

THIS BID MUST BE FILED IN DUPLICATE IN A SEALED BID ENVELOPE

SPECIFICATIONS AND BID

FOR

FORT BEND GRAND PARKWAY TOLL ROAD AUTHORITY
FORT BEND GRAND PARKWAY TOLL ROAD
SH 99, Segment D

Control: 3510-04-046

Section 4: West Airport Boulevard Overpass

From 0.54 mile south of West Airport Blvd to
0.48 mile north of West Airport Blvd

Notice To Bidder:

ALL BIDS ARE TO BE SUBMITTED TO THE FORT BEND GRAND
PARKWAY TOLL ROAD AUTHORITY, C/O PROFESSIONAL PROJECT
MANAGEMENT SERVICES, 19875 SOUTHWEST FREEWAY, SUITE 270,
SUGAR LAND, TEXAS, 77479 BY 2:00 P.M. ON WEDNESDAY, JULY 13,
2011.

BIDDER IS REQUIRED TO FILL IN INFORMATION BELOW:

Lone Star Road Construction, Ltd.
BIDDER (Company Name)

TOTAL AMOUNT OF BID \$ 8,940,683 ⁶⁹/_{xx}

FORT BEND COUNTY, TEXAS

**BID TO
FORT BEND GRAND PARKWAY TOLL ROAD AUTHORITY**

**FORT BEND GRAND PARKWAY TOLL ROAD
SH 99, Segment D**

**Section 4: West Airport Boulevard Overpass
From 0.54 mile south of West Airport Blvd to
0.48 mile north of West Airport Blvd**

The undersigned, as bidder, declare that the only person or parties interested in this bid as principals are those named herein; that this bid is made without collusion with any other person, firm, or corporation, that he has carefully examined the form of contract, instructions to bidders, profiles, grades, specifications, and the plans therein referred to, and has carefully examined the location and local conditions of and the classes of materials prescribed for, the proposed work, and agree that he will perform the work and services and furnish the materials, supplies, and equipment, and incidentals necessary to complete the contract, if awarded, in a good and workmanlike manner in accordance with this bid and with the plans, specifications and special provisions if any, incorporated therein.

It is further agreed that the quantities of work to be performed and materials to be furnished may be increased or diminished as may be necessary in the opinion of the Engineer to complete the work fully as planned and contemplated, and that all quantities of work and materials, whether increased or decreased, are to be performed or furnished at the unit prices set forth below except as provided for in the specifications, but such changes shall be made only in strict accord with the specifications and contract, and in no other manner.

The undersigned agree and pledge himself/themselves to complete the work in full within the time stated in the specifications.

Accompanying this bid is a bid bond or cashier's check payable to the order of Fort Bend Grand Parkway Toll Road Authority (FBGPTRA), for 5% of total bid dollars (\$ 5%), said check to be returned to the bidder, unless this bid is accepted and he shall fail to execute a contract and file a bond within ten (10) days of its acceptance and the award of a contract, in which case the bidder herein now agrees said check shall be forfeited and become the property of FBGPTRA, as payment for agreed and liquidated damages due to delay and other inconveniences suffered by the FBGPTRA on account of failure of the bidder to execute a contract and file the bond required by law and the specifications. It is understood that FBGPTRA reserves the right to reject any and all bids. The work proposed to be done shall be accepted only when fully completed and finished to the entire satisfaction of the Engineer and the Commissioner's Court and in strict compliance with the provisions of the specifications and contract.

It is further agreed that the work is to be completed in full in 400 calendar days.

The undersigned lists the following work of similar character completed by him:

COMPANY NAME LOVE STAR ROAD CONSTRUCTION LTD.

AUTHORIZED SIGNATURE [Signature]
Dwane Hubble, President of Hubble
Management LLC, its General Partner

TITLE _____

NOTE: Signatures to comply with the Specifications & Letter of Evidence. ORIGINAL SIGNATURE MUST APPEAR ON THIS FORM.

STREET ADDRESS 10333 WINDFERN

MAILING ADDRESS HOUSTON, TEXAS 77064

PHONE 281-477-0515

CONTRACT WITH FORT BEND GRAND PARKWAY TOLL ROAD AUTHORITY

THE STATE OF TEXAS §
COUNTY OF FORT BEND §

Contractor hereby contracts and agrees with Fort Bend Grand Parkway Toll Road Authority to perform the work and services and to furnish the materials, supplies, and equipment, and incidentals necessary to complete this contract in a good and workmanlike manner in accordance with his bid and with the plans, specifications, and special provisions prepared by the Engineer, for

FORT BEND GRAND PARKWAY TOLL ROAD AUTHORITY FORT BEND GRAND PARKWAY TOLL ROAD SH 99, Segment D Section 4: West Airport Boulevard Overpass

Unit and Section

The Contractor represents to the Fort Bend Grand Parkway Toll Road Authority (FBGPTRA) that he has carefully examined this contract and the plans, specifications, and special provisions attached to and made a part of this contract on which his bid is based, and is thoroughly familiar therewith.

The FBGPTRA agrees to pay to the Contractor for the performance of all the obligations of this contract in a good and workmanlike manner in accordance with the plans, specifications, and special provisions, the several installments, at the rates and at the times and in the manner specified therein, not exceeding in the aggregate the sum of Eight million, nine hundred forty thousand, six hundred eighty three dollars (\$ 8,940,683.69), dollars and sixty nine cents.

The Contractor agrees to begin the performance of the work on the date fixed in the contract requisition when it shall have been issued, and to prosecute it diligently to completion.

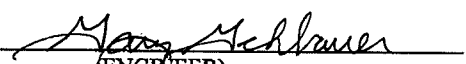
The deposit of a copy of the contract requisition in the United States mail addressed to the Contractor at 10353 Windfern, Houston, TX 77064 shall be sufficient notice of the issuance of such requisition and of the date performance shall begin.

Wherever any notice to the Contractor by the FBGPTRA may be required or desirable under the terms of this agreement and related documents, such notice shall be sufficient if it be in writing, addressed to the Contractor at the above address, and deposited in the United States mail.

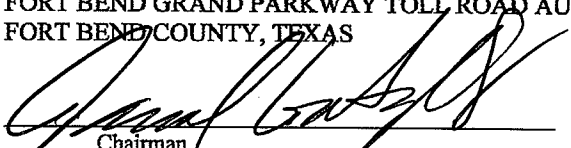
This contract and all obligations therein are performable in Fort Bend County, Texas. Executed at Sugar Land, Texas, this _____ day of _____ 2011.

ATTEST: 

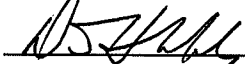
July 20, 2011

RECOMMENDED FOR APPROVAL

(ENGINEER)

FORT BEND GRAND PARKWAY TOLL ROAD AUTHORITY
FORT BEND COUNTY, TEXAS

BY: 
Chairman

BY: LOWESTAR ROAD CONSTRUCTION Ltd.
Contractor

BY: 
Dwane Hubble, President of Hubble Management LLC, its General Partner
(TITLE)

NOTICE TO CONTRACTORS

Sealed bids will be received by the undersigned for Fort Bend Grand Parkway Toll Road Authority until 2:00 P.M., Wednesday, July 13, 2011, at the Fort Bend Grand Parkway Toll Road Authority, c/o Professional Project Management Services, 19875 Southwest Freeway, Suite 270, Sugar Land, Texas, 77479 for:

FORT BEND GRAND PARKWAY TOLL ROAD AUTHORITY

FORT BEND GRAND PARKWAY TOLL ROAD

SH 99, Segment D

Section 4: West Airport Boulevard Overpass

From 0.54 mile south of West Airport Blvd to

0.48 mile north of West Airport Blvd

A non-mandatory pre-bid meeting will be held on June 30, 2011 at 9:30 a.m. at the office of Professional Project Management Services, 19875 Southwest Freeway, Suite 270, Sugar Land, Texas 77479. The construction site will be available for inspection at all times.

SPECIAL NOTICE: Unit prices must be shown for each individual bid item. This unit price will be the determining factor in the final analysis of the official bid amount. If a bidder fails to bid on any item, the Authority, at its option, reject such bid as incomplete.

Plans and specifications are available at www.civcastusa.com.

NOTICE: A bid-bond or cashier's check for 5% of the amount bid, payable to Fort Bend Grand Parkway Toll Road Authority, must accompany each bid as a guarantee that the bidder, if successful, will enter into contract and make bond in accordance with the requirements of the specifications. Fort Bend Grand Parkway Toll Road Authority reserves the right to reject any and all bids.

Bids must be filed in duplicate in a bid envelope, and sealed, plainly marked Bids for

FORT BEND GRAND PARKWAY TOLL ROAD AUTHORITY

FORT BEND GRAND PARKWAY TOLL ROAD

SH 99, Segment D

Section 4: West Airport Boulevard Overpass

All bids will be retained by the Authority and will not be returned to the bidders. No bid tendered later than the time specified will be accepted.

IMPORTANT NOTICE TO CONTRACTORS

The successful contractor on this project shall have TEN DAYS after the date of receipt of their contract and bond documents to have same executed by their bonding company and returned to the office of the Fort Bend Grand Parkway Toll Road Authority, c/o Professional Project Management Services, 19875 Southwest Freeway, Suite 270, Sugar Land, Texas.

PLEASE NOTE: In order for this bid to be considered and valid, the following must be adhered to:

Bidder must sign "Bid to Fort Bend Grand Parkway Toll Road Authority"

Bidder must fill in "Bid Sheets" in total

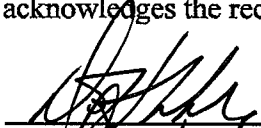
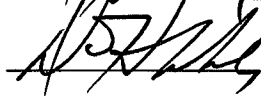
Bidder must submit a 5% Bid Bond or Cashier's Check with Bid

Bidder must acknowledge receipt of all Addendums in space provided below

NOTICE: Escalation Provisions or other alternations included in bid documents will render the bid invalid.

ACKNOWLEDGMENT OF ADDENDA

The Contractor hereby acknowledges the receipt of the following Addenda:

Addendum No. 1:		Dated:	<u>7-8-11</u>
<i>Geotechnical Data</i> Addendum No. 2:		Dated:	<u>7-12-11</u>
Addendum No. 3:	_____	Dated:	_____

SALES TAX EXEMPTION

NOTICE TO CONTRACTORS

The Contractor's attention is directed to TEX. TAX CODE ANN. 151.311, which was amended by the Texas Legislature, effective October 1, 1993.

Under Section 151.311, as amended, tangible personal property purchased by a contractor for use in the performance of a contract for the improvement of real property for an organization such as Fort Bend Grand Parkway Toll Road Authority (FBGPTRA) is exempt from the payment of sales and use tax thereon when the property is incorporated into the realty in the performance of the contract. Building materials, etc., are exempt from tax if they are: (1) necessary and essential for the performance of the contract; and (2) completely consumed at the job site (i.e., after being used once for their intended purpose they are used up or destroyed). Items that can be re-used on other jobs are not tax exempt.

Services purchased by a contractor are also tax exempt, where: (1) the contract is for an improvement to real estate for an exempt organization; and (2) the contract expressly requires the specific service to be provided or purchased by the person performing the contract; or (3) the service is integral to the performance of the contract.

Machinery and equipment, including repair and replacement parts for the same, are not tax exempt when used in the performance of a contract for the improvement of real estate for FBGPTRA.

The Contractor should be aware that the Texas Comptroller of Public Accounts issues rules interpreting applicable provisions of the tax code from time to time. The rules should be consulted when answering specific questions. The Contractor can obtain additional information concerning the applicable sales and use tax, as well as sales tax permits and information regarding resale certificates, from the State Comptroller's Office, at (800) 252-5555.

BIDDER MUST COMPLETE THIS FORM AND

ATTACH BID CHECK OR BOND

All bid checks or bonds must be for the required amount and be payable to Fort Bend Grand Parkway Toll Road Authority.

(DO NOT MAKE CHECK OR BOND PAYABLE TO ANY INDIVIDUAL).

Authorization for Fort Bend Grand Parkway Toll Road Authority to return our bid check without liability of any kind or nature to address listed below, via regular mail if:

1. We are unsuccessful bidder
2. Bond posted in lieu of bid check
3. Upon completion of contract

Bid for: FORT BEND GRAND PARKWAY TOLL ROAD
SH 99, SEGMENT D, SECTION 4, WEST AIRPORT BVD OVERPASS

Bond) Attached

Cashier's Check No.) _____ drawn on _____ Company Bank of _____

_____ dated _____, 2011 Amount \$ _____

BIDDER

Name: LONE STAR ROAD CONSTRUCTION, LTD.

Signature: 

Mailing Address: 10333 WINDFERN

City and State: HOUSTON, TEXAS Zip Code: 77064

(Cashiers) (Bond)
Mark Out One

THE AMERICAN INSTITUTE OF ARCHITECTS

AIA Document A310 Bid Bond

KNOW ALL MEN BY THESE PRESENTS, THAT WE Lone Star Road Construction, Ltd.
10333 Windfern Road, Houston, TX 77064

as Principal, hereinafter called the Principal, and Colonial American Casualty and Surety
Company / Fidelity and Deposit Company of Maryland
2000 W. Sam Houston Parkway, Suite 1300, Houston, TX 77042

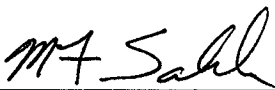
a corporation duly organized under the laws of the State of Maryland
as Surety, hereinafter called the Surety, are held and firmly bound unto Fort Bend Grand Parkway Toll Road Authority

as Obligee, hereinafter called the Obligee, in the sum of Five Percent of Amount Bid
Dollars (\$ 5%),
for the payment of which sum well and truly to 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.

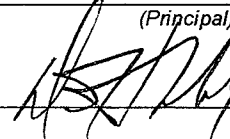
WHEREAS, the Principal has submitted a bid for Airport Boulevard Overpass at SH99, Job No. 3510-04-046


NOW, THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a Contract with
the Obligee in accordance with the terms of such bid, and give such bond or bonds as may be specified in the bidding or
Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt
payment of labor and materials furnished in the prosecution thereof, or in the event of the failure of the Principal to enter
such Contract and give such bond or bonds, if the Principal shall pay to the Obligee the difference not to exceed the
penalty hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith
contract with another party to perform the Work covered by said bid, then this obligation shall be null and void, otherwise
to remain in full force and effect.

Signed and sealed this 13th day of July, 2011

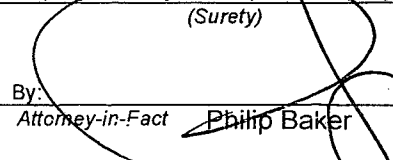

(Witness)

Lone Star Road Construction, Ltd.

(Principal) (Seal)
By:  Dwane Hubble, President of Hubble
Management LLC, its General Partner
(Title)


Michele Bonnin (Witness)

Colonial American Casualty and Surety
Company / Fidelity and Deposit Company of Maryland

(Surety) (Seal)
By:  Philip Baker
Attorney-in-Fact (Title)

Power of Attorney
FIDELITY AND DEPOSIT COMPANY OF MARYLAND
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY

KNOW ALL MEN BY THESE PRESENTS: That the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, and the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, corporations of the State of Maryland, by M. P. HAMMOND, Vice President, and ERIC D. BARNES, Assistant Secretary, in pursuance of authority granted by Article VI, Section 2, of the By-Laws of said Companies, which are set forth on the reverse side hereof and are hereby certified to be in full force and effect on the date hereof, does hereby nominate, constitute and appoint Edward ARENS and Philip BAKER, both of The Woodlands, Texas, EACH its true and lawful agent and Attorney-in-Fact, to make, execute, seal and deliver, for, and on its behalf as surety, and as its act and deed, any and all bonds and undertakings, EXCEPT bonds on behalf of Independent Executors, Community Survivors and Community Guardians. and the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Companies, as fully and amply, to all intents and purposes, as if they had been duly executed and acknowledged by the regularly elected officers of the Company at its office in Baltimore, Md., in their own proper persons. This power of attorney revokes that issued on behalf of Edward Donald ARENS, Philip Wayne BAKER, dated November 28, 2006.

The said Assistant Secretary does hereby certify that the extract set forth on the reverse side hereof is a true copy of Article VI, Section 2, of the By-Laws of said Companies, and is now in force.

IN WITNESS WHEREOF, the said Vice-President and Assistant Secretary have hereunto subscribed their names and affixed the Corporate Seals of the said FIDELITY AND DEPOSIT COMPANY OF MARYLAND, and the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, this 15th day of March, A.D. 2007.

ATTEST:

FIDELITY AND DEPOSIT COMPANY OF MARYLAND
COLONIAL AMERICAN CASUALTY AND SURETY COMPANY



Eric D. Barnes

Eric D. Barnes Assistant Secretary

M. P. Hammond

By:

M. P. Hammond

M. P. Hammond Vice President

State of Maryland }
City of Baltimore } ss:

On this 15th day of March, A.D. 2007, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, came M. P. HAMMOND, Vice President, and ERIC D. BARNES, Assistant Secretary of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, and the COLONIAL AMERICAN CASUALTY AND SURETY COMPANY, to me personally known to be the individuals and officers described in and who executed the preceding instrument, and they each acknowledged the execution of the same, and being by me duly sworn, severally and each for himself depose and saith, that they are the said officers of the Companies aforesaid, and that the seals affixed to the preceding instrument is the Corporate Seals of said Companies, and that the said Corporate Seals and their signatures as such officers were duly affixed and subscribed to the said instrument by the authority and direction of the said Corporations.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal the day and year first above written.



Constance A. Dunn

Constance A. Dunn

Constance A. Dunn Notary Public

My Commission Expires: July 14, 2011



Fidelity and Deposit Company of Maryland

Claims Office: 1400 American Lane, Schaumburg, Illinois 60196

IMPORTANT NOTICE

To obtain information or make a complaint:

You may call the Fidelity and Deposit Company of Maryland or Colonial American Casualty and Surety Company's toll-free telephone number for information or to make a complaint at:

1-800-654-5155

You may contact the Texas Department of Insurance to obtain information on companies, coverages, rights, or complaints at:

1-800-252-3439

You may write the Texas Department of Insurance:

**P.O. Box 149104
Austin, TX 78714-9104
FAX # (512) 475-1771**

PREMIUM OR CLAIM DISPUTES: Should you have a dispute concerning the premium or about a claim, you should first contact Fidelity and Deposit Company of Maryland or Colonial American Casualty and Surety Company. If the dispute is not resolved, you may contact the Texas Department of Insurance.

ATTACH THIS NOTICE TO YOUR POLICY: This notice is for information only and does not become a part or condition of the attached document.

BIDDER'S CERTIFICATION

The Texas Government Code Chapter 2252 relates to bids by non resident bidders. A portion of the Act has been extracted and is as follows:

Section 2252.001


- (3) "Nonresident bidder" refers to a person who is not a resident.
- (4) "Resident bidder" refers to a person whose principal place of business is in this state, including a contractor whose ultimate parent company or majority owner has its principal place of business in this state.

Section 2252.002

A governmental entity may not award a governmental contract to a nonresident bidder unless the nonresident underbids the lowest bid submitted by a responsible resident bidder by an amount that is not less than the amount by which a resident bidder would be required to underbid the nonresident bidder to obtain a comparable contract in the state in which the nonresident's principal place of business is located.

I certify that LOVE STAR ROAD CONSTRUCTION, LTD is a Resident bidder of
(Company Name)

Texas as defined in Chapter 2252 of the Government Code.

Signature: 

Print Name: DUANE HUBBLE

I certify that _____ is a Nonresident bidder as
(Company Name)

defined in Chapter 2252 of the Government Code and our principal place of business is

_____ City and State.

Signature: _____

Print Name: _____

AFFIDAVIT INSTRUCTIONS

1. If the Proposal is submitted by an individual, he shall sign the affidavit.
2. If the Proposal is submitted by a general partnership, any partner may sign the Affidavit.
3. If the Proposal is submitted by a limited partnership, any general partner acting within the scope of the document creating the limited partnership may sign the Affidavit. A CERTIFIED COPY OF SAID DOCUMENT MUST BE ATTACHED TO THE AFFIDAVIT.
4. If the Proposal is submitted by a corporation, a person authorized by the bylaws or by the Board of Directors may sign the Affidavit. A CERTIFIED COPY OF THE BYLAWS OR BOARD OF DIRECTORS AUTHORIZATION MUST BE ATTACHED TO THE AFFIDAVIT.
5. If the Proposal is submitted by a joint venture composed of individuals, any individual may sign the affidavit.
6. If the Proposal is submitted by a joint venture composed of individuals and partnerships, the Affidavit may be signed by the individual or by any general partner of any partnership, acting within the scope of the document creating the joint venture. A CERTIFIED COPY OF SAID DOCUMENT MUST BE ATTACHED TO THE AFFIDAVIT.
7. If the Proposal is submitted by a joint venture in which a corporation is a party, separate Affidavits must be executed, one by each corporation and one by each individual or partnership, each pursuant to the requirements set forth above.

AFFIDAVIT

THE STATE OF TEXAS

COUNTY OF Harris

Before me, the undersigned authority, on this day personally appeared DWANE HUBBLE

who being by me duly sworn upon oath says: that he is duly qualified and authorized to make this affidavit for and on behalf of LONE STAR ROAD CONSTRUCTION, LTD ("Contractor"), HARRIS County, TEXAS, of and is fully cognizant of the facts herein set out; that Contractor has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with the contract for the above referenced toll road project.

West Airport Overpass
[Signature], Dwane Hubble, President of Lone Star Road Construction Management LLC, its General Partner
NAME TITLE

SWORN TO AND SUBSCRIBED BEFORE ME by the said DWANE HUBBLE, this 13th day of July, 2011, to certify which witness my hand and seal of office.

Michael Salch
Notary Public in and for the

State of Texas



Owner FORT BEND GRAND PARKWAY TOLL ROAD AUTHORITY

CSJ 3510-04-046

Highway FORT BEND GRAND PARKWAY TOLL ROAD; SH 99; SECTION D

Project SECTION 4: WEST AIRPORT BOULEVARD OVERPASS

County FORT BEND

ITEM	DESC	Bid Item Description	Unit	Quantity	Bid Price	Amount
100	2002	PREPARING R-O-W	STA	49.50	\$2,500.00	\$123,750.00
104	2001	REMOVING CONC (PAV)	SY	70.00	\$156.00	\$10,920.00
104	2022	REMOVING CONC (CURB & GUTTER)	LF	880.00	\$9.00	\$7,920.00
104	2023	REMOVING (CTB)	LF	563.00	\$5.00	\$2,815.00
110	2001	EXCAVATION (ROADWAY)	CY	6621.00	\$2.50	\$16,552.50
132	2006	EMBANKMENT (FINAL) (DENS CONT) (TY C)	CY	155696.00	\$6.00	\$934,176.00
132	2036	EMBANK (FINAL) (DC) (TY E) (CSBE)	CY	12900.00	\$27.00	\$348,300.00
132	2037	EMB (FNL) (DC) (TY E) (CSBE) (RWALL FND IMPR)	CY	15617.00	\$27.00	\$421,659.00
161	2017	COMPOST MANUF TOPSOIL (BIP) (4")	SY	71076.00	\$0.75	\$53,307.00
162	2002	BLOCK SODDING	SY	2724.00	\$2.50	\$6,810.00
162	2003	STRAW OR HAY MULCH	SY	142152.00	\$0.11	\$15,636.72
164	2039	DRILL SEEDING (PERM) (URBAN) (CLAY)	SY	71076.00	\$0.10	\$7,107.60
164	2051	DRILL SEED (TEMP) (WARN OR COOL)	SY	71076.00	\$0.10	\$7,107.60
166	2011	FERTILIZER	AC	29.97	\$400.00	\$11,988.00
168	2001	VEGETATIVE WATERING	MG	3600.00	\$17.00	\$61,200.00
260	2006	LIME TRT (EXT MATL) (6")	SY	25604.00	\$1.25	\$32,005.00
260	2012	LIM (HYD, COM OR QK) (SLRY) OR QK (DRY)	TON	417.00	\$100.00	\$41,700.00

276	2224	CEM TRT (PLNT MX) (CL N) (TY E) (GR 4) (6")	SY	30658.00	\$8.50	\$260,593.00
276	2238	CEM TRT (PLNT MX) (CL N) (TY E) (GR 4) (12")	SY	5117.00	\$17.00	\$86,989.00
292	2017	ASPHALT STAB BASE (GR 4) (PG 64)	TON	1689.00	\$76.00	\$128,364.00
360	2005	CONC PVMT (CONTR REINF - CRCP) (12")	SY	28874.00	\$45.00	\$1,299,330.00
368	2001	WIDE FLANGE PAVEMENT TERMINALS	LF	160.00	\$370.00	\$59,200.00
400	2001	STRUCT EXCAV	CY	15617.00	\$2.00	\$31,234.00
400	2005	CEM STABIL BKFL	CY	3279.00	\$32.00	\$104,928.00
400	2016	CEMENT STAB BACKFILL (INLET OR MH)	CY	394.00	\$32.00	\$12,608.00
402	2001	TRENCH EXCAVATION PROTECTION	LF	3171.00	\$1.00	\$3,171.00
416	2004	DRILL SHAFT (36 IN)	LF	1488.00	\$140.00	\$208,320.00
416	2007	DRILL SHAFT (54 IN)	LF	864.00	\$275.00	\$237,600.00
420	2003	CL C CONC (ABUT)	CY	120.80	\$335.00	\$40,468.00
420	2004	CL C CONC (BENT)	CY	193.60	\$510.00	\$98,736.00
420	2016	CL C CONC (COLLAR)	EA	1.00	\$1,500.00	\$1,500.00
422	2001	REINF CONC SLAB	SF	27318.00	\$10.20	\$278,643.60
423	2004	RETAINING WALL (MSE) (FRAC FIN)	SF	67017.00	\$25.60	\$1,715,635.20
425	2068	PRESTR CONC GIRDER (TX54)	LF	3448.00	\$118.00	\$406,864.00
428	2001	CONC SURF TREAT (CLASS I)	SY	2964.00	\$2.00	\$5,928.00
432	2039	RIPRAP (MOW STRIP) (4 IN)	CY	23.00	\$200.00	\$4,600.00
432	2084	RIP-RAP (CONC) (CL B) (4")	CY	294.00	\$135.00	\$39,690.00
432	2084	STRUCTURAL STEEL (MISC NON-BRIDGE)	LB	418.00	\$5.00	\$2,090.00
450	2013	RAIL (TY SSTR)	LF	6673.00	\$25.00	\$166,825.00
454	2002	SEALED EXPANSION JOINT (4 IN) (SEJ-P)	LF	164.00	\$160.00	\$26,240.00
464	2003	RC PIPE (CL III) (18 IN)	LF	526.00	\$30.00	\$15,780.00

464	2005	RC PIPE (CL III) (24 IN)	LF	155.00	\$32.00	\$4,960.00
464	2007	RC PIPE (CL III) (30 IN)	LF	185.00	\$37.00	\$6,845.00
464	2011	RC PIPE (CL III) (48 IN)	LF	662.00	\$72.00	\$47,664.00
464	2021	RC PIPE (CL IV) (18 IN)	LF	552.00	\$30.00	\$16,560.00
464	2026	RC PIPE (CL IV) (36 IN)	LF	490.00	\$53.00	\$25,970.00
464	2027	RC PIPE (CL IV) (42 IN)	LF	245.00	\$66.00	\$16,170.00
464	2028	RC PIPE (CL IV) (48 IN)	LF	245.00	\$80.00	\$19,600.00
464	2035	RC PIPE (CL V) (18 IN)	LF	414.00	\$36.00	\$14,904.00
464	2041	RC PIPE (CL V) (42 IN)	LF	761.00	\$73.00	\$55,553.00
465	2010	INLET (COMPL) (TY AAD)	EA	18.00	\$5,500.00	\$99,000.00
465	2180	INLET (COMPL) (TY AZR) 2 GRATES	EA	19.00	\$5,100.00	\$96,900.00
476	2025	JACK BOR OR TUN PIPE (42 IN) (RC) (CL V)	LF	124.00	\$500.00	\$62,000.00
496	2002	REMOV STR (INLET)	EA	1.00	\$100.00	\$100.00
496	2007	REMOV STR (PIPE)	LF	6.00	\$17.00	\$102.00
500	2001	MOBILIZATION	LS	1.00	\$750,000.00	\$750,000.00
502	2001	BARRICADES, SIGNS & TRAFFIC HANDLING	MO	14.00	\$2,000.00	\$28,000.00
506	2016	CONSTRUCTION EXITS (INSTALL) (TY 1)	SY	835.00	\$15.00	\$12,525.00
506	2019	CONSTRUCTION EXITS (REMOVE)	SY	835.00	\$9.00	\$7,515.00
506	2031	SANDBAGS FOR EROSION CONTROL	EA	171.00	\$9.00	\$1,539.00
506	2034	TEMPORARY SEDIMENT CONTROL FENCE	LF	1000.00	\$10.00	\$10,000.00
512	2005	PORT CTB (FUR & INST) (SNGL SLP) (TY 2)	LF	3060.00	\$12.00	\$36,720.00
512	2041	PORT CTB (REMOVE) (SNGL SLP) (TY 2)	LF	3060.00	\$7.00	\$21,420.00
514	2004	PERM CONC TRF BARR (SGL SLP) (TY 1) (42")	LF	570.00	\$36.00	\$20,520.00
529	2007	CONC CURB (DOWEL)	LF	61.00	\$4.00	\$244.00


540	2001	MTL W - BEAM GD FEN (TIM POST)	LF	300.00	\$45.00	\$13,500.00
540	2011	MTL BEAM GD FEN TRANS (THRIE - BEAM)	EA	5.00	\$2,000.00	\$10,000.00
544	2001	GUARDRAIL END TREATMENT (INSTALL)	EA	5.00	\$3,000.00	\$15,000.00
662	2064	WK ZN PAV MRK REMOV (W) (4") (BRK)	LF	360.00	\$1.15	\$414.00
662	2067	WK ZN PAV MRK REMOV (W) (4") (SLD)	LF	1430.00	\$0.90	\$1,287.00
662	2099	WK ZN PAV MRK REMOV (Y) (4") (SLD)	LF	1430.00	\$0.90	\$1,287.00
666	2012	REFL PAV MRK TY I (W) 4"(SLD)(100 MIL)	LF	2314.00	\$0.90	\$2,082.60
666	2036	REFL PAV MRK TY I (W) 8"(SLD)(100 MIL)	LF	1052.00	\$1.60	\$1,683.20
666	2111	REFL PAV MRK TY I (Y) 4"(SLD)(100 MIL)	LF	3020.00	\$0.90	\$2,718.00
666	2123	REFL PAV MRK TY I (Y) 8"(SLD)(100 MIL)	LF	750.00	\$1.30	\$975.00
666	2126	REFL PAV MRK TY I (Y) 12"(SLD)(100 MIL)	LF	425.00	\$2.50	\$1,062.50
672	2010	REFL PAV MRKR TY I-A	EA	31.00	\$3.00	\$93.00
672	2017	REFL PAV MRKR TY II-C-R	EA	354.00	\$3.00	\$1,062.00
677	2001	ELIM EXT PAV MRK & MRKS (4")	LF	3220.00	\$0.20	\$644.00
677	2001	ELIM EXT PAV MRK & MRKS (6")	LF	12205.00	\$0.26	\$3,173.30
678	2001	PAV SURF PREP FOR MRK (4")	LF	23103.00	\$0.05	\$1,155.15
678	2003	PAV SURF PREP FOR MRK (8")	LF	4366.00	\$0.12	\$523.92
678	2004	PAV SURF PREP FOR MRK (12")	LF	425.00	\$0.16	\$68.00
678	2007	PAV SURF PREP FOR MRK (ARROW)	EA	2.00	\$11.00	\$22.00
678	2018	PAV SURF PREP FOR MRK (WORD)	EA	2.00	\$11.00	\$22.00
678	2037	PAV SURF PREP FOR MRK (7")	LF	1910.00	\$0.08	\$152.80
3224	2041	D - GR HMA (QCQA) TY - D SAC-A PG70-22	TON	845.00	\$75.00	\$63,375.00
6834	2001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	45.00	\$160.00	\$7,200.00
6986	2002	PREFB PV MK W/WNTY TY B (W)(4")(SLD)	LF	8929.00	\$3.00	\$26,787.00

6986	2003	PREFB PV MK W/WNTY TY B (W)(7")(BRK) CNTST	LF	1910.00	\$6.00	\$11,460.00
6986	2012	PREFB PV MK W/WNTY TY B (Y)(4")(SLD)	LF	8840.00	\$3.00	\$26,520.00
6986	9001	PREFB PV MK W/WNTY TY B (W)(8")(SLD)	LF	2564.00	\$6.00	\$15,384.00
6986	9005	PREFB PV MK W/WNTY TY B (W)(ARROW)	EA	2.00	\$415.00	\$830.00
6986	9007	PREFB PV MK W/WNTY TY B (W)(WORD)	EA	2.00	\$550.00	\$1,100.00
9200	2001	MEGAPIXEL ROBOTIC WEBCAMERA	EA	1.00	\$38,000.00	\$38,000.00

\$8,940,683.69

LONE STAR ROAD CONSTRUCTION, LTD certifies that the unit prices shown on this complete computer print-out for all of the bid items and the alternates contained in this proposal are the unit prices intended and that its bid will be tabulated using these unit prices and no other information from this print-out.

LONE STAR ROAD CONSTRUCTION, LTD acknowledges and agrees that the total bid amount shown will be read as its total bid and further agrees that the official total bid amount will be determined by multiplying the unit bid prices shown in this print-out by the respective estimated quantities shown in the proposal and then totaling all of the extended amounts.

Signed: 
Dwane Hubble, President of Hubble
Management LLC, its General Partner
Title: _____
Date: 7/13/2011

ALT	ITEM	DESC	SP	Bid Item Description	Unit	Quantity	Bid Price	Amount	Seq.
I04	509			REMOV CONC(SDWLK)	SY	266.400	\$10.000	\$2,664.00	1
				E X A M P L E					
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 ONLY 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 <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin-right: 5px;">E</div> <div style="margin-right: 5px;">→</div> <div style="display: flex; align-items: center;"> <div style="font-size: 2em; margin-right: 5px;">X</div> <div style="text-align: center; margin-right: 5px;">A M P</div> <div style="margin-right: 5px;">DLRS</div> </div> <div style="margin-left: 5px;">and No</div> <div style="margin-left: 5px;">CENTS</div> </div>	EA	9.000	1

Unit price for each plant in place

	249	014		FLEX BASE(DEL)(DENSOT)(TY A GR4 CL2) <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin-right: 5px;">E</div> <div style="margin-right: 5px;">→</div> <div style="display: flex; align-items: center;"> <div style="font-size: 2em; margin-right: 5px;">X</div> <div style="text-align: center; margin-right: 5px;">A M P</div> <div style="margin-right: 5px;">DLRS</div> </div> <div style="margin-left: 5px;">and Fifty three</div> <div style="margin-left: 5px;">CENTS</div> </div>	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) <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin-right: 5px;">E</div> <div style="margin-right: 5px;">→</div> <div style="display: flex; align-items: center;"> <div style="font-size: 2em; margin-right: 5px;">X</div> <div style="text-align: center; margin-right: 5px;">A M P</div> <div style="margin-right: 5px;">DLRS</div> </div> <div style="margin-left: 5px;">and No</div> <div style="margin-left: 5px;">CENTS</div> </div>	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)(.4KW)S <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin-right: 5px;">E</div> <div style="margin-right: 5px;">→</div> <div style="display: flex; align-items: center;"> <div style="font-size: 2em; margin-right: 5px;">X</div> <div style="text-align: center; margin-right: 5px;">A M P</div> <div style="margin-right: 5px;">DLRS</div> </div> <div style="margin-left: 5px;">and Thirty seven</div> <div style="margin-left: 5px;">CENTS</div> </div>	EA	13.000	7
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Unit price of each Roadway Illumination Assembly

EXAMPLE

EXAMPLE

EXAMPLE

EXAMPLE

FORT BEND GRAND PARKWAY TOLL ROAD AUTHORITY
FORT BEND GRAND PARKWAY (SH 99) – SEGMENT D, SECTION 4

COUNTY: FORT BEND			PROPOSAL SHEET FBGPTRA		A U T H	U S E O N L Y
	TXDOT ITEM-CODE		UNIT BID PRICE ONLY, WRITTEN IN WORDS			
ALT.	ITEM NO.	DESC. CODE		UNIT	APPROX. QUANTITIES	
	100	2002	PREPARING ROW _____ DLRS. and _____ CENTS	STA	49.50	
	104	2001	REMOVING CONC (PAV) _____ DLRS. and _____ CENTS	SY	70.00	
	104	2022	REMOVING CONC (CURB AND GUTTER) _____ DLRS. and _____ CENTS	LF	880.00	
	104	2023	REMOVING CONC (CTB) _____ DLRS. and _____ CENTS	LF	563.00	
	110	2001	EXCAVATION (ROADWAY) _____ DLRS. and _____ CENTS	CY	6621.00	
	132	2006	EMBANKMENT (FINAL) (DENS CONT) (TY C) _____ DLRS. and _____ CENTS	CY	155696.00	
	132	2036	EMBANK (FINAL) (DC) (TY E) (CSBE) _____ DLRS. and _____ CENTS	CY	12900.00	
	132	2037	EMB (FNL) (DC) (TYE) (CSBE) (RWALL FND IMPR) _____ DLRS. and _____ CENTS	CY	15617.00	

FORT BEND GRAND PARKWAY TOLL ROAD AUTHORITY
 FORT BEND GRAND PARKWAY (SH 99) – SEGMENT D, SECTION 4

COUNTY: FORT BEND			PROPOSAL SHEET FBGPTRA		A U T H	U S E O N L Y
TxDOT ITEM-CODE			UNIT BID PRICE ONLY, WRITTEN IN WORDS		UNIT	APPROX. QUANTITIES
ALT.	ITEM NO.	DESC. CODE				
	161	2017	COMPOST MANUF TOPSOIL (BIP) (4")	DLRS.	SY	71076.00
			and	CENTS		
	162	2002	BLOCK SODDING	DLRS.	SY	2724.00
			and	CENTS		
	162	2003	STRAW OR HAY MULCH	DLRS.	SY	142152.00
			and	CENTS		
	164	2039	DRILL SEEDING (PERM) (URBAN) (CLAY)	DLRS.	SY	71076.00
			and	CENTS		
	164	2051	DRILL SEED (TEMP) (WARM OR COOL)	DLRS.	SY	71076.00
			and	CENTS		
	166	2001	FERTILIZER	DLRS.	AC	29.97
			and	CENTS		
	168	2001	VEGETATIVE WATERING	DLRS.	MG	3600.00
			and	CENTS		
	260	2006	LIME TRT (EXST MATL) (6")	DLRS.	SY	25604.00
			and	CENTS		

FORT BEND GRAND PARKWAY TOLL ROAD AUTHORITY
 FORT BEND GRAND PARKWAY (SH 99) – SEGMENT D, SECTION 4

COUNTY: FORT BEND			PROPOSAL SHEET FBGPTRA	A U T H	U S E O N L Y
	TxDOT ITEM-CODE		UNIT BID PRICE ONLY, WRITTEN IN WORDS	UNIT	APPROX. QUANTITIES
ALT.	ITEM NO.	DESC. CODE			
	260	2012	LIME (HYD, COM OR QK) (SLRY) OR QK (DRY) _____ DLRS.	TON	417.00
			and _____ CENTS		
	276	2224	CEM TRT (PLNT MX) (CL N) (TY E) (GR 4) (6") _____ DLRS.	SY	30658.00
			and _____ CENTS		
	276	2238	CEM TRT (PLNT MX) (CL N) (TY E) (GR 4) (12") _____ DLRS.	SY	5117.00
			and _____ CENTS		
	292	2017	ASPHALT STAB BASE (GR 4) (PG 64) _____ DLRS.	TON	1689.00
			and _____ CENTS		
	360	2005	CONC PVMT (CONT REINF - CRCP) (12") _____ DLRS.	SY	28874.00
			and _____ CENTS		
	368	2001	WIDE FLANGE PAVEMENT TERMINALS _____ DLRS.	LF	160.00
			and _____ CENTS		
	400	2001	STRUCT EXCAV _____ DLRS.	CY	15617.00
			and _____ CENTS		
	400	2005	CEM STABIL BKFL _____ DLRS.	CY	3279.00
			and _____ CENTS		

FORT BEND GRAND PARKWAY TOLL ROAD AUTHORITY
 FORT BEND GRAND PARKWAY (SH 99) – SEGMENT D, SECTION 4

COUNTY: FORT BEND			PROPOSAL SHEET FBGPTRA	A U T H	U S E O N L Y
	TXDOT ITEM-CODE		UNIT BID PRICE ONLY, WRITTEN IN WORDS	UNIT	APPROX. QUANTITIES
ALT.	ITEM NO.	DESC. CODE			
	400	2016	CEMENT STAB BACKFILL (INLET OR MH) _____ DLRS. and _____ CENTS	CY	394.00
	402	2001	TRENCH EXCAVATION PROTECTION _____ DLRS. and _____ CENTS	LF	3171.00
	416	2004	DRILL SHAFT (36 IN) _____ DLRS. and _____ CENTS	LF	1488.00
	416	2007	DRILL SHAFT (54 IN) _____ DLRS. and _____ CENTS	LF	864.00
	420	2003	CL C CONC (ABUT) _____ DLRS. and _____ CENTS	CY	120.80
	420	2004	CL C CONC (BENT) _____ DLRS. and _____ CENTS	CY	193.60
	420	2016	CL C CONC (COLLAR) _____ DLRS. and _____ CENTS	EA	1.00
	422	2001	REINF CONC SLAB _____ DLRS. and _____ CENTS	SF	27318.00

FORT BEND GRAND PARKWAY TOLL ROAD AUTHORITY
 FORT BEND GRAND PARKWAY (SH 99) – SEGMENT D, SECTION 4

COUNTY: FORT BEND			PROPOSAL SHEET FBGPTRA		A U T H	U S E O N L Y
	TXDOT ITEM-CODE		UNIT BID PRICE <u>ONLY</u> , WRITTEN IN WORDS			
ALT.	ITEM NO.	DESC. CODE		UNIT	APPROX. QUANTITIES	
	423	2004	RETAINING WALL (MSE) (FRAC FIN) _____ DLRS. and _____ CENTS	SF	67017.00	
	425	2068	PRESTR CONC GIRDER (TX54) _____ DLRS. and _____ CENTS	LF	3448.00	
	428	2001	CONC SURF TREAT (CLASS I) _____ DLRS. and _____ CENTS	SY	2964.00	
	432	2039	RIPRAP (MOW STRIP) (4 IN) _____ DLRS. and _____ CENTS	CY	23.00	
	432	2084	RIPRAP (CONC) (CL B) (4") _____ DLRS. and _____ CENTS	CY	294.00	
	442	2048	STRUCTURAL STEEL (MISC NON - BRIDGE) _____ DLRS. and _____ CENTS	LB	418.00	
	450	2013	RAIL (TY SSTR) _____ DLRS. and _____ CENTS	LF	6673.00	
	454	2002	SEALED EXPANSION JOINT (4 IN) (SEJ - P) _____ DLRS. and _____ CENTS	LF	164.00	

FORT BEND GRAND PARKWAY TOLL ROAD AUTHORITY
 FORT BEND GRAND PARKWAY (SH 99) – SEGMENT D, SECTION 4

COUNTY: FORT BEND			PROPOSAL SHEET FBGPTRA	A U T H	U S E O N L Y
	TXDOT ITEM-CODE		UNIT BID PRICE ONLY, WRITTEN IN WORDS	UNIT	APPROX. QUANTITIES
ALT.	ITEM NO.	DESC. CODE			
	464	2003	RC PIPE (CL III) (18 IN) _____ DLRS. and _____ CENTS	LF	526.00
	464	2005	RC PIPE (CL III) (24 IN) _____ DLRS. and _____ CENTS	LF	155.00
	464	2007	RC PIPE (CL III) (30 IN) _____ DLRS. and _____ CENTS	LF	185.00
	464	2011	RC PIPE (CL III) (48 IN) _____ DLRS. and _____ CENTS	LF	662.00
	464	2021	RC PIPE (CL IV) (18 IN) _____ DLRS. and _____ CENTS	LF	552.00
	464	2026	RC PIPE (CL IV) (36 IN) _____ DLRS. and _____ CENTS	LF	490.00
	464	2027	RC PIPE (CL IV) (42 IN) _____ DLRS. and _____ CENTS	LF	245.00
	464	2028	RC PIPE (CL IV) (48 IN) _____ DLRS. and _____ CENTS	LF	245.00

FORT BEND GRAND PARKWAY TOLL ROAD AUTHORITY
 FORT BEND GRAND PARKWAY (SH 99) – SEGMENT D, SECTION 4

COUNTY: FORT BEND			PROPOSAL SHEET FBGPTRA	A U T H	U S E O N L Y
	TxDOT ITEM-CODE		UNIT BID PRICE ONLY, WRITTEN IN WORDS	UNIT	APPROX. QUANTITIES
ALT.	ITEM NO.	DESC. CODE			
	464	2035	RC PIPE (CL V) (18 IN) _____ DLRS. and _____ CENTS	LF	414.00
	464	2041	RC PIPE (CL V) (42 IN) _____ DLRS. and _____ CENTS	LF	761.00
	465	2010	INLET (COMPL) (TY AAD) _____ DLRS. and _____ CENTS	EA	18.00
	465	2180	INLET (COMPL) (TY AZR) 2 GRATES _____ DLRS. and _____ CENTS	EA	19.00
	476	2025	JACK BOR OR TUN PIPE (42 IN) (RC) (CL V) _____ DLRS. and _____ CENTS	LF	124.00
	496	2002	REMOV STR (INLET) _____ DLRS. and _____ CENTS	EA	1.00
	496	2007	REMOV STR (PIPE) _____ DLRS. and _____ CENTS	LF	6.00
	500	2001	MOBILIZATION _____ DLRS. and _____ CENTS	LS	1.00

FORT BEND GRAND PARKWAY TOLL ROAD AUTHORITY
 FORT BEND GRAND PARKWAY (SH 99) – SEGMENT D, SECTION 4

COUNTY: FORT BEND			PROPOSAL SHEET FBGPTRA	A U T H	U S E O N L Y
	TxDOT ITEM-CODE		UNIT BID PRICE ONLY, WRITTEN IN WORDS	UNIT	APPROX. QUANTITIES
ALT.	ITEM NO.	DESC. CODE			
	502	2001	BARRICADES, SIGNS AND TRAFFIC HANDLING _____ DLRS. and _____ CENTS	MO	14.00
	506	2016	CONSTRUCTION EXITS (INSTALL) (TY 1) _____ DLRS. and _____ CENTS	SY	835.00
	506	2019	CONSTRUCTION EXITS (REMOVE) _____ DLRS. and _____ CENTS	SY	835.00
	506	2031	SANDBAGS FOR EROSION CONTROL _____ DLRS. and _____ CENTS	EA	171.00
	506	2034	TEMPORARY SEDIMENT CONTROL FENCE _____ DLRS. and _____ CENTS	LF	1000.00
	512	2005	PORT CTB (FUR & INST) (SNGL SLP) (TY 2) _____ DLRS. and _____ CENTS	LF	3060.00
	512	2062	PORT CTB (REMOVE) (SNGL SLP) (TY J - J) _____ DLRS. and _____ CENTS	LF	3060.00
	514	2004	PERM CONC TRF BARR (SGL SLP) (TY 1) (42") _____ DLRS. and _____ CENTS	LF	570.00

FORT BEND GRAND PARKWAY TOLL ROAD AUTHORITY
 FORT BEND GRAND PARKWAY (SH 99) – SEGMENT D, SECTION 4

COUNTY: FORT BEND			PROPOSAL SHEET FBGPTRA	A U T H	U S E O N L Y
ALT.	TxDOT ITEM-CODE ITEM NO.	DESC. CODE	UNIT BID PRICE ONLY, WRITTEN IN WORDS	UNIT	APPROX. QUANTITIES
	529	2007	CONC CURB (DOWEL) _____ DLRS. and _____ CENTS	LF	61.00
	540	2001	MTL W - BEAM GD FEN (TIM POST) _____ DLRS. and _____ CENTS	LF	300.00
	540	2011	MTL BEAM GD FEN TRANS (THRIE - BEAM) _____ DLRS. and _____ CENTS	EA	5.00
	544	2001	GUARDRAIL END TREATMENT (INSTALL) _____ DLRS. and _____ CENTS	EA	5.00
	662	2064	WK ZN PAV MRK REMOV (W) 4" (BRK) _____ DLRS. and _____ CENTS	LF	360.00
	662	2067	WK ZN PAV MRK REMOV (W) 4" (SLD) _____ DLRS. and _____ CENTS	LF	1430.00
	662	2099	WK ZN PAV MRK REMOV (Y) 4" (SLD) _____ DLRS. and _____ CENTS	LF	1430.00
	666	2012	REFL PAV MRK TY I (W) 4" (SLD) (100MIL) _____ DLRS. and _____ CENTS	LF	2314.00

FORT BEND GRAND PARKWAY TOLL ROAD AUTHORITY
 FORT BEND GRAND PARKWAY (SH 99) – SEGMENT D, SECTION 4

COUNTY: FORT BEND			PROPOSAL SHEET FBGPTRA	A U T H	U S E O N L Y
ALT.	TxDOT ITEM-CODE ITEM NO.	DESC. CODE	UNIT BID PRICE ONLY, WRITTEN IN WORDS	UNIT	APPROX. QUANTITIES
	666	2036	REFL PAV MRK TY I (W) 8" (SLD) (100MIL) _____ DLRS. and _____ CENTS	LF	1052.00
	666	2111	REFL PAV MRK TY I (Y) 4" (SLD) (100MIL) _____ DLRS. and _____ CENTS	LF	3020.00
	666	2123	REFL PAV MRK TY I (Y) 8" (SLD) (100MIL) _____ DLRS. and _____ CENTS	LF	750.00
	666	2126	REFL PAV MRK TY I (Y) 12" (SLD) (100MIL) _____ DLRS. and _____ CENTS	LF	425.00
	672	2010	REFL PAV MRKR TY I - A _____ DLRS. and _____ CENTS	EA	31.00
	672	2017	REFL PAV MRKR TY II - C - R _____ DLRS. and _____ CENTS	EA	354.00
	677	2001	ELIM EXT PAV MRK & MRKS (4") _____ DLRS. and _____ CENTS	LF	3220.00
	677	2002	ELIM EXT PAV MRK & MRKS (6") _____ DLRS. and _____ CENTS	LF	12205.00

FORT BEND GRAND PARKWAY TOLL ROAD AUTHORITY
 FORT BEND GRAND PARKWAY (SH 99) – SEGMENT D, SECTION 4

COUNTY: FORT BEND			PROPOSAL SHEET FBGPTRA	A U T H	U S E O N L Y
ALT.	TxDOT ITEM-CODE ITEM NO.	DESC. CODE	UNIT BID PRICE <u>ONLY</u> , WRITTEN IN WORDS	UNIT	APPROX. QUANTITIES
	678	2001	PAV SURF PREP FOR MRK (4") _____ DLRS. and _____ CENTS	LF	23103.00
	678	2003	PAV SURF PREP FOR MRK (8") _____ DLRS. and _____ CENTS	LF	4366.00
	678	2004	PAV SURF PREP FOR MRK (12") _____ DLRS. and _____ CENTS	LF	425.00
	678	2007	PAV SURF PREP FOR MRK (ARROW) _____ DLRS. and _____ CENTS	EA	2.00
	678	2018	PAV SURF PREP FOR MRK (WORD) _____ DLRS. and _____ CENTS	EA	2.00
	678	2037	PAV SURF PREP FOR MRK (7") _____ DLRS. and _____ CENTS	LF	1910.00
	3224	2041	D - GR HMA (QCQA) TY - D SAC - A PG70 - 22 _____ DLRS. and _____ CENTS	TON	845.00

FORT BEND GRAND PARKWAY TOLL ROAD AUTHORITY
FORT BEND GRAND PARKWAY (SH 99) – SEGMENT D, SECTION 4

COUNTY: FORT BEND			PROPOSAL SHEET FBGPTRA	A U T H	U S E O N L Y
ALT.	TxDOT ITEM-CODE ITEM NO.	DESC. CODE	UNIT BID PRICE ONLY, WRITTEN IN WORDS	UNIT	APPROX. QUANTITIES
	6834	2001	PORTABLE CHANGEABLE MESSAGE SIGN _____ DLRS. and _____ CENTS	DAY	45.00
	6986	2002	PREFB PV MK W / WNTY TY B (W) (4") (SLD) _____ DLRS. and _____ CENTS	LF	8929.00
	6986	2003	PREFB PV MK W / WNTY TY B (W) 7" (BRK) CNTST _____ DLRS. and _____ CENTS	LF	1910.00
	6986	2012	PREFB PV MK W / WNTY TY B (Y) (4") (SLD) _____ DLRS. and _____ CENTS	LF	8840.00
	6986	9001	PREFB PV MK W / WNTY TY B (W) (8") (SLD) _____ DLRS. and _____ CENTS	LF	2564.00
	6986	9005	PREFB PV MK W / WNTY TY C (W) (ARROW) _____ DLRS. and _____ CENTS	EA	2.00
	6986	9007	PREFB PV MK W / WNTY TY C (W) (WORD) _____ DLRS. and _____ CENTS	EA	2.00
	9200	2001	MEGAPIXEL ROBOTIC WEBCAMERA _____ DLRS. and _____ CENTS	EA	1.00

Highway Fort Bend Grand Parkway Toll Road
SH 99, Segment D (Section 4)

County Fort Bend

The enclosed Texas Department of Transportation 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(s).

NOTE: For the purpose of constructing this Proposal and the attached form of Contract, the Texas Department of Transportation Standard Specifications for Construction of Highways, Streets and Bridges, as adopted by the Texas Department of Transportation on June 1, 2004, hereinafter referred to are approved and incorporated herein by reference for all purposes by the Fort Bend Grand Parkway Toll Road Authority as official specifications, together with and to be modified by the Special Provisions and Special Specifications as are listed herein.



Mary Mellbauer, PE
Brown & Gay Engineers, Inc.
Program Manager

Date: 6-20-2011

Design Section: 4

County: Fort Bend

Highway: Fort Bend Grand Parkway Toll Road (SH 99)

GENERAL NOTES

If fixed features require, the governing slopes shown may vary between the limits shown and to the extent determined by the Engineer.

Notify the Engineer immediately if discrepancies are discovered in the horizontal control or the benchmark data.

References to manufacturer's trade name or catalog numbers are for the purpose of identification only. Similar materials from other manufacturers are permitted if they are of equal quality, comply with the specifications for this project, and are approved, except for roadway illumination, electrical, and traffic signal items.

The cost for materials, labor, and incidentals to provide for traffic across the roadway and for ingress and egress to private property in accordance with Section 7.7 of the standard specifications is subsidiary to the various bid items. Restore access roadways to their original condition upon completing construction.

Clearly mark or highlight on the shop drawings, the items being furnished for this project. Submit required shop drawings in accordance with the shop drawing distribution list shown in the note for Item 5 for review and distribution.

Stencil the National Bridge Inventory (NBI) number on each existing bridge shown on these plans. The NBI number is shown above the title block for each bridge layout.

Unless otherwise shown on the plans or otherwise directed, commence work after sunrise and ensure construction equipment is off the road by sunset.

General: Site Management

Mark stations every 100 ft. and maintain the markings for the project duration. Remove the station markings at the completion of the project. This work is subsidiary to the various bid items.

Do not mix or store materials, or store or repair equipment, on top of concrete pavement or bridge decks unless authorized by the Engineer. Permission will be granted to store materials on surfaces if no damage or discoloration will result.

Personal vehicles of employees are not permitted to park within the right of way, including sections closed to public traffic. Employees may park on the right of way at the Contractor's office, equipment, and materials storage yard sites.

Assume ownership of debris and dispose of at an approved location. Do not dispose of debris on private property unless approved in writing by the Fort Bend Grand Parkway Toll Road Authority (FBGPTRA).

Control the dust caused by construction operations. For sweeping the base material in preparation for laying asphalt and for sweeping the finished concrete pavement, use one of the following types of sweepers or equal:

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Tricycle Type
Wayne Series 900
Elgin White Wing
Elgin Pelican

Truck Type - 4 Wheel
M-B Cruiser II
Wayne Model 945
Mobile TE-3
Mobile TE-4
Murphy 4042

General: Traffic Control and Construction

Schedule work so that the base placement operations follow the subgrade work as closely as practical to reduce the hazard to the traveling public and to prevent undue delay caused by wet weather.

When design details are not shown on the plans, provide signs and arrows conforming to the latest "Standard Highway Sign Designs for Texas" manual.

General: Utilities

Consider the locations of underground utilities depicted in the plans as approximate and employ responsible care to avoid damaging utility facilities. Depending upon scope and magnitude of planned construction activities, advanced field confirmation by the utility owner or operator may be prudent. Where possible, protect and preserve permanent signs, markers, and designations of underground facilities.

If the Contractor damages or cause damage (breaks, leaks, nicks, dents, gouges, etc.) to the utility, contact the utility facility owner or operator immediately.

Install or remove poles and luminaires located near overhead or underground electrical lines using established industry and utility safety practices. Consult the appropriate utility company before beginning such work.

If overhead or underground power lines need to be de-energized, contact the electrical service provider to perform this work. Costs associated with de-energizing the power lines or other protective measures required are at no expense to the FBGPTRA.

If working near power lines, comply with the appropriate sections of Texas State Law and Federal Regulations relating to the type of work involved.

Perform electrical work in conformance with the National Electrical Code (NEC) and TxDOT standard sheets.

Item 5: Control of the Work

Before contract letting, electronically generated earthwork cross-section data will be furnished free of charge to the prospective bidders on a compact high-density disk, in an ASCII print format. This will be available through the FBGPTRA Program Management Consultant. The

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earthwork cross-section data provided above is for non-construction purposes only and it is the responsibility of the prospective bidder to validate the enclosed data with the appropriate plans, specifications, and estimates for the projects.

Submit shop drawings electronically for the fabrication of items as documented in Table 1 below. Send all electronic shop drawing submittals to the FBGPTRA Program Management Consultant at pvoiles@browngay.com. References to 11 in. x 17 in. sheets in individual specifications for structural items imply electronic CAD sheets.

Table 1
2004 Construction Specification Required Shop/Working Drawing Submittals

Spec Item No.'s	Product	Submittal Required	Approval Required (Y/N)	Contractor/Fabricator P.E. Seal Required
7.8	Construction Load Analyses	Y	Y	Y
400	Excavation and Backfill for Structures (cofferdams)	Y	N	Y
403	Temporary Special Shoring	Y	N	Y
420	Formwork/Falsework	Y	N	Y
423	Retaining Walls, (calcs req'd.)	Y	Y	Y
425	Optional Design Calculations (Prstrs Bms)	Y	Y	Y
425	Prestr Concr Sheet Piling	Y	Y	N
425	Prestr Concr Beams	Y	Y	N
425	Prestr Concr Bent	Y	Y	N
426	Post Tension Details	Y	Y	N
434	Elastomeric Bearing Pads (All)	Y	Y	N
441	Bridge Protective Assembly	Y	Y	N
441	Misc Steel (various steel assemblies)	Y	Y	N
441	Steel Pedestals (bridge raising)	Y	Y	N
441	Steel Bearings	Y	Y	N
441	Steel Bent	Y	Y	N
441	Steel Diaphragms	Y	Y	N
441	Steel Finger Joint	Y	Y	N
441	Steel Plate Girder	Y	Y	N
441	Steel Tub-Girders	Y	Y	N
441	Erection Plans	Y	N	Y
449	Sign-Structure Anchor Bolts	Y	Y	N
450	Railing	Y	Y	N
462	Concrete Box Culvert	Y	Y	N
462	Concrete Box Culvert (Alternate Designs Only, calcs reqd.)	Y	Y	Y
464	Reinforced Concrete Pipe (Jack and Bore only; ONLY when requested)	Y	Y	Y
465	Pre-cast Junction Boxes, Grates, and Inlets	Y	Y	N
465	Pre-cast Junction Boxes, Grates, and Inlets (Alternate Designs Only, calcs req'd.)	Y	Y	Y
466	Pre-cast Headwalls and Wingwalls	Y	Y	N
467	Pre-cast Safety End Treatments	Y	Y	N
495	Raising Existing Structure (calcs reqd.)	Y	Y	Y
610	Roadway Illumination Supports	Y	Y	Y
613	High Mast Illumination Poles (Non-standard only, calcs reqd.)	Y	Y	Y
627	Treated Timber Poles	Y	Y	N
644	Special Non-Standard Supports (Bridge Mounts, Barrier Mounts, Etc.)	Y	Y	Y
647	Large Roadside Sign Supports	Y	Y	Y

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650	Cantilever Sign Structure Supports - Alternate Design Cals.	Y	Y	Y
650	Sign Structures	Y	Y	N
652	Highway Sign Lighting Fixtures	Y	Y	N
654	Sign Walkways	Y	Y	N
680	Installation of Highway Traffic Signals	Y	Y	N
682	Vehicle and Pedestrian Signal Heads	Y	Y	N
684	Traffic Signal Cables	Y	Y	N
685	Roadside Flashing Beacon Assemblies	Y	Y	N
686	Traffic Signal Pole Assemblies (Steel)	Y	Y	Y
687	Pedestal Pole Assemblies	Y	Y	N
688	Detectors	Y	Y	N
784	Repairing Steel Bridge Members	Y	Y	Y
SS	Prestr Concr Crown Span	Y	Y	N
SS	Sound Barrier Walls	Y	Y	N
SS	Camera Poles	Y	Y	Y
SS	Pedestrian Bridge (Calcs req'd.)	Y	Y	Y
SS	Screw-In Type Anchor Foundations	Y	Y	N
SS	Fiber Optic/Communication Cable	Y	Y	N
SS	Spread Spectrum Radios for Signals	Y	Y	N
SS	VIVDS System for Signals	Y	Y	N
SS	CTMS Equipment	Y	Y	N

Item 7: Legal Relations and Responsibilities

Do not initiate activities in a Project Specific Location (PSL), associated with a U.S. Army Corps of Engineers (USACE) permit area, that have not been previously evaluated by the USACE as part of the permit review of this project. Such activities include those pertaining to, but are not limited to, haul roads, equipment staging areas, borrow and disposal sites. Associated defined here means materials are delivered to or from the PSL. The permit area includes the waters of the U.S. or associated wetlands affected by activities associated with this project. Special restrictions may be required for such work. Assume responsibility for consultations with the USACE regarding activities, including PSLs that have not been previously evaluated by the USACE. Provide the Engineer with a copy of consultations or approvals from the USACE before initiating activities.

The Contractor may proceed with activities in PSLs that do not affect a USACE permit area if a self-determination has been made that the PSL is non-jurisdictional or if proper USACE clearances have been obtained in jurisdictional areas or have been previously evaluated by the USACE as part of the permit review of this project. The Contractor is solely responsible for documenting any determinations that their activities do not affect a USACE permit area. Maintain copies of their determinations for review by the Engineer or any regulatory agency.

Document and coordinate with the USACE, if required, before hauling any excavation from or hauling any embankment to a USACE permit area by either 1 or 2 below:

1. Restricted Use of Materials for the Previously Evaluated Permit Areas.

Document both the Project Specific Locations (PSL) and their authorization. Maintain copies for review by the FBGPTRA or any regulatory agency. When an area within the project limits has been evaluated by the USACE as part of the permit process for this project:

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- a. Suitable excavation of required material in the areas shown on the plans and cross sections as specified in the Item, "Excavation" is used for permanent or temporary fill (under the Item, "Embankment") within a USACE permit area.
 - b. Suitable embankment (under the Item, "Embankment") from within the USACE permit area is used as fill within a USACE evaluated area.
 - c. Unsuitable excavation or excess excavation, "Waste" (under the Item, "Excavation"), that is disposed of at a location approved within a USACE evaluated area.
- 2. Contractor Materials from Areas Other than Previously Evaluated Areas.**
Provide the FBGPTRA with a copy of USACE coordination or approvals before initiating any activities for an area within the project limits that has not been evaluated by the USACE or for any off right of way locations used for the following, but not limited to, haul roads, equipment staging areas, borrow and disposal sites:
- a. The Item, "Embankment" used for temporary or permanent fill within a USACE permit area.
 - b. Unsuitable excavation or excess excavation, "Waste" (under the Item, "Excavation"), that is disposed of outside a USACE evaluated area.

The total area disturbed for this project is more than 5 acres. The disturbed area in this project, the project locations in the Contract, and Contractor project specific locations (PSLs) within 1 mile of the project limits for the Contract, will further establish the authorization requirements for storm water discharges. The Contractor will obtain an authorization to discharge storm water from the Texas Commission on Environmental Quality (TCEQ) for the construction activities shown on the plans. The Contractor is to obtain required authorization from the TCEQ for Contractor PSLs for construction support activities on or off the ROW. When the total area disturbed in the Contract and PSLs within 1 mile of the project limits exceeds 5 acres, provide a copy of the Contractor NOI for PSLs on the ROW to the Engineer (to the appropriate MS4 operator when on an off-state system route) and to the local government that operates a separate storm drain system.

This project does not require a U.S. Army Corps of Engineers (USACE) Section 404 Permit before letting, but if a permit is needed during construction, assume responsibility for preparing the permit application. Submit the permit application to the FBGPTRA for approval. Once the permit application is approved, the FBGPTRA will submit it to the USACE. Assume responsibility for the requested revisions, in coordination with the FBGPTRA.

Maintain the roadway slope stability. Maintaining slope stability is subsidiary to the various bid items.

Item 8: Prosecution and Progress

Working days will be charged Sunday through Saturday, including all holidays, regardless of weather conditions, material availability, or other conditions not under the control of the Contractor. Work on national holidays will not be permitted without written permission of the Engineer.

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Item 100: Preparing Right of Way

Clean existing ditches under fill sections of undesirable materials including grass, muck, and trash. Perform this work in accordance with the Construction section of the Item, "Preparing Right of Way." This work is subsidiary to this bid Item.

The Item, "Preparing Right of Way" will be measured for payment only in those designated areas shown on the plans. Preparing right of way necessary to perform construction that is outside designated areas is subsidiary to this bid Item.

Remove abandoned utilities that are in conflict with the new utilities, at no expense to the FBGPTRA.

Remove and assume ownership of the existing ground mounted signs within the limits of roadway construction unless otherwise noted or directed. This work is subsidiary to the Item, "Preparing Right of Way."

Item 104: Removing Concrete

Removing concrete curb is paid as a separate bid item if the existing pavement on which it rests is not removed at the same time.

Item 105: Removing Stabilized Base and Asphalt Pavement

Removing curb on cement-stabilized base or on cement treatment being removed at the same time is subsidiary to this bid Item.

Item 104: Removing Concrete

Item 105: Removing Stabilized Base and Asphalt Pavement

Removing the concrete pavement material is paid under the Item, "Removing Concrete."

Removing the base material is paid under the Item, "Removing Stabilized Base and Asphalt Pavement."

Item 110: Excavation

If manipulating the excavated material requires moving the same material more than once to accomplish the desired results, the excavation is measured and paid for only once regardless of the manipulation required.

Transition the ditch grades and channel bottom widths at structure locations. Use only approved channel excavation in the embankment.

Item 132: Embankment

Before paving occurs, embankment shall be allowed to settle for four months after embankment construction is completed.

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If salvaged base is used for the embankment material, break it into small pieces to achieve the required density and to facilitate placing in the embankment. Obtain approval of the material before placing in the embankment.

Furnish Type C material with a maximum Liquid Limit (LL) of 65, a minimum Plasticity Index (PI) of 5, and composed of suitable earth material such as loam, clay, or other materials that form a suitable embankment.

The embankment material used on the project which has a Liquid Limit exceeding 45 will be tested for Liquid Limits at the rate of one test per 20,000 cu. yd. or per total quantity less than 20,000 cu. yd., unless otherwise directed. Only use material that passes the above tests.

Provide a finished grade with the top 4 in. capable of sustaining vegetation. Use fertile soil that is easily cultivated, free from objectionable material and highly resistant to erosion. This work is paid under the Item, "Topsoil."

An optional embankment source is the Fort Bend County Drainage District's (FBCDD) Big Creek, Segment 4 (from Booth Line Road to FM 2977), excavation project which has approximately 100,000 cubic yards of material available for use on this project. Preliminary testing indicates that the material proposed to be excavated meets the Type C requirements after mixing. However, the Contractor shall still be responsible for meeting the testing requirements of this item. Contractor will be responsible for surveying and excavating to lines and grades as required by FBCDD, as well as hauling. Contact Mr. Jeff Janecek, Fort Bend County Drainage District, at 281-342-2863, for additional information.

Item 161: Compost

Item 162: Sodding for Erosion Control

Item 164: Seeding for Erosion Control

Item 166: Fertilizer

Item 168: Vegetative Watering

Refer to the "Fertilizer, Seed, Sod, Straw, Compost, and Water" standard sheet for material specifications, application rates, and for watering requirements.

Item 204: Sprinkling

Perform subsidiary sprinkling as required under various other items in accordance with the Item, "Sprinkling."

Sprinkling for dust control is subsidiary to the various bid items.

Item 260: Lime Treatment (Road-Mixed)

For slurry placing, before discharging through the distributors, sufficiently agitate or mix the lime and water to place the lime in suspension and to obtain a uniform mixture.

The Engineer will observe the lime treatment that the Contractor elects to open to construction traffic immediately after compaction. If the construction traffic damages the subgrade, route the traffic off the damaged section in accordance with the standard specification. If the construction

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traffic does not damage the subgrade, cure the subgrade until other courses of material cover it. Apply these courses within 14 days with a maximum curing period of 7 days.

Place the hydrated and the commercial lime as a water suspension or slurry according to the slurry placing method shown in Section 260.4.C.2, "Slurry Placement."

Use the type of lime at particular locations as directed.

Place the quicklime dry or as a slurry.

For the dry quicklime, a spreader box is not required if the lime material is evenly distributed.

In limited areas, the Contractor may construct the lime slurry subgrade under a sequence of work in which the application, mixing, and compaction are completed in the same working day, if approved by the Engineer.

Provide documentation from certified public scales showing gross, tare, and net weights. Provide producer's delivery tickets also showing gross, tare, and net weights. Completely empty the lime trailers at the project site. The Engineer may direct the Contractor to reweigh any shipment of lime on certified scales. The cost of this operation is subsidiary to the Item, "Lime Treatment (Road-Mixed)."

The percentage of lime shown on the plans is estimated on the basis of engineering tests. If soil tests made during construction indicate properties different than those originally anticipated, the Engineer may vary the percentage of the lime to provide soil characteristics similar to those of the preliminary tests.

Mix the lime with the new base material in an approved pugmill type stationary mixer.

Item 276: Cement Treatment (Plant-Mixed)

Before placing the new base, wet and coat the vertical construction joints between the new base and the previously placed base with dry cement.

If the total thickness of the cement treatment is greater than 8 in., compact it in multiple lifts in accordance with Section 276.4.C, "Compaction." Place the courses in the same working day unless otherwise approved.

If using a 100 percent crushed stone aggregate for the proposed base or other aggregate, it must contain 4.5 percent cement based on the dry weight of the aggregate. There is no minimum compressive strength requirement for this Item.

The requirement for core drilling to determine the thickness of cement treatment is waived if using less than 500 sq. yd. at one location.

For widening the existing pavement, the Engineer may waive the requirements for preparing the subgrade by scarifying and compacting if the as-cut subgrade can be maintained to the density of the natural ground and to a uniform consistency when placing the base course. Keep the subgrade wet.

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Compact in accordance with the standard specifications and complete the finishing operations within a period of 5 hours after adding the cement to the base material.

Cure the final course of cement treatment using an asphalt distributor that distributes the approved curing material and water mixture material at a rate of 0.25 gallons per square-yard evenly and smoothly or as recommended by the manufacturer at the recommended dilution rate, under a pressure necessary for proper distribution. Provide a curing material meeting the requirements of the Item, "Asphalts, Oils, and Emulsions" for curing the cement treatment. Use the following materials for curing the courses of cement treatment:

Curing Material	Application
Water	All courses, except final course
PCE	Final course

Continue curing until placing another course or opening the finished section to traffic.

Spread the material so that the layers of base are uniform in depth and in loose density before compacting.

Type E material consists of Type A material, crushed concrete (except under flexible pavement), or Reclaimed Asphalt Pavement (RAP) meeting the requirements of the Item, "Flexible Base." If approved, the 20 percent maximum RAP limitation may be waived.

Unless otherwise directed, place the next pavement layer within 7 working days of placing the base.

If using crushed stone for the Type E material under this Item, ensure it meets the requirements for the Item, "Flexible Base," Type A, Grade 1. Texas Test Method TEX-117-E is not required for this Item.

If using Recycled Type E cement treatment under proposed flexible pavement, produce it using the existing base salvaged from within this project and salvaged asphalt concrete pavement. Do not use crushed concrete under flexible pavement.

If using Recycled Type E cement treatment under proposed concrete pavement, produce it using the existing base salvaged from within this project, salvaged asphalt concrete pavement, or crushed concrete. If using crushed concrete as an aggregate, meet the requirements of Grade 3.

If using salvaged existing base and asphalt concrete pavement as described above, size it so that all the material, except the existing individual aggregate, passes the 2-in. sieve and is of a gradation that allows satisfactory compaction. Provide salvaged material that does not contain deleterious material such as clay or organic material. Provide material passing the No. 40 sieve, defined as soil binder, with a maximum Plasticity Index of 10 and a maximum Liquid Limit of 35 when tested in accordance with test method TEX-106-E.

Item 292: Asphalt Treatment (Plant-Mixed)

If using the iron ore topsoil as the primary aggregate, meaning 80 percent or more by weight of the total mixture, the requirements for the water susceptibility test are waived.

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Mixtures containing the iron ore topsoil are exempted from test methods TEX-217-F (Part I, separation of deleterious material and Part II, decantation test for coarse aggregate) and TEX-203-F (Sand Equivalent Test).

Assume responsibility for proportioning the materials entering the asphalt mixture, regardless of the type of plant used.

Furnish the mix designs for approval.

Compact the courses to a minimum density of 95 percent of the maximum density as determined using test method TEX-126-E.

Meet the following grading requirements:

Sieve Size	Percent Passing Grade 4 (Bondbreaker)
1-3/4 in.	-
1 in.	-
1/2 in.	100
No. 4	30 - 70
No. 40	15 - 45

Physical requirements are as follows:

- Maximum Plasticity Index (PI) = 8
- Maximum Liquid Limit (LL) = 35
- Maximum Wet Ball Mill = 50 (crushed stone)
- Maximum LA Abrasion = 50 (iron ore)

If blending the materials, perform the Wet Ball Mill test for the composite aggregate.

Form the asphalt material from 3.5 to 7 percent of the mixture by weight.

For nominal aggregate size less than 0.5 in., design the mix in accordance with test method TEX 204-F. The minimum stability is 30 percent with a laboratory molded density of 96 percent plus or minus 1.5 percent.

If the layer thickness after placing is 1.25 in. or less, the bondbreaker is exempt from the in-place density control described in Section 292.4.E, "Compaction."

Item 360: Concrete Pavement

Where the pavement curb is left off for a later tie, provide the dowels or the tie bars as indicated on the paving detail sheets. The dowel bars and tie bars are subsidiary to the various bid items.

Repair portions of the concrete pavement surfaces that are damaged while in a plastic state before that area receives permanent pavement markings and opens to traffic. Perform repairs that are structurally equivalent to and cosmetically uniform with the adjacent undamaged areas. Do not repair by grouting onto the surface.

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On pavement widening, hand finishing in place of the longitudinal float will be permitted.

Where existing pavement is widened with new pavement, place the new pavement a minimum of 2 ft. wide.

Equip the batching plants to proportion by weight, aggregates and bulk cement, using approved proportioning devices and approved automatic scales.

For mono curb, the curb height transitions will be paid at the contract unit price of the larger curb height in the transition. The 2.5-in. laydown curbs for driveways will be paid at the unit price bid for the Item, "Mono Curb (6 in.)."

High-early strength cement may be used for frontage road and city street intersection construction.

Do not use limestone dust of fracture as fine aggregate.

If the concrete design requires greater than 5.5 sacks of cementitious material per cubic yard, obtain written approval. If placing concrete pavement mixes from April 1 to October 31, inclusive, use a minimum of 25 percent by weight of Class F Fly Ash.

The pay limits for concrete pavements with traffic rails extends to the outside edge or back of the traffic rail.

Perform saw cutting as shown on the plans in accordance with Section 360.4.J, "Sawing Joints." This saw cutting is subsidiary to this bid Item.

Use coarse aggregate to produce concrete with a Coefficient of Thermal Expansion (CTE) of less than 6.0×10^{-6} in/in/°F. Before construction, submit test specimens to FBGPTRA, as directed by the Engineer, for aggregate acceptance. Provide samples or test specimens as directed. FBGPTRA will perform the testing. Test results are final. Testing is required for naturally occurring aggregates.

Items 360, 420, and 421: All Concrete Items

For concrete cylinder split samples, transport the test cylinders as directed by the Engineer. Transporting the test cylinders is subsidiary to the various bid items.

The approach pavement is paid for under the Item, "Concrete Pavement."

Item 400: Excavation and Backfill for Structures

Plugging existing pipe culverts is subsidiary to the various bid items.

If Recycled Cement Treatment (Type D) is included in the plans, the following additional requirements apply:

1. Use only approved sand, crushed concrete, or salvaged base free from deleterious matter, as aggregate for cement-stabilized backfill

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2. Provide crushed concrete or salvaged base backfill material in accordance with the Item, "Cement Treatment (Plant-Mixed)(Type D)" (base or crushed concrete), except the recycled Type D material must not contain Reclaimed Asphalt Pavement (RAP).
3. For backfill material below the spring line of pipes, use cement-stabilized sand rather than Recycled Type D backfill material.
4. For the cement-stabilized sand backfill, use a minimum of 7 percent of hydraulic cement based on the dry weight of backfill material. The cement content for the crushed concrete and salvaged base is specified in the Item, "Cement Treatment (Plant-Mixed) (Type D)."
5. Place and compact the stabilized backfill material using a gradation that provides a dense mass without segregating and is impervious to passing of water.

Item 416: Drilled Shaft Foundations

Include the cost for furnishing and installing anchor bolts mounted in the drilled shafts in the unit bid price for the various diameter drilled shafts.

FBGPTRA may test using ultrasonic methods the anchor bolts for overhead sign supports, light standards, and traffic signal poles after they are installed. Replace faulty anchor bolts as directed. Do not weld the anchor bolts.

Item 420: Concrete Structures

Unless otherwise noted, use Class C concrete with an ordinary surface finish for signal, lighting, or sign structure foundations.

Item 421: Hydraulic Cement Concrete

Entrained air is required in all slip formed concrete (bridge rail, concrete traffic barrier, pavement, etc.), but is not required for other structural concrete. Adjust the dosage of air entraining agent for low air content as directed or allowed by the Engineer. If entrained air is provided where not required, only the upper limits of the Special Provision will be enforced.

Item 423: Retaining Walls

Provide a fractured fin finish on retaining walls with color as shown on plans.

Place concrete riprap mow strips for retaining walls as shown on the plans and in accordance with the Item, "Riprap." Use Class B concrete reinforced with No. 4 bars spaced at 18 in. centers each direction and placed 2 in. below the surface. This work is paid for under the Item, "Riprap."

Provide and maintain positive drainage away from the earth wall system, including the leveling pad, for the contract duration.

The following Mechanically Stabilized Earth (MSE) wall systems are approved:

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Reinforced Earth Walls
The Reinforced Earth Company
1331 Airport Freeway, Suite 302
Euleless, Texas 76010-4150
(817) 283-5503

Retained Earth Walls
Foster Geotechnical
901 North Highway 77
Hillsboro, Texas 76645
(254) 580-9100

Reinforced Soil Embankment Walls
Texas Welded Wire, Inc.
645 West Hurst Boulevard
Hurst, Texas 76053
(817) 282-4560

Tricon Retained Soil Walls
Tricon Precast, Ltd.
15055 Henry Road
Houston, Texas 77060
(281) 931-9832

Strengthened Earth Walls
Hanson Concrete Products
3500 Maple Avenue
Dallas, Texas 75219
(214) 525-5877

Strengthened Soil Walls
Shaw Technologies, Inc.
P.O. Box 271448
Flower Mound, Texas 75027
(817) 490-1924

VP Wall System
Valley Prestress Products, Inc.
P.O. Box 1367
Mission, Texas 78573
(956) 584-5701

Tensor Retaining Wall System
Tensor Earth Technologies, Inc.
5883 Glenridge Drive, Suite 200
Atlanta, Georgia 30328
(888) 828-5126

Stabilized Earth Wall
T&B Structural Systems, Inc.
6800 Manhattan Blvd.
Fort Worth, Texas 76120
(888) 280-9858 (Toll Free)

Structural Embankment Systems
Robertson Engineering, Inc.
327 North Denton Street, Suite 100
Weatherford, Texas 76088
(817) 596-7500

Item 427: Surface Finishes for Concrete

Provide a Surface Area I finish for structures. Use concrete paint for the surface finish.

Item 428: Concrete Surface Treatment

Provide a Class I surface treatment to the following elements: The upper surfaces of the bridge slab (including direct traffic culverts), bridge sidewalks and medians, and the inside face of curbs.

Item 450: Railing

Add a 3/4-in. longitudinal chamfer to the SSTR railing. Provide a continuous chamfer typically located 6 in. above the final grade. The cost of this is subsidiary to the Item, "Railing."

Design Section: 4

County: Fort Bend

Highway: Fort Bend Grand Parkway Toll Road (SH 99)

Item 464: Reinforced Concrete Pipe

Concrete collars are subsidiary to the various bid items except for those specified on the plans for stage construction, which are paid for under the Item, "Concrete Structures" as "Cl C Conc (Collar)."

Rubber gaskets are required for concrete pipe joints except for connections of safety end treatments, driveway culverts, and joints between the existing pipes and extensions.

If performing the work under the Item, "Jacking, Boring, or Tunneling Pipe or Box," use tongue and groove pipe instead of rubber gaskets at these locations.

Provide leave-outs or holes in the proposed storm drain structures and pipes for drainage during interim construction. This work is subsidiary to the various bid items.

The flowline elevations of side road structures are based on the proposed ditches. Field-verify these elevations and adjust them as necessary to meet the field conditions. Before placing these structures, prepare and submit for approval, the data (revised elevation, alignment, length, etc.) for the adjusted structures.

If groundwater is encountered while installing the storm drain system, install a suitable dewatering system to facilitate construction of the storm drains. The costs for materials and labor required to install and maintain this system are subsidiary to the Item, "Reinforced Concrete Pipe."

Item 465: Manholes and Inlets

If required on the plans, build manholes and inlets to stage 1 construction, cover with temporary pavement, and complete in a later phase of construction. This temporary covering and pavement are subsidiary to the various bid items.

If building manholes or inlets in graded areas, first construct them to an elevation at least 4 in. above the top of the highest entering pipe and cover with a wooden cover. Complete the construction of such manholes or inlets to the finished elevation when completing the grading work for such manholes or inlets. Adjust the final elevation, if required, since this elevation is approximate.

Construct manholes and inlets in paved areas to an elevation so their temporary wooden covers are flush with the surface of the base material.

Do not leave excavations or trenches open over night.

Items 496: Removing Structures

Do not permit debris resulting from the structure removal or construction activities to enter a natural or manmade waterway such as drainage channels, rivers, streams, bays, etc. Remove debris which falls into such waterways. This work is subsidiary to the Item, "Removing Structures."

Design Section: 4

County: Fort Bend

Highway: Fort Bend Grand Parkway Toll Road (SH 99)

Item 502: Barricades, Signs, and Traffic Handling

Use a traffic control plan for handling traffic through the various phases of construction. Follow the phasing sequence unless otherwise agreed upon by the Area Engineer and the Project Manager. Ensure this plan conforms to the latest "Texas Manual on Uniform Traffic Control Devices" and the latest Barricade and Construction (BC) Standard Sheets. The latest versions of Work Zone Standard Sheets WZ (BTS-1) and WZ (BTS-2) are the traffic control plan for the signal installations.

Submit changes to the traffic control plan to the Area Engineer. Provide a layout showing the construction phasing, signs, striping, and signalizations for changes to the original traffic control plan.

Furnish and maintain the barricades and warning signs, including the necessary temporary and portable traffic control devices, during the various phases of construction. Place and construct these barricades and warning signs in accordance with the latest "Texas Manual on Uniform Traffic Control Devices" for typical construction layouts.

Cover work zone signs when work related to the signs is not in progress, or when any hazard related to the signs no longer exists.

Keep the delineation devices, signs, and pavement markings clean. This work is subsidiary to the Item, "Barricades, Signs, and Traffic Handling."

If a section is not complete before the end of the workday, pull back the base material to the existing pavement edge on a 6H: 1V slope. Edge drop-offs during the hours of darkness are not permitted.

Before detouring traffic onto the mainlane shoulders, remove dirt, debris, vegetation, and other deleterious material from the surface of the shoulders. Appropriately sign the detour in an approved manner. This work is subsidiary to the various bid items.

Cover or remove the permanent signs and construction signs that are incorrect or that do not apply to the current situation for a particular phase.

Replace the overhead signs, informational signs, and exit signs to be removed, with temporary signs providing the correct information to the traveling public. Size the replacement signs and include them in the traffic control plan.

Do not mount signs on drums or barricades, except those listed in the latest Barricades and Construction standard sheets.

Use traffic cones for daytime work only. Replace the cones with plastic drums during nighttime hours.

Place positive barriers to protect drop-off conditions greater than 2 ft. within the clear zone that remain overnight.

Design Section: 4

County: Fort Bend

Highway: Fort Bend Grand Parkway Toll Road (SH 99)

If using paint and bead markings as described above, purchase the traffic paint from the open market.

Item 662: Work Zone Pavement Markings

Item 666: Reflectorized Pavement Markings

Item 6986: Longitudinal Prefabricated Pavement Markings (PPM) with Warranty

Use Type III glass beads for thermoplastic and multipolymer pavement markings.

Use a 0.100 in. (100 mil) thickness for thermoplastic pavement markings, measured to the top of the thermoplastic, not including the exposed glass beads.

For roadways with asphalt surfaces to be striped with work zone or permanent thermoplastic markings, the Contractor has the option to apply paint and beads markings for a maximum 30-day period until placing the thermoplastic markings, or until starting the succeeding phase of work on the striped area. Maintain the paint and beads markings, at no expense to the FBGPTRA, until placing the thermoplastic markings or starting the succeeding phase of work on the striped area. The work zone markings, whether paint and beads or thermoplastic, are paid under the Item, "Work Zone Pavement Markings" and the markings are paid for only once for the given phase of construction.

If using paint and bead markings as described above, purchase the traffic paint from the open market.

If the Type II markings become dirty and require cleaning by washing, brushing, compressed air, or other approved methods before applying the Type I thermoplastic markings, this additional cleaning is subsidiary to the Item, "Reflectorized Pavement Markings."

Establish the alignment and layout for work zone striping and permanent striping.

Stripe roadways before opening them to traffic.

Place pavement markings under these items in accordance with details shown on the plans, the latest "Texas Manual on Uniform Traffic Control Devices," or as directed.

Item 677: Eliminating Existing Pavement Markings and Markers

Remove existing pavement markings on concrete or asphalt surfaces by flail milling or as directed.

Item 3224: Dense-Graded Hot Mix Asphalt (QC/QA)

Use a maximum 6H:1V slope for the asphalt concrete pavement edge.

The stockpile will be the point of sampling of coarse aggregate for test method TEX-217-F (Part II, decantation).

Place the asphalt concrete pavement in courses as shown on the typical sections.

Design Section: 4

County: Fort Bend

Highway: Fort Bend Grand Parkway Toll Road (SH 99)

Do not use petroleum-based solvents in the beds of hot mix asphalt delivery vehicles.

Dilution of tack coat is not allowed.

Do not use Surface Aggregate Classification (SAC) C for this project.

For determining the Asphalt Content, only ignition ovens will be allowed.

The following two Aggregate Property Requirements are revised from those shown in Table 1 of the specifications:

- Los Angeles Abrasion, using Test Method Tex-410-A is changed to 28% max. Magnesium Sulfate Soundness, 5 cycles, using Test Method Tex-411-A is changed to 20% max.
- Also, the fine aggregate is to consist of 100% manufactured sands and screenings. Natural sands are not allowed. 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 test method Tex-408-A to verify the material is free from organic impurities.

Basis of Estimate

Item	Description	Limit and Rate	Unit
260	Lime Treatment (Road-Mixed) For materials used as subgrade ** <ul style="list-style-type: none">• Lime(HYD, COM, or QK)(SLRY) or QK(DRY)	6 % by weight based on 100 Lb. / Cu. Ft. subgrade	TON
292	Asphalt Treatment (Plant-Mixed) <ul style="list-style-type: none">• Asphalt• Aggregate	110 Lb. / Sq. Yd.-In. 5 % by weight 95 % by weight	TON
3224	Dense-Graded Hot Mix Asphalt (QC/QA) <ul style="list-style-type: none">• Asphalt• Aggregate	110 Lb. / Sq. Yd.-In. 6 % by weight 94 % by weight	TON

* For Contractor's information only (non-pay item).

** If used in existing roadway base, rate will be determined on a case by case basis.

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 June 1, 2004. Standard Specifications are incorporated into the Contract by reference and a copy may be purchased from TxDOT.

Items 1- 9	General Requirements and Covenants
Item 100	Preparing Right of Way
Item 104	Removing Concrete
Item 110	Excavation (132)
Item 132	Embankment (100)(160)(204)(210)(216)(400)
Item 161	Compost (160)
Item 162	Sodding For Erosion Control (166)(168)
Item 164	Seeding for Erosion Control (162)(166)(168)
Item 166	Fertilizer
Item 168	Vegetative Watering
Item 260	Lime Treatment (Road-Mixed) (105)(132)(204)(210)(216)(300) (310)(520)
Item 276	Cement Treatment (Plant-Mixed) (204)(210)(216)(247)(300)(310)(520)
Item 292	Asphalt Treatment (Plant Mixed) (300)(301)(320)(520)(585)
Item 360	Concrete Pavement (300)(420)(421)(438)(440)(529)(585)
Item 368	Concrete Pavement Terminals (260)(276)(292)(300)(360) (400)(420)(421)(440)(442)
Item 400	Excavation and Backfill for Structures(132)(401)(420)(421)
Item 402	Trench Excavation Protection
Item 416	Drilled Shaft Foundations (420)(421)(440)(448)
Item 420	Concrete Structures (400)(421)(426)(427)(428)(438)(440)(441)(448) (454)
Item 422	Reinforced Concrete Slab (420)(421)(424)(426)(440)
Item 423	Retaining Walls (110)(132)(400)(420)(421)(424)(440)(445)(458)(556)
Item 425	Precast Prestressed Concrete Structural Members (420)(421)(424)(426) (427)(434)(440)(442)
Item 428	Concrete Surface Treatment (427)
Item 432	Riprap (247)(420)(421)(440)
Item 434	Elastomeric Bridge Bearings
Item 442	Metal For Structures (441)(447)(448)
Item 450	Railing (420)(421)(424)(440)(540)
Item 454	Bridge Expansion Joints (442)
Item 464	Reinforced Concrete Pipe (400)
Item 465	Manholes and Inlets (400)(420)(421)(440)(471)
Item 476	Jacking, Boring, or Tunneling Pipe or Box (464)
Item 496	Removing Structures (430)
Item 500	Mobilization
Item 502	Barricades, Signs, and Traffic Handling
Item 504	Field Office and Laboratory
Item 506	Temporary Erosion, Sedimentation, and Environmental Controls (556)
Item 512	Portable Concrete Traffic Barrier (420)(421)(424)(440)(442)
Item 514	Permanent Concrete Traffic Barrier (400)(416)(420)(421)(424)(440)

	(442)(448)
Item 529	Concrete Curb, Gutter and Combined Curb and Gutter (360)(420)(421) (440)
Item 540	Metal Beam Guard Fence (421)(445)(529)(542)(544)
Item 544	Guardrail End Treatments
Item 556	Pipe Underdrains (402)(432)
Item 662	Work Zone Pavement Markings (666)(668)(672)(677)
Item 666	Reflectorized Pavement Markings (662), (677), (678)
Item 677	Eliminating Existing Pavement Markings and Markers (300)(302)

SPECIAL PROVISIONS

Special Provisions will govern and take precedence over the Specifications enumerated hereon wherever in conflict therewith. All Special Provisions are included herein.

General - FBGPTRA

- Special Provision to Item 4 – Scope of Work (FBGPTRA)
- Special Provision to Item 005-004
- Special Provision to Item 006-030
- Special Provision to Item 7 – Legal Relations and Responsibilities (FBGPTRA)
- Special Provision to Item 8 – Prosecution and Progress (FBGPTRA)
- Special Provision to Item 9 – Measurement and Payment (FBGPTRA)
- Special Provision to Item 100-002
- Special Provision to Item 132-005
- Special Provision to Item 161-006
- Special Provision to Item 164-004
- Special Provision to Item 166-001
- Special Provision to Item 247-040
- Special Provision to Item 260-002
- Special Provision to Item 300-032
- Special Provision to Item 360-007
- Special Provision to Item 368-001
- Special Provision to Item 416-001
- Special Provision to Item 420-002
- Special Provision to Item 421-035
- Special Provision to Item 424-002
- Special Provision to Item 425-001
- Special Provision to Item 428-001
- Special Provision to Item 434-003
- Special Provision to Item 440-005
- Special Provision to Item 441-006
- Special Provision to Item 442-016
- Special Provision to Item 447-002
- Special Provision to Item 448-002
- Special Provision to Item 450-001
- Special Provision to Item 464-003
- Special Provision to Item 465-001
- Special Provision to Item 500-005
- Special Provision to Item 502-033
- Special Provision to Item 506-013
- Special Provision to Item 512-002

Special Provision to Item 514-002
Special Provision to Item 540-023
Special Provision to Item 544-001
Special Provision to Item 672-034

SPECIAL SPECIFICATIONS

All Special Specifications are included herein.

Item 3224	Dense-Graded Hot-Mix Asphalt (QA/QC)
Item 6834	Portable Changeable Message Sign
Item 6986	Longitudinal Prefabricated Pavement Markings (PPM) with Warranty (677)(8094)
Item 8094	Mobile Retroreflectivity Data Collection for Pavement Markings
Item 9200	Megapixel Robotic WebCamera

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 specifications for this contract.

**FORT BEND GRAND PARKWAY TOLL ROAD AUTHORITY
SPECIAL PROVISION – GENERAL**

For this project, the following sections of the Texas Standard Specifications (“TSS”) are hereby modified with respect to the clauses cited below and no other clauses or requirements of the TSS are waived or changed hereby.

Global – All references to “State” or “Department” are replaced with “Authority.”

**FORT BEND GRAND PARKWAY TOLL ROAD AUTHORITY
SPECIAL PROVISION TO ITEM 4**

For this project, the following sections of the Texas Standard Specifications ("TSS") are hereby modified with respect to the clauses cited below and no other clauses or requirements of the TSS are waived or changed hereby.

Article 4.2. Changes in the Work The following second paragraph is inserted:

For purposes of extra work, the following individuals have the authority shown to approve extra work. The Authority has no obligation to pay for extra work unless the Contractor secures written authorization executed by the appropriate person prior to commencement of the work. Extra work may not be split or severed to avoid the requirements of this section.

Mike Stone (Operations Manager) or	
Bill Jameson (General Manager):	\$ 50,000 or less
Board of Directors:	greater than \$ 50,000

Article 4.4. Requests and Claims for Additional Compensation The Article is deleted and replaced with the following:

In the event the Contractor requests additional compensation for work not clearly covered in the contract, the contractor shall notify the Authority in writing of his intention to make a claim for additional compensation before beginning such work, within 21 days of the day Contractor knows or should have known of such claim. The Contractor must provide a written estimate of the amount of the claim or assessment of damages within 30 days of timely notice of the claim. If such notice is not given, then the Contractor waives his right to file a claim for such work. Notice of claim by the Contractor knows or should have known of such claim. Notice of such claim by the Contractor and the documentation of the cost of the claim work by Contractor shall not be construed as proof or substantiation of the validity of such claim. All such claims must be approved in writing by the Board of Directors of the Authority.

No claims for delay damages may be made nor will the Authority ever be obligated to pay delay damages. Contractor's sole remedy for damages caused by delay is an extension of the contract time. This limitation applies to delay caused by the Authority and delay caused by third parties only. Contractor will not be entitled to extension of time for delays resulting in whole or part from the Contractors actions or omissions.

Item 4 is supplemented by the addition of the following Article

Article 4.7. Change Orders. The unit prices Bid shall govern for additions to, or deductions from the Contract. If materials or labor are required for which no unit price is bid, the price shall be that reached by agreement by the Authority and the Contractor after definite evidence is furnished by the Contractor to the Authority that the price is the current prevailing price in the area. If the Authority and the Contractor cannot agree, the Engineer shall determine the price for changes.

No compensation shall be allowed under a Change Order for any person not actively engaged in the performance of the specified work.

No extra work shall be paid for without an approved Change Order prior to the start of the extra work.

If additional time is required by reason of the Change, the number of days for completion provided for in this Contract shall be adjusted at the time the Change Order is entered into, and if no adjustment is made on the Change Order form, any additional time is to be considered waived by the Contractor.

Any extension of time given shall not release the Contractor or the Surety from their Performance and Payment Bonds or from all obligations hereunder, which shall remain in full force until the discharge of the Contract.

All time limits stated in the Contract Documents are the essence of the agreement. The provisions of this Article 4.7 shall not exclude recovery of damage (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court and arbitration costs for delay by either party.)

SPECIAL PROVISION

005---004

Control of the Work

For this project, Item 005, "Control of the Work," 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 5.2 Plans and Working Drawings, is supplemented with the following:

Submit shop drawings electronically for the fabrication of structural items as documented in the "Guide to Electronic Shop Drawing Submittal" available on the internet at ftp://ftp.dot.state.tx.us/pub/txdot-info/library/pubs/bus/bridge/e_submit_guide.pdf and as directed by the Engineer for other items required by the standard specifications. References to 11 x 17 sheets in individual specifications for structural items imply electronic CAD sheets.

SPECIAL PROVISION

006---030

Control of Materials

For this project, Item, Item 006, "Control of Materials," of the Standard Specifications is amended hereby with respect to the clauses cited below, and no other clauses or requirements of this Item are waived or changed hereby.

Article 6.9. Recycled Materials is voided and replaced by the following:

The Department will not allow hazardous wastes, as defined in 30 TAC 335, proposed for recycling. Use nonhazardous recyclable materials (NRMs) only if the Specification for the Item does not disallow or restrict use. Determine if NRMs are regulated under 30 TAC 312, 330, 332, 334, or 335, and comply with all general prohibitions and requirements. Use NRMs in accordance with DMS-11000, "Evaluating and Using Nonhazardous Recyclable Materials Guidelines," and furnish all documentation required by that Specification.

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

Use materials that are free of hazardous materials as defined in Item 1, "Definition of Terms."

Notify the Engineer immediately when a visual observation or odor indicates that materials in required material sources or on sites owned or controlled by the Department may contain hazardous materials. Except in the case of Section 6.10.A.1.a, "Cleaning and Painting Steel" below, the Department is responsible for testing and removing or disposing of hazardous materials not introduced by the Contractor on sites owned or controlled by the Department as indicated below. The plans will indicate locations where paint on steel is suspected to contain hazardous materials and where regulated asbestos containing materials have been found. The Engineer may suspend work wholly or in part during the testing, removal, or disposition of hazardous materials on sites owned or controlled by the Department, except in the case of Section 6.10.A.1.a.

When a visual observation or odor indicates that materials delivered to the work locations by the Contractor may contain hazardous materials, have an approved commercial laboratory test the materials for contamination. Remove, remediate, and dispose of any of these materials found to be contaminated. Testing, removal, and disposition of hazardous materials introduced onto the work locations by the Contractor will be at the Contractor's expense. Working day charges will not be suspended and extensions of working days will not be granted for activities related to handling hazardous material delivered by the Contractor.

A. Painted Steel Requirements. As shown on the plans, existing paint on steel may contain hazardous materials. Perform work in accordance with the following:

1. Removing Paint from Steel.

- a. **Cleaning and Painting Steel.** For contracts that are primarily for painting existing steel, perform the work in accordance with Item 446, "Cleaning and Painting Steel."
 - b. **Other Contracts.** For all other projects when an existing paint must be removed to perform other work, perform paint removal work in accordance with Item 446, "Cleaning and Painting Steel" unless the paint is shown or determined to contain hazardous materials. If the paint is shown or determined to contain hazardous materials, the Department will provide for a separate contractor to remove paint prior to or during the Contract to allow dismantling of the steel for the Contractor's salvaging, reuse, or recycling or where paint must be removed to perform other work. For steel that is dismantled by unbolting, no paint stripping will be required. Use care to not damage existing paint. When dismantling is performed using flame or saw-cutting methods to remove steel elements coated with paint containing hazardous materials, the plans will show stripping locations. Coordinate with the separate contractor for stripping work to be performed during the Contract.
2. **Removal and Disposal of Painted Steel.** For Contracts where painted steel is to be removed and disposed of by the Contractor, painted steel may be reused or disposed of at a steel recycling or smelting facility. If the paint is shown or determined to contain hazardous materials, maintain and make available to the Engineer invoices and other records showing the reuse owner or for recycling, records obtained from the recycling or smelting facility showing the received weight of the steel and the facility name. Painted steel to be retained by the Department will be shown on the plans.
- B. Asbestos Requirements.** The plans will indicate locations or elements where asbestos containing materials (ACM) have been found. At these locations or at locations where previously unknown ACM has been found, the Department will arrange for abatement by a separate contractor during the Contract. For work at these locations, notify the Engineer of proposed dates of demolition or removal of structural elements with ACM at least 60 days before work is to begin to allow the Department sufficient time to abate the asbestos.

When the work by a separate contractor for removal of paint or asbestos abatement is to be performed during the Contract, provide traffic control as shown on the plans and coordinate and cooperate with the separate contractor. Continue other work detailed in the plans not directly involved in the paint removal or asbestos abatement work. Coordinate with the Department the timing of the separate contractor's work in advance in order to allow the Department to schedule work with the separate contractor. Work for the traffic control and other work will not be paid for directly but will be subsidiary to pertinent Items.

FORT BEND GRAND PARKWAY TOLL ROAD AUTHORITY
SPECIAL PROVISION TO ITEM 7
LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC

For the Work, Item 7 of the Texas Standard Specifications is hereby modified with respect to the clauses cited below and no other clauses or requirements of this item are waived or changed hereby.

Article 7.1, Laws to be Observed, is supplemented by the addition of the following:

It is the intent of the Authority that all construction work shall be accomplished with minimum disturbance and inconvenience to the public.

The operation of heavy construction equipment over adjacent streets shall be avoided to the greatest extent practicable. If such operation is unavoidable, care shall be taken to prevent the creation of any nuisance, including, but not limited to, the tracking of dirt or the blowing of dust from uncovered loads.

If sites, buildings, and locations of historical, archaeological, educational, or scientific interests are discovered after construction operations are begun, operation in that particular area shall cease immediately and the sites, buildings, or location shall be investigated or evaluated by the Fort Bend Grand Parkway Toll Road Authority (FBGPTRA). An extension of time will be granted, if necessary, for delays caused by these investigations and evaluations. It is specifically understood, however, that if the Contractor is delayed by virtue of an investigation and evaluation that this delay will not be considered as basis for claim for damages or additional compensation of any kind by the Contractor, and that an extension of time will be sole remedy of Contractor for such delay.

Article 7.4, Insurance and Bonds, is revised to read in its entirety as follows;

7.4 Insurance. The Contractor shall not commence work under any contract until he has furnished the Authority with satisfactory proof of insurance of such character and in such amounts as set forth below.

The Contractor shall purchase and maintain in full force and effect until completion of the Work and the expiration of the applicable Texas statute of limitations such insurance as will cover the obligation and liabilities of himself, his agents, employees, and subcontractors which may arise from operation under this Contract. All such insurance must be written with companies satisfactory to the Authority.

The minimum insurance required as set forth below shall also apply to all subcontractors, and it shall be the responsibility of the Contractor to ensure their compliance therewith.

The Contractor shall secure and maintain until the expiration of the applicable Texas statute of limitations, in his own name, the following minimum amount of insurance in the companies

satisfactory to the Authority and to provide the Authority with Certificates of Insurance, with original signatures:

The Contractor shall provide and maintain liability insurance which protects him from claims under Workers' Compensation Acts and from any other claims for damages of personal injury, including death. Protection will cover any claim resulting from performance of the work, whether by himself, any Subcontractor, or anyone directly or indirectly employed by either. Insurance must be maintained with a company or companies to whom the FBGPTRA has no reasonable objection.

The Contractor shall provide and maintain statutory Workers' Compensation and Employer's Liability Insurance with limits of not less than five hundred thousand dollars (\$500,000.00) for accidental injury to one or more person in any one accident or occurrence and where the compensation law does not provide for Occupational Disease, then the Employer's Liability Occupational Disease Insurance shall be provided with limits of not less than five hundred thousand dollars (\$500,000.00) per accident or occurrence. The policy shall include, when appropriate:

- a. All States endorsement, and
- b. United States Longshoremen and Harbor Workers' Compensation Act.

Contractor shall provide Comprehensive General Liability Insurance to the FBGPTRA and its employees as additional insureds. This general liability insurance will include contractual liability insurance required to meet the Contractor's obligations under the provision for indemnification.

Contractor shall provide and maintain Comprehensive General Public Liability policy covering premises and operations, contractual liability, personal injury liability, products and completed operations, and if an exposure exists, elevator liability and watercraft liability with limits of not less than two million dollars (\$2,000,000.00) per occurrence, including, where the exposure exists, coverage for blasting and explosions, blowout and crating and underground damage.

Comprehensive Automobile Liability Insurance will be provided by the Contractor. Such Comprehensive Automobile Liability Insurance shall include hired cars and non-owner coverages with limits of not less than one million dollars (\$1,000,000.00) per person and not less than two million dollars (\$2,000,000.00) per occurrence and Automobile Property Damage with limits of not less than one million dollars (\$1,000,000.00) per occurrence.

Owner's and Contractor's Protective Policy, naming the FBGPTRA as the insured, with combined single limits of \$2,000,000.00

The designation of the Contractor in this policy shall be the name of the Contractor and his/their Subcontractors.

The Comprehensive General Liability Insurance and Owner's Protection or Protective Liability Insurance Policies shall also provide coverage for legal liability arising from operations under

this Contract for property damage due to the collapse of or structural injury to any building or structure, and to any underground facilities and utilities.

Contractor shall provide Builder's Risk Insurance (Building Construction Only) to cover all storm, fire, explosion, and similar damage. The insurance will incorporate Texas Form No. 21 as currently approved by the Texas State Board of Insurance. This type will provide constant insurance at one hundred (100) percent of all insurable values as created during construction. This insurance shall include as named insureds the Fort Bend Grand Parkway Toll Road Authority, its directors, employees, and all subcontractors as their interests may appear and shall insure against loss from the perils of the fire and those risks included under "Extended Coverage". It shall include "All Risk" insurance for physical loss or damage including, without duplication of coverage, at least theft, vandalism, malicious mischief and transit damage. The Contractor shall increase limits of coverage, if necessary, to reflect estimated replacement costs. The Contractor shall be responsible for any co-insurance penalties or deductibles.

Insurance shall not be canceled or lapsed and account of partial occupancy prior to substantial completion. The insurance carrier shall include in each of the insurance policies required herein, the following statement:

"The policy will not be canceled or materially changed during the period of coverage without at least thirty (30) days prior written notice to the Fort Bend Grand Parkway Toll Road Authority, P.O. Box 546, Richmond, Texas 77406; Attention: Mike Stone".

The Fort Bend Grand Parkway Toll Road Authority, its directors, and employees shall be added as additional named insureds to all coverages required above. All policies written on behalf of the Contractor shall contain a "Waiver of Subrogation Endorsement" and the Contractor shall "Hold Harmless" the FBGPTRA.

Irrespective of the requirements as to insurance to be carried by the Contractor as provided herein, insolvency, bankruptcy, or failure of any insurance company to pay all claims accruing, shall not relieve the Contractor of any obligations herein.

Contractor and his Subcontractors and suppliers shall waive all rights against each other and the FBGPTRA, its directors, and its employees for damages caused by perils covered by insurance. This waiver shall not be effective to the extent of any loss not covered by insurance.

Contractor shall save harmless the FBGPTRA and all its representatives from all damages, expenses, suits, actions, and claims of every kind and character whatsoever which the FBGPTRA may suffer directly or indirectly due to any bankruptcy, State or Federal tax levies or liens, other legal proceedings or other matters, similar or dissimilar, affecting the Contractor in which the FBGPTRA may become in any way involved, whether related to the Contractor and/or the Contractor's performance or non-performance under the Contract. The Contractor shall not be released from said liability until the work shall have been completed and accepted by the FBGPTRA. Any unpaid monies due the said Contractor or surety on under and by virtue of his Contract may be retained by the FBGPTRA and held until all such claims have been finally resolved, either by Court action or settlement and suitable evidence to that effect furnished to the FBGPTRA.

The Contractors construction activities may require his employees, agents, subcontractors, equipment, and material deliveries to cross railroad properties and tracks.

The Contractor shall issue to owners of such railroad properties written description of planned activities and timing, shall obtain owner's permission, and shall comply with owner's insurance and other requirements. The Contractor shall conduct his operations on railroad properties in such a manner as not to interfere with, hinder or obstruct the railroad companies in any manner whatsoever in the use or operation of its/their trains or other property. Such operations on railroad properties may require the Contractor to execute a "right of entry agreement" with the particular railroad company or companies involved, and to this end the Contractor should satisfy himself as to the requirements with the railroad company and be prepared to execute such right of entry agreements with railroad companies if said companies so require. The requirements specified herein likewise relate to the Contractors' use of private and/or construction access roads crossing said railroad companies' properties.

Whenever work under the Contract involves construction activities that require the Contractor's employees, agents, subcontractors, equipment and material to cross or temporarily occupy railroad properties and tracks, the Contractor shall secure and maintain in his own name types of insurance to minimum amounts as required by owners of such railroad properties and tracks in companies satisfactory to the FBGPTRA and to the railroad companies.

Neither the approval by the FBGPTRA of any insurance supplied by a Contractor nor the failure to disapprove the insurance shall relieve the Contractor from full responsibility for liability, damage, and accidents as set forth herein.

No special payments shall be made for any insurance that the Contractor may be required to carry, but all costs thereof shall be included in the price bid for the various items included in the Proposal. Bidders shall determine all the kinds and the cost of insurance that may be required before submitting their bids and shall submit acceptable evidence of the same to the Authority pursuant to the provisions of Article 3.4, Execution of Contract, Bonds, and Certificates of Insurance.

Article 7.8. Hauling and Loads on Roadways and Structures is supplemented by the following:

D. Stockpiling of Materials. Do not store or stockpile material on bridge structures without written permission. If required, submit a structural analysis and supporting documentation by a licensed professional engineer for review by the Engineer. Permission may be granted if the Engineer finds that no damage or overstresses in excess of those normally allowed for occasional overweight loads will result to structures that will remain in use after Contract completion. Provide temporary matting or other protective measures as directed.

Article 7.12, Responsibility of Damage Claims. The article is revised as follows:

To the fullest extent permitted by laws and regulations, the Contractor agrees to indemnify and save harmless the FBGPTRA, the Project Engineer, the Section Engineer(s), Construction Phase Engineer, and their contractors, subcontractors, agents, and employees from all suits, action or

claims and from all liability and damages for any and all injuries or damages sustained by any person or property in consequence of any neglect in the performance of the contract by the Contractor and from any claims or amounts arising or recovered under the "Workers' Compensation Laws", Article 6252-19, V.T.C.S. (Texas Tort Claims Act), or any other laws. The Contractor shall further so indemnify and be responsible for all damages or injury to property of any character occurring during the prosecution of work resulting from any act, omission, neglect or misconduct on his part in manner or method of executing the work; or from failure to properly execute the work; or from defective work or materials. The Contractor shall not be released from these responsibilities until all claims have been settled and suitable evidence to that effect furnished to the FBGPTRA. The Contractor shall not be obligated to indemnify or save harmless the Project Engineer, the Section Engineer(s), Construction Phase Engineer, or their contractors, subcontractors, agents, and employees for damages caused by or resulting solely from defects in plans, designs, or specifications prepared by them or solely from the negligence of them in rendition or conduct of professional duties called for or arising out of the Contract Documents.

The Contractor's attention is directed to the fact that pipelines and other underground installations as may be shown on the plans have been taken from the best available information. There may be other pipelines or installations. The Contractor shall save harmless the FBGPTRA, Project Engineer, Section Engineer(s), Construction Phase Engineer, contractors, and subcontractors from any and all suits or claims resulting from damage by his operations to any pipeline or underground installation.

Where any gas, water, or other utility installations will be affected by the work to be carried on by the Contractor, he shall see that ample notice is given to the owners, operators, or persons in charge to the end that the prosecution of the work under this contract shall not be delayed.

If the Contractor asserts any claim or brings any type of legal action (including an original action, third-party action, or cross-claim) against any director or individual employee or agent of the FBGPTRA for any cause of action or claim for alleged negligence arising from the Contract, the Contractor will be ineligible to bid on any proposed Contract with the FBGPTRA during the pendency of the claim or legal action.

Article 7.14. Contractor's Responsibility for Work, Section B. Appurtenances is voided and replaced by the following:

B. Appurtenances.

1. Unreimbursed Repair. Except for destruction (not reusable) due to hurricanes, reimbursement will not be made for repair of damage to the following temporary appurtenances, regardless of cause:
 - signs,
 - barricades,
 - changeable message signs, and
 - other work zone traffic control devices.

Crash cushion attenuators and guardrail end treatments are the exception to the above listing and are to be reimbursed in accordance with Section 7.14.B.2, "Reimbursed Repair."

For the devices listed in this section, reimbursement may be made for damage due to hurricanes. Where the contractor retains replaced appurtenances after completion of the project, the Department will limit the reimbursement to the cost that is above the salvage value at the end of the project.

2. Reimbursed Repair. Reimbursement will be made for repair of damage due to the causes listed in Section 7.14.A, "Reimbursable Repair," to appurtenances (including temporary and permanent crash cushion attenuators and guardrail end treatments).

Article 7.14, Contractor's Responsibility for Work, is supplemented by the addition of the following paragraph:

- G. Contractor shall be responsible for any damage and/or delay to work performed by any other independent Contractor of the FBGPTRA which is proximately caused by the negligence or willful act of the Contractor, his agents, employees, subcontractors and invitees.

Article 7.15. Electrical Requirements, Section A. Definitions, Section 3. Certified Person is voided and replaced by the following:

3. Certified Person. A certified person is a person who has passed the test from the TxDOT course TRF450, "TxDOT Roadway Illumination and Electrical Installations" or other courses as approved by the Traffic Operations Division. Submit a current and valid TRF certification upon request. On June 1, 2011, Texas Engineering Extension Service (TEEX) certifications for "TxDOT Electrical Systems" course will no longer be accepted. All TRF 450 certifications that have been issued for "TxDOT Roadway Illumination and Electrical Installations" course that expire before June 1, 2011 will be accepted until June 1, 2011.

Article 7.15. Electrical Requirements, Section A. Definitions, Section 4. Licensed Electrician is voided and replaced by the following: 4. Licensed Electrician. A licensed electrician is a person with a current and valid unrestricted master electrical license, or unrestricted journeyman electrical license that is supervised or directed by an unrestricted master electrician. An unrestricted master electrician need not be on the work locations at all times electrical work is being done, but the unrestricted master electrician must approve work performed by the unrestricted journeyman. Licensed electrician requirements by city ordinances do not apply to on state system work.

The unrestricted journeyman and unrestricted master electrical licenses must be issued by the Texas Department of Licensing and Regulation or by a city in Texas with a population of 50,000 or greater that issues licenses based on passing a written test and demonstrating experience.

The Engineer may accept other states' electrical licenses. Submit documentation of the requirements for obtaining that license. Acceptance of the license will be based on sufficient evidence that the license was issued based on:

- passing a test based on the NEC similar to that used by Texas licensing officials, and
- sufficient electrical experience commensurate with general standards for an unrestricted master and unrestricted journeyman electrician in the State of Texas.

Article 7.17, Personal Liability of Public Officials, is revised to read in its entirety as follows:
7.17 Personal Liability. In carrying out provisions of the Contract Documents or in exercising any power or authority granted there under, there shall be no liability for the Project Engineer, the Section Engineer(s), Construction Phase Engineer, their respective officers, employees, subcontractors, or authorized assistants, either personally or otherwise, as they are agents and representatives of the Authority, and there shall be no liability, either personal or otherwise for any member of the Commissioners' Court, of the FBGPTRA or any of the FBGPTRA's officers, employees, or consultants. Neither the Contract Document nor FBGPTRA's or Contractor's course of conduct shall be deemed to create the relationship of principal and agent by and between the FBGPTRA and the Contractor.

Article 7.19. Preservation of Cultural and Natural Resources and the Environment is supplemented by the following:

G. Asbestos Containing Material. In Texas, 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, Subpart M (NESHAP) 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.

Provide notice to the Department of demolition or renovation to the structures listed in the plans at least 30 calendar days prior to initiating demolition or renovation of each structure or load bearing member. Provide the scheduled start and completion date of structure demolition, renovation, or removal.

When demolition, renovation, or removal of load bearing members is planned for several phases, provide the start and completion dates identified by separate phases.

DSHS requires that notifications be postmarked at least 10 working days prior to initiating demolition or renovation. If the date of actual demolition, renovation, or removal is changed, the Department will be required to notify DSHS at least 10 days in advance of the work. This notification is also required when a previously scheduled (notification sent to DSHS) demolition, renovation or removal is delayed. Therefore, if the date of actual demolition, renovation, or removal is changed, provide the Engineer, in writing, 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.

Item 7 is supplemented by the addition of the following Articles:

Article 7.20 Contractor's Responsibility of Safety. In accordance with generally accepted construction practices, the Contractor will be solely and completely responsible for conditions at the job site, including the safety of all persons and property during performance of the Work. The requirement will apply continuously and shall not be limited to normal working hours.

Article 7.21 Third Party Beneficiary. It is specifically agreed between the parties hereto that it is not intended by any of the provisions of any part of the contract or of the Contract Documents to create in the public or in any member thereof any third party beneficiary rights hereunder, or to authorize anyone not a party to the Contract to maintain a suit for personal injuries, property damage, or any other relief in law or equity pursuant to the terms and provisions of the Contract Documents. The duties, obligations, and responsibilities of the parties to this Contract with respect to third parties shall remain as imposed by law.

Article 7.22 Indemnification and Hold Harmless for Telecommunications. The contractor shall indemnify and hold harmless the FBGPTRA from and against all costs, liability, and expense whatsoever (including, without limitation, attorney's fees, court costs and expense) arising out of any act or omission of the contractor, its agents and/or employees, that causes or contributes to (1) any damage to or destruction of any telecommunications system on the FBGPTRA property, and (2) any injury to or death of any person employed by or on behalf of any telecommunications company, and/or its contractor, agents and/or employees, on the FBGPTRA property. Contractor shall not have or seek recourse against the FBGPTRA for any claim or cause of property. Contractor shall not have or seek recourse against the FBGPTRA for any claim or cause of action alleged loss of profits or revenue or loss of service or other consequential damage to a telecommunication company using the FBGPTRA's property or a customer or user of services of the fiber optic cable on the FBGPTRA's property.

REQUIRED WORKERS COMPENSATION COVERAGE

"The law requires that each person working on this site or providing services related to this construction project must be covered by workers compensation insurance. This includes persons providing, hauling, or delivering equipment or materials, or providing transportation or other services related to the project, regardless of the identity of their employer or status as an employee."

"Call the Texas Workers Compensation Commission at 512-440-3789 to receive information on the legal requirements for coverage, to verify whether your employer has provided the required coverage, or to report any employer's failure to provide coverage."

The Contractor shall contractually require each person with whom it contracts to provide services on a project, to:

- a. provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of the Texas Labor Code, Section 401.011 (44) for all of its employees providing services on the project, for the duration of all the project;
- b. provide to the contractor, prior to that person beginning work on the project, a certificate of coverage showing that coverage is being provided for all employees of the person providing services on the project, for the duration of the project;
- c. provide the contractor, prior to the end of the coverage period. A new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate ends during the duration of the project.
- d. obtain from each other person with whom it contracts, and provide the contractor:
 1. a certificate of coverage, prior to the other person beginning work on the project and
 2. a new certificate of coverage showing extension of coverage, prior to the end of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of the project;
- e. retain all required certificates of coverage on file for the duration of the project and for one year thereafter;
- f. notify the governmental entity in writing by certified mail or personal delivery, within 10 days after the person knew or should have known, of any change that materially affects the provision of the coverage of any person providing services on the project; and
- g. contractually require each person with whom it contracts, to perform as required by paragraphs (1) – (7), with the certificates of coverage to be provided to the person for whom they are providing services.

By signing this contract or providing or causing to be provided a certificate or coverage, the Contractor is representing to the governmental entity that all employees of the contractor who will provide services on the project will be covered by workers compensation coverage for the duration of the project, that the coverage will be based on the proper reporting of classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate insurance carrier or, in the case of the self-insured, with the Commission's Division of Self-Insurance Regulation. Providing false or misleading information may subject the contractor to administrative penalties, criminal penalties, or other civil actions.

The contractor's failure to comply with any of these provisions is a breach of contract by the contractor which entitles the governmental entity to declare the contract void if the contractor does not remedy the breach within ten days after receipt of notice of breach from the governmental entity.

FORT BEND GRAND PARKWAY TOLL ROAD AUTHORITY

SPECIAL PROVISION TO ITEM 8

PROSECUTION AND PROGRESS

For this project, Item 8 of the Texas Department of Transportation Standard Specifications is hereby amended with respect to the articles cited below and no other articles or requirements of this Item are waived or changed hereby.

Article 8.1, Prosecution of Work, is revised by removing the first three sentences and replacing as follows:

8.1 Prosecution of Work. Prior to beginning construction operations, a preconstruction conference between the Contractor and the Engineer will be conducted. Prior to the preconstruction conference, The Contractor shall submit to the Engineer a preliminary CPM progress schedule which details the first 100 days of the contract in accordance with the requirements of Article 8.2, Progress Schedules. Within 30 calendar days following the preconstruction conference, the contractor shall submit the final version of the Contract Schedule. If the contractor fails to submit the initial schedule within the 30 days, the Engineer may withhold \$1,000 per day until an initial (baseline) schedule that complies with the specifications is submitted. The engineer will review the schedule within 7 days, and determine if the schedule is acceptable. If the schedule is not acceptable, the contractor will have 7 days to make the necessary changes. If the contractor fails to submit the revised and corrected initial schedule within the 30 days, the Engineer may withhold \$1,000 per day until an initial schedule that complies with the specifications is submitted.

Article 8.2B, Construction Contracts, is revised to read in its entirety as follows:

8.2B Construction Contracts. The Contractor must furnish a Critical Path Method schedule. Each schedule submittal must be accompanied by an electronic backup copy of the schedule. Schedules must be submitted at least monthly and must accompany each pay application. The schedule shall include all planned work activities and sequences. The initial schedule must utilize all of the contract time allowed in the contract. The schedule should incorporate major material procurements including preparation of shop drawings, submittals, fabrication and delivery of long lead items, known utility relocations, and other activities that may affect the completion of the Contract in the progress schedule. Each activity will be assigned a dollar value, the sum of which shall be equal to the adjusted contract value. The schedule activities must generally have durations shorter than one month and the work divided into discrete increments to allow easy identification of the specific task and simplify the updating process.

The Contractor may use Phoenix CPM Scheduling Software or Primavera P6. Schedules prepared and submitted in any other format will not be accepted.

The Engineer may require the Contractor to develop more detailed schedules for certain phases of the project such as major traffic changes, work requiring lane closures, or recovery schedules if the project falls behind schedule etc.

The contractor must provide a person proficient in CPM analysis to create and maintain the project schedule and be available when requested to meet with the Owner's Representative.

The CPM schedule must generally comply with construction industry standards as presented in "CPM in Construction" by James J. O'Brien or the AGC Guide to "Construction Planning and Scheduling". The schedule must have a clearly identifiable Critical Path. The Critical Path is defined as the longest path. It is the Fort Bend Grand Parkway Toll Road Authority's (the Authority) intention to conduct regular schedule update and review meetings with the Contractor to identify potential conflicts and opportunities on the project. The schedules submitted throughout the project will be essential elements in any delay claim.

The project schedule shall include but is not limited to the following:

- Begin the project schedule on the start date of contract time or start of compensable work on the project, whichever occurs first;
- Show the sequence and interdependence of activities required for complete performance of the work;
- Ensure all work sequences are logical and show a coordinated plan of the work;
- Show a predecessor and successor for each activity
- Clearly and accurately identify the critical path as the longest continuous path
- Provide a legend for all abbreviations and include the schedule filename, run date, data date, project start date, and project completion date in the title block of each schedule submittal;
- Through the use of calendars, incorporate seasonal weather conditions into the schedule for work (e.g., earthwork, concrete paving, structures, asphalt, drainage, etc.) that may be influenced by temperature or precipitation. Also, incorporate non work periods such as holidays, weekends, or other non-work days as identified in the Contract;
- No constraints or negative lags will be allowed.
- Show submittal and procurement periods.

For each activity on the project schedule provide:

- A logical activity number utilizing an alphanumeric designation system tied to the sequence of work and traffic control plans;
- A concise description of the work represented by the activity;
- An activity duration in days;
- The estimated quantity of work;

- Plan and incorporate resources, such as crews and heavy equipment, for each activity. Accurately represent the planned labor and equipment hours necessary to achieve the estimated productivity rates;
- Code the activities so that organized plots of the schedule may be produced;

The project schedule will be maintained for use by both the contractor and the Engineer. It will become an as-built record of the daily progress achieved on the project. In order to maintain an accurate as-built record of each activity, the actual start dates and finish dates must be recorded contemporaneously as they occur. If continuous progress of an activity is interrupted for any reason except non-work periods, such as holidays, weekends, or interference from temperature or precipitation, then the activity will be broken into a subsequent activity (or activities, based on the number of interruptions) similarly numbered with successive alpha character as necessary. The original duration of the subsequent activity will be that of the remaining duration of the original activity. Relationships of the subsequent activity will match those of the original activity so that the integrity of the project schedule logic is maintained. Once established the original durations and actual dates of all activities will remain unchanged.

Revisions to the schedule may be made as necessary. The project schedule shall be revised when changes in construction phasing and sequencing, changes in Traffic Control Plan, or other changes that cause deviation from the original project schedule occur. Any revisions to the schedule must be listed in the monthly updated narrative with the purpose of the revision and description of the impact on the schedule's critical path and project completion date.

The cut-off day for recording monthly progress will be established by the Project Engineer. Submit the updated schedule no later than the 1st work day of the following month.

A monthly update narrative will be included in the monthly schedule update. This narrative should include but is not limited to the following:

- The status of the project completion date, listing reasons why any change may have occurred;
- List all activities that have been added, deleted, or otherwise changed in the schedule with explanations for the modifications and description of the impacts each has on the project schedule;
- Any revisions that may have been performed to the schedule, providing the purpose of the revision and description of the impact to the project critical path and completion dates; and
- The status of the critical path, explaining reasons for any changes in critical path, impacts to the critical path that occurred during the period represented, or identifying any potential impacts that may occur in the next 3 months, including but not limited to material deliveries, utility and right way clearances, or other potential impacts.

No direct compensation will be made for fulfilling these requirements, as this work is considered subsidiary to the Item 500-2001, Mobilization. If the contractor does not submit the monthly schedule update by the 1st workday of the following month, the Engineer may withhold \$1,000 per day until an updated schedule that complies with the specifications is submitted.

Any amounts withheld by the Engineer for failure to comply with any part of Article 8.2 may be deducted from the Contract Amount by the Engineer at his discretion.

Article 8.3, Computation of Contract Time for Completion, is revised to read in its entirety as follows:

8.3 Computation of Contract Time for Completion. Time is of the essence of this Contract. All references to days are references to calendar days unless expressly stated otherwise. Calculation of Contract Time will commence on the Notice to Proceed date and run continuously for the duration of the contract.

The Contractor must achieve Substantial Completion within the contract duration specified.

The Contractor must achieve Final Completion no more than the number of days specified by the Engineer from the date of Substantial Completion.

Work shall begin on the date fixed in the Contract requisition. It shall be prosecuted regularly and without interruption until completion. The entire work shall be finished and fully completed to the satisfaction of the Engineer in **FOUR HUNDRED (400) CALENDAR DAYS.**

Article 8.5, Failure to Complete Work on Time, is revised to read in its entirety as follows:

8.5 Failure to Complete Work on Time. Failing to achieve Final Completion within the days specified by the Engineer the Contractor will be assessed liquidated damages of \$1,500 per day which will be withheld from any amount owed the Contractor. If the amount owed the Contractor is insufficient to withhold the amount, the Contractor shall pay the difference to the Authority.

The Project, of which the Work forms an essential part, is to be operated as a controlled access toll road project, and delay in completion of the Work of this Contract will cause delay in opening the Project to traffic and will cause losses to the Authority, including, but not limited to, lost revenue, interest on monies borrowed, increased administrative, legal and engineering costs, and other tangible and intangible losses. The liquidated damages set forth above are to cover partially such losses and expenses.

The Engineer may waive the collection of liquidated damages if the Work in its entirety, or any portion of the Work for which a date of completion is stipulated, has been substantially completed within the prescribed time of completion therefore.

If the Contractor fails to complete the Work within the time fixed by the Contract, or extensions thereof, and if the Engineer shall, nevertheless, permit the Contractor to continue and complete same, such permission shall neither modify nor waive any liability of the Contractor for damages arising from non-completion of the Work within the said time, but all such liabilities shall continue in full force against the Contractor

Item 8 is supplemented by the addition of the following Article:

8.11 Extension of Time - Control of the contract duration, completion date, and contract amount are essential elements of this contract and shall only be adjusted in writing by Change Order. A

Change Order amending the contract duration and the contract completion date or the contract amount shall only be considered after the Contractor has made such a request in a timely manner accompanied by proper documentation supporting such a request. The contract duration, completion date, and amount may not be adjusted by any other means.

Reasons for adjustment. The Engineer will consider adjustment of the contract duration, completion date, and contract amount for any changed condition or event which in the sole opinion of the Engineer is beyond the control of the Contractor; could not have been reasonably foreseen; and impacts the longest path on the properly prepared and submitted CPM schedule for the project.

Longest Path. Extensions of time will be granted only to the extent the changed conditions impact the longest path of the properly prepared CPM schedule. No extension of time will be granted for any change that does not impact the longest path, nor will any extension of time be granted for that portion of any delay event that is absorbed by float within the schedule.

Delays affecting activities not on the longest path by definition can not affect the completion date of the project and will not be considered as a reason to adjust the contract duration or the contract completion date but may be considered for cost impacts. In cases of non-critical delays the Contractor must provide timely documentation of the condition giving rise to the non-critical delay and documentation on the how the delay is causing the cost impact. All notice requirements contained in this provision pertain equally to critical as well as non-critical impacts without exception.

Timely notice of any impact is an essential element of this contract. The Contractor must provide the Engineer with notice of any delay which may impact the project completion date or impact cost within 7 calendar days from the commencement of the delay, or 7 calendar days from the date the Contractor should have reasonably been aware of the delay. Initial notice of the delay must be in writing and must generally describe the event or condition causing the delay and must specifically identify the schedule activities by activity ID and description which are being impacted, and generally the types and amounts of cost per day being incurred. The Contractor's initial notice shall also provide a brief explanation of why an alternative construction sequence eliminating or minimizing the delay is not possible or practical. This initial notice may be a letter containing all of the elements described above. The Engineer may request an immediate schedule review meeting with the Contractor upon notice of any delay to review the current CPM schedule and consider all possible alternatives.

FAILURE TO PROVIDE WRITTEN NOTICE WITHIN 7 CALENDAR DAYS OF THE COMMENCEMENT OF ANY DELAY MAY RESULT IN THE DENIAL OF ANY REQUEST FOR AN ADJUSTMENT TO THE CONTRACT DURATION, COMPLETION DATE, OR CONTRACT AMOUNT RESULTING FROM THAT DELAY.

The Impact of the Delay will be evaluated using the Time Impact Analysis method. A Time Impact Analysis consists of the following steps:

Step 1. Establish the status of the project immediately prior to the delay event or impact, or as near as practical prior to the commencement of the delay.

Step 2. Using the schedule produced in Step 1, add an activity to the schedule for the delay event with an estimated duration, or the actual duration of the delay event in the case of delay which has ended. Logically connect the added activity representing the delay event to the appropriate predecessor and successor activities to determine the impact to the completion date.

Step 3. Track the effects of the impact on the schedule during the occurrence by progressing the schedule monthly including the delay activity included in Step 2.

Step 4. Immediately after the conclusion of the delay event, or as near as practical after the delay event has ended, establish the status of the project and provide details identifying any mitigating actions or circumstances used to keep the project ongoing during the impact period.

Submit Step 1 and 2 with the Notice of Potential Time Impact. Incorporate Step 3 into schedule updates until impact is complete. Submit Step 4 with the Final Documentation, no later than 10 days after the completion of the impact.

Determine the time impact by comparing the status of the work prior to the impact (Step 1) to the prediction of the effect of the impact (Step 2), and to the actual effects of the impact once it is complete (step 4). All four steps of the Time Impact Analysis shall be completed before consideration of a Contract time extension or adjustment of milestone date will be provided.

Final Documentation. After the delay event or condition has ended the Contractor has 10 days to prepare and submit the final documentation of the impact of the delay including all cost impacts. An additional 30 days to prepare the final statement of impacts may be granted by the Engineer if requested by the Contractor in writing prior to the conclusion of the initial 10 day period. This documentation shall include a concise Time Impact Analysis Statement prepared using the submitted CPM schedules and a statement of all additional costs incurred as a result of the delay event or condition with backup documentation to support the claimed cost.

FAILURE TO PROVIDE WRITTEN DOCUMENTATION OF THE TIME AND COST IMPACT OF ANY DELAY WITHIN 10 DAYS OF THE CONCLUSION OF ANY DELAY MAY RESULT IN THE SUBSEQUENT DENIAL OF ANY REQUEST FOR AN ADJUSTMENT TO THE CONTRACT COMPLETION DATE OR COST IMPACTS.

END OF SPECIAL PROVISION

FORT BEND GRAND PARKWAY TOLL ROAD AUTHORITY

SPECIAL PROVISION TO ITEM 9

MEASUREMENT AND PAYMENT

For the project, Item 9, "Measurement and Payment", of the Standard Specifications, is hereby modified with respect to the clauses cited below and no other clauses or requirements of this Item are waived or changed hereby.

Article 9.5 A. Labor is revised to read in its entirety as follows:

The Contractor will receive an additional 15% as compensation based on the total wages paid said laborers and foremen. For cost of premiums on public-liability and workers compensation insurance, social security and unemployment insurance taxes, an amount equal to 55 percent of the sum of the labor cost, excluding the 15 percent compensation provided above, will be paid to the Contractor.

Article 9.5 C. Materials is revised to read in its entirety as follows:

The Contractor will receive the actual cost, including freight charges, of the materials used on such work to which cost will be added a sum equal to 15 percent thereof as compensation.

Article 9.6, Progress Payments. The first paragraph is voided and replaced by the following:

Once each month on a set day agreed to at the beginning of the contract, the Contractor shall provide the Engineer with his monthly estimate for quantities installed during the preceding month and the value thereof at the Contract unit prices.

In addition to the above, an estimate shall be made and included for acceptable structural steel, concrete members or units, and certain other structural components, and the Contractor shall furnish an affidavit that the material is stored in a bonded facility approved by the Fort Bend Grand Parkway Toll Road Authority (FBGPTRA). The estimate shall be made and included for 75 percent of the invoice material cost and invoice freight cost of materials involved after the Contractor has furnished the engineer with a copy of the paid invoices. Only materials requiring approved shop drawings, or where shop drawings are permitted due to quantities of units or because of stage construction, which are completely constructed and/or fabricated on the Contractor's order for a specific project, and on which an approved Test Report has been issued are eligible.

The Contractor shall submit, with each request for partial payment, an updated and current backup copy of the CPM Schedule per the Special Specification for CPM Schedules, 1310. No request for payment will be processed without the appropriate schedule update.

Article 9.8 Final Payment. The following paragraphs are added:

The Contractor shall after completion of his contract submit his final estimate for quantities installed during the construction period and the value thereof at the Contract unit prices.

The Engineer shall approve and submit the final estimate to the Commissioners' Court and the County shall at such time or within thirty (30) days from and after the date of said estimate as the County may elect, pay the entire sum so found to be due after audit and approval by the County Auditor, after deducting therefrom all previous payments and all amounts to be kept and all amounts to be retained under the provisions of the Contract. All prior partial estimates and payments shall be subject to correction in the final estimate and payment. It is mutually agreed between the parties to the Contract that no estimate or payment made under the Contract, except the final payment, shall exclude any claim of the County or shall constitute conclusive evidence of acceptable performance of the Contract either wholly or in part by the County; and no payments shall be construed to be an acceptance of any defective work or improper materials, or a release from any claims for damages. The Contractor hereby further agrees that the payment of the final amount due under the Contract and adjustment and payment of the bill rendered for any work done in accordance with any alterations to the Contract on a Change In Contract form shall release the County and the Engineer from any and all claims or liability on account of work performed under the Contract or alterations thereof. The Contractor agrees to examine the final estimate and, if he finds it correct, to execute thereon his release in full of all claims due by Fort Bend County, and to certify under oath to the payment by him of all claims against him for labor, materials, and supplies furnished by the Contractor by all persons and firms in the performance of the Contract.

Item 9 is supplemented by the addition of the following Article:

Article 9.10 Tax Exemptions. The bidder obligates himself, if awarded the Contract, to use reasonable diligence to obtain for the FBGPTRA any and all exemptions from State or Federal excise or other tax if required to pay such taxes or if such taxes are paid, to assist the FBGPTRA in any necessary way to obtain refund of such taxes so paid and to execute any required documents necessary to obtain refunds or to assert such exemptions.

SPECIAL PROVISION

100--002

Preparing Right of Way

For this project, Item 100, "Preparing Right of Way," 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 100.4. Payment. The second paragraph is voided and replaced by the following:

Total payment of this Item will not exceed 10% of the original contract amount until final acceptance. The remainder will be paid on the estimate after the final acceptance under Article 5.8, "Final Acceptance."

SPECIAL PROVISION**132---005****Embankment**

For this project, Item 132, "Embankment," 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 132.2. Materials is supplemented with the following:

- **Type E.** Cement stabilized material consisting of Type C select backfill meeting the requirements of Article 423.2.C.2. Table 2. Select Backfill Gradation Limits and hydraulic cement meeting the requirements of DMS-4600, "Hydraulic Cement," and the Department's Hydraulic Cement Quality Monitoring Program (HCQMP). Sources not on the HCQMP will require testing and approval before use.

Article 132.2. Materials. The last paragraph is voided and not replaced.

Article 132.3.C. Embankment Adjacent to Culverts and Bridges is voided and replaced by the following:

Article 132.3.C. Embankment Adjacent to Culverts and Bridges. Except as noted below, in Article 132.3.D, compact embankments adjacent to culverts, under bridge approach slabs, and adjacent to abutments where using Wide Flange Terminal Anchorage systems but not cement stabilized embankment, in accordance with Item 400, "Excavation and Backfill for Structures."

Article 132.3.D. Compaction Methods. The first paragraph is supplemented by the following:

When cement stabilized backfill embankment, reinforced volume embankment, retaining wall foundation improvements, or embankment foundation improvements are shown on the plans, compact each layer to the required density, in accordance with Article 276.4.C, "Compaction."

Article 132.3. Construction is supplemented with the following:

G. Cement Stabilized Backfill Embankment (CSBE). Provide Type E material for cement stabilized backfill embankment. Place CSBE for embankments, retaining wall foundation improvements, embankment foundation improvements and backfill material placed between the reinforced volume of retaining walls in accordance with the requirements of Article 423.2.C.4, "Cement Stabilized Backfill" at the locations shown on the plans or as directed.

Article 132.5. Payment. The first paragraph is 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 "Embankment (Final)," "Embankment (Original)," or "Embankment (Vehicle)," of the compaction method and type specified. Where Cement Stabilized Backfill Embankment (CSBE) is shown on the plans, it will be paid for at the unit price bid for "Embankment (Final) (CSBE)," "Embankment (Final)(CSBE)(Retaining Wall Foundation Improvement)," "Embankment (Final)(CSBE)(Embankment Foundation Improvement)," or "Embankment (Final)(CSBE) (Reinforced Volume of Retaining Walls) of the compaction method and type shown on the plans. When the embankment adjacent to the cement stabilized reinforced volume is not cement stabilized, the cement stabilized reinforced volume will be paid as "Embankment (Final)" of the compaction method and type shown on the plans. This price is full compensation for all cement, cement treatment and stabilization, furnishing embankment, hauling, placing, compacting, curing, finishing, and reworking; disposal of waste material; and equipment, labor, tools, and incidentals.

SPECIAL PROVISION

161--006

Compost

For this project, Item 161, "Compost," 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 161.2. Materials. Table 1 and following two paragraphs are voided and replaced by the following:

**Table 1
Physical Requirements for Compost**

Property	Test Method	Requirement
Particle Size	TMECC' 02.02-B, "Sample Sieving for Aggregate Size Classification"	95% passing 5/8 in. 70% passing 3/8 in.
Heavy Metals Content	TMECC 04.06, "Heavy Metals and Hazardous Elements": 04.06-As, Arsenic 04.06-Cd, Cadmium 04.06-Cu, Copper 04.06-Pb, Lead 04.06-Hg, Mercury 04.06-Mo, Molybdenum 04.06-Ni, Nickel 04.06-Se, Selenium 04.06-Zn, Zinc	Pass
Salinity	TMECC 04.10-A, "1:5 Slurry Method, Mass Basis"	5.0 dS/m Max ²
pH	TMECC 04.11-A, "1:5 Slurry pH"	5.5-8.5
Maturity	TMECC 05.05-A, "% Emergence and Relative Seedling Vigor"	> 80%
Organic Matter Content	TMECC 05.07-A, "Loss-On-Ignition Organic Matter Method"	25-65% (dry mass)
Stability	TMECC 05.08-B, "Carbon Dioxide Evolution Rate"	≤8
Fecal Coliform	TMECC 07.01-B, "Fecal Coliforms"	1,000 MPN/g Max

1. "Test Methods for the Examination of Composting and Compost," published by the United States Department of Agriculture and the USCC.

2. A soluble salt content up to 10.0 dS/m for compost used in compost-manufactured topsoil will be acceptable.

Maintain compost in designated stockpiles at the producer's site. The Department reserves the right to sample compost at the jobsite. Material may be tested to verify compliance with this Specification by an STA-certified lab. Make payment to the STA-certified lab approved by the Department. Submit lab invoices for passing tests to the Department for reimbursement. Maintain a complete record of all test reports for the previous and current calendar year.

SPECIAL PROVISION

164---004

Seeding for Erosion Control

Item 164, "Seeding for Erosion Control," 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 164.2.D. Cellulose Fiber Mulch is voided and replaced by the following:

Use only bonded fiber matrix that are on the approved list published in "Field Performance of Erosion Control Products," available from the Maintenance Division. Use material of the class and type as shown on the plans and provide a copy of the manufacturer's label for the selected product.

Article 164.3. Construction. The following is added after the first sentence:

Use approved equipment to vertically track the seedbed as shown on the plans or as directed by the Engineer.

Article 164.3.C. Cellulose Fiber Mulch Seeding is voided and replaced by the following:

C. Bonded Fiber Matrix Seeding. Plant seed according to Section 164.3.A, "Broadcast Seeding". Immediately after planting the seed or seed mixture, apply the bonded fiber matrix uniformly over the seeded area using suitable equipment. Applications should be made in accordance to the Product Installation Sheet published in "Field Performance of Erosion Control Products" available from the Maintenance Division.

Article 164.5. Payment is voided and replaced by the following:

The work performed and the materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Broadcast Seeding (Perm)" of the rural or urban seed mixture and sandy or clay soil specified, "Broadcast Seeding (Temp)" of warm or cool season specified, "Straw or Hay Mulch Seeding (Perm)" of the rural or urban seed mixture and sandy or clay soil specified, "Straw or Hay Mulch Seeding (Temp)" of warm or cool season specified, "Bonded Fiber Matrix Seeding (Perm)" of the rural or urban seed mixture and sandy or clay soil specified, "Bonded Fiber Matrix Seeding (Temp)" of warm or cool season specified, "Drill Seeding (Perm)" of the rural or urban seed mixture and sandy or clay soil specified, "Drill Seeding (Temp)" of warm or cool season specified, and "Straw or Hay Mulching." This price is full compensation for furnishing materials, including water for hydro-seeding and hydro-mulching operations, mowing, labor, equipment, tools, supplies, and incidentals. Fertilizer will not be paid for directly but will be subsidiary to this Item. Water for irrigating the seeded area, when specified, will be paid for under Item 168, "Vegetative Watering."

SPECIAL PROVISION

166---001

Fertilizer

Item 166, "Fertilizer," 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 166.2. Materials is voided and replaced by the following:

Use a complete fertilizer containing nitrogen (N), phosphoric acid (P), and potash (K) nutrients unless otherwise specified on the plans. At least 50% of the nitrogen component must be a slow-release sulfur coated urea. Ensure that fertilizer is in an acceptable condition for distribution in containers labeled with the analysis. Fertilizer is subject to testing by the Texas A&M Feed and Fertilizer Control Service in accordance with the Texas Fertilizer Law.

Article 166.3. Construction is voided and replaced by the following:

Deliver and apply the complete fertilizer uniformly at a rate equal to 60 lb. of nitrogen per acre or at the analysis and rate specified on the plans.

Apply fertilizer as a dry material and do not mix with water to form a slurry.

Incorporate fertilizer during seedbed preparation as specified in the plans.

SPECIAL PROVISION**247---040****Flexible Base**

For this project, 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.

Article 247.2. Materials, Section A. Aggregate, Table 1. Material Requirements is replaced by the following:

Table 1
Material Requirements

Property	Test Method	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Master gradation sieve size (cumulative % retained)	Tex-110-E				As shown on the plans	
2-1/2 in.		-	0	0		0
1-3/4 in.		0	0-10	0-10		0-5
7/8 in.		10-35	-	-		10-35
3/8 in.		30-50	-	-		35-65
No. 4		45-65	45-75	45-75		45-75
No. 40		70-85	60-85	50-85		70-90
Liquid Limit, % max. ¹	Tex-104-E	35	40	40	As shown on the plans	35
Plasticity Index, max. ¹	Tex-106-E	10	12	12	As shown on the plans	10
Plasticity index, min. ¹						
Wet ball mill, % max. ²	Tex-116-E	40	45	-	As shown on the plans	40
Wet ball mill, % max. increase passing the No. 40 sieve		20	20	-	As shown on the plans	20
Classification, max. ³	Tex-117-E	When shown on the plans	When shown on the plans	-	As shown on the plans	-
Min. compressive strength, psi	Tex-117-E				As shown on the plans	
lateral pressure 0 psi		45	35	-		-
lateral pressure 3 psi		-	-	-		90
lateral pressure 15 psi		175	175	-		175

1. Determine the plastic index in accordance with Tex-107-E (linear shrinkage) when liquid limit is unattainable as defined in Tex-104-E.

2. When a soundness value is required by the plans, test material in accordance with Tex-411-A.

3. When Classification is required by the plans, a triaxial Classification of 1.0 or less for Grades 1 and 2.3 or less for Grade 2 is required. The Classification requirement for Grade 4 will be as shown on the plans.

Article 247.2. Materials, Section A. Aggregate, Section 3. Recycled Material, Section b. Recycled Material (Including Crushed Concrete) Requirements, Section (1), Contractor Furnished Recycled Materials is supplemented by the following:

Provide recycled materials that have a maximum sulfate content of 3000 ppm when tested in accordance with Tex-145-E.

Article 247.4. Construction, Section C. Compaction is supplemented by the following:

Before final acceptance, the Engineer will select the locations of tests and measure the flexible base depth in accordance with Tex-140-E when Complete in Place measurement is specified. Correct areas deficient by more than 1/2 in. in thickness by scarifying, adding material as required, reshaping, recompacting, and refinishing at the Contractor's expense.

Article 247.4. Construction, Section C. Compaction, Section 2. Density Control first paragraph is replaced by the following:

Compact to at least 100% of the maximum dry density determined by Tex-113-E, unless otherwise shown on the plans. Maintain moisture during compaction at not less than 1 percentage point below the optimum moisture content determined by Tex-113-E. Determine the moisture content of the material in accordance with Tex-115-E or Tex-103-E during compaction daily and report the results the same day to the Engineer, unless otherwise shown on the plans or directed.

Article 247.4. Construction. is supplemented with the following:

F. Lime Treatment. When type B flexible base (Complete In Place) is shown on the plans, furnish lime that meets the requirements of DMS-6350, "Lime and Lime Slurry," and DMS-6330, "Lime Sources Prequalification of Hydrated Lime and Quicklime," of the type and quantity specified in the plans. Construct in accordance with Item 260, "Lime Treatment (Road Mixed)".

G. Ride Quality. This section applies to the final travel lanes that receive a 1 or 2 course surface treatment for the final surface, unless otherwise shown on the plans.

Measure ride quality of the base course after placement of the prime coat and before placement of the surface treatment. Use a high speed or lightweight inertial profiler certified at the Texas Transportation Institute. Provide the Engineer with equipment certification documentation. Display a current decal on the equipment indicating the certification expiration date. Use a certified profiler operator from the Construction Division's approved list. When requested, furnish the Engineer documentation for the person certified to operate the profiler.

Within 3 days after placement of the prime coat, provide all profile measurements to the Engineer in electronic data files 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 having an average international roughness index (IRI) value greater than 125.0 in. per mile to an IRI value of 125.0 in. per mile or less for each wheelpath, unless otherwise shown on the plans.

Re-profile and correct sections that fail to meet ride quality after placement of the prime coat, as directed by the Engineer. Correct re-profiled sections until specification requirements are met. Perform this work at no additional expense to the Department.

Article 247.6. Payment. Section A. Flexible Base (Complete In Place), is replaced with the following:

Payment will be made for the type and grade specified. For cubic yard measurement, "In Vehicle," "In Stockpile," or "In Final Position" will be specified. For square yard measurement, a depth will be specified. This price is full compensation for lime, lime treatment, furnishing materials, temporary stockpiling, assistance provided in stockpile sampling and operations to level stockpiles for measurement, loading, hauling, delivery of materials, spreading, blading, mixing, shaping, placing, compacting, reworking, finishing, correcting locations where thickness is deficient, curing, furnishing scales and labor for weighing and measuring, and equipment, labor, tools, and incidentals.

SPECIAL PROVISION

260---002

Lime Treatment (Road-Mixed)

For this project, Item 260, "Lime Treatment (Road-Mixed)," 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 260.2. Materials, Section A. Lime. The first two sentences are voided and replaced by the following:

A. Lime. Furnish lime that meets the requirements of DMS-6350 "Lime and Lime Slurry," and DMS-6330, "Prequalification of Lime Sources." Use hydrated lime, commercial lime slurry, quicklime, or carbide lime slurry as shown on the plans.

Article 260.3. Equipment, Section B. Slurry Equipment. The last sentence of the second paragraph is voided and replaced by the following:

Equip the distributor truck with a sampling device in accordance with Tex-600-J, Part I, when using commercial lime slurry or carbide lime slurry.

Article 260.4. Construction, Section C. Application of Lime, Section 2. Slurry Placement. The first paragraph is voided and replaced with the following:

Provide slurry free of objectionable materials, at or above the minimum dry solids content, and with a uniform consistency that will allow ease of handling and uniform application. Deliver commercial lime slurry or carbide lime slurry to the jobsite, or use hydrated lime or quicklime to prepare lime slurry at the jobsite or other approved location, as specified. When dry quicklime is applied as a slurry, use 80 percent of the amount shown on the plans.

Article 260.5. Measurement, Section A. Lime is supplemented by the following:

4. Carbide Lime Slurry. Lime slurry will be measured by the ton (dry weight) as calculated from the minimum percent dry solids content of the slurry, multiplied by the weight of the slurry in tons delivered.

Article 260.6. Payment. The first paragraph is 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 in accordance with Section 260.6.A, "Lime," and Section 260.6.B, "Lime Treatment."

Article 260.6. Payment, Section A. Lime. The first sentence is voided and replaced by the following:

A. Lime. Lime will be paid for at the unit price bid for "Lime" of one of the following types:

- Hydrated Lime (Dry),
- Hydrated Lime (Slurry),
- Commercial Lime Slurry,
- Quicklime (Dry),
- Quicklime (Slurry), or
- Carbide Lime Slurry.

Article 260.6. Payment, Section B. Lime Treatment is voided and replaced by the following:

B. Lime Treatment. Lime treatment will be paid for at the unit price bid for "Lime Treatment (Existing Material)," "Lime Treatment (New Base)," or "Lime Treatment (Mixing Existing Material and New Base)," for the depth specified. No payment will be made for thickness or width exceeding that shown on the plans. This price is full compensation for shaping existing material, loosening, mixing, pulverizing, spreading, applying lime, compacting, finishing, curing, curing materials, blading, shaping and maintaining shape, replacing mixture, disposing of loosened materials, processing, hauling, preparing secondary subgrade, water, equipment, labor, tools, and incidentals.

SPECIAL PROVISION

300---032

Asphalts, Oils, and Emulsions

For this project, Item 300, "Asphalts, Oils, and Emulsions," 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 300.2. Materials. The first paragraph is voided and replaced by the following:

Provide asphalt materials that meet the stated requirements when tested in accordance with the referenced Department, AASHTO, and ASTM test methods. Unless otherwise shown in the plans and specifications, provide asphalt materials that have been preapproved for use by the Construction Division, in accordance with Tex-545-C, "Asphalt Binder Quality Program."

SPECIAL PROVISION

360---007

Concrete Pavement

For this project, Item 360, "Concrete Pavement," 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 360.3. Equipment, Section E. Curing Equipment. The third sentence is voided and replaced by the following:

Provide curing equipment that is independent of all other equipment when required to meet the requirements of Article 360.4.I, "Curing."

Article 360.4. Construction, Section H. Spreading and Finishing, Section 2. Maintenance of Surface Moisture. The first and second sentences are voided and replaced by the following:

Prevent surface drying of the pavement before application of the curing system by means that may include water fogging, the use of wind screens and the use of evaporation retardants.

Article 360.4. Construction, Section H. Spreading and Finishing, Section 3. Surface Texturing is voided and replaced by the following:

Complete final texturing before the concrete has attained its initial set. Drag the carpet longitudinally along the pavement surface with the carpet contact surface area adjusted to provide a satisfactory coarsely textured surface. Prevent the carpet from getting plugged with grout. Do not perform carpet dragging operations while there is excessive bleed water.

A metal-tine texture finish is required for all areas with a posted speed limit in excess of 45 mph. A metal-tine texture finish is required unless otherwise shown on the plans for areas with a posted speed limit less than 45 mph. Immediately following the carpet drag, apply a single coat of evaporation retardant at a rate recommended by the manufacturer. Provide the metal-tine finish immediately after the concrete surface has set enough for consistent tining. Operate the metal-tine device to obtain grooves spaced at 1 in., approximately 3/16 in. deep, with a minimum depth of 1/8 in., and approximately 1/12 in. wide. Do not overlap a previously tined area. Use manual methods to achieve similar results on ramps and other irregular sections of pavements. Repair damage to the edge of the slab and joints immediately after texturing. Do not tine pavement that will be overlaid or that is scheduled for blanket diamond grinding or shot blasting.

When carpet drag is the only surface texture required by the plans, ensure that adequate and consistent micro-texture is achieved by applying sufficient weight to the carpet and keeping the carpet from getting plugged with grout, as directed by the Engineer. Target a carpet drag texture of .04 in., as measured by Tex 436-A. Correct any location with a texture less than .03 in. by

diamond grinding or shot blasting. The Engineer will determine the test locations at points located transversely to the direction of traffic in the outside wheel path.

Article 360. 4. Construction, Section I. Curing. The first sentence is voided and replaced by the following:

Keep the concrete pavement surface from drying as described in Section 360.4.H.2, "Maintenance of Surface Moisture," until the curing material has been applied.

Article 360. 4. Construction, Section I. Curing, Section 1. Membrane Curing. The first paragraph is voided and replaced by the following:

Spray the concrete surface uniformly with 2 coats of membrane curing compound at an individual application rate of not more than 180 sq. ft. per gallon. Do not allow the concrete surface to dry before applying the curing compound. Use a towel or absorptive fabric to remove any standing pools of bleed water that may be present on the surface before applying the curing compound. Apply the first coat within 10 min. after completing texturing operations. Apply the second coat within 30 min. after completing texturing operations.

SPECIAL PROVISION

368---001

Concrete Pavement Terminals

For this project, Item 368, "Concrete Pavement Terminals," 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 368.5. Payment. The second paragraph is voided and replaced with the following:

This price is full compensation for excavation, disposal of waste material, backfilling, 12 in. cement treatment, hydraulic cement concrete (sleeper slab and support slab) underneath the concrete pavement, joint material, reinforcing steel, wide-flange beams, equipment, materials, labor, tools and incidentals.

The last sentence of the third paragraph is voided.

SPECIAL PROVISION

420---002

Concrete Structures

For this project, Item 420, "Concrete Structures," 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 420.4. Construction, Section I, "Finish of Bridge Slabs". The tenth paragraph is supplemented with the following:

For bridge approach slabs the carpet drag, burlap drag, or broom finish may be applied either longitudinally or transversely.

Article 420.4. Construction, Section I, "Finish of Bridge Slabs". The first sentence of the fourteenth paragraph is voided and replaced by the following:

Unless noted otherwise, saw-cut grooves in the hardened concrete of bridge slabs, bridge approach slabs, and direct-traffic culverts to produce the final texturing after completion of the required curing period.

Article 420.4. Construction, Section I, "Finish of Bridge Slabs". The fourteenth paragraph is amended by the following:

When saw-cut grooves are not required in the plans, provide either a carpet drag or broom finish for micro-texture. In this case insure that an adequate and consistent micro-texture is achieved by applying sufficient weight to the carpet and keeping the carpet or broom from getting plugged with grout. For surfaces that do not have adequate texture, the Engineer may require corrective action including diamond grinding or shot blasting.

Article 420.4. Construction, Section J. Curing Concrete. The first sentence of the fourth paragraph is voided and replaced by the following:

For upper surfaces of bridge slabs, bridge approach slabs, median and sidewalk slabs, and culvert top slabs constructed using Class S concrete, apply interim curing using a Type 1-D curing compound before the water sheen disappears but no more than 45 minutes after application of the evaporation retardant. Do not allow the concrete surface to dry before applying the interim cure, and do not place the interim cure over standing water.

Article 420.6 Payment. The pay adjustment formula given in the sixth bullet of the fourth paragraph is voided and replaced by the following:

$$A = Bp[-5.37(Sa/Ss)^2 + 11.69(Sa/Ss) - 5.32]$$

Where:

A = Amount to be paid

Sa = Actual strength from cylinders or cores

Ss = Specified design strength

Bp = Unit bid price

SPECIAL PROVISION**421---035****Hydraulic Cement Concrete**

For this project, Item 421, "Hydraulic Cement Concrete," 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 421.2.D. Water, Table 1. Chemical Limits for Mix Water is voided and replaced by the following:

Table 1
Chemical Limits for Mix Water

Contaminant	Test Method	Maximum Concentration (ppm)
Chloride (Cl)	ASTM C 114	
Prestressed concrete		500
Bridge decks and superstructure		500
All other concrete		1,000
Sulfate (SO ₄)	ASTM C 114	2,000
Alkalies (Na ₂ O + 0.658K ₂ O)	ASTM C 114	600
Total Solids	ASTM C 1603	50,000

Article 421.2.B. Supplementary Cementing Materials (SCM) is supplemented with the following:

6. **Modified Class F Fly Ash (MFFA).** Furnish MFFA conforming to DMS-4610, "Fly Ash."

Article 421.2.D. Water, Table 2. Acceptance Criteria for Questionable Water Supplies is voided and replaced by the following:

Table 2
Acceptance Criteria for Questionable Water Supplies

Property	Test Method	Limits
Compressive strength, min. % control at 7 days	ASTM C 31, ASTM C 39 ^{1,2}	90
Time of set, deviation from control, h:min.	ASTM C 403 ¹	From 1:00 early to 1:30 later

1. Base comparisons on fixed proportions and the same volume of test water compared to the control mix using 100% potable water or distilled water.
2. Base comparisons on sets consisting of at least two standard specimens made from a composite sample.

Article 421.2.E.1 Coarse Aggregate. The fourth paragraph is voided and replaced by the following:

Unless otherwise shown on the plans, provide coarse aggregate with a 5-cycle magnesium sulfate soundness when tested in accordance with Tex-411-A of not more than 25% when air

entrainment is waived and 18% when air entrainment is not waived. Crushed recycled hydraulic cement concrete is not subject to the 5-cycle soundness test.

Article 421.2.E.2 Fine Aggregate. The fifth paragraph is voided and replaced by the following:

$$\text{Acid insoluble (\%)} = \{(A1)(P1)+(A2)(P2)\}/100$$

where:

A1 = acid insoluble (%) of aggregate 1

A2 = acid insoluble (%) of aggregate 2

P1 = percent by weight of aggregate 1 of the fine aggregate blend

P2 = percent by weight of aggregate 2 of the fine aggregate blend

Article 421.2.E.2. Fine Aggregate. The final paragraph is voided and replaced by the following:

For all classes of concrete, provide fine aggregate with a fineness modulus between 2.3 and 3.1 as determined by Tex-402-A.

Article 421.2.E. Aggregate is supplemented by the following:

- 4. Intermediate Aggregate.** When necessary to complete the concrete mix design, provide intermediate aggregate consisting of clean, hard, durable particles of natural or lightweight aggregate or a combination thereof. Provide intermediate aggregate free from frozen material and from injurious amounts of salt, alkali, vegetable matter, or other objectionable material, and containing no more than 0.5% clay lumps by weight in accordance with Tex-413-A.

If more than 30% of the intermediate aggregate is retained on the No. 4 sieve, the retained portion must meet the following requirements:

- must not exceed a wear of 40% when tested in accordance with Tex-410-A.
- must have a 5-cycle magnesium sulfate soundness when tested in accordance with Tex-411-A of not more than 25% when air entrainment is waived and 18% when air entrainment is not waived.

If more than 30% of the intermediate aggregate passes the 3/8" sieve, the portion passing the 3/8" sieve must not show a color darker than standard when subjected to the color test for organic impurities in accordance with Tex-408-A and must have an acid insoluble residue, unless otherwise shown on the plans, for concrete subject to direct traffic equal to or greater than the value calculated with the following equation:

$$AI_{ia} \geq \frac{60 - (AI_{fa})(P_{fa})}{(P_{ia})}$$

where:

AI_{fa} = acid insoluble (%) of fine aggregate or fine aggregate blend

P_{fa} = percent by weight of the fine aggregate or fine aggregate blend as a percentage of the total weight of the aggregate passing the 3/8" sieve in the concrete mix design

P_{ia} = percent by weight of the intermediate aggregate as a percentage of the total weight of the aggregate passing the 3/8" sieve in the concrete mix design

Article 421.2.F. Mortar and Grout is supplemented by the following:

Section 421.4.A.6, "Mix Design Options," does not apply for mortar and grout.

Article 421.3.A. Concrete Plants and Mixing Equipment is supplemented by the following:

When allowed by the plans or the Engineer, for concrete classes not identified as structural concrete in Table 5 or for Class C concrete not used for bridge-class structures, the Engineer may inspect and approve all plants and trucks in lieu of the NRMCA or non-Department engineer sealed certifications. The criteria and frequency of Engineer approval of plants and trucks is the same used for NRMCA certification.

Article 421.3.A.2. Volumetric Mixers is supplemented by the following:

Unless allowed by the plans or the Engineer, volumetric mixers may not supply classes of concrete identified as structural concrete in Table 5.

Article 421.4.A Classification and Mix Design. The first paragraph is voided and replaced by the following:

Unless a design method is indicated on the plans, furnish mix designs using ACI 211, "Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete," Tex-470-A, or other approved procedures for the classes of concrete required in accordance with Table 5. Perform mix design and cement replacement using the design by weight method unless otherwise approved. Do not exceed the maximum water-to-cementitious-material ratio.

Article 421.4.A. Classification and Mix Design, Table 5 Concrete Classes is voided and replaced by the following:

Table 5
Concrete Classes

Class of Concrete	Design Strength, Min. 28-day f'_c (psi)	Maximum W/C Ratio ¹	Coarse Aggregate Grades ^{2,3}	General Usage ⁴
A	3,000	0.60	1-4, 8	Inlets, manholes, curb, gutter, curb & gutter, conc. retards, sidewalks, driveways, backup walls, anchors
B	2,000	0.60	2-7	Riprap, small roadside signs, and anchors
C ⁵	3,600	0.45	1-6	Drilled shafts, bridge substructure, bridge railing, culverts except top slab of direct traffic culverts, headwalls, wing walls, approach slabs, concrete traffic barrier (cast-in-place)
C(HPC) ⁵	3,600	0.45	1-6	As shown on the plans
D	1,500	0.60	2-7	Riprap
E	3,000	0.50	2-5	Seal concrete
F ⁵	Note 6	0.45	2-5	Railroad structures; occasionally for bridge piers, columns, or bents
F(HPC) ⁵	Note 6	0.45	2-5	As shown on the plans
H ⁵	Note 6	0.45	3-6	Prestressed concrete beams, boxes, piling, and concrete traffic barrier (precast)
H(HPC) ⁵	Note 6	0.45	3-6	As shown on the plans
S ⁵	4,000	0.45	2-5	Bridge slabs, top slabs of direct traffic culverts

Class of Concrete	Design Strength, Min. 28-day f'_c (psi)	Maximum W/C Ratio ¹	Coarse Aggregate Grades ^{2,3}	General Usage ⁴
S(HPC) ⁵	4,000	0.45	2-5	As shown on the plans
P	See Item 360	0.45	2-3	Concrete pavement
DC ⁵	5,500	0.40	6	Dense conc. overlay
CO ⁵	4,600	0.40	6	Conc. overlay
LMC ⁵	4,000	0.40	6-8	Latex-modified concrete overlay
SS ⁵	3,600 ⁷	0.45	4-6	Slurry displacement shafts, underwater drilled shafts
K ⁵	Note 6	0.45	Note 6	Note 6
HES	Note 6	0.45	Note 6	Note 6

1. Maximum water-cement or water-cementitious ratio by weight.
2. Unless otherwise permitted, do not use Grade 1 coarse aggregate except in massive foundations with 4-in. minimum clear spacing between reinforcing steel bars. Do not use Grade 1 aggregate in drilled shafts.
3. Unless otherwise approved, use Grade 8 aggregate in extruded curbs.
4. For information only.
5. Structural concrete classes.
6. As shown on the plans or specified.
7. Use a minimum cementitious material content of 650 lb/cy of concrete. Do not apply Table 6 over design requirements to Class SS concrete.

Article 421.4.A. Classification and Mix Design, Table 6 Over Design to Meet Compressive Strength Requirements. Footnote 3 is supplemented by the following:

For Class K and concrete classes not identified as structural concrete in Table 5 or for Class C concrete not used for bridge-class structures, the Engineer may designate on the plans an alternative over-design requirement up to and including 1,000 psi for specified strengths less than 3,000 psi and up to and including 1,200 psi for specified strengths from 3,000 to 5,000 psi.

Article 421.4.A.1. Cementitious Materials is supplemented by the following:

The upper limit of 35% replacement of cement with Class F fly ash specified by mix design Options 1 and 3 may be increased to a maximum of 45% for mass placements, high performance concrete, and precast members when approved.

Article 421.4.A.3. Chemical Admixtures is supplemented by the following:

When a corrosion-inhibiting admixture is required, use a 30% calcium nitrite solution. The corrosion-inhibiting admixture must be set neutral unless otherwise approved. Dose the admixture at the rate of gallons of admixture per cubic yard of concrete shown on the plans.

Article 421.4.A.4 Air Entrainment is voided and replaced by the following:

Air entrain all concrete except for Class B and concrete used in drilled shafts unless otherwise shown on the plans. Unless otherwise shown on the plans, target an entrained air content of 4.0% for concrete pavement and 5.5% for all other concrete requiring air entrainment. To meet the air-entraining requirements, use an approved air-entraining admixture. Unless otherwise shown on the plans, acceptance of concrete loads will be based on a tolerance of $\pm 1.5\%$ from the target air content. If the air content is more than 1.5 but less than 3.0% above the target air, the concrete

may be accepted based on strength tests. For specified concrete strengths above 5,000 psi, a reduction of 1% is permitted.

Article 421.4.A Table 7 Air Entrainment is voided.

Article 421.4.A.6. Mix Design Options. The first and second paragraphs are voided and replaced by the following:

For structural concrete identified in Table 5 and any other class of concrete designed using more than 520 lb. of cementitious material per cu. yd., use one of the mix design Options 1–8 shown below, unless otherwise shown on the plans.

For concrete classes not identified as structural concrete in Table 5 and designed using less than 520 lb. of cementitious material per cu. yd., use one of the mix design Options 1–8 shown below, except that Class C fly ash may be used instead of Class F fly ash for Options 1, 3, and 4 unless sulfate-resistant concrete is shown on the plans.

Do not use mix design Options 6 or 7 when High Performance Concrete (HPC) is required. Option 8 may be used when HPC is required provided: a minimum of 20% of the cement is replaced with a Class C fly ash; Tex-440-A, "Initial Time of Set of Fresh Concrete" is performed during mix design verification; the additional requirements for permeability are met; and the concrete is not required to be sulfate-resistant.

Article 421.4.A.6.b. Option 2 is voided and replaced by the following:

b. Option 2. Replace 35 to 50% of the cement with GGBFS or MFFA.

Article 421.4.A.6.c. Option 3 is voided and replaced by the following:

c. Option 3. Replace 35 to 50% of the cement with a combination of Class F fly ash, GGBFS, MFFA, UFFA, metakaolin, or silica fume; however, no more than 35% may be fly ash, and no more than 10% may be silica fume.

Article 421.4.A.6.f. Option 6 is voided and replaced by the following:

f. Option 6. Use lithium nitrate admixture at a minimum dosage determined by testing conducted in accordance with Tex-471-A, "Lithium Dosage Determination Using Accelerated Mortar Bar Testing." 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 List of Approved Lithium Testing Laboratories, certified by the Construction Division as being capable of testing according to Tex-471-A, "Lithium Dosage Determination Using Accelerated Mortar Bar Testing."

Article 421.4.A.6.g. Option 7 is voided and replaced by the following:

g. Option 7. When using hydraulic cement only, ensure that the total alkali contribution from the cement in the concrete does not exceed 3.5 lb. per cubic yard of concrete when 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.

Do not use Option 7 when any of the aggregates in the concrete are listed on the Department's List of Aggregate Sources Excluded from Option 7 ASR Mitigation.

Article 421.4.A.6.h. Option 8 is voided and replaced by the following:

h. Option 8. For any deviations from Options 1–5, perform annual testing on coarse, intermediate, and fine aggregate separately in accordance with ASTM C 1567. Before use of the mix, provide a certified test report signed and sealed by a licensed professional engineer, from a laboratory on the Department's List of Approved ASTM C 1260 Laboratories, demonstrating that the ASTM C 1567 test result for each aggregate does not exceed 0.08% expansion at 14 days.

Do not use Option 8 when any of the aggregates in the concrete are listed on the Department's List of Aggregate Sources Excluded from Option 8 ASR Mitigation. When HPC is required, provide a certified test report signed and sealed by a licensed professional engineer demonstrating that AASHTO T 277 test results indicate the permeability of the concrete is less than 1,500 coulombs tested immediately after either of the following curing schedules:

- Moist cure specimens 56 days at 73°F.
- Moist cure specimens 7 days at 73°F followed by 21 days at 100°F.

Article 421.4.B. Trial Batches is supplemented by the following:

Once a trial batch substantiates the mix design, the proportions and mixing methods used in the trial batch become the mix design of record.

Article 421.4.B. Trial Batches. The fourth sentence of the second paragraph is voided and replaced by the following:

Test at least one set of design strength specimens, consisting of two specimens per set, at 7-day, 28-day, and at least one additional age.

Article 421.4.D. Measurement of Materials, Table 9 is voided and replaced by the following:

Table 9
Measurement Tolerances – Non-Volumetric Mixers

Material	Tolerance (%)
Cement, wt.	-1 to +3
SCM wt.	-1 to +3
Cement + SCM (cumulative weighing), wt.	-1 to +3
Water, wt. or volume	±3
Fine aggregate, wt.	±2
Coarse aggregate, wt.	±2
Fine + coarse aggregate (cumulative weighing), wt.	±1
Chemical admixtures, wt. or volume	±3

Article 421.4.E. Mixing and Delivering Concrete. The first paragraph is supplemented with the following:

Do not top-load new concrete onto returned concrete.

Article 421.4.E.3. Truck-Mixed Concrete. The first paragraph is voided and replaced by the following:

Mix the concrete in a truck mixer from 70 to 100 revolutions at the mixing speed designated by the manufacturer to produce a uniform concrete mix. Deliver the concrete to the project in a thoroughly mixed and uniform mass and discharge the concrete with a satisfactory degree of uniformity. Additional mixing at the job site at the mixing speed designated by the manufacturer is allowed as long as the requirements of Section 421.4.A.5, "Slump" and Section 421.4.E, "Mixing and Delivering Concrete" are met.

SPECIAL PROVISION

424---002

Precast Concrete Structures (Fabrication)

For this project, Item 424, "Precast Concrete Structures (Fabrication)," 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 424.3. Construction, Section B. Fabrication, Section 4. Quality of Concrete. The first paragraph is voided and replaced by the following:

Provide concrete in accordance with Item 421, "Hydraulic Cement Concrete," except for the following:

- Air-entrained concrete will not be required in precast concrete members, unless otherwise shown on the plans.
- Use a minimum of 25% Class F fly ash with mix design Option 1 from Section 421.4.A.6, "Mix Design Options," for all precast concrete members.
- Do not use mix design Options 6, 7, or 8 from Section 421.4.A.6., "Mix Design Options" for all precast concrete members.

For each type of structure or unit, use the class of concrete shown on the plans or in the pertinent Item.

SPECIAL PROVISION

425---001

Precast Prestressed Concrete Structural Members

For this project, Item 425, "Precast Prestressed Concrete Structural Members," 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 425.2. Materials is supplemented by the following:

For bridges with Type Tx28, Tx34, Tx40, Tx46, Tx54, Tx62 and/or Tx70 prestressed concrete girders, the contractor can submit an alternate design for approval using other TxDOT prestressed concrete girder shapes . Alternate designs must be signed, sealed, and dated by a Licensed Professional Engineer and submitted to the Engineer for review and approval. Use the same live load as the original design and adhere to the current versions of the AASHTO LRFD Bridge Design Specifications and the TxDOT LRFD Bridge Design Manual. Alternate bridge designs can differ from the original design only by type of girder used. Do not raise the roadway grade or lower the structure bottom chord elevation to accommodate the alternate girders. No other changes to the original geometry, including bent locations, are allowed. Substructure re-design may be necessary to accommodate the alternate girders.

Article 425.5. Payment is supplemented by the following:

No additional compensation will be made for alternate designs or for any increase in quantities required to accommodate alternate designs, including quantities paid for under other Items.

SPECIAL PROVISION

428---001

Concrete Surface Treatment

For this project, Item 428, "Concrete Surface Treatment," 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 428.3. Construction, Section B. Surface Treatment Class II. The second paragraph is voided and replaced by the following:

- Clean the concrete surfaces using shot or abrasive blasting, unless otherwise restricted, followed by vacuuming and air-blasting as needed, to remove all visible curing compound, oils, and any other contaminants that retard or prevent penetration of the mixture before treatment application. Completely remove all spent abrasive media. Demonstrate the method of cleaning to the Engineer.

Do not damage the concrete surface to the point that the coarse aggregate is exposed. Acceptance of the entire cleaned surface by the Engineer is required before the application of the treatment material.

SPECIAL PROVISION

434---003

Elastomeric Bridge Bearings

For this project, Item 434, "Elastomeric Bridge Bearings," 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 434.1. Description. The third bullet is voided and replaced by the following:

- **Sliding Elastomeric Bearings.** Consisting of a steel top (sole) plate with a stainless steel facing (upper component) bearing on a lower component. The lower component may be either a layer of polytetrafluoroethylene (PTFE) bonded to a preformed fabric pad or a layer of PTFE recessed and bonded to a steel plate that is vulcanized to the top of a laminated elastomeric bearing pad with or without special components (steel guide bars and bottom plate).

Article 434.2. Materials, Section A. Plain and Laminated Elastomeric Bearings, Section 1. Elastomer. The fifth paragraph is voided and replaced by the following:

Plain sample bearings must measure 9 in. × 19 in. × 1 in. with 70-durometer hardness. Laminated sample bearings must measure 9 in. × 14 in. × 1-1/2 in. with the following number of steel laminates:

- 50 durometer--3 steel laminates,
- 60 durometer--2 steel laminates, and
- 70 durometer--2 steel laminates.

Article 434.2. Materials, Section A. Plain and Laminated Elastomeric Bearings is supplemented by the following:

5. **Coatings.** Provide coating materials as required in accordance with Item 445, "Galvanizing," and Item 446, "Cleaning and Painting Steel."

Article 434.2. Materials, Section B. Sliding Elastomeric Bearings, Section 1. Lower Component, Section b. PTFE. The second sentence is voided and not replaced.

Article 434.2. Materials, Section B. Sliding Elastomeric Bearings, Section 1. Lower Component is supplemented by the following:

- c. Laminated Elastomeric Bearing Pad.** Furnish laminated elastomeric bearing pads produced by a manufacturer prequalified by the Construction Division. Provide elastomer for laminated elastomeric bearing pads in accordance with Section 434.2.A.1, "Elastomer." Provide steel laminates for laminated elastomeric bearing pads in accordance with Section 434.2.A.2, "Steel Laminates." Provide steel plates for laminated elastomeric bearing pads in accordance with Section 434.2.A.3, "Steel Top Plates."

Article 434.2. Materials, Section B. Sliding Elastomeric Bearings is supplemented by the following:

4. **Coatings.** Provide coating materials as required in accordance with Item 445, "Galvanizing," and Item 446, "Cleaning and Painting Steel."

Article 434.3. Construction, Section A. Plain and Laminated Elastomeric Bearings, Section 4. Field Methods. The second paragraph is voided and replaced by the following:

Field-weld as required in accordance with Item 448, "Structural Field Welding." Do not damage the elastomer when welding near bearings. Replace bearings damaged by field welding at the Contractor's expense.

Article 434.3 Construction, Section B. Sliding Elastomeric Bearings is voided and replaced by the following:

B. Sliding Elastomeric Bearings. Before fabrication of sliding elastomeric bearings, prepare and submit clear and legible shop drawings for the complete assembly in accordance with the plans and Section 441.3.A.6.b(2), "Non-Bridge Structures." Provide a bearing layout with the shop drawings.

Attach the stainless steel sheet to the steel top (sole) plate by continuous fillet-welding around the edges with an approved welding electrode. Do not extend the weld above the sliding surface. Protect the sliding surface from weld spatter. Provide the finished stainless steel surface flat to a tolerance of 1/32 in. After attachment to the steel plate, polish the stainless steel sheet to a bright mirror finish less than 20 micro-in. rms, and solvent-clean to remove traces of polishing compound.

For lower components with laminated elastomeric bearing pads, fabricate the laminated elastomeric bearing pads according to Section 434.3.A, "Plain and Laminated Elastomeric Bearings." Vulcanize the laminated elastomeric bearing pad to the PTFE faced steel plate. Machine the steel plate recessed surface flat to a tolerance of 1/32 in. and within 1/32 in. of required depth. Bond the PTFE material to the steel plate recessed surface with an approved adhesive. Fit the PTFE material into the recessed surface with not more than 1/32-in. gaps around the perimeter.

For lower components with preformed fabric pads, provide preformed fabric pads within the following tolerances from plan dimension:

- length and width: +1/4 in., -0 in., and
- thickness: +/-5%.

Bond the PTFE material to the preformed fabric pad using approved adhesive methods or by vulcanizing through an appropriate polychloroprene interlayer.

Perform required welding in accordance with Item 441, "Steel Structures." Manufacture guide bars when required so that adjacent top and bottom bar surfaces are parallel to within 1/16 in. in the assembled position. The tolerance for diameter of anchor bolt holes is +1/8 in., -0 in. The maximum deviation for flatness of steel top (sole) plates, except at stainless steel attached surfaces, is 1/16 in. in any 24 in.

1. **Markings.** Mark the bearing type on the surface of each sliding elastomeric bearing. The marking must remain legible until placement in the structure. Permanently mark the laminated elastomeric bearing pad with the information specified in Section 434.3.A.1, "Markings."
2. **Testing and Acceptance.** For lower components with laminated elastomeric bearing pads, test a minimum of 10% of the sliding elastomeric bearing assemblies to an average compressive strength of 2,250 psi or a stress approved by the Engineer. Provide calibrated equipment per ASTM E 4 for this compression testing. No tested sliding elastomeric bearing may show visible damage to the PTFE or stainless steel surfaces nor evidence of bond failure between the:
 - PTFE faced steel plate and laminated elastomeric bearing pad,
 - steel laminates and elastomer within the laminated elastomeric bearing pad, and
 - steel plate and PTFE.

Perform check tests if necessary on the steel, laminated elastomeric bearing pads, preformed fabric pads, or PTFE material to verify the properties required under Section 434.2.B, "Sliding Elastomeric Bearings."

Bearings represented by test specimens passing the requirements of this Item will be approved for use in the structure subject to on-site inspection by the Engineer for visible defects.

- a. **Lower Component.** Manufacture 1 additional bearing lower component for testing purposes. After bearings have been manufactured for a project, notify the Construction Division, which will sample a bearing lower component at random from the lot. The Construction Division will perform a 90° peel test (adhesion test) to ensure that the sample meets a minimum required peel strength of:
 - 20 lb. per inch between the PTFE material and steel plate when tested per Tex 601-J, and
 - 25 lb. per inch between the PTFE material and preformed fabric pad when tested per ASTM D 429, Method B.

The Construction Division will also determine adhesion between the PTFE faced steel plate and laminated elastomeric bearing pad per Tex-601-J.

- b. **Documentation.** Furnish copies of certified mill test reports for the steel top (sole) plate, stainless steel, PTFE faced steel plate, and any required steel special components. Provide a manufacturer's certification that the preformed fabric pad and PTFE material meet the requirements of this Item. Furnish certified laboratory test results on the elastomer properties of each batch or lot of compound for laminated elastomeric bearing pads.
3. **Storage.** Store sliding elastomeric bearings horizontally in a dry, sheltered area. Provide moisture- and dust-resistant wrapping maintained in good condition until installation. Lift bearings only from the undersides. Protect bearings from damage, dirt, oil, grease, and other foreign substances.

4. **Field Methods.** Provide concrete surfaces for bearing areas under sliding elastomeric bearings in accordance with Section 420.4.H, "Treatment and Finishing of Horizontal Surfaces Other Than Bridge Slabs."

Field-weld as required in accordance with Item 448, "Structural Field Welding." Avoid damage to the laminated elastomeric bearing pad or preformed fabric pad when welding near bearings. Bearings damaged by field welding will be replaced by the Contractor at the Contractor's expense.

Article 434.5. Payment, Section B. Sliding Elastomeric Bearings is voided and replaced by the following:

B. Sliding Elastomeric Bearings. 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 "Sliding Elastomeric Bearing" of the type specified. This price is full compensation for the stainless steel faced top plate, the PTFE faced steel plate vulcanized to the top of a laminated elastomeric bearing pad or the PTFE faced preformed fabric pad, the steel special components, the anchor bolts required to connect the bearing between superstructure and substructure; installation; and tools, equipment, labor, and incidentals.

SPECIAL PROVISION

440---005

Reinforcing Steel

For this project, Item 440, "Reinforcing Steel" 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 440.2 Materials, Section A. Approved Mills is supplemented by the following:

Contact the Construction Division with the name and location of the producing mill for stainless steel reinforcement at least 4 weeks prior to ordering any material.

Article 440.2. Materials, Section D. Weldable Reinforcing Steel is supplemented by the following:

Do not weld stainless reinforcing steel without permission from the Engineer. If welding is required, provide stainless steel reinforcing suitable for welding and submit welding procedures and electrodes to the Engineer for approval.

Article 440.2. Materials, Section G. Mechanical Couplers is voided and replaced by the following:

When mechanical splices in reinforcing steel bars are shown on the plans, use couplers of the type specified in DMS-4510, "Mechanical Couplers for Reinforcing Steel," Article 4510.5.A, "General Requirements."

Furnish only couplers produced by a manufacturer pre-qualified in accordance with DMS-4510. Do not use sleeve-wedge type couplers on coated reinforcing. Sample and test couplers for use on individual projects in accordance with DMS-4510. Furnish couplers only at locations shown on the plans.

Furnish couplers for stainless reinforcing steel with the same alloy designation as the reinforcing steel.

Article 440.2. Materials is supplemented by the following:

H. Fibers. When allowed by the plans, supply fibers at the minimum dosage listed on the Material Producer List maintained by the Materials and Pavements Section of the Construction Division. When shown on the plans, use fibers that do not corrode due to carbonation of concrete or the use of deicing salts.

I. Stainless Steel. When stainless reinforcing steel is required in the plans, provide deformed steel bars of the types listed below and conforming to ASTM A 955, Gr. 60 or higher.

UNS Designation	S31653	S31803	S24100	S32304
AISI Type	316LN	2205	XM-28	2304

Article 440.3. Construction, Section A. Bending is supplemented by the following:

Bend stainless reinforcing steel in accordance with ASTM A955.

Article 440.3. Construction, Section C. Storage is supplemented by the following:

Do not allow stainless steel reinforcement to be in direct contact with uncoated steel reinforcement, nor with galvanized reinforcement. This does not apply to stainless steel wires and ties. Store stainless steel bar reinforcement separately, off the ground on wooden supports.

Article 440.3. Construction, Section D. Splices. The fifth bullet is voided and replaced by the following:

- For box culvert extensions with less than 1 ft. of fill, lap the existing longitudinal bars with the new bars as shown in Table 5. For extensions with more than 1 ft. of fill, lap at least 1 ft. 0 in.

Article 440.3. Construction, is supplemented by the following:

G. Handling and Placing Stainless Steel Reinforcing.

Handle, cut, and place stainless steel bar reinforcement using tools that are not used on carbon steel. Do not use carbon steel tools, chains, slings, etc. when handling stainless steel. Use only nylon or polypropylene slings. Cut stainless steel using shears, saws, abrasive cutoff wheels, or torches. Remove any thermal oxidation using pickling paste. Do not field bend stainless steel without approval.

Use 16 gauge fully annealed stainless steel tie wire conforming to the material properties listed in 440.2.I. "Stainless Steel". Support all stainless steel on solid plastic, stainless steel, or epoxy coated steel chairs. Do not use uncoated carbon steel chairs in contact with stainless steel.

SPECIAL PROVISION

441---006

Steel Structures

For this project, Item 441, "Steel Structures," 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 441.3, "Construction," Section A, "General Requirements," Section 1, "Applicable Codes," is voided and replaced by the following:

Perform all fabrication in accordance with AASHTO/NSBA Steel Bridge Collaboration S2.1, including fabrication of non-bridge members. Follow all applicable provisions of the appropriate AWS code (D1.5 or D1.1) except as otherwise noted in the plans or in this Item. Weld sheet steel (thinner than 1/8 in.) in accordance with ANSI/AWS D1.3, Structural Welding Code—Sheet Steel. Unless otherwise stated, requirements of this Item are in addition to the requirements of S2.1. In case of a conflict between this Item and S2.1, follow the more stringent requirement. Perform all bolting in accordance with Item 447, "Structural Bolting."

Article 441.3, "Construction," Section A, "General Requirements," Section 5, "Qualification of Plant, Laboratories, and Personnel," Section b, "Nondestructive Examination (NDE)," is voided and replaced by the following:

Personnel performing NDE must be qualified in accordance with the applicable AWS code. Current certification in accordance with ASNT SNT-TC-1A is required for an inspector to be considered qualified. Testing agencies and individual third-party contractors must also successfully complete periodic audits for compliance, performed by the Department. In addition, ultrasound technicians must pass a hands-on test administered by the Construction Division. A technician who fails the hands-on test must wait 6 months before taking the test again. Qualification to perform ultrasonic testing for the Department will be revoked when the technician's employment is terminated, and recertification based on a new hands-on test will be required.

Article 441.3, "Construction," Section A, "General Requirements," Section 9, "Inspection." The second paragraph is voided and replaced by the following:

Provide the Inspector with the helpers and equipment needed to move material to allow inspection. QC is solely the responsibility of the Contractor. The Contractor must have a QC staff qualified in accordance with the applicable AWS code. Welding inspectors must be current AWS Certified Welding Inspectors. The QC staff must provide inspection of all materials and workmanship prior to inspection by the Department.

Article 441.3, "Construction," Section B, "Welding," Section 5, "Nondestructive Examination (NDE)," Section c, "Magnetic Particle Testing." The first sentence is voided and not replaced.

Article 441.3, "Construction," Section D, "Dimensional Tolerances," Section 2, "Flange Straightness." The second sentence is voided and replaced by the following:

Rolled material must meet this straightness requirement before being laid out or worked.

Article 441.3, "Construction," Section D, "Dimensional Tolerances," Section 3, "Alignment of Deep Webs in Welded Field Connection." The first sentence is voided and replaced by the following:

For girders 48 in. deep or deeper, the webs may be slightly restrained while checking compliance with tolerances of S2.1 for lateral alignment at welded field connections.

Article 441.3, "Construction," Section D, "Dimensional Tolerances," Section 4, "Bearings," Section c, "Shoes," is supplemented by the following:

- For a pin and rocker type expansion shoe, the axis of rotation coincides with the central axis of the pin.
- When the shoe is completely assembled, as the top bolster travels through its full anticipated range, no point in the top bolster plane changes elevation by more than 1/16 in. and the top bolster does not change inclination by more than 1 degree, for the full possible travel.

Article 441.3, "Construction," Section D, "Dimensional Tolerances," Section 4, "Bearings," is supplemented by the following:

d. Beam supports. Fabricate beam support planes true to the box girder bearing to 1/16 in. in the short direction and true to the vertical axis of the nesting girders to 1/16 in.

Article 441.3, "Construction," Section G, "Shop Assembly," Section 1, "General Shop Assembly." The first paragraph is voided and replaced by the following:

1. General Shop Assembly. Shop-assemble field connections of primary members of trusses, arches, continuous beam spans, bents, towers (each face), plate girders, field connections of floor beams and stringers (including for railroad structures), field-bolted plate diaphragms for curved plate girders and railroad underpasses, and rigid frames. Field-bolted crossframes and rolled-section diaphragms do not require shop assembly. Complete fabrication, welding (except for shear studs), and field splice preparation before members are removed from shop assembly. Obtain approval for any deviation from this procedure. The Contractor is responsible for accurate geometry.

SPECIAL PROVISION

442---016

Metal for Structures

For this project, Item 442, "Metal for Structures," 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 442.2, "Materials," Section A, "Structural Steel," Section 1, "Bridge Structures." The third sentence is voided and not replaced.

Article 442.5, "Payment," is voided and replaced by the following:

442.5. 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 "Structural Steel" of the type (Rolled Beam, Plate Girder, Tub Girder, Box Girder, Railroad Through-Girder, Railroad Deck-Girder, Miscellaneous Bridge, Miscellaneous Non-Bridge) specified. This price is full compensation for materials, fabrication, transportation, erection, paint, painting, galvanizing, equipment, tools, labor, and incidentals.

SPECIAL PROVISION

447---002

Structural Bolting

For this project, Item 447, "Structural Bolting," 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 447. Section 4. Construction, Section C. Preparation of Faying Surfaces. The second paragraph is voided and replaced by the following:

Perform blast-cleaning or painting of faying surfaces in accordance with Item 446, "Cleaning and Painting Steel." Provide an SSPC-SP 10 blast cleaning prior to shipment if surfaces to be in contact after final bolting will be left unpainted. Do not wire-brush uncoated faying surfaces. Roughen galvanized faying surfaces by hand wire-brushing. For main girder splices, perform a brush-blast to provide an SSPC-SP 6 finish not sooner than 48 hours prior to assembling the connection unless otherwise approved.

Article 447.4. Construction, Section D. Bolt Installation, Section 3. Tension Bolts is supplemented by the following:

Tension all bolts in a connection within 10 days of installation. Bolts not tensioned within 10 days of installation are subject to field R-C testing. Relubricate or replace any installed bolts that do not have sufficient lubrication as determined by the field R-C test.

Article 447.4. Construction, Section E. Bolt Tensioning, Section 1. Turn-of-the-Nut Method, Table 2. Note 1 below Table 2 is voided and replaced by the following:

1. Nut rotation is relative regardless of the element (nut or bolt) being turned. The tolerance is -0° , $+30^{\circ}$ for bolts installed by 1/2 turn or less and -0° , $+45^{\circ}$ for bolts installed by 2/3 turn or more.

SPECIAL PROVISION

448---002

Structural Field Welding

For this project, Item 448, "Structural Field Welding," 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 448.3 Equipment is voided and replaced by the following:

Provide electrode drying and storing ovens that can maintain the required temperatures specified in Section 448.4.C.1, "Electrode Condition." Each oven must have a door that is sealed and can be latched. Each oven must have a small port that may be opened briefly to insert a thermometer or the oven must be equipped with a thermometer that allows for direct reading of temperature inside the oven without opening the oven. Provide equipment able to preheat and maintain the temperature of the base metal as required and as shown on the plans. Provide approved equipment, temperature indicator sticks, infrared thermometer, etc., for checking preheat and interpass temperatures at all times while welding is in progress. Provide welding equipment meeting the requirements of the approved welding procedure specifications (WPS), if required, and capable of making consistent high-quality welds.

Article 448.4.B.2.Certified Steel Structures Welder. The second bulleted item is voided and replaced by the following:

- Use metal for test plates that meets Item 442, "Metal for Structures," with a minimum yield point of 36 ksi. The minimum width of test plate must be sufficient to accommodate the radiograph inspection of 6 continuous inches of the weld, not counting the ends of the weld.

Article 448.4.C.5. Welding Practice. The second paragraph is voided and replaced by the following:

Use the stringer-bead technique where possible for groove welds. In vertical welding passes, progress upward using a back-step sequence keeping the end of the low-hydrogen electrode contained within the molten metal and shield of flux, unless the electrode manufacturer's specifications indicate otherwise

Article 448.4.C.7. Radiographic Inspection is supplemented by the following:

Meet the requirements specified in Section 441.3.B.5.a, "Radiographic Testing" for radiograph film quality.

SPECIAL PROVISION

450---001

Railing

For this project, Item 450, "Railing," 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 450.2. Materials is supplemented with the following:

Where epoxy anchors are allowed or required, provide an approved Type III, Class C epoxy in accordance with DMS-6100, "Epoxies and Adhesives," for installing drilled and epoxied rail anchorage reinforcement or rail anchor bolts. Use other materials if shown in the plans. Provide only dual cartridge epoxy systems mixed with a static mixing nozzle supplied by the epoxy adhesive manufacturer and dispensed with a tool supplied by the epoxy adhesive manufacturer. Do not use bulk epoxies. Drill and install anchorage reinforcement or anchor bolts to the embedment depth shown in the plans or the depth recommended by the manufacturer, whichever is deeper. No additional payment will be made for providing embedment deeper than shown in the plans. If no resistance or embedment depth is specified in the plans, select an embedment depth capable of developing the yield strength of the steel anchor.

Article 450.3. Construction, Section B. Concrete Railing. The last paragraph is voided and replaced by the following:

Obtain approval to slipform railing. Slipforming equipment must be approved. Do not slipform railing with cast-in-place anchor bolts unless noted otherwise. Provide additional reinforcing, at Contractor's expense, as needed to prevent movement of the reinforcement cage. Clear cover and epoxy coating requirements for additional reinforcement are the same as shown for the rail reinforcement. The rail reinforcing cage may be tack welded to the rail anchorage reinforcement provided the rail and anchorage reinforcement are not epoxy coated and weld locations measured along the rail are no closer than 3 ft. If epoxy coated reinforcement is required for the railing proposed to be slipformed, tie all bar intersections. Provide a wire line to maintain vertical and horizontal alignment of the slipform machine. Attach a grade line gauge or pointer to the machine so a continuous comparison can be made between the rail being placed and the established grade line. Rails or supports at the required grade are allowed instead of sensor controls. Prior to placing concrete, make one or more passes with the slipform over the rail segment to ensure proper operation and maintenance of grades and clearances. Provide slipformed rail within a vertical and horizontal alignment tolerance of +/- 1/4 in. in 10 ft. Construct rail with a smooth and uniform appearance. Consolidate concrete so it is free of honeycomb. Provide concrete with a consistency that will maintain the shape of the rail without support. Minimize starting and stopping of the slipform operation by ensuring a continuous supply of concrete.

Do not exceed the manufacturer's recommended speed for the slipform machine. If slipforming causes movement of the reinforcement such that plan clearances are not achieved, stop slipforming and take remedial action. Remove and replace unsatisfactory slipformed rail at the Contractor's expense.

Install epoxy adhesive anchorages in accordance with the manufacturer's instructions including hole size, drilling equipment and method, hole cleaning equipment and method, mixing and dispensing epoxy, and anchor insertion. Do not alter the manufacturer's mixing nozzle or dispenser. Anchorage bars or bolts must be clean and free of grease, oil, or any other foreign material. Do not weld to an anchor bar or anchor bolt that is anchored with epoxy adhesive. Do not expose rail to traffic until epoxy adhesive has cured.

Article 450.3. Construction, Section C. Tests is supplemented with the following:

The Engineer will select three anchor bars or bolts of the first day's production to be tested after the epoxy has cured. Test the bars or bolts in the presence of the Engineer in accordance with ASTM E 1512, using a restrained test, to evaluate the epoxy adhesive's bond strength. Verify that the anchor bars or bolts develop the required pullout resistance in the plans or 75 percent of the yield strength of the bars or bolts, whichever is less, without a bond failure of the epoxy. The Engineer may require additional tests during production. If any of the tests do not meet the required test load, perform corrective measures to provide adequate capacity. Repair damage from testing.

Article 450.5. Payment is voided and replaced with 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 "Railing" of the type specified. This price will be full compensation for furnishing, preparing, and placing concrete, expansion joint material, reinforcing steel, structural steel, aluminum, cast steel, pipe, anchor bolts or bars, testing of epoxy anchors, and all other materials required in the finished railing; removal and disposal of salvageable materials; and hardware, paint and painting of metal railing, galvanizing, equipment, labor, tools, and incidentals.

SPECIAL PROVISION

464---003

Reinforced Concrete Pipe

For this project, 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.

Article 464.2. Materials, Section A. Fabrication is voided and replaced by the following:

Fabrication plants must be approved by the Construction Division in accordance with DMS-7310, "Reinforced Concrete Pipe Fabrication and Plant Qualification" before furnishing precast reinforced concrete pipe for Department projects. The Construction Division maintains a list of approved reinforced concrete pipe plants.

Furnish material and fabricate reinforced concrete pipe in accordance with DMS-7310, "Reinforced Concrete Pipe Fabrication and Plant Qualification."

Article 464.2. Materials, Section B. Design. 1. General. Table 2 is voided and replaced with the following:

Table 2
Arch Pipe

Design Size	Equivalent Diameter (in.)	Rise (in.)	Span (in.)
1	18	13-1/2	22
2	21	15-1/2	26
3	24	18	28-1/2
4	30	22-1/2	36-1/4
5	36	26-5/8	43-3/4
6	42	31-5/16	51-1/8
7	48	36	58-1/2
8	54	40	65
9	60	45	73
10	72	54	88

Article 464.2. Materials, Section C. Physical Test Requirements is voided and not replaced.

Article 464.2. Materials, Section D. Markings. 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-7310, "Reinforced Concrete Pipe Fabrication and Plant Qualification":

- class or D-Load of pipe,
- ASTM designation,
- date of manufacturer,
- name or trademark of manufacturer and plant location,
- designated manufacturer's approval marking,
- pipe to be used for jacking and boring (when applicable), and
- pipe meeting sulfate-resistant concrete plan requirements (when applicable).

Article 464.2. Materials, Section E. Inspection is voided and replaced with the following:

Provide access for inspection of the finished pipe at the project site before and during installation.

Article 464.2. Materials, Section F. Causes for Rejection is voided and replaced by the following:

Individual sections of pipe may be rejected for any of the conditions stated in the annex of DMS-7310, "Reinforced Concrete Pipe Fabrication and Plant Qualification."

Article 464.2. Materials, Section G. Repairs is voided and replaced by the following:

Make repairs if necessary as stated in the annex of DMS-7310, "Reinforced Concrete Pipe Fabrication and Plant Qualification."

Article 464.2. Materials, Section H. Rejections is voided and not replaced.

SPECIAL PROVISION

465---001

Manholes and Inlets

For this project, Item 465, "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.

Article 465.2, Materials. The second paragraph is voided and replaced by the following:

Precast manholes, inlets, risers, and appurtenances are acceptable unless otherwise shown. Alternate designs for precast items must be acceptable to the Engineer and must conform to functional dimensions and dimensions for plan wall, slab and edge beam thicknesses, and reinforcing steel areas. Alternate designs must be designed and sealed by a licensed professional engineer.

SPECIAL PROVISION

500---005

Mobilization

For this project, Item 500, "Mobilization," 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 500.1. Description is supplemented by the following:

Work for this Item includes submissions required by the Contract.

Article 500.3. Payment, Section A is voided and replaced by the following:

A. Payment will be made upon presentation of a paid invoice for the payment, performance, or retainage bonds, and required insurance. The combined payment for bonds and insurance will be no more than 10% of the mobilization lump sum or 1% of the total Contract amount, whichever is less.

Article 500.3. Payment, Section F is voided and replaced by the following:

F. Upon final acceptance, 97% of the mobilization lump sum bid will be paid. Previous payments under this Item will be deducted from this amount.

Article 500.3. Payment is supplemented by the following:

G. Payment for the remainder of the lump sum bid for "Mobilization" will be made after all submittals are received, final quantities have been determined and when any separate vegetative establishment and maintenance, test and performance periods provided for in the Contract have been successfully completed.

SPECIAL PROVISION

502---033

Barricades, Signs, and Traffic Handling

For this project, 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 502.4. Payment, Section C. Maximum Total Payment Prior to Acceptance is voided and replaced by the following:

C. Maximum Total Payment Prior to Acceptance. The total payment for this Item will not exceed 10% of the total Contract amount before final acceptance in accordance with Article 5.8, "Final Acceptance." The remaining balance will be paid in accordance with Section 502.4.E, "Balance Due."

SPECIAL PROVISION

506---013

Temporary Erosion, Sedimentation, and Environmental Controls

For this project, Item 506, "Temporary Erosion, Sedimentation, and Environmental Controls," of the Standard Specifications, is hereby amended with respect to the clauses cited below, and no other clauses or requirements of this Item are waived or changed hereby.

Article 506.2. Materials. Section I. Sandbags. Table 1 is replaced with the following:

**Table 1
Sand Gradation**

Sieve #	Retained (% by Weight)
4	MAXIMUM 3%
100	MINIMUM 80%
200	MINIMUM 95%

Article 506.4 Construction, B. General, 2. Maintenance, is voided and replaced by the following:

B. General.

- 2. Maintenance.** Perform maintenance in accordance with the plans and the TPDES General Permit. Correct ineffective control measures. Implement additional controls as directed.

An Inspector will perform a regularly scheduled SWP3 inspection once a month. Make corrections as soon as possible before the next anticipated rain event or within 7 calendar days after being able to enter the site to work on each control device. A control device site being "too wet to work" during the entire 7 calendar day time period is the only acceptable reason for not accomplishing the corrections within the 7 calendar day time limit. Provide documentation on the Department's inspection form developed from the Department's inspections or through other approved methods.

If maintenance corrections are not made within this timeframe, work on the project may be suspended by the Engineer. Time charges will continue until SWP3 is brought into compliance and documentation of corrective action is provided. This in no way releases the contractor of liability for noncompliance.

SPECIAL PROVISION

512---002

Portable Concrete Traffic Barrier

For this project, Item 512, "Portable Concrete Traffic Barrier," 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 512.2. Materials. The first paragraph is supplemented by the following:

For precast concrete traffic barrier,

- Furnish the class of concrete shown on the plans. Air-entrained concrete will not be required, unless otherwise shown on the plans.
- Use a minimum of 25% Class F fly ash with mix design Option 1 from Section 421.4.A.6, "Mix Design Options."
- Do not use mix design Options 6, 7, or 8 from Section 421.4.A.6., "Mix Design Options."

Article 512.3. Construction. The second sentence of the first paragraph is voided and replaced by the following:

Multi-project fabrication plants as defined in Item 424, "Precast Concrete Structures (Fabrication)" that produce concrete traffic barrier, except temporary barrier furnished and retained by the Contractor, must be approved in accordance with DMS-7350, "Qualification Procedure for Multi-Project Fabrication Plants of Precast Concrete Traffic Barrier."

SPECIAL PROVISION

540---023

Metal Beam Guard Fence

For this project, Item 540, "Metal Beam Guard Fence," 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 540.2. Materials, Section A. Metal Beam Rail Elements. The third paragraph is replaced by the following:

Furnish metal beam rail elements from a manufacturer on the Department's approved Material Producer List, entitled "Metal Beam Guard Fence Rail Element Manufacturers."

Article 540.2. Materials, Section B. Posts, Section 2. Steel Posts is voided and replaced by the following:

2. **Steel Posts.** Provide rolled sections conforming to the material requirements of ASTM A 36. Drill or punch posts for standard rail attachment as shown on the plans. Galvanize in accordance with Item 445, "Galvanizing." Low fill culvert posts may be fabricated as galvanized "blanks" with the hole to accept the rail and the final height field fabricated. Treat all exposed post surfaces caused by the field fabrication in accordance with Section 445.3.D. "Repairs."

Article 540.2. Materials, Section B. Posts, Table 1, Rail Element Requirements. The section entitled "Markings" is voided and replaced by the following:

Markings	Permanently mark each metal beam rail element with the information required in AASHTO M 180. Permanently mark all curved sections of metal beam rail element, in addition, with the radius of the curved section in the format "R=xx ft." These additional markings (die-imprinted) must be on the back of the metal beam rail section away from traffic and visible after erection.
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Article 540.2. Materials, Section B. Posts is supplemented by the following:

3. **Composite Posts.** Meet the requirements of DMS-7210, "Composite Material Posts and Blocks for Metal Beam Guard Fence."

Article 540.2. Materials is supplemented by the following:

- H. **Terminal Anchor Posts.** Furnish new terminal anchor posts from steel conforming to the material requirements of ASTM A 36. Fabricate posts in accordance with Item 441, "Steel Structures." Galvanize terminal anchor posts after fabrication in accordance with Item 445, "Galvanizing."
- I. **Driveway Terminal Anchor Posts.** Furnish new terminal anchor posts from steel conforming to the material requirements of ASTM A 36. Fabricate posts in accordance with Item 441, "Steel Structures." Galvanize terminal anchor posts after fabrication in accordance with Item 445, "Galvanizing."

Article 540.3. Construction, Section B. Rail Elements is supplemented by the following:

Short Radius. Special rail fabrication will be required at installations having a curvature of less than 150 ft. radius. The required radius shall be as shown on the plans. Short radius metal beam guard fence requires the placement of controlled release terminal (CRT) posts of the quantity shown on the plans.

Article 540.3. Construction is supplemented by the following:

- G. **Driveway Terminal Anchor Posts.** Embed terminal anchor posts in concrete unless otherwise shown on the plans.

Article 540.4. Measurement is supplement by the following:

- D. **Short Radius.** Measurement will be by the foot to the nearest whole foot along the face of the rail in place, from beginning of radius (and first CRT post) to the end of radius.
- E. **Driveway Terminal Anchor Section.** Measurement will be by each section, complete in place, consisting of a driveway terminal anchor post and one 6 ft. section of rail element.

Article 540.5. Payment. The first paragraph is voided and replaced by the following:

540.5. Payment. The work performed and material furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Metal W-Beam Guard Fence" of the post type specified, "Metal Thrie-Beam Guard Fence" of the post type specified, "Terminal Anchor Section," "Metal Beam Guard Fence Transition" of the type specified, "Metal W-Beam Guard Fence Adjustment," "Metal Thrie-Beam Guard Fence Adjustment," "Terminal Anchor Section Adjustment," "Transition Adjustment," "Short Radius," or "Driveway Terminal Anchor Section." When weathering steel is required, Type IV will be specified.

Article 540.5. Payment, Section C. Transition is voided and replaced by the following:

C. Transition. The price bid for "Metal Beam Guard Fence Transition" is full compensation for furnishing nested sections of thrie-beam; nested sections of W-beam; thrie-beam-to-W-beam transitional rail piece, posts, concrete, curb, and connections to W-beam guard fence and bridge rails; thrie-beam terminal connectors and terminal connectors; excavation and backfilling; and equipment, labor, tools, and incidentals.

Article 540.5. Payment is supplemented by the following:

E. Short Radius. The price bid for "Short Radius" is full compensation for furnishing special rail fabricated metal beam guard fence, controlled release terminal (CRT) posts, materials, hauling, erection, blocks, driving posts, excavating, backfilling, equipment, labor, tools, and incidentals.

F. Driveway Terminal Anchor Section. The price bid for "Driveway Terminal Anchor Section" is full compensation for furnishing the rail element, driveway anchor assembly, driveway terminal anchor post, and foundations; installing the rail element anchor assembly and the driveway terminal anchor post and foundations; excavation and backfilling; and equipment, labor, tools, and incidentals.

SPECIAL PROVISION

672---034

Raised Pavement Markers

For this project, Item 672, "Raised Pavement Markers," 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 672.2. Materials, Section B. Adhesives is supplemented by the following:

- The Contractor may propose alternate adhesive materials for consideration and approval by the Engineer.

Article 672.3. Construction. The sixth paragraph is voided and replaced by the following:

Use the following adhesive materials for placement jiggle bar tile, reflectorized pavement markers, and traffic buttons unless otherwise shown on the plans:

- standard or flexible bituminous adhesive for applications on bituminous pavements.
- epoxy adhesive or flexible bituminous adhesive for applications on hydraulic cement concrete pavements.

Use epoxy adhesive for plowable reflectorized pavement markers.

Article 672.3. Construction is supplemented by the following:

Provide a 30-day performance period that begins the day following written acceptance for each separate location. The date of written acceptance will be the last calendar day of each month for the RPMs installed that month for the completed separate project locations. This written acceptance does not constitute final acceptance.

Replace all missing, broken or non-reflective RPMs. Visual evaluations will be used for these determinations. Upon request, the Engineer will allow a Contractor representative to accompany the Engineer on these evaluations.

The Engineer may exclude RPMs from the replacement provisions of the performance, provided the Engineer determines that the failure is a result of causes other than defective material or inadequate installation procedures. Examples of outside causes are extreme wear at intersections, damage by snow or ice removal, and pavement failure.

Replace all missing or non-reflective RPMs identified during the performance period within 30 days after notification. The end of the performance period does not relieve the Contractor from the performance deficiencies requiring corrective action identified during the performance period.

Article 672.5. Payment is supplemented by the following:

No additional payment will be made for replacement of RPMs failing to meet the performance requirements.

RPMs INSTALLATION RECORD

The 30 day performance period begins the day after written acceptance for each separate location. The date of written acceptance will be the last calendar day of each month for the RPMs installed that month for the completed separate project locations.

COUNTY HIGHWAY	CONTROL PROJECT	LIMITS FROM LIMITS TO	MONTH/YR OF INSTALLATION

Contractor signature _____

_____ Date

Department signature _____

_____ Date

SPECIAL SPECIFICATION

3224

Dense-Graded Hot-Mix Asphalt (QC/QA)

1. **Description.** Construct a hot-mix asphalt (HMA) pavement layer composed of a compacted, dense-graded mixture of aggregate and asphalt binder mixed hot in a mixing plant.
2. **Materials.** Furnish uncontaminated materials of uniform quality that meet the requirements of the plans and specifications.

Notify the Engineer of all material sources. Notify the Engineer before changing any material source or formulation. When the Contractor makes a source or formulation change, the Engineer will verify that the specification requirements are met 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.

A. 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. Samples must be 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.

1. **Coarse Aggregate.** Coarse aggregate stockpiles must have no more than 20% material passing the No. 8 sieve.
Provide aggregate from sources listed in the BRSQC located at http://www.dot.state.tx.us/txdot_library/publications/producer_list.htm. 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. 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.

Do not add material to a stockpile that has been tested and approved, for sources not listed on the Department's *Bituminous Rated Source Quality Catalog* (BRSQC). Provide coarse aggregate with at least the minimum SAC as shown on the plans. SAC requirements apply only to aggregates used on the surface of travel lanes. When shown on the plans, SAC requirements apply to aggregates used on surfaces other than travel lanes. The SAC for sources on the Department's Aggregate Quality Monitoring Program (AQMP) is listed in the BRSQC.

a. 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 in order to meet requirements for Class A materials. When blending Class A and B aggregates to meet a Class A requirement, ensure that at least 50% by weight of the material retained on the No. 4 sieve comes from the Class A aggregate source. Blend by volume if the bulk specific gravities of the Class A and B aggregates differ by more than 0.300. For blending purposes, coarse aggregate from RAP and Recycled Asphalt Shingles (RAS) will be considered as Class B aggregate.

When the Contractor blends Class A and B aggregates to meet a Class A requirement, the Engineer may perform tests at any time during production to ensure that at least 50% by weight of the material retained on the No. 4 sieve comes from the Class A aggregate source. In such cases where the Engineer elects to verify conformance, the Engineer will use the Department's mix design program 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 program; however, a failing spot check will require confirmation with a stockpile gradation determined by the Engineer.

- b. 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 prior to 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 will estimate the magnesium sulfate soundness loss ($Mg_{est.}$) for each coarse aggregate source by multiplying the RSSM value by the ratio of the actual Micro-Deval percent loss ($MD_{act.}$) divided by the Rated Source Micro-Deval (RSMD) using the formula $Mg_{est.} = (RSSM)(MD_{act.}/RSMD)$. 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 Geotechnical, Soils, & Aggregates Branch of the Construction Division. Additional testing may be required prior to granting approval.

2. **Intermediate Aggregate.** Aggregates not meeting the definition of coarse or fine aggregate will be defined as intermediate aggregate. When used, supply intermediate aggregates 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. When used, supply intermediate aggregate from coarse aggregate sources that meet the requirements shown in Table 1, unless otherwise approved.

If 10% or more of the stockpile is retained on the No. 4 sieve, test the stockpile and verify that it meets the requirements in Table 1 for coarse aggregate angularity (Tex-460-A) and flat and elongated particles (Tex-280-F).

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. At most 15% of the total aggregate may be field sand or other uncrushed fine aggregate. With the exception of field sand, use fine aggregate from coarse aggregate sources that meet the requirements shown in Table 1, unless otherwise approved.

If 10% or more of the stockpile is retained on the No. 4 sieve, test the stockpile and verify that it meets the requirements in Table 1 for coarse aggregate angularity (Tex-460-A) and flat and elongated particles (Tex-280-F).

Table 1
Aggregate Quality Requirements

Property	Test Method	Requirement
Coarse Aggregate		
SAC	AQMP	As shown on plans
Deleterious material, %, max	Tex-217-F, Part I	1.5
Decantation, %, max	Tex-217-F, Part II	1.5
Micro-Deval abrasion, %, max	Tex-461-A	Note 1
Los Angeles abrasion, %, max	Tex-410-A	40
Magnesium sulfate soundness, 5 cycles, %, max	Tex-411-A	30
Coarse aggregate angularity, 2 crushed faces, %, Min	Tex-460-A, Part I	85 ²
Flat and elongated particles @ 5:1, %, max	Tex-280-F	10
Fine Aggregate		
Linear shrinkage, %, Max	Tex-107-E	3
Combined Aggregate³		
Sand equivalent, %, Min	Tex-203-F	45

1. Used to estimate the magnesium sulfate soundness loss in accordance with Section 3224.2.A.1, "Coarse Aggregate."

2. Only applies to crushed gravel.

3. Aggregates, without mineral filler, RAP, or additives, combined as used in the job-mix formula (JMF)

**Table 2
Gradation Requirements for Fine Aggregate**

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

B. 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. Do not use more than 2% mineral hydrated lime unless otherwise shown on the plans. If a substitute binder is used, do not use more than 1% hydrated lime unless otherwise shown on the plans or allowed by the Engineer. 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. When used, provide mineral filler that:

- is sufficiently dry, free-flowing, and free from clump and foreign matter;
- does not exceed 3% linear shrinkage when tested in accordance with Tex-107-E; and
- meets the gradation requirements in Table 3.

**Table 3
Gradation Requirements for Mineral Filler**

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

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

D. Asphalt Binder. Furnish the type and grade of performance-graded (PG) asphalt specified on the plans. Unless otherwise shown on the plans, the Contractor may use a substitute PG binder listed in Table 4 in lieu of the PG binder originally specified, 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.J, "Performance-Graded Binders;"
- the substitute binder has an un-aged dynamic shear value less than or equal to 2.00 kPa and an RTFO aged dynamic shear value less than or equal to 5.00 kPa at the PG test temperature; 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 4
Allowable Substitute PG Binders

PG Binder Originally Specified	Allowable Substitute PG Binders
PG 76-22	PG 70-22 or PG 64-22
PG 70-22	PG 64-22 or PG 58-22
PG 64-22	PG 58-22
PG 76-28	PG 70-28 or PG 64-28
PG 70-28	PG 64-28 or PG 58-28
PG 64-28	PG 58-28

- E. Tack Coat.** Unless otherwise shown on the plans or approved, 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 or preferred tack coat materials may be required when shown on the plans. Do not dilute emulsified asphalts at the terminal, in the field, or at any other location before use.

The Engineer will obtain at least 1 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. The Engineer will obtain the sample from the asphalt distributor immediately before use.

- F. Additives.** When shown on the plans, use the type and rate of additive specified. Other additives that facilitate mixing, compaction, or improve the quality of the mixture may be allowed when approved.

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 back into the drum.

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 Department approved WMA additives or processes. The Department's approved list of WMA additives and processes is located at http://www.dot.state.tx.us/txdot_library/publications/producer_list.htm.

WMA is allowed for use on all projects and is required when shown on plans. The maximum placement or target discharge temperature for WMA may be set at a value less than 275°F when shown on the plans.

Department approved WMA additives or processes may be used to facilitate mixing and compaction of HMA produced at target discharge temperatures greater than 275°F; however, such mixtures will not be defined as WMA.

G. Recycled Materials.

1. **RAP.** RAP is salvaged, milled, pulverized, broken, or crushed asphalt pavement. Crush or break RAP so that 100% of the particles pass the 2 in. sieve.

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. This allowance does not apply to a Contractor using unfractionated 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. Unless otherwise shown on the plans, the Department will not perform any tests or assume any liability for the quality of the Department-owned RAP. When shown on the plans, the Contractor will retain ownership of RAP generated on the project.

Fractionated RAP is defined as having 2 or more RAP stockpiles, divided into coarse and fine fractions. The coarse RAP stockpile will contain only material retained by processing over a 3/8 in. screen or 1/2 in. screen, unless otherwise approved. The fine RAP stockpile will contain only material passing the 3/8 in. screen or 1/2 in. screen, unless otherwise approved. The Engineer may allow the Contractor to use an alternate to the 3/8 in. screen or 1/2 in. screen to fractionate the RAP. The maximum percentages of fractionated RAP may be comprised of coarse or fine fractionated RAP or the combination of both coarse and fine fractionated RAP. Utilize a separate cold feed bin for each stockpile of fractionated RAP used.

Determine asphalt content and gradation of RAP stockpiles for mixture design purposes in accordance with Tex-236-F. Perform other tests on RAP when shown on the plans. Do not exceed the maximum allowable percentages of RAP shown in Table 5. Asphalt binder from RAP and RAS is designated as recycled asphalt binder. When RAP or RAS is used, calculate and ensure that the ratio of the recycled asphalt binder to total binder does not exceed the percentages shown in Table 5. The allowable percentages shown in Table 5 may be decreased or increased 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 8. 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.

2. **RAS.** Use of post-manufactured RAS or post-consumer RAS is permitted unless otherwise shown on the plans. RAS are defined as processed asphalt shingle material from manufacturing of asphalt roofing shingles or from re-roofing residential structures. Post-manufactured RAS are processed manufacturer's shingle scrap by-product. Post-consumer RAS, or tear-offs, are processed shingle scrap removed from residential structures. Comply with all regulatory requirements stipulated for RAS by the Texas Commission on Environmental Quality (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 1/2 in. sieve and 95% pass the 3/8 in. sieve when tested in accordance with Tex-200-F, Part I. Perform a sieve analysis on processed RAS material prior to extraction (or ignition) of the asphalt.

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. When RAS is preblended with sand or fine RAP, show the materials as two separate bins on the mixture design job mix formula (JMF) even though the combined materials are added using a single cold feed bin.

Determine asphalt content and gradation of the RAS material for mixture design purposes in accordance with Tex-236-F. Do not exceed the maximum allowable percentages of RAS shown in Table 5. Asphalt binder from RAS and RAP is designated as recycled asphalt binder. When RAS or RAP is used, calculate and ensure that the ratio of the recycled asphalt binder to total binder does not exceed the percentages shown in Table 5. The allowable percentages shown in Table 5 may be decreased or increased when shown on the plans.

Certify compliance of the RAS with DMS-11000, "Evaluating and Using Nonhazardous Recyclable Materials (NRM) Guidelines." If the RAS has not come into contact with any hazardous materials, treat it as an established NRM. Unless otherwise directed, use only RAS from shingle sources on the Construction Division's "Nonhazardous Recycled Materials" approved list at http://www.dot.state.tx.us/txdot_library/publications/producer_list.htm. Prior to use, remove substantially all materials 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. Unless otherwise approved, do not use RAS if deleterious materials are more than 1.5% of the stockpiled RAS. Submit a sample for approval to the Engineer prior to submitting the mixture design. The Department will perform the testing for deleterious material of RAS to determine specification compliance.

Table 5
Maximum Allowable Amounts of Recycled Binder, RAP & RAS

Mixture Description & Location	Maximum Ratio of Recycled Binder ¹ to Total Binder (%)	Maximum Allowable % (Percentage by Weight of Total Mixture)		
		Unfractionated RAP ²	Fractionated RAP ³	RAS ⁴
Surface Mixes ⁵	35.0	10.0	20.0	5.0
Non-Surface Mixes ⁶ < 8 in. From Final Riding Surface	40.0	15.0	30.0	5.0
Non-Surface Mixes ⁶ > 8 in. From Final Riding Surface	45.0	20.0	40.0	5.0

1. Combined recycled binder from RAP and RAS.
2. Do not use in combination with RAS or fractionated RAP.
3. May not be used in addition to unfractionated RAP; however, up to 5% of fractionated RAP may be replaced with RAS.
4. May be used separately or as a replacement for no more than 5% of the allowable fractionated RAP.
5. "Surface" mixes are defined as mixtures that will be the final lift or riding surface of the pavement structure.
6. "Non-Surface" mixes are defined as mixtures that will be an intermediate or base layer in the pavement structure.

3. Equipment. Provide required or necessary equipment in accordance with Item 320, "Equipment for Hot-Mix Asphalt Materials."

4. Construction. Produce, haul, place, and compact the specified paving mixture. On or before the first day of paving, it is mandatory to schedule and participate in a pre-paving meeting with the Engineer unless otherwise shown on the plans.

A. Certification. Personnel certified by the Department-approved Hot Mix Asphalt Center 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 that is developed and signed by a Level 2 certified specialist. Provide a Level 1A certified specialist at the plant during production operations. Provide a Level 1B certified specialist to conduct placement tests.

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

Test Description	Test Method	Contractor	Engineer	Level
1. Aggregate and Recycled Material Testing				
Sampling	Tex-400-A	✓	✓	1A
Dry sieve	Tex-200-F, Part I	✓	✓	1A
Washed sieve	Tex-200-F, Part II	✓	✓	1A
Deleterious material	Tex-217-F, Parts I & III	✓	✓	2
Decantation	Tex-217-F, Part II	✓	✓	2
Los Angeles abrasion	Tex-410-A		✓	
Magnesium sulfate soundness	Tex-411-A		✓	
Micro-Deval abrasion	Tex-461-A		✓	
Coarse aggregate angularity	Tex-460-A	✓	✓	2
Flat and elongated particles	Tex-280-F	✓	✓	2
Linear shrinkage	Tex-107-E	✓	✓	2
Sand equivalent	Tex-203-F	✓	✓	2
Organic impurities	Tex-408-A	✓	✓	2
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 (TGC)	Tex-206-F	✓	✓	1A
Molding (SGC)	Tex-241-F	✓	✓	1A
Laboratory-molded density	Tex-207-F	✓	✓	1A
VMA (calculation only)	Tex-207-F	✓	✓	2
Rice gravity	Tex-227-F	✓	✓	1A
Ignition oven correction factors ¹	Tex-236-F	✓	✓	2
Indirect tensile strength	Tex-226-F	✓	✓	2
Hamburg wheel test	Tex-242-F	✓	✓	2
Boil test	Tex-530-C	✓	✓	1A
4. Production Testing				
Selecting Random Numbers	Tex-225-F, Part I		✓	1A
Mixture sampling	Tex-222-F	✓	✓	1A
Molding (TGC)	Tex-206-F	✓	✓	1A
Molding (SGC)	Tex-241-F	✓	✓	1A
Laboratory-molded density	Tex-207-F	✓	✓	1A
VMA (calculation only)	Tex-207-F	✓	✓	1A
Rice gravity	Tex-227-F	✓	✓	1A
Gradation & asphalt content ¹	Tex-236-F	✓	✓	1A
Control charts	Tex-233-F	✓	✓	1A
Moisture content	Tex-212-F	✓	✓	1A
Hamburg Wheel test	Tex-242-F	✓	✓	2
Micro-Deval abrasion	Tex-461-A		✓	
Boil test	Tex-530-C	✓	✓	1A
Aging ratio	Tex-211-F		✓	
Overlay Test	Tex-248-F		✓	
Cantabro Test	Tex-245-F		✓	
5. Placement Testing				
Selecting Random Numbers	Tex-225-F, Part II		✓	1A/1B
Trimming Roadway Cores	Tex-207-F	✓	✓	1A/1B
In-place air voids	Tex-207-F	✓	✓	1A/1B
Establish rolling pattern	Tex-207-F	✓		1B
Control charts	Tex-233-F	✓	✓	1A
Ride quality measurement	Tex-1001-S	✓	✓	1B
Segregation (density profile)	Tex-207-F, Part V	✓	✓	1B
Longitudinal joint density	Tex-207-F, Part VII	✓	✓	1B
Thermal profile	Tex-244-F	✓	✓	1B
Tack coat adhesion	Tex-243-F		✓	1B

1. Refer to Section 3224.4.I.2.c for exceptions to using an ignition oven.

B. Reporting and Responsibilities. Use Department-provided software to record and calculate all test data including but not limited to mixture design, production and placement QC/QA, control charts, thermal profiles, segregation density profiles, and longitudinal joint density. Obtain the latest version of the software at http://www.dot.state.tx.us/txdot_library/consultants_contractors/forms/site_manager.htm or from the Engineer. The Engineer and the Contractor shall 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 shall immediately report to the other party any test result that requires production or placement to be suspended, a payment penalty, or fails to meet the specification requirements. Record and submit all test results and pertinent information on Department-provided software to the Engineer electronically by means of a portable USB flash drive, compact disk, or via email.

Subsequent sublots placed after test results are available to the Contractor, which require them to suspend operations, may be considered unauthorized work. Unauthorized work will be accepted or rejected at the discretion of the Engineer in accordance with Section 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 Asphalt content ¹ Laboratory-molded density ² Moisture content ³ Boil test ³	Contractor	Engineer	1 working day of completion of the subplot
Production Quality Assurance			
Gradation ³ Asphalt content ³ Laboratory-molded density ¹ Hamburg wheel test ² Boil test ³ Binder tests ²	Engineer	Contractor	1 working day of completion of the subplot
Placement Quality Control			
In-place air voids ² Segregation ¹ Longitudinal joint density ¹ Thermal profile ¹	Contractor	Engineer	Reported at the completion of each lot
Placement Quality Assurance			
In-place air voids ¹ Segregation ² Longitudinal joint density ² Thermal profile ² Aging ratio ²	Engineer	Contractor	1 working day of receipt of the trimmed cores for in-place air voids ⁴
Pay 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. To be reported as soon as results become available.
3. To be performed at the frequency specified on the plans.
4. 2 days are allowed if cores can not be dried to constant weight within 1 day.

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

- C. **QCP.** Develop and follow the QCP in detail. Obtain approval from the Engineer 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 to the Engineer before the mandatory prepping meeting. Receive the Engineer's approval of the QCP before beginning production. Include the following items in the QCP.

1. **Project Personnel.** For project personnel, include:
 - a list of individuals responsible for QC with authority to take corrective action; and
 - contact information for each individual listed.
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.
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, lime, liquid antistriper);
 - procedures for reporting job control test results; and
 - procedures to avoid segregation and drain-down in the silo.
4. **Loading and Transporting.** For loading and transporting, include:
 - type and application method for release agents; and
 - truck loading procedures to avoid segregation.
5. **Placement and Compaction.** For placement and compaction, include:
 - proposed agenda for mandatory prepping meeting, including date and location;
 - 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.

D. Mixture Design.

1. **Design Requirements.** The Contractor may elect to design the mixture using a Texas Gyratory Compactor (TGC) or a Superpave Gyratory Compactor (SGC), unless otherwise shown on the plans. Use the typical weight design example given in Tex-204-F, Part I, when using a TGC. Use the Superpave mixture design procedure given in Tex-204-F, Part IV, when using a SGC. Design the mixture to meet the requirements listed in Tables 1, 2, 3, 4, 5, 8, 9, and 10.
 - a. **Target Laboratory Molded Density When The TGC Is Used.** Design the mixture at a 96.5% target laboratory-molded density or as noted in Table 9. The target laboratory-molded density may be increased 0.5%, not to exceed 97.0%, at the Contractor's discretion. When electing to raise the target laboratory-molded density from the specified value, document the target value on the JMF1 submittal. Perform Hamburg and Tensile Strength tests at the corresponding optimum asphalt content.
 - b. **Design Number of Gyration (Ndesign) When The SGC Is Used.** 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 9. The Ndesign level may be reduced to no less than 35 gyrations at the Contractor's discretion. When electing to reduce the Ndesign level from the specified value, document the target value on the JMF1 submittal. Perform Hamburg and Tensile Strength tests at the corresponding optimum asphalt content.

Use an approved laboratory 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 Construction Division maintains a list of approved laboratories at http://www.dot.state.tx.us/txdot_library/publications/producer_list.htm. The Engineer will be allowed 10 working days to provide the Contractor with Hamburg Wheel test results on the laboratory mixture design.

The Contractor may submit a new mixture design at anytime during the project. The Engineer will approve all mixture designs before the Contractor can begin production. When shown on the plans, the Engineer will provide the mixture design.

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

- the combined aggregate gradation, source, specific gravity, and percent of each material used;
- the target laboratory-molded density (or Ndesign level when using the SGC);
- 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 Bands (% Passing by Weight or Volume)
and VMA¹ Requirements

Sieve Size	A Coarse Base	B Fine Base	C Coarse Surface	D Fine Surface	F Fine Mixture
2"	100.0				
1-1/2"	98.0–100.0	100.0	–	–	–
1"	78.0–94.0	98.0–100.0	100.0	–	–
3/4"	64.0–85.0	84.0–98.0	95.0–100.0	100.0	–
1/2"	50.0–70.0	–	–	98.0–100.0	100.0
3/8"	–	60.0–80.0	70.0–85.0	85.0–100.0	98.0–100.0
#4	30.0–50.0	40.0–60.0	43.0–63.0	50.0–70.0	70.0–90.0
#8	22.0–36.0	29.0–43.0	32.0–44.0	35.0–46.0	38.0–48.0
#30	8.0–23.0	13.0–28.0	14.0–28.0	15.0–29.0	12.0–27.0
#50	3.0–19.0	6.0–20.0	7.0–21.0	7.0–20.0	6.0–19.0
#200	2.0–7.0	2.0–7.0	2.0–7.0	2.0–7.0	2.0–7.0
Design VMA, % Minimum					
–	12.0	13.0	14.0	15.0	16.0
Production (Plant-Produced) VMA, % Minimum					
–	11.0	12.0	13.0	14.0	15.0

1. Voids in mineral aggregates

Table 9
Laboratory Mixture Design Properties

Mixture Property	Test Method	Requirement
Target laboratory-molded density, %	Tex-207-F	96.5 ¹
Design gyrations (Ndesign)	Tex-241-F	50 gyrations ²
Tensile strength (dry), psi (molded to 93% ±1% density)	Tex-226-F	85–200 ³
Boil test ⁴	Tex-530-C	–

1. May be adjusted down to 96.0 or up to 97.0% when shown on the plans or specification or allowed by the Engineer when using the TGC (Tex-204-F, Part I).

2. May be adjusted within a range of 35–100 gyrations when shown on the plans or specification or allowed by the Engineer.

3. The Engineer may allow the IDT strength to exceed 200 psi if the corresponding Hamburg Wheel rut depth is greater than 4.0 mm and less than 12.5 mm.

4. Used to establish baseline for comparison to production results. May be waived when approved.

**Table 10
Hamburg Wheel Test Requirements¹**

High-Temperature Binder Grade	Minimum # of Passes² @ 0.5" Rut Depth, Tested @ 122°F
PG 64 or lower	10,000
PG 70	15,000
PG 76 or higher	20,000

1. Tested in accordance with Tex-242-F.

2. May be decreased or waived when shown on the plans

- 2. Job-Mix Formula Approval.** The job-mix formula (JMF) is the combined aggregate gradation, target laboratory molded density (or 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 recommend 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 2 trial batches per design are required.

a. Contractor's Responsibilities.

- (1) Providing Gyrotory Compactor.** Use a Texas Gyrotory Compactor (TGC) calibrated in accordance with Tex-914-K when electing or required to design the mixture in accordance with Tex-204-F, Part I, for molding production samples. Furnish a Superpave Gyrotory Compactor (SGC) calibrated in accordance with Tex-241-F when electing or required to design the mixture in accordance with Tex-204-F, Part IV, for molding production samples. If the SGC is used, locate the SGC at the Engineer's field laboratory and make the SGC available to the Engineer for use in molding production samples.
- (2) Gyrotory Compactor Correlation Factors.** Use Tex-206-F, Part II, to perform a gyrotory compactor correlation when the Engineer uses a different gyrotory compactor. Apply the correlation factor to all subsequent production test results.
- (3) Submitting JMF1.** Furnish the Engineer a mix design report (JMF1) with representative samples of all component materials and request approval to produce the trial batch. If opting to have the Department perform the Hamburg Wheel test on the laboratory mixture, provide the Engineer with approximately 10,000 g of the design mixture and request that the Department perform the Hamburg Wheel test.
- (4) Supplying Aggregate.** Provide the Engineer with approximately 40 lb. of each aggregate stockpile, unless otherwise directed.

- (5) **Supplying Asphalt.** Provide the Engineer at least 1 gal. of the asphalt material and sufficient quantities of any additives proposed for use.
- (6) **Ignition Oven Correction Factors.** Determine the aggregate and asphalt correction factors from the ignition oven in accordance with Tex-236-F. Prior to the trial batch production, provide the Engineer with split samples of the mixtures, including all additives (except water), and blank samples used to determine the correction factors for the ignition oven used for quality assurance 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.
- (7) **Boil Test.** Perform the test and retain the tested sample from Tex-530-C until completion of the project or as directed by the Engineer. Use this sample for comparison purposes during production. The Engineer may waive the requirement for the boil test.
- (8) **Trial Batch Production.** Upon receiving conditional approval of JMF1 and authorization from the Engineer to produce a trial batch, provide a plant-produced 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 11.
- (9) **Trial Batch Production Equipment.** To produce the trial batch, use only equipment and materials proposed for use on the project.
- (10) **Trial Batch Quantity.** Produce enough quantity of the trial batch to ensure that the mixture meets the specification requirements.
- (11) **Number of Trial Batches.** Produce trial batches as necessary to obtain a mixture that meets the specification requirements.
- (12) **Trial Batch Sampling.** Obtain a representative sample of the trial batch and split it into three equal portions, in accordance with Tex-222-F. Label these portions as "Contractor," "Engineer," and "Referee." Deliver samples to the appropriate laboratory as directed.
- (13) **Trial Batch Testing.** Test the trial batch to ensure that the mixture produced using the proposed JMF1 meets the requirements in Table 11. The trial batch mixture must also be in compliance with the Hamburg Wheel requirement in Table 10. Use an 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.

(14) Development of JMF2. After the Engineer grants full approval of JMF1 based on results from the trial batch, evaluate the trial batch test results, determine the optimum mixture proportions, and submit as JMF2. Adjust the asphalt content or gradation to achieve the specified target laboratory-molded density. The asphalt content established for JMF2 is not required to be within any tolerance of the optimum asphalt content established for JMF1; however, mixture produced using JMF2 must meet the VMA requirements for production shown in Table 8. If the optimum asphalt content for JMF2 is more than 0.5% lower than the optimum asphalt 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.

(15) Mixture Production. After receiving approval for JMF2 and receiving a passing result from the Department's or a Department-approved laboratory's Hamburg Wheel test on the trial batch, use JMF2 to produce Lot 1 as described in Section 3224.4.I.3.a.(1) "Lot 1 Placement." As an option, once JMF2 is approved, proceed to Lot 1 production at the Contractor's risk without receiving the results from the Department's Hamburg Wheel test on the trial batch.

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

(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.

(17) JMF Adjustments. If necessary, adjust the JMF before beginning a new lot. The adjusted JMF must:

- be provided to the Engineer in writing before the start on a new lot;
- be numbered in sequence to the previous JMF;
- meet the master gradation limits shown in Table 8; and
- be within the operational tolerances of JMF2 listed in Table 11.

(18) Requesting Referee Testing. If needed, use referee testing in accordance with Section 3224.4.I.1, "Referee Testing," to resolve testing differences with the Engineer.

Table 11
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 content, %	Tex-236-F	±0.5	±0.3 ³	±0.3
Laboratory-molded density, %	Tex-207-F	±1.0	±1.0	±1.0
In-place air voids, %		N/A	N/A	±1.0
Laboratory-molded bulk specific gravity		N/A	N/A	±0.020
VMA, %, min		Note 4	Note 4	N/A
Theoretical maximum specific (Rice) gravity	Tex-227-F	N/A	N/A	±0.020

1. Contractor may request referee testing only when values exceed these tolerances.

2. 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.

3. Only applies to mixture produced for Lot 1 and higher.

4. Test and verify that Table 8 requirements are met.

b. Engineer's Responsibilities.

(1) Gyrotory Compactor. For mixtures designed in accordance with Tex-204-F, Part I, the Engineer will use a Department TGC, calibrated according to Tex-914-K, to mold samples for trial batch and production testing. The Engineer will make the Department TGC and the Department field laboratory available to the Contractor for molding verification samples, if requested by the Contractor.

For mixtures designed in accordance with Tex-204-F, Part IV, 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

(2) Conditional Approval of JMF1 and Authorizing Trial Batch. Within 2 working days of receiving the mixture design report (JMF1) and all required materials and Contractor-provided Hamburg Wheel test results, the Engineer will review the Contractor's mix design report and verify conformance with all aggregates, asphalt, additives, and 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, a total of 10 working days is allowed for conditional approval of JMF 1. The Engineer will base full approval of JMF1 on test results on mixture from the trial batch.

The Engineer will determine the Micro-Deval abrasion loss and will estimate the magnesium sulfate soundness loss for each coarse aggregate source in accordance with Section 3224.2.A.1, "Coarse Aggregate." In addition to Micro-Deval testing, the Engineer may sample and test project materials at any time during the project to verify specification compliance. If the Engineer's test results are pending after 2 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.

- (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 10.
- (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 quality assurance testing during production in accordance with Tex-236-F.
- (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 11. 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 10.

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 9;
 - Tex-461-A, to determine the need for additional magnesium sulfate soundness testing; and
 - Tex-530-C, to retain and use for comparison purposes during production.
- (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 11. The Engineer will notify the Contractor that an additional trial batch is required if the trial batch does not meet these requirements.

- (7) **Approval of JMF2.** The Engineer will approve JMF2 within 1 working day if the gradation meets the master grading limits shown in Table 8. The asphalt content established for JMF2 is not required to be within any tolerance of the optimum asphalt content established for JMF1; however, mixture produced using JMF2 must meet the VMA requirements shown in Table 8. If the optimum asphalt content for JMF2 is more than 0.5% lower than the optimum asphalt 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.
- (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. As an option, the Contractor may, at their own risk, proceed 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.

- (9) **Approval of JMF3.** The Engineer will approve JMF3 within 1 working day if it meets the master grading limits shown in Table 8 and is within the operational tolerances of JMF2 listed in Table 11.

E. 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.

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. On a daily basis, provide the Engineer with the records of asphalt binder and hot-mix asphalt discharge temperatures (in legible and discernable increments) in accordance with Item 320, "Equipment for Hot-Mix Asphalt Materials." Unless otherwise approved, do not store mixture for a period long enough to affect the quality of the mixture, nor in any case longer than 12 hr.
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 350°F (or 275°F for WMA) and is not lower than 215°F. The Department will not pay for or allow placement of any mixture produced at more than 350°F.

When WMA is required, produce the WMA within the target temperature discharge range of 215°F and 275°F. 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. If requested, determine the moisture content 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.

- F. Hauling Operations.** Before use, clean all truck beds to ensure that mixture is not contaminated. When a release agent is necessary, use a release agent on the approved list maintained by the Construction Division to coat the inside bed of the truck.

Use only equipment for hauling as defined in Section 3224.4.G.3.d, "Hauling Equipment." Other hauling equipment may be used when allowed by the Engineer.

- G. 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 by the Engineer. When the Pave-IR system is not used for specification compliance, use a non-contact infrared thermometer to measure and record the internal temperature of the mixture as discharged from the truck or material transfer device prior to or as the mix enters the paver and an approximate station number or GPS coordinates on each ticket. Unless otherwise directed, 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. 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, or as directed. Ensure that all finished surfaces will drain properly. Place mixture within the compacted lift thickness shown in Table 12, unless otherwise shown on the plans or allowed. Unless otherwise shown on the plans, the thickness determined is based on the rate of 110 lb./sy for each inch of pavement.

Table 12
Compacted Lift Thickness and Required Core Height

Mixture Type	Compacted Lift Thickness		Minimum Untrimmed Core Height (in.) Eligible for Testing
	Minimum (in.)	Maximum (in.)	
A	3.00	6.00	2.00
B	2.50	5.00	1.75
C	2.00	4.00	1.50
D	1.50	3.00	1.25
F	1.25	2.50	1.25

- Weather Conditions.** Place mixture when the roadway surface temperature is equal to or higher than the temperatures listed in Table 13, unless otherwise approved or as shown on the plans. Measure the roadway surface temperature with a handheld infrared thermometer. The Engineer may allow mixture placement to begin prior to the roadway surface reaching the required temperature requirements, if conditions are such that the roadway surface will reach the required temperature within 2 hours of beginning placement operations. Unless otherwise shown on the plans, place mixtures only when weather conditions and moisture conditions of the roadway surface are suitable in the opinion of the Engineer.

In lieu of complying with the requirements in Table 13, the Contractor may pave any time the roadway is dry and the roadway surface temperature is at least 32°F by using a Pave-IR system and demonstrating to the Engineer that no recurring severe thermal segregation exists. When using the Pave-IR system on pavement surfaces that do not meet the requirements in Table 13, the Engineer may restrict the Contractor from paving surface mixtures if the ambient temperature is likely to drop below 32°F within 12 hours of paving. When used, operate the Pave-IR system in accordance with Tex-244-F and provide the Engineer with the automated report described in Tex-244-F on a daily basis unless otherwise directed.

Table 13
Minimum Pavement Surface Temperatures

Originally Specified High Temperature Binder Grade	Minimum Pavement Surface Temperatures in Degrees Fahrenheit	
	Subsurface Layers or Night Paving Operations	Surface Layers Placed in Daylight Operations
PG 64 or lower	45	50
PG 70	55 ¹	60 ¹
PG 76 or higher	60 ¹	60 ¹

- Contractors may pave at temperatures 10°F lower than the values shown in Table 13 when utilizing a paving process including WMA or equipment that eliminates thermal segregation. In such cases, the Contractor must use either a hand held thermal camera or a hand held infrared thermometer 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.

2. **Tack Coat.** Clean the surface before placing the tack coat. Unless otherwise approved, apply tack coat uniformly at the rate directed by the Engineer. The Engineer will set the rate between 0.04 and 0.10 gal. of residual asphalt per square yard of surface area. Apply the tack coat in a uniform manner such that streaks and other irregular patterns are avoided. Apply a thin, uniform tack coat to all contact surfaces of curbs, structures, and all joints. Allow adequate time for emulsion to break completely prior to placing any material. Prevent splattering of tack coat when placed adjacent to curb, gutter, and structures. Roll the tack coat with a pneumatic-tire roller to remove streaks and other irregular patterns when directed. The Engineer may use Tex-243-F to verify that the tack coat has adequate adhesive properties. The Engineer may suspend paving operations until there is adequate adhesion.

3. **Lay-Down Operations.**

a. **Thermal Profile.** Use an infrared thermometer or thermal camera to obtain a thermal profile on each subplot in accordance with Tex-244-F. The Engineer will obtain a thermal profile at least once per project and may obtain as many thermal profiles as deemed necessary. Thermal profiles are not applicable in miscellaneous areas as described in Section 3224.4.I.3.a(4), "Miscellaneous Areas."

At the completion of each lot, provide the Engineer with the thermal profile of every subplot within the lot. Report the results of each thermal profile in accordance with Section 3224.4.B, "Reporting."

(1) **Moderate Thermal Segregation.** Any areas that have a maximum temperature differential greater than 25°F but not exceeding 50°F are deemed as having moderate thermal segregation. Take immediate corrective action to eliminate the moderate thermal segregation. Evaluate areas with moderate thermal segregation by performing a density profile in accordance with Section 3224.4.I.3.c(2), "Segregation (Density Profile)."

(2) **Severe Thermal Segregation.** Any areas that have a maximum temperature differential greater than 50°F are deemed as having severe thermal segregation. When the Pave-IR system is not used, no production or placement bonus will be paid for any subplot that contains severe thermal segregation. Unless otherwise directed, suspend operations and take immediate corrective action to eliminate severe thermal segregation. Resume operations when the Engineer determines that subsequent production will meet the requirements of this Item. Evaluate areas with severe thermal segregation by performing a density profile in accordance with Section 3224.4.I.3.c(2), "Segregation (Density Profile)." Unless otherwise directed, remove and replace the material in any areas that have both severe thermal segregation and a failing result for Segregation (Density Profile). The subplot in question may receive a production and placement bonus if applicable when the defective material is successfully removed and replaced.

- (3) **Use of the Pave-IR System.** In lieu of obtaining thermal profiles on each subplot using an infrared thermometer or thermal camera, the Contractor may use the Pave IR system (paver mounted infrared bar) to obtain a continuous thermal profile in accordance with Tex-244-F. When electing to use the Pave-IR system, notify the Engineer prior to beginning placement operations and specify if using the Pave-IR system for specification compliance or for information only. When electing to use the Pave-IR system for information only, use an infrared thermometer or thermal camera to obtain thermal profiles in accordance with Tex-244-F. When electing to use the Pave-IR system for information only, segregation density profiles are applicable.

When using the Pave-IR system for specification compliance, review the output results on a daily basis and, unless otherwise directed, provide the automated report described in Tex-244-F to the Engineer for review. Modify the paving process as necessary to eliminate any (moderate or severe) thermal segregation identified by the Pave-IR system. The Engineer may suspend paving operations if the Contractor cannot successfully modify the paving process to eliminate recurring severe thermal segregation. Density profiles in accordance with Section 3224.4.I.3.c(2), "Segregation (Density Profile)," are not required and are not applicable when using the Pave-IR system. Upon completion of use of the Pave-IR system for specification compliance or as requested by the Engineer, provide the Engineer with electronic copies of all daily data files that can be used with the Pave-IR system software to generate temperature profile plots.

- b. **Windrow Operations.** When hot mix is placed in windrows, operate windrow pickup equipment so that substantially all the mixture deposited on the roadbed is picked up and loaded into the paver.
- c. **Hauling Equipment.** The Contractor may elect to 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 a MTD with remixing capability or when a Pave-IR system is used for specification compliance, unless otherwise allowed by the Engineer.
- d. **Screed Heaters.** If the paver stops for more than 5 minutes, turn off screed heaters to prevent overheating of the mat. If the screed heater remains on for more than 5 minutes while the paver is stopped, the Engineer may evaluate the suspect area in accordance with Section 3224.4.I.3.c(4), "Recovered Asphalt Dynamic Shear Rheometer (DSR)."

- H. **Compaction.** Uniformly compact the pavement to the density requirements of the specification. Use the control strip method given in Tex-207-F, Part IV, to establish the rolling pattern. Do not use pneumatic-tire rollers if excessive pickup of fines by roller tires occurs. Unless otherwise directed, use only water or an approved release agent on rollers, tamps, and other compaction equipment.

Where specific air void requirements are waived, furnish and operate compaction equipment as approved. 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. When directed, sprinkle the finished mat with water or limewater to expedite opening the roadway to traffic.

I. Acceptance Plan. Pay adjustments for the material will be in accordance with Article 6, "Payment."

Sample and test the hot mix on a lot and subplot basis. If the production pay factor given in Section 3224.6.A, "Production Pay Adjustment Factors," for 2 consecutive lots or the placement pay factor given in Section 3224.6.B, "Placement Pay Adjustment Factors," for 2 consecutive lots is below 1.000, suspend production until test results or other information indicate to the satisfaction of the Engineer that the next material produced or placed will result in pay factors of at least 1.000.

- 1. Referee Testing.** The Construction 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 11 and the differences cannot be resolved. 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 test in question. Allow 10 working days from the time the samples are received at the referee laboratory for test results to be reported. The Department may require the Contractor to reimburse the Department for referee tests if more than 3 referee tests per project are required and the Engineer's test results are closer than the Contractor's test results to the referee test results.

The Construction 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 pay adjustment factors for the subplot in question. The Contractor may decline referee testing and accept the Engineer's test results when the placement pay 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 3224.6.B.2, "Placement Sublots Subject to Removal and Replacement."

2. Production Acceptance.

- a. **Production Lot.** A production lot consists of 4 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 3 to 4 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 content for JMF2 is more than 0.5% lower than the optimum asphalt 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. If the indirect tensile strength exceeds 200 psi, take corrective action to bring the mixture within specification compliance unless otherwise directed.

- (1) **Small-Quantity Production.** When the anticipated daily production is less than 1,000 tons, the total production for the project is less than 5,000 tons, when paving miscellaneous areas, or when mutually agreed between the Engineer and the Contractor, the Engineer may deem the mixture as small quantity production. In such cases all quality control and quality assurance (QC/QA) sampling and testing requirements are waived. If the Engineer deems the mixture as small quantity production, the production and placement pay factors will be 1.000. However, the Engineer will retain the right to perform random acceptance tests for production and placement and may reject objectionable materials and workmanship.

When the Engineer deems the mixture as small quantity production:

- produce, haul, place, and compact the mixture as directed by the Engineer;
- control mixture production to yield a laboratory-molded density that is within $\pm 1.0\%$ of the target density as tested by the Engineer; and
- compact the mixture to yield in-place air voids that are greater than or equal to 2.7% and less than or equal to 9.9% as tested by the Engineer.

- (2) **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 3224.6.A, "Production Pay Adjustment Factors." Close all lots within 5 working days, unless otherwise allowed by the Engineer.

b. Production Sampling.

- (1) **Mixture Sampling.** 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.

Obtain hot mix samples from trucks at the plant in accordance with Tex-222-F. For each subplot, take one sample at the location randomly selected. The Engineer will perform or witness the sampling of production sublots. For at least 1 subplot per lot, the Engineer will obtain and test a "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 for no more than 1 subplot per lot at any time during production of the lot. The Engineer will use the Contractor's split sample for sublots not sampled by the Engineer.

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 testing by the Department is completed.

- (2) **Informational Cantabro and Overlay Testing.** During the first week of production, randomly select 1 subplot from Lot 2 or higher for Cantabro and Overlay testing. Obtain and provide the Engineer with approximately 150 lb. (70 kg) of mixture in sealed containers, boxes, or bags labeled with CSJ, mixture type, lot, and subplot number. The Engineer will ship the mixture to the Construction Division for Cantabro and Overlay testing. Results from these tests will not be used for specification compliance.
- (3) **Asphalt Binder Sampling.** Obtain a 1 qt. sample of the asphalt binder for each lot of mixture produced. 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. Take the sample in accordance with Tex-500-C, Part II. Label the can with the corresponding lot and subplot numbers and deliver the sample to the Engineer. The Engineer may also obtain independent samples. If obtaining an independent asphalt binder sample, the Engineer will split a sample of the asphalt binder with the Contractor. The Engineer will test at least one asphalt binder sample per project to verify compliance with Item 300, "Asphalts, Oils, and Emulsions."

- c. **Production Testing.** The Contractor and Engineer must perform production tests in accordance with Table 14. 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 11 for all sublots.

If the Engineer's laboratory-molded density on any subplot is less than 95.0% or greater than 98.0%, 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.

If the aggregate mineralogy is such that Tex-236-F does not yield reliable results, the Engineer may allow alternate methods for determining the asphalt content and aggregate gradation. Unless otherwise allowed, the Engineer will require the Contractor to provide evidence that results from Tex-236-F are not reliable before permitting an alternate method. If an alternate test method is allowed, use the applicable test procedure as directed.

**Table 14
Production and Placement Testing Frequency**

Description	Test Method	Minimum Contractor Testing Frequency	Minimum Engineer Testing Frequency ¹
Individual % retained for #8 sieve and larger	Tex-200-F or Tex-236-F	1 per subplot	1 per 12 sublots
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
VMA			
Laboratory-molded bulk specific gravity			
In-Place air voids			
Segregation (density profile) ⁵	Tex-207-F, Part V	1 per subplot	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
Asphalt content	Tex-236-F	1 per subplot	1 per lot
Hamburg Wheel test	Tex-242-F	N/A	1 per project
Recycled Asphalt Shingles (RAS) ²	Tex-217-F, Part III	N/A	
Thermal profile ⁵	Tex-244-F	1 per subplot	
Asphalt binder sampling and testing ¹	Tex-500-C	1 per lot (sample only)	
Boil test ³	Tex-530-C	1 per lot	
Cantabro Test ⁴	Tex-245-F	1 per project	
Overlay Test ⁴	Tex-248-F	(sample only)	

1. The Engineer may perform as many additional tests as deemed necessary.
2. Testing performed by the Construction Division.
3. The Engineer may reduce or waive the sampling and testing requirements based on a satisfactory test history.
4. Testing performed by the Construction Division and for informational purposes only.
5. Not required when the Pave-IR system is used for specification compliance.

d. Operational Tolerances. Control the production process within the operational tolerances listed in Table 11. When production is suspended, the Engineer will allow production to resume when test results or other information indicates that the next mixture produced will be within the operational tolerances.

- (1) **Gradation.** A subplot is defined as out of tolerance if either the Engineer's or the Contractor's test results are out of operational tolerance. Unless otherwise directed, suspend production when test results for gradation exceed the operational tolerances for three consecutive sublots on the same sieve or four consecutive sublots on any sieve. The consecutive sublots may be from more than one lot.
- (2) **Asphalt 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 11. No production or placement bonus will be paid for any subplot that is out of operational tolerance for asphalt content. Suspend production and shipment of mixture if the Engineer's or the Contractor's asphalt content deviates from the current JMF by more than 0.5% for any subplot.
- (3) **Void in the Mineral Aggregate (VMA).** The Engineer will determine the VMA for every subplot. For sublots when the Engineer does not determine asphalt content, the Engineer will use the asphalt content results from quality control 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 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 bonus 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 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) **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 JMF1. 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. When the production or core samples fail the Hamburg Wheel test criteria in Table 10, suspend production until further Hamburg Wheel tests meet the specified values. 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 approved laboratory's Hamburg Wheel test results in a "remove and replace" condition, the Contractor may request that the Department confirm the results by retesting the failing material. The Construction Division will perform the Hamburg Wheel tests and determine the final disposition of the material in question based on the Department's test results.

- e. **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 11, payment will be made for the load. If test results are not within operational tolerances, no payment will be made for the load and the Engineer may require removal.

3. Placement Acceptance.

- a. **Placement Lot.** A placement lot consists of four placement sublots. A placement subplot consists of the area placed during a production subplot.
 - (1) **Lot 1 Placement.** Placement bonuses for Lot 1 will be in accordance with Section 3224.6.B, "Placement Pay Adjustment Factors." However, no placement penalty 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 9.9%. Remove and replace any subplot with in-place air voids less than 2.7% or greater than 9.9%.
 - (2) **Incomplete Placement Lots.** An incomplete placement lot consists of the area placed as described in Section 3224.4.I.2.a(2), "Incomplete Production Lots," excluding miscellaneous areas as defined in Section 3224.4.I.3.a(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.
 - (3) **Shoulders, Ramps, Etc.** Shoulders, ramps, intersections, acceleration lanes, deceleration lanes, and turn lanes are subject to in-place air void determination, 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) **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. Intersections and temporary detours will be considered miscellaneous areas when shown on the plans. Miscellaneous areas also include level-ups and thin overlays, if the layer thickness designated on the plans is less than the minimum untrimmed core height eligible for testing shown in Table 12. Unless otherwise shown

on the plans, the thickness determined is based on the rate of 110 lb./sy for each inch of pavement. Miscellaneous areas are not eligible for random placement sampling locations. Compact areas that are not subject to in-place air void determination in accordance with Section 3224.4.H, "Compaction."

- b. **Placement Sampling.** At the beginning of the project, the Engineer will select random numbers for all placement sublots. 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 1 random sample location for each placement subplot in accordance with Tex-225-F. If the randomly generated sample location is within 2 ft. of a joint or pavement edge, adjust the location by no more than necessary to achieve a 2-ft. clearance.

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 hereby defined as in close proximity to where the cores are taken. Unless otherwise approved, obtain the cores within 1 working day of the time the placement subplot is completed. Obtain two 6-in. diameter cores side by side from within 1 ft. of the random location provided for the placement subplot. For Type D and Type F 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. If an adequate bond does not exist between the current and underlying layer, take corrective action to ensure that an adequate bond will be achieved during subsequent placement operations.

Immediately after obtaining the cores from the roadway, trim the cores in accordance with Tex-207-F if the core heights exceed the minimum untrimmed values listed in Table 12. 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 they are trimmed and will retain custody of the cores until testing by the Department is completed. Prior to turning the trimmed cores over to the Engineer, the Contractor may elect to 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 elect to 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 the Construction Division's protocol to provide a secure means and process that protects the integrity of the cores during transport.

If the core height before trimming is less than the minimum untrimmed value shown in Table 12, decide whether to include the pair of cores in the air void determination for that subplot. If electing to have the cores included in air void determination, trim the cores as described above before delivering to the Engineer. If electing to not have the cores included in 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. The placement pay factor for the subplot will be 1.000 if cores will not be included in air void determination.

In lieu 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. Trimming of the cores may be performed by either the Department or Contractor representative. The Engineer will witness all trimming operations in cases where the Contractor representative performs the trimming operation.

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

c. **Placement Testing.** Perform placement tests in accordance with Table 14. After the Engineer returns the cores, the Contractor has the option to 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 11.

(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 Corelok 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 pay 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.

- (2) **Segregation (Density Profile).** Test for segregation using density profiles in accordance with Tex-207-F, Part V. Density profiles are not required and are not applicable when using the Pave-IR system. Density profiles are not applicable in miscellaneous areas as described in Section 3224.4.I.3.a(4), "Miscellaneous Areas."

Unless otherwise approved, perform a density profile every time the screed stops, on areas that are identified by either the Contractor or the Engineer as having thermal segregation, and on any visibly segregated areas. If the screed does not stop, and there are no visibly segregated areas or areas that are identified as having thermal segregation, perform a minimum of 1 profile per subplot.

At the completion of each lot, provide the Engineer with the density profile of every subplot within the lot. Report the results of each density profile in accordance with Section 3224.4.B, "Reporting."

The density profile is considered failing if it exceeds the tolerances in Table 15. No production or placement bonus will be paid for any subplot that contains a failing density profile. When the Pave-IR system is not used, the Engineer will measure the density profile at least once per project and may measure the density profile at any time, at any location, and as often as deemed necessary to verify conformance. 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 3224.4.I.3.c(5), "Irregularities." The subplot in question may receive a production and placement bonus 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 2 consecutive density profiles fail, unless otherwise approved. Resume production after the Engineer approves changes to production or placement methods.

**Table 15
Segregation (Density Profile) Acceptance Criteria**

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

(3) Longitudinal Joint Density.

- (a) Informational Tests.** While establishing the rolling pattern, perform joint density evaluations, 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
- (b) Record Tests.** For each subplot, perform a joint density evaluation at each pavement edge that is or will become a longitudinal joint. 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 an independent joint density verification at least once per project and may make independent joint density verifications at the random sample locations and as often as deemed necessary to verify conformance. The Engineer's joint density test results will be used when available.

At the completion of each lot, provide the Engineer with the joint density of every subplot within the lot. Report the results of each joint density in accordance with Section 3224.4.B, "Reporting."

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

- (4) Recovered Asphalt Dynamic Shear Rheometer (DSR).** When the Pave-IR system is not used for specification compliance, 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 Construction Division. The aging ratio is the dynamic shear rheometer (DSR) value of the extracted binder divided by the DSR value of the original unaged binder. DSR values are obtained according to 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.

(5) **Irregularities.** Identify and correct irregularities including but not limited to 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 and 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 1 day while the Contractor is taking appropriate corrective action.

4. **Ride Quality.** Unless otherwise shown on the plans, measure ride quality in accordance with Item 585, "Ride Quality for Pavement Surfaces."

5. **Measurement.** 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."

6. **Payment.** The work performed and materials furnished in accordance with this Item and measured as provided under Article 5, "Measurement," will be paid for at the unit price bid for "Dense Graded Hot-Mix Asphalt (QC/QA)" of the type, surface aggregate classification, and binder specified. These prices are full compensation for surface preparation; materials including tack coat; placement; equipment; labor; tools; and incidentals.

Pay adjustments for bonuses and penalties will be applied as determined in this Item; however, a pay 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.

Applicable pay adjustment bonuses 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 density in accordance with Section 3224.4.B, "Reporting." If the Contractor uses the Pave-IR system for specification compliance, documentation is not required for thermal profiles or segregation density profiles on individual sublots; however, the Pave-IR 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.

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

When WMA is specified on the plans, at the Contractor's request, the Engineer has the option to assign all sublots a production pay adjustment factor of 1.000. When the Engineer elects to assign all sublots a production pay adjustment factor of 1.000, control mixture production to yield a laboratory-molded density with an absolute deviation no greater than 1.0 percent from the target laboratory-molded density as defined in Table 9 or as shown on

plans, as tested by the Engineer. The Engineer may suspend production and shipment of mixture if the laboratory-molded density deviates more than 1.0 percent from the target laboratory-molded density for two consecutive sublots.

- A. Production Pay Adjustment Factors.** The production pay adjustment factor is based on the laboratory-molded density using the Engineer's test results. A pay adjustment factor will be determined from Table 16 for each subplot using the deviation from the target laboratory-molded density defined in Table 9. The production pay adjustment factor for completed lots will be the average of the pay adjustment factors for the 4 sublots sampled within that lot.

Table 16
Production Pay Adjustment Factors for Laboratory-Molded Density¹

Absolute Deviation from Target Laboratory-Molded Density	Production Pay Adjustment Factor (Target Laboratory-Molded Density)
0.0	1.050
0.1	1.050
0.2	1.050
0.3	1.044
0.4	1.038
0.5	1.031
0.6	1.025
0.7	1.019
0.8	1.013
0.9	1.006
1.0	1.000
1.1	0.965
1.2	0.930
1.3	0.895
1.4	0.860
1.5	0.825
1.6	0.790
1.7	0.755
1.8	0.720
> 1.8	Remove and replace

1. If the Engineer's laboratory-molded density on any subplot is less than 95.0% or greater than 98.0%, take immediate corrective action to bring the mixture within these tolerances. The Engineer may suspend operations if the Contractors 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.

1. **Payment for Incomplete Production Lots.** Production pay adjustments for incomplete lots, described under Section 3224.4.I.2.a(2), "Incomplete Production Lots," will be calculated using the average production pay factors from all sublots sampled. A production pay factor of 1.000 will be assigned to any lot when the random sampling plan did not result in collection of any samples.
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 16, the Engineer may require removal and replacement, or may allow the subplot to be left in place without payment. The Engineer may also elect to accept the subplot in accordance with Item 5 "Control of the Work" Article 5.3.A "Acceptance of Defective or Unauthorized Work."

Replacement material meeting the requirements of this Item will be paid for in accordance with this Article.

- B. Placement Pay Adjustment Factors.** The placement pay adjustment factor is based on in-place air voids using the Engineer's test results. A pay adjustment factor will be determined from Table 17 for each subplot that requires in-place air void measurement. A placement pay 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 pay adjustment factor of 1.000 will be assigned to quantities placed in miscellaneous areas as described in Section 3224.4.I.3.a(4), "Miscellaneous Areas." The placement pay adjustment factor for completed lots will be the average of the placement pay adjustment factors up to 4 sublots within that lot.

Table 17
Placement Pay Adjustment Factors for In-place Air Voids

In-place Air Voids	Placement Pay Adjustment Factor	In-place Air Voids	Placement Pay Adjustment Factor
<2.7	Remove and Replace	6.4	1.042
2.7	0.705	6.5	1.040
2.8	0.720	6.6	1.038
2.9	0.735	6.7	1.036
3.0	0.750	6.8	1.034
3.1	0.765	6.9	1.032
3.2	0.780	7.0	1.030
3.3	0.795	7.1	1.028
3.4	0.810	7.2	1.026
3.5	0.825	7.3	1.024
3.6	0.840	7.4	1.022
3.7	0.855	7.5	1.020
3.8	0.870	7.6	1.018
3.9	0.885	7.7	1.016
4.0	0.900	7.8	1.014
4.1	0.915	7.9	1.012
4.2	0.930	8.0	1.010
4.3	0.945	8.1	1.008
4.4	0.960	8.2	1.006
4.5	0.975	8.3	1.004
4.6	0.990	8.4	1.002
4.7	1.005	8.5	1.000
4.8	1.020	8.6	0.998
4.9	1.035	8.7	0.996
5.0	1.050	8.8	0.994
5.1	1.050	8.9	0.992
5.2	1.050	9.0	0.990
5.3	1.050	9.1	0.960
5.4	1.050	9.2	0.930
5.5	1.050	9.3	0.900
5.6	1.050	9.4	0.870
5.7	1.050	9.5	0.840
5.8	1.050	9.6	0.810
5.9	1.050	9.7	0.780
6.0	1.050	9.8	0.750
6.1	1.048	9.9	0.720
6.2	1.046	> 9.9	Remove and Replace
6.3	1.044		

- 1. Payment for Incomplete Placement Lots.** Pay adjustments for incomplete placement lots described under Section 3224.4.I.3.a.(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. A placement pay adjustment factor of 1.000 will be assigned to any lot when the random sampling plan did not result in collection of any samples.

2. **Placement Sublots Subject to Removal and Replacement.** If after referee testing, the placement pay adjustment factor for any subplot results in a “remove and replace” condition as listed in Table 17, 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 Pavements Section of the Construction Division, where they will be trimmed if necessary and tested for bulk specific gravity within 10 working days of receipt. The average bulk specific gravity of the cores will be divided by the Engineer’s average maximum theoretical specific gravity for that lot to determine the new pay adjustment factor of the subplot in question. If the new pay adjustment factor is 0.700 or greater, the new pay adjustment factor will apply to that subplot. If the new pay 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 elect to accept the subplot in accordance with Item 5 “Control of the Work” Article 5.3.A “Acceptance of Defective or Unauthorized Work.” Replacement material meeting the requirements of this Item will be paid for in accordance with this Article.

C. **Total Adjustment Pay Calculation.** Total adjustment pay (TAP) will be based on the applicable pay adjustment factors for production and placement for each lot.

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

Where:

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

B = Bid price × placement lot quantity × average pay adjustment factor for the placement lot + (bid price × miscellaneous quantities × 1.000)

SPECIAL SPECIFICATION

6834

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 595b, except paint the sign face assembly flat black.

- A. **Minimum Luminance Requirements.** All PCMS units shall meet the following luminance requirements measured at the character level in candela as is published in Report 4940-2, "Photometric Requirements for Portable Changeable Message Signs," conducted by the Texas Transportation Institute. Luminance will be tested in accordance with Tex-880.
 - Minimum Daytime Character Luminance of 4000cd/m² with a contrast ratio of 5.
 - Minimum Nighttime Character Luminance of 30/cd/m².
- B. **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.
- C. **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 78 in. high x 126 in. wide sign housing. Provide a minimum 18 in. character height. Provide a 5 x 7 character pixel matrix. Provide a message visibility distance of 750 ft. 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.
- D. **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.
- E. **Power Source.** Provide a diesel generator, solar powered power source, or both. Provide a backup power source as necessary.
- F. **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 shall 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 shall 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

6986

Longitudinal Prefabricated Pavement Markings (PPM) with Warranty

1. **Description.** Furnish and place longitudinal PPM as shown on the plans. Provide a manufacturer's warranty bond for a 6 year period. The Department will allow a Contractor provided warranty bond in lieu of the manufacturer's bond if all conditions of the manufacturer's warranty including the requirements of this Item are met. In such case, the Contractor is responsible for meeting the warranty requirements. Use the form provided by the Department. The Department will allow substitution of a contractor's bond with a manufacturer's bond after execution of the Contract prior to final acceptance.
2. **Materials.** Use pavement markings that meet the requirements of Type B in DMS-8240, "Permanent Prefabricated Pavement Markings," and that are shown on the Material Producer List (MPL) entitled "Pavement Markings (Permanent, Prefabricated)" maintained by the Department.
3. **Equipment.** Provide equipment as required or directed according to the following (The provider of the warranty bond is responsible for providing equipment during the warranty period unless otherwise shown on the plans.):
 - A. **Preparation and Application.** Use equipment designed for the pavement preparation and application of the type of PPM material selected.
 - B. **Colorimeter.** Provide a colorimeter using 45°/0° geometry CIE, D65 Illuminant, 2° standard observation angle meeting the requirements of ASTM E 1347, E 1348, or E 1349.
 - C. **Retroreflectometer.** Unless otherwise shown on the plans, provide a portable or mobile retroreflectometer meeting the following requirements.
 1. **Portable Retroreflectometer.** Provide a portable retroreflectometer that meets the requirements of ASTM E 1710.
 2. **Mobile Retroreflectometer.** Provide a mobile retroreflectometer that:
 - is approved by the Construction Division (CST) and certified by the Texas Transportation Institute Mobile Retroreflectometer Certification Program for project evaluation of retroreflectivity
 - is calibrated daily, before measuring retroreflectivity on any pavement stripe, with a portable retroreflectometer meeting the following requirements: ASTM E 1710, entrance angle of 88.76°, observation angle of 1.05°, and an accuracy of ±15%;

- requires no traffic control when retroreflectivity measurements are taken and is capable of taking continuous readings at or near posted speeds

Furnish mobile retroreflectivity measurements in compliance with Special Specification, "Mobile Retroreflectivity Data Collection for Pavement Markings" unless otherwise approved by the Engineer. The Engineer may require an occasional field comparison check with a portable retroreflectometer meeting the requirements listed above to insure accuracy.

4. Construction.

- A. General.** Prepare the pavement surface using controlled techniques that minimize pavement damage and hazards to the traveling public. Apply the PPM materials, according to the manufacturer's recommendations, using widths, colors, shapes, and at locations as shown on the plans.

Obtain approval for the sequence of work and estimated daily production. Use traffic control as shown on the plans or as approved. Establish guides to mark the lateral location of pavement markings as shown on the plans or as directed, and have guide locations verified. Use material for guides that will not leave a permanent mark on the roadway. Apply markings in alignment with the guides and without deviating for the alignment more than 1 in. per 200 ft. of roadway or more than 2 in. maximum. Remove all applied markings that are not in alignment or sequence as stated in the plans or as stated in the specifications at the Contractor's expense and in accordance with Item 677, "Eliminating Existing Pavement Markings and Markers," except for measurement and payment.

- B. Initial Performance Requirements.** Meet Article 5, "Performance Requirements" initially, after installation.

The Engineer will conduct visual performance evaluations of PPM. For markings that do not meet the Engineer's visual performance evaluation, the Contractor may present test results for color (using a colorimeter), retroreflectivity (using a retroreflectometer in accordance with this Item), and durability (in accordance with ASTM D 913) for the Engineer's use in making acceptance or rejection decisions.

For PPM not meeting performance requirements, repair or replace until reevaluation shows the PPM meet the performance requirements as approved by the Engineer.

- C. Written Acceptance.** The Department will provide written acceptance after the Contractor meets the initial performance requirements. This written acceptance (see attached sample form) will include the date, location, length, and type of PPM.

5. Performance Requirements.

- A. **Color.** Provide PPM consisting of pigments blended to provide color conforming to highway colors as shown in Table 1.

**Table 1
Color Requirements**

Federal 595 Color		Chromaticity Coordinates								Brightness (Y)
		1		2		3		4		
		x	y	x	y	X	y	x	y	
White	17855	.290	.315	.310	.295	.350	.340	.330	.360	60 min
Yellow	33538	.470	.455	.510	.489	.490	.432	.537	.462	30 min
Black										5 max

- B. **Retroreflectivity.** Provide PPM for longitudinal markings meeting the minimum retroreflectivity values listed in Table 2.

**Table 2
Minimum Retroreflectivity Requirements**

Color	Retroreflectivity, mcd/m ² /lx, Min
White	120
Yellow	120

- C. **Durability.** Provide PPM that do not lose more than 5% of the striping material in a 1,000- ft. section of continuous stripe or broken stripe (25 broken stripes). Pavement markings must remain in the proper alignment and location.
- D. **Performance Evaluation Procedures.** Provide traffic control and conduct evaluations of color, retroreflectivity, and durability as required or directed.

1. **Color.** Measure color using 45°/0° geometry CIE, D65 Illuminant, 2° standard observation angle in accordance with ASTM E 1347, E 1348, or E 1349.
2. **Retroreflectivity.** Unless otherwise shown on the plans, conduct retroreflectivity evaluations of pavement markings with either a portable or mobile retroreflectometer. Make all measurements in the direction of traffic flow, except for broken centerline on 2-way roadways, where measurements will be made in both directions.

If using a portable retroreflectometer, take a minimum of 1 measurement every mile on each series of markings (i.e., edgeline, center skipline, each line of a double line, etc.), at locations approved by the Engineer. If more than 1 measurement is taken, average the measurements. For all markings measured in both directions, take a minimum of 1 measurement in each direction. If the measurement taken on a specific series of markings within each mile segment falls below the minimum retroreflectivity values, take a minimum of 5 more measurements at locations determined by the Engineer within that mile segment for that series of marking. If the average of these 5 measurements falls below the minimum retroreflectivity requirements, that mile segment of the applied markings does not meet the performance requirement.

If using a mobile retroreflector, review the results to determine deficient sections and deficient areas of interest. These areas do not meet the performance requirements.

3. **Durability.** Measure durability in accordance with ASTM D 913 for marking material loss and visual inspection for alignment and location. Conduct evaluations at locations approved by the Engineer.

6. **Warranty Requirements.**

Each warranty period is for 6 yr. and starts the day after written acceptance.

The marking warrantor is responsible for meeting Article 5, "Performance Requirements" for the duration of the warranty period.

During the warranty period, the Engineer will conduct periodic visual performance evaluations of PPM. For retroreflectivity the Engineer will use Tex-828-B, "Determining Functional Characteristics of Pavement Markings." The warrantor may be present during these evaluations. For areas, which, in the opinion of the Engineer, have a questionable visual evaluation, the warrantor may replace the PPM or may conduct a performance evaluation for the performance requirement in question, according to Section 5.D, "Performance Evaluation Procedures." Conduct retroreflectivity evaluations according to Section 5.D.2, "Retroreflectivity," using either portable or mobile retroreflector unless otherwise shown on the plans. The warrantor is responsible for traffic control when conducting performance evaluations.

The warrantor will replace PPM that fails to meet the color, retroreflectivity, or durability performance requirements during the warranty period. Replace PPM that fails to meet the performance requirements within 30 days of notification.

All replacement PPM must meet the materials and performance requirements of this specification, under the following conditions to complete the warranty period:

If the longitudinal PPM fails to meet the performance requirements in Article 5 in Years 1 through 4, use materials meeting Type B requirements of specification DMS-8240.

If the longitudinal PPM fails to meet the performance requirements in Article 5 in Years 5 or 6, use materials that meet DMS-8240 (Type A or B) or on the MPL entitled "Pavement Markings (Multipolymer)," to meet the performance requirements of Article 5.

The end of the warranty period does not relieve the warrantor from the performance deficiencies requiring corrective action identified during the warranty period.

The Engineer may exclude PPM from the replacement provisions of the warranty period, provided the Engineer determines that the failure is a result of outside causes rather than defective material. Examples of outside causes are extreme wear at intersections, damage by snow or ice removal, and premature pavement failure.

Provide a contact person, address and telephone number for notification of needed PPM replacement.

7. **Measurement.** This Item will be measured by the foot or by any other unit shown on the plans. Each stripe will be measured separately.

This is a plans quantity measurement item. The quantity to be paid is the quantity shown in the proposal unless modified by Article 9.2, "Plans Quantity Measurement." Additional measurements or calculations will be made if adjustments of quantities are required.

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 "Longitudinal Prefabricated Pavement Markings (PPM) with Warranty" of the color, shape and width, specified as applicable, at the time of project acceptance. This price is full compensation for materials, application of longitudinal PPM, testing, warranty work, equipment, labor, tools, and incidentals.

PPM INSTALLATION RECORD FOR WRITTEN ACCEPTANCE

** Warranty period begins the day after written acceptance.

COUNTY HIGHWAY	CONTROL PROJECT	LIMITS FROM LIMITS TO	LENGTH	TYPE PPM	ACCEPTANCE DATE

Contractor signature _____ Date _____
Department signature _____ Date _____

WARRANTY BOND	CONTRACT NO.	
	COUNTY	
	BOND NO	

KNOW ALL PERSONS BY THESE PRESENTS: That we, _____, manufacturer of or Contractor for prefabricated pavement markings, as Principal, and _____, as Surety, are held and firmly bound unto the State of Texas, as Obligee, in the penal sum of _____ Dollars \$ _____, lawful money of the United States, well and truly to be paid to the State of Texas, and we bind ourselves, our heirs, successors, executors, and administrators jointly and severally, firmly by these presents.

Whereas, the above bounden Principal has provided prefabricated pavement markings to _____ for the foregoing contract entered into between _____ and the Obligee, attached hereto; and

Whereas, the Principal is required to protect the Obligee against any defects resulting from faulty prefabricated pavement markings installed under said contract for a period of 6 years beginning the day after written acceptance.

Now, therefore, the condition of this obligation is such that if the above bounden principal, its heirs, successors, executors, and administrators shall promptly and faithfully carry out and perform the warranty as provided in said contract, and shall, within thirty days of due notice, replace any installed prefabricated pavement markings that may fail to meet Obligee's performance evaluation as provided for in the Contract during the period specified above or shall pay over, make good, and reimburse to the said Obligee all loss and damage that said Obligee may sustain by reason of failure or default of said Principal so to do, then this obligation shall be null and void, otherwise it shall remain in full force and effect.

Provided further that the end of a warranty period shall not relieve Principal from its obligation to correct deficiencies requiring corrective action, so long as those deficiencies are identified during the warranty period.

WITNESS our hand this _____ day of _____ 20 _____

(Warrantor Name)

* By: _____
(Warrantor Officer)

**SURETY (Print Firm Name and Seal)

By: _____
(Title)

* By: _____
(Warrantor Officer)

**SURETY (Print Firm Name and Seal)

By: _____
(Title)

**SURETY (Print Firm Name and Seal)

By: _____
(Title)

* Attach a Power of Attorney showing that the officer of the warrantor has authority to sign this obligation.
 ** Attach a Power of Attorney showing that the surety officer or Attorney-In-Fact has authority to sign this obligation; the Power of Attorney and bond must be impressed with the corporate seal. The surety must be a US Treasury listed company and provide notification information.

SPECIAL SPECIFICATION

8094

Mobile Retroreflectivity Data Collection for Pavement Markings

1. **Description.** Furnish mobile retroreflectivity data collection (MRDC) for pavement markings on roadways as shown in the plans or as designated by the Engineer. Conduct MRDC on dry pavement only.
2. **Equipment and Personnel.**
 - A. **Mobile Retroreflectometer.** Provide a self-propelled, mobile retroreflectometer certified by the Texas Transportation Institute (TTI) Mobile Retroreflectometer Certification Program.
 - B. **Portable Retroreflectometer.** Provide a portable retroreflectometer that uses 30-meter geometry meeting the requirements described in ASTM E 1710. Maintain, service, and calibrate all portable retroreflectometers according to the manufacturer's instructions.
 - C. **Operating Personnel for Mobile Retroreflectometer.** Provide all personnel required to operate the mobile retroreflectometer and portable retroreflectometer. Ensure MRDC system operator has a current certification from the TTI Mobile Retroreflectometer Certification Program to conduct MRDC with the certified mobile retroreflectometer provided.
 - D. **Additional Personnel.** Provide any other personnel necessary to compile, evaluate, and submit MRDC.
 - E. **Safety Equipment.** Supply and operate all required safety equipment to perform this service.
3. **MRDC Documentation.** Document all MRDC by county and roadway or as directed by the Engineer. Submit all data to the Department no later than three working days after the day the data is collected. Submit all raw data collected in addition to all other data submitted. Provide data files in Microsoft Excel format or a format approved by the Engineer. Provide a high-quality DVD showing the markings as they are measured. The data file and video must contain the following information:
 - A. **Preliminary Documentation Sample.** Submit a sample data file, video, and map of MRDC data in the required format ten working days prior to beginning any work. The format must meet specification and be approved by the Engineer before any work may begin.
 - B. **Initial Documentation Review and Approval.** The Department will review documentation submitted for the first day of MRDC, and if it does not meet specification requirements, will not allow further MRDC until deficiencies are

corrected. The Department will inform the contractor no later than three working days after submittal if the first day of MRDC does not meet specification requirements. Time charges will continue unless otherwise directed by the Engineer.

C. Data File. Provide data files with the following:

- date;
- district number;
- county;
- route number with reference markers or other reference information provided by the Engineer to indicate the location of beginning and end data collection points on that roadway;
- cardinal direction;
- line type (single solid, single broken, double solid, etc.);
- line color;
- file name corresponding to video;
- data for each centerline listed separately;
- average reading taken for each 0.1 mi. interval or interval designated by the Engineer;
- accurate GPS coordinates (within 20 feet) for each interval;
- color-coding for each interval indicating passing or failing, unless otherwise directed by the Engineer (Passing and failing thresholds will be provided by the Engineer);
- graphical representation of the MRDC (y-axis showing retroreflectivity and x-axis showing intervals) corresponding with each data file;
- distance in miles driven while measuring the pavement markings;
- event codes (pre-approved by the Engineer) indicating problems with measurement;
- portable retroreflectometer field check average reading and corresponding mobile average reading for that interval when applicable; and
- upper validation threshold (may be included separately with the raw data but must be clearly identified with the data collected using that threshold).

D. Map in Electronic Format. Provide a map in an electronic format approved by the Engineer with each MRDC submission that includes the following information:

- date;
- district number;
- county;
- color-coded one mile intervals (or interval length designated by the Engineer) for passing and failing retroreflectivity values or retroreflectivity threshold values provided by the Engineer; and
- percentage of passing and failing intervals, if required by the Engineer.

E. **Video.** Provide a high-quality DVD with the following information:

- labeled with date and corresponding data file name;
- district number;
- county;
- route number with reference markers or other designated reference information to indicate the location of beginning and end collection points on that roadway; and
- retroreflectivity values presented on the same screen with the following information:
 - date;
 - location;
 - starting and ending mileage;
 - total miles;
 - retroreflectivity readings; and
 - upper validation thresholds (may be included separately with the raw data but must be clearly identified with the data collected using that threshold).

F. **Field Comparison Checks with a Portable Retroreflectometer.** Take a set of field comparison readings with the portable retroreflectometer at least once every four hours while conducting MRDC or at the frequency designated by the Engineer. Take a minimum of twenty readings, spread out over the interval measured. List the average portable retroreflectometer reading next to the mobile average reading for that interval with the reported MRDC data. Request approval from the Engineer to take field comparison readings on a separate roadway, when measuring a roadway where portable retroreflectometer readings are difficult to take. Take the off-location field comparison readings at no additional cost. Submit the portable retroreflectometer printout of all the readings taken for the field comparison check with the corresponding MRDC data submitted. The mobile average reading must be within +/-15% of the portable average reading. The Engineer may require new MRDC for some or all of the pavement markings measured in a four hour interval prior to a field comparison check not meeting the +/-15% range. Provide the new MRDC at no extra cost to the Department. The Engineer may take readings with a Department portable retroreflectometer to ensure accuracy at any time. The Department's Construction Division will take comparison readings and serve as the referee if there is a significant difference between the Engineer's portable readings and the Contractor's mobile and handheld readings. For best results, take field comparison readings on a fairly flat and straight roadway when possible.

G. **Periodic Field Checks at Pre-Measured Locations.** When requested by the Engineer, measure with the mobile unit and report to the Engineer immediately after measurement the average retroreflectivity values for a designated pre-measured test location. The Engineer will have taken measurements at the test location within ten days of the test. The test location will not include pavement markings less than thirty days old. If the

measured averages do not fall within +/-15 % of the pre-measured averages, further calibration and comparison measurements may be required before any further MRDC. Submit the results of the field check with the MRDC report for that day.

4. **Final Report.** Submit a final report in the format specified by the Engineer to the Department's Traffic Engineering representative within one calendar week after the service is complete. The final report must contain a list of all problems encountered (pre-approved event codes) and the locations where problems occurred during MRDC.
5. **Measurement.** When mobile retroreflectivity data collection for pavement markings is specified on the plans to be a pay item, measurement will be by the mile driven while measuring pavement markings.
6. **Payment.** Unless otherwise specified on the plans, the work performed, materials furnished, equipment, labor, tools, and incidentals will not be paid for directly, but will be considered subsidiary to bid items of the Contract. When mobile retroreflectivity data collection for pavement markings is specified on the plans to be a pay item, the work performed in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Mobile Retroreflectivity Data Collection." This price is full compensation for providing summaries of readings to the Engineer, equipment calibration and prequalification, equipment, labor, tools, and incidentals.

FORT BEND GRAND PARKWAY TOLL ROAD AUTHORITY

SPECIAL SPECIFICATION

9200

Megapixel Robotic WebCamera

1. **Description.** Construct an outdoor robotic monitoring camera, including certified installation services; one year tech support, maintenance and software upgrades; one year of operation; and one year of archiving time-lapse service.

2. **Materials**

A. **Manufacturer**

- 1) EarthCam, Inc.
800.EarthCam (327.8422) toll free
201.488.1111 voice
201.488.1119 fax
84 Kennedy Street,
Hackensack, NJ 07601.
www.EarthCam.net

B. **System Requirements**

- 1) The indoor/outdoor camera system shall consist of a tamper and impact resistant enclosure with integrated camera and heavy-duty robotic pedestal to be mounted on a 40 foot (minimum) fixed pole (not provided by manufacturer).
- 2) The camera shall take high-resolution 8 Megapixel digital images every 15 minutes and provide live video.
- 3) The camera shall upload both images and video over a wireless cellular modem, a wireless point-to-point system or a RJ-45 hardwired connection to a DSL or cable modem.
- 4) The content shall be sent to a secure, password protected website with an Interface and Online Software features provided by the Vendor as a Managed Service.
- 5) The system will operate on 120VAC (230VAC Available) voltage and have a maximum power consumption of 35W.

C. **Equipment**

- 1) Camera: Integrated 8 Megapixel high-definition camera and lens assembly consisting of a charge coupled device (CCD) camera with a remotely controlled focal length lens with the following features:
 - a. Imager: 1/2.5" CCD 8 Megapixel.
 - b. Resolution: 3,264 x 2,488 Pixels = 8 Megapixels.
 - c. Panoramic Resolution: 29,376 x 9,792 = 288 Megapixels.
 - d. Lens: Zoom 6mm – 72mm capable of 12x Optical, 4x Digital.
 - e. Video Compression: AVI (Motion JPEG).
 - f. Auto Features: ISO, Shutter, White Balance and Focus.
- 2) Camera Enclosure:

- a. Built-in aluminum and epoxy powder painted weatherproof standard IP66/IP67.
 - b. Body constructed from extruded aluminum and die-cast aluminum end-cover plates.
 - c. Weatherproof feature is maintained by 2 EPDM-rubber end gaskets between cover plates and 3 cable glands.
- 3) Pan and Tilt Robotic Base: High-performance outdoor pan/tilt designed to provide steady images in windy environments with the following features:
- a. Pan Range: 360° continuous pan.
 - b. Tilt Range: +30° to -90° from level.
 - c. Motor Type: Stepper.
- 4) Overall System:
- a. Camera Enclosure Dimension: 6.9" (175mm) W x 6.6" (168mm) H x 19.4" (493mm) L.
 - b. Pan/Tilt Unit Dimensions: 7.0" (178mm) W x 10.5" (274mm) H x 6.4" (163mm) D.
 - c. Operational Temperature: -10°F to +120°F (-23°C to + 49°C).
 - d. Camera Enclosure Weight: 13lb (5.9kg).
 - e. Pan/Tilt Unit Weight: 12lb (5.4kg).
- 5) Data Connection: Provide one of the following:
- a. In areas with cellular coverage, operate cameras via built-in cellular data connection provided and maintained by the system vendor.
 - b. In areas without cellular coverage, operate cameras via an RJ-45 Ethernet data connection over broadband or satellite Internet access provided and maintained by the Contractor.
- 6) Quantity of Cameras: As required by Owner.
- D. Interface and Online Software**
- 1) Remote Access: Contractor's System Vendor shall provide an internet based interface and online software as a managed service, to allow the viewing of all high-definition digital still images captured and live video stored, from any location with internet access via a secure password protected website.
- a. Maintain images on the System Vendor's website for reference available at all times during the life of the project and for not less than 60 days after completion.
- 2) Online Interface Features:
- a. Software delivered by vendor as a managed service.
 - b. Displays company logo and project name.
 - c. Capable of viewing live video.
 - d. Picture in Picture to control and view live video, while viewing high definition images.
 - e. Robotic pan, tilt and zoom control of robotic camera system.
 - f. Featuring high-definition panoramic images with a panoramic image comparison tool.
 - g. Calendar based navigation system for selecting specific images and panoramas.
 - h. Multifunction image browsing.
 - i. Pan, tilt and zoom control capability within a high-definition image.

- j. Onscreen button for wiper control to allow remote cleaning of the viewing window.
- k. A multiview screen to view all of the cameras on a project at the same time.
- l. Graphical mark-up tools for detailing and creating overlays on images.
- m. Graphical weather applet displaying ten points of local weather data and 48-hour forecast.
- n. Remote solar monitoring screen displaying the DC amperage output of solar panels.
- o. Remote battery monitoring screen displaying battery voltage, temperature and status.
- p. Remote cellular monitoring screen displaying connectivity, network traffic and modem temperature.
- q. Remote wireless radio monitoring screen displaying connectivity, network traffic and Google Map features including wireless radio locations.
- r. Share image tools: save, print, email and post to message board or mobile devices.
- s. Automated progress reports in Power Point, Open Office and PDF formats.
- t. Map, aerial and satellite view by Google.
- u. Time lapse features include – Instant time lapse play back by day, week, month or year.
- v. Machine to machine self-healing technology that automates maintenance of camera up to 288 times daily.
- w. Account security features include – Four levels of password protection, IP address block / permission and SSL protection of the user login password.
- x. All Images are the copyright of the client and protected on secure servers owned and operated by the system vendor.

3. Construction

A. Preparation

- 1) Unpack camera system components and save packing materials (box and foam) for future shipment of camera system including associated appurtenances and mounting equipment to Owner or Manufacturer as required.

B. Installation

- 1) General:
 - a. Engage the manufacturer to provide Certified Installation Services. Install camera system in accordance with manufacturer's printed instructions, State and Municipality codes and requirements and approved submittals.
 - b. Install units plumb and level and at proper angle to provide maximum field of view of on-site operations.
 - c. Securely and rigidly anchor products in place.
 - d. Connect cameras to power.
- 2) Position camera so that field of view of approximately 51° horizontal and 39° vertical covers intended area of site with a clear area for the robotic unit to pan and tilt.
 - a. Install camera at elevation that will provide uncompromised visual coverage.

- b. Install camera so that position of sun or manmade light sources will not come into direct contact with field of view of camera at any time during construction.

C. Field Quality Control

- 1) Pre-installation Testing: Test camera on-site at ground level prior to mounting unit in its intended elevated position.
 - a. Contact System Vendor not less than 24 hours in advance of installation for testing.
 - b. Connect unit.
 - c. After 30 minutes, contact System Vendor and require System Vendor to remotely confirm camera is operating properly.
 - d. Install cameras in approved locations.

D. Cleaning

- 1) Clean installed items using methods and materials recommended in writing by manufacturer.
- 2) Clean camera system components, including camera-housing windows, lenses, and monitor screens.

E. Instruction

- 1) Engage a factory-authorized service representative by phone to instruct Contractors personnel in procedures to adjust and maintain camera equipment.
 - a. Instruct personnel on procedures and schedules for troubleshooting and maintaining equipment.
 - b. Explain methods of determining optimum alignment and adjustment of components.

F. Operation, Termination, and Removal

- 1) Maintenance: Maintain camera equipment in good operating condition on a 24-hour basis until removal.
- 2) Termination and Removal: Removal of camera system when instructed by the owner.
 - a. Camera system including associated appurtenances and mounting equipment are property of Owner.

- 4. **Measurement.** All cameras satisfactorily installed and operational will be measured by the each, which includes a twelve (12) month operational period.
- 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 bid price for "Megapixel Robotic Camera".

This price is full compensation for furnishing the labor, materials, tools, equipment, and incidentals necessary to install and operate the camera, complete in place, as required by the manufacturer. Also, this price includes 12 months of time-lapse edited DVD movie, certified installation services; one year tech support, maintenance and software upgrades; and one year of operation. New electrical services will be paid for under Item 628, "Electrical Services."