

NOTIFICATION OF ADDENDUM

ADDENDUM NO. 1

DATED 1/06/2005

Control	0915-12-247
Project	STP 98(289)MM
Highway	CS
County	BEXAR

Ladies/Gentlemen:

Attached please find an addendum on the above captioned project. Included in the attachment is an addendum notification which details the changes and the respective proposal pages which were added and/or changed.

Except for new bid insert pages, it is unnecessary to return any of the pages attached.

Bid insert pages must be returned with the bid proposal submitted to the Department, unless your firm is submitting a bid using a computer print out. The computer print out must be changed to reflect the new bid item information.

Contractors and material suppliers, etc. who have previously been furnished informational proposals are not being furnished a copy of the addendum. If you have a subcontractor on the above project, please advise them of this addendum. Acknowledgment of this addendum is not requested if your company has been issued a proposal stamped "This Proposal Issued for Informational Purposes."

You are required to acknowledge receipt of this addendum by entering the date, which appears at the top of this letter on the Addendum Acknowledgement Form, contained in your bid proposal.

Failure to Acknowledge receipt of this addendum in your bid proposal will result in your bid not being read.

SUBJECT: PLANS AND PROPOSAL ADDENDUMS

PROJECT: STP 98 (289)MM

CONTROL: 0915-12-247

COUNTY: BEXAR

LETTING: 01/11/2005

REFERENCE NO: 1231

PROPOSAL ADDENDUMS

PROPOSAL COVER

X BID INSERTS (SH. NO.: 1 - 7 OF 7 (6 & 7 ARE NEW SHEETS))

X GENERAL NOTES (SH. NO.: A THRU V (W & X DELETED).)

X SPEC LIST (SH. NO.: 1 - 3 OF 3)

X SPECIAL PROVISIONS:

ADDED:

DELETED: 301---002, 340---004

X SPECIAL SPECIFICATIONS:

ADDED: 3117, 5028, 5288, 5419

DELETED:

X OTHER: SEE CHANGES BELOW.

DESCRIPTION OF ABOVE CHANGES

(INCLUDING PLANS SHEET CHANGES)

PROPOSAL:

BID INSERTS -

REVISED QUANTITIES FOR BID ITEMS:

104-5009

512-5003

610-5043

ADDED BID ITEMS:

104-5011 512-5002 620-5010 5028-5003

104-5014 529-5001 649-5006 5288-5001

104-5039 530-5001 3117-5032 5419-5003

104-5045 531-5001 3117-5053

164-5007 540-5001 3117-5054

260-5006 540-5005 3117-5107

260-5017 618-5016 5028-5001

452-5001 620-5004 5028-5002

DESCRIPTION OF ABOVE CHANGES

(INCLUDING PLANS SHEET CHANGES)

(CONTINUED)

DELETED BID ITEMS:

340-5045
512-5001
512-5004

GENERAL NOTES -

ON SPEC DATA SHT. "A", DELETED FIRST FOUR (4) PARAGRAPHS OF THE GENERAL NOTES AND REVISED "ASPHALTIC CONCRETE PAVEMENT" DATA.

ON SPEC DATA SHT. "D", PRIOR TO "ITEM 2", ADDED NOTES REGARDING STANDARD SHEETS USING ENGLISH UNITS.

ON SPEC DATA SHT. "G", DELETED NOTES FOR "ITEM 110" & "ITEMS 162 & 166".

ON SPEC DATA SHT. "H", DELETED NOTES FOR "ITEM 314".

ON SPEC DATA SHT. "J", DELETED NOTES FOR "ITEM 345".

ON SPEC DATA SHT. "N", DELETED NOTES FOR "ITEM 510" AND DELETED SECOND PARAGRAPH FOR "ITEM 529". DELETED THIRD PARAGRAPH FOR ITEM 540.

ON SPEC DATA SHTS. "O", "P", "Q" & "R", REPLACED EXISTING NOTES FOR "ITEM 610" WITH NEW NOTES. DELETED NOTES FOR "ITEM 611". REPLACED EXISTING NOTES FOR "ITEM 618 OR 620" WITH NEW NOTES.

ON SPEC DATA SHT. "S", DELETED NOTES FOR "ITEM 624" & "ITEM 656".

ON SPEC DATA SHT. "T", DELETED NOTES FOR "ITEM 686".

ON SPEC DATA SHT. "V", DELETED NOTES FOR "ITEM 5433", "ITEM 6003" & "ITEM 6008".

EXISTING SPEC DATA SHEETS "W" & "X" WERE DELETED DUE TO SHIFTING OF PAGES.

SPEC LIST -

DELETED STANDARD SPEC ITEM 340 & ITS REFERENCE ITEMS.

DELETED S.P. 301---002 & 340---004

ADDED STANDARD SPEC ITEMS 260, 452, 529, 530, 531, 540, 618, 620 & 649 AND ALL APPLICABLE REFERENCE ITEMS.

PLANS:

PLAN SHEET 1 (TITLE SHEET) -
DELETED PLAN SHEET 3K FROM INDEX OF SHEETS.

ADDED PLAN SHEET 4A TO INDEX OF SHEETS.

CHANGED TITLE FOR PLAN SHEET 40 ON INDEX OF SHEETS.

DESCRIPTION OF ABOVE CHANGES
(INCLUDING PLANS SHEET CHANGES)

(CONTINUED)

ADDED PLAN SHEETS 45 & 45A TO INDEX OF SHEETS.

CHANGED TITLE FOR PLAN SHEET 46 ON INDEX OF SHEETS.

ADDED PLAN SHEETS 46A, 46B, 46C & 46D TO INDEX OF SHEETS.

PLAN SHEET 2 (TYPICAL SECTIONS) -
REVISED TYPICAL SECTIONS.

PLAN SHEET 3 (GENERAL NOTES) -
ON SPEC DATA SHT. "A", DELETED FIRST FOUR (4) PARAGRAPHS OF THE GENERAL NOTES AND REVISED "ASPHALTIC CONCRETE PAVEMENT" DATA.

PLAN SHEET 3A (GENERAL NOTES) -
ON SPEC DATA SHT. "D", PRIOR TO "ITEM 2", ADDED NOTES REGARDING STANDARD SHEETS USING ENGLISH UNITS.

PLAN SHEET 3C (GENERAL NOTES) -
ON SPEC DATA SHT. "G", DELETED NOTES FOR "ITEM 110" & "ITEMS 162 & 166".
ON SPEC DATA SHT. "H", DELETED NOTES FOR "ITEM 314".

PLAN SHEET 3D (GENERAL NOTES) -
ON SPEC DATA SHT. "J", DELETED NOTES FOR "ITEM 345".

PLAN SHEET 3F (GENERAL NOTES) -
ON SPEC DATA SHT. "N", DELETED NOTES FOR "ITEM 510" AND DELETED SECOND PARAGRAPH FOR "ITEM 529". DELETED THIRD PARAGRAPH FOR ITEM 540.

PLAN SHEETS 3G & 3H (GENERAL NOTES) -
ON SPEC DATA SHTS. "O", "P", "Q" & "R", REPLACED EXISTING NOTES FOR "ITEM 610" WITH NEW NOTES. DELETED NOTES FOR "ITEM 611". REPLACED EXISTING NOTES FOR "ITEM 618 OR 620" WITH NEW NOTES.

PLAN SHEET 3I (GENERAL NOTES) -
ON SPEC DATA SHT. "S", DELETED NOTES FOR "ITEM 624" & "ITEM 656".
ON SPEC DATA SHT. "T", DELETED NOTES FOR "ITEM 686".

PLAN SHEET 3J (GENERAL NOTES) -
ON SPEC DATA SHT. "V", DELETED NOTES FOR "ITEM 5433", "ITEM 6003" & "ITEM 6008".

PLAN SHEET 3K (GENERAL NOTES) - SHEET WAS OMITTED FROM PLANS.
EXISTING SPEC DATA SHEETS "W" & "X" WERE DELETED DUE TO SHIFTING OF PAGES.

PLAN SHEET 4 (E & Q SHEET) -
PLAN SHEET 4A (E & Q SHEET) (NEW SHEET ADDED TO PLANS) -
PLAN SHEET 5 (SUMMARIES SHEET) -
REVISED QUANTITIES FOR BID ITEMS:
104-5009
512-5003

610-5043

ADDED BID ITEMS:

104-5011	512-5002	620-5010	5028-5003
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DESCRIPTION OF ABOVE CHANGES (INCLUDING PLANS SHEET CHANGES)

(CONTINUED)

104-5014	529-5001	649-5006	5288-5001
104-5039	530-5001	3117-5032	5419-5003
104-5045	531-5001	3117-5053	
164-5007	540-5001	3117-5054	
260-5006	540-5005	3117-5107	
260-5017	618-5016	5028-5001	
452-5001	620-5004	5028-5002	

DELETED BID ITEMS:

340-5045
512-5001
512-5004

PLAN SHEET 6 (TYPICAL SECTIONS) -
REVISED TYPICAL SECTIONS.

PLAN SHEET 8 (TRAFFIC CONTROL PLAN SEQUENCE OF WORK) -
REVISED NOTES.

PLAN SHEETS 9, 10, 11 & 12 (TCP PLAN SHEETS) -
REVISED SHEETS TO ADD VIA BARRELS AND REVISED CTB QUANTITIES.

PLAN SHEET 31 (BRIDGE PLAN & PROFILE) -
REVISED AND ADDED LIGHT POLES TO BRIDGE.

PLAN SHEET 33 (SIDEWALK & DEMOLITIONS DETAILS) -
PLAN SHEET 34 (INTERIOR BENT) -
REVISED DETAILS.

PLAN SHEETS 38 & 39 (TYPE C411) -
REVISED STANDARD SHEET.

PLAN SHEET 40 (IBSD-ABC & IV-24) -
REPLACED EXISTING STANDARD SHEET IBSD-C(M) WITH THIS SHEET.

PLAN SHEET 45 (MBGF-03A(M) -
PLAN SHEET 45A (SGT(7)-03A(M)) -
NEW STANDARD SHEETS ADDED TO SET OF PLANS.

PLAN SHEET 46 (SIGNING, ILLUMINATION & PAVEMENT MARKINGS LAYOUT) -
NUMEROUS ITEMS ADDED TO QUANTITIES TABLES AND NUMEROUS DATA AND NOTES
ADDED TO THE LAYOUT.

PLAN SHEETS 46A & 46B (LIGHT DETAILS) -
PLAN SHEETS 46C & 46D (ED (1) & (2) - 03) -
NEW SHEETS ADDED TO PLANS.

PLAN SHEET 52 (SW3P) -
REVISED SW3P.

PLAN SHEET 53 (SW3P LAYOUT) -
REVISED SW3P LAYOUT.

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	104	5009		REMOV CONC (SDWLK) and DOLLARS CENTS	M2	52.000	1
	104	5011		REMOV CONC (DRVWY) and DOLLARS CENTS	M2	18.000	2
	104	5014		REMOV CONC (CURB) and DOLLARS CENTS	M	29.000	3
	104	5022		REMOV CONC (HDWL) and DOLLARS CENTS	M3	7.400	4
	104	5039		REMOVE CONC (SDWALK)(BRIDGE) and DOLLARS CENTS	M2	235.000	5
	104	5045		REMOV CONC (PAVERS) and DOLLARS CENTS	M2	1.000	6
	164	5007	002	CELL FIB SEED (TEMP)(WARM) and DOLLARS CENTS	M2	3,142.000	7
	164	5069	002	CELL FIB MULCH SEED and DOLLARS CENTS	M2	3,142.000	8
	260	5006		LIME TREAT SUBGR (OC)(150 MM) and DOLLARS CENTS	M2	35.000	9
	260	5017		LIME (TY A(SLRY),TY B OR TY C(SLRY) and DOLLARS CENTS	MGR	.280	10
	354	5032		PLANE ASPH CONC PAV (20 MM) and DOLLARS CENTS	M2	906.640	11

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	416	5003	004	DRILL SHAFT (450 MM) and DOLLARS CENTS	M	22.000	12
	416	5004	004	DRILL SHAFT (600 MM) and DOLLARS CENTS	M	66.000	13
	420	5018	010	CL S CONC (SLAB) and DOLLARS CENTS	M3	135.000	14
	420	5032	010	CL S CONC (BRIDGE SDWLK) and DOLLARS CENTS	M3	20.000	15
	420	5065	010	CL S CONCRETE (ABUT) and DOLLARS CENTS	M3	15.500	16
	420	5066	010	CL S CONCRETE (BENT) and DOLLARS CENTS	M3	6.600	17
	425	5003	001	PRESTR CONC BEAM (TY C) and DOLLARS CENTS	M	200.000	18
	432	5032		RIPRAP (CONC)(CL B)(130 MM) and DOLLARS CENTS	M3	3.700	19
	435	5014	001	ELASTOMERIC BEAR (IF 4) and DOLLARS CENTS	EA	20.000	20
	442	5003		STR STL (ARMOR JOINT) and DOLLARS CENTS	KG	5,365.000	21
	450	5049		RAIL (TY C411)(MOD) and DOLLARS CENTS	M	196.500	22

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	452	5001		REMOV RAIL (METAL RAIL ELEMENTS ONLY) DOLLARS CENTS and	M	6.000	23
	500	5001		MOBILIZATION DOLLARS CENTS and	LS	1.000	24
	502	5001	020	BARRICADES, SIGNS AND TRAF HANDLE DOLLARS CENTS and	MO	12.000	25
	512	5002		PORT CONC TRAF BAR(STKPL,INSTL & RETRN) DOLLARS CENTS and	M	100.000	26
	512	5003		PORT CONC TRAF BAR (MOVE & RESET) DOLLARS CENTS and	M	100.000	27
	529	5001		CONC CURB (TY 1) DOLLARS CENTS and	M	26.000	28
	530	5001		DRVWYS (CONC)(150 MM) DOLLARS CENTS and	M2	15.000	29
	531	5001		CONCRETE SIDEWALKS DOLLARS CENTS and	M	31.000	30
	534	5001		STRUCT APPROACH SLABS DOLLARS CENTS and	M3	6.400	31
	540	5001		MTL BEAM GD FEN (2.67 MM) DOLLARS CENTS and	M	30.000	32

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	540	5005		TERM ANCHOR SECT (2.67 MM) DOLLARS and CENTS	EA	2.000	33
	610	5043	001	RDWY ILL ASSEM (SPL TY 4) DOLLARS and CENTS	EA	3.000	34
	618	5016		CONDUIT (PVC)(SCHD 80)(32 MM) DOLLARS and CENTS	M	104.000	35
	620	5004		ELEC CONDUCTOR (NO. 6) BARE DOLLARS and CENTS	M	98.000	36
	620	5010		ELEC CONDUCTOR (NO. 6) INSULATED DOLLARS and CENTS	M	196.000	37
	649	5006		RELOC SMALL RDSG SGN ASSMS DOLLARS and CENTS	EA	1.000	38
	662	5001	005	WRK ZN PAV MRK REMOV (W) (SLD) (100 MM) DOLLARS and CENTS	M	50.000	39
	662	5012	005	WRK ZN PAV MRK REMOV (W) (ARROW) DOLLARS and CENTS	EA	4.000	40
	662	5023	005	WRK ZN PAV MRK REMOV (Y) (SLD)(100 MM) DOLLARS and CENTS	M	824.000	41
	666	5001	011	REFL PAV MRK TY I (W) (SLD) (100 MM) DOLLARS and CENTS	M	196.000	42

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	666	5024	011	REFL PAV MRK TY I (Y) (SLD) (100 MM) DOLLARS and CENTS	M	454.000	43
	666	5032	011	REFL PAV MRK TY I (Y) (SLD) (600 MM) DOLLARS and CENTS	M	51.000	44
	666	5035	011	REFL PAV MRK TY II (W) (SLD) (100 MM) DOLLARS and CENTS	M	196.000	45
	666	5056	011	REFL PAV MRK TY II (Y) (SLD) (100 MM) DOLLARS and CENTS	M	454.000	46
	666	5063	011	REFL PAV MRK TY II (Y) (SLD) (600 MM) DOLLARS and CENTS	M	51.000	47
	672	5007	004	RAIS PAV MRKR CL B (REFL) TY I-C DOLLARS and CENTS	EA	6.000	48
	672	5009	004	RAIS PAV MRKR CL B (REFL) TY II-A-A DOLLARS and CENTS	EA	68.000	49
	677	5001		ELIM EXT PAV MRK & MRKR (100 MM) DOLLARS and CENTS	M	824.000	50
	3117	5032		HOT MIX (TY C)(SURF)(PG 70-22) DOLLARS and CENTS	MGR	2.110	51
	3117	5053		HOT MIX (TY B)(BASE)(PG 64-22) DOLLARS and CENTS	MGR	2.820	52
	3117	5054		HOT MIX (TY D)(SURF)(PG 70-22) DOLLARS and CENTS	MGR	124.800	53

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	3117	5107		HOT MIX (TY A)(BASE)(PG 64-22) DOLLARS and CENTS	MGR	20.420	54
	5002	5004		ROCK FILTER DAMS (TY 2) DOLLARS and CENTS	M	38.000	55
	5002	5005		ROCK FILTER DAMS (REMOV & REPLAC)(TY 2) DOLLARS and CENTS	M	38.000	56
	5002	5006		ROCK FILTER DAMS (REMOV)(TY 2) DOLLARS and CENTS	M	38.000	57
	5006	5001		CONSTRUCT EXIT (TY 1) DOLLARS and CENTS	M2	60.000	58
	5006	5002		CONSTRUCT EXIT (REMOV & REPLAC)(TY 1) DOLLARS and CENTS	M2	60.000	59
	5006	5003		CONSTRUCT EXIT (REMOV)(TY 1) DOLLARS and CENTS	M2	60.000	60
	5012	5001		TEMP SEDMT CONT FENCE DOLLARS and CENTS	M	51.000	61
	5012	5002		TEMP SEDMT CONT FENCE (REMOV & REPLAC) DOLLARS and CENTS	M	51.000	62
	5012	5003		TEMP SEDMT CONT FENCE (REMOV) DOLLARS and CENTS	M	51.000	63

ALT	ITEM-CODE			UNIT BID PRICE ONLY. WRITTEN IN WORDS	UNIT	APPROX QUANTITIES	DEPT USE ONLY
	ITEM NO	DESC CODE	S.P. NO.				
	5028	5001		VEH IMP ATTN ASSEM BRLS DOLLARS and CENTS	EA	14.000	64
	5028	5002		VEH IMP ATTN ASSEM BRLS (MOVE & RESET) DOLLARS and CENTS	EA	14.000	65
	5028	5003		VEH IMP ATTN ASSEM BRLS (REMOVE) DOLLARS and CENTS	EA	14.000	66
	5288	5001		LANDSCAPE PAVERS DOLLARS and CENTS	M2	20.000	67
	5419	5003		SINGLE GDRAIL TERM (TY I) DOLLARS and CENTS	EA	2.000	68

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Highway: CS (Mission Road)

GENERAL NOTES:

===== Asphaltic Concrete Pavement =====

Type	Location	Depth	Rate/Area	Quantity
D	Bridge Rdwy	50 mm	0.145 Mgr/M2 * 861 M2	124.8 Mgr
C	Main Rdwy	38 mm	0.108 Mgr/M2 * 19.4 M2	2.11 Mgr
B	Main Rdwy	51 mm	0.145 Mgr/M2 * 19.4 M2	2.82 Mgr
A	Main Rdwy	203 mm	0.580 Mgr/M2 * 35.2 M2	20.42 Mgr

===== Surface Treatment Data =====

Description	1st Course
Area	861 M2
asph--type	----- See Bid Item-----
asph--rate(L/M2)	1.358/1 = 1170 L
aggr--type/gr	ty PB/gr 4
aggr--rate(M3/M2)	1/100.5 = 8.6 M3

The following State, District, Local and/or Utility Standards have been modified: Texas Classic Combination Railing, Type C411(MOD).

All pavement markings shall be in accordance with the Texas MUTCD.

The location of utilities, either underground or overhead, shown within the right-of-way and/or the project cross-sections are approximate.

The following list are the telephone numbers of utility locators for some of the utilities that may be encountered. It is the responsibility of the Contractor to have utilities located before construction.

City Public Service	1-800-545-6005
Emergency	353-HELP
Southwestern Bell Telephone	1-800-545-6005
Time Warner Cable	1-800-545-6005
San Antonio Water System	704-7109 or 227-6143
Bexar Metropolitan Water	354-6546
Valero Gas	349-7555
AT & T	1-800-252-1133
State-Wide Router	1-800-545-6005
District Signal Shop (Mr. Gilbert L. Meier, Jr.)	615-5975
District Electrical Shop (Mr. Roy McCue)	615-5995

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Trans Guide

(Mr. Les Tomasini)

731-5131

Most existing natural gas pipelines that will no longer be in service are usually abandoned-in-place. If a gas pipe has to be removed, wrapped steel gas pipelines shall be assumed to be asbestos containing, unless analytical testing of the wrap material determines that the wrap material contains less than 1% asbestos, as determined using the Polarized Light Microscopy (PLM) Method. The Contractor shall observe and comply with all federal, state and local laws, ordinances and regulations regarding the management of asbestos containing materials. At a minimum, the following procedure shall be used by the Contractor whenever an existing wrapped steel gas pipe has to be removed (for whatever reason) during construction operations.

1. The Contractor shall notify the Engineer.
2. As soon as the pipe is removed, the Contractor shall cover and secure the ends of the pipe with a double layer of 6 mil plastic, then move it to a secure temporary storage site (approved by the Engineer) within the project limits. Care shall be taken to avoid damage to the plastic and if damaged, shall be replaced before further handling of the pipe. If the wrapping of the pipe is damaged, the entire pipe shall be covered with plastic.
3. The Contractor and/or the Engineer will determine the owner (utility company) of the gas line to coordinate removal of the pipe from the project. If the owner of the gas pipe cannot be determined, the Engineer will make arrangements to transport the pipe off the project. The Contractor will not be responsible for removing the pipe from the project.
4. The removal of the steel gas pipe from the trench is subsidiary to the work that created the need to remove the pipe (structural excavation, roadway excavation, removal and replacement of the pipe, etc). The work performed in handling the pipe after it has been removed (covering with plastic, hauling to a secure storage within the project, and loading onto the transportation vehicle for removal from the project) will be paid for through the extra work order process.

Asbestos Cement (AC) Pipe Tie-ins:

There are several locations where the proposed water line will/might tie into an existing AC pipe. When performing this work, the Contractor shall observe and comply with all federal, state and local laws, ordinances and regulations regarding the management of asbestos containing materials. At the minimum, work involving AC pipe should be overseen by a person who has received asbestos training and is familiar with the National Emissions Standards for Hazardous Air Pollutants (NESHAP). If greater than 80 m of pipe is to be removed, written notification to the Texas Department of Health (TDH) 10 days prior commencing with the removal of AC pipe is required. At each location shown in the plans and/or identified by the Contractor to involve AC pipe, the Contractor will be required to remove the necessary amount of AC pipe to make the connection without creating any friable material. The Contractor shall remove whole sections of AC pipe and make the tie-in at the nearest joint. The Contractor shall remove the AC pipe and store it in a secure, Engineer approved location for pick up by the owner of the utility. Prior to

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performing this work, the Contractor shall notify the Engineer and the owner of the utility of the work schedule 48 hours in advance of beginning the work.

The Contractor shall be responsible for contacting the Engineer or the City of San Antonio at 210-615-5975(TxDOT) or 210-207-7765 (City) when construction operations are within 120 m of a signalized intersection to determine/verify the location of loop detectors, conduit, ground-boxes, etc. Any signal equipment damaged by the Contractor's operations shall be repaired or replaced at their expense. The method of repair or replacement shall be pre-approved and inspected by the Engineer. Depending on the type and extent of the damage, the Engineer reserves the right to perform the repair or replacement work and the Contractor will be billed for the cost of this work.

All existing raised pavement markings shall be removed by the Contractor as the work progresses as approved by the Engineer. This work will not be paid for separately, but shall be considered subsidiary to the various bid items. Materials removed shall become the property of the Contractor for proper management.

The existing topsoil and grass may be placed in windrows along the edge of the grading operations or as directed/approved by the Engineer. After grading operations are completed, the topsoil and grass shall be spread uniformly on all slopes and ditches. This work will not be paid for directly but will be subsidiary to the various bid items.

In instances where fixed features require, the cross section slopes may be varied to the extent determined/approved by the Engineer.

If waste areas or material source areas result from this project, the Contractor is reminded to follow the requirements of the Texas Aggregate Quarry and Pit Safety Act.

The Contractor shall maintain the right of way free of trash, construction debris and surplus materials as shown in the plans and/or as directed/approved by the Engineer.

Any materials removed and not reused by the Contractor on the project and determined to be salvageable by the Engineer, shall be retained by the owner and shall be stored within the project limits at an approved secure location or delivered undamaged to the salvage/storage yard as directed by the Engineer. Materials that are not determined to be salvageable by the Engineer shall become the property of the Contractor for proper management in accordance with local, state and/or federal requirements at their expense. Traffic signs must be defaced in such a manner that they will not reappear in public as signs.

In preparing holes for posts and/or foundations, care shall be taken by the Contractor so as not to rupture existing drainage structures, electrical conduits, public utilities, etc.

Any sign panels that are to be adjusted and/or removed and replaced, shall be done in the same workday unless otherwise approved by the Engineer.

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Sign types for which details are not shown in the plans shall conform with the "Texas MUTCD".

The Contractor shall notify the Engineer and/or the City of San Antonio Traffic Signal Design Engineer (210-733-4573) at least two weeks prior to a proposed traffic pattern change(s) that will require a revision to traffic signals. This is required to provide the State/City time to perform a traffic study, determine the new signal timing and phasing settings that need to be implemented with the traffic change.

The contractor's attention is directed to the fact that the following Standard plan sheets using U.S. Customary (English) units are included in this project:

Bridge Approach Standard – Asphalt (BAS-A)

Texas Classic Combination Railing (MOD) – Type C411

Prestressed Concrete I-Beam Standard Designs 24ft Roadway (IBSD-ABC & IV – 24)

Prestressed I-Beam Details (IBD)

Electrical Details – Conduit ED(1)-03

Electrical Details – Conductors ED(2)-03

These Items will be measured and paid for as shown in the specification, but will utilize the standard included for construction details.

For contractor's information, conversion factors are included in the Appendix to the Texas Department of Transportation 1995 Standard Specification for Construction and Maintenance of Highways, Streets, and Bridges.

--Item 2--

The bidder's attention is directed to the first paragraph of Article 2.3 of The Standard Specifications. In view of the complex nature of the work, the need for close coordination with various utilities, traffic control considerations, and other factors influencing the prosecution of the work, it is strongly recommended that prospective bidders examine the project site with the Engineer's staff.

--Item 5—

The Contractor shall be responsible for referencing all existing striping and pavement markings in a manner which will allow these markings to be re-established. Extra referencing shall be placed (if needed) to ensure that the Proj.'s markings (lane lines, edge lines, ramp gores, etc.) are in line with signs, TMS arrows, etc. located on OSB's.

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For projects that have milling, seal coating and ACP, the following requirements apply: ACP placed at curb, traffic inlets and slotted drains shall be neatly tapered down to the inlet. The Contractor shall not restrict the opening of the inlet nor leave an abrupt ACP drop-off in front of the inlet.

If a bridge deck is milled, seal coated and/or overlaid, it shall be cleaned of excess material. This material shall be removed and not just broomed to the sides of the bridge or off the bridge, but in front of or under the guardrail approach to the bridge.

The Contractor shall remove excess material that falls through open joints in the bridge deck onto the bridge caps. Open bridge joints shall also be cleaned to ensure that they remain open as intended.

The above work will not be paid for directly, but will be considered subsidiary work.

--Item 7--

The total disturbed area for this project is 1.2 hectare . The disturbed area in this project, all project locations in the Contract and Contractor project specific locations (PSLs), within 16 km of the project limits, for the Contract will further establish the authorization requirements for storm water discharges. The Department 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 any required authorization from the TCEQ for any Contractor PSLs for construction support activities on or off the ROW. When the total area disturbed in the Contract and PSLs within 16 km of the project limits exceeds, provide a copy of the Contractor NOI for PSLs on the ROW to the Engineer (to the appropriate MS4 operator when the project is on an off-state system route).

--Item 8--

Primavera Project Planner computer software is required for the CPM as covered in The Special Provision to this Item.

Night and/or weekend work is required. See the Sequence of Work, Traffic Control Plan, time restrictions for lane closures, etc. shown in the plans and/or Special Provisions.

The number of working or calendar days allowed to complete this project and interim milestones, if any, was calculated using a conceptual time determination schedule that assumes generic resources, production rates and sequences of construction. The time determination schedule also assumes average weather conditions based on historic data for the San Antonio District. The Engineer will supply bidders upon written request one electronic copy of the time determination schedule compatible with Primavera Project Planner software.

Every effort has been made to schedule the work in accordance with the traffic control plans, sequence of work, working time restrictions, constraints and limitations shown in the proposal.

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The determination schedule is provided for informational use only and is not intended for bidding or construction purposes. If the bidder utilizes the schedule for bidding or construction purposes, the bidder accepts the schedule as their own and assumes the responsibility for verifying all aspects of the schedule. The department will not adjust the number of working days for the project and milestones, if any, due to differences in opinion regarding any assumptions made in the preparation of the schedule or for errors, omissions or discrepancies found in the time determination schedule.

The contractor shall locate all manholes and valves within the construction area of the project. Each manhole and valve will be identified by its owner (SAWS, CPS, etc.) and station and offset. No roadwork may begin until this list has been submitted to the Engineer.

--Item 9--

When directed/approved by the Engineer, the Contractor shall provide two uniformed, off-duty certified peace officers with two officially marked vehicles (if patrol cruisers are available from the enforcement agency involved) during any work that requires a lane to be closed. These officers in patrol cruisers (if provided) shall be located as directed/approved by the Engineer to monitor and/or direct traffic during the lane closure. The method used to direct traffic at signalized intersections shall be as directed/approved by the Engineer. Additional officers and cruisers may be required when directed/approved by the Engineer. The Department will pay only the actual invoice cost for peace officers, cruisers and 5% compensation as allowed in the Special Provision to this item. The Department will not pay for scheduling fees, or any other itemized cost in addition to the actual invoice cost of the peace officers and the allowable 5%.

--Item 100--

The Contractor shall not begin any clearing operations until the Engineer has established and defined the trees and areas of vegetation that should not be removed or disturbed by construction activities. To ensure that these areas are not disturbed, the Contractor shall place protection fencing as shown in the plans or as directed/approved by the Engineer.

All right of way clearing operations will be coordinated with the project's SW3P and as directed/approved by the Engineer.

The Contractor may be required to trim and remove brush and trees in order to construct the project or to provide a horizontal clearance of approximately 0.6 m inside the right of way line and a vertical clearance of at least 3.6 m. For this operation, no vertical flailing equipment shall be allowed and the method used shall be approved by the Engineer.

To avoid the spread of oak wilt disease, all species of oak trees that are damaged or cut (branches, roots and/or stumps) during construction operations, shall be treated with a commercial tree wound dressing (pruning spray) within 20 minutes of the damage or cut. To prevent possible infection from tree to tree, disinfect all pruning tools with a solution of 70% isopropyl alcohol before moving to the next tree. Unless otherwise approved by the Engineer, tree limbs and trees that are removed (cut or pushed over) shall be removed from the project no

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later than the next working day in which they were cut or pushed over. The Engineer can stop all construction operations if the above dressing and/or removal requirements are not followed.

--Item 164 & 166--

For Cellulose Fiber Mulch Seeding (CFMS): the seed and fertilizer may be mixed together and placed in one operation but the placement of the mulch shall be accomplished by a second operation. Fertilizer is required as specified in the Special Provision to this Item.

For drill seeding permanent warm season grasses: the seed drill shall be capable of properly storing and metering the release of small seeds (such as Bermuda grass) separately from fluffy type seeds (such as Bluestem). Drills manufactured for planting standard grain crops will not be acceptable.

--Item 168--

Watering rates for sod: 1.1 L per M2 per cycle with 3 cycles per week for the first 4 weeks then 1.1 L per M2 per cycle with 1 cycle per week for the next 8 weeks

Watering rates for seeding: 6 L per M2 per cycle with 6 cycles per week for the first 4 weeks then 6 L per M2 per cycle with 3 cycles per week for the next 8 weeks.

These watering rates are to estimate the amount of watering that might be needed to supplement natural rainfall to keep the soil moist until germination and establishment of seeds and grasses can occur. The Contractor will adjust these rates as directed or approved by the Engineer to take into account actual field conditions such as rain, soil temperature, soil texture, air temperature, sunny vs. cloudy days, etc. Increasing the gals per cycle to decrease the number of cycles per week will not be allowed.

--Item 300--

The asphalt binder used in the manufacture of non-surface layers of the hot mix asphaltic concrete Type A, B and/or C, shall be PG 64 - 22.

The asphalt binder used in the manufacture of the hot mix asphaltic concrete Type C (Surf), shall be PG 70 -22.

Previously tested aggregates delivered to the project, which are found to contain excessive quantities of dust (more than 0.5 percent passing the 0.425 sieve) during precoating, stockpiling or hauling operations, may be rejected by the Engineer. Test Method Tex-200-F, Part I shall be used for testing.

Precoated Aggregate Type PE shall consist of crushed slag, crushed stone or natural limestone rock asphalt.

--Item 302, 345 & 3146--

The District Laboratory will utilize the Ignition Oven Method (Tex 236-F) for aggregate

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gradation, with the option of utilizing belt or vacuum extraction gradation in the event the ignition oven malfunctions.

--Item 305--

All ACP material removed will remain the property of the Contractor. If the Contractor decides to dispose of the ACP material, the Contractor shall dispose of it in an appropriate manner in compliance with local, state, and federal regulations.

--Item 316--

Material rates shown are based on a rate normally used for typical/average conditions, and may be adjusted by the Engineer depending on the type of material used, and the existing condition/type of the roadway surface. If emulsions are used, a minimum 24 hour curing period shall elapse before placing any subsequent asphalt courses. Because of the required curing period, the Contractor shall obtain approval from the Engineer before using emulsions.

When using latex asphalt, the Contractor shall take precautionary measures to avoid drifting of asphalt onto traffic and adjacent properties.

The Contractor will be required to set a string line for all surface treatment operations unless otherwise approved by the Engineer.

The location of aggregate stockpiles at the project shall be approved by the Engineer. The aggregate shall be free of excess surface moisture, as determined by the Engineer, before application.

Flux oil or emulsions may be used for precoating LRA and LRA-Trap Rock blends. When emulsions are used as the pre-coat material, the precoated aggregate shall be adequately dried to the satisfaction of the Engineer. It will be the responsibility of the Contractor/Producer to provide adequate drying and a minimum 30 day curing period before delivery of the aggregates. The Engineer reserves the right to reject any precoated aggregate which is improperly coated or otherwise unsatisfactory for use.

If the aggregates to be precoated are found to have stripping characteristics, the Engineer may require the addition of a lime slurry. If lime is required, lime meeting the requirements of Item 264 shall be added to the aggregate at the rate of 1% hydrated lime by weight of aggregate and shall be added in slurry form at the cold feed. The cost of the lime shall be considered subsidiary to this Item. If approved by the Engineer, the lime slurry may be added at the stockpile, but not more than 24 hours in advance of use.

It shall be the Contractor's responsibility to ensure that the asphalt used for precoating the aggregate at the plant and the asphalt used for the surface treatment will not result in a reaction that may adversely effect the bonding of the aggregate and asphalt during the surface treatment operation.

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The addition of baghouse fines will not be permitted in the production of precoated material.

Mixes that do not maintain flow qualities where the material can not be satisfactorily spread by approved mechanical spreading devices will not be acceptable.

Stockpiles of aggregate precoated with AC may generate excessive heat build-up resulting in damage to the asphalt and/or aggregates if adequate cooling has not been initially provided. Stockpiles showing evidence of heat damage (as determined by the Engineer) can be rejected by the Engineer.

Aggregates used for the final surface shall have a Flakiness Index not to exceed 15 and shall be subjected to 5 cycles of the Soundness Test in accordance with Test Method Tex-411-A. The percent loss shall not be greater than 30 when magnesium sulfate is used. This test will not apply to blends with crushed trap rock, crushed rhyolite, crushed limestone rock asphalt or lightweight aggregate.

All rolling shall be in accordance with Item 213 (Medium, Type B) at the approximate rate of 1 hr/3000 M2 or as directed/approved by the Engineer. The light pneumatic roller will be acceptable at the approximate rate of 1 hr/2000 M2.

All concrete curbs and/or concrete islands that get coated with oil during the surface treatment operation shall be cleaned as directed/approved by the Engineer prior to final acceptance of the project.

--Item 318--

Depending on the weather conditions, a curing period of 10 days or as directed/approved by the Engineer shall elapse before placing any subsequent asphaltic courses.

--Item 330 & 332--

The longitudinal joints shall be at the lane lines or as directed/ approved by the Engineer.

The asphalt plant shall be equipped with truck scales as defined in Item 520.3(1). Three weight tickets bearing the date, the truck number and the gross, net and tare weights shall be given to the truck driver by the plant personnel, and then given to the State inspector at the spreading and finishing machine. May be required to weigh loads of asphaltic concrete on public scales or portable platform scales to check the weight of the material.

The special aggregate for the Class B LRA shall be trap rock or crushed slag.

If LRA is stockpiled on the project on other than a clean hard surface, where it can get contaminated with foreign materials, the LRA at the bottom of the stockpile shall not be used. A set of standard truck scales will be required to determine the quantity of contaminated material to be deducted from the pay quantity. Unless approved otherwise, LRA shall not be stockpiled more than 10 days prior to lay-down operations.

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The fluxing material shall be either an emulsified combination of asphalt and softening agent added individually (the softening agent may also be an emulsion), or a material meeting the requirements of the Standard Specification and/or Special Provision to the Item "Asphalt's, "Oils and Emulsions". The material(s) selected shall be approved by the Engineer.

--Item 354--

All material resulting from the planing operations, will become the property of the Contractor. If the Contractor decides to dispose of the planing material, the Contractor shall dispose of it in an appropriate manner in compliance with all local, state, and federal regulations.

The Contractor shall take precaution to avoid damage to existing bridge deck and armor joints during the planing operation. Any damage to the bridge decks shall be repaired as approved by the Engineer. Any damage to the armor joints shall be repaired or replaced as directed/approved by the Engineer.

--Item 420--

Bent concrete will be measured for payment as plan quantity.

--Item 421--

Grade 7 aggregate may be used for concrete, but, it will require written approval from the Engineer prior to use. The Contractor shall coordinate this approval with the concrete producer. Concrete with grade 7 aggregate will not be accepted at the project site until this written approval is on file.

--Item 421 & 427--

All surface finishes for concrete shall receive a surface area I class C finish unless otherwise directed/approved by the Engineer.

--Item 421 & 520--

After the concrete producer contacts the District Laboratory or the Engineer's office (when outside the San Antonio area) to request an inspector at the concrete batch plant, TxDOT will determine if an inspector can be scheduled. If an inspector is not available, TxDOT will notify the producer. At that time, if the concrete producer has a TxDOT approved automated concrete batch ticket and the concrete is not for drill shafts, columns, caps, abutments, bridge decks or top slab of a direct traffic culvert, the producer will be allowed to batch the concrete without a TxDOT inspector being present.

The concrete producers will be required to develop and use an automated concrete batch ticket that will contain the same information as TxDOT's concrete batch ticket. The producer's ticket shall be a computer printout submitted to TxDOT for approval prior to use. It will be the Contractor's responsibility to inform their concrete producer/supplier of this requirement. Use of the approved ticket is required for batching miscellaneous concrete. Concrete for drill shafts, columns, caps, abutments, bridge decks or top slabs of direct traffic culverts shall be

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batched in the presence of a TxDOT inspector using the producer's automated concrete batch ticket.

--Item 427--

The class of finish applied to the existing concrete surface shall be the same as that applied to the adjoining new concrete surface as directed/approved by the Engineer.

--Item 432--

In all riprap slopes, 75 mm diameter weep holes shall be provided at 3 m maximum spacing and backed with loose graded gravel or crushed stone and galvanized hardware cloth as directed/approved by the Engineer.

In areas where guard fence posts are to be placed in riprap, the riprap shall have an +/- 460 mm blocked out area (round or square).

--Item 442--

All structural steel shall receive Protection System II - Grey.
All armor joints shall receive Protection System I or II.

--Item 449--

The pipe joint compound used to coat the threads of the anchor bolts prior to installation of nuts when erecting a high mast pole, shall be an electrically conducting protective thread lubricant compound (Crouse-Hinds TL-2, 0z/Gedney STL, Thomas & Betts Kopr-Shield).

--Item 496—

The existing paint system on the structure (s) to be removed may contain lead and/or other metals. All costs incurred by the Contractor for proper management of this paint system, shall be subsidiary to this Item.

--Item 500--

"Materials on Hand" payments will not be considered in determining percentages used to compute payment for Item "Mobilization".

--Item 502--

State Standard Sheet(s) "Traffic Control Plan (TCP)" requires that certain signs are to remain in place until the standard pavement markings are placed. The standard markings should be in place no later than 14 days after surface treatment operations are completed.

When advanced warning flashing arrow panel(s) is/are specified, the Contractor shall be required to have one standby unit in good condition at the job site ready for immediate use.

Use of shadow vehicles with Truck Mounted Attenuators (TMA) as called for in the State Standard Sheet(s) "Traffic Control Plan" (TCP) will not be considered optional.

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The Contractor shall treat pavement drop-offs as shown in the TCP section of the plans and/or in Appendix B, "Treatment of Pavement Drop-off in Work Zones" of the TxDOT Roadway Design Manual or as approved/directed by the Engineer. The treatment information can be obtained on-line at the following internet web site:

<http://manuals.dot.state.tx.us/dynaweb/coldesig/rdw/> or a hard copy can be obtained from the Engineer.

After the Contractor has been notified in writing by the Engineer, the time frame to provide properly maintained traffic control devices before they are considered to be in non-compliance with this Item, is 48 hours regardless of the days of the week involved. If the Contractor doesn't take the necessary steps approved by the Engineer to eliminate the non-compliance conditions within the 48 hours established above, payment for this Item for the month(s) in non-compliance can be withheld as covered in Section 502.4(7).

The Contractor is responsible for implementing and maintaining the traffic control and for furnishing all traffic control devices, and flaggers. The construction methods shall be conducted to provide the least possible interference to traffic so as to permit the continuous movement of traffic in all allowable directions at all times. The Contractor shall clean and remove from the work area all loose material resulting from contract operations in a timely manner.

Moving an existing sign to a temporary location and placing it on temporary or permanent supports will be subsidiary to this Item. Installations with permanent supports at permanent locations will be paid for under the applicable bid item (s).

The Traffic Control Plan/Sequence of Work required traffic to be moved to a new pavement section prior to the placement of the final mat of ACP. For these sections, the Contractor will be required to construct all manholes and/or valves included in the contract to the elevation of the pavement being used by traffic. The manholes and/or valves shall be brought to final pavement elevations just prior to the final mat of ACP. If, between the final elevation adjustment and the final mat of ACP, the manholes and/or valves are going to be exposed to traffic, the Contractor will be required to place temporary asphalt around the manhole and/or valve to provide a minimum 50:1 taper. The cost of elevation adjustments and asphalt tapers will not be paid for directly, but will be part of the price bid for other manhole and/or valve work.

--Item 504--

The Contractor will be required to furnish one field office Type E. The site/location proposed by the Contractor for the field office has to be approved by the Engineer. The field office shall be at least 92.9 M2 in size and shall be partitioned into at least 4 workrooms, shall have windows and doors, shall be provided with the necessary plan tables, shelves, and lockers required and constructed as directed/approved by the Engineer and shall contain the facilities of a toilet and lavatory.

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The field office shall have a storage area for office technical equipment as directed/approved by the Engineer. The storage area shall be a minimum of 6 M³ and shall be reasonably secure from forced entry and removal from the office.

The field office parking area shall be of adequate material, shape and size to accommodate 6 vehicles as approved by the Engineer. When directed by the Engineer (depending on the location), the field office and the parking area shall be enclosed with a fence approved by the Engineer.

If the Contractor obtains asphaltic material from a source other than a commercial source presently inspected by TxDOT, the Contractor shall furnish a Type D structure for the asphalt mix control laboratory for the Engineer's exclusive use. In addition to the requirements of Item 504, this structure shall have a utility sink with an adequate clean potable water supply for testing and a minimum height of 2.5 m and provide a minimum of 40 M² of gross floor area for permanently located asphalt plants or 20 M² for temporary plants serving only this project. The floor area will be partitioned into a minimum of two interconnected rooms, with an exterior door and a minimum of two windows per room. The floor shall have an impervious cover and sufficient strength to support the testing equipment. Portable structures shall be support blocked for stability and shall be tied down.

The Type D structure shall be adequately air conditioned and be furnished with a minimum of one desk, three chairs, one file cabinet, a telephone line and one built-in equipment storage cabinet for the storage of equipment. The cabinet shall be a minimum of 1M wide by 0.6 m deep by 1M high and shall be reasonably secure from forced entry and removal from the office.

The Type D structure shall be provided with a 240 volt electrical service entrance and a minimum of 2 convenience outlets per wall. The service shall consist of a minimum of four 120 volt circuits with 20 amp breakers and no more than two grounded convenience outlets per circuit and provisions for a minimum of two 220 volt ovens with vents to the outside. Space heaters for heating the structure are unacceptable. The Contractor shall ensure the electrical wiring of the structure is adequate for the needs of the testing equipment.

Asphalt content will be determined utilizing the Ignition Method so the structure shall provide for asphalt content by extraction. The room to contain the ignition oven shall have electrical power provided in accordance with the oven manufactures specifications and the NEC.

The Contractor will be Responsible for providing the necessary office furniture consisting of desks, chairs, filing cabinets, etc. as directed/approved by the Engineer.

The Contractor will be required to clean the field office and laboratory as needed, but not less than once a week. This will include, but not be limited to, sweeping and mopping floors, cleaning the toilet and lavatory, and emptying waste baskets.

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The Contractor will be required to provide 2 phone line(s), 1 phone(s) and pay all phone related charges to provide this service to the State's field office. The Contractor shall provide to the Engineer a copy of the monthly phone bill which will be used to monitor phone usage. This will be subsidiary and will not be paid for directly.

--Item 512--

Approximately 200 M of portable concrete traffic barrier will be furnished by the State. The Contractor shall pick up the barriers at the storage site located at Rocket Lane/1604 and transport them to the project location. When the barriers are no longer needed, the Contractor shall remove the barriers and return them to the storage site located at Rocket Lane/1604.

The Contractor will be responsible for supplying all connecting hardware. This shall include re-bar grids for full size barrier and connecting nuts, bolts, washers and end pins for low profile barrier. Costs associated with furnishing this material will not be paid directly, but shall be considered subsidiary to the portable barrier Items. The connecting hardware will remain the property of the Contractor after project completion.

The CTB furnished by the State might have different types of lifting methods and type provided depends on what is available at the designated stockpile. The Contractor shall modify their lifting equipment and/or the barrier if the lifting equipment and barrier are not compatible.

The Contractor will be responsible for the portable CTB furnished by the State from the time they are loaded at the State's storage site until they are returned to storage. CTB damaged during loading, unloading and use on the project shall be repaired or replaced at the Contractor's expense; therefore, any existing defects to the CTB's have to be reported to the Engineer to document the barrier's condition at the time of loading.

--Item 529--

Class "C" concrete will be required for machine extruded curb.

--Item 540--

MBGF posts shall be round (not rectangular), shall have domed tops, and shall not be painted.

Guard fence posts placed in proposed and/or existing areas of riprap, sidewalks or any other concrete shall have an 460 mm +/- (square or round) block out. After the posts are installed, the blocked out area shall be topped off with 100 mm of low strength concrete grout mortar consisting of about 1 sack of cement per cubic yard of mix.

If 10 or less timber posts are needed, posts may be purchased locally and may be accepted on the basis of visual inspection by the Engineer.

The nominal post length shall be 1930 mm instead of the 1830 mm detailed on the State Standard Sheet "Metal Beam Guard Fence". This additional post length above the rail element is for rail element height adjustments by future ACP overlay projects.

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--Item 610--

The electrical Service for the proposed illumination assemblies shall be existing secondary enclosures previously installed by City Public Service. The Contractor shall coordinate the field wiring in the secondary enclosures with City Public Service. No direct payment will be made for this work and it shall be considered subsidiary to Item 610.

The Illumination Assemblies required for this project are currently stored at the TxDOT Maintenance Yard, 2300 Roosevelt Ave. These assemblies include the Light Poles, Luminaires, Ballasts and Transformer Bases. The Contractor shall arrange to pick up these materials and use them on this project. The Contractor will be able to view the material, during normal TxDOT working hours, prior to the letting. The Contractor shall furnish all labor and equipment required to load and haul all materials.

The location of poles and fixtures are diagrammatic only and may be shifted by the engineer to accommodate local conditions. Erection and/or removal of poles and luminaires located near overhead electrical lines shall be accomplished using established industry and utility safety practices and in accordance with laws governing such work. The contractor shall consult with appropriate utility company prior to beginning such work.

The fixture shall be Sternberg Vintage Lighting Mission Trails (Mt/508) with #508 vandal resistant cast aluminum, flared and fluted fitter to fit a Sternberg Candy Cane Pole, or equivalent, as approved by the engineer. A spun aluminum shade shall be gloss white inside to reflect all the light downward. The lamp will be located 6 m +/- or 4,3 n +/- above ground (5.5 m +/- or 3.7 m +/- above the pole base plate) as shown in plans. The overall size of the fixture shall be 457 mm x 711 mm.

Where manufacturer's provide warranties or guarantees as a customary trade practice, contractor shall furnish to the engineer such warranties or guarantees.

A. General

1. Structural support design for luminaires. Lighting Standards shall be designed in accordance with the latest issue of the AASHTO "standard specifications for structural supports for highway signs, luminaires and traffic signals." All poles shall be designed for 129 km/h wind loads. An additional 1.3 gust factor shall be applied to the wind loads. For transformer base poles, fabricator shall include transformer base and connecting hardware in design calculations and shop drawing submittals. Manufacturer's shop drawings shall include the ASTM designations for all material to be used.

2. Aluminum Poles

- a. Aluminum poles shall be fabricated in accordance with "Structural Welding, Aluminum" ANSI/AWS D1.2

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- b. The 180 degree candy cane shaped bend shall be made of 50 mm o.d. extruded aluminum with a 3 mm wall thickness. The cane material shall be alloy 6063T-6511. It shall have a centerline bend radius of 356 mm.
 - c. The cane shall be welded to a 152 mm to 76 mm spun tapered aluminum pole made of alloy 6063T-6. The pole shall have a peripherally reinforced access door approximately 457 mm from the bottom of the pole base. The base plate will be fabricated to have a 330 mm bolt circle as to be mounted on a transformer base. The base plate shall be joined by a continuous circumferential weld at the outside top and inside bottom of the anchor base.
 - d. All burrs and casting blemishes on post and fixture shall ground smooth prior to assembly. Castings shall be sandblasted prior to painting to ensure uniform finish and enhance adhesion of subsequent coatings. Prime coat shall be followed by two coats of semi-gloss akylid enamel in the color as shown on the plans.
 - e. Six meter pole assemblies will require a factory attached banner system to the spun tapered shafts. This will consist of an upper and lower banner arm attached to the fixture side of the pole. The banner system shall consist of a banner adapter welded to the pole and a removable banner arm to mate to the adapter. The banner system will ensure the 508 mm x 1.524 m banner can be installed on the pole. Each banner arm will be made of 22 mm O.D. aluminum tubing alloy 6061T6 and terminated with a 38 mm diameter cast threaded ball for easy installation of banner material.
3. Alternate material equal to or better than material specified may be substituted with the approval of the engineer.
4. Luminaires
- a. The fixture shall be attached to the pole by welding the fitter onto the post.
 - b. The light source within the fixture shall be 250 watt or 175 watt metal halide, as shown on the plans.
 - c. The ballasts used shall be of the high power factor design and mounted in the transformer base.
 - d. The mogul base socket and ballasts shall be UL recognized for the specified lamps.
 - e. The optical system shall be composed of a specular type 3 light distribution output with a horizontal (unless otherwise shown on plans) lamp mounting. A clear glass hinged lens will offer easy access and protection of lamp.
5. Illumination assembly poles shall be erected plumb and true. Top of foundation shall be struck level so pole will be plumb. Shims and leveling nuts shall not be used under transformer bases. Grout shall not be placed between base plate or flange and the foundation.

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6. In each pole, continuous color-coded stranded No. 12 AWG copper type XHHW or other approved XLP conductors shall be connected to the line side of each ballast.
7. Acorn nuts will not be allowed for attaching pole to transformer base or foundation.
8. Entire post, fitter and all components shall be shock wrapped and packed in individual cartons to protect the finish.
9. Fused Connector – All electrical connectors for breakaway poles shall be watertight and shall be designed as breakaway (Buchanan 65U, Bussmann HEBW, Littlefuse LEB or equal). All fuses shall be time-delay types. 10 amp (Littlefuse FLO, Bussman RNQ or equal).
10. Un-fused Connector – all electrical connections for neutrals shall be watertight. For breakaway poles, connections shall be designed as breakaway, shall have a white color marking, and shall have a permanently installed solid neutral (Buchanan 20U, Bussmann HET, Littlefuse LET or equal). Dummy/neutral fuse shall be Bussman NTS-R-3 or equal. On shoe base poles omit un-fused connector for neutral conductor.
11. Ground Rod Clamp – Blackburn GG58H, Burndy GKP635, or equal.

B. Transformer Base

12. Transformer base shall be cast from aluminum, ASTM B-108 or B26 alloy 356.0-T6 or other material approved by the engineer, and shall be furnished with eight ½ inch flat washers as recommended by the manufacturer. Transformer base bolt circles (top and bottom) shall match bolt circles for poles and foundations as shown on plans.
13. Transformer base shall be approximately 376-500 mm high and shall have a door approximately 330 mm x 203 mm x 235 mm or as otherwise approved by the engineer. Screw or bolts for attachment of door to base shall be stainless steel. Four machine bolts with four nuts, eight ½ inch flat washers and four lock washer, galvanized ASTM A-153 class C or D, or B-695 Class 50 shall be provided with each transformer base for connecting the pole. Bolts shall be ASTM A325 or approved equal. Nuts shall be ASTM A-563 grade DH galvanized. A ½-13 female threaded grounding lug shall be provided inside the transformer base near the bottom.
14. All breakaway bases shall meet the breakaway requirements of the AASHTO “Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals”, latest edition, and shall have been tested by FHWA approved methods. All bases shall have been structurally tested to meet or exceed the full designed plastic moment capacity of the pole. Certification of the plastic moment load test and FHWA breakaway requirement test of the model of base being furnished shall be submitted with shop drawings. Shop drawings shall show breakaway base model number and manufacturer’s name or logo.

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15. Bases shall be stamped, incised or by other approved permanent means, marked to show fabricator's name or logo, and model number. Such information shall be placed in a readily seen location, inside or outside the base, but shall not be placed on the door.

Doors for transformer bases shall be made of plastic, fiberglass or other non-aluminum material approved by the Engineer. Transformer bases shall be cleaned by grit blast cleaning after heat treatment. Certification by the manufacturer of heat treatment shall be furnished with transformer bases. The certification shall show the metal alloy and temper and that the base meets those requirements, chemical and physical. The certification shall also show the material ASTM specification. Transformer bases shall be cast with a removable tab bar for material testing. Some bars may have been removed by the manufacturer for testing. (Add)

--Item 618 OR 620--

It might be necessary to saw cut existing concrete at some locations for placement of conduit.

The existing concrete shall be saw cut, removed from the steel reinforcement (bars or fabric) and the steel bent to accommodate the conduit. After the conduit has been placed in its final position, the steel shall be bent back to its original position and the trench shall be back-filled with CL "A" concrete. This work is considered subsidiary to this Item.

The conduit for illumination on City of San Antonio streets shall be installed at a depth of 915 mm instead of the usual 460 mm called for by this specification.

All conduit elbows and rigid metal extensions required to be installed on PVC conduit systems

Only materials with approved product codes or designations from pre-qualified producers are acceptable. The Construction Division (CST) maintains the material producers list of approved producer product codes or designations. Use the following website to view this list:

<http://www.dot.state.tx.us/business/materialproducerlist.htm>

Electrical work performed by non-certified persons as defined in Special provision to Item 8, is not in accordance with the requirements of the contract and may be rejected. The required electrical certification course is available and is scheduled periodically by TEEX. Alternatively, Contractors may purchase an entire course for their personnel to be held at a time and location of their choice as negotiated through TEEX. For more information, contact:

Texas Engineering Extension Service (TEEX)
TxDOT Electrical System Course (979) 845-6563

--Item 620—

All electrical connectors for breakaway poles shall be breakaway (Bussman HEBW, Littlefuse LEB, Ferraz-Shawmut FEB, HMC Flood-Seal SLK-MD or equal) in accordance with the latest RID standard. All electrical connections for neutrals shall be breakaway and shall have a white

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colored marking and a permanently installed solid neutral (Bussman HET, Littlefuse LET, Ferraz-Shawmut FEBN, HMC Flood-Seal SDK-MD or equal).

--Item 644& 646--

The wedge anchor system shown on State Standard Sheet SMD (TWT)-02 and the expanded foam foundation covered by note number 11 on the SMD (SLIP-2)-02 will not be allowed.

The "Roll Pin" shown on SMD (SLIP-1)-02 is required.

--Item 649-

A traffic sign inventory by the Contractor will be required prior to the commencement of any work. The inventory shall show the sign type, size, condition, and location. The inventory shall be conducted by the Contractor with the Engineer present and jointly agreed upon.

All traffic signs to be salvaged for reuse on the project shall be stored by the Contractor at a secure location as directed/approved by the Engineer.

--Item 662--

Work zone marker tabs or guide-marks placed prior to the final course of asphaltic concrete pavement or surface treatment shall be removed daily by the Contractor as the ACP operations progress. This removal shall be considered subsidiary to this Item.

When guide-mark tabs are set-up in the plans to be used along with short term marker tabs (that are paid for by the each), the guide-marks will not be paid for under their own Item but will be included with the short term pay item. The Contractor shall install the guide-marks immediately following the final rolling of the ACP in accordance with Item 662 and the State Standard Sheet(s) "Barricade and Construction". The short term tabs can be installed at the same time as the guide-mark tabs.

--Item 666--

TY I material shall be TY B-Alkyd as specific in Departmental Materials Specification DMS-8220.

After the surface has cured for two (2) days, been cleaned and prepared according to the specifications and as directed/approved by the Engineer, all markings shall be applied in accordance with this item, the plans, Texas MUTCD and/or as directed/approved by the Engineer. The thermoplastic markings may be applied directly over existing painted pavement markings where applicable.

The minimum thickness of Type I markings on ACP or concrete surfaces, as measured in accordance with Test Method TEX-854-B using a needlepoint micrometer shall be 3.0 mm for all stop bars, crosswalks, legends and symbols. The thickness for all other lines (lane, edge, no passing, etc.) shall be 2.5 mm. The thickness on surface treatments shall be as shown in the

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Special Provision to this Item. These thicknesses (not including the thickness of the surface applied glass beads) are required for the full width and length of the line being placed.

If TY II marking material is used as the sealer for the TY I markings, they shall be placed a minimum of 14 calendar days in advance of the TY I markings. The Contractor has the option of using the acrylic sealer instead of the Type II marking material as a sealer for TY I markings.

--Item 672--

Raised pavement markers shall not be placed until the asphaltic concrete pavement or surface treatment has cured a minimum of one week and shall be placed no less than two weeks after the ACP or surface treatment placement.

The bituminous adhesive shall be heated with equipment approved by the Engineer. The equipment shall be capable of heating and maintaining the adhesive at a temperature minimum of 199 degrees to a maximum of 204 degrees or in accordance with the manufacture's recommended temperature range. The equipment shall also be capable of agitating the material to maintain a uniform consistency and temperature. If any adhesive is burned due to overheating, it shall be replaced. The adhesive will be packaged in cardboard containers weighing less than 45 kg. Adhesive dispensing equipment shall be truck or trailer mounted. All adhesive material shall be placed directly from the heated dispenser to the pavement. Portable or non-heated containers will not be allowed for the placement of the adhesive material.

The adhesive application shall be of sufficient thickness so that when the markers are pressed into the adhesive, 3 mm or more adhesive will remain under 100% of the marker. The adhesive should extend not less than 10 mm, but not more than 40 mm beyond the perimeter of the marker.

--Item 677--

Elimination of existing thermoplastic pavement markings will consist of a mechanical method approved by the Engineer (677.3(4)) followed by the placement of a surface treatment (677.3(1)(2)).

--Item 3117--

See Item 5440 for ride quality information.

R.A.P. will not be allowed in the surface mat of ACP unless approved otherwise by the Engineer.

The longitudinal joints in the top lift (surface course) shall be at the lane lines or as directed/approved by the Engineer.

The asphalt plant shall be equipped with truck scales as defined in Item 520.3(1) of The Standard Specifications. Three weight tickets bearing the date, the truck number and the gross, net and tare weights shall be given to the truck driver then given to the State inspector at the spreading

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and finishing machine. The Contractor may be required to weigh loads of asphaltic concrete on public scales or portable platform scales to verify the proper weight of the material.

The density and aggregate requirements for the travel-lanes shall also apply to the shoulders.

The minimum Surface Aggregate Classification required shall be class "A".

The Contractor is required to submit a copy of the Tex 233-F production charts to the Engineer on a weekly basis. At the end of the ACP work, all the production chart originals shall be provided to the Engineer.

Crushing of the aggregate for hot mix and immediate use for production of the mix will not be allowed. The aggregate shall be stockpiled until enough material is available for five days of hot mix production unless prior approval is provided by the Engineer. In order to provide adequate time for design and verification of the mix, a pre-placement meeting shall be held at least one month prior to the placement of the hot mix.

The main purpose of hot mix cores taken by the State are for payment calculations. If (for quality control purposes) the Contractor wants the core information sooner than the State can provide these results, take additional cores.

The use of diesel and/or solvents as asphalt release agents in the production, transportation, and/or construction of the hot mix asphaltic concrete is prohibited. Only approved asphalt release agents shall be used, the approved list may be obtained from the District Laboratory.

No more than one lot will be open for any specific type of hot mix, unless authorized by the Engineer. After a lot is open and the Contractor requests to change plants or producers, upon approval by the Engineer, the previous lot will be closed and a new lot will be opened. The numbering for the hot mix lots produced at the new plant/producer will start with a new numbering sequence beginning with lot 1. If allowed by the Engineer to switch back to the original or previous plant or producer, the next lot from that plant or producer will resume numbering sequentially from the last lot produced by that plant or producer.

Asphalt content will be determined utilizing the Ignition Method. For Type "C" and Type "C" (Surface) ACP, the acceptable asphalt content tolerance limit from the approved Job Mix Formula shall be +/-0.3%.

All longitudinal joints adjacent to the travel way shall be constructed with a joint marker device which creates a minimum 6:1 taper. For placement of 50 mm or more the device shall provide a maximum 15 mm vertical edge and a minimum 6:1 taper. Outside edge joints shall have a 6:1 taper or shall be backfilled the same day as detailed in the plans.

The Contractor's lay-down operational production shall be scheduled such that uneven travel lanes shall be minimized or eliminated weekly.

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This project shall be equipped with a material transfer device capable of transferring mix from the haul truck to the paver. If a material transfer vehicle is used, the Contractor shall monitor its loading such that no damage to the existing pavement structure is experienced. Material transfer devices can include a pick up machine, such as a Lincoln 660 or similar.

--Item 5012—

It is not anticipated that erosion control devices will be needed. However, in the event that any devices are needed, the storm water pollution prevention plan (SW3P) shall consist of the control measures deemed appropriate by the Engineer and Contractor as specified under this Special Specification, and/or as directed/approved by the Engineer. Payment for the work will be determined in accordance with Article 4.3, "Extra Work".

If needed, the SW3P shall consist of temporary sediment control fences as specified in this Special Specification, State Standard Sheet(s), and/or as directed/approved by the Engineer.

--Item 5162--

The Contractor shall provide 2 transportable cellular telephone(s) for use by State inspection personnel. The cell phone plan selected by the Contractor has to be reviewed and approved by the Engineer prior to this service being provided.

--Item 5440—

Surface Test Type A (straightedge) shall be used.

The localized roughness penalty is waived.

CONTROL : 0915-12-247
PROJECT : STP 98(289)MM
HIGHWAY : CS
COUNTY : BEXAR

TEXAS DEPARTMENT OF TRANSPORTATION

GOVERNING SPECIFICATIONS AND SPECIAL PROVISIONS

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

STANDARD SPECIFICATIONS: ADOPTED BY THE TEXAS DEPARTMENT OF
----- TRANSPORTATION MARCH 1, 1995.
STANDARD SPECIFICATIONS ARE INCORPORATED
INTO THE CONTRACT BY REFERENCE.

- ITEMS 1 TO 9 INCL., GENERAL REQUIREMENTS AND COVENANTS
- ITEM 104 REMOVING CONCRETE
- ITEM 164 SEEDING FOR EROSION CONTROL (166) (168) (300)
- ITEM 260 LIME TREATMENT FOR MATERIALS USED AS SUBGRADE (ROAD MIXED)
(132) (204) (264) (300) (520)
- ITEM 354 PLANING AND/OR TEXTURING PAVEMENT
- ITEM 416 DRILLED SHAFT FOUNDATIONS (420) (421) (440) (448) (520) (522)
(524)
- ITEM 420 CONCRETE STRUCTURES (421) (426) (427) (433) (435) (437) (438)
(440) (441) (520) (522) (524) (526) (5381)
- ITEM 425 PRESTRESSED CONCRETE STRUCTURAL MEMBERS (421) (424) (426)
(427) (433) (435) (440) (442) (5381)
- ITEM 432 RIPRAP (420) (421) (427) (440)
- ITEM 435 ELASTOMERIC MATERIALS
- ITEM 442 METAL FOR STRUCTURES (441) (446) (447) (448) (449)
- ITEM 450 RAILING (420) (421) (424) (440) (441) (442) (445) (446) (448)
(520) (522) (524) (526)
- ITEM 452 REMOVING RAILING
- ITEM 500 MOBILIZATION
- ITEM 502 BARRICADES, SIGNS AND TRAFFIC HANDLING
- ITEM 504 FACILITIES FOR FIELD OFFICE AND LABORATORY (5162)
- ITEM 506 TEMPORARY EROSION, SEDIMENTATION AND WATER POLLUTION
PREVENTION AND CONTROL
- ITEM 512 PORTABLE CONCRETE TRAFFIC BARRIER (421) (424) (437) (440)
(442) (526)
- ITEM 529 CONCRETE CURB, GUTTER AND COMBINED CURB AND GUTTER (360)
(420) (421) (437) (440) (526)
- ITEM 530 DRIVEWAYS AND TURNOUTS (360) (522)
- ITEM 531 SIDEWALKS (360) (420) (421) (437) (440) (526)
- ITEM 534 STRUCTURE APPROACH SLABS (360) (420) (421) (433) (438) (440)

ITEM 540 METAL BEAM GUARD FENCE (421)(442)(445)(492)
 ITEM 610 ROADWAY ILLUMINATION ASSEMBLIES (441)(442)(445)(447)(449)
 (616)(620)(656)(658)
 ITEM 618 CONDUIT (400)(476)
 ITEM 620 ELECTRICAL CONDUCTORS
 ITEM 649 REMOVING OR RELOCATING ROADSIDE SIGN ASSEMBLIES (445)
 (634)(636)(637)(643)(646)(647)(656)
 ITEM 662 WORK ZONE PAVEMENT MARKINGS (666)(672)(677)(678)
 ITEM 666 REFLECTORIZED PAVEMENT MARKINGS (677)(678)
 ITEM 672 RAISED PAVEMENT MARKERS (677)(5381)
 ITEM 677 ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS (302)
 (316)(678)

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

REQUIRED CONTRACT PROVISIONS, FEDERAL-AID CONSTRUCTION CONTRACTS
 (FORM FHWA 1273, DECEMBER, 1993)

WAGE RATES

SPECIAL PROVISION "STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY
 CONSTRUCTION CONTRACT SPECIFICATIONS" (000---001)
 SPECIAL PROVISION "CERTIFICATION OF NONDISCRIMINATION IN EMPLOYMENT
 (000---003)
 SPECIAL PROVISION "NOTICE TO ALL BIDDERS" (000---009)
 SPECIAL PROVISION "CONVERSION FACTORS" (000---021)
 SPECIAL PROVISION "NOTICE OF REQUIREMENT FOR AFFIRMATIVE ACTION TO
 ENSURE EQUAL EMPLOYMENT OPPORTUNITY" (000---423)
 SPECIAL PROVISION "PARTNERING" (000---878)
 SPECIAL PROVISION "OPTIONAL TRAINING" (000--1631)
 SPECIAL PROVISION "SCHEDULE OF LIQUIDATED DAMAGES" (000--1712)
 SPECIAL PROVISION "DISADVANTAGED BUSINESS ENTERPRISE IN FEDERAL-AID
 CONSTRUCTION" (000--1720)
 SPECIAL PROVISIONS TO ITEM 1 (001---078)(001---088)
 SPECIAL PROVISION TO ITEM 2 (002---043)
 SPECIAL PROVISION TO ITEM 3 (003---020)
 SPECIAL PROVISION TO ITEM 4 (004---009)
 SPECIAL PROVISION TO ITEM 5 (005---006)
 SPECIAL PROVISION TO ITEM 6 (006---011)
 SPECIAL PROVISION TO ITEM 7 (007---393)
 SPECIAL PROVISION TO ITEM 8 (008---048)
 SPECIAL PROVISION TO ITEM 9 (009---045)
 SPECIAL PROVISION TO ITEM 164 (164---002)
 SPECIAL PROVISION TO ITEM 300 (300---049)
 SPECIAL PROVISION TO ITEM 302 (302---014)
 SPECIAL PROVISION TO ITEM 316 (316---001)
 SPECIAL PROVISION TO ITEM 360 (360---031)
 SPECIAL PROVISION TO ITEM 416 (416---004)
 SPECIAL PROVISION TO ITEM 420 (420---010)
 SPECIAL PROVISION TO ITEM 421 (421---028)
 SPECIAL PROVISION TO ITEM 424 (424---002)
 SPECIAL PROVISION TO ITEM 425 (425---001)

SPECIAL PROVISION TO ITEM 426 (426---002)
 SPECIAL PROVISION TO ITEM 427 (427---001)
 SPECIAL PROVISION TO ITEM 433 (433---002)
 SPECIAL PROVISION TO ITEM 435 (435---001)
 SPECIAL PROVISION TO ITEM 440 (440---005)
 SPECIAL PROVISION TO ITEM 441 (441---008)
 SPECIAL PROVISION TO ITEM 445 (445---001)
 SPECIAL PROVISION TO ITEM 446 (446---008)
 SPECIAL PROVISION TO ITEM 447 (447---002)
 SPECIAL PROVISION TO ITEM 449 (449---001)
 SPECIAL PROVISION TO ITEM 502 (502---020)
 SPECIAL PROVISION TO ITEM 522 (522---002)
 SPECIAL PROVISION TO ITEM 524 (524---006)
 SPECIAL PROVISION TO ITEM 526 (526---002)
 SPECIAL PROVISION TO ITEM 610 (610---001)
 SPECIAL PROVISION TO ITEM 662 (662---005)
 SPECIAL PROVISION TO ITEM 666 (666---011)
 SPECIAL PROVISION TO ITEM 672 (672---004)

SPECIAL SPECIFICATIONS:

 ITEM 3117 QUALITY CONTROL/QUALITY ASSURANCE OF HOT MIX ASPHALT
 ITEM 5002 ROCK FILTER DAMS FOR EROSION AND SEDIMENTATION CONTROL
 (506)
 ITEM 5006 CONSTRUCTION EXITS (506)
 ITEM 5012 TEMPORARY SEDIMENT CONTROL FENCE (506)
 ITEM 5028 VEHICULAR IMPACT ATTENUATOR ASSEMBLIES (SAND-FILLED
 PLASTIC BARRELS)
 ITEM 5162 TRANSPORTABLE CELLULAR TELEPHONES
 ITEM 5288 LANDSCAPE PAVERS
 ITEM 5381 EPOXY AND ADHESIVES
 ITEM 5419 SINGLE GUARDRAIL TERMINAL
 ITEM 5479 INCENTIVE FOR USE OF LOW EMISSION DIESEL IN NONATTAINMENT
 AND AFFECTED COUNTIES
 ITEM 5481 NONATTAINMENT AND NEAR NONATTAINMENT AREAS INCENTIVE FOR
 USING NON-ROAD DIESEL EQUIPMENT POWERED BY EPA TIER 1, 2
 AND 3 DIESEL ENGINES

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

SPECIAL SPECIFICATION

3117

Quality Control/Quality Assurance of Hot Mix Asphalt

1. **Description.** This Item shall govern the construction of a base course, a level-up course, a surface course or any combination of these courses as shown on the plans. Each course must be composed of a compacted mixture of aggregate and asphalt material mixed hot in a mixing plant, in accordance with the typical sections and details shown on the plans and the requirements herein.
 - (1) **Quality Control:** Contractor sampling, testing and inspection for operational control.
 - (2) **Quality Assurance:** Engineer sampling, testing and inspection activities to determine payment and to make acceptance decisions.
 - (3) **Verification Tests:** Tests to verify accuracy of quality control, quality assurance and mixture design testing.
 - (4) **Referee Tests:** Tests used to resolve differences between Contractor and Engineer test results. The Construction Division of TxDOT is designated as the referee laboratory.
 - (5) **Independent Assurance Program:** An unbiased and independent evaluation of all the sampling and testing techniques used in the acceptance program. These activities are performed by the Engineer. The test results are not used for acceptance.
2. **Certification and Reporting Requirements.** All sampling and testing (Contractor and Engineer) will be conducted by personnel certified by the TxDOT-approved program. The certification level required for performance of each test shall comply with requirements shown in Table 7. The Contractor shall provide a list of certified personnel to be used on the project prior to the beginning of production. An updated list shall be provided when personnel changes are made. The Contractor's certified Level IA HMA specialist shall be at the plant prior to the beginning of and during plant production operations.

TxDOT's automated hot mix program will be used by the Engineer and the Contractor to record all test data and calculate all pay factors. The Engineer will provide the automated program to the Contractor. A diskette copy of the automated hot mix program shall be used by the Contractor to submit test results to the Engineer on a daily basis.

The results of all quality control testing shall be plotted by the Contractor, and the results of all quality assurance testing will be plotted by the Engineer in accordance with Test Method TEX-233-F. The control chart shall be updated as soon as test results for each subplot becomes available.

3. **Materials.** Before mixing begins, the Contractor shall furnish to the project materials meeting the following requirements. Additional test requirements affecting the quality of individual materials or the paving mixture shall be required when shown on the plans.

(1) **Aggregate.** The aggregate shall be composed of a coarse aggregate, a fine aggregate, and may include reclaimed asphalt pavement (RAP). The Contractor may use a mineral filler when necessary to meet the mixture design requirements. Samples of each aggregate shall be submitted for testing and approval. Approval must be completed prior to submission of the mixture design. Additional aggregate testing may be performed by the Engineer at any time during production.

Aggregate from each source shall meet the quality requirements of Table 1 and other requirements as specified herein. Aggregate quality testing will be performed by the Engineer. Aggregate may be sampled either before or after delivery to the plant or both as determined by the Engineer. The aggregate contained in RAP will not be required to meet Table 1 requirements.

(A) **Coarse Aggregate Stockpile.** Coarse aggregate stockpile shall contain no more than 20 percent by mass of material passing the 2.00 millimeters sieve. The aggregate shall be natural, lightweight or manufactured, and shall be of uniform quality throughout. When specified on the plans, certain coarse aggregate material may be allowed, required or prohibited.

Lightweight aggregate is defined as expanded shale, clay or slate produced by the rotary kiln method. Manufactured aggregate is defined as any aggregate other than natural or lightweight. Lightweight or manufactured materials with the same or similar gradation whose unit weights vary by more than 6.0 percent from that used in the mixture design may require a redesign, as determined by the Engineer.

Gravel from each source, including the gravel aggregate from RAP, shall be so crushed as to have a minimum of 85 percent of the particles retained on the 4.75 millimeter sieve with two (2) or more mechanically induced crushed faces, as determined by Test Method TEX-460-A (Part I). The material passing the 4.75 millimeter sieve and retained on the 2.00 millimeter sieve must be the product of crushing aggregate that was originally retained on the 4.75 millimeter sieve.

The polish value for the virgin coarse aggregate stockpiles used in the surface or finish course, when tested in accordance with Test Method TEX-438-A, shall not be less than the value shown on the plans. Unless otherwise shown on the plans, the polish value requirement will apply only to aggregate used on travel lanes. For rated sources, the Construction Division's Rated Source Quality Catalog (RSQC) will be used to determine polish value compliance. Blending of coarse aggregates to meet the polish value requirements will be allowed unless otherwise shown on the plans. When blending is allowed, the blended coarse aggregates shall contain non-polishing aggregates of at least 50 percent by volume retained on the 4.75 millimeter sieve for Types C, D, and coarse matrix high binder (CMHB) mixes, and at least 50 percent by volume retained on the 2.00 millimeters sieve for Type F mixes. Blending of coarse aggregates to meet polish value requirements shall be in accordance with Test Method TEX-438-A, Part II, Method B.

Aggregates that do not meet the minimum polish value or RSQC requirement may be used provided that they meet skid acceptance criteria unless otherwise shown on plans. A list of aggregate sources with an acceptable skid history is available from the Engineer.

- (B) Reclaimed Asphalt Pavement (RAP).** RAP is defined as a salvaged, milled, pulverized, broken or crushed asphalt pavement. The RAP to be used in the mix shall be crushed or broken to the extent that 100 percent will pass the 50 millimeter sieve. The Contractor has the option to use up to 20 percent RAP in surfacing mixtures and level-ups and up to 30 percent RAP in base course mixtures. Only RAP from designated state-owned sources may be used in surface mixtures.

The stockpiled RAP shall not be contaminated by dirt or other objectionable materials. Unless otherwise shown on the plans, stockpiled, crushed RAP shall have either a decantation of five (5) percent or less or a plasticity index of eight (8) or less, when tested in accordance with Test Method TEX-406-A, Part I, or Test Method TEX-106-E, respectively. This requirement applies to stockpiled RAP from which the asphalt has not been removed by extraction.

The polish value of RAP aggregate will not be used in any determination of polish value specification compliance.

When shown on the plans or when designated in a special provision, state-owned RAP sources are available to the Contractor. The approximate asphalt material content and asphalt cement properties will be shown on the plans. If the source is an existing stockpile material, the decantation or plasticity index will also be shown on the plans.

Any contractor-owned RAP that is allowed to be used on the project shall remain the property of the Contractor, while stockpiled, and shall not be intermingled with state-owned RAP stockpiles. Any unused Contractor-owned RAP material shall be removed from the project site upon completion of the project. Any unused state-owned RAP shall be returned to the stockpile as directed by the Engineer.

- (C) Fine Aggregate Stockpile.** Fine aggregate stockpiles shall be of uniform quality throughout. A maximum of 15 percent of the total virgin aggregate may be field sand or other uncrushed fine aggregate, unless a value less than 15 percent is shown on the plans. When specified on the plans, certain fine aggregate material may be allowed, required or prohibited.

Fine aggregate stockpiles shall meet the following gradation requirements when tested in accordance with Test Method Tex-200-F, Part II.

Percent by Mass

Passing the 9.5 mm sieve	100
Passing the 2.00 mm sieve	70.0 - 100.0
Passing the 0.075 mm sieve	0.0 - 30.0

Unless otherwise shown on the plans, gravel fine aggregates, except for field sand, shall not be allowed. Crushed gravel fine aggregates, when allowed, shall be the

result of crushing aggregate that was originally retained on the 4.75 millimeter sieve.

Except in CMHB mixtures, all fine aggregates except for field sand, shall be supplied from sources whose coarse aggregate meet the Los Angeles Abrasion and magnesium sulfate soundness loss requirements.

- (D) **Mineral Filler.** Mineral filler shall consist of thoroughly dried stone dust. The use of fly ash will not be permitted. If other mineral filler is used, it must be approved by the Engineer. The mineral filler shall be free from foreign matter and meet the following gradation requirements when tested in accordance with Test Method TEX-200-F, Part II.

	Percent by Mass
Passing the 2.00 mm sieve	100
Passing the 0.075 mm sieve	More than 30.0

- (E) **Baghouse Fines.** The addition of fines collected by the baghouse or other air-cleaning or dust-collecting equipment is permitted.

(2) Asphalt Material.

- (A) **Asphalt Material.** Asphalt material for the paving mixture shall be of the grade shown on the plans and shall meet the requirements of Item 300, "Asphalts, Oils And Emulsions."
- (B) **Tack Coat.** Asphalt materials shown on the plans or approved by the Engineer shall meet the requirements of Item 300, "Asphalts, Oils And Emulsions."

4. Job Mix Formula. A job mix formula (JMF) identifies the combined aggregate gradation and lists the percentage of each material component to be used in the mix. The JMFs are described in the following sections.

For mixture Types A, B, C, D and F, the target laboratory molded density is 96.0 percent. For mixture Types CMHB-C or CMHB-F, the target laboratory density is 96.5 percent. When shown on the plans, the target laboratory molded density for any type of mixture may be set at any value within the range of 96.0 to 97.0. These target lab densities apply to all JMFs.

- (1) **Development of Laboratory Mixture Design (JMF 1).** JMF 1 is the laboratory mixture design developed by the Contractor's Level II certified specialist in accordance with Test Method TEX-204-F. JMF 1 shall use the project aggregates, asphalt material, and any other additives that are allowed or required.

Creep, Hveem stability, gradation by washed sieve analysis in accordance with TEX-200-F, Part II and VMA properties shall conform to the requirements specified in Table 2 as determined in accordance with the Test Methods in Table 7.

The mixture proposed for use shall be evaluated for moisture susceptibility in the mixture design stage by Test Method TEX-531-C, unless waived on the plans. Mixture approval criteria shall be in accordance with Item 301, "Asphalt Antistripping Agents."

The Contractor may select either lime or a liquid antistripping agent to reduce the moisture susceptibility of the aggregate. The addition of these antistripping agents shall be in accordance with Item 301, "Asphalt Antistripping Agents." The Engineer may waive testing for moisture susceptibility if a similar design using the same materials has proven satisfactory. When the antistripping additive type and rate are shown on the plans, then all moisture susceptibility testing requirements for mixture design will be waived, unless otherwise shown on plans.

When it is suspected that there is a significant difference between the specific gravities for the individual aggregates, then the specific gravity shall be determined for all aggregates.

If the specific gravity values differ by 0.300 or more, the mixture design shall be by the volumetric method, Test Method TEX-204-F, Part II.

The Contractor's and Engineer's responsibilities in development and approval of JMF 1 are as follows:

(A) Contractor Responsibilities. The Contractor shall develop JMF 1 in accordance with Test Method TEX 204-F and requirements of Article 4, Subarticle (1). The Contractor shall submit to the Engineer all required worksheets, computer files and laboratory molded specimens for Hveem stability or creep testing. In the JMF 1 transmittal letter, the Contractor shall indicate if the Hveem stability, creep, and moisture susceptibility verification by the Engineer is to be conducted on trial batch or lab produced mixtures. All these tests must be conducted on the same mix, either trial batch or lab produced. Contractor is responsible for performing press correlation in accordance with TEX-206-F, Part II. Press correlation may be used during mix design.

When the nuclear gauge is used for determining the asphalt content, then calibration samples prepared by the Contractor during the laboratory mixture design shall be retained by the Contractor for later use as necessary.

The Contractor shall notify the Engineer of any changes in material sources. If a source changes at any point, a new laboratory mixture design shall be required unless otherwise approved by the Engineer. The Engineer may request a new laboratory mixture design if the asphalt material grade or formulation is changed.

(B) Engineer Responsibilities. The Engineer will review the Contractor's mix design report and verify conformance with all aggregates, asphalt, additives and mixture specifications within 2 working days of JMF 1 submission. If the Contractor has elected to conduct the Hveem stability, Creep, and moisture susceptibility testing from a trial batch, and all specification requirements related to materials are met, the Engineer will authorize production of the trial batch and verification of JMF will be in accordance with Article 4.(2). If the Contractor has elected to conduct Hveem stability, creep and moisture susceptibility testing on lab produced mixtures, then the Engineer will conduct Hveem stability or creep on molded specimens prepared by the Contractor or the Engineer as determined by the Engineer. The moisture susceptibility testing, when required, will be conducted on samples prepared by the Engineer. All required testing must be completed within 10

working days from the submission of JMF 1 and all required materials. Further verification of JMF 1 is based on a plant produced mix in accordance with Article 4.(2). The Engineer may use material samples collected by either the Engineer or the Contractor. The samples may be obtained at the plant or quarry as determined by the Engineer. Quarry samples shall be from materials produced for the project. The Engineer may elect to sample at both locations.

- (2) **Verification of JMF 1.** The Contractor shall use the proposed JMF 1 to provide a plant-produced trial mixture for use in design verification testing, approval of JMF 1 and the development of JMF 2. The trial mixture should be of sufficient quantity to ensure that a representative mixture is produced. All equipment and materials used in production of the trial mixture shall be those proposed for the project. When the plant is moved or a new plant is to be used, a new trial batch is required. All materials, labor and equipment furnished by the Contractor for the production of the trial mixture are subsidiary to the bid item for hot mix and will not be paid for directly.

The Engineer will sample and test to verify JMF 1 as follows:

Design Requirement	Mixture Source	Tolerance Limit
Combined Aggregate Gradation	Trial Batch	Table 2 and Table 3 requirements
Asphalt Content	Trial Batch	+/- 0.5% from Target
Laboratory Molded Density	Trial Batch	+/- 1.0% from Target
VMA	Trial Batch	Table 2 (Production VMA)
Hveem Stability	Trial Batch or Lab mix (1)	Table 2 Requirements
Static Creep	Trial Batch or Lab mix (1)	Table 2 Requirements
Moisture Susceptibility	Trial Batch or Lab mix (1)	Item 301, or as shown on plans

- (1) As determined by Contractor.

If JMF 1 is not approved, the Contractor shall produce additional trial mixtures, subject to the provisions of this article.

- (3) **Referee Testing.** Referee testing will be used to resolve differences between the Engineer and the Contractor when these differences exceed the allowable values shown in Table 4. In addition to the properties shown in Table 4, when the Engineer's tensile strength ratio or tensile strength for moisture conditioned specimens fails requirements and the Contractor's results meet requirements, referee testing is allowed. Referee test results will be provided within 10 workings days from receipt of samples at the referee laboratory.
- (4) **Development of JMF 2.** If JMF 1 is approved, the Contractor shall evaluate the test results of the trial batch and determine the optimum mixture ingredients for JMF 2. The Engineer will approve

JMF 2 within one working day, provided that it meets the master grading limits shown in Table 2, the operational tolerance of JMF 1 for gradation listed in Table 3 and the asphalt content is within +/- 0.5% of JMF 1.

- (3) **Development of JMF 3.** JMF 2 will be used to produce Lot 1 and to develop JMF 3. Plant adjustments may be made during production of Lot 1 in order to develop JMF 3. Acceptance of the material will be in accordance with Article 8. Pay adjustments for Lot 1 will be in accordance with Article 10, except that the first 225 megagrams produced and placed will receive a 1.000 pay factor as described under Subarticle 8.(2) and Section 8.(5)(B). The first 225 megagrams are not included in Lot 1.

If for Lot 1 the difference exceeds the tolerances listed in Table 4, the Contractor and the Engineer must resolve the differences prior to beginning Lot 2.

At the end of production of Lot 1, the Contractor shall submit the JMF 3 to the Engineer. The Engineer will approve the JMF 3 provided that it meets the master grading limits shown in Table 2, meets the operational tolerance of JMF 1 for gradation listed in Table 3, and that the asphalt content is within +/- 0.5 % of JMF 1. JMF 3 must be such that the target lab density can be achieved.

When aggregate blending is allowed and is used to achieve polish value, the bin percentage and stockpile gradation must be such that the polish value requirements are met.

- (6) **Job Mix Formula Adjustment:** At any time during the project, the Contractor may submit for the Engineer's approval a new laboratory mixture design as detailed in Subarticle 4.(1). Unless otherwise approved by the Engineer, plant-produced trial mixes will be required to verify the new laboratory mixture design as described in Subarticle 4.(2).

The Contractor may adjust the job mix formula prior to beginning a new lot provided that it meets the master gradation limits shown in Table 2 and the operational tolerance of JMF 2 for the gradation listed in Table 3. Also, the asphalt content must be within +/- 0.5% of JMF 2. The new job mix formula must be such that, the target lab density shown in Article 4, Job Mix Formula can be achieved.

5. Equipment.

- (1) **General.** All equipment for the handling of all materials, mixing, placing and compacting of the mixture shall be maintained in good repair and operating condition. In case of equipment malfunction, the Contractor shall cease production until defective equipment is repaired or replaced.
- (2) **Mixing Plants.** Automatic proportioning devices shall be required for all plants and documentation as to their accuracy may be required by the Engineer.

If a liquid or emulsified additive is to be introduced into the asphaltic material at the mix plant, it shall be added to the asphalt line at the required rate by means of an in-line metering device. The Contractor shall demonstrate that the meter meets the requirements of Item 520, "Weighing and Measuring Equipment." An in-line blending device is required to disperse the additive into the asphaltic material. A sampling port

shall be provided on the asphalt line near the outlet of the additive blending device so that the modified asphaltic material may be sampled. The measuring, blending, and sampling equipment and its location must be approved by the Engineer.

- (3) **Fuel.** When using fuel oil heavier than grade No. 2 or when using waste oil, the Contractor shall ensure that the fuel delivered to the burner is at a viscosity of 100 SSU or less, when tested in accordance with Test Method TEX-534-C. This viscosity ensures complete burning of the fuel. Higher viscosities may be allowed by the Engineer if recommended by the burner manufacturer. If necessary, the Contractor shall preheat the oil to maintain the required viscosity.

The Contractor shall provide means for obtaining a sample of the fuel just prior to entry into the burner in order to perform the viscosity test. The Contractor shall perform this test or provide a laboratory test report that will establish the temperature of the fuel necessary to meet the viscosity requirements. There shall be an in-line thermometer to check the temperature of the fuel delivered to the burner.

Regardless of the burner fuel used, the burner or combination of burners and types of fuel used shall provide a complete burn of the fuel and shall not leave any fuel residue adhering to the heated aggregate.

- (4) **Surge-Storage System and Scales.** A surge-storage system may be used to minimize the production interruptions during the normal day's operations. A device such as a gob hopper or other device designed to prevent segregation in the surge-storage bin shall be used. The mixture shall be weighed upon discharge from the surge-storage system.

When a surge-storage system is used, scales shall be standard platform truck scales or other equipment such as weigh hopper (suspended) scales and shall conform to Item 520, "Weighing and Measuring Equipment." If truck scales are used, they shall be placed at a location approved by the Engineer. If other weighing equipment is used, the Engineer may require mass checks by truck scales for the basis of approval of the equipment.

Temporary storing or holding of the hot mix asphalt by the surge-storage system will be required for drum-mix plants during the normal day's operation. Overnight storage will not be permitted unless authorized on the plans or in writing by the Engineer.

- (5) **Recording Device and Record Printer.** The mixture shall be weighed for payment. If a surge-storage system is used, an automatic recording device and a digital record printer shall be provided to indicate the date, project identification number, vehicle identification, total mass of the load, tare mass of the vehicle, the mass of asphaltic mixture in each load and the number of loads for the day, unless otherwise indicated on the plans. When surge-storage is not used, batch weights will be used as the basis for payment and automatic recording devices and automatic digital record printers in accordance with Item 520, "Weighing and Measuring Equipment," shall be required.
- (6) **Laboratory.** The Contractor shall establish, maintain and operate a laboratory. The laboratory shall be equipped to perform the tests indicated in this specification. All quality control testing shall be performed at the Contractor's on-site laboratory, unless otherwise approved by the Engineer. All test equipment at the laboratory shall be

calibrated and certified in accordance with Test Method TEX-237-F or the manufacturer's recommendations. The Engineer will verify that all the necessary equipment, materials and current test procedures are present and that all equipment meets these requirements prior to the production of hot mix asphalt.

6. Stockpiling, Storage and Feeding of Materials.

- (1) **Storage and Heating of Asphalt Materials.** The asphalt material storage capacity shall be ample to meet the requirements of the plant. Asphalt shall not be heated to a temperature in excess of that specified in Item 300, "Asphalts, Oils And Emulsions." All equipment used in the storage and handling of asphalt material shall be kept in a clean condition at all times and shall be operated in such a manner that there will be no contamination with foreign matter. The heating apparatus shall be equipped with a continuously recording thermometer and a 24-hour chart that will record the temperature of the asphalt material at the location of the highest temperature.

Continuous recordings shall be made for asphalt material and hot mix asphalt temperatures. These recordings shall be made available to the Engineer on a daily basis.

- (2) **Scalping Screen.** A scalping screen shall be required after the cold feeds and ahead of the combined aggregate belt scales for all plants.
- (3) **Plants Using Rap.** If RAP is used, a separate cold bin shall be required. The RAP feed system shall be equipped to remove particles over 50 millimeters in size prior to the weighing device. There shall be adequate cold bin controls to provide a uniform amount of RAP to the mixture.

Positive mass measurement of RAP shall be provided by the use of belt scales or other approved devices or methods. RAP shall be mixed and blended so that there is no evidence of unseparated particles in the mixture as it leaves the mixer.

7. Construction Methods.

- (1) **General.** It shall be the responsibility of the Contractor to produce, transport, place and compact the specified paving mixture in accordance with the requirements herein.

If at any time prior to placement on the roadway surface the temperature of the mixture falls below 100°C, the quantity of that mixture shall be determined to the satisfaction of the Engineer and removed from the project at the expense of the Contractor and no payment will be made for the mixture that is removed.

- (2) **Adverse Weather Conditions.** Unless otherwise approved by the Engineer, asphalt mixture, when placed with a spreading and finishing machine, or tack coat shall not be placed when air temperature is below 10°C and is falling, but it may be placed when the air temperature is above 5°C and is rising. If a mixture is placed on a wet or damp surface and it does not bond to the existing pavement, ravels, or has other surface irregularities, the mixture shall be removed or repaired to the satisfaction of the Engineer. Removal or repair shall be at the expense of the Contractor.

- (3) **Tack Coat.** Tack coat shall be used at the direction of the Engineer. The surface upon which the tack coat is to be placed shall be cleaned thoroughly to the satisfaction of the Engineer. A uniform application of tack coat shall be applied at a rate not to exceed 0.2 liter residual asphalt material per square meter of surface area. In CMHB mixtures, the rate shall not exceed 0.3 liter residual asphalt material per square meter of surface area. All contact surfaces of curbs and structures and all joints shall be painted with a thin, uniform application of tack coat. During the application of tack coat, care shall be taken to prevent splattering of adjacent pavement, curb and gutter and structures. The tack coat shall be rolled with a pneumatic tire roller when directed by the Engineer.
- (4) **Transporting Hot Mix.** The hot mix shall be hauled to the work site in tight vehicles previously cleaned of all foreign material. Diesel shall not be used as a truck bed release agent. Any transporting operation that results in contamination of hot mix with foreign materials will not be allowed.
- (5) **Windrow Pick-Up Equipment.** Windrow pick-up equipment shall be such that substantially all the mixture deposited on the roadbed is picked up and loaded into the spreading and finishing machine. The mixture shall not be contaminated with foreign material. The loading equipment shall be designed so that, without resorting to hand finishing, it does not interfere with the spreading and finishing machine in obtaining the required line, grade and surface.
- (6) **Placing.** The hot mix shall be dumped and spread on the approved prepared surface with a spreading and finishing machine. When properly compacted, the finished pavement shall be smooth, of uniform texture and density and shall meet the requirements of the typical cross sections and the surface tests. In addition, the placing of the hot mix shall be done without tearing, shoving, gouging or segregating the mixture and without producing streaks in the mat.

Adjacent to flush curbs, gutters and structures, the surface shall be finished uniformly high so that when compacted, it will be slightly above the edge of the curb or structure.

Construction joints of successive courses of asphaltic material shall be offset at least 150 millimeters. Construction joints on surface courses shall coincide with lane lines or shall be as directed by the Engineer.

- (7) **Compacting.** The pavement shall be compacted thoroughly and uniformly with the necessary rollers to obtain the air voids and cross section of the finished paving mixture meeting the requirements of the plans and specifications.

The edges of the pavement along curbs, headers and similar structures or in such locations that will not allow thorough compaction with the rollers, shall be thoroughly compacted with lightly oiled tamps. Rolling with a trench roller may be required by the Engineer on widened areas, in trenches and in other limited areas.

With the exception of the above requirements, and when specific air void requirements have not been voided by plan note, the type and size of compaction equipment and the rolling patterns used will be entirely at the discretion of the Contractor.

Where specific air void requirements are voided, one (1) three-wheel roller, one (1) pneumatic-tire roller, and one (1) tandem roller shall be furnished for each compaction operation except as provided below or as approved by the Engineer. The use of a tandem roller may be waived by the Engineer when the surface is already adequately smooth and further steel-wheel rolling is shown to be ineffective. With approval of the Engineer, the Contractor may substitute a vibratory roller for the three-wheel roller and/or the tandem roller. Use of at least one (1) pneumatic-tire roller is required. Use of pneumatic tire rollers will not be allowed for CMHB mixtures if excessive pickup of fines by roller tires occurs. Additional or heavier rollers shall be furnished if required by the Engineer. Rolling patterns that achieve maximum compaction shall be established by the Contractor as outlined in Test Method TEX-207-F, Part IV. For these conditions there will be no pay adjustment factor calculated for in-place air voids.

(8) Opening to Traffic. The compacted pavement shall be opened to traffic when directed by the Engineer.

8. Acceptance Plan.

(1) General. Acceptance of the hot mix will be based on the acceptance plan described herein. Random sampling of the hot mix shall be performed on a lot and subplot basis.

(2) Production Lot. The Engineer will select the lot size. A production lot shall consist of 4 equal sublots. The maximum subplot size shall be 900 megagrams or 500 square meters. Lot size can only be changed prior to the beginning of a lot.

The first 225 megagrams of the first day production will be assigned a production pay factor of 1.000 to allow the Contractor to adjust the hot mix plant. The first 225 megagrams are not included in Lot 1.

(A) Small Production Quantities: When the anticipated daily production is less than 450 megagrams, the Engineer may elect to either waive all sampling and testing requirements or follow the acceptance plan described in Subarticle 8.(2). If the Engineer elects to waive sampling and testing, both production and placement pay factors will be 1.000. If the Engineer elects to follow the acceptance plan described in Subarticle 8.(2), and this results in less than four sublots for the job, pay adjustment will be in accordance with Subarticle 8.(2) (B), "Incomplete Lots".

(B) Incomplete Lots: If a lot is begun but cannot be completed such as on the last day of production or in other circumstances deemed appropriate by the Engineer, the lot may be closed out by the Engineer. Payment for the lot will be adjusted in accordance with Subarticle 10.(2).

(3) Production Sampling. All sampling locations shall be determined by the random sampling procedure defined in Test Method TEX-225-F. The Engineer is responsible for establishing the random sample locations before lot production begins. Only the locations of the samples that will be taken by the Contractor will be disclosed to the Contractor.

Hot mix shall be obtained from trucks at the plant in accordance with Test Method TEX-222-F. For each subplot, the Contractor shall take one sample at the location

randomly selected by the Engineer. In addition, for each lot the Engineer will randomly, select at least two (2) sublots and take one (1) random sample from each selected subplot. Each sample will be split by the sampler into three equal portions in accordance with Test Method TEX-200-F. These portions will be labeled as Contractor, Engineer and referee and will be delivered to the appropriate party's laboratory. Referee samples will be delivered to the Engineer. Unused samples will be discarded after the Contractor accepts pay adjustment factors for that lot.

A sampling platform approved by the Engineer shall be provided by the Contractor.

- (4) Production Testing.** Production testing responsibility is divided between the Engineer and the Contractor. The Engineer will determine lab density for each subplot, and the Contractor has the option to verify Engineer's test results on split samples provided by the Engineer. The Contractor shall determine compliance with operational tolerance using Contractor's samples, on all sublots and the Engineer will verify Contractor's test results.

The Contractor can request referee testing should the difference between the Contractor's and the Engineer's test results exceed the values shown in Table 4.

All production testing by both the Engineer and the Contractor must be completed and reported within one working day of completion of the subplot.

- (A) Lab Density.** Density is a mixture design and pay factor parameter. The lab density is determined by the Engineer for each subplot. It is determined in accordance with Test Methods TEX-207-F and TEX-227-F. When the Engineer obtains a sample from a subplot in accordance with Subarticle 8.(3), that sample will be used by the Engineer to determine the laboratory bulk specific gravity and the maximum theoretical specific gravity and to calculate the lab density. For sublots not sampled by the Engineer, the Contractor's split sample will be used by the Engineer to determine laboratory bulk specific gravity and maximum theoretical specific gravity and to calculate lab density.

- (B) Gradation Test.** Gradations shall be determined in accordance with Test Method TEX-200-F. Aggregates for gradation determination are obtained from one of the following three (3) methods:

- * extraction (TEX-210-F)
- * cold feed/hot bin samples (TEX-229-F)
- * ignition oven (TEX-236-F)

When cold feed samples are used for gradation testing, the Contractor shall supply a correlation as outlined in TEX-229-F. Correlation factors shall be verified by the Contractor and approved by the Engineer once every five (5) production days. Gradation testing shall be conducted by the Contractor for each subplot on samples taken by the Contractor. The Engineer will verify that the operational tolerances for gradation shown in Table 3 have been met. The minimum verification frequency will be one (1) Engineer's sample for every twelve (12) sublots.

- (C) **Asphalt Content.** The asphalt material content shall be determined in accordance with Test Method TEX-228-F or TEX-236-F.

Asphalt content testing shall be conducted by the Contractor for each subplot on samples taken by the Contractor. The Engineer will conduct asphalt content testing on Engineer's samples on a minimum of one (1) for every four (4) sublots.

If the asphalt content exceeds the operational tolerance shown in Table 3 on two (2) consecutive sublots per lot, based on the Engineer's test results or two (2) consecutive sublots per lot based on the Contractor's test results no production or placement bonus will be paid for that lot.

- (D) **HVEEM Stability.** Hveem stability will be determined in accordance with Test Method TEX-208-F. Hveem stability testing is conducted by the Engineer a minimum of once per lot on specimens molded by the Engineer.

- (E) **Moisture Susceptibility.** Production verification testing after final approval of moisture susceptibility testing will use Test Method TEX-530-C and is required when anti-stripping additives are used, unless waived in the plans. In such cases, the Engineer will determine the location and frequency of sampling and will perform the test.

- (F) **Operational Tolerances.** The hot mix shall meet operational tolerances shown in Table 3 for each subplot. When either the Contractor's or the Engineer's test results exceed the operational tolerances shown in Table 3 for three (3) consecutive tests for a single property, then the Contractor shall cease production until test results or other information indicate, to the satisfaction of the Engineer, that the next material to be produced will meet the specified values.

The Contractor shall select the target discharge temperature of the mixture between 120°C and 180°C. The mixture, when discharged from the mixer, shall not vary from this selected temperature more than 13°C, but in no case shall the temperature exceed 180°C.

- (G) **Individual Loads of Hot Mix.** Individual loads of hot mix in the truck can be rejected by the Engineer. When a load of hot mix is rejected for reasons other than temperature as stated in Subarticle 7.(1) and Section 8.(4)(F), the rejected load will be tested at the request of the Contractor. This request must be made within four (4) hours of rejection. If tests are within operational tolerances, payment will be made for the load. If test results are not within operational tolerances as shown in Table 3, no payment will be made for the load. The Engineer will perform sampling and testing.

- (5) **Placement Lot.** A placement lot shall consist of the area placed in a production lot, excluding miscellaneous areas. A placement subplot shall consist of one fourth of the area of the placement lot.

- (A) **Incomplete Placement Lots.** An incomplete placement lot shall consist of the area placed in an incomplete production lot as described in Section 8.(2)(B)

excluding miscellaneous areas. For these lots, one placement sample location will be selected for each production subplot placed.

(B) Miscellaneous Areas. Areas that are not generally subject to primary traffic such as driveways, mailbox turnouts, crossovers, gores and other similar areas are considered to be miscellaneous areas. The area placed during the first 225 megagrams of the first day's production is also a miscellaneous area. Shoulders and ramps are not considered miscellaneous areas. Miscellaneous areas are the only areas that are not eligible for random placement sampling locations, and will be assigned placement pay factor 1.000.

(C) Level-Ups and Thin Overlays. For the purpose of calculating a placement pay adjustment factor, level-ups and thin overlays will be considered as miscellaneous areas. The placement pay adjustment factor shall be 1.000 for any layer thickness designated on the plans less than 37.5 mm or for level-up areas. The Contractor will establish a rolling pattern that will achieve in-place air voids in accordance with Subarticle 7.(7). Total adjusted pay (TAP) will be based on TAP 2 as shown in Subarticle 10.(4).

(D) Shoulders and Ramps. Shoulders and ramps are not subject to in-place air voids determination unless otherwise shown on the plans. When shoulders and ramps are not subject to in-place air voids determination, then compaction shall be in accordance with Subarticle 7.(7). The Contractor may declare the shoulders and/or ramps as eligible for in-place air void testing and pay adjustments; however, the Contractor must notify the Engineer in writing prior to beginning of the mix production.

(6) Placement Sampling: The Engineer is responsible for determining the random sampling plan. The Contractor shall be responsible for obtaining two (2) cores side-by-side from each placement subplot. The Engineer will witness the coring operation, and measurement of core thickness. The Engineer will mark the cores for identification and return them to the Contractor for trimming. Immediately after obtaining the cores, the Contractor shall repair core holes in a manner approved by the Engineer.

For Type A and Type B hot mix, 150 millimeter diameter cores shall be obtained. For all other types of hot mix, 100 millimeter diameter or 150 millimeter diameter cores shall be obtained.

The Contractor is responsible for trimming and delivering all cores to the Engineer within two working days following placement operations. If the layer thickness before trimming of any core in a subplot is 32 mm or less, the Contractor may elect not to include the air void determinations for that subplot and the pay factor for that subplot shall be 1.000. However, this decision must be made prior to trimming the cores and the cores in question must be delivered to the Engineer.

(A) Sample Locations. One random sample location shall be determined for each placement subplot. The random sample location shall be determined in accordance with Test Method TEX-225-F. No random sample location shall be located within 0.6 meters of a joint or pavement edge. The sample shall be taken within 0.3 meters of the random location provided.

Shoulders and ramps are always eligible for selection as a random sample location, however, if a random sample location falls on a ramp or shoulder that is not eligible for testing of air voids, cores will not be taken for the subplot and a 1.000 pay factor will be assigned to that subplot.

In case the random sample location falls in the travel lane portion of the subplot, then cores shall be taken and the pay adjustment factors determined in accordance with Article 10.(3) will be assigned to the entire subplot, shoulders and ramps included.

(B) Placement Testing. The Engineer will determine placement pay adjustment factors by measuring in-place air voids in accordance with Test Method TEX-207-F and TEX-227-F.

The theoretical maximum specific gravity used for in-place air voids determination will be the average of the values obtained for all sublots in the production lot tested by the Engineer.

The average air void content of the two (2) cores shall be used to calculate a placement pay adjustment factor for each subplot tested. Placement pay adjustment factors shall be determined in accordance with Article 10.

Paraffin coating will be used if required by Test Method TEX-207-F. If a paraffin-coated sample yields a higher specific gravity than the uncoated sample, then the test results from nonparaffin-coated cores will be used for placement pay factor determination.

After determining air void contents the Engineer will return tested cores to the Contractor.

The Contractor can request referee testing should the difference between the Contractor's and the Engineer's test results exceed the values shown in Table 4.

(C) Ride Quality. Unless otherwise shown on the plans, ride quality will be required in accordance with Special Specification, "Ride Quality for Pavement Surfaces".

(7) Irregularities or Segregation. If a pattern of surface irregularities including, but not limited to rutting, segregation, raveling, mat slippage, color, texture, roller marks, tears or uncoated aggregate particles is detected by the Contractor or the Engineer, the Contractor shall make an investigation into the causes and immediately take the appropriate corrective action. Placement may continue for no more than one (1) day of production only if appropriate action is being taken. If no appropriate corrective action is taken or if the problem exists after one (1) day, paving shall cease until the Contractor further investigates the causes and the Engineer approves further production to determine effectiveness of the corrective action.

Segregated areas shall be corrected at the Contractor's expense as directed by the Engineer. Correction may include removal and replacement. Disputes will be resolved by the Construction Division.

- (8) **Referee Tests.** The TxDOT Construction Division will perform the referee tests. Either the Engineer or the Contractor may request referee tests; however, all referee samples must be submitted to the Construction Division by the Engineer. Referee tests will be performed on every subplot for the lot(s) in question. These tests are final and will establish pay adjustment factors for the lot(s) in question.

The Contractor shall pay only for referee tests the Contractor requests and for which the Engineer's test result is closer to the referee test result than that of the Contractor.

- (9) **Independent Assurance Tests.** Independent assurance tests as defined in Subarticle 1.(5) will be performed by the Engineer on all tests used for acceptance of the hot mix.

9. **Measurement.** The quantity of hot mix will be measured by the composite mass or composite volumetric method.

- (1) **Composite Mass Method.** Hot mix will be measured by the megagrams of the composite hot mix of the type actually used in the completed and accepted work in accordance with the plans and specifications for the project. The composite hot mix is hereby defined as the asphalt, aggregate, RAP and additives as noted on the plans and/or approved by the Engineer.

If mixing is done by a drum-mix plant, measurement will be made on scales as specified herein.

If mixing is done by a weigh-batch plant or modified weigh-batch plant, measurement will be determined on the batch scales unless surge-storage is used. Records of the number of batches, batch design and the mass of the composite hot mix shall be kept. Where surge-storage is used, measurement of the material taken from the surge-storage bin will be made on truck scales or suspended hopper scales.

- (2) **Composite Volumetric Method.** Hot mix will be measured by the cubic meter of compacted hot mix of the type actually used in the completed and accepted work in accordance with the plans and specifications for the project. The composite hot mix is hereby defined as the asphalt, aggregate, RAP and additives as noted on the plans and/or approved by the Engineer.

The volume of the composite hot mix shall be calculated by the following formula:

$$V = W/(1000 G_a)$$

V = Cubic meter of compacted hot mix

W = Total mass of hot mix in kilograms

G_a = Average actual specific gravity of three (3) molded specimens as prepared by Test Method TEX-206-F and determined in accordance with Test Method TEX-207-F, using samples collected by the Engineer.

If mixing is done by a drum-mix plant, the mass "W" will be determined by scales as specified herein.

If mixing is done by a weigh-batch plant or modified weigh-batch and surge-storage is not used, the mass "W" will be determined by batch scales. Records of the number of

batches, batch designs and mass of asphalt and aggregate shall be kept. Where surge-storage is used, measurement of the material taken from the surge-storage bin will be made on truck scales or suspended hopper scales.

10. Payment and Pay Adjustment Factors.

- (1) **General.** The work performed and materials furnished in accordance with this Item and measured as provided under Article 9, "Measurement" will be paid for at the unit price bid for the "Hot Mix" of the type specified and as determined in Article 10, "Payment and Pay Adjustment Factors."

Measurement Method	Bid Item	Unit Of Measure
Composite Mass	Hot Mix	Megagrams
Composite Volumetric	Hot Mix	Cubic Meter

The payment based on the unit bid price shall be full compensation for quarrying, for furnishing all materials and additives, for freight involved, for sampling and testing, for all hot mix design(s), for all quality control, for all heating, for mixing, for hauling, for cleaning the existing base course or pavement, for tack coat, for placing, rolling and finishing hot mix, for transporting RAP, for transporting any excess RAP to locations shown on the plans, and for all manipulations, labor, tools, equipment and incidentals necessary to complete the work.

All templates, straightedges, core drilling equipment, scales and other weighing and measuring devices necessary for the proper construction, measuring and checking of the work shall be furnished, operated and maintained by the Contractor at his expense.

The Contractor's laboratory building and equipment shall be furnished, maintained, and operated by certified specialists at the Contractor's own expense.

If the production or placement pay factor for three (3) consecutive lots is below 1.000, then the Contractor shall cease production until test results, or other information, indicate to the satisfaction of the Engineer that the next material to be produced will meet the specified values.

- (2) **Production Pay Adjustment Factors:** The "pay adjustment factor" for production is based on the lab density and will be determined using the Engineer's test results. A pay adjustment factor will be determined from Table 5 for each subplot using the deviation from target lab density defined in Article 4. The pay adjustment factor for the production lot will be the average of the pay adjustment factors for the sublots within that lot.

Pay adjustments for incomplete production lots described under Section 8.(2)(B) will be calculated in accordance with Subarticle 10.(2) using the average of the production pay factors from all sublots sampled. If the random sampling plan did not result in collection of any samples, a production pay factor of 1.000 will be assigned to that lot.

If the total pay adjustment factor for production for any lot is less than 1.000, the Contractor has the option to remove and replace the lot or agree to accept the lot at an

adjusted unit price determined by the total pay adjustment calculation. If the pay adjustment factor for production for any subplot is less than 0.700, the Engineer will randomly choose the locations, within that subplot, of a minimum of five 150 millimeter diameter cores, to be taken by the Contractor in the presence of the Engineer. The Engineer will submit the cores to the Construction Division where they will be re-molded on the Texas Gyro Press. Laboratory molded bulk specific gravity and maximum theoretical specific gravity will be determined within ten working days of receipt, to determine the new pay adjustment factor of the subplot in question. If the new pay adjustment factor is 0.700 or greater, then the new pay adjustment factor will apply to that subplot. If the new pay adjustment factor is less than 0.700, the subplot will not be paid for by the Engineer, and the material shall be removed at the expense of the Contractor. Replacement material shall meet the requirements of this specification with payment made accordingly.

- (3) **Placement Pay Adjustment Factors:** The pay adjustment factor for a placement subplot shall be determined from Table 6 for the sublots that require air void measurement. For sublots that do not require air void measurement, the pay adjustment factor shall be 1.000. For sublots, that contain areas which require air void measurements and areas which do not require air voids measurement, i.e. travel lanes and shoulders, a pay adjustment factor of 1.000 will be assigned to the entire subplot when the random sample location falls in an area not eligible for testing. When the random sample location does fall in an area eligible for testing, then a pay adjustment factor will be determined in accordance with this Subarticle and it will apply to the entire subplot. The pay adjustment factor for a placement lot shall be the average of the four (4) pay adjustment factors for the sublots within that lot.

Pay adjustments for incomplete placement lots described under Section 8.5(A) will be calculated in accordance with this Subarticle using the average of the placement pay factors from all sublots sampled. If the random sampling plan did not result in collection of any samples, a placement pay factor of 1.000 will be assigned.

If the total pay adjustment factor for placement for any lot is less than 1.000, the Contractor has the option to remove and replace the lot or agree to accept the lot at an adjusted unit price determined by the total pay adjustment calculation. If the pay adjustment factor for placement for any subplot is less than 0.700, the Engineer will randomly choose the locations, within that subplot, of four cores, to be taken by the Contractor in the presence of the Engineer. The Engineer will submit the cores to the Construction Division where they will be tested for bulk specific gravity within ten working days of receipt. The average of the four bulk specific gravities 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, then the new pay adjustment factor will apply to that subplot. If the new pay adjustment factor is less than 0.700, the subplot will not be paid for by the Engineer, and the material shall be removed at the expense of the Contractor. Replacement material shall meet the requirements of this specification with payment made accordingly.

(4) Total Adjustment Pay Calculation. Total adjustment pay (TAP) shall be based on the applicable pay adjustment factors for production and placement.

For production only * TAP1 = A

For production and placement TAP2 = $\frac{A+B}{2}$

A = Bid price x production lot quantity x pay adjustment factor for production

B = (Bid price x placement lot quantity x pay adjustment factor for placement) + (Bid price x miscellaneous quantities x 1.000)

* Applies only when placement of the mixture is not part of the contract.

Pay adjustment factors shall be rounded to the thousandth place (e.g., 0.000).

Table 1
Aggregate Quality Requirements

Requirement	Test Method	Manufactured or Natural Aggregate	Lightweight Aggregate
Coarse Aggregate			
Dry, Loose Unit Weight, kg/m ³ , minimum	TEX-404-A	-	560
Pressure Slaking Value, maximum	TEX-431-A	-	4.0
Freeze Thaw Loss, percent, maximum	TEX-432-A	-	7.0
24 Hour Water Absorption, percent, maximum	TEX-433-A	-	12.0
Deleterious Material, percent, maximum	TEX-217-F Part I	1.5	1.5
Decantation, percent, maximum	TEX-217-F Part II	1.5	1.5
Los Angeles Abrasion, percent, maximum for mixture other than CMHB	TEX-410-A	40	35
for CMHB Mixtures	TEX-410-A	35	-
Magnesium Sulfate Soundness Loss, 5 cycle, percent, maximum	TEX-411-A	30 Or as shown on Plans	-
Polish Value	TEX-438-A	Shown on Plans	Shown on Plans
Fine Aggregate			
Linear Shrinkage, percent, maximum	TEX-107-E Part II	3	3
Combined Coarse And Fine Aggregates And Mineral Filler			
Sand Equivalent Value, percent, minimum	TEX-203-F	45	45

**Table 2. Mixture Requirements
Master Grading
(Percent Passing By Mass Or Volume)**

Sieve Size	Type						
	A Coarse Base	B Fine Base	C Coarse Surface	D Fine Surface	F Fine Mixture	CMHB-F Fine Surface	CMHB-C Coarse Surface
37.5 mm	98.0-100.0						
31.52 mm	95.0-100.0						
25.0 mm		98.0-100.0					
22.4 mm	70.0-90.0	95.0-100.0	98.0-100.0				98.0-100.0
16.0 mm		75.0-95.0	95.0-100.0				95.0-100.0
12.5 mm	50.0-70.0			98.0-100.0		98.0-100.0	
9.5 mm		60.0-80.0	70.0-85.0	85.0-100.0	98.0-100.0	85.0-100.0	50.0-70.0
6.3 mm					95.0-100.0		
4.75 mm	30.0-50.0	40.0-60.0	43.0-63.0	50.0-70.0		40.0-60.0	30.0-45.0
2.00 mm	20.0-34.0	27.0-40.0	30.0-40.0	32.0-42.0	32.0-42.0	15.0-25.0	15.0-25.0
0.425 mm	5.0-20.0	10.0-25.0	10.0-25.0	11.0-26.0	9.0-24.0	6.0-20.0	6.0-20.0
0.180 mm	2.0-12.0	3.0-13.0	3.0-13.0	4.0-14.0	3.0-13.0	6.0-18.0	6.0-18.0
0.075 mm	1.0-6.0	1.0-6.0	1.0-6.0	1.0-6.0	1.0-6.0	5.0-8.0	5.0-8.0
Mixture Properties							
VMA, Design % Minimum	12.0	13.0	14.0	15.0	16.0	15.0	14.0
VMA, Production % Minimum	11.0	12.0	13.0	14.0	15.0	14.0	13.0
HVEEM Stability, Minimum*	35*	35*	35*	35*	35*		
Creep Slope mm/mm/Sec Maximum						0.00000004	0.00000004
Creep Stiffness kPa Minimum						41,400	41,400
Permanent Strain mm/mm Maximum						0.0006	0.0006

* Or as shown on plans.

**Table 3
Operational Tolerances Of Current Job Mix Formula**

Item	Tolerance (Mass or Volume)
Individual Percent Retained on each sieve 2.00 mm and larger	Plus or Minus 5*
Individual Percent Retained on each sieve smaller than 2.00 mm	Plus or Minus 3*
Asphalt Content **	Plus or Minus 0.3 **
HVEEM Stability (Except for CMHB)	Minimum 35 - No Maximum
Moisture Susceptibility, TEX-530-C	Item 301

* When within these tolerances, the gradation of the mixture may fall outside the master grading limits for all sieves except passing 0.075 mm. For the passing 0.075 mm, any test result which is not within the master grading limit will be considered as exceeding the operational tolerance.

** Production of mixture to the project shall cease if the Asphalt Content deviates from the current Job Mix Formula by more than 0.5 percent for any subplot.

**Table 4
Maximum Allowable Difference Between Contractor And Engineer Tests**

Test Method No.	Test Description	Max. Difference
TEX-210-F TEX-200-F or TEX-236-F	SIEVE ANALYSIS:	
	Individual percent retained for 16.0 mm sieves & larger	Plus or Minus 5.0
	Individual percent retained for sieves smaller than 16.0 mm and larger than 0.075 mm	Plus or Minus 3.0
	Percent passing 0.075 mm sieve	Plus or Minus 1.6
TEX-228-F or TEX-236-F	Asphalt Material Content	Plus or Minus 0.3
TEX-207-F	In-place Air Voids	Plus or Minus 1.0
TEX-207-F	Laboratory Molded Air Voids	Plus or Minus 1.4
TEX-227-F	Theoretical Maximum (Rice) Gravity	Plus or Minus 0.020
TEX-207-F	Laboratory Molded Bulk Specific Gravity	Plus or Minus 0.020

**Table 5
Production Pay Adjustment Factors For Lab Density**

Absolute Deviation From Target Lab Molded Density	Pay Factor
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	0.980
1.2	0.960
1.3	0.940
1.4	0.920
1.5	0.900
1.6	0.850
1.7	0.800
1.8	0.700
>1.8	No Pay

Table 6
Placement Pay Adjustment Factors For In-Place Density

In-Place Air Voids	Pay Adjustment Factor	In-Place Air Voids	Pay Adjustment Factor	In-Place Air Voids	Pay Adjustment Factor
<2.6	No Pay	6.9	1.035	11.3	0.885
2.6	0.700	7.0	1.033	11.4	0.880
2.7	0.738	7.1	1.032	11.5	0.875
2.8	0.775	7.2	1.030	11.6	0.870
2.9	0.813	7.3	1.028	11.7	0.865
3.0	0.850	7.4	1.027	11.8	0.860
3.1	0.860	7.5	1.025	11.9	0.855
3.2	0.870	7.6	1.023	12.0	0.850
3.3	0.880	7.7	1.022	12.1	0.845
3.4	0.890	7.8	1.020	12.2	0.840
3.5	0.900	7.9	1.018	12.3	0.835
3.6	0.910	8.0	1.017	12.4	0.830
3.7	0.920	8.1	1.015	12.5	0.825
3.8	0.930	8.2	1.013	12.6	0.820
3.9	0.940	8.3	1.012	12.7	0.815
4.0	0.950	8.4	1.010	12.8	0.810
4.1	0.960	8.5	1.008	12.9	0.805
4.2	0.970	8.6	1.007	13.0	0.800
4.3	0.980	8.7	1.005	13.1	0.795
4.4	0.990	8.8	1.003	13.2	0.790
4.5	1.000	8.9	1.002	13.3	0.785
4.6	1.010	9.0	1.000	13.4	0.780
4.7	1.020	9.1	0.995	13.5	0.775
4.8	1.030	9.2	0.990	13.6	0.770
4.9	1.040	9.3	0.985	13.7	0.765
5.0	1.050	9.4	0.980	13.8	0.760
5.1	1.050	9.5	0.975	13.9	0.755
5.2	1.050	9.6	0.970	14.0	0.750
5.3	1.050	9.7	0.965	14.1	0.745
5.4	1.050	9.8	0.960	14.2	0.740
5.5	1.050	9.9	0.955	14.3	0.735
5.6	1.050	10.0	0.950	14.4	0.730
5.7	1.050	10.1	0.945	14.5	0.725
5.8	1.050	10.2	0.940	14.6	0.720
5.9	1.050	10.3	0.935	14.7	0.715
6.0	1.050	10.4	0.930	14.8	0.710
6.1	1.048	10.5	0.925	14.9	0.705
6.2	1.047	10.6	0.920	15.0	0.700
6.3	1.045	10.7	0.915	>15.0	No Pay
6.4	1.043	10.8	0.910		
6.5	1.042	10.9	0.905		
6.6	1.040	11.0	0.900		
6.7	1.038	11.1	0.895		
6.8	1.037	11.2	0.890		

**Table 7
Test Methods, Test Responsibility And Minimum Certification Levels**

TEST	CERTIFICATION		LEVEL
	CONTRACTOR	TxDOT	
1. Aggregate Testing			
SAMPLING	TEX-400-A	TEX-400-A	IA
WASHED SIEVE	TEX-200-F, PART II		IA
UNIT WEIGHT		TEX-404-A	
L.A. ABRASION		TEX-410-A	
SOUNDNESS		TEX-411-A	
PRESSURE SLAKE		TEX-431-A	
POLISH VALUE		TEX-438-A	
CRUSHED FACE COUNT		TEX-460-A	
LINEAR SHRINKAGE		TEX-107-E	
SAND EQUIVALENT		TEX-203-F	
2. Laboratory Mix Design And Verification			
DESIGN and JMF Changes	TEX-204-F	TEX-204-F	II
MIXING	TEX-205-F	TEX-205-F	II
MOLDING	TEX-206-F	TEX-206-F	IA
DENSITY AND VMA	TEX-207-F	TEX-207-F	II
TENSILE STRENGTH	TEX-226-F	TEX-226-F	II
RICE GRAVITY	TEX-227-F	TEX-227-F	IA
NUCLEAR GAUGE CALIBRATION	TEX-228-F	TEX-228-F	II or IA
IGNITION OVEN CALIBRATION	TEX-236-F	TEX-236-F	II or IA
BOIL TEST	TEX-530-C	TEX-530-C	II
TENSILE STRENGTH RATIO	TEX-531-C	TEX-531-C	II
STABILITY		TEX-208-F	
CREEP		TEX-231-F	
3. Trial Mix Verification			
APPROVED GYRATORY PRESS			IA
CORRELATION			
SAMPLING	TEX-222-F	TEX-222-F	IA
MOLDING	TEX-206-F	TEX-206-F	IA
DENSITY	TEX-207-F	TEX-207-F	IA
STABILITY		TEX-208-F	
EXTRACTION	TEX-210-F	TEX-210-F	IA
MOISTURE		TEX-212-F	IA
RICE GRAVITY	TEX-227-F	TEX-227-F	IA
ASPHALT CONTENT(NUCLEAR)	TEX-228-F	TEX-228-F	IA
ASPHALT CONTENT (IGNITION)	TEX-236-F	TEX-236-F	
BOIL TEST		TEX-530-C	II
TENSILE STRENGTH RATIO		TEX-531-C	II

**Table 7
Test Methods, Test Responsibility And Minimum Certification Levels
(continued)**

Test	Certification		Level
	Contractor	TxDOT	
4. Production Operations			
RANDOM SAMPLING		TEX-225-F	IA
SAMPLING	TEX-222-F	TEX-222-F	IA
ASPHALT CONTENT(NUCLEAR)	TEX-228-F	TEX-228-F	IA
ASPHALT CONTENT(IGNITION)	TEX-236-F	TEX-236-F	
EXTRACTION OR COLD FEED	TEX-229-F	TEX-229-F	IA
MOLDING	TEX-206-F	TEX-206-F	IA
LAB DENSITY	TEX-207-F	TEX-207-F	IA
RICE GRAVITY	TEX-227-F	TEX-227-F	IA
STABILITY		TEX-208-F	
5. Roadway Operations			
RANDOM SAMPLING		TEX-225-F	IB or IA
AIR VOIDS	TEX-207-F	TEX-207-F	IB or IA
ESTABLISH ROLLING PATTERN	TEX-207-F	TEX-207-F	IB
RIDE MEASUREMENT	TEX-1000-S	TEX-1000-S	IB

SPECIAL SPECIFICATION

5028

Vehicular Impact Attenuator Assemblies (Sand-Filled Plastic Barrels)

- 1. Description.** This Item shall govern for the furnishing and installation and/or removal and/or removal and resetting of individual, impact-absorbent, frangible-plastic sand-filled barrels to form vehicle impact attenuator assemblies as shown on the plans or as directed by the Engineer.
- 2. Operating Characteristics.** The operating characteristics of the barrel or barrels, shall be such as to absorb the kinetic energy from a moving vehicle by a dispersible sand content and shattering or fracturing of the plastic barrels.

The Contractor shall furnish for approval manufacturer's certificates or literature for all items of the assembly that are stock items prior to fabrication and installation of the vehicular impact attenuator assembly.

- 3. Materials.** All materials supplied by the Contractor shall be new.

The barrels shall be furnished in the color of Federal Yellow unless otherwise specified on the plans.

Barrels and lids shall be made of high density polyethylene plastic material or other approved type of plastic material suitable for the functional characteristics of each individual component of the complete individual barrel assembly.

- (1) Barrels.** Each barrel shall be molded from plastic and shall contain sand supported in a stable position. Barrels may be molded in one piece or in multiple components. The barrels shall shatter upon vehicular impact but otherwise support and contain without leakage 90, 180, 320, 640 and 960 kilograms sand masses at the proper height. Barrels shall be approximately 915 millimeters in height and approximately 915 millimeters in diameter at the top.
 - (2) Lids.** Each barrel shall have a plastic weatherproof lid which shall be snapped, clamped or riveted in place to deter theft and/or prevent the lid from becoming a flying object upon impact by a vehicle.
 - (3) Sand-fill Material.** The sand-fill material shall be clean, dry concrete sand or of a type acceptable to the Engineer. The mass of sand required in each barrel shall be as shown on the plans or as directed by the Engineer.
- 4. Construction.** The sand-filled plastic barrel assemblies shall be fabricated and installed in accordance with these specifications and with the details shown on the plans.

Where practical, for convenience in future replacements, the Contractor will be required to outline (in contrasting color paint) the location of the barrels and mark the mass of sand in each barrel as indicated on the specific site plan.

Damaged barrels shall be repaired or replaced immediately.

Vehicular impact attenuator assemblies furnished by the Contractor and shown on the plans to become the property of the State and/or those supplied by the State, not designated on the plans for permanent use and are no longer required on the project, shall be removed and stored by the Contractor at a site designated on the plans or as directed by the Engineer.

When the vehicular impact attenuator assemblies are deemed by the Engineer to be of no further use in the handling of traffic on the project, the following will apply: a) each assembly furnished by the Contractor which is to be transferred to the State and b) each assembly which is to be returned to the State shall be cleaned by the Contractor and inspected by the Engineer. All barrels, either State- or Contractor-furnished, that are deemed not acceptable by the Engineer for future use, will become the property of the Contractor and shall be disposed of at his expense.

5. **Measurement.** Vehicular impact attenuator assemblies will be measured as each barrel in the vehicular impact attenuator assembly installation, complete in place.

Moving and resetting vehicular impact attenuator assemblies will be measured as each barrel in the assembly removed either from a stockpile or from an existing location and reset in a new location as detailed on the plans and specified herein.

Removing vehicular impact attenuator assemblies will be measured as each barrel in the assembly removed from an existing location and, unless otherwise shown on the plans, stockpiled in the area designated on the plans or by the Engineer.

6. **Payment.** The work performed and material (except as specified below) furnished in accordance with this Item and measured as provided under "Measurement", will be paid for at the unit price bid for "Vehicular Impact Attenuator Assembly Barrels". This price shall be full compensation for all labor, equipment, tools, incidentals and services, and for furnishing all materials necessary to complete the work described by this item (except as specified below).

The work performed in removing the vehicular impact attenuator assembly barrels from a stockpile or from an existing location of the highway facility, resetting in a new location, and measured as provided under "Measurement", above, will be paid for at the unit price bid for "Vehicular Impact Attenuator Assembly Barrels (Move and Reset)". This price shall be full compensation for moving the barrels, resetting the barrels in the new location, furnishing and placing all required sand-fill material, and for all manipulations, labor, tools, equipment and incidentals necessary to complete the work (except as specified below).

The work performed in removing the assembly barrels from an existing location, placing them in a designated area, and measured as provided under "Measurement", will be paid for at the unit price bid for "Vehicular Impact Attenuator Assembly Barrels (Remove)". This price shall be full compensation for removing the barrels from roadway or structure, stockpiling them in the designated area, removing and disposing of the sand-fill material and

for all manipulations, labor, tools, equipment and incidentals necessary to complete the work.

Except for cases of damage by the Contractor or that caused by his operations, all work required for repair and/or replacement of damaged vehicle impact attenuator barrels will be paid for at the unit price bid for "Vehicular Impact Attenuator Assembly Barrels".

Where required, special foundations, support pads, back-up walls, etc., and when necessary, their removal, will be measured and paid for in accordance with pertinent bid items.

SPECIAL SPECIFICATION

5288

Landscape Pavers

- 1. **Description.** This Item shall govern for furnishing and installing subbase, bedding sand and paving units in accordance with this Item and as shown on the plans.
- 2. **Materials.** The paving units shall meet all the requirements of ASTM C 936, "Solid Concrete Interlocking Paving Units" and the requirements specified herein. The paving units shall be made using normal weight aggregates conforming to ASTM C 33, and shall conform to the shape, color, laying pattern, and dimensions shown on the plans.

The bedding sand shall be fine aggregate grade No.1 as specified in Table 2 of Item 421, "Portland Cement Concrete". Except for Fineness Modulus requirements and the aggregate gradation which shall be in compliance with the following gradation:

Sieve Size	Percent Passing
9.5 mm	100
4.75 mm	85-100
0.150 mm	10-30

The sand shall be of uniform moisture content at 3 to 7 percent when spread and shall be protected against rain when stockpiled on site prior to spreading.

- 3. **Testing.** The manufacturer shall furnish the Engineer certification that the interlocking paving units meet or exceed all the requirements of ASTM C 936 and this specification. Additional paving units may be required at the discretion of the Engineer, for testing by the Department.
- 4. **Construction Methods.** The construction methods shall be as follows or as approved by the Engineer:
 - (1) **Subbase Installation.**
 - (a) Any unsuitable material encountered in the subgrade shall be replaced by suitable material and compacted to a uniform grade. Where subgrade stabilization has been specified, the subgrade shall be prepared accordingly.
 - (b) The Contractor shall have the option of providing either Item 247, "Flexible Base", Type C, Grade 3, 80 millimeter, (OC) or a 100 millimeter cement stabilized subbase either of which will be subsidiary to the Landscape Pavers.
 - (c) The upper layer of subgrade shall be sufficiently well- graded and compacted to prevent infiltration of the bedding sand into its surface both during construction and

throughout completion of the project. If available subgrade materials are unsuited to this requirement, then the upper surface shall either be blended by application of crushed fines, which shall then be watered and compacted into the surface or suitably sealed.

- (d) Before placing the sand bedding course and laying the paving units, the subbase will be inspected and meet the approval of the Engineer.

(2) Bedding Sand Installation.

- (a) An uncompacted sand bed base shall be screeded over the compacted subbase to a minimum depth of 25 millimeters and no greater than 40 millimeters. This assumes that after the pavers are placed and vibrated the elevation will be approximately 15 millimeters lower. Under no circumstances shall bedding sand be used for leveling.
- (b) The spread sand shall be carefully maintained in a loose condition and protected against precompaction both prior to and following screeding. Any precompacted sand or screed sand left overnight shall be loosened before further paving units are placed. Sand shall be lightly screeded in a loose condition to the predetermined depth only, slightly ahead of laying the paving units. Under no circumstances shall the sand be screeded in advance of the laying face to an extent to which paving will not be completed that day.

Screeded sand must be fully protected against accidental precompaction including compaction by rain or dew. Any screeded sand which is precompacted prior to laying of units shall be removed and brought to profile in a loose condition.

(3) Paver Installation.

- (a) Paving units shall be placed on uncompacted screeded sand bed to the nominated laying pattern, care being taken to maintain the specified bond throughout the job. Paving units shall be placed to achieve gaps nominally 3 millimeter wide between adjacent units such that all joints are correctly aligned.
- (b) The first row shall abutt an edge restraint with a gap of 3 millimeter and shall be laid at a suitable angle to the edge restraint to achieve the required visual orientation of paving units in the completed pavement.
- (c) In each row all full units shall be laid first. Closure units shall be cut and fitted subsequently. Such closure units shall consist of not less than 25 percent of a full unit. Units shall be cut using a power saw. A grout mix consisting of one part cement to two parts concrete sand, shall be used to fill larger edge spaces.
- (d) No other construction traffic shall be allowed on pavement during the paver installation until pavers have been compacted and sanded.

(4) Paver Compaction.

- (a) After laying the paving units, they shall be compacted to achieve consolidation of the sand bedding and brought to design levels and profiles by not less than two and preferably three passes of a suitable plate compactor.
- (b) The compactor shall be a high-frequency, low-amplitude mechanical flat plate vibrator having a plate area sufficient to cover a minimum of 12 paving units. This plate type compactor shall be capable of delivering a 15,500 to 22,220 newtons centrifugal compaction force. This equipment shall be equivalent to model P-22 manufactured by Koehring, Master Division, Dayton, Ohio.
- (c) Compaction shall proceed as closely as possible following laying and prior to the acceptance of any traffic.
- (d) Compaction should not be attempted, however, within 0.9 meter of the laying face. Compaction shall continue until lipping has been eliminated between the adjoining units. Joints shall then be filled and compacted as herein described.
- (e) All work to within 0.9 meter of the laying face must be left fully compacted at the completion of each day.
- (f) Units which are damaged during compaction shall be removed and replaced.
- (g) As soon as practical after compaction, and in any case prior to the termination of work on that day and prior to acceptance of work on that day and prior to the acceptance of construction traffic, sand for joint filling shall be spread over the pavement. The filling sand should be allowed to dry and then swept to fill the joints. At least one pass of the plate vibrator is required to achieve compaction of the joint-filling sand.

- 5. Measurement.** This Item will be measured by the square meter of landscape pavers complete in place.

This is a plans quantity measurement Item and the quantity to be paid for will be that quantity shown in the proposal and on the "Estimate and Quantity" sheet of the contract plans, except as may be modified by Article 9.8. If no adjustment of quantities is required additional measurements or calculations will not be required.

- 6. Payment.** The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Landscape Pavers". This price shall be full compensation for all labor, materials, excavation, equipment and incidentals necessary to install subbase, bedding sand, and paving units in the quantities, locations, lines and grades established by the Engineer and to the details shown on the plans.

SPECIAL SPECIFICATION

5419

Single Guardrail Terminal

- 1. Description.** This Item shall govern for the furnishing and installation of an ET-2000 Guardrail Terminal (ET-2000 model), or a SKT 350 Guardrail Terminal (SKT 350 model) at locations shown on the plans. These units must meet the requirements of NCHRP 350 Test Level 3 and have received written acceptance from the Federal Highway Administration. Only one model of Single Guardrail Terminal shall be selected by the Contractor and installed for each contract.

The ET-2000 model is a patented product and may be obtained from Trinity Industries, 2525 Stemmons Freeway, Dallas, Texas 75207, (800) 527-6050. The SKT 350 model is a patented product and may be obtained from Interstate Steel Corporation, P.O. Box 1962, Big Spring, Texas 79721, (915) 263-3725.

- 2. Materials.** All materials shall be new and conform to the details shown on the plans. Posts shall be of the shape and dimension specified on the plans for this guardrail terminal. Except for shape and dimension, posts shall meet the requirements of Item 540, "Metal Beam Guard Fence". Rail elements shall meet the requirements for materials as specified in Item 540, "Metal Beam Guard Fence".
- 3. Construction.** These units shall be installed in accordance with the manufacturers shop drawings.

Damaged units shall be repaired or replaced immediately.

Further information regarding assembly and installation may be obtained from the manufacturer of the particular device. The manufacturer shall provide to the Engineer one installation and repair manual specific to the particular unit for each contract.

- 4. Measurement.** This Item will be measured as each Single Guardrail Terminal installation complete in place, of the type shown on the plans.

"Single Guardrail Terminal (Move and Reset)" will be measured as each installation either from a stockpile or from an existing location and reset in a new location as detailed in the plans or as directed by the Engineer.

"Single Guardrail Terminal (Remove)" will be measured as each installation removed from an existing location and stockpiled in the area designated on the plans or by the Engineer.

- 5. Payment.** The work performed and the materials (except as specified below) furnished in accordance with this Item and measured as provided for under "Measurement", will be paid for at the unit price bid for "Single Guardrail Terminal", "Single Guardrail Terminal (Move and Reset)" and/or "Single Guardrail Terminal (Remove)", as type specified. This price

shall be full compensation for all labor, (except as specified below) equipment, tools, incidentals, and services, and for furnishing all materials (except as specified below) necessary to complete the work described by this Item.

Except for cases of damage by the contractor or that caused by his operations, all work required for the repair and/or replacement of damaged terminals will be paid for as "Extra Work", in accordance with Article 4.3., "Extra Work".