for submitting reports, maintaining records, and documenting good faith efforts to use SBEs.
- 2.1.2.7. The Contractor must inform the Department of the representative's name, title and telephone number within 10 days of beginning work.
- 2.1.3. **Eligibility of SBEs.**
- 2.1.3.1. The Department certifies the eligibility of SBEs.
- 2.1.3.2. The Department maintains and makes available to interested parties a directory of certified SBEs.
- 2.1.3.3. Only firms certified at the time of letting or at the time the commitments are submitted are eligible to be used in the information furnished by the Contractor required under Section 2.(a) above.
- 2.1.3.4. Certified HUBs and DBEs are eligible as SBEs.
- 2.1.3.5. Small Business Size Regulations and Eligibility is referenced on e-CFR (Code of Federal Regulations), Title 13 – Business Credit and Assistance, Chapter 1 – Small Business Administration, Part 121 – Small Business Size Regulations, Subpart A – Size Eligibility Provisions and Standards.
- 2.1.4. **Determination of SBE Participation.** SBE participation shall be counted toward meeting the SBE goal in this contract in accordance with the following:

- 2.1.4.1. A Contractor will receive credit for all payments actually made to a SBE for work performed and costs incurred in accordance with the contract, including all subcontracted work.
- 2.1.4.2. A SBE Contractor or subcontractor may not subcontract more than 75% of a contract. The SBE shall perform not less than 25% of the value of the contract work with its own organization.
- 2.1.4.3. A SBE may lease equipment consistent with standard industry practice. A SBE may lease equipment from the prime contractor if a rental agreement, separate from the subcontract specifying the terms of the lease arrangement, is approved by the Department prior to the SBE starting the work in accordance with the following:
- 2.1.4.3.1. If the equipment is of a specialized nature, the lease may include the operator. If the practice is generally acceptable with the industry, the operator may remain on the lessor's payroll. The operator of the equipment shall be subject to the full control of the SBE, for a short term, and involve a specialized piece of heavy equipment readily available at the job site.
- 2.1.4.3.2. For equipment that is not specialized, the SBE shall provide the operator and be responsible for all payroll and labor compliance requirements.
- 2.1.5. **Records and Reports.**
- 2.1.5.1. The Contractor shall submit monthly reports, after work begins, on SBE payments, (including payments to HUBs and DBEs). The monthly reports are to be sent to the Area Engineer's office. These reports will be due within 15 days after the end of a calendar month.
- These reports will be required until all SBE subcontracting or supply activity is completed. The "SBE Progress Report" is to be used for monthly reporting. Upon completion of the contract and prior to receiving the final payment, the Contractor shall submit the "SBE Final Report" to the Office of Civil Rights and a copy to the Area Engineer. These forms may be obtained from the Office of Civil Rights and reproduced as necessary. The Department may verify the amounts being reported as paid to SBEs by requesting, on a random basis, copies of invoices and cancelled checks paid to SBEs. When the SBE goal requirement is not met, documentation supporting Good Faith Efforts, as outlined in Section 2.(b) of this Special Provision, must be submitted with the Final Report.
- 2.1.5.2. SBE subcontractors and/or suppliers should be identified on the monthly report by SBE certification number, name and the amount of actual payment made to each during the monthly period. **These reports are required regardless of whether or not SBE activity has occurred in the monthly reporting period.**
- 2.1.5.3. All such records must be retained for a period of 3 years following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the Department.
- 2.1.6. **Compliance of Contractor.** To ensure that SBE requirements of this contract are complied with, the Department will monitor the Contractor's efforts to involve SBEs during the performance of this contract. This will be accomplished by a review of monthly reports submitted by the Contractor indicating his progress in achieving the SBE contract goal and by compliance reviews conducted by the Department.
- A Contractor's failure to comply with the requirements of this Special Provision shall constitute a material breach of this contract. In such a case, the Department reserves the right to employ remedies as the Department deems appropriate in the terms of the contract.
- 2.2. **Article B - No SBE Goal.**
- 2.2.1. **Policy.** It is the policy of the Department that SBEs shall have an opportunity to participate in the performance of contracts. Consequently, the requirements of the Department's Small Business Enterprise Program apply to this contract as specified in Section 2-5 of this Article.

- 2.2.2. **Contractor's Responsibilities.** If there is no SBE goal, the Contractor will offer SBEs an opportunity to participate in the performance of contracts and subcontracts.
- 2.2.3. **Prohibit Discrimination.** The Contractor and any subcontractor shall not discriminate on the basis of race, color, national origin, religion, age, disability or sex in the award and performance of contracts. These nondiscrimination requirements shall be incorporated into any subcontract and purchase order.
- 2.2.4. **Records and Reports.**
- 2.2.4.1. The Contractor shall submit reports on SBE (including HUB and DBE) payments. The reports are to be sent to the Area Engineer's office. These reports will be due annually by the 31st of August or at project completion, whichever comes first.
- These reports will be required until all SBE subcontracting or supply activity is completed. The "SBE Progress Report" is to be used for reporting. Upon completion of the contract and prior to receiving the final payment, the Contractor shall submit the "SBE Final Report" to the Office of Civil Rights and a copy to the Area Engineer. These forms may be obtained from the Office of Civil Rights and reproduced as necessary. The Department may verify the amounts being reported as paid to SBEs by requesting copies of invoices and cancelled checks paid to SBEs on a random basis.
- 2.2.4.2. SBE subcontractors and/or suppliers should be identified on the report by SBE Certification Number, name and the amount of actual payment made.
- 2.2.4.3. All such records must be retained for a period of 3 years following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the Department.

Special Provision to Item 000

Americans with Disabilities Act Curb Ramp Workshop



Before starting work, schedule and attend a mandatory preconstruction Americans with Disabilities Act curb ramp workshop. The workshop will be administered by the Department, will be four hours or less, and will be held during normal working hours at an approved location in proximity to the project.

Supervisory personnel responsible for control of the work must attend the workshop.

The Department will provide workshop facilitators and facilities. No direct compensation will be made for fulfilling these requirements, as this workshop is considered subsidiary to the Items of the Contract.

Special Provision 000

Certificate of Interested Parties (Form 1295)



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.

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.

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.

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.

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," 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.

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 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.

Special Provision to Item 3 Award and Execution 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." 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

Type of Insurance	Amount of Coverage
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

Special Provision to Item 5

Control of the Work



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.

Special Provision to Item 5

Control of the Work



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.

Special Provision to Item 6

Control of Materials



For this project, Item 6, "Control of Materials," 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., "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/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 and e-mail;
- reimburse the Department for CL Table 1 testing using the contract fee schedule for the CL (including mileage and travel/standby time) 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 and 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)
SOILS/BASE		
Tex-101-E	Preparation of Soil and Flexible Base Materials for Testing (included in other tests)	
Tex-104-E	Liquid Limit of Soils (included in 106-E)	
Tex-105-E	Plastic Limit of Soils (included in 106-E)	
Tex-106-E	Calculating the Plasticity Index of Soils	7
Tex-110-E	Particle Size Analysis of Soils	6
Tex-113-E	Moisture-Density Relationship of Base Materials	7
Tex-114-E	Moisture-Density Relationship of Subgrade and Embankment Soil	7
Tex-115-E	Field Method for In-Place Density of Soils and Base Materials	2
Tex-116-E	Ball Mill Method for the Disintegration of Flexible Base Material	5
Tex-117-E, Part II	Triaxial Compression Tests For Disturbed Soils and Base Materials (Part II)	6
Tex-113-E w/ Tex-117-E	Moisture-Density Relationship of Base Materials with Triaxial Compression Tests For Disturbed Soils and Base Materials (Part II)	10
Tex-140-E	Measuring Thickness of Pavement Layer	2
Tex-145-E	Determining Sulfate Content in Soils - Colorimetric Method	4
HOT MIX ASPHALT		
Tex-200-F	Sieve Analysis of Fine and Coarse Aggregate (dry, from ignition oven with known correction factors)	1 (Note 2)
Tex-203-F	Sand Equivalent Test	3
Tex-206-F, w/ Tex-207-F, Part I, w/ Tex-227-F	(Lab-Molded Density of Production Mixture – Texas Gyrotory) Method of Compacting Test Specimens of Bituminous Mixtures with Density of Compacted Bituminous Mixtures, Part I - Bulk Specific Gravity of Compacted Bituminous Mixtures, with Theoretical Maximum Specific Gravity of Bituminous Mixtures	1 (Note 2)
Tex-207-F, Part I &/or Part VI	(In-Place Air Voids of Roadway Cores) Density of Compacted Bituminous Mixtures, Part I- Bulk Specific Gravity of Compacted Bituminous Mixtures &/or Part VI - Bulk Specific Gravity of Compacted Bituminous Mixtures Using the Vacuum Method	1 (Note 2)
Tex-207-F, Part V	Density of Compacted Bituminous Mixtures, Part V- Determining Mat Segregation using a Density-Testing Gauge	3
Tex-207-F, Part VII	Density of Compacted Bituminous Mixtures, Part VII - Determining Longitudinal Joint Density using a Density-Testing Gauge	4
Tex-212-F	Moisture Content of Bituminous Mixtures	3
Tex-217-F	Deleterious Material and Decantation Test for Coarse Aggregate	4
Tex-221-F	Sampling Aggregate for Bituminous Mixtures, Surface Treatments, and LRA (included in other tests)	
Tex-222-F	Sampling Bituminous Mixtures (included in other tests)	
Tex-224-F	Determination of Flakiness Index	3
Tex-226-F	Indirect Tensile Strength Test (production mix)	4
Tex-235-F	Determining Draindown Characteristics in Bituminous Materials	3
Tex-236-F (Correction Factors)	Asphalt Content from Asphalt Paving Mixtures by the Ignition Method (Determining Correction Factors)	4
Tex-236-F	Asphalt Content from Asphalt Paving Mixtures by the Ignition Method (Production Mixture)	1 (Note 2)
Tex-241-F w/ Tex-207-F, Part I, w/ Tex-227-F	(Lab-Molded Density of Production Mixture – Superpave Gyrotory) Superpave Gyrotory Compacting of Specimens of Bituminous Mixtures (production mixture) with Density of Compacted Bituminous Mixtures, Part I- Part I - Bulk Specific Gravity of Compacted Bituminous Mixtures, with Theoretical Maximum Specific Gravity of Bituminous Mixtures	1 (Note 2)
Tex-242-F	Hamburg Wheel-Tracking Test (production mix, molded samples)	3
Tex-244-F	Thermal Profile of Hot Mix Asphalt	1
Tex-246-F	Permeability of Water Flow of Hot Mix Asphalt	3
Tex-280-F	Flat and Elongated Particles	3
Tex-530-C	Effect of Water on Bituminous Paving Mixtures (production mix)	4

AGGREGATES		
Tex-400-A	Sampling Flexible Base, Stone, Gravel, Sand, and Mineral Aggregates	3
Tex-410-A	Abrasion of Coarse Aggregate Using the Los Angeles Machine	5
Tex-411-A	Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate	12
Tex-461-A	Degradation of Coarse Aggregate by Micro-Deval Abrasion	5
CHEMICAL		
Tex-612-J	Acid Insoluble Residue for Fine Aggregate	4
GENERAL		
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)		
Note 1– Turn-Around Time includes test time and time for travel/sampling and reporting. 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.		

Special Provision to Item 6

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.

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 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.

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 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.

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 7.2.4., "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.

Special Provision to Item 8 Prosecution and Progress



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.

Special Provision to Item 8 Prosecution and Progress



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."

Special Provision to Item 009

Measurement and Payment



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 25th 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.

Special Provision to Item 9

Measurement and Payment



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 ¹	Tex-117-E, Part II	6
Compressive Strength ²	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.

Special Provision to Item 300 Asphalt, Oils, and Emulsions



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 % Retained¹)

Sieve	Grade								
	1	2	3S ²	3		4S ²	4	5S ²	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 ¹	
		Minimum	Maximum
SAC	AQMP	As shown on the plans	
Deleterious Material ² , %	Tex-217-F , Part I	-	2.0
Decantation, %	Tex-406-A	-	1.5
Flakiness Index, %	Tex-224-F	-	17
Gradation	Tex-200-F , Part I	Table 2 Requirements	
Los Angeles Abrasion, %	Tex-410-A	-	35
Magnesium Sulfate Soundness, 5 Cycle, %	Tex-411-A	-	25
Micro-Deval Abrasion, %	Tex-461-A	Note 3	
Coarse Aggregate Angularity ⁴ , 2 Crushed Faces, %	Tex-460-A , Part I	85	-
Additional Requirements for Lightweight Aggregate			
Dry Loose Unit Wt., lb./cu. ft.	Tex-404-A	35	60
Pressure Slaking, %	Tex-431-A	-	6.0
Freeze-Thaw Loss, %	Tex-432-A	-	10.0
Water Absorption, 24hr., %	Tex-433-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.

Special Provision to Item 314

Emulsified Asphalt Treatment



Item 314, "Emulsified Asphalt Treatment" 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.

Articles 1 through 6 are voided and replaced by the following:

1. DESCRIPTION

Apply a mixture of water and asphalt emulsion as a base or subgrade treatment; for erosion control, including dust prevention; or as a prime coat.

2. MATERIALS

Furnish materials of the type and grade shown on the plans in accordance with the following:

- 2.1. **Emulsion.** Furnish emulsified asphalt meeting the requirements of Item 300, "Asphalt, Oils, and Emulsions."
- 2.2. **Emulsion and Water Mixture.** Dilute the emulsion by adding water to create a mixture containing a proportion of emulsion, expressed as a percentage of total volume, in accordance with the percentage shown on the plans or as directed.

3. EQUIPMENT

Provide a self-propelled sprinkler in accordance with Article 204.3., "Equipment." Provide current calibration documentation for the tank used for distribution.

4. CONSTRUCTION

Agitate the emulsion and water mixture to produce a uniform blend. Evenly distribute at the rate selected by the Engineer to locations shown on the plans or as directed.

- 4.1. **Base or Subgrade Treatment.** Treat the base or subgrade to the depth and width shown on the plans or as directed.

Regulate the percentage of emulsion in the mixture and distribute successive applications to achieve the specified rate. Maintain the proper moisture content of the treated material. Mix the treated material, then shape and compact as required by the specification for the course. Finish the course to the line, grade, and typical section shown on the plans. Maintain the surface with light applications of the mixture while curing the course, as directed.
- 4.2. **Erosion Control.** Apply the mixture as shown on the plans or as directed.
- 4.3. **Prime Coat.** Regulate the percentage of emulsion in the mixture and distribute successive applications to achieve the specified rate.

5. MEASUREMENT

The treatment will be measured by the gallon of emulsion used in the emulsion and water mixture.

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 "Emulsified Asphalt (Base or Subgrade Treatment)," "Emulsified Asphalt (Erosion Control)," or "Emulsified Asphalt (Prime Coat)," of the type and grade specified. This price is full compensation for materials, including emulsion and water, and for equipment, labor, tools, and incidentals.

Special Provision to Item 316

Seal Coat



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.

Special Provision to Item 334

Hot-Mix Cold-Laid Asphalt Concrete Pavement



Item 334, "Hot-Mix Cold-Laid Asphalt Concrete Pavement," 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 hereby.

Section 334.4.1.2., "Job-Mix Formula Approval," Table 5, is voided and replaced by the following:

Table 5
Laboratory Mixture Design Properties

Property	Test Method	Requirement
Target laboratory-molded density, % ¹	Tex-207-F	94.0 ± 1.5
Hveem stability, Min	Tex-208-F	35
Hydrocarbon-volatile content, %, Max	Tex-213-F	0.6
Moisture content, %, Max ²	Tex-212-F	1.0
Boil test, %, Max ³	Tex-530-C	10

1. Unless otherwise shown on the plans.
2. Unless otherwise approved.
3. Limit may be increased or eliminated when approved.

Special Provision to Item 340 Dense-Graded Hot-Mix (Small Quantity)



Item 340, "Dense-Graded Hot-Mix (Small Quantity)" of the Standard Specifications is replaced by Special Specification [3076](#), "Dense-Graded Hot-Mix Asphalt," Section 4.9.4., "Exempt Production." All Item 340 Special Provisions and bid codes are no longer available, beginning with the February 2022 letting.

Special Provision to Item 420

Concrete Substructure



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.

Special Provision to Item 421

Hydraulic Cement Concrete



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, ¹ Min f'_c (psi)	Max w/cm Ratio	Coarse Aggregate Grades ^{2,3,4}	Cement Types	Mix Design Options	Exceptions to Mix Design Options	General Usage ⁵
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 ⁶	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 ⁶	Note ⁷	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 ⁶	Note ⁷	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"> ■ Bridge Deck Panels, ■ Retaining Wall Systems, ■ Coping, ■ Sound Walls, ■ Wall Columns, ■ Traffic Rail, ■ Traffic Barrier, ■ Long/Arch Span Culverts, and ■ precast concrete products included in Items 462, 464, and 465. 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 ⁶	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, ¹ Min f_c (psi)	Max w/cm Ratio	Coarse Aggregate Grades ^{2,3,4}	Cement Types	Mix Design Options	Exceptions to Mix Design Options	General Usage ⁵
CO ⁶	4,600	0.40	6		1-8		Bridge deck concrete overlay
LMC ⁶	4,000	0.40	6-8				Latex-modified concrete overlay
SS ⁶	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 ⁶	Note ⁷	0.40	Note ⁷	I, II, I/II, III, IP, IL, IS, IT, V	1-8		Note ⁷
HES	Note ⁷	0.45	Note ⁷	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 ¹⁰	0.45	Note ¹⁰	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 ¹⁰	0.45	Note ¹⁰	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, ^{1,2} 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	
A	> 0.10%	> 0.10%	Determine the dosage of SCMs needed to limit the 14-day expansion of each aggregate ¹ to 0.10% when tested individually in accordance with ASTM C1567.
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 ² 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.
C	≤ 0.10%	> 0.10%	Determine the dosage of SCMs needed to limit the 14-day expansion of coarse and intermediate ¹ aggregate to 0.10% when tested individually in accordance with ASTM C1567.
D	> 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 ² 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.

Special Provision to Item 427

Surface Finishes for Concrete



Item 427, "Surface Finishes for 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 427.2.1 "Coatings," is supplemented with the following:

Epoxy Waterproofing. Provide Type X Epoxy per [DMS-6100](#) "Epoxies and Adhesives." Match color of coating with Federal Standard 595C color 35630, concrete gray, unless otherwise shown on the plans.

Article 427.4.2.2 "Application," is supplemented with the following:

Epoxy Waterproofing. Mix epoxy per manufacturer's instructions. Apply the coating on a dry surface at a maximum application rate of 100 sq. ft per gallon. Apply a thin uniform film of mixed epoxy to the substrate by the use of a short nap roller or brush. The epoxy may be sprayed following the thinning requirements of the manufacturer. No more than 15% reduction is permitted.

Match the color of the applied coating with the color standard shown on the plans. Apply when ambient temperature is between 50°F and 100°F.

Article 427.6 "Payment," the second paragraph is voided and replaced in its entirety with:

When a surface finish for concrete is specified as a pay item, 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 "Adhesive Grout Finish," "Concrete Paint Finish," "Opaque Sealer Finish," "Silicone Resin Paint Finish," "Epoxy Waterproof Finish," or "Blast Finish." This price is full compensation for materials; cleaning and preparing surfaces; application of materials; and equipment, labor, tools, and incidentals.

Special Provision to Item 440

Reinforcement for Concrete



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.

Special Provision to Item 442

Metal for Structures



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.

Special Provision to Item 448

Structural Field Welding



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 ¹	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.

Special Provision to Item 462

Concrete Box Culverts and Drains



Item 462, "Concrete Box Culverts and Drains," 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., "General." The last paragraph is voided and replaced with the following:

Furnish material for precast formed and machine-made box culverts in accordance with DMS-7305, "Fabrication and Qualification Procedure for Multi-Project Fabrication Plants of Precast Concrete Drainage Structures."

Sections 2.2.2., "Formed Precast," and 2.2.3., "Machine-Made Precast," are voided and replaced by the following.

2.2.2 **Precast.** Precast formed and machine –made box culvert fabrication plants must be approved in accordance with DMS-7305, "Fabrication and Qualification Procedure for Multi-Project Fabrication Plants of Precast Concrete Drainage Structures." The Construction Division maintains a list of approved precast box culvert fabrication plants on the Department's MPL. Fabricate precast boxes in accordance with DMS-7305, "Fabrication and Qualification Procedure for Multi-Project Fabrication Plants of Precast Concrete Drainage Structures."

Sections 2.3.2., "Formed Precast," and 2.3.3., "Machine-Made Precast," are voided and replaced by the following.

2.3.2 **Precast.** Make, cure, and test compressive test specimens for precast formed and machine –made box culverts in accordance with DMS-7305, "Fabrication and Qualification Procedure for Multi-Project Fabrication Plants of Precast Concrete Drainage Structures."

Section 2.5., "Marking," the first paragraph is voided and replaced with the following.

Marking. Clearly mark each precast unit with the following:

- Name or trademark of fabricator and plant location;
- ASTM designation and product designation (when applicable);
- Date of manufacture,
- Box size,
- Minimum and maximum fill heights,
- Designation "TX" for precast units fabricated per DMS-7305,
- Fabricator's designated approval stamp for each approved unit,
- Designation "SR" for boxes meeting sulfate-resistant concrete plan requirements (when applicable), and
- Precast drainage structures used for jacking and boring (when applicable).

Section 2.6., "Tolerances." The section is voided and replaced with the following.

Ensure precast sections meet the permissible variations listed in ASTM C1577.

Ensure that the sides of a section at each end do not vary from being perpendicular to the top and bottom by more than 1/2 in. when measured diagonally between opposite interior corners. Deviations from this tolerance will be acceptable if the sections can be fitted at the plant and the joint opening at any point does not exceed 1 in. Use match-marks for proper installation on sections that have been accepted in this manner.

Ensure wall and slab thicknesses are not less than shown on the plans except for occasional deficiencies not greater than 3/16 in. or 5%, whichever is greater. If proper jointing is not affected, thicknesses in excess of plan requirements are acceptable.

Section 2.7., “Defects and Repair.” The section is voided and replaced with the following:

Fine cracks on the surface of members that do not extend to the plane of the nearest reinforcement are acceptable unless the cracks are numerous and extensive. Repair cracks that extend into the plane of the reinforcing steel in accordance with the Department’s Concrete Repair Manual. The Engineer may accept boxes with repairs that are sound, properly finished, and cured in conformance with pertinent specifications. Discontinue further production of precast sections until corrections are made and proper curing is provided when fine cracks on the surface indicate poor curing practices.

Repair precast boxes in accordance with DMS-7305, “Fabrication and Qualification Procedure for Multi-Project Fabrication Plants of Precast Concrete Drainage Structures.”

Section 2.8., “Storage and Shipment.” This section is voided and replaced with the following:

- 2.8 **Storage and Shipment.** Store precast sections on a level surface. Do not place any load on the sections until design strength is reached and curing is complete. Store and ship precast boxes in accordance with DMS-7305, “Fabrication and Qualification Production for Multi-Project Fabrication Plants of Precast Concrete Drainage Structures.

Special Provision to Item 464

Reinforced Concrete Pipe



Item 464, "Reinforced Concrete Pipe," 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., "Fabrication." The section is voided and replaced with the following.

Fabrication plants must be approved by the Materials and Tests Division in accordance with DMS-7305, "Fabrication and Qualification Procedure for Multi-Project Fabrication Plants of Precast Concrete Drainage Structures," before furnishing precast reinforced concrete pipe for Departmental projects. The Department's MPL has a list of approved reinforced concrete pipe plants.

Furnish material and fabricate reinforced concrete pipe in accordance with DMS-7305, "Fabrication and Qualification Procedure for Multi-Project Fabrication Plants of Precast Concrete Drainage Structures."

Section 2.3., "Marking." The first paragraph is voided and replaced with the following.

Furnish each section of reinforced concrete pipe marked with the following information specified in DMS-7305, "Fabrication and Qualification Procedure for Multi-Project Fabrication Plants of Precast Concrete Drainage Structures."

- Class or D-Load of pipe,
- ASTM designation,
- Date of manufacture,
- Pipe size,
- Name or trademark of fabricator and plant location,
- Designation "TX" for precast units fabricated per DMS-7305;
- Designated fabricator's approval stamp for each approved unit,
- Pipe to be used for jacking and boring (when applicable), and
- Designation "SR" for pipe meeting sulfate-resistant concrete plan requirements (when applicable).

Section 2.5., "Causes for Rejection." The section is voided and replaced with the following.

Individual sections of pipe may be rejected for any of the conditions stated in the Annex of DMS-7305, "Fabrication and Qualification Procedure for Multi-Project Fabrication Plants of Precast Concrete Drainage Structures."

Section 2.6., "Repairs." The section is voided and replaced with the following:

Make repairs, if necessary, as stated in the Annex of DMS-7305, "Fabrication and Qualification Procedure for Multi-Project Fabrication Plants of Precast Concrete Drainage Structures."

Special Provision to Item 465

Junction Boxes, Manholes, and Inlets



Item 465, "Junction Boxes, Manholes, and Inlets," 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., "Concrete," The section is voided and replaced with the following.

Furnish concrete per DMS-7305 for formed and machine-made precast junction boxes, manholes, and inlets. Furnish Class C concrete for cast-in-place junction boxes, manholes, and inlets unless otherwise shown on the plans.

Section 3.1., "Precast Junction Boxes, Manholes, and Inlets," The section is voided and replaced with the following.

Construct formed and machine-made precast junction boxes, manholes, and inlets in accordance with DMS-7305, "Fabrication and Qualification Procedure for Multi-Project Fabrication Plants of Precast Concrete Drainage Structures" and the Contract Plans, except as otherwise noted in this Item.

Multi-project fabrication plants as defined in Item 424 "Precast Concrete Structural Members (Fabrication)," that produce junction boxes, manholes, and inlets will be approved by the Materials and Tests Division in accordance with DMS-7305, "Fabrication and Qualification Procedure for Multi-Project Fabrication Plants of Precast Concrete Drainage Structures." The Department's MPL has a list of approved multi-project fabrication plants.

Section 3.1.1., "Lifting Holes," The section is voided and not replaced.

Section 3.1.2., "Marking," The section is voided and replaced with the following.

Marking. Clearly mark each precast junction box, manhole, and inlet unit with the following information:

- name or trademark of fabricator and plant location;
- product designation;
- ASTM designation (if applicable);
- date of manufacture;
- designation "TX" for precast units fabricated per DMS-7305;
- designated fabricator's approval stamp for each approved unit; and
- designation "SR" for product meeting sulfate-resistant concrete plan requirements (when applicable).

Special Provision to Item 502

Barricades, Signs and Traffic Handling



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



Item 506, "Temporary Erosion, Sedimentation, and Environmental Controls," 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 506.1., "Description." The second paragraph is voided and replaced by the following.

Contractor is considered primary operator to have day-to-day operational control as defined in TPDES GP TXR150000.

- 1.1. For projects with soil disturbance of less than 1 acre, no submittal to TCEQ will be required but Contractor will follow SWP3. For projects with soil disturbance of 1 acre to less than 5 acres a small site notice will be posted at the site. For projects with soil disturbance of 5 acres or more a Notice of Intent (NOI) is required and a large site notice posted at site. Postings will be in accordance with TPDES GP TXR150000. Postings not associated with project specific locations will be in same location as Department's postings.
- 1.2. **Notice of Intent (NOI).** Submit a NOI, if applicable, with the TCEQ under the TPDES GP TXR150000 at least 7 days prior to commencement of construction activities at the project site. Provide a signed copy to the Engineer and any other MS4 operators at the time of submittal. The Department will submit their NOI prior to contractor submission and will provide a copy for Contractor's use in completing the Contractor's NOI form.
- 1.3. **Notice of Change (NOC).** Upon concurrence of the Engineer, submit a NOC, if applicable, to the TCEQ within 14 days of discovery of a change or revision to the NOI as required by the TPDES GP TXR150000. Provide a signed copy of the NOC to the Engineer and any other MS4 operators at the time of submittal.
- 1.4. **Notice of Termination (NOT).** Upon concurrence of the Engineer, submit a NOT, if applicable, to the TCEQ within 30 days of the Engineer's approval that 70% native background vegetative cover is met or equivalent permanent stabilization have been employed in accordance with the TPDES GP TXR 150000. Provide a signed copy of the NOT to the Engineer and any other MS4 operators at the time of submittal.

Section 506.3.1, "Contractor Responsible Person Environmental (CRPE) Qualifications and Responsibilities," is supplemented by the following:

- 3.1. **Contractor Responsible Person Environmental (CRPE) Qualifications and Responsibilities.** Provide and designate in writing at the preconstruction conference a CRPE and alternate CRPE who have overall responsibility for the storm water management program. The CRPE will implement stormwater and erosion control practices; will oversee and observe stormwater control measure monitoring and management; will monitor the project site daily and produce daily monitoring reports as long as there are BMPs in place or soil disturbing activities are evident to ensure compliance with the SWP3 and TPDES General Permit TXR150000. Daily monitor reports shall be maintained and made available upon request. During time suspensions when work is not occurring or on contract non-work days, daily inspections are not required unless a rain event has occurred. The CRPE will provide recommendations on how to improve the effectiveness of control measures. Attend the Department's preconstruction conference for the project. Ensure training is completed as identified in Section 506.3.3., "Training," by all applicable personnel before employees work on the project. Document and maintain and make available upon request, a list, signed by the CRPE, of all applicable Contractor and subcontractor employees who have completed the training. Include the employee's name, the training course name, and date the employee completed the training.

Section 506.3.3., "Training," is supplemented by the following:

Training is provided by the Department at no cost to the Contractor and is valid for 3 yr. from the date of completion. The Engineer may require the following training at a frequency less than 3 yr. based on environmental needs:

- “Environmental Management System: Awareness Training for the Contractor” (English and Spanish) (Approximate running time 20 min.), and
- “Storm Water: Environmental Requirements During Construction” (English and Spanish) (Approximate running time 20 min.).

The Contractor responsible person environmental (CRPE), alternate CRPE designated for emergencies, Contractor's superintendent, Contractor, and subcontractor lead personnel involved in soil disturbing or SWP3 activities must enroll in and complete the training listed below and maintain and make available upon request the certificate of completion. Training is provided by a third party and is valid for 3 yr. from the date shown on the Certificate of Completion. Coordinate enrollment as prescribed by the Department and pay associated fees for the following training:

- “Revegetation During Construction,”
- “Construction General Permit Compliance,” and
- “Construction Stage Gate Checklist (CSGC).”

Training and associated fee will not be measured or paid for directly but are subsidiary to this Item.

Special Provision to Item 520

Weighing and Measuring Equipment



Item 520, "Weighing and Measuring Equipment" 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 520.2., "Equipment." The third paragraph is voided and replaced by the following.

Calibrate truck scales using weights certified by the Texas Department of Agriculture (TDA) or an equivalent agency as approved. Provide a written calibration report from a scale mechanic for truck scale calibrations. Cease plant operations during the checking operation. Do not use inaccurate or inadequate scales. Bring performance errors as close to zero as practicable when adjusting equipment.

Article 520.2., "Equipment." The fourth paragraph is amended to include the following:

At the Contractors option, an electronic ticket delivery system (e-ticketing) may be used instead of printed tickets. The use of e-ticketing will require written approval of the Engineer. At a minimum, the approved system will:

- Provide electronic, real-time e-tickets meeting the requirements of the applicable bid items;
- Automatically generate e-tickets using software and hardware fully integrated with the automated scale system used to weigh the material, and be designed in such a way that data input cannot be altered by the Contractor or the Engineer;
- Provide the Engineer access to the e-ticketing data in real-time with a web-based or app-based system compatible with iOS;
- Provide offline capabilities to prevent data loss if power or connectivity is lost;
- Require both the Contractor and the Engineer to accept or reject the e-ticket and provide the ability to record the information required by the applicable bid items, as well as any comments. Record the time of the approval/rejection and include it in the summary spreadsheet described below. Provide each party the capability to edit their respective actions and any entered information;

The Contractor may discontinue use of the e-ticket system and provide printed tickets as needed to meet the requirements of the applicable bid items.

Special Provision to Item 636

Signs



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.

Texas Department of Transportation													
C	Fabrication Date											T	1
J	F	M	A	M	J	J	A	S	O	N	D		2
	201		202		203		204		205				3
	0	1	2	3	4	5	6	7	8	9			4
Sheeting MFR - Substrate													
A	B	C	D	E	F	G	H	J	K	L	M		5
Film MFR													
A	B	C	D	E	F	G	H	J	K	L	M		6
Sheeting MFR - Legend													
A	B	C	D	E	F	G	H	J	K	L	M		7
Installation Date													
				0	1	2	3						8
	0	1	2	3	4	5	6	7	8	9			9
J	F	M	A	M	J	J	A	S	O	N	D		10
	201		202		203		204		205				11
	0	1	2	3	4	5	6	7	8	9			12
Name of Sign Fabricator Physical Address City, State, Zip Code													13

Figure 1
Decal Design (Row numbers explained in Table 1)

Table 1
Decal Description
Row Explanation

1 – Sign fabricator
2 – Month fabricated
3 – First 3 digits of year fabricated
4 – Last digit of year fabricated
5 – Manufacturer of the sheeting applied to the substrate
6 – Film (colored transparent or non-reflective black) manufacturer
7 – Manufacturer of the sheeting for the legend
8 – Tens digit of date installed
9 – Ones digit of date installed
10 – Month installed
11 – First 3 digits of year installed
12 – Last digit of year installed
13 – Name of sign fabricator and physical location of sign shop

Special Provision to Item 656

Foundations for Traffic Control Devices



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/m²/lx)
- Yellow markings: 175 mcd/m²/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.

Special Provision to Item 680 Highway Traffic Signals



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 Specification 1007

Irrigation Wells, Gates, and Valves



1. DESCRIPTION

Furnish and install irrigation wells, gates, and valves as shown on the plans or as directed.

2. MATERIALS

Furnish materials in accordance with the following:

- Item 421, "Hydraulic Cement Concrete,"
- Item 440, "Reinforcement for Concrete," and
- Item 464, "Reinforced Concrete Pipe."

- 2.1. **Brick.** Use brick for irrigation wells that conforms to the requirements of "Sewer and Manhole Brick (made from clay or shale), Grade SM" in accordance with ASTM Designation: C32.
- 2.2. **Cement.** Use Type I hydraulic cement in accordance with ASTM Designation: C150.
- 2.3. **Lime.** Use hydrated lime of an established brand as approved.
- 2.4. **Sand.** Use sand that is composed of clean, hard, durable, uncoated grains, free from lumps, soft or flaky particles, loam, organic matter or other injurious substances as approved.
- 2.5. **Water.** Use water suitable for drinking or for ordinary household use without being treated.
- 2.6. **Concrete.** Use Class A concrete or as shown on plans that conforms to the requirements of Item 421, "Hydraulic Cement Concrete."
- 2.7. **Reinforcing Steel.** Use reinforcing steel that conforms to the requirements of Item 440, "Reinforcement for Concrete."
- 2.8. **Reinforced Concrete Pipe.** Use reinforced concrete pipe that conforms to the requirements of Item 464, "Reinforced Concrete Pipe."
- 2.9. **Well Gates.** Use approved gates.
- 2.10. **Irrigation Valves.** Use approved valves.

3. GENERAL

Construct irrigation wells either with brick or reinforced concrete pipe. If brick is used, then construct the inlet square with inside dimensions as specified for the size of the inlet and construct the walls a minimum of 8 in. thick. If reinforced concrete pipe is used, then construct the inside diameter of the pipe as specified for the size of the inlet and Class III pipe required.

4. CONSTRUCTION METHODS

- 4.1. **Brick Masonry.** Use brick masonry that consists of whole, sound, straight, hard bricks, laid in freshly mixed mortar to the forms and section required. Wet and lay bricks true to line in parallel courses, properly bonded

with face joints flush. Lay each brick in full, close joints of mortar on its bed, end and side at one operation. Plaster all exposed surfaces of brick irrigation wells with 1/2 in. of mortar.

Mix mortar in the proportions, by volume, of 1 part cement, 1 part lime, and 4 parts of sand. First mix the sand, cement, and lime dry in a tight box until the mixture assumes a uniform color, after which add water as the mixing continues until the mortar attains a consistency such that it can be easily handled and spread with a trowel. Use mechanical mixing instead of hand mixing if desired.

- 4.2. **Irrigation Wells.** Construct irrigation wells as shown on the plans under miscellaneous structural details.
- 4.3. **Concrete Foundation.** Construct concrete foundations as shown on the plans under miscellaneous structural details.
- 4.4. **Gates and Valves.** Install gates and valves at locations shown on the plans. Install gates and valves in such a manner as to completely seal the ends of the concrete pipe and be securely anchored. Furnish drive extensions for gates that extend to the hand wheel above the top of wells, headwalls, or concrete canal lining to facilitate operation.

5. MEASUREMENT

These Items will be measured by the each of the various sizes specified.

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 "Irrigation Well," "Well Gate," or "Irrigation Valve," of the specified sizes. This price shall be full compensation for furnishing, transporting, and installing all materials, labor, tools, equipment, and incidentals.

Unless otherwise shown on the plans, structural excavation for irrigation wells, well gates, and irrigation valves will not be measured but will be considered subsidiary to the various bid items.

Special Specification 1008

Pressure Irrigation Polyvinyl Chloride (PVC) Pipe



1. DESCRIPTION

Furnish and install polyvinyl chloride (PVC) pipe for a pressure irrigation pipe system. The pipe will be the sizes, types, and dimensions shown on the plans and will include all connections and joints to new or existing pipes and other appurtenances as required to complete the work.

2. MATERIALS

Furnish materials in accordance with the following:

- Item 400, "Excavation and Backfill for Structures,"
- Item 401, "Flowable Backfill,"
- Item 464, "Reinforced Concrete Pipe" or Item 4024, "Reinforced Concrete Low-Head Pressure Pipe," and
- Item 467, "Safety End Treatment".

Unless otherwise shown on the plans, pressure irrigation PVC pipe and joint fittings must conform to the following:

PVC pipe must be manufactured from virgin compounds in accordance with ASTM D2241, and must meet or exceed the requirements of ASTM D1784 for the cell class 12454B.

The Contractor must furnish the Engineer with manufacturer documentation certifying that the pressure irrigation PVC pipe and joint fittings comply with the requirements of this Item. All pipe must be marked with the ASTM resin cell classification and the date of manufacture.

3. INSPECTION

The quality of materials, the process of manufacture, and the finished pipe will be subject to inspection and approval by the Engineer at the manufacturing plant. In addition, the finished pipe will be subject to further inspection by the Engineer at the project site prior to and during installation.

4. SECTION PROPERTIES

The Contractor must provide PVC pipe that meets the following minimum values of pipe wall thickness for 100 psi.

Polyvinyl Chloride Pipe (PVC)

Nominal Pipe Diameter (in.)	Min. Wall Thickness (in.)	Weight (lb. per ft.)
6	0.150	1.9
8	0.199	3.3
10	0.249	5.2
12	0.299	7.5
15	0.373	11.7
18	0.496	17.6
21	0.538	24.6
24	0.605	32.4

5. JOINTS

Joints must maintain pipe alignment and prevent infiltration of material during the life of the installation. Joints will consist of an external sleeve and gasket system or an integral gasketed system, and must conform to ASTM D3139. Gasket material must conform to either ASTM D1056 or ASTM F477.

6. CONSTRUCTION

Only trench installation of pressure irrigation PVC pipe will be permitted, except where pressure irrigation PVC pipe is placed in casing pipe meeting the requirements of Item 464, "Reinforced Concrete Pipe" or Item 4024, "Reinforced Concrete Low-Head Pressure Pipe".

- 6.1. **Excavation.** All excavation must be in accordance with the requirements of Item 400, "Excavation and Backfill for Structures".
- 6.2. **Shaping and Bedding.** The pipe must be bedded in a foundation of compacted cohesionless material, such as sand, crushed stone, or pea gravel, with maximum size not exceeding 3/8 in. This material must extend a minimal of 6 in. below the outermost corrugations or ribs, and must be carefully and accurately shaped to fit the lowest part of the pipe exterior for at least 10% of the overall height. When requested by the Engineer, the Contractor must furnish a template for each size and shape of pipe to be placed for use in checking the shaping of the bedding. The template must consist of a thin plate or board cut to match the lower half of the cross-section of the pipe.
- 6.3. **Laying Pipe.** Unless otherwise approved by the Engineer, the laying of pipes on the bedding must start at the outlet end with the separate sections firmly joined together. Proper facilities must be provided for hoisting and lowering the section of the pipe into the trench without damaging the pipe or disturbing the bedding and side of the trench. Any pipe which is not in alignment or which shows any undue settlement after laying must be removed and relaid at the Contractor's expense.

Multiple installation of pressure irrigation PVC pipe must be laid with the centerlines of individual barrels parallel. Unless otherwise shown on the plans, the following clear distances between outer surfaces of adjacent pipes must be maintained:

Nominal Pipe Diameter (in.)	Clear Distance Between Pipes
18	1 ft. 2 in.
24	1 ft. 5 in.
30	1 ft. 8 in.
36	1 ft. 11 in.

- 6.4. **Reuse of Existing Appurtenances.** When existing appurtenances are shown on the plans for reuse, the portion to be reused will be severed and moved to the new position previously prepared, by approved methods.

Connections must conform to the requirements for joining sections of pipes as indicated here or as shown on the plans. Any existing appurtenances damaged during moving operations must be restored to their original condition at the Contractor's expense. The Contractor, if he so desires, may remove and dispose of the existing headwalls and aprons and construct new headwalls at his own expense, in accordance with the pertinent specifications and design indicated on the plans or as furnished by the Engineer.

6.5. **Connections and Stub Ends.** Connections of irrigation pipe to existing irrigation or appurtenance will be as shown on the plans or as directed. The bottom of the existing structure must be mortared or concreted if necessary, to eliminate any drainage pockets created by the new connection. Where the sewer is connected into existing structures which are to remain in service, any damage to the existing structure resulting from making the connection must be restored by the Contractor to the satisfactions of the Engineer. Stub ends, for connections to future work not shown on the plans, must be sealed by installing watertight plugs into the free end of the pipe.

6.6. **Backfilling.** Particular attention is necessary when backfilling PVC pipe. After the pipe structure has been installed as required by the plan details it must be backfilled according to the following, except where it is placed in steel casing:

Type I. Backfill consists of Item 401, "Flowable Backfill". The flowable backfill must be placed across the entire width of the trench and must maintain a minimum depth of 12 in. above the pipe.

Type II. Backfill consists of a cohesionless material, such as sand, crushed stone, or pea gravel, and having a maximum size not to exceed 3/8 in. The backfill material must be placed along both sides of the completed structure(s) to a depth of 12 in. above the pipe. The backfill must be placed in uniform layers not exceeding 6 in. in depth (loose measurement), wetted if required, and thoroughly compacted between adjacent structures and between the structure and the sides of the trench. Until a minimum cover of 12 in. is obtained, only hand operated tamping equipment will be allowed within vertical planes 2 ft. beyond the horizontal projection of the outside surfaces of the structure.

All pipe, excluding private driveway and side road culvert pipe, must be backfilled with Type I backfill. For private driveway and side road culvert pipe the Contractor must have the option of using either Type I or Type II backfill.

Any backfill above Type I or Type II backfill material must be placed in accordance with Item 400, "Excavation and Backfill for Structures". If Type I backfill is used a minimum of 24 hr. must elapse prior to backfilling the remaining portion of the trench with backfill material in accordance with Item 400, "Excavation and Backfill for Structures".

During the backfilling operations, special emphasis is placed upon the need for obtaining uniform backfill material and uniform compacted density throughout the length of the structure so that unequal pressure will be avoided. Extreme care is to be taken to insure proper backfill under the structure (haunch zone).

6.7. **Protection of Pipe.** Unless otherwise shown on the plans or permitted in writing by the Engineer, no heavy earth moving equipment will be permitted to be hauled over the structure until a minimum of 4 ft. of compacted fill (permanent or temporary) has been placed over the top of the structure.

Prior to adding each new layer of loose backfill material, until a minimum of 12 in. of cover is obtained, an inspection will be made of the inside periphery of the structure for local or unequal deformation caused by improper construction methods. Evidence of such will require corrective measures as directed by the Engineer.

Pipe damaged by the Contractor must be removed and replaced by the Contractor at no additional cost to the Department.

6.8. **Treatment of Exposed Ends of Pipe.** All exposed ends of the pipe must be treated with concrete safety end treatment or metal end treatment as shown on the plans and conforming to the Item 467, "Safety End Treatment".

7. MEASUREMENT

- 7.1. This Item will be measured by the foot. Such measurements will be made between the ends of the barrel along its flow line, exclusive of safety end treatments. Safety end treatments must be measured in accordance with Item 467, "Safety End Treatment". Where spurs, branches or connections to existing pipe lines are involved, measurement of the spur or new connecting pipe will be made from the intersection of its flow line with the outside surface of the pipe into which it connects. Where inlets, headwalls, catch basins, manholes, junction chambers, or other structures are included in lines of pipe, that length of pipe tying into the structure wall will be included for measurement but no other portion of the structure length or width will be so included.
- 7.2. For multiple pipes, the measured length will be the sum of the lengths of the barrels, measured as prescribed above.
- 7.3. This is a plans quantity measurement Item and the quantity to be paid for will be that quantity shown in the proposal and on the "Estimate and Quantity" sheet of the contract plans, except as may be modified by Article 9.2. If no adjustment of quantities is required additional measurements or calculations will not be required.
- 7.4. Flowable backfill will not be measured, but considered subsidiary to this Item.

8. PAYMENT

- 8.1. 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 "Pressure Irrigation PVC Pipe (Type I backfill)", of the size specified or "Pressure Irrigation PVC Pipe (Type I or II backfill)", of the size specified or "Pressure Irrigation PVC Pipe", of the size specified. This price will be full compensation for furnishing, hauling, placing and joining of pipes; for all connections to new or existing structures, for moving and reusing headwalls where required; for removing and disposing of portions of existing structures as required; for the bedding and Type I or II backfill material as required; for cutting of pipe ends on skew; and for all labor, tools, equipment and incidentals necessary to complete the work.
- 8.2. Excavation and backfill above the Type I or II backfill will be paid for in accordance with Item 400, "Excavation and Backfill for Structures".
- 8.3. Safety end treatment will be paid for in accordance with Item 467, "Safety End Treatment".
- 8.4. Casing pipe will be paid for in accordance with Item 464, "Reinforced Concrete Pipe" or Item 4024, "Reinforced Concrete Low-Head Pressure Pipe".

Special Specification 3077

Superpave Mixtures



1. DESCRIPTION

Construct a hot-mix asphalt (HMA) pavement layer composed of a compacted, Superpave (SP) mixture of aggregate and asphalt binder mixed hot in a mixing plant. Payment adjustments will apply to HMA placed under this specification unless the HMA is deemed exempt in accordance with Section 3077.4.9.4., "Exempt Production."

2. MATERIALS

Furnish uncontaminated materials of uniform quality that meet the requirements of the plans and specifications.

Notify the Engineer of all material sources and before changing any material source or formulation. The Engineer will verify that the specification requirements are met when the Contractor makes a source or formulation change and may require a new laboratory mixture design, trial batch, or both. The Engineer may sample and test project materials at any time during the project to verify specification compliance in accordance with Item 6, "Control of Materials."

- 2.1. **Aggregate.** Furnish aggregates from sources that conform to the requirements shown in Table 1 and as specified in this Section. Aggregate requirements in this Section, including those shown in Table 1, may be modified or eliminated when shown on the plans. Additional aggregate requirements may be specified when shown on the plans. Provide aggregate stockpiles that meet the definitions in this Section for coarse, intermediate, or fine aggregate. Aggregate from reclaimed asphalt pavement (RAP) is not required to meet Table 1 requirements unless otherwise shown on the plans. Supply aggregates that meet the definitions in [Tex-100-E](#) for crushed gravel or crushed stone. The Engineer will designate the plant or the quarry as the sampling location. Provide samples from materials produced for the project. The Engineer will establish the Surface Aggregate Classification (SAC) and perform Los Angeles abrasion, magnesium sulfate soundness, and Micro-Deval tests. Perform all other aggregate quality tests listed in Table 1. Document all test results on the mixture design report. The Engineer may perform tests on independent or split samples to verify Contractor test results. Stockpile aggregates for each source and type separately. Determine aggregate gradations for mixture design and production testing based on the washed sieve analysis given in [Tex-200-F](#), Part II.

- 2.1.1. **Coarse Aggregate.** Coarse aggregate stockpiles must have no more than 20% material passing the No. 8 sieve. Aggregates from sources listed in the Department's *Bituminous Rated Source Quality Catalog* (BRSQC) are preapproved for use. Use only the rated values for hot-mix listed in the BRSQC. Rated values for surface treatment (ST) do not apply to coarse aggregate sources used in hot-mix asphalt.

For sources not listed on the Department's BRSQC:

- build an individual stockpile for each material;
- request the Department test the stockpile for specification compliance; and
- once approved, do not add material to the stockpile unless otherwise approved.

Provide aggregate from non-listed sources only when tested by the Engineer and approved before use. Allow 30 calendar days for the Engineer to sample, test, and report results for non-listed sources.

Provide coarse aggregate with at least the minimum SAC shown on the plans. SAC requirements only apply to aggregates used on the surface of travel lanes. SAC requirements apply to aggregates used on surfaces other than travel lanes when shown on the plans. The SAC for sources on the Department's *Aggregate Quality Monitoring Program* (AQMP) ([Tex-499-A](#)) is listed in the BRSQC.

- 2.1.1.1. **Blending Class A and Class B Aggregates.** Class B aggregate meeting all other requirements in Table 1 may be blended with a Class A aggregate to meet requirements for Class A materials, unless otherwise shown on the plans. Ensure that at least 50% by weight, or volume if required, of the material retained on the No. 4 sieve comes from the Class A aggregate source when blending Class A and B aggregates to meet a Class A requirement unless otherwise shown on the plans. Blend by volume if the bulk specific gravities of the Class A and B aggregates differ by more than 0.300. Coarse aggregate from RAP and Recycled Asphalt Shingles (RAS) will be considered as Class B aggregate for blending purposes.

The Engineer may perform tests at any time during production, when the Contractor blends Class A and B aggregates to meet a Class A requirement, to ensure that at least 50% by weight, or volume if required, of the material retained on the No. 4 sieve comes from the Class A aggregate source. The Engineer will use the Department's mix design template, when electing to verify conformance, to calculate the percent of Class A aggregate retained on the No. 4 sieve by inputting the bin percentages shown from readouts in the control room at the time of production and stockpile gradations measured at the time of production. The Engineer may determine the gradations based on either washed or dry sieve analysis from samples obtained from individual aggregate cold feed bins or aggregate stockpiles. The Engineer may perform spot checks using the gradations supplied by the Contractor on the mixture design report as an input for the template; however, a failing spot check will require confirmation with a stockpile gradation determined by the Engineer.

- 2.1.1.2. **Micro-Deval Abrasion.** The Engineer will perform a minimum of one Micro-Deval abrasion test in accordance with [Tex-461-A](#) for each coarse aggregate source used in the mixture design that has a Rated Source Soundness Magnesium (RSSM) loss value greater than 15 as listed in the BRSQC. The Engineer will perform testing before the start of production and may perform additional testing at any time during production. The Engineer may obtain the coarse aggregate samples from each coarse aggregate source or may require the Contractor to obtain the samples. 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. The Engineer will consult the Soils and Aggregates Section of the Materials and Tests Division, and additional testing may be required before granting approval.

- 2.1.2. **Intermediate Aggregate.** Aggregates not meeting the definition of coarse or fine aggregate will be defined as intermediate aggregate. Supply intermediate aggregates, when used that are free from organic impurities. The Engineer may test the intermediate aggregate in accordance with [Tex-408-A](#) to verify the material is free from organic impurities. Supply intermediate aggregate from coarse aggregate sources, when used that meet the requirements shown in Table 1 unless otherwise approved.

Test the stockpile if 10% or more of the stockpile is retained on the No. 4 sieve, and verify that it meets the requirements in Table 1 for crushed face count ([Tex-460-A](#)) and flat and elongated particles ([Tex-280-F](#)).

2.1.3.

Fine Aggregate. Fine aggregates consist of manufactured sands, screenings, and field sands. Fine aggregate stockpiles must meet the gradation requirements in Table 2. Supply fine aggregates that are free from organic impurities. The Engineer may test the fine aggregate in accordance with [Tex-408-A](#) to verify the material is free from organic impurities. Unless otherwise shown on the plans, up to 10% of the total aggregate may be field sand or other uncrushed fine aggregate. Use fine aggregate, with the exception of field sand, from coarse aggregate sources that meet the requirements shown in Table 1 unless otherwise approved.

Test the stockpile if 10% or more of the stockpile is retained on the No. 4 sieve and verify that it meets the requirements in Table 1 for crushed face count ([Tex-460-A](#)) and flat and elongated particles ([Tex-280-F](#)).

Table 1
Aggregate Quality Requirements

Property	Test Method	Requirement
Coarse Aggregate		
SAC	Tex-499-A (AQMP)	As shown on the plans
Deleterious material, %, Max	Tex-217-F , Part I	1.0
Decantation, %, Max	Tex-217-F , Part II	1.5
Micro-Deval abrasion, %	Tex-461-A	Note 1
Los Angeles abrasion, %, Max	Tex-410-A	35 ²
Magnesium sulfate soundness, 5 cycles, %, Max	Tex-411-A	25 ³
Crushed face count, ⁴ %, Min	Tex-460-A , Part I	85
Flat and elongated particles @ 5:1, %, Max	Tex-280-F	10
Fine Aggregate		
Linear shrinkage, %, Max	Tex-107-E	3
Sand equivalent, %, Min	Tex-203-F	45

- Used to estimate the magnesium sulfate soundness loss in accordance with Section 3077.2.1.1.2., "Micro-Deval Abrasion."
- For base mixtures defined in Section 3077.2.7., "Recycled Materials," the Los Angeles abrasion may be increased to a maximum of 40%.
- For base mixtures defined in Section 3077.2.7., "Recycled Materials," the magnesium sulfate soundness, five cycles, may be increased to a maximum of 30%.
- Only applies to crushed gravel.

Table 2
Gradation Requirements for Fine Aggregate

Sieve Size	% Passing by Weight or Volume
3/8"	100
#8	70–100
#200	0–30

2.2.

Mineral Filler. Mineral filler consists of finely divided mineral matter such as agricultural lime, crusher fines, hydrated lime, or fly ash. Mineral filler is allowed unless otherwise shown on the plans. Use no more than 2% hydrated lime or fly ash unless otherwise shown on the plans. Use no more than 1% hydrated lime if a substitute binder is used unless otherwise shown on the plans or allowed. Test all mineral fillers except hydrated lime and fly ash in accordance with [Tex-107-E](#) to ensure specification compliance. The plans may require or disallow specific mineral fillers. Provide mineral filler, when used, that:

- is sufficiently dry, free-flowing, and free from clumps and foreign matter as determined by the Engineer;
- does not exceed 3% linear shrinkage when tested in accordance with [Tex-107-E](#); and
- meets the gradation requirements in Table 3, unless otherwise shown on the plans.

Table 3
Gradation Requirements for Mineral Filler

Sieve Size	% Passing by Weight or Volume
#8	100
#200	55–100

2.3.

Baghouse Fines. Fines collected by the baghouse or other dust-collecting equipment may be reintroduced into the mixing drum.

- 2.4. **Asphalt Binder.** Furnish the type and grade of performance-graded (PG) asphalt specified on the plans.
- 2.5. **Tack Coat.** Furnish CSS-1H, SS-1H, or a PG binder with a minimum high-temperature grade of PG 58 for tack coat binder in accordance with Item 300, "Asphalts, Oils, and Emulsions." Specialized tack coat materials listed on the Department's MPL are allowed or required when shown on the plans. Do not dilute emulsified asphalts at the terminal, in the field, or at any other location before use.
- 2.6. **Additives.** Use the type and rate of additive specified when shown on the plans. Additives that facilitate mixing, compaction, or improve the quality of the mixture are allowed when approved. Provide the Engineer with documentation such as the bill of lading showing the quantity of additives used in the project unless otherwise directed.
- 2.6.1. **Lime and Liquid Antistripping Agent.** When lime or a liquid antistripping agent is used, add in accordance with Item 301, "Asphalt Antistripping Agents." Do not add lime directly into the mixing drum of any plant where lime is removed through the exhaust stream unless the plant has a baghouse or dust collection system that reintroduces the lime into the drum.
- 2.6.2. **Warm Mix Asphalt (WMA).** Warm Mix Asphalt (WMA) is defined as HMA that is produced within a target temperature discharge range of 215°F and 275°F using approved WMA additives or processes from the Department's MPL.
- WMA is allowed for use on all projects and is required when shown on the plans. When WMA is required, the maximum placement or target discharge temperature for WMA will be set at a value below 275°F.
- Department-approved WMA additives or processes may be used to facilitate mixing and compaction of HMA produced at target discharge temperatures above 275°F; however, such mixtures will not be defined as WMA.
- 2.6.3. **Compaction Aid.** Compaction Aid is defined as a chemical warm mix additive that is used to produce an asphalt mixture at a discharge temperature greater than 275°F.
- Compaction Aid is allowed for use on all projects and is required when shown on the plans.
- 2.7. **Recycled Materials.** Use of RAP and RAS is permitted unless otherwise shown on the plans. Use of RAS is restricted to only intermediate and base mixes unless otherwise shown on the plans. Do not exceed the maximum allowable percentages of RAP and RAS shown in Table 4. The allowable percentages shown in Table 4 may be decreased or increased when shown on the plans. Determine the asphalt binder content and gradation of the RAP and RAS stockpiles for mixture design purposes in accordance with [Tex-236-F](#), Part I. The Engineer may verify the asphalt binder content of the stockpiles at any time during production. Perform other tests on RAP and RAS when shown on the plans. Asphalt binder from RAP and RAS is designated as recycled asphalt binder. Calculate and ensure that the ratio of the recycled asphalt binder to total binder does not exceed the percentages shown in Table 5 during mixture design and HMA production when RAP or RAS is used. Use a separate cold feed bin for each stockpile of RAP and RAS during HMA production.
- Surface, intermediate, and base mixes referenced in Tables 4 and 5 are defined as follows:
- **Surface.** The final HMA lift placed at the top of the pavement structure or placed directly below mixtures produced in accordance with Items 316, 342, 347, or 348;
 - **Intermediate.** Mixtures placed below an HMA surface mix and less than or equal to 8.0 in. from the riding surface; and
 - **Base.** Mixtures placed greater than 8.0 in. from the riding surface. Unless otherwise shown on the plans, mixtures used for bond breaker are defined as base mixtures.
- 2.7.1. **RAP.** RAP is salvaged, milled, pulverized, broken, or crushed asphalt pavement. Fractionated RAP is defined as a stockpile that contains RAP material with a minimum of 95.0% passing the 3/8-in. or 1/2-in.

sieve, before burning in the ignition oven, unless otherwise approved. The Engineer may allow the Contractor to use an alternate to the 3/8-in. or 1/2-in. screen to fractionate the RAP.

Use of Contractor-owned RAP including HMA plant waste is permitted unless otherwise shown on the plans. Department-owned RAP stockpiles are available for the Contractor's use when the stockpile locations are shown on the plans. If Department-owned RAP is available for the Contractor's use, the Contractor may use Contractor-owned fractionated RAP and replace it with an equal quantity of Department-owned RAP. Department-owned RAP generated through required work on the Contract is available for the Contractor's use when shown on the plans. Perform any necessary tests to ensure Contractor- or Department-owned RAP is appropriate for use. The Department will not perform any tests or assume any liability for the quality of the Department-owned RAP unless otherwise shown on the plans. The Contractor will retain ownership of RAP generated on the project when shown on the plans.

Do not use Department- or Contractor-owned RAP contaminated with dirt or other objectionable materials. Do not use Department- or Contractor-owned RAP if the decantation value exceeds 5% and the plasticity index is greater than eight. Test the stockpiled RAP for decantation in accordance with [Tex-406-A](#), Part I. Determine the plasticity index in accordance with [Tex-106-E](#) if the decantation value exceeds 5%. The decantation and plasticity index requirements do not apply to RAP samples with asphalt removed by extraction or ignition.

Do not intermingle Contractor-owned RAP stockpiles with Department-owned RAP stockpiles. Remove unused Contractor-owned RAP material from the project site upon completion of the project. Return unused Department-owned RAP to the designated stockpile location.

Table 4
Maximum Allowable Amounts of RAP¹

Maximum Allowable Fractionated RAP (%)		
Surface	Intermediate	Base
20.0	30.0	35.0

1. Must also meet the recycled binder to total binder ratio shown in Table 5.

2.7.2.

RAS. Use of post-manufactured RAS or post-consumer RAS (tear-offs) is not permitted in surface mixtures unless otherwise shown on the plans. RAS may be used in intermediate and base mixtures unless otherwise shown on the plans. Up to 3% RAS may be used separately or as a replacement for fractionated RAP in accordance with Table 4 and Table 5. RAS is defined as processed asphalt shingle material from manufacturing of asphalt roofing shingles or from re-roofing residential structures. Post-manufactured RAS is processed manufacturer's shingle scrap by-product. Post-consumer RAS is processed shingle scrap removed from residential structures. Comply with all regulatory requirements stipulated for RAS by the TCEQ. RAS may be used separately or in conjunction with RAP.

Process the RAS by ambient grinding or granulating such that 100% of the particles pass the 3/8 in. sieve when tested in accordance with [Tex-200-F](#), Part I. Perform a sieve analysis on processed RAS material before extraction (or ignition) of the asphalt binder.

Add sand meeting the requirements of Table 1 and Table 2 or fine RAP to RAS stockpiles if needed to keep the processed material workable. Any stockpile that contains RAS will be considered a RAS stockpile and be limited to no more than 3.0% of the HMA mixture in accordance with Table 4.

Certify compliance of the RAS with [DMS-11000](#), "Evaluating and Using Nonhazardous Recyclable Materials Guidelines." Treat RAS as an established nonhazardous recyclable material if it has not come into contact with any hazardous materials. Use RAS from shingle sources on the Department's MPL. Remove substantially all materials before use that are not part of the shingle, such as wood, paper, metal, plastic, and felt paper. Determine the deleterious content of RAS material for mixture design purposes in accordance with [Tex-217-F](#), Part III. Do not use RAS if deleterious materials are more than 0.5% of the stockpiled RAS unless

otherwise approved. Submit a sample for approval before submitting the mixture design. The Department will perform the testing for deleterious material of RAS to determine specification compliance.

2.8.

Substitute Binders. Unless otherwise shown on the plans, the Contractor may use a substitute PG binder listed in Table 5 instead of the PG binder originally specified if using recycled materials, and if the substitute PG binder and mixture made with the substitute PG binder meet the following:

- the substitute binder meets the specification requirements for the substitute binder grade in accordance with Section 300.2.10., "Performance-Graded Binders;" and
- the mixture has less than 10.0 mm of rutting on the Hamburg Wheel test ([Tex-242-F](#)) after the number of passes required for the originally specified binder. Use of substitute PG binders may only be allowed at the discretion of the Engineer if the Hamburg Wheel test results are between 10.0 mm and 12.5 mm.

Table 5
Allowable Substitute PG Binders and Maximum Recycled Binder Ratios

Originally Specified PG Binder	Allowable Substitute PG Binder for Surface Mixes	Allowable Substitute PG Binder for Intermediate and Base Mixes	Maximum Ratio of Recycled Binder ¹ to Total Binder (%)		
			Surface	Intermediate	Base
76-22 ^{4,5}	70-22	70-22	15.0	25.0	30.0
70-22 ^{2,5}	N/A	64-22	15.0	25.0	30.0
64-22 ^{2,3}	N/A	N/A	15.0	25.0	30.0
76-28 ^{4,5}	70-28	70-28	15.0	25.0	30.0
70-28 ^{2,5}	N/A	64-28	15.0	25.0	30.0
64-28 ^{2,3}	N/A	N/A	15.0	25.0	30.0

1. Combined recycled binder from RAP and RAS. RAS is not permitted in surface mixtures unless otherwise shown on the plans.
2. Binder substitution is not allowed for surface mixtures.
3. Binder substitution is not allowed for intermediate and base mixtures.
4. Use no more than 15.0% recycled binder in surface mixtures when using this originally specified PG binder.
5. Use no more than 25.0% recycled binder when using this originally specified PG binder for intermediate mixtures. Use no more than 30.0% recycled binder when using this originally specified PG binder for base mixtures.

3. EQUIPMENT

Provide required or necessary equipment in accordance with Item 320, "Equipment for Asphalt Concrete Pavement."

4. CONSTRUCTION

Produce, haul, place, and compact the specified paving mixture. In addition to tests required by the specification, Contractors may perform other QC tests as deemed necessary. At any time during the project, the Engineer may perform production and placement tests as deemed necessary in accordance with Item 5, "Control of the Work." Schedule and participate in a mandatory pre-paving meeting with the Engineer on or before the first day of paving unless otherwise shown on the plans.

4.1.

Certification. Personnel certified by the Department-approved hot-mix asphalt certification program must conduct all mixture designs, sampling, and testing in accordance with Table 6. Supply the Engineer with a list of certified personnel and copies of their current certificates before beginning production and when personnel

changes are made. Provide a mixture design developed and signed by a Level 2 certified specialist. Provide Level 1A certified specialists at the plant during production operations. Provide Level 1B certified specialists to conduct placement tests. Provide AGG101 certified specialists for aggregate testing.

Table 6
Test Methods, Test Responsibility, and Minimum Certification Levels

Test Description	Test Method	Contractor	Engineer	Level ¹
1. Aggregate and Recycled Material Testing				
Sampling	Tex-221-F	✓	✓	1A/AGG101
Dry sieve	Tex-200-F, Part I	✓	✓	1A/AGG101
Washed sieve	Tex-200-F, Part II	✓	✓	1A/AGG101
Deleterious material	Tex-217-F, Parts I & III	✓	✓	AGG101
Decantation	Tex-217-F, Part II	✓	✓	AGG101
Los Angeles abrasion	Tex-410-A		✓	TxDOT
Magnesium sulfate soundness	Tex-411-A		✓	TxDOT
Micro-Deval abrasion	Tex-461-A		✓	AGG101
Crushed face count	Tex-460-A	✓	✓	AGG101
Flat and elongated particles	Tex-280-F	✓	✓	AGG101
Linear shrinkage	Tex-107-E	✓	✓	AGG101
Sand equivalent	Tex-203-F	✓	✓	AGG101
Bulk specific gravity	Tex-201-F	✓	✓	AGG101
Unit weight	Tex-404-A	✓	✓	AGG101
Organic impurities	Tex-408-A	✓	✓	AGG101
2. Asphalt Binder & Tack Coat Sampling				
Asphalt binder sampling	Tex-500-C, Part II	✓	✓	1A/1B
Tack coat sampling	Tex-500-C, Part III	✓	✓	1A/1B
3. Mix Design & Verification				
Design and JMF changes	Tex-204-F	✓	✓	2
Mixing	Tex-205-F	✓	✓	2
Molding (SGC)	Tex-241-F	✓	✓	1A
Laboratory-molded density	Tex-207-F, Parts I & VI	✓	✓	1A
Rice gravity	Tex-227-F, Part II	✓	✓	1A
Ignition oven correction factors ²	Tex-236-F, Part II	✓	✓	2
Indirect tensile strength	Tex-226-F	✓	✓	1A
Hamburg Wheel test	Tex-242-F	✓	✓	1A
Boil test	Tex-530-C	✓	✓	1A
4. Production Testing				
Selecting production random numbers	Tex-225-F, Part I		✓	1A
Mixture sampling	Tex-222-F	✓	✓	1A/1B
Molding (SGC)	Tex-241-F	✓	✓	1A
Laboratory-molded density	Tex-207-F, Parts I & VI	✓	✓	1A
Rice gravity	Tex-227-F, Part II	✓	✓	1A
Gradation & asphalt binder content ²	Tex-236-F, Part I	✓	✓	1A
Control charts	Tex-233-F	✓	✓	1A
Moisture content	Tex-212-F, Part II	✓	✓	1A/AGG101
Hamburg Wheel test	Tex-242-F	✓	✓	1A
Micro-Deval abrasion	Tex-461-A		✓	AGG101
Boil test	Tex-530-C	✓	✓	1A
Abson recovery	Tex-211-F		✓	TxDOT
5. Placement Testing				
Selecting placement random numbers	Tex-225-F, Part II		✓	1B
Trimming roadway cores	Tex-251-F, Parts I & II	✓	✓	1A/1B
In-place air voids	Tex-207-F, Parts I & VI	✓	✓	1A
In-place density (nuclear method)	Tex-207-F, Part III	✓		1B
Establish rolling pattern	Tex-207-F, Part IV	✓		1B
Control charts	Tex-233-F	✓	✓	1A
Ride quality measurement	Tex-1001-S	✓	✓	Note 3
Segregation (density profile)	Tex-207-F, Part V	✓	✓	1B
Longitudinal joint density	Tex-207-F, Part VII	✓	✓	1B
Thermal profile	Tex-244-F	✓	✓	1B
Shear Bond Strength Test	Tex-249-F		✓	TxDOT

- Level 1A, 1B, AGG101, and 2 are certification levels provided by the Hot Mix Asphalt Center certification program.
- Refer to Section 3077.4.9.2.3., "Production Testing," for exceptions to using an ignition oven.
- Profiler and operator are required to be certified at the Texas A&M Transportation Institute facility when Surface Test Type B is specified.

4.2.

Reporting and Responsibilities. Use Department-provided templates to record and calculate all test data, including mixture design, production and placement QC/QA, control charts, thermal profiles, segregation density profiles, and longitudinal joint density. 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. The maximum allowable time for the Contractor and Engineer to exchange test data is as given in Table 7 unless otherwise approved. The Engineer and the Contractor will immediately report to the other party any test result that requires suspension of production or placement, a payment adjustment less than 1.000, or that fails to meet the specification requirements. Record and electronically submit all test results and pertinent information on Department-provided templates.

Subsequent sublots placed after test results are available to the Contractor, which require suspension of operations, may be considered unauthorized work. Unauthorized work will be accepted or rejected at the discretion of the Engineer in accordance with Article 5.3., "Conformity with Plans, Specifications, and Special Provisions."

**Table 7
Reporting Schedule**

Description	Reported By	Reported To	To Be Reported Within
Production Quality Control			
Gradation ¹	Contractor	Engineer	1 working day of completion of the subplot
Asphalt binder content ¹			
Laboratory-molded density ²			
Moisture content ³			
Boil test ³			
Production Quality Assurance			
Gradation ³	Engineer	Contractor	1 working day of completion of the subplot
Asphalt binder content ³			
Laboratory-molded density ¹			
Hamburg Wheel test ⁴			
Boil test ³			
Binder tests ⁴			
Placement Quality Control			
In-place air voids ²	Contractor	Engineer	1 working day of completion of the lot
Segregation ¹			
Longitudinal joint density ¹			
Thermal profile ¹			
Placement Quality Assurance			
In-place air voids ¹	Engineer	Contractor	1 working day after receiving the trimmed cores ⁵
Segregation ³			1 working day of completion of the lot
Longitudinal joint density ³			
Thermal profile ³			
Aging ratio ⁴			
Payment adjustment summary	Engineer	Contractor	2 working days of performing all required tests and receiving Contractor test data

1. These tests are required on every subplot.
2. Optional test. When performed on split samples, report the results as soon as they become available.
3. To be performed at the frequency specified in Table 17 or as shown on the plans.
4. To be reported as soon as the results become available.
5. Two days are allowed if cores cannot be dried to constant weight within 1 day.

The Engineer will use the Department-provided template to calculate all payment adjustment factors for the lot. Sublot samples may be discarded after the Engineer and Contractor sign off on the payment adjustment summary documentation for the lot.

Use the procedures described in [Tex-233-F](#) to plot the results of all quality control (QC) and quality assurance (QA) testing. Update the control charts as soon as test results for each subplot become available.

Make the control charts readily accessible at the field laboratory. The Engineer may suspend production for failure to update control charts.

- 4.3. **Quality Control Plan (QCP).** Develop and follow the QCP in detail. Obtain approval for changes to the QCP made during the project. The Engineer may suspend operations if the Contractor fails to comply with the QCP.

Submit a written QCP before the mandatory pre-paving meeting. Receive approval of the QCP before beginning production. Include the following items in the QCP:

- 4.3.1. **Project Personnel.** For project personnel, include:
- a list of individuals responsible for QC with authority to take corrective action;
 - current contact information for each individual listed; and
 - current copies of certification documents for individuals performing specified QC functions.
- 4.3.2. **Material Delivery and Storage.** For material delivery and storage, include:
- the sequence of material processing, delivery, and minimum quantities to assure continuous plant operations;
 - aggregate stockpiling procedures to avoid contamination and segregation;
 - frequency, type, and timing of aggregate stockpile testing to assure conformance of material requirements before mixture production; and
 - procedure for monitoring the quality and variability of asphalt binder.
- 4.3.3. **Production.** For production, include:
- loader operation procedures to avoid contamination in cold bins;
 - procedures for calibrating and controlling cold feeds;
 - procedures to eliminate debris or oversized material;
 - procedures for adding and verifying rates of each applicable mixture component (e.g., aggregate, asphalt binder, RAP, RAS, lime, liquid antistriper, WMA);
 - procedures for reporting job control test results; and
 - procedures to avoid segregation and drain-down in the silo.
- 4.3.4. **Loading and Transporting.** For loading and transporting, include:
- type and application method for release agents; and
 - truck loading procedures to avoid segregation.
- 4.3.5. **Placement and Compaction.** For placement and compaction, include:
- proposed agenda for mandatory pre-paving meeting, including date and location;
 - proposed paving plan (e.g., paving widths, joint offsets, and lift thicknesses);
 - type and application method for release agents in the paver and on rollers, shovels, lutes, and other utensils;
 - procedures for the transfer of mixture into the paver, while avoiding segregation and preventing material spillage;
 - process to balance production, delivery, paving, and compaction to achieve continuous placement operations and good ride quality;
 - paver operations (e.g., operation of wings, height of mixture in auger chamber) to avoid physical and thermal segregation and other surface irregularities; and
 - procedures to construct quality longitudinal and transverse joints.

4.4. Mixture Design.

4.4.1. **Design Requirements.** Use the SP design procedure provided in [Tex-204-F](#), unless otherwise shown on the plans. Design the mixture to meet the requirements listed in Tables 1, 2, 3, 4, 5, 8, 9, 10, and 11.

Design the mixture at 50 gyrations (Ndesign). Use a target laboratory-molded density of 96.0% to design the mixture; however, adjustments can be made to the Ndesign value as noted in Table 10. The Ndesign level may be reduced to at least 35 gyrations at the Contractor's discretion.

Use an approved laboratory from the Department's MPL to perform the Hamburg Wheel test and provide results with the mixture design, or provide the laboratory mixture and request that the Department perform the Hamburg Wheel test. The Engineer will be allowed 10 working days to provide the Contractor with Hamburg Wheel test results on the laboratory mixture design.

The Engineer will provide the mixture design when shown on the plans. The Contractor may submit a new mixture design at any time during the project. The Engineer will verify and approve all mixture designs (JMF1) before the Contractor can begin production.

The aggregate gradation may pass below or through the reference zone shown in Table 9 unless otherwise shown on the plans. Design a mixture with a gradation that has stone-on-stone contact and passes below the reference zone shown in Table 9 when shown on the plans. Verify stone-on-stone contact using the method given in the SP design procedure in [Tex-204-F](#), Part IV.

Provide the Engineer with a mixture design report using the Department-provided template. Include the following items in the report:

- the combined aggregate gradation, source, specific gravity, and percent of each material used;
- asphalt binder content and aggregate gradation of RAP and RAS stockpiles;
- the Ndesign level used;
- results of all applicable tests;
- the mixing and molding temperatures;
- the signature of the Level 2 person or persons that performed the design;
- the date the mixture design was performed; and
- a unique identification number for the mixture design.

Table 8
Master Gradation Limits (% Passing by Weight or Volume) and VMA Requirements

Sieve Size	SP-B Intermediate	SP-C Surface	SP-D Fine Mixture
2"	–	–	–
1-1/2"	100.0 ¹	–	–
1"	98.0–100.0	100.0 ¹	–
3/4"	90.0–100.0	98.0–100.0	100.0 ¹
1/2"	Note ²	90.0–100.0	98.0–100.0
3/8"	–	Note ²	90.0–100.0
#4	23.0–90.0	28.0–90.0	32.0–90.0
#8	23.0–34.6	28.0–37.0	32.0–40.0
#16	2.0–28.3	2.0–31.6	2.0–37.6
#30	2.0–20.7	2.0–23.1	2.0–27.5
#50	2.0–13.7	2.0–15.5	2.0–18.7
#200	2.0–8.0	2.0–10.0	2.0–10.0
Design VMA, % Minimum			
–	14.0	15.0	16.0
Production (Plant-Produced) VMA, % Minimum			
–	13.5	14.5	15.5

1. Defined as maximum sieve size. No tolerance allowed.
2. Must retain at least 10% cumulative.

Table 9
Reference Zones (% Passing by Weight or Volume)

Sieve Size	SP-B Intermediate	SP-C Surface	SP-D Fine Mixture
2"	–	–	–
1-1/2"	–	–	–
1"	–	–	–
3/4"	–	–	–
1/2"	–	–	–
3/8"	–	–	–
#4	–	–	–
#8	34.6–34.6	39.1–39.1	47.2–47.2
#16	22.3–28.3	25.6–31.6	31.6–37.6
#30	16.7–20.7	19.1–23.1	23.5–27.5
#50	13.7–13.7	15.5–15.5	18.7–18.7
#200	–	–	–

Table 10
Laboratory Mixture Design Properties

Mixture Property	Test Method	Requirement
Target laboratory-molded density, %	Tex-207-F	96.0
Design gyrations (Ndesign)	Tex-241-F	50 ¹
Indirect tensile strength (dry), psi	Tex-226-F	85–200 ²
Dust/asphalt binder ratio ³	–	0.6–1.4
Boil test ⁴	Tex-530-C	–

- Adjust within a range of 35–100 gyrations when shown on the plans or specification or mutually agreed between the Engineer and Contractor.
- The Engineer may allow the IDT strength to exceed 200 psi if the corresponding Hamburg Wheel rut depth is greater than 3.0 mm and less than 12.5 mm.
- Defined as % passing #200 sieve divided by asphalt binder content.
- Used to establish baseline for comparison to production results. May be waived when approved.

Table 11
Hamburg Wheel Test Requirements

High-Temperature Binder Grade	Test Method	Minimum # of Passes @ 12.5 mm ¹ Rut Depth, Tested @ 50°C
PG 64 or lower	Tex-242-F	10,000 ²
PG 70		15,000 ³
PG 76 or higher		20,000

- When the rut depth at the required minimum number of passes is less than 3 mm, the Engineer may require the Contractor to lower the Ndesign level to at least 35 gyrations.
- May be decreased to at least 5,000 passes when shown on the plans.
- May be decreased to at least 10,000 passes when shown on the plans.

4.4.2. **Job-Mix Formula Approval.** The job-mix formula (JMF) is the combined aggregate gradation, Ndesign level, and target asphalt percentage used to establish target values for hot-mix production. JMF1 is the original laboratory mixture design used to produce the trial batch. When WMA is used, JMF1 may be designed and submitted to the Engineer without including the WMA additive. When WMA is used, document the additive or process used and recommended rate on the JMF1 submittal. The Engineer and the Contractor will verify JMF1 based on plant-produced mixture from the trial batch unless otherwise approved. The Engineer may accept an existing mixture design previously used on a Department project and may waive the trial batch to verify JMF1. The Department may require the Contractor to reimburse the Department for verification tests if more than two trial batches per design are required.

4.4.2.1. **Contractor's Responsibilities.**

4.4.2.1.1. **Providing Superpave Gyrotory Compactor (SGC).** Furnish an SGC calibrated in accordance with [Tex-241-F](#) for molding production samples. Locate the SGC at the Engineer's field laboratory and make the SGC available to the Engineer for use in molding production samples.

- 4.4.2.1.2. **Gyratory Compactor Correlation Factors.** Use [Tex-206-F](#), Part II, to perform a gyratory compactor correlation when the Engineer uses a different SGC. Apply the correlation factor to all subsequent production test results.
- 4.4.2.1.3. **Submitting JMF1.** Furnish a mix design report (JMF1) with representative samples of all component materials and request approval to produce the trial batch. Provide approximately 10,000 g of the design mixture if opting to have the Department perform the Hamburg Wheel test on the laboratory mixture, and request that the Department perform the test.
- 4.4.2.1.4. **Supplying Aggregates.** Provide approximately 40 lb. of each aggregate stockpile unless otherwise directed.
- 4.4.2.1.5. **Supplying Asphalt.** Provide at least 1 gal. of the asphalt material and enough quantities of any additives proposed for use.
- 4.4.2.1.6. **Ignition Oven Correction Factors.** Determine the aggregate and asphalt correction factors from the ignition oven in accordance with [Tex-236-F](#), Part II. Provide correction factors that are not more than 12 months old. Provide the Engineer with split samples of the mixtures before the trial batch production, including all additives (except water), and blank samples used to determine the correction factors for the ignition oven used for QA testing during production. Correction factors established from a previously approved mixture design may be used for the current mixture design if the mixture design and ignition oven are the same as previously used, unless otherwise directed.
- 4.4.2.1.7. **Boil Test.** Perform the test and retain the tested sample from [Tex-530-C](#) until completion of the project or as directed. Use this sample for comparison purposes during production. The Engineer may waive the requirement for the boil test.
- 4.4.2.1.8. **Trial Batch Production.** Provide a plant-produced trial batch upon receiving conditional approval of JMF1 and authorization to produce a trial batch, including the WMA additive or process if applicable, for verification testing of JMF1 and development of JMF2. Produce a trial batch mixture that meets the requirements in Table 4, Table 5, and Table 12. The Engineer may accept test results from recent production of the same mixture instead of a new trial batch.
- 4.4.2.1.9. **Trial Batch Production Equipment.** Use only equipment and materials proposed for use on the project to produce the trial batch.
- 4.4.2.1.10. **Trial Batch Quantity.** Produce enough quantity of the trial batch to ensure that the mixture meets the specification requirements.
- 4.4.2.1.11. **Number of Trial Batches.** Produce trial batches as necessary to obtain a mixture that meets the specification requirements.
- 4.4.2.1.12. **Trial Batch Sampling.** Obtain a representative sample of the trial batch and split it into 3 equal portions in accordance with [Tex-222-F](#). Label these portions as "Contractor," "Engineer," and "Referee." Deliver samples to the appropriate laboratory as directed.
- 4.4.2.1.13. **Trial Batch Testing.** Test the trial batch to ensure the mixture produced using the proposed JMF1 meets the mixture requirements in Table 12. Ensure the trial batch mixture is also in compliance with the Hamburg Wheel-requirement in Table 11. Use a Department-approved laboratory to perform the Hamburg Wheel test on the trial batch mixture or request that the Department perform the Hamburg Wheel test.
- The Engineer will be allowed 10 working days to provide the Contractor with Hamburg Wheel test results on the trial batch. Provide the Engineer with a copy of the trial batch test results.
- 4.4.2.1.14. **Development of JMF2.** Evaluate the trial batch test results after the Engineer grants full approval of JMF1 based on results from the trial batch, determine the optimum mixture proportions, and submit as JMF2.

Adjust the asphalt binder content or gradation to achieve the specified target laboratory-molded density. The asphalt binder content established for JMF2 is not required to be within any tolerance of the optimum asphalt binder content established for JMF1; however, mixture produced using JMF2 must meet the voids in mineral aggregates (VMA) requirements for production shown in Table 8. If the optimum asphalt binder content for JMF2 is more than 0.5% lower than the optimum asphalt binder content for JMF1, the Engineer may perform or require the Contractor to perform [Tex-226-F](#) on Lot 1 production to confirm the indirect tensile strength does not exceed 200 psi. Verify that JMF2 meets the mixture requirements in Table 4 and Table 5.

- 4.4.2.1.15. **Mixture Production.** Use JMF2 to produce Lot 1 as described in Section 3077.4.9.3.1.1., “Lot 1 Placement,” after receiving approval for JMF2 and a passing result from the Department’s or a Department-approved laboratory’s Hamburg Wheel test on the trial batch. If desired, proceed to Lot 1 production, once JMF2 is approved, at the Contractor’s risk without receiving the results from the Department’s Hamburg Wheel test on the trial batch.

Notify the Engineer if electing to proceed without Hamburg Wheel test results from the trial batch. Note that the Engineer may require up to the entire subplot of any mixture failing the Hamburg Wheel test to be removed and replaced at the Contractor’s expense.

- 4.4.2.1.16. **Development of JMF3.** Evaluate the test results from Lot 1, determine the optimum mixture proportions, and submit as JMF3 for use in Lot 2.

- 4.4.2.1.17. **JMF Adjustments.** If JMF adjustments are necessary to achieve the specified requirements, make the adjustment before beginning a new lot. The adjusted JMF must:

- be provided to the Engineer in writing before the start of a new lot;
- be numbered in sequence to the previous JMF;
- meet the mixture requirements in Table 4 and Table 5;
- meet the master gradation limits shown in Table 8; and
- be within the operational tolerances of JMF2 listed in Table 12.

- 4.4.2.1.18. **Requesting Referee Testing.** Use referee testing, if needed, in accordance with Section 3077.4.9.1., “Referee Testing,” to resolve testing differences with the Engineer.

Table 12
Operational Tolerances

Description	Test Method	Allowable Difference Between Trial Batch and JMF1 Target	Allowable Difference from Current JMF Target	Allowable Difference between Contractor and Engineer ¹
Individual % retained for #8 sieve and larger	Tex-200-F or Tex-236-F	Must be Within Master Grading Limits in Table 8	±5.0 ^{2,3}	±5.0
Individual % retained for sieves smaller than #8 and larger than #200			±3.0 ^{2,3}	±3.0
% passing the #200 sieve			±2.0 ^{2,3}	±1.6
Asphalt binder content, %	Tex-236-F	±0.5	±0.3 ³	±0.3
Dust/asphalt binder ratio ⁴	–	Note 5	Note 5	N/A
Laboratory-molded density, %	Tex-207-F	±1.0	±1.0	±0.5
In-place air voids, %		N/A	N/A	±1.0
Laboratory-molded bulk specific gravity		N/A	N/A	±0.020
VMA, % min	Tex-204-F	Note 6	Note 6	N/A
Theoretical maximum specific (Rice) gravity	Tex-227-F	N/A	N/A	±0.020

- Contractor may request referee testing only when values exceed these tolerances.
- When within these tolerances, mixture production gradations may fall outside the master grading limits; however, the % passing the #200 will be considered out of tolerance when outside the master grading limits.
- Only applies to mixture produced for Lot 1 and higher.
- Defined as % passing #200 sieve divided by asphalt binder content.
- Verify that Table 10 requirement is met.
- Verify that Table 8 requirements are met.

4.4.2.2. **Engineer's Responsibilities.**

4.4.2.2.1. **Gyratory Compactor.** The Engineer will use a Department SGC, calibrated in accordance with [Tex-241-F](#), to mold samples for laboratory mixture design verification. For molding trial batch and production specimens, the Engineer will use the Contractor-provided SGC at the field laboratory or provide and use a Department SGC at an alternate location. The Engineer will make the Contractor-provided SGC in the Department field laboratory available to the Contractor for molding verification samples.

4.4.2.2.2. **Conditional Approval of JMF1 and Authorizing Trial Batch.** The Engineer will review and verify conformance of the following information within two working days of receipt:

- the Contractor's mix design report (JMF1);
- the Contractor-provided Hamburg Wheel test results;
- all required materials including aggregates, asphalt, additives, and recycled materials; and
- the mixture specifications.

The Engineer will grant the Contractor conditional approval of JMF1 if the information provided on the paper copy of JMF1 indicates that the Contractor's mixture design meets the specifications. When the Contractor does not provide Hamburg Wheel test results with laboratory mixture design, 10 working days are allowed for conditional approval of JMF1. The Engineer will base full approval of JMF1 on the test results on mixture from the trial batch.

Unless waived, the Engineer will determine the Micro-Deval abrasion loss in accordance with Section 3077.2.1.1.2., "Micro-Deval Abrasion." If the Engineer's test results are pending after two working days, conditional approval of JMF1 will still be granted within 2 working days of receiving JMF1. When the Engineer's test results become available, they will be used for specification compliance.

After conditionally approving JMF1, including either Contractor- or Department-supplied Hamburg Wheel test results, the Contractor is authorized to produce a trial batch.

- 4.4.2.2.3. **Hamburg Wheel Testing of JMF1.** If the Contractor requests the option to have the Department perform the Hamburg Wheel test on the laboratory mixture, the Engineer will mold samples in accordance with [Tex-242-F](#) to verify compliance with the Hamburg Wheel test requirement in Table 11.
- 4.4.2.2.4. **Ignition Oven Correction Factors.** The Engineer will use the split samples provided by the Contractor to determine the aggregate and asphalt correction factors for the ignition oven used for QA testing during production in accordance with [Tex-236-F](#), Part II. Provide correction factors that are not more than 12 months old.
- 4.4.2.2.5. **Testing the Trial Batch.** Within 1 full working day, the Engineer will sample and test the trial batch to ensure that the mixture meets the requirements in Table 12. If the Contractor requests the option to have the Department perform the Hamburg Wheel test on the trial batch mixture, the Engineer will mold samples in accordance with [Tex-242-F](#) to verify compliance with the Hamburg Wheel test requirement in Table 11.
- The Engineer will have the option to perform the following tests on the trial batch:
- [Tex-226-F](#), to verify that the indirect tensile strength meets the requirement shown in Table 10; and
 - [Tex-530-C](#), to retain and use for comparison purposes during production.
- 4.4.2.2.6. **Full Approval of JMF1.** The Engineer will grant full approval of JMF1 and authorize the Contractor to proceed with developing JMF2 if the Engineer's results for the trial batch meet the requirements in Table 12. The Engineer will notify the Contractor that an additional trial batch is required if the trial batch does not meet these requirements.
- 4.4.2.2.7. **Approval of JMF2.** The Engineer will approve JMF2 within one working day if the mixture meets the requirements in Table 5 and the gradation meets the master grading limits shown in Table 8. The asphalt binder content established for JMF2 is not required to be within any tolerance of the optimum asphalt binder content established for JMF1; however, mixture produced using JMF2 must meet the VMA requirements shown in Table 8. If the optimum asphalt binder content for JMF2 is more than 0.5% lower than the optimum asphalt binder content for JMF1, the Engineer may perform or require the Contractor to perform [Tex-226-F](#) on Lot 1 production to confirm the indirect tensile strength does not exceed 200 psi.
- 4.4.2.2.8. **Approval of Lot 1 Production.** The Engineer will authorize the Contractor to proceed with Lot 1 production (using JMF2) as soon as a passing result is achieved from the Department's or a Department-approved laboratory's Hamburg Wheel test on the trial batch. The Contractor may proceed at its own risk with Lot 1 production without the results from the Hamburg Wheel test on the trial batch.
- If the Department's or Department-approved laboratory's sample from the trial batch fails the Hamburg Wheel test, the Engineer will suspend production until further Hamburg Wheel tests meet the specified values. The Engineer may require up to the entire subplot of any mixture failing the Hamburg Wheel test be removed and replaced at the Contractor's expense.
- 4.4.2.2.9. **Approval of JMF3 and Subsequent JMF Changes.** JMF3 and subsequent JMF changes are approved if they meet the mixture requirements shown in Table 4, Table 5, and the master grading limits shown in Table 8, and are within the operational tolerances of JMF2 shown in Table 12.
- 4.5. **Production Operations.** Perform a new trial batch when the plant or plant location is changed. Take corrective action and receive approval to proceed after any production suspension for noncompliance to the specification. Submit a new mix design and perform a new trial batch when the asphalt binder content of:
- any RAP stockpile used in the mix is more than 0.5% higher than the value shown on the mixture design report; or
 - RAS stockpile used in the mix is more than 2.0% higher than the value shown on the mixture design report.

- 4.5.1. **Storage and Heating of Materials.** Do not heat the asphalt binder above the temperatures specified in Item 300, "Asphalts, Oils, and Emulsions," or outside the manufacturer's recommended values. Provide the Engineer with daily records of asphalt binder and hot-mix asphalt discharge temperatures (in legible and discernible increments) in accordance with Item 320, "Equipment for Asphalt Concrete Pavement," unless otherwise directed. Do not store mixture for a period long enough to affect the quality of the mixture, nor in any case longer than 12 hr. unless otherwise approved.
- 4.5.2. **Mixing and Discharge of Materials.** Notify the Engineer of the target discharge temperature and produce the mixture within 25°F of the target. Monitor the temperature of the material in the truck before shipping to ensure that it does not exceed the maximum production temperatures listed in Table 13 (or 275°F for WMA). The Department will not pay for or allow placement of any mixture produced above the maximum production temperatures listed in Table 13.

Table 13
Maximum Production Temperature

High-Temperature Binder Grade ¹	Maximum Production Temperature
PG 64	325°F
PG 70	335°F
PG 76	345°F

1. The high-temperature binder grade refers to the high-temperature grade of the virgin asphalt binder used to produce the mixture.

Produce WMA within the target discharge temperature range of 215°F and 275°F when WMA is required. Take corrective action any time the discharge temperature of the WMA exceeds the target discharge range. The Engineer may suspend production operations if the Contractor's corrective action is not successful at controlling the production temperature within the target discharge range. Note that when WMA is produced, it may be necessary to adjust burners to ensure complete combustion such that no burner fuel residue remains in the mixture.

Control the mixing time and temperature so that substantially all moisture is removed from the mixture before discharging from the plant. Determine the moisture content, if requested, by oven-drying in accordance with [Tex-212-F](#), Part II, and verify that the mixture contains no more than 0.2% of moisture by weight. Obtain the sample immediately after discharging the mixture into the truck, and perform the test promptly.

- 4.6. **Hauling Operations.** Clean all truck beds before use to ensure that mixture is not contaminated. Use a release agent shown on the Department's MPL to coat the inside bed of the truck when necessary.

Use equipment for hauling as defined in Section 3077.4.7.3.3., "Hauling Equipment." Use other hauling equipment only when allowed.

- 4.7. **Placement Operations.** Collect haul tickets from each load of mixture delivered to the project and provide the Department's copy to the Engineer approximately every hour or as directed. Use a hand-held thermal camera or infrared thermometer, when a thermal imaging system is not used, to measure and record the internal temperature of the mixture as discharged from the truck or Material Transfer Device (MTD) before or as the mix enters the paver and an approximate station number or GPS coordinates on each ticket. Calculate the daily yield and cumulative yield for the specified lift and provide to the Engineer at the end of paving operations for each day unless otherwise directed. The Engineer may suspend production if the Contractor fails to produce and provide haul tickets and yield calculations by the end of paving operations for each day.

Prepare the surface by removing raised pavement markers and objectionable material such as moisture, dirt, sand, leaves, and other loose impediments from the surface before placing mixture. Remove vegetation from pavement edges. Place the mixture to meet the typical section requirements and produce a smooth, finished surface with a uniform appearance and texture. Offset longitudinal joints of successive courses of hot-mix by at least 6 in. Place mixture so that longitudinal joints on the surface course coincide with lane lines and are not placed in the wheel path, or as directed. Ensure that all finished surfaces will drain properly. Place the

mixture at the rate or thickness shown on the plans. The Engineer will use the guidelines in Table 14 to determine the compacted lift thickness of each layer when multiple lifts are required. The thickness determined is based on the rate of 110 lb./sq. yd. for each inch of pavement unless otherwise shown on the plans.

Table 14
Compacted Lift Thickness and Required Core Height

Mixture Type	Compacted Lift Thickness Guidelines		Minimum Untrimmed Core Height (in.) Eligible for Testing
	Minimum (in.)	Maximum (in.)	
SP-B	2.50	4.0	2.00
SP-C	2.00	3.0	1.25
SP-D	1.25	2.0	1.25

4.7.1. **Weather Conditions.**

4.7.1.1. **When Using a Thermal Imaging System.** Place mixture when the roadway is dry and the roadway surface temperature is at or above the temperatures listed in Table 15A. The Engineer may restrict the Contractor from paving surface mixtures if the ambient temperature is likely to drop below 32°F within 12 hr. of paving. Place mixtures only when weather conditions and moisture conditions of the roadway surface are suitable as determined by the Engineer. Provide output data from the thermal imaging system to demonstrate to the Engineer that no recurring severe thermal segregation exists in accordance with Section 3077.4.7.3.1.2., "Thermal Imaging System."

Table 15A
Minimum Pavement Surface Temperatures

High-Temperature Binder Grade ¹	Minimum Pavement Surface Temperatures (°F)	
	Subsurface Layers or Night Paving Operations	Surface Layers Placed in Daylight Operations
PG 64	35	40
PG 70	45 ²	50 ²
PG 76	45 ²	50 ²

1. The high-temperature binder grade refers to the high-temperature grade of the virgin asphalt binder used to produce the mixture.
2. Contractors may pave at temperatures 10°F lower than these values when a chemical WMA additive is used as a compaction aid in the mixture or when using WMA.

4.7.1.2. **When Not Using a Thermal Imaging System.** When using a thermal camera instead of the thermal imaging system, place mixture when the roadway surface temperature is at or above the temperatures listed in Table 15B unless otherwise approved or as shown on the plans. Measure the roadway surface temperature with a hand-held thermal camera or infrared thermometer. The Engineer may allow mixture placement to begin before the roadway surface reaches the required temperature if conditions are such that the roadway surface will reach the required temperature within 2 hr. of beginning placement operations. Place mixtures only when weather conditions and moisture conditions of the roadway surface are suitable as determined by the Engineer. The Engineer may restrict the Contractor from paving if the ambient temperature is likely to drop below 32°F within 12 hr. of paving.

Table 15B
Minimum Pavement Surface Temperatures

High-Temperature Binder Grade ¹	Minimum Pavement Surface Temperatures (°F)	
	Subsurface Layers or Night Paving Operations	Surface Layers Placed in Daylight Operations
PG 64	45	50
PG 70	55 ²	60 ²
PG 76	60 ²	60 ²

1. The high-temperature binder grade refers to the high-temperature grade of the virgin asphalt binder used to produce the mixture.
2. Contractors may pave at temperatures 10°F lower than these values when a chemical WMA additive is used as a compaction aid in the mixture, when using WMA, or utilizing a paving process with equipment that eliminates thermal segregation. In such cases, for each sublot and in the presence of the Engineer, use a hand-held thermal camera operated in accordance with [Tex-244-F](#) to demonstrate to the satisfaction of the Engineer that the uncompacted mat has no more than 10°F of thermal segregation.

4.7.2. Tack Coat.

4.7.2.1. **Application.** Clean the surface before placing the tack coat. The Engineer will set the rate between 0.04 and 0.10 gal. of residual asphalt per square yard of surface area. Apply a uniform tack coat at the specified rate unless otherwise directed. Apply the tack coat in a uniform manner to avoid streaks and other irregular patterns. Apply the tack coat to all surfaces that will come in contact with the subsequent HMA placement, unless otherwise directed. Allow adequate time for emulsion to break completely before placing any material. Prevent splattering of tack coat when placed adjacent to curb, gutter, and structures. Do not dilute emulsified asphalts at the terminal, in the field, or at any other location before use.

4.7.2.2. **Sampling.** The Engineer will obtain at least one sample of the tack coat binder per project in accordance with [Tex-500-C](#), Part III, and test it to verify compliance with Item 300, "Asphalts, Oils, and Emulsions." The Engineer will notify the Contractor when the sampling will occur and will witness the collection of the sample from the asphalt distributor immediately before use.

For emulsions, the Engineer may test as often as necessary to ensure the residual of the emulsion is greater than or equal to the specification requirement in Item 300, "Asphalts, Oils, and Emulsions."

4.7.3. **Lay-Down Operations.** Use the placement temperatures in Table 16 to establish the minimum placement temperature of mixture delivered to the paver.

Table 16
Minimum Mixture Placement Temperature

High-Temperature Binder Grade ¹	Minimum Placement Temperature (Before Entering Paver) ^{2,3}
PG 64	260°F
PG 70	270°F
PG 76	280°F

1. The high-temperature binder grade refers to the high-temperature grade of the virgin asphalt binder used to produce the mixture.
2. Minimum placement temperatures may be reduced 10°F if using a chemical WMA additive as a compaction aid.
3. When using WMA, the minimum placement temperature is 215°F.

4.7.3.1. **Thermal Profile.** Use a hand-held thermal camera or a thermal imaging system to obtain a continuous thermal profile in accordance with [Tex-244-F](#). Thermal profiles are not applicable in areas described in Section 3077.4.9.3.1.4., "Miscellaneous Areas."

4.7.3.1.1. **Thermal Segregation.**

- 4.7.3.1.1.1. **Moderate.** Any areas that have a temperature differential greater than 25°F, but not exceeding 50°F, are deemed as moderate thermal segregation.
- 4.7.3.1.1.2. **Severe.** Any areas that have a temperature differential greater than 50°F are deemed as severe thermal segregation.
- 4.7.3.1.2. **Thermal Imaging System.** Review the output results when a thermal imaging system is used, and provide the automated report described in [Tex-244-F](#) to the Engineer daily unless otherwise directed. Modify the paving process as necessary to eliminate any recurring (moderate or severe) thermal segregation identified by the thermal imaging system. The Engineer may suspend paving operations if the Contractor cannot successfully modify the paving process to eliminate recurring severe thermal segregation. Density profiles are not required and not applicable when using a thermal imaging system. Provide the Engineer with electronic copies of all daily data files that can be used with the thermal imaging system software to generate temperature profile plots daily or upon completion of the project or as requested by the Engineer.
- 4.7.3.1.3. **Thermal Camera.** When using a thermal camera instead of the thermal imaging system, take immediate corrective action to eliminate recurring moderate thermal segregation when a hand-held thermal camera is used. Evaluate areas with moderate thermal segregation by performing density profiles in accordance with Section 3077.4.9.3.3.2., "Segregation (Density Profile)." Provide the Engineer with the thermal profile of every subplot within one working day of the completion of each lot. When requested by the Engineer, provide the thermal images generated using the thermal camera. Report the results of each thermal profile in accordance with Section 3077.4.2., "Reporting and Responsibilities." The Engineer will use a hand-held thermal camera to obtain a thermal profile at least once per project. No production or placement payment adjustments greater than 1.000 will be paid for any subplot that contains severe thermal segregation. Suspend operations and take immediate corrective action to eliminate severe thermal segregation unless otherwise directed. Resume operations when the Engineer determines that subsequent production will meet the requirements of this Section. Evaluate areas with severe thermal segregation by performing density profiles in accordance with Section 3077.4.9.3.3.2., "Segregation (Density Profile)." Remove and replace the material in any areas that have both severe thermal segregation and a failing result for Segregation (Density Profile) unless otherwise directed. The subplot in question may receive a production and placement payment adjustment greater than 1.000, if applicable, when the defective material is successfully removed and replaced.
- 4.7.3.2. **Windrow Operations.** Operate windrow pickup equipment so that when hot-mix is placed in windrows, substantially all the mixture deposited on the roadbed is picked up and loaded into the paver.
- 4.7.3.3. **Hauling Equipment.** Use belly dumps, live bottom, or end dump trucks to haul and transfer mixture; however, with exception of paving miscellaneous areas, end dump trucks are only allowed when used in conjunction with an MTD with remixing capability or when a thermal imaging system is used unless otherwise allowed.
- 4.7.3.4. **Screed Heaters.** Turn off screed heaters to prevent overheating of the mat if the paver stops for more than 5 min. The Engineer may evaluate the suspect area in accordance with Section 3077.4.9.3.3.4., "Recovered Asphalt Dynamic Shear Rheometer (DSR)," if the screed heater remains on for more than 5 min. while the paver is stopped.
- 4.8. **Compaction.** Compact the pavement uniformly to contain between 3.7% and 7.5% in-place air voids. Take immediate corrective action to bring the operation within 3.7% and 7.5% when the in-place air voids exceed the range of these tolerances. The Engineer will allow paving to resume when the proposed corrective action is likely to yield between 3.7% and 7.5% in-place air voids.

Obtain cores in areas placed under Exempt Production, as directed, at locations determined by the Engineer. The Engineer may test these cores and suspend operations or require removal and replacement if the in-place air voids are less than 2.7% or more than 9.0%. Areas defined in Section 3077.4.9.3.1.4., "Miscellaneous Areas," are not subject to in-place air void determination.

Furnish the type, size, and number of rollers required for compaction as approved. Use additional rollers as required to remove any roller marks. Use only water or an approved release agent on rollers, tamps, and other compaction equipment unless otherwise directed.

Use the control strip method shown in [Tex-207-F](#), Part IV, on the first day of production to establish the rolling pattern that will produce the desired in-place air voids unless otherwise directed.

Use tamps to thoroughly compact the edges of the pavement along curbs, headers, and similar structures and in locations that will not allow thorough compaction with rollers. The Engineer may require rolling with a trench roller on widened areas, in trenches, and in other limited areas.

Complete all compaction operations before the pavement temperature drops below 160°F unless otherwise allowed. The Engineer may allow compaction with a light finish roller operated in static mode for pavement temperatures below 160°F.

Allow the compacted pavement to cool to 160°F or lower before opening to traffic unless otherwise directed. Sprinkle the finished mat with water or limewater, when directed, to expedite opening the roadway to traffic.

- 4.9. **Acceptance Plan.** Payment adjustments for the material will be in accordance with Article 3077.6., "Payment."

Sample and test the hot-mix on a lot and subplot basis. Suspend production until test results or other information indicates to the satisfaction of the Engineer that the next material produced or placed will result in pay factors of at least 1.000 if the production pay factor given in Section 3077.6.1., "Production Payment Adjustment Factors," for two consecutive lots or the placement pay factor given in Section 3077.6.2., "Placement Payment Adjustment Factors," for two consecutive lots is below 1.000.

- 4.9.1. **Referee Testing.** The Materials and Tests Division is the referee laboratory. The Contractor may request referee testing if a "remove and replace" condition is determined based on the Engineer's test results, or if the differences between Contractor and Engineer test results exceed the maximum allowable difference shown in Table 12 and the differences cannot be resolved. The Contractor may also request referee testing if the Engineer's test results require suspension of production and the Contractor's test results are within specification limits. Make the request within 5 working days after receiving test results and cores from the Engineer. Referee tests will be performed only on the subplot in question and only for the particular tests in question. Allow 10 working days from the time the referee laboratory receives the samples for test results to be reported. The Department may require the Contractor to reimburse the Department for referee tests if more than three referee tests per project are required and the Engineer's test results are closer to the referee test results than the Contractor's test results.

The Materials and Tests Division will determine the laboratory-molded density based on the molded specific gravity and the maximum theoretical specific gravity of the referee sample. The in-place air voids will be determined based on the bulk specific gravity of the cores, as determined by the referee laboratory and the Engineer's average maximum theoretical specific gravity for the lot. With the exception of "remove and replace" conditions, referee test results are final and will establish payment adjustment factors for the subplot in question. The Contractor may decline referee testing and accept the Engineer's test results when the placement payment adjustment factor for any subplot results in a "remove and replace" condition. Placement sublots subject to be removed and replaced will be further evaluated in accordance with Section 3077.6.2.2., "Placement Sublots Subject to Removal and Replacement."

- 4.9.2. **Production Acceptance.**

- 4.9.2.1. **Production Lot.** A production lot consists of four equal sublots. The default quantity for Lot 1 is 1,000 tons; however, when requested by the Contractor, the Engineer may increase the quantity for Lot 1 to no more than 4,000 tons. The Engineer will select subsequent lot sizes based on the anticipated daily production such

that approximately three to four sublots are produced each day. The lot size will be between 1,000 tons and 4,000 tons. The Engineer may change the lot size before the Contractor begins any lot.

If the optimum asphalt binder content for JMF2 is more than 0.5% lower than the optimum asphalt binder content for JMF1, the Engineer may perform or require the Contractor to perform [Tex-226-F](#) on Lot 1 to confirm the indirect tensile strength does not exceed 200 psi. Take corrective action to bring the mixture within specification compliance if the indirect tensile strength exceeds 200 psi unless otherwise directed.

- 4.9.2.1.1. **Incomplete Production Lots.** If a lot is begun but cannot be completed, such as on the last day of production or in other circumstances deemed appropriate, the Engineer may close the lot. Adjust the payment for the incomplete lot in accordance with Section 3077.6.1., "Production Payment Adjustment Factors." Close all lots within five working days unless otherwise allowed.
- 4.9.2.2. **Production Sampling.**
- 4.9.2.2.1. **Mixture Sampling.** Obtain hot-mix samples from trucks at the plant in accordance with [Tex-222-F](#). The sampler will split each sample into three equal portions in accordance with [Tex-200-F](#) and label these portions as "Contractor," "Engineer," and "Referee." The Engineer will perform or witness the sample splitting and take immediate possession of the samples labeled "Engineer" and "Referee." The Engineer will maintain the custody of the samples labeled "Engineer" and "Referee" until the Department's testing is completed.
- 4.9.2.2.1.1. **Random Sample.** At the beginning of the project, the Engineer will select random numbers for all production sublots. Determine sample locations in accordance with [Tex-225-F](#). Take one sample for each subplot at the randomly selected location. The Engineer will perform or witness the sampling of production sublots.
- 4.9.2.2.1.2. **Blind Sample.** For one subplot per lot, the Engineer will obtain and test a "blind" sample instead of the random sample collected by the Contractor. Test either the "blind" or the random sample; however, referee testing (if applicable) will be based on a comparison of results from the "blind" sample. The location of the Engineer's "blind" sample will not be disclosed to the Contractor. The Engineer's "blind" sample may be randomly selected in accordance with [Tex-225-F](#) for any subplot or selected at the discretion of the Engineer. The Engineer will use the Contractor's split sample for sublots not sampled by the Engineer.
- 4.9.2.2.2. **Informational Shear Bond Strength Testing.** Select one random subplot from Lot 2 or higher for shear bond strength testing. Obtain full depth cores in accordance with [Tex-249-F](#). Label the cores with the Control Section Job (CSJ), producer of the tack coat, mix type, shot rate, lot, and subplot number and provide to the Engineer. The Engineer will ship the cores to the Materials and Tests Division or district laboratory for shear bond strength testing. Results from these tests will not be used for specification compliance.
- 4.9.2.2.3. **Asphalt Binder Sampling.** Obtain a 1-qt. sample of the asphalt binder witnessed by the Engineer for each lot of mixture produced. The Contractor will notify the Engineer when the sampling will occur. Obtain the sample at approximately the same time the mixture random sample is obtained. Sample from a port located immediately upstream from the mixing drum or pug mill and upstream from the introduction of any additives in accordance with [Tex-500-C](#), Part II. Label the can with the corresponding lot and subplot numbers, producer, producer facility location, grade, district, date sampled, and project information including highway and CSJ. The Engineer will retain these samples for one year. The Engineer may also obtain independent samples. If obtaining an independent asphalt binder sample and upon request of the Contractor, the Engineer will split a sample of the asphalt binder with the Contractor.
- At least once per project, the Engineer will collect split samples of each binder grade and source used. The Engineer will submit one split sample to MTD to verify compliance with Item 300, "Asphalts, Oils, and Emulsions" and will retain the other split sample for one year.
- 4.9.2.3. **Production Testing.** The Contractor and Engineer must perform production tests in accordance with Table 17. The Contractor has the option to verify the Engineer's test results on split samples provided by the Engineer. Determine compliance with operational tolerances listed in Table 12 for all sublots.

Take immediate corrective action if the Engineer's laboratory-molded density on any subplot is less than 95.0% or greater than 97.0% to bring the mixture within these tolerances. The Engineer may suspend operations if the Contractor's corrective actions do not produce acceptable results. The Engineer will allow production to resume when the proposed corrective action is likely to yield acceptable results.

The Engineer may allow alternate methods for determining the asphalt binder content and aggregate gradation if the aggregate mineralogy is such that [Tex-236-F](#), Part I does not yield reliable results. Provide evidence that results from [Tex-236-F](#), Part I are not reliable before requesting permission to use an alternate method unless otherwise directed. Use the applicable test procedure as directed if an alternate test method is allowed.

Table 17
Production and Placement Testing Frequency

Description	Test Method	Minimum Contractor Testing Frequency	Minimum Engineer Testing Frequency
Individual % retained for #8 sieve and larger	Tex-200-F or Tex-236-F	1 per subplot	1 per 12 sublots ¹
Individual % retained for sieves smaller than #8 and larger than #200			
% passing the #200 sieve			
Laboratory-molded density	Tex-207-F	N/A	1 per subplot ¹
Laboratory-molded bulk specific gravity			
In-place air voids			
VMA	Tex-204-F		
Segregation (density profile)	Tex-207-F , Part V	1 per subplot ²	1 per project
Longitudinal joint density	Tex-207-F , Part VII		
Moisture content	Tex-212-F , Part II	When directed	
Theoretical maximum specific (Rice) gravity	Tex-227-F	N/A	1 per subplot ¹
Asphalt binder content	Tex-236-F	1 per subplot	1 per lot ¹
Hamburg Wheel test	Tex-242-F	N/A	1 per project
Recycled Asphalt Shingles (RAS) ³	Tex-217-F , Part III	N/A	
Thermal profile	Tex-244-F	1 per subplot ²	
Asphalt binder sampling and testing	Tex-500-C , Part II	1 per lot (sample only) ⁴	
Tack coat sampling and testing	Tex-500-C , Part III	N/A	
Boil test ⁵	Tex-530-C	1 per lot	
Shear Bond Strength Test ⁶	Tex-249-F	1 per project (sample only)	

- For production defined in Section 3077.4.9.4., "Exempt Production," the Engineer will test one per day if 100 tons or more are produced. For Exempt Production, no testing is required when less than 100 tons are produced.
- To be performed in the presence of the Engineer, unless otherwise approved. Not required when a thermal imaging system is used.
- Testing performed by the Materials and Tests Division or designated laboratory.
- Obtain samples witnessed by the Engineer. The Engineer will retain these samples for one year.
- The Engineer may reduce or waive the sampling and testing requirements based on a satisfactory test history.
- Testing performed by the Materials and Tests Division or District for informational purposes only.

4.9.2.4. **Operational Tolerances.** Control the production process within the operational tolerances listed in Table 12. When production is suspended, the Engineer will allow production to resume when test results or other information indicates the next mixture produced will be within the operational tolerances.

4.9.2.4.1. **Gradation.** Suspend operation and take corrective action if any aggregate is retained on the maximum sieve size shown in Table 8. A subplot is defined as out of tolerance if either the Engineer's or the Contractor's test results are out of operational tolerance. Suspend production when test results for gradation exceed the operational tolerances in Table 12 for three consecutive sublots on the same sieve or four consecutive sublots on any sieve unless otherwise directed. The consecutive sublots may be from more than one lot.

4.9.2.4.2. **Asphalt Binder Content.** A subplot is defined as out of operational tolerance if either the Engineer's or the Contractor's test results exceed the values listed in Table 12. No production or placement payment

adjustments greater than 1.000 will be paid for any subplot that is out of operational tolerance for asphalt binder content. Suspend production and shipment of the mixture if the Engineer's or the Contractor's asphalt binder content deviates from the current JMF by more than 0.5% for any subplot.

- 4.9.2.4.3. **Voids in Mineral Aggregates (VMA).** The Engineer will determine the VMA for every subplot. For sublots when the Engineer does not determine asphalt binder content, the Engineer will use the asphalt binder content results from QC testing performed by the Contractor to determine VMA.

Take immediate corrective action if the VMA value for any subplot is less than the minimum VMA requirement for production listed in Table 8. Suspend production and shipment of the mixture if the Engineer's VMA results on two consecutive sublots are below the minimum VMA requirement for production listed in Table 8. No production or placement payment adjustments greater than 1.000 will be paid for any subplot that does not meet the minimum VMA requirement for production listed in Table 8 based on the Engineer's VMA determination.

Suspend production and shipment of the mixture if the Engineer's VMA result is more than 0.5% below the minimum VMA requirement for production listed in Table 8. In addition to suspending production, the Engineer may require removal and replacement or may allow the subplot to be left in place without payment.

- 4.9.2.4.4. **Hamburg Wheel Test.** The Engineer may perform a Hamburg Wheel test at any time during production, including when the boil test indicates a change in quality from the materials submitted for JMF 1. In addition to testing production samples, the Engineer may obtain cores and perform Hamburg Wheel tests on any areas of the roadway where rutting is observed. Suspend production until further Hamburg Wheel tests meet the specified values when the production or core samples fail the Hamburg Wheel test criteria in Table 11. Core samples, if taken, will be obtained from the center of the finished mat or other areas excluding the vehicle wheel paths. The Engineer may require up to the entire subplot of any mixture failing the Hamburg Wheel test to be removed and replaced at the Contractor's expense.

If the Department's or Department approved laboratory's Hamburg Wheel test results in a "remove and replace" condition, the Contractor may request that the Department confirm the results by re-testing the failing material. The Materials and Tests Division will perform the Hamburg Wheel tests and determine the final disposition of the material in question based on the Department's test results.

- 4.9.2.5. **Individual Loads of Hot-Mix.** The Engineer can reject individual truckloads of hot-mix. When a load of hot-mix is rejected for reasons other than temperature, contamination, or excessive uncoated particles, the Contractor may request that the rejected load be tested. Make this request within 4 hr. of rejection. The Engineer will sample and test the mixture. If test results are within the operational tolerances shown in Table 12, payment will be made for the load. If test results are not within operational tolerances, no payment will be made for the load.

4.9.3. **Placement Acceptance.**

- 4.9.3.1. **Placement Lot.** A placement lot consists of four placement sublots. A placement subplot consists of the area placed during a production subplot.

- 4.9.3.1.1. **Lot 1 Placement.** Placement payment adjustments greater than 1.000 for Lot 1 will be in accordance with Section 3077.6.2., "Placement Payment Adjustment Factors;" however, no placement adjustment less than 1.000 will be assessed for any subplot placed in Lot 1 when the in-place air voids are greater than or equal to 2.7% and less than or equal to 9.0%. Remove and replace any subplot with in-place air voids less than 2.7% or greater than 9.0%.

- 4.9.3.1.2. **Incomplete Placement Lots.** An incomplete placement lot consists of the area placed as described in Section 3077.4.9.2.1.1., "Incomplete Production Lot," excluding areas defined in Section 3077.4.9.3.1.4., "Miscellaneous Areas." Placement sampling is required if the random sample plan for production resulted in a sample being obtained from an incomplete production subplot.

- 4.9.3.1.3. **Shoulders, Ramps, Etc.** Shoulders, ramps, intersections, acceleration lanes, deceleration lanes, and turn lanes are subject to in-place air void determination and payment adjustments unless designated on the plans as not eligible for in-place air void determination. Intersections may be considered miscellaneous areas when determined by the Engineer.
- 4.9.3.1.4. **Miscellaneous Areas.** Miscellaneous areas include areas that typically involve significant handwork or discontinuous paving operations, such as temporary detours, driveways, mailbox turnouts, crossovers, gores, spot level-up areas, and other similar areas. Temporary detours are subject to in-place air void determination when shown on the plans. Miscellaneous areas also include level-ups and thin overlays when the layer thickness specified on the plans is less than the minimum untrimmed core height eligible for testing shown in Table 14. The specified layer thickness is based on the rate of 110 lb./sq. yd. for each inch of pavement unless another rate is shown on the plans. When "level up" is listed as part of the item bid description code, a payment adjustment factor of 1.000 will be assigned for all placement sublots as described in Article 3077.6, "Payment." Miscellaneous areas are not eligible for random placement sampling locations. Compact miscellaneous areas in accordance with Section 3077.4.8., "Compaction." Miscellaneous areas are not subject to in-place air void determination, thermal profiles testing, segregation (density profiles), or longitudinal joint density evaluations.
- 4.9.3.2. **Placement Sampling.** The Engineer will select random numbers for all placement sublots at the beginning of the project. The Engineer will provide the Contractor with the placement random numbers immediately after the subplot is completed. Mark the roadway location at the completion of each subplot and record the station number. Determine one random sample location for each placement subplot in accordance with [Tex-225-F](#). Adjust the random sample location by no more than necessary to achieve a 2-ft. clearance if the location is within 2 ft. of a joint or pavement edge.

Shoulders, ramps, intersections, acceleration lanes, deceleration lanes, and turn lanes are always eligible for selection as a random sample location; however, if a random sample location falls on one of these areas and the area is designated on the plans as not subject to in-place air void determination, cores will not be taken for the subplot and a 1.000 pay factor will be assigned to that subplot.

Provide the equipment and means to obtain and trim roadway cores on-site. On-site is defined as in close proximity to where the cores are taken. Obtain the cores within one working day of the time the placement subplot is completed unless otherwise approved. Obtain two 6-in. diameter cores side-by-side from within 1 ft. of the random location provided for the placement subplot. For SP-C and SP-D mixtures, 4-in. diameter cores are allowed. Mark the cores for identification, measure and record the untrimmed core height, and provide the information to the Engineer. The Engineer will witness the coring operation and measurement of the core thickness. Visually inspect each core and verify that the current paving layer is bonded to the underlying layer. Take corrective action if an adequate bond does not exist between the current and underlying layer to ensure that an adequate bond will be achieved during subsequent placement operations.

Trim the cores immediately after obtaining the cores from the roadway in accordance with [Tex-251-F](#) if the core heights meet the minimum untrimmed value listed in Table 14. Trim the cores on-site in the presence of the Engineer. Use a permanent marker or paint pen to record the lot and subplot numbers on each core as well as the designation as Core A or B. The Engineer may require additional information to be marked on the core and may choose to sign or initial the core. The Engineer will take custody of the cores immediately after witnessing the trimming of the cores and will retain custody of the cores until the Department's testing is completed. Before turning the trimmed cores over to the Engineer, the Contractor may wrap the trimmed cores or secure them in a manner that will reduce the risk of possible damage occurring during transport by the Engineer. After testing, the Engineer will return the cores to the Contractor.

The Engineer may have the cores transported back to the Department's laboratory at the HMA plant via the Contractor's haul truck or other designated vehicle. In such cases where the cores will be out of the Engineer's possession during transport, the Engineer will use Department-provided security bags and the Roadway Core Custody protocol located at <http://www.txdot.gov/business/specifications.htm> to provide a secure means and process that protects the integrity of the cores during transport.

Decide whether to include the pair of cores in the air void determination for that subplot if the core height before trimming is less than the minimum untrimmed value shown in Table 14. Trim the cores as described above before delivering to the Engineer if electing to have the cores included in the air void determination. Deliver untrimmed cores to the Engineer and inform the Engineer of the decision to not have the cores included in air void determination if electing to not have the cores included in air void determination. The placement pay factor for the subplot will be 1.000 if cores will not be included in air void determination.

Instead of the Contractor trimming the cores on-site immediately after coring, the Engineer and the Contractor may mutually agree to have the trimming operations performed at an alternate location such as a field laboratory or other similar location. In such cases, the Engineer will take possession of the cores immediately after they are obtained from the roadway and will retain custody of the cores until testing is completed. Either the Department or Contractor representative may perform trimming of the cores. The Engineer will witness all trimming operations in cases where the Contractor representative performs the trimming operation.

Dry the core holes and tack the sides and bottom immediately after obtaining the cores. Fill the hole with the same type of mixture and properly compact the mixture. Repair core holes with other methods when approved.

4.9.3.3. **Placement Testing.** Perform placement tests in accordance with Table 17. After the Engineer returns the cores, the Contractor may test the cores to verify the Engineer's test results for in-place air voids. The allowable differences between the Contractor's and Engineer's test results are listed in Table 12.

4.9.3.3.1. **In-Place Air Voids.** The Engineer will measure in-place air voids in accordance with [Tex-207-F](#) and [Tex-227-F](#). Before drying to a constant weight, cores may be pre-dried using a CoreDry or similar vacuum device to remove excess moisture. The Engineer will average the values obtained for all sublots in the production lot to determine the theoretical maximum specific gravity. The Engineer will use the average air void content for in-place air voids.

The Engineer will use the vacuum method to seal the core if required by [Tex-207-F](#). The Engineer will use the test results from the unsealed core to determine the placement payment adjustment factor if the sealed core yields a higher specific gravity than the unsealed core. After determining the in-place air void content, the Engineer will return the cores and provide test results to the Contractor.

4.9.3.3.2. **Segregation (Density Profile).** Test for segregation using density profiles in accordance with [Tex-207-F](#), Part V when using a thermal camera instead of the thermal imaging system. Density profiles are not required and are not applicable when using a thermal imaging system. Density profiles are not applicable in areas described in Section 3077.4.9.3.1.4., "Miscellaneous Areas."

Perform a minimum of one density profile per subplot. Perform additional density profiles when any of the following conditions occur, unless otherwise approved:

- the paver stops due to lack of material being delivered to the paving operations and the temperature of the uncompacted mat before the initial break down rolling is less than the temperatures shown in Table 18;
- areas that are identified by either the Contractor or the Engineer with thermal segregation;
- any visibly segregated areas that exist.

Table 18
Minimum Uncompacted Mat Temperature Requiring a Segregation Profile

High-Temperature Binder Grade¹	Minimum Temperature of the Uncompacted Mat Allowed Before Initial Break Down Rolling^{2,3,4}
PG 64	<250°F
PG 70	<260°F
PG 76	<270°F

1. The high-temperature binder grade refers to the high-temperature grade of the virgin asphalt binder used to produce the mixture.
2. Segregation profiles are required in areas with moderate and severe thermal segregation as described in Section 3077.4.7.3.1.3.
3. Minimum uncompacted mat temperature requiring a segregation profile may be reduced 10°F if using a chemical WMA additive as a compaction aid.
4. When using WMA, the minimum uncompacted mat temperature requiring a segregation profile is 215°F.

Provide the Engineer with the density profile of every subplot in the lot within one working day of the completion of each lot. Report the results of each density profile in accordance with Section 3077.4.2., "Reporting and Responsibilities."

The density profile is considered failing if it exceeds the tolerances in Table 19. No production or placement payment adjustments greater than 1.000 will be paid for any subplot that contains a failing density profile. When a hand-held thermal camera is used instead of a thermal imaging system, the Engineer will measure the density profile at least once per project. The Engineer's density profile results will be used when available. The Engineer may require the Contractor to remove and replace the area in question if the area fails the density profile and has surface irregularities as defined in Section 3077.4.9.3.3.5., "Irregularities." The subplot in question may receive a production and placement payment adjustment greater than 1.000, if applicable, when the defective material is successfully removed and replaced.

Investigate density profile failures and take corrective actions during production and placement to eliminate the segregation. Suspend production if two consecutive density profiles fail unless otherwise approved. Resume production after the Engineer approves changes to production or placement methods.

Table 19
Segregation (Density Profile) Acceptance Criteria

Mixture Type	Maximum Allowable Density Range (Highest to Lowest)	Maximum Allowable Density Range (Average to Lowest)
SP-B	8.0 pcf	5.0 pcf
SP-C & SP-D	6.0 pcf	3.0 pcf

4.9.3.3.3. Longitudinal Joint Density.

4.9.3.3.3.1. **Informational Tests.** Perform joint density evaluations while establishing the rolling pattern and verify that the joint density is no more than 3.0 pcf below the density taken at or near the center of the mat. Adjust the rolling pattern, if needed, to achieve the desired joint density. Perform additional joint density evaluations at least once per subplot unless otherwise directed.

4.9.3.3.3.2. **Record Tests.** Perform a joint density evaluation for each subplot at each pavement edge that is or will become a longitudinal joint. Joint density evaluations are not applicable in areas described in Section 3077.4.9.3.1.4., "Miscellaneous Areas." Determine the joint density in accordance with [Tex-207-F](#), Part VII. Record the joint density information and submit results on Department forms to the Engineer. The evaluation is considered failing if the joint density is more than 3.0 pcf below the density taken at the core random sample location and the correlated joint density is less than 90.0%. The Engineer will make independent joint density verification at least once per project and may make independent joint density

verifications at the random sample locations. The Engineer's joint density test results will be used when available.

Provide the Engineer with the joint density of every subplot in the lot within one working day of the completion of each lot. Report the results of each joint density in accordance with Section 3077.4.2., "Reporting and Responsibilities."

Investigate joint density failures and take corrective actions during production and placement to improve the joint density. Suspend production if the evaluations on two consecutive sublots fail unless otherwise approved. Resume production after the Engineer approves changes to production or placement methods.

4.9.3.3.4. **Recovered Asphalt Dynamic Shear Rheometer (DSR).** The Engineer may take production samples or cores from suspect areas of the project to determine recovered asphalt properties. Asphalt binders with an aging ratio greater than 3.5 do not meet the requirements for recovered asphalt properties and may be deemed defective when tested and evaluated by the Materials and Tests Division. The aging ratio is the DSR value of the extracted binder divided by the DSR value of the original unaged binder. Obtain DSR values in accordance with AASHTO T 315 at the specified high temperature performance grade of the asphalt. The Engineer may require removal and replacement of the defective material at the Contractor's expense. The asphalt binder will be recovered for testing from production samples or cores in accordance with [Tex-211-F](#).

4.9.3.3.5. **Irregularities.** Identify and correct irregularities including segregation, rutting, raveling, flushing, fat spots, mat slippage, irregular color, irregular texture, roller marks, tears, gouges, streaks, uncoated aggregate particles, or broken aggregate particles. The Engineer may also identify irregularities, and in such cases, the Engineer will promptly notify the Contractor. If the Engineer determines that the irregularity will adversely affect pavement performance, the Engineer may require the Contractor to remove and replace (at the Contractor's expense) areas of the pavement that contain irregularities. The Engineer may also require the Contractor to remove and replace (at the Contractor's expense) areas where the mixture does not bond to the existing pavement.

If irregularities are detected, the Engineer may require the Contractor to immediately suspend operations or may allow the Contractor to continue operations for no more than one day while the Contractor is taking appropriate corrective action.

4.9.4. **Exempt Production.** The Engineer may deem the mixture as exempt production for the following conditions:

- anticipated daily production is less than 500 tons;
- total production for the project is less than 5,000 tons;
- when mutually agreed between the Engineer and the Contractor; or
- when shown on the plans.

For exempt production, the Contractor is relieved of all production and placement QC/QA sampling and testing requirements, except for coring operations when required by the Engineer. The production and placement pay factors are 1.000 if the specification requirements listed below are met, all other specification requirements are met, and the Engineer performs acceptance tests for production and placement listed in Table 17 when 100 tons or more per day are produced:

- produce, haul, place, and compact the mixture in compliance with the specification and as directed;
- control mixture production to yield a laboratory-molded density that is within $\pm 1.0\%$ of the target laboratory-molded density as tested by the Engineer;
- compact the mixture in accordance with Section 3077.4.8., "Compaction"; and
- when a thermal imaging system is not used, the Engineer may perform segregation (density profiles) and thermal profiles in accordance with the specification.

4.9.5. **Ride Quality.** Measure ride quality in accordance with Item 585, "Ride Quality for Pavement Surfaces," unless otherwise shown on the plans.

5. MEASUREMENT

- 5.1. **Superpave Mixtures.** Hot mix will be measured by the ton of composite hot-mix, which includes asphalt, aggregate, and additives. Measure the weight on scales in accordance with Item 520, "Weighing and Measuring Equipment."
- 5.2. **Tack Coat.** Tack coat will be measured at the applied temperature by strapping the tank before and after road application and determining the net volume in gallons from the calibrated distributor. The Engineer will witness all strapping operations for volume determination. All tack, including emulsions, will be measure by the gallon applied.

The Engineer may allow the use of a metering device to determine the asphalt volume used and application rate if the device is accurate within 1.5% of the strapped volume.

6. PAYMENT

The work performed and materials furnished in accordance with this Item and measured as provided under Article 3077.5.1, "Measurement," will be paid for at the unit bid price for "Superpave Mixtures" of the mixture type, SAC, and binder specified. These prices are full compensation for surface preparation, materials, placement, equipment, labor, tools, and incidentals.

The work performed and materials furnished in accordance with this Item and measured as provided under Article 3077.5.2, "Measurement," will be paid for at the unit bid price for "Tack Coat" of the tack coat provided. These prices are full compensation for materials, placement, equipment, labor, tools, and incidentals. Payment adjustments will be applied as determined in this Item; however, a payment adjustment factor of 1.000 will be assigned for all placement sublots for "level ups" only when "level up" is listed as part of the item bid description code. A payment adjustment factor of 1.000 will be assigned to all production and placement sublots when "exempt" is listed as part of the item bid description code, and all testing requirements are met.

Payment for each subplot, including applicable payment adjustments greater than 1.000, will only be paid for sublots when the Contractor supplies the Engineer with the required documentation for production and placement QC/QA, thermal profiles, segregation density profiles, and longitudinal joint densities in accordance with Section 3077.4.2., "Reporting and Responsibilities." When a thermal imaging system is used, documentation is not required for thermal profiles or segregation density profiles on individual sublots; however, the thermal imaging system automated reports described in [Tex-244-F](#) are required.

Trial batches will not be paid for unless they are included in pavement work approved by the Department.

Payment adjustment for ride quality will be determined in accordance with Item 585, "Ride Quality for Pavement Surfaces."

- 6.1. **Production Payment Adjustment Factors.** The production payment adjustment factor is based on the laboratory-molded density using the Engineer's test results. The bulk specific gravities of the samples from each subplot will be divided by the Engineer's maximum theoretical specific gravity for the subplot. The individual sample densities for the subplot will be averaged to determine the production payment adjustment factor in accordance with Table 20 for each subplot using the deviation from the target laboratory-molded density defined in Table 10. The production payment adjustment factor for completed lots will be the average of the payment adjustment factors for the four sublots sampled within that lot.

Table 20
Production Payment Adjustment Factors for Laboratory-Molded Density¹

Absolute Deviation from Target Laboratory-Molded Density	Production Payment Adjustment Factor (Target Laboratory-Molded Density)
0.0	1.075
0.1	1.075
0.2	1.075
0.3	1.066
0.4	1.057
0.5	1.047
0.6	1.038
0.7	1.029
0.8	1.019
0.9	1.010
1.0	1.000
1.1	0.900
1.2	0.800
1.3	0.700
> 1.3	Remove and replace

1. If the Engineer's laboratory-molded density on any subplot is less than 95.0% or greater than 97.0%, take immediate corrective action to bring the mixture within these tolerances. The Engineer may suspend operations if the Contractor's corrective actions do not produce acceptable results. The Engineer will allow production to resume when the proposed corrective action is likely to yield acceptable results.

- 6.1.1. **Payment for Incomplete Production Lots.** Production payment adjustments for incomplete lots, described under Section 3077.4.9.2.1.1., "Incomplete Production Lots," will be calculated using the average production pay factors from all sublots sampled.

A production payment factor of 1.000 will be assigned to any lot when the random sampling plan did not result in collection of any samples within the first subplot.

- 6.1.2. **Production Sublots Subject to Removal and Replacement.** If after referee testing, the laboratory-molded density for any subplot results in a "remove and replace" condition as listed in Table 20, the Engineer may require removal and replacement or may allow the subplot to be left in place without payment. The Engineer may also accept the subplot in accordance with Section 3077.5.3.1., "Acceptance of Defective or Unauthorized Work." Replacement material meeting the requirements of this Item will be paid for in accordance with this Section.

- 6.2. **Placement Payment Adjustment Factors.** The placement payment adjustment factor is based on in-place air voids using the Engineer's test results. The bulk specific gravities of the cores from each subplot will be divided by the Engineer's average maximum theoretical specific gravity for the lot. The individual core densities for the subplot will be averaged to determine the placement payment adjustment factor in accordance with Table 21 for each subplot that requires in-place air void measurement. A placement payment adjustment factor of 1.000 will be assigned to the entire subplot when the random sample location falls in an area designated on the plans as not subject to in-place air void determination. A placement payment adjustment factor of 1.000 will be assigned to quantities placed in areas described in Section 3077.4.9.3.1.4., "Miscellaneous Areas." The placement payment adjustment factor for completed lots will be the average of the placement payment adjustment factors for up to four sublots within that lot.

Table 21
Placement Payment Adjustment Factors for In-Place Air Voids

In-Place Air Voids	Placement Payment Adjustment Factor	In-Place Air Voids	Placement Payment Adjustment Factor
< 2.7	Remove and Replace	5.9	1.048
2.7	0.710	6.0	1.045
2.8	0.740	6.1	1.042
2.9	0.770	6.2	1.039
3.0	0.800	6.3	1.036
3.1	0.830	6.4	1.033
3.2	0.860	6.5	1.030
3.3	0.890	6.6	1.027
3.4	0.920	6.7	1.024
3.5	0.950	6.8	1.021
3.6	0.980	6.9	1.018
3.7	1.000	7.0	1.015
3.8	1.015	7.1	1.012
3.9	1.030	7.2	1.009
4.0	1.045	7.3	1.006
4.1	1.060	7.4	1.003
4.2	1.075	7.5	1.000
4.3	1.075	7.6	0.980
4.4	1.075	7.7	0.960
4.5	1.075	7.8	0.940
4.6	1.075	7.9	0.920
4.7	1.075	8.0	0.900
4.8	1.075	8.1	0.880
4.9	1.075	8.2	0.860
5.0	1.075	8.3	0.840
5.1	1.072	8.4	0.820
5.2	1.069	8.5	0.800
5.3	1.066	8.6	0.780
5.4	1.063	8.7	0.760
5.5	1.060	8.8	0.740
5.6	1.057	8.9	0.720
5.7	1.054	9.0	0.700
5.8	1.051	> 9.0	Remove and Replace

- 6.2.1. **Payment for Incomplete Placement Lots.** Payment adjustments for incomplete placement lots described under Section 3077.4.9.3.1.2., "Incomplete Placement Lots," will be calculated using the average of the placement pay factors from all sublots sampled and sublots where the random location falls in an area designated on the plans as not eligible for in-place air void determination.

If the random sampling plan results in production samples, but not in placement samples, the random core location and placement adjustment factor for the subplot will be determined by applying the placement random number to the length of the subplot placed.

If the random sampling plan results in placement samples, but not in production samples, no placement adjustment factor will apply for that subplot placed.

A placement payment adjustment factor of 1.000 will be assigned to any lot when the random sampling plan did not result in collection of any production samples.

- 6.2.2. **Placement Sublots Subject to Removal and Replacement.** If after referee testing, the placement payment adjustment factor for any subplot results in a "remove and replace" condition as listed in Table 21, the Engineer will choose the location of two cores to be taken within 3 ft. of the original failing core location. The Contractor will obtain the cores in the presence of the Engineer. The Engineer will take immediate possession of the untrimmed cores and submit the untrimmed cores to the Materials and Tests Division,

where they will be trimmed, if necessary, and tested for bulk specific gravity within 10 working days of receipt.

The bulk specific gravity of the cores from each subplot will be divided by the Engineer's average maximum theoretical specific gravity for the lot. The individual core densities for the subplot will be averaged to determine the new payment adjustment factor of the subplot in question. If the new payment adjustment factor is 0.700 or greater, the new payment adjustment factor will apply to that subplot. If the new payment adjustment factor is less than 0.700, no payment will be made for the subplot. Remove and replace the failing subplot, or the Engineer may allow the subplot to be left in place without payment. The Engineer may also accept the subplot in accordance with Section 3077.5.3.1., "Acceptance of Defective or Unauthorized Work." Replacement material meeting the requirements of this Item will be paid for in accordance with this Section.

- 6.3. **Total Adjusted Pay Calculation.** Total adjusted pay (TAP) will be based on the applicable payment adjustment factors for production and placement for each lot.

$$TAP = (A+B)/2$$

where:

A = Bid price × production lot quantity × average payment adjustment factor for the production lot

B = Bid price × placement lot quantity × average payment adjustment factor for the placement lot + (bid price × quantity placed in miscellaneous areas × 1.000)

Production lot quantity = Quantity actually placed - quantity left in place without payment

Placement lot quantity = Quantity actually placed - quantity left in place without payment - quantity placed in miscellaneous areas

Special Specification 4003

Type CAC Concrete



1. DESCRIPTION

Remove unsound concrete and replace with Type CAC (calcium aluminate cement) concrete, for ultra-rapid concrete repairs.

2. MATERIALS

Provide materials that meet the following material requirements and in accordance with the requirements of the following Items:

- Item 420, "Concrete Substructures"
- Item 440, "Reinforcement for Concrete"

- 2.1. **Binder.** Provide cement binder meeting the following chemical composition, including the addition of supplementary cementing materials (SCMs) in accordance with Table 1.

Table 1
Chemistry Range for CAC + SCMs

Element	Range (%)
Al ₂ O ₃	20–55
CaO	28–42
SiO ₂	3–22
TiO ₂	0.5–3
Fe ₂ O ₃	0.5–18
MgO	0.2–8.5
SO ₃	0–3
K ₂ O + Na ₂ O	0–1.6

- 2.2. **Coarse Aggregate.** Supply mechanically crushed gravel or stone aggregates that meet the definitions in Tex-100-E. Provide coarse aggregate from sources listed in the Department's *Concrete Rated Source Quality Catalog* (CRSQC). Provide aggregate from non-listed sources only when tested and approved before use. Allow 30 calendar days for the Engineer to sample, test, and report results for non-listed sources. Do not combine approved material with unapproved material. The aggregate must conform to the quality requirements listed in Item 421, "Hydraulic Cement Concrete," and meet the gradation requirements of Grade 5 (67).
- 2.3. **Chemical Admixtures.** Use only chemical admixtures that are currently on the Department's MPL and of a type and dosage approved by the cement manufacturer before use. Submit the manufacturer's approval to the Engineer.
- 2.4. **SCMs.** The use of SCMs are permitted as an addition to the required cement content, provided that trial batches have demonstrated it to be suitable as determined by the Engineer and the cement manufacturer.

3. CERTIFICATION

The concrete supplier must be certified by the Volumetric Mixer Manufacturers Bureau (VMMB) or have an inspection report signed and sealed by a licensed professional engineer demonstrating that the equipment meets all requirements of ASTM C685. Provide documentation of the certification and calibration records.

4. PROPORTIONING

The Contractor will be responsible in determining the proportions of the concrete. In addition, the following requirements shall be met unless otherwise approved:

Table 2
Proportions of Concrete

Material/Properties	Unit	Type CAC
Cement Binder	lb./cu.yd., Min	675
	sacks/cu.yd., Min	7.2
Coarse Aggregate	Aggregate weight (%)	58 ±2
Fine Aggregate	Aggregate weight (%)	42 ±2
Total Water	lb./cu. yd., Max.	256
Slump	inches, Max.	10.00
Entrained Air	%	As shown on the plans
Water to Cement Ratio ¹	w-cm, Max.	0.35
Minimum Required Early Age Compressive Strength (Tex-418-A)	psi	3,000 @ 3 hr.
Minimum Required Ultimate Compressive Strength (Tex-418-A) ²	psi	4,000

1. Max w-cm ratio is based on the calcium aluminate cement binder quantity only.
2. As discussed under the "Job Control Compressive Strength Testing" section in this specification.

5. EQUIPMENT

Provide equipment as outlined below:

- 5.1. **Concrete Removal Equipment.** Provide sawing equipment capable of sawing the concrete to the specified depth. Provide power-driven chipping tools not heavier than the nominal 30-lb. class or hydrodemolition equipment for the bulk removal of concrete. Provide chipping hammers not heavier than the nominal 15-lb. class or hydrodemolition equipment for the removal of concrete beneath reinforcing steel or along the edges of the repair area.
- 5.2. **Surface Preparation Equipment.** Provide abrasive blasting or hydrodemolition equipment capable of preparing the concrete surface and exposed reinforcing steel for the repair material. Provide air compressors with air lines equipped with filters designed to remove all oil from the air for air-blast cleaning. Provide high-pressure water blasting equipment as necessary to prepare surfaces for repair.
- 5.3. **Proportioning and Mixing Equipment.** Mix the concrete using volumetric trucks or as determined by the Engineer. Provide all necessary equipment needed to transport, mix, and place the concrete as determined by the manufacturer. Any special equipment needed will be proposed by the Contractor and be subject to approval.
- 5.4. **Placing and Finishing Equipment.** Provide sufficient and appropriate hand tools for placing and finishing stiff plastic concrete and for working them to the correct level for strike-off. Provide small, immersion-type vibrators for all repairs deeper than 6 in. Provide external form vibrators where immersion-type vibrators cannot be used.

6. TRIAL BATCHES

Secure the Engineer's approval of the sources and the proportions of the cement binder, fine aggregate, coarse aggregate, water, SCMs, and chemical admixtures proposed for use with the Type CAC concrete. Perform all trial batches and testing necessary to substantiate the proposed mix designs, and provide documentation including mix design, material proportions, and test results substantiating that the mix design conforms to specific requirements. The trial batches will be conducted by the area office.

- Early Age Compressive Strength—minimum of 3,000 psi at 3 hr. of age cured at ambient temperature

- Ultimate Compressive Strength—minimum of 4,000 psi at 1 day of age cured under adiabatic conditions

7. CONSTRUCTION

Perform repairs, mix, and place the Type CAC concrete in accordance with manufacturer recommendations and as described in this specification. Obtain approval for all materials and methods of application at least 2 weeks before beginning any repair work. Repair locations will be indicated on the plans or by the Engineer. Saw-cut the entire perimeter of all repair areas to a minimum depth of 1/2 in. Avoid re-entrant corners for areas to be repaired. Adjust the depth of the saw-cut as necessary to avoid cutting reinforcing steel near the surface of the concrete.

- 7.1. **Removal of Concrete.** Use power-driven chipping tools or hydrodemolition equipment to remove all loose or defective concrete. Avoid damage to sound concrete to remain in place. Avoid hitting reinforcing steel with the chipping tools. Once the initial concrete is removed, use small power-driven chipping or hydrodemolition equipment to undercut all exposed reinforcing steel. Expose the entire perimeter of the steel bars for the full area of the repair. Provide a minimum clearance of 1/2 in. between the exposed steel and the surrounding concrete or two times the maximum aggregate size, whichever is greater. Remove additional concrete as necessary to keep the repair area to a reasonably uniform depth. Damage to sound concrete or to the bond of reinforcing steel outside the repair area will be repaired at the Contractor's expense. Obtain approval of the completed concrete removal before proceeding to surface preparation.
- 7.2. **Surface Cleaning.** Clean the area to be repaired by abrasive blasting, high-pressure water blasting, or other approved methods. Remove all loose particles, dirt, deteriorated concrete, or other substances that would impair the bond of the repair material. Clean exposed reinforcing steel of concrete, rust, oil, and other contaminants. Follow this with a high-pressure air blast for final cleaning.
- 7.3. **Anchors.** When reinforcing steel is required, support it using bar supports, anchor studs, expansion hook bolts, grouted rebar, or steel pins capable of resisting a pullout force of 2,500 lb. Space anchors no more than 12 in. center-to-center on overhead surfaces, 18 in. center-to-center on vertical surfaces, and 36 in. center-to-center on top horizontal surfaces. Use at least three anchors in each individual patch area. Secure steel pins or studs into the concrete with epoxy or other approved methods. Do not use explosive force to shoot pins, studs, or other anchors into the concrete. Check the resistance to pullout of the reinforcing anchors as directed. Notify the Engineer before installation of the anchors. Locate anchors to prevent damage to prestressing tendons or conduits embedded in the concrete. Maintain a minimum clear cover of 1 in. between the reinforcing steel and anchors and the finished surface of the repair area.
- 7.4. **Reinforcing Steel.** Replace or supplement any reinforcing steel that has more than 25% section loss due to corrosion. Place supplemental reinforcing steel as indicated on the plans or as directed. Provide additional reinforcement for all areas where the thickness of the repair material will exceed 4 in. Use a single layer of 2 × 2 – W1.2 × W1.2 or 3 × 3 – W1.5 × W1.5 welded wire fabric or No. 3 bars spaced at 6 in., unless noted otherwise on the plans. Place the reinforcing steel parallel to the finished surface, and support it so that it will be roughly in the middle of the repair area and a minimum of 3/4 in. out from the surface to be covered. Lap adjacent sheets or bars at least 6 in. and tie them together securely at a spacing of at most 18 in. pre-bend reinforcing steel fabric to fit around corners and into re-entrant angles before installing it. Place and secure reinforcement to prevent displacement due to repair material application.
- 7.5. **Formwork.** Where forms are necessary or desired, erect them in accordance with Item 420, "Concrete Structures." Ensure forms are securely attached and mortar-tight if pressure-type application methods are used.
- 7.6. **Substrate Preparation.** Where saturated surface-dry (SSD) conditions are needed, prewet the substrate by ponding water on the surface for 24 hr. before placing the repair materials. If ponding is not possible, achieve SSD conditions by high-pressure water blasting 15 to 30 min. before placing the repair material. An SSD condition is achieved when the surface remains damp when exposed to sunlight for 15 min.

- 7.7. **Initial Discharge.** Discharge a minimum of 2 cu. ft. or until the concrete is well mixed before discharging the concrete into the forms.
- 7.8. **Placement.** Avoid cold joints by pouring sequentially.
- 7.9. **Curing Concrete.** Wet mat cure in accordance with Section 420.4.10.2., "Water Curing," until repair is opened to traffic or as directed by the Engineer.

8. JOB CONTROL COMPRESSIVE STRENGTH TESTING

The specific procedure for determining the early age and ultimate compressive strength is as follows.

- 8.1. **Early Age Compressive Strength Determination.** For early compressive strength determination, one set of two 6 in. × 12 in. cylinders will be taken to determine the 3 hr. compressive strength. The test cylinders will be collected and delivered to the laboratory within 30 min. of the compressive strength test at the specified age. Exercise enough care to ensure that the test cylinders are not transported before reaching final (hardened) set.
- 8.2. **Ultimate Compressive Strength Determination.** The ultimate compressive strength will be determined by testing two sets of two 6 in. × 12 in. cylinders. The cylinders will be cured in an adiabatic box supplied or approved by the Engineer. Immediately place the cylinders into the box after casting. Measure and record the maximum temperature during the first 24 hr. of curing. Two specimens will be tested for compressive strength after 24 ±2 hr. and 48 ±4 hr. of adiabatic curing. The lowest compressive strength measured will be considered as the ultimate compressive strength and will meet the minimum requirements of 4,000 psi.
- 8.3. **Additional Field Cylinders.** In addition to the cylinders used for the early age and ultimate compressive strength determination, an additional set of three 4 in. × 8 in. cylinders will be cast, field cured for 24 ±2 hr., de-molded, and then moist cured at 73°F (22.8°C) until testing at 7 days of age.
- 8.4. **Frequency of Testing in the Field.** A total of six 6 in. × 12 in. and three 4 in. × 8 in. cylinders for 3-hr., ultimate, and 7-day compressive strength determination will be taken from every 30 cu. yd. of concrete or fraction thereof on each production day during construction, or more frequently as directed.

9. MEASUREMENT

When Type CAC concrete is shown on the plans to be a pay item, measurement will be by the cubic yard measured in place.

10. PAYMENT

Unless otherwise specified on the plans, the work performed, materials furnished, trial batches, equipment, labor, tools, and incidentals will not be paid for directly, but will be considered subsidiary to pertinent items.

When Type CAC concrete is specified as a pay item, 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 "Type CAC Concrete." This price is full compensation for concrete removal and preparation; formwork; furnishing, hauling, and placing concrete and for all labor, tools, equipment, concrete, and incidentals necessary to complete the work. The preparation of trial batches described will not be paid for directly and are considered subsidiary to this Item.

Special Specification 4024

Reinforced Concrete Low-Head Pressure Pipe



1. DESCRIPTION

Furnish and install reinforced concrete low-head pressure pipe. Install the pipe of the various classes, sizes, and dimensions to the lines and grades shown on the plans or as directed. The installation of pipe includes all joints or connections to new or existing pipe, wells, vents, inlets, headwalls, etc., as required to complete the work.

2. MATERIALS

Furnish materials in accordance with the following:

- Item 400, "Excavation and Backfill for Structures,"
- Item 402, "Trench Excavation Protection," or Item 403, "Temporary Special Shoring," and
- Item 464, "Reinforced Concrete Pipe".

Provide reinforced concrete low-head pressure pipe that conforms to the requirements of ASTM C 361 except for the following modifications:

- 2.1. The article entitled "Classification" is voided and replaced by the correspondingly named article of ASTM C 76 for Class II, III, IV, and V pipe.
- 2.2. The article entitled "Bases of Acceptance" is voided and replaced by the correspondingly named article of ASTM C 76.
- 2.3. The following section of the article entitled "Materials" is supplemented by the following:
 - 2.3.1. Cement: Type II cement will be required unless otherwise shown on the plans.
 - 2.4. All reference to methods pertaining to testing the strength of the concrete contained in articles entitled "Materials" and "Physical Test Requirements" are voided and replaced by the following:

The strength requirements for the concrete must meet the design requirements of ASTM C 76 for Class II, III, IV, and V pipe.

Perform 3-edge bearing tests for Class II, III, IV, and V pipe on 1 pipe for each 100 pipe or fraction of each size and class for the load to produce a 0.01 in. crack and, at the discretion of the Engineer, the ultimate load. Plainly mark "TEST" with durable paint on both top and bottom and do not use the pipe sections tested only to the 0.01 in. crack.
- 2.5. The article entitled "Design" is voided and replaced by the correspondingly named article of ASTM C 76 with the exception of the following:
 - 2.5.1. **Circumferential Reinforcement:** Use circumferential reinforcement at each end of the pipe unit that consists of 2 complete coils or rings in which the end is lapped or welded. Unless otherwise shown on the plans, the clear distance of the end coil or ring must not be less than 1/2 in. nor more than 1 in. from the end of the pipe unit.
 - 2.5.2. **Longitudinal Reinforcement:** Extend the longitudinals the full length of the pipe. The longitudinal bars provided in the bell may be continuous bars or spliced to the main longitudinal bars.

- 2.5.3. **Joints:** Construct all joints to the requirements of ASTM C 361.
- 2.6. In addition to the requirements included under the section "Joints" of ASTM C 361, the joints must meet the following requirements (see attached typical joint drawing for illustration of joint details for pipe having an internal diameter of 12 to 60 in. inclusive; for pipes with internal diameters larger than 60 in., joint design details will be submitted to the Engineer for approval).
- 2.6.1. Construct a joint of all concrete design with gasket retained in a groove, using an endless gasket of round cross-section.
- 2.6.2. Construct the thickness of spigot shell at end of spigot that is not less than 80% of thickness of pipe shell.
- 2.6.3. Use a finish of the inner surface of the bell or groove and surfaces of the spigot or tongue that is in accordance to the requirements of ASTM C 443.
- 2.7. The article entitled "Physical Test Requirements" is supplemented by the following:

Use a method and equipment to manufacture the pipe that produces a uniformly dense concrete free from porous areas. When tested for absorption as provided in ASTM C 76 "Absorption Test Requirement of Concrete", the absorption shall not exceed 5%.
- 2.8. The article "Hydrostatic Tests" is voided and replaced with the following:

For Class II, III, IV, and V pipe, hydrostatic tests on pipe will not be required.
- 2.9. The article entitled "Hydrostatic Test on Rubber Gasket Joints" is voided and replaced with the following:

For Class II, III, IV, and V pipe, hydrostatic tests on rubber gasket joints will not be required provided the manufacturer provides adequate gauging devices and properly checks the pipe with same to assure that all dimensions of pipe affecting water tightness of the joints are within the required tolerances. Gauge tests of pipe sections selected for other tests in the presence of the inspector.

3. CONSTRUCTION

The construction methods are to be in accordance with Item 464, "Reinforced Concrete Pipe", except for the following modifications.

- 3.1. References to jointing are voided.
- 3.2. Install rubber gasket joints by forcing the spigot or tongue of each pipe section (with the gasket in place) into the bell or groove of the previously laid joint with approved device that will smoothly force the sections together and so that the gasket is properly seated and compressed. Adequately lubricate the bell and spigot or groove and tongue with soft soap or other approved lubricant before the sections are forced together.
- 3.3. Construct angles or bends in pipe lines by using either prefabricated angle joints or a reinforced concrete collar. Unless otherwise shown on the plans, use collars of such width that each pipe section will be imbedded in the collar a minimum of 6 in. Construct the thickness of the collar outside the pipe that is a minimum of 6 in. Furnish reinforcement in the collar that consists of at least one layer of 6 in. x 6 in., No. 6 gage x 6 gage steel wire fabric or heavier, supplemented by additional circumferential reinforcing steel as required to provide reinforcing at least equal to that in the pipe. Lap the fabric at least 6 in. Furnish Class A or C concrete and form and place monolithically.
- 3.4. Where pipe connects to headwalls or wells at the bell end of pipe lines, cut off the bell and lay the pipe so that the normal pipe section extends into the headwall or well.

4. MEASUREMENT

This Item will be measured by the foot of pipe. Such measurement will be made between the ends of the pipe barrel along the central axis as installed. Where spurs or branches, or connections to existing pipe lines are involved, measurement of the spur or new connecting pipe will be made from the intersection of its central axis with the outside surface of the pipe into which it connects. Where inlets, manholes, junction chambers or other structures are included in lines of pipe, that length of pipe provided for tying into the structure wall will be included for measurement but no other portion of the structure length or width will be included.

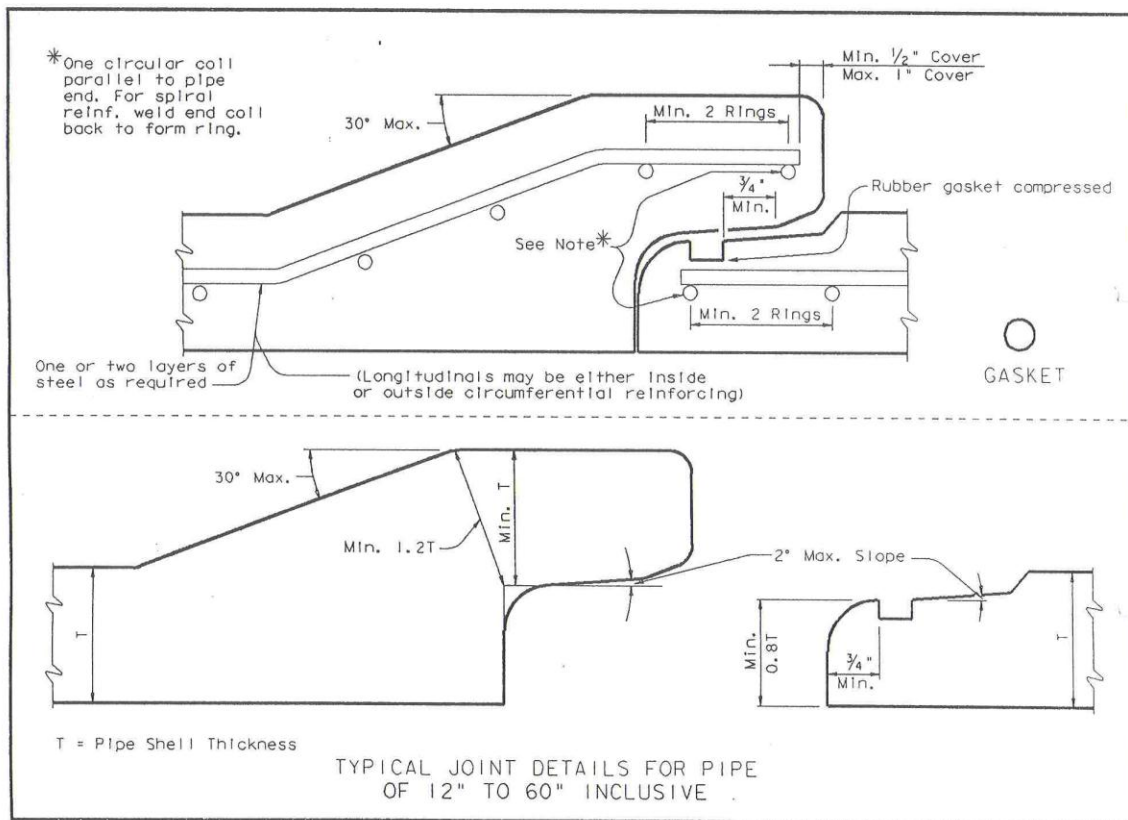
Excavation in natural ground for installing concrete pipe will be measured as prescribed in Item 400, "Excavation and Backfill for Structures".

Unless otherwise shown on the plans, structural excavation for pipe headwalls will not be measured but will be considered subsidiary to the various bid items.

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 "Reinforced Concrete Low-Head Pressure Pipe" of the class and size specified. This price is full compensation for constructing, furnishing, transporting, placing, and jointing the pipe; the excavation, hauling and placing of earth cushion material where required for bedding pipe in rock excavation; the preparation and shaping of beds; hauling, placing and jointing of pipes; for end finish; for all connections to existing structures and for all materials, labor, equipment, tools, and incidentals necessary to complete the work, except excavation and backfill which will be paid for in accordance with Item 400, "Excavation and Backfill for Structures". The excavation of rock or other incompressible materials, as may be required in providing proper bedding, will be paid for in accordance with Item 400, "Excavation and Backfill for Structures". Where pipes are laid on a skew, full compensation for cutting the ends parallel with the centerline of the highway will be considered as included in the price paid for linear foot for the designated item of pipe and no additional allowance will be made.

Protection methods for excavations greater than 5 ft. in depth will be measured and paid for as required under Item 402, "Trench Excavation Protection," or Item 403, "Temporary Special Shoring."



Special Specification 5145

Gate (Install)



1. DESCRIPTION

Remove and dispose of existing gates and furnish and install new gates.

2. MATERIALS

Furnish materials as shown on the plans, as stated below, or as directed. Furnish certification from the materials manufacturer stating that all materials comply with the requirements of this Item before installation of the gate. Before installation, the proposed gates must be approved by the Engineer for each driveway location. Use only new materials.

2.1. **General.** Furnish materials in accordance with the following:

- Item 421, "Hydraulic Cement Concrete," Class B
- Item 445, "Galvanizing."

2.2. **Posts.** Provide posts of the size and weight shown on the plans. Do not provide rerolled or open-seam posts. Use material for all posts in accordance with ASTM F1043, Group 1A Regular Grade or Group 1C High Strength.

2.3. **Post Caps.** Provide malleable iron post caps designed to exclude all moisture. Furnish barbed wire support arms integral with the post caps if barbed wire is shown on the plans. Furnish post caps with an opening for the top rail if a top rail is shown on the plans. Post caps must have a 2-in. skirt.

2.4. **Miscellaneous Fittings and Fasteners.** Furnish enough fittings and fasteners to erect the gate materials in a proper manner. Furnish fittings for posts from pressed or rolled steel, forged steel, malleable iron, or wrought iron of good commercial quality, spaced as shown on the plans. Galvanize all fittings, bolts, and miscellaneous hardware in accordance with Item 445, "Galvanizing."

2.5. **Coatings.** Hot-dip galvanize all materials unless specified otherwise in this Item or on the plans. Fabric, tension wire, and barbed wire may be aluminum-coated or alloy-coated if approved. Additionally, coat all material except bolts, nuts, washers, and pipe material with thermally fused polyvinyl chloride (PVC) in accordance with ASTM F668, Class 2b, meeting the specified color when shown on the plans.

2.6. **Posts, Braces, and Gates—Standard Weight (Schedule 40) Pipe.** Hot-dip galvanize inside and outside according to ASTM F1043 (1.8 oz. per sq. ft. of galvanized zinc weight).

2.7. **Slide Gate Operator.** Proposed gates Type 3 and Type 4 will include a vehicular slide gate operator. The type or class of vehicular gate operator must fall within residential use classification. The slide gate operator must have enough power to operate the necessary gate weight and travel distance. The slide gate operator specifications and gate information must be submitted to the Engineer for approval.

3. CONSTRUCTION

Install the gates as shown on the plans or as directed. Gate lengths and heights will be field verified before ordering any materials. Before installation, the proposed gates at each location will be approved by the Engineer.

3.1. **Clearing and Grading.** Clear all brush, rocks, and debris necessary for the installation of gates.

3.2. **Postholes.** For all posts, drill holes in the ground to provide concrete footings of the dimensions shown on the plans.

3.3. **Concrete Footings.** Center posts in their footings. Place concrete and compact by tamping or other approved methods. Machine mix all batches of concrete greater than 1/2 cu. yd. Hand mixing concrete is allowed on batches less than 1/2 cu. yd.

Use forms for footings where the ground cannot be satisfactorily excavated to neat lines. Crown the concrete or grout (for solid rock) to carry water from the post. Keep the forms in place for at least 24 hr. Backfill the footing with moistened material as soon as each form is removed, and thoroughly tamp. Cover concrete with at least 4 in. of loose moist material, free of clods and gravel, immediately after placing concrete. No other curing is required.

Spread all excess excavated and loose material used for curing neatly and uniformly. Remove excess concrete and other construction debris from the site.

4. MEASUREMENT

This Item will be measured as each gate installed.

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 "Gate (Install)—Type 1," "Gate (Install)—Type 2," "Gate (Install)—Type 3," "Gate (Install)—Type 4," or "Gate (Install)—Type 5" of the type, height, and width of opening specified on the plans. Clearing and grading for fencing and gates will not be paid for directly but is subsidiary to this Item.

5.1. **Gate (Install)—Type 1.** This price is full compensation for removing the existing gate; installing a new gate; and providing materials, center anchorages, equipment, labor, tools, and incidentals.

5.2. **Gate (Install)—Type 2.** This price is full compensation for removing the existing gate; installing a new gate; and providing materials, center anchorages, equipment, labor, tools, and incidentals.

5.3. **Gate (Install)—Type 3.** This price is full compensation for removing the existing gate; installing a new gate; and providing materials, center anchorages, equipment, slide gate operator equipment, labor, tools, and incidentals.

5.4. **Gate (Install)—Type 4.** This price is full compensation for removing the existing gate; installing a new gate; and providing materials, center anchorages, equipment, slide gate operator equipment, labor, tools, and incidentals.

5.5. **Gate (Install)—Type 5.** This price is full compensation for removing the existing gate; installing a new gate; and providing materials, center anchorages, equipment, labor, tools, and incidentals.

Special Specification 5148

Riprap Canal Liner



1. DESCRIPTION

Furnish and place riprap canal liner in United Irrigation District (UID) facility.

2. MATERIALS

- 2.1. **Canal Lining Material.** The canal lining material must be Canal[®] 123012 polypropylene/polyethylene terephthalate (PP/PET) composed of a top 12-oz. per square yard black polypropylene non-woven bonded throughout to a 30-mil polyethylene geomembrane middle layer that is bonded throughout to a bottom 12-oz. per square yard gray polyester non-woven as manufactured by HUESKER, Inc., or approved equal. The top polypropylene non-woven is designed for concrete or shotcrete to be placed above to resist hydrolysis. Canal[®] 123012 PP/PET must be inert to biological degradation and naturally encountered chemicals, alkalis, and acids. Canal[®] 123012 PP/PET geocomposite conforms to the nominal values listed in Table 1.

Table 1
Physical Properties of Canal[®] 123012 Polypropylene/Polyethylene Terephthalate (PP/PET)

Property	Test Method	Values	Values
Membrane thickness	ASTM D 5199	30 mils	0.75 mm
Grab tensile strength machine direction	ASTM D 4632	535 lb.	2,380 N
Grab elongation machine direction	ASTM D 4632	>50%	>50%
Trapezoid tear strength machine direction	ASTM D 4533	180 lb.	800 N
CBR puncture	ASTM D 6241	1,250 lb.	5,560 N
Puncture strength (5/16)	ASTM D 4833	250 lb.	1,112 N
Peel strength (non-woven to membrane)	ASTM D 7005	4 psi	700 N per meter
Shear strength (non-woven to membrane)	ASTM D 7005	10 psi	1,751 N per meter
Permeability—constant head at 15 psi	ASTM D 4491	4.5×10 ⁻¹¹ centimeters per second	4.5×10 ⁻¹¹ centimeters per second

The geocomposite must be suitable for canal linings, ponds, lagoons, landfills, and waterproofing where concrete or shotcrete will be placed above.

The subgrade must be prepared in accordance with Section 2.2., "Preparing Subgrade."

Geocomposite liner must be installed over the prepared subgrade in accordance with Section 3.1., "Geocomposite Geotextile Lining."

Cover material protective 3-in. concrete or shotcrete cover must meet the requirements of Section 3.2., "Cover Material," and must be placed over the installed geocomposite lining.

- 2.2. **Preparing Subgrade.** The supporting subgrade soils for which the geocomposite liner will be placed must be free of large rocks and any other material that could damage the geocomposite. The subgrade must be smooth, clean, and compacted in accordance with Item 132, "Embankment," Section 3.4.2., "Density Control."
- 2.3. **Geocomposite Liner.** The lining material must be Canal[®] 123012 PP/PET composed of a top 12-oz. per square yard black polypropylene non-woven bonded to a 30-mil polyethylene geomembrane middle layer that is bonded to a bottom 12-oz. per square yard gray polyester non-woven as manufactured by HUESKER, Inc., or approved equal. The physical properties of the canal liner must be as shown in Table 1.

3. INSTALLATION

- 3.1. **Geocomposite Geotextile Lining.** The geocomposite lining material must be anchored and held in place with sandbags or by other approved means until the cover material has been placed to prevent uplift by wind. Care must be taken to ensure that the geocomposite lining is placed in a condition that will conform to the contour of the subgrade surface. However, care must also be taken to avoid unnecessary bulges, folds, or wrinkles in the geocomposite liner. The geocomposite liner may be installed on slopes less than 1-1/2 to 1 because of its high interface friction. No equipment may be operated on the top surface of the geocomposite lining material without the Engineer's permission.

Seam geocomposite material using either a wedge welder or a hot melt adhesive. If using the hot melt adhesive, the material must be unrolled and overlapped at least 6 in. Seams must be laid in a shingle fashion downstream. Overlaps must be increased to 8 in. when covering an irregular substrate. The recommended hot melt adhesive must have a low viscosity (i.e., will penetrate through the non-woven reaching the membrane) and have a quick set time. The surface area to be seamed must be free of wrinkles, free of debris, and dry.

After installation, all seamed areas must be visually inspected before covering. Any suspect areas must be repaired as necessary.

Repair any geocomposite liner damaged during installation before placing the protective cover. The costs of repairing the geocomposite liner must be borne by the Contractor. Before making repairs, the contact surfaces of the geocomposite must be thoroughly cleaned to remove all dirt, dust, moisture, and other foreign materials by methods approved. Repairs or patching of the liner must be made with the material on the cleaned surface. The patch must extend at least 6 in. in each direction beyond the damaged area. Bond the patch material to the prepared surface, smoothing out any wrinkles.

Where the geocomposite liner joins concrete structures, the lining must be adhered to the concrete using hot melt adhesive as approved. Before the geocomposite liner is attached to a structure, the concrete surface to which the lining is to adhere must be cleaned with a wire brush.

The geocomposite liner must be anchored near the top of the slope as recommended by the manufacturer and approved.

- 3.2. **Cover Material.** The geocomposite liner must not be covered before inspection and approval. Place at least 3 in. of concrete or shotcrete above the geocomposite liner as specified.
- 3.3. **Manufacture.** The manufacturer must have produced the proposed geocomposite liner for at least 10 yr. with successful completed projects having a total minimum area of 15 million sq. ft.
- 3.4. **Delivery.** Each geocomposite liner roll must be labeled with the manufacturer's name, product identification number, roll number, and roll dimensions.
- 3.5. **Storage.** Temporary storage at the jobsite must be on a level surface, free of sharp objects, and where water cannot accumulate. The geocomposite liner must be protected from puncture, abrasion, heat or cold, material degradation, or other damaging circumstances. Storage must not result in crushing the core of the roll goods or flattening of the rolls. Rolls must not be stored more than three high. Damaged geocomposite lining material must be removed from the jobsite and replaced with geocomposite that meets the specified requirements.
- 3.6. **Handling.** Rolls may not be dragged, lifted by one end, or dropped. A pipe or solid bar of sufficient strength to support the full weight of a roll without significant bending must be used for all handling activities. The diameter of the pipe or solid bar must be small enough to be easily inserted through the core of the roll. Chains must be used to link the ends of the pipe or bar to the ends of the spreader bar. The spreader bar must be wide enough to prevent the chains from rubbing against the ends of the roll. Alternatively, a stinger

bar protruding from the end of a forklift or other equipment may be used. The stinger bar must be at least 3/4 the length of the core and must be capable of supporting the full weight of the roll without significant bending.

- 3.7. **Weather Limitations.** Geocomposite liner must not be deployed or field-seamed in the presence of moisture (e.g., rain, fog, or dew), in areas of ponded water, or in the presence of windy conditions. Unless authorized, seaming must be attempted at ambient temperatures below 36°F.
- 3.8. **Equipment.** Equipment used in performance of the work must be in conformance with the geocomposite manufacturer's recommendation and must be maintained in satisfactory working condition.

4. MEASUREMENT

- 4.1. This Item will be measured by the square foot.

5. PAYMENT

- 5.1. 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 "Riprap Canal Liner." This price is full compensation for liner, glue, installing all materials, labor, tools, equipment, and incidentals.

Special Specification 6001

Portable Changeable Message Sign



1. DESCRIPTION

Furnish, operate, and maintain portable trailer mounted changeable message sign (PCMS) units.

2. MATERIALS

Furnish new or used material in accordance with the requirements of this Item and the details shown on the plans. Provide a self-contained PCMS unit with the following:

- Sign controller
- Changeable Message Sign
- Trailer
- Power source

Paint the exterior surfaces of the power supply housing, supports, trailer, and sign with Federal Orange No. 22246 or Federal Yellow No. 13538 of Federal Standard 595C, except paint the sign face assembly flat black.

2.1. **Sign Controller.** Provide a controller with permanent storage of a minimum of 75 pre-programmed messages. Provide an external input device for random programming and storage of a minimum of 75 additional messages. Provide a controller capable of displaying up to 3 messages sequentially. Provide a controller with adjustable display rates. Enclose sign controller equipment in a lockable enclosure.

2.2. **Changeable Message Sign.** Provide a sign capable of being elevated to at least 7 ft. above the roadway surface from the bottom of the sign. Provide a sign capable of being rotated 360° and secured against movement in any position.

Provide a sign with 3 separate lines of text and 8 characters per line minimum. Provide a minimum 18 in. character height. Provide a 5 × 7 character pixel matrix. Provide a message legibility distance of 600 ft. for nighttime conditions and 800 ft. for normal daylight conditions. Provide for manual and automatic dimming light sources.

The following are descriptions for 3 screen types of PCMS:

- **Character Modular Matrix.** This screen type comprises of character blocks.
- **Continuous Line Matrix.** This screen type uses proportionally spaced fonts for each line of text.
- **Full Matrix.** This screen type uses proportionally spaced fonts, varies the height of characters, and displays simple graphics on the entire sign.

2.3. **Trailer.** Provide a 2 wheel trailer with square top fenders, 4 leveling jacks, and trailer lights. Do not exceed an overall trailer width of 96 in. Shock mount the electronics and sign assembly.

2.4. **Power Source.** Provide a diesel generator, solar powered power source, or both. Provide a backup power source as necessary.

2.5. **Cellular Telephone.** When shown on the plans, provide a cellular telephone connection to communicate with the PCMS unit remotely.

3. CONSTRUCTION

Place or relocate PCMS units as shown on the plans or as directed. The plans will show the number of PCMS units needed, for how many days, and for which construction phases.

Maintain the PCMS units in good working condition. Repair damaged or malfunctioning PCMS units as soon as possible. PCMS units will remain the property of the Contractor.

4. MEASUREMENT

This Item will be measured by each PCMS or by the day used. All PCMS units must be set up on 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 PCMS set up and operational on the worksite.

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 "Portable Changeable Message Sign." This price is full compensation for PCMS units; set up; relocating; removing; replacement parts; batteries (when required); fuel, oil, and oil filters (when required); cellular telephone charges (when required); software; and equipment, materials, tools, labor, and incidentals.

Special Specification 6027

Preparation of Existing Conduits, Ground Boxes, or Manholes



1. DESCRIPTION

Prepare conduits, ground boxes, or manholes; replace conduits, ground boxes, or manholes, when necessary; replace conduit fittings with junction boxes; replace damaged ground box or manholes covers; adjust ground box or manholes covers; install pull lines in conduits; install cable racks in ground boxes or manholes.

2. MATERIALS

Provide new materials that comply with the details shown on the plans, the requirements of this Item, and to the pertinent requirements of the following Items:

- Item 624, "Ground Boxes"
- Item 465, "Manholes and Inlets"

When conduit replacement is required, provide conduit meeting the requirements of Item 618, "Conduit." Use conduit of same size and type of that being replaced or as directed.

Provide 24 in. × 24 in. × 12 in. (L × W × D) minimum size NEMA 4X junction boxes with screw covers.

Provide polyester tapes or rope pull cords with a tensile strength of at least 1200 lb.

Provide heavy duty, non-metallic, non-corrosive cable racks that can support a minimum dead load of 300 lbs. Ensure cable racks are resistant to the effects of oils, hydrocarbons, common esters, ketones, ethers, or amides. Ensure cable racks are adjustable between 8 in. and 14 in. wide. Do not provide grounding or insulators for cable racks.

3. CONSTRUCTION

Check existing conduit and ground boxes.

- 3.1. **Preparation of Conduit, Ground Box or Manhole.** Pull a mandrel through empty conduits. Use a mandrel with a diameter greater than 70% of the inside diameter of the conduit and 2 in. length. Repair or replace conduit runs that will not allow passage of the mandrel. Replace conduit deemed impractical to repair or remains unsuitable in accordance with Item 618, "Conduit." Clean the conduit by pulling a rubber swab slightly larger in diameter than the conduit.

Blow compressed air through conduits that contain wires. Remove debris from the conduit by pushing a fish tape through the conduit. Do not use water to clear debris. Retest the conduit by blowing compressed air.

Install 1 pull cord in each conduit for use in installing the conductors, cables, or innerduct. Leave 1 pull cord in each conduit after the conductors, cables, or innerduct have been installed.

Remove silt and debris from ground boxes or manholes prior to installing cable.

- 3.2. **Installation of Ground Box or Manhole.** Furnish new ground boxes or manholes as directed. Install ground boxes or manholes as shown the plans or as directed.

Backfill disturbed surface with material equal in composition and density to the surrounding area. Replace surfacing material with similar material to an equivalent condition.

- 3.3. **Installation or Adjustment of Ground Box or Manhole Covers.** Remove, dispose, and install ground box or manhole covers as shown on the plans or as directed. Adjust ground box or manhole covers as shown on the plans or as directed. Adjustment may include welding, raising, or lowering.

Backfill disturbed surface with material equal in composition and density to the surrounding area. Replace surfacing material with similar material to an equivalent condition.

- 3.4. **Installation of Junction Box.** Locate conduit fittings in conduits carrying fiber optic cables. Replace the conduit fitting and associated section of conduit with a junction box. Install junction boxes as shown on the plans.

- 3.5. **Installation of Cable Rack Assembly.** Install cable racks to permit coiling of conductors or cables without violating the manufacturer's minimum bending radius. Install 2 cable rack supports and 4 adjustable levels on each support, at a minimum, on each wall of the ground box or manhole as shown on plans or as directed. Anchor the cable rack support permanently to the ground box wall with mechanical or powder actuated fasteners. Use fasteners with an ultimate pull out strength of at least 2500 lb. and ultimate shear strength of at least 3000 lb. Provide sufficient cable supports for the particular number of conductors or cables coiled or passing through the ground box or manhole as shown on the plans or as directed.

4. MEASUREMENT

This Item will be measured by the foot of conduit cleared, tested, replaced and repaired, by each cable rack, junction box, ground box, or manhole installed or prepared, and by each ground box or manhole cover replaced or adjusted.

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 "Conduit (Prepare)," "Junction Box (Install)," "Manhole (Install)," "Ground Box (Install)," "Manhole (Prepare)," "Ground Box (Prepare)," "Cover (Replace)" of the sizes specified, "Cover (Adjust)," and "Cable Rack Assembly (Install)." This price is full compensation for cleaning and testing conduit, ground boxes, and manholes; furnishing and installing pull cords, ground boxes, manholes, junction boxes, and cable racks; excavating and backfilling; adjusting ground boxes and manholes covers; disposal of unsalvageable material; and equipment, materials, labor, tools, and incidentals.

Repair of existing conduit will be paid for by the Department in accordance with Article 9.7., "Payment for Extra Work and Force Account Method."

Special Specification 6054

Spread Spectrum Radios for Traffic Signals



1. DESCRIPTION

Furnish and install spread spectrum radios.

2. MATERIALS

Supply complete manufacturer specifications for radio, antennas, cables, connectors, power supply, mounting hardware, and lightning surge protector, including the exact gain of the antenna.

3. SPREAD SPECTRUM RADIO

Furnish spread spectrum radios with the following operating minimum characteristics:

Table1
Radio Characteristics

Radio Parameters	Radio Requirements
FREQUENCY	902 - 928 MHz
RANGE	15 Miles line of sight
REPEAT CAPABILITIES	Store and Forward Repeater Capabilities
POWER	1.0 Watt Transmitting Power
ENVIRONMENT	Temperature -22°F to 140°F
FCC APPROVAL	No License Requirements Type acceptance under FCC Part 15.247
DATA CHARACTERISTICS	Half or Full Duplex Operation RS232C interface Selectable 1,200 thru 19,200 bps
REGULATED POWER SUPPLY	Voltage 12 DC Amperage 3 Amp Operating Temp -22°F to 140°F

Install radios as shown on the plans or as directed.

Supply radios with diagnostic software capable of testing the link between the master radio and the remote radios. Provide software capable of detecting channels which are not adequate for the transmission of data and allow for the exclusion of these frequencies in the selection of frequencies to be scanned.

4. RADIO ANTENNA

Furnish radio antennas with the following minimum characteristics:

Table2
Antenna Characteristics

Antenna Parameters	Antenna Requirements
REMOTE SITE	Unidirectional (Yagi), Minimum 9 dB gain (dB reference to half wave dipole)
MASTER SITE	Omni-directional, Minimum 6 dB gain (dB reference to half wave dipole)
RANGE	15 Miles
IMPEDANCE	50 Ohm
WIND RATING	125 miles per hour
CONNECTORS	Type "N" Female

Mount the antenna on a traffic signal pole, an illumination pole, or a separate steel pole as directed. Ground the antenna to the metal support. Do not use a wood pole or support.

5. CABLE

Furnish low loss coaxial cable with the following minimum characteristics:

Table3
Coaxial Cable Characteristics

Cable Parameters	Cable Requirements
NOMINAL IMPEDANCE	50 Ohm
MAX ATTENUATION	4.2 dB/100 ft. at 900 MHz

Furnish heliax type cable for runs over 100 ft. in length. Furnish cable connectors with a type "N" male connector. Install cable connectors in accordance with manufacturer's recommendations. Install cable as shown on the plans or as directed.

Furnish a coaxial protector (PolyPhaser IS-50NX-C2, Andrew APG-BNFNF- 090, Huber Suhner 3400-41-0048, or equivalent). Mount coaxial protector adjacent to and bonded to the cabinet ground bus.

6. TESTING, TRAINING, AND WARRANTY

Provide a factory certified representative for installation and testing of the equipment. Conduct a test site survey prior to the installation of the equipment. The Department reserves the right to conduct their own site survey as needed.

When required, provide up to 2 days of training to Department personnel in the operation, setup, and maintenance of the spread spectrum radio system. Provide instruction and materials for a maximum of 20 persons and at a location selected by the Department. Provide instruction personnel certified by the manufacturer. The User's Guide is not an adequate substitute for practical classroom training and formal certification.

Provide equipment with no less than 95% of the manufacturer's standard warranty remaining when equipment invoices are submitted for payment. Any equipment with less than 95% of its warranty remaining will not be accepted.

Provide updates of the spread spectrum radio software free of charge during the warranty period, including the update to NTCIP compliancy.

7. MEASUREMENT

This Item will be measured by each spread spectrum radio, antenna and by the linear foot of cable furnished and installed.

8. 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 "Spread Spectrum Radio," "Antenna" of the type specified, "Coaxial Cable," and "Heliac Cable." The price is full compensation for furnishing, assembling, and installing the spread spectrum radios, antennas, and cable; for mounting attachments; and for testing, labor, tools, equipment, and incidentals.

Special Specification 6061

Global Positioning System (GPS) Communication Unit



1. DESCRIPTION

Furnish, install, and make fully operational a GPS Communication Unit (GPSCU) at designated locations as shown on the plans and as detailed in accordance with this specification. Use the same manufacturer and model for each GPSCU. The GPSCU provides a reliable and independent GPS time reference for every traffic signal controller application.

2. MATERIALS

Provide only equipment that is new, corrosion resistant, and in strict accordance with the details shown on the plans, in this specification, and the pertinent requirements of the following items:

- Item 680, "Installation of Highway Traffic Signals"
- Item 681, "Temporary Traffic Signals"

Provide a GPSCU that is fully compatible with a Type 1 or Type 2 NEMA (National Electrical Manufacturers Association) traffic signal controller.

2.1. **GPS Communication Module.** Provide a GPS Communication Module (GPSCM) that has the following traffic signal controller interface features:

- Microwave clock update application included (operates with any traffic signal controller)
- Tracking LED that indicates GPS satellite acquisition status
- -34°C to +74°C operating temperature range
- A power consumption of 125mA at 12V
- LED power status indicator
- Complies with Part 15 of FCC rules
- Mounted inside of the traffic signal controller cabinet
- RS 232 communication to the NEMA signal controller

2.2. **GPS Antenna.** Provide a GPS Antenna that has the following features:

- 28dB gain
- 3m cable
- SMA Male
- Compliant with National Marine Electronics Association (NMEA) 0183 devices
- Water and dust resistant
- Mounted externally on the traffic signal controller cabinet

3. OPERATION

Once the GPSCM acquires satellite communication (as shown by LED indicator), ensure the GPSCU then operates as follows:

- It uses the operating software of the traffic signal controller interface with the GPSCU to sync the date and time of the traffic signal controller once per minute.

4. CONSTRUCTION

Provide equipment that utilizes the latest available techniques for design and construction with a minimum number of parts, subassemblies, circuits, cards, and modules to maximize standardization and commonality.

Design the equipment for ease of maintenance. Provide component parts that are readily accessible for inspection and maintenance. Provide test points that are for checking essential voltages and waveforms.

- 4.1. **Electronic Components.** Provide this item in accordance with Special Specification "Electronic Components."
- 4.2. **Mechanical Components.** Provide external screws, nuts, and locking washers that are stainless steel; no self-tapping screws will be allowed. Provide parts made of corrosion resistant material, such as plastic, stainless steel, anodized aluminum, or brass. Protect materials from fungus growth and moisture deterioration. Separate dissimilar metals by an inert dielectric material.
- 4.3. **Documentation Requirements.** Provide one copy of the manufacturer's operation manual at each installation location.
- 4.4. **Testing.** The Department reserves the right to test the GPSCU to ensure quality assurance before installations and random sampling of units being provided to the Department. The Department's testing procedures will include the following:
- The GPSCU will meet the criteria of the specification.
 - The GPSCU demonstrates the operations described in Section 3 of this specification.
 - The GPSCU and its components will be tested in an environmental chamber (temperature ranges from -34 °C to +74 °C).
- 4.5. **Technical Assistance.** Ensure that a manufacturer's technical representative is available on site to assist the technical personnel at each installation site and with GPS equipment installation and communication system configuration.
- Do not execute the initial powering up of the GPS equipment without the permission of the manufacturer's representative.
- 4.6. **Warranty.** Guarantee equipment furnished and installed to perform according to the manufacturer's published specifications prior to the acceptance of the system by the Department. Warrant equipment against defects or failure in design, materials, and workmanship in accordance with the manufacturer's standard warranty for a minimum of 5 years.

5. SUBMITTALS

Submit manufacturers' cut sheets / specifications and software for the equipment proposed under these specifications to the Department's Traffic Operations section for approval at the following e-mail address: HOU-TrfShpDrwgs@txdot.gov.

6. MEASUREMENT

This Item will be measured as each unit furnished, installed, made fully functional, and tested in accordance with these special specifications or as directed. A unit will include one GPSCU meeting the specifications, standards, and requirements contained herein, module, antenna, and antenna cabling back to the module, mounting hardware, manufacturer's operation manual, required testing results, manufacturer's technical specification, and the cost of the materials, training, warranty, equipment, and accessories necessary to the complete installation of the unit.

7. 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 "GPS Communication Unit." This price is full compensation for the equipment described under this Item with module, antenna, cables, and connectors; for documentation and testing, and for the cost of furnishing labor, materials, software, warranty, training, equipment, and incidentals.

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