CENTRAL TEXAS REGIONAL
MOBILITY AUTHORITY

Regular Meeting of the Board of Directors

9:00 a.m.
Wednesday, February 28, 2024

Lowell H. Lebermann, Jr., Board Room
3300 N. IH-35, Suite 300
Austin, Texas 78705

A live video stream of this meeting may be viewed on the internet at www.mobilityauthority.com

Persons with disabilities. If you plan to attend this meeting and may need auxiliary aids or services, such as an interpreter for those who are deaf or hearing impaired, or if you are a reader of large print or Braille, please contact Laura Bohl at (512) 996-9778 at least two days before the meeting so that appropriate arrangements can be made.

Español. Si desea recibir asistencia gratuita para traducir esta información, llame al (512) 996-9778.

AGENDA

No action on the following:

1. Welcome and opportunity for public comment – See ***Notes*** at the end of this agenda.

Consent Agenda

*See **Notes** at the end of this agenda.*

2. Approve the minutes from the January 31, 2024 Regular Board Meeting.
3. Prohibit the operation of certain vehicles on Mobility Authority toll facilities pursuant to the Habitual Violator Program.
4. Approve an agreement with Lone Star Paving Company for mill and overlay work on the 45SW Maintenance Project.

5. Approve Amendment No. 3 to the First Amended and Restated Maintenance Services Contract for the Central Texas Regional Mobility Authority Toll Collection System with Kapsch TrafficCom USA, Inc. to remove intelligent transportation system performance-based maintenance services from the agreement.

Regular Items

Items to discuss, consider, and take appropriate action.

6. Accept the financial statements for January 2024.
7. Discuss and consider approving a toll rate schedule for the 183A Phase III Project.
8. Discuss and consider approving an agreement with Luna Data Solutions Inc. for a video interoperability sharing solution to support regional coordination for traffic management and incident response.
9. Discuss and consider approving Change Order No. 24 with The Lane Construction Corporation for increases in the quantity of topsoil required for the 183A Phase III project.
10. Discuss and consider approving Amendment No. 1 to the agreement with Great Hills Constructors for the 183 North Mobility Project to modify the early completion incentive and to add an interim milestone for early lane opening and associated incentive.

Briefings and Reports

Items for briefing and discussion only. No action will be taken by the Board.

11. An update on the Mobility Authority's Habitual Violator Program and related toll nonpayment enforcement remedies.
12. Executive Director Report.
    A. 183 Trail Interpretative Signage and Augmented Reality Experience
    B. Agency performance metrics.
        i. Roadway Performance
        ii. Call-Center Performance

Executive Session

Under Chapter 551 of the Texas Government Code, the Board may recess into a closed meeting (an executive session) to deliberate any item on this agenda if the Chairman announces the item

will be deliberated in executive session and identifies the section or sections of Chapter 551 that authorize meeting in executive session. A final action, decision, or vote on a matter deliberated in executive session will be made only after the Board reconvenes in an open meeting.

The Board may deliberate the following items in executive session if announced by the Chairman:

13. Discuss the acquisition of one or more parcels or interests in real property needed for the 183A Phase III Project and related issues, including a final agreed judgment, pursuant to §551.072 (Deliberation Regarding Real Property) and §551.071 (Consultation with Attorney).
14. Discuss legal issues related to claims by or against the Mobility Authority; pending or contemplated litigation and any related settlement offers; or other matters as authorized by §551.071 (Consultation with Attorney).
15. Discuss legal issues relating to procurement and financing of Mobility Authority transportation projects and toll system improvements, as authorized by §551.071 (Consultation with Attorney).
16. Discuss personnel matters as authorized by §551.074 (Personnel Matters).

Reconvene in Open Session.

Regular Items

Items to discuss, consider, and take appropriate action.

17. Approve a final agreed judgment with Klatt Properties LP, Sprint Spectrum LP, Verizon Wireless Services LLC f/k/a Dallas MTA LP, and Wells Fargo Bank for the acquisition of Parcel 3 of the 183A Phase III Project, a 3.646-acre tract of land **owned by Klatt Properties, a Texas Limited Partnership**; and located at County Road 258 and 183A, Liberty Hill, Williamson County, Texas.
18. Adjourn meeting.

Notes

Opportunity for Public Comment. At the beginning of the meeting, the Board provides a period of up to one hour for public comment on any matter subject to the Mobility Authority's jurisdiction. Each speaker is allowed a maximum of three minutes. A person who wishes to address the Board must register in advance and provide the speaker's name, address, phone number and email, as well as the agenda item number and whether you wish to speak during the public comment period or during the agenda item. If a speaker's topic is not listed on this agenda, the Board may not deliberate the speaker's topic or question the speaker during the open comment period but may direct staff to investigate the matter or propose that an item be placed on a subsequent agenda for deliberation and possible action by the Board. The Board may not deliberate or act on an item that is not listed on this agenda.

Consent Agenda. The Consent Agenda includes routine or recurring items for Board action with a single vote. The Chairman or any Board Member may defer action on a Consent Agenda item for discussion and consideration by the Board with the other Regular Items.

Public Comment on Agenda Items. A member of the public may offer comments on a specific agenda item in open session if he or she signs the speaker registration sheet for that item before the Board takes up consideration of the item. The Chairman may limit the amount of time allowed for each speaker. Public comment unrelated to a specific agenda item must be offered during the open comment period.

Meeting Procedures. The order and numbering of agenda items is for ease of reference only. After the meeting is convened, the Chairman may rearrange the order in which agenda items are considered, and the Board may consider items on the agenda in any order or at any time during the meeting.

Participation by Telephone Conference Call. One or more members of the Board of Directors may participate in this meeting through a telephone conference call, as authorized by Sec. 370.262, Texas Transportation Code (*see below*). Under that law, each part of the telephone conference call meeting that by law must be open to the public, shall be audible to the public at the meeting location, and will be tape-recorded or documented by written minutes. On conclusion of the meeting, the tape recording or the written minutes of the meeting will be made available to the public.

TEXAS TRANSPORTATION CODE Sec. 370.262. MEETINGS BY TELEPHONE CONFERENCE CALL.
(a) Chapter 551, Government Code, does not prohibit any open or closed meeting of the board, a committee of the board, or the staff, or any combination of the board or staff, from being held by telephone conference call. The board may hold an open or closed meeting by telephone conference call subject to the requirements of Sections 551.125(c)-(f), Government Code, but is not subject to the requirements of Subsection (b) of that section.

(b) A telephone conference call meeting is subject to the notice requirements applicable to other meetings.

(c) Notice of a telephone conference call meeting that by law must be open to the public must specify the location of the meeting. The location must be a conference room of the authority or other facility in a county of the authority that is accessible to the public.

(d) Each part of the telephone conference call meeting that by law must be open to the public shall be audible to the public at the location specified in the notice and shall be tape-recorded or documented by written minutes. On conclusion of the meeting, the tape recording or the written minutes of the meeting shall be made available to the public.

TEXAS GOVERNMENT CODE Sec. 551.125. OTHER GOVERNMENTAL BODY. (a) Except as otherwise provided by this subchapter, this chapter does not prohibit a governmental body from holding an open or closed meeting by telephone conference call.

~~(b) A meeting held by telephone conference call may be held only if:~~
~~(1) an emergency or public necessity exists within the meaning of Section 551.045 of this chapter; and~~
~~(2) the convening at one location of a quorum of the governmental body is difficult or impossible; or~~
~~(3) the meeting is held by an advisory board.~~

(c) The telephone conference call meeting is subject to the notice requirements applicable to other meetings.

(d) The notice of the telephone conference call meeting must specify as the location of the meeting the location where meetings of the governmental body are usually held.

(e) Each part of the telephone conference call meeting that is required to be open to the public shall be audible to the public at the location specified in the notice of the meeting as the location of the meeting and shall be tape-recorded. The tape recording shall be made available to the public.

(f) The location designated in the notice as the location of the meeting shall provide two-way communication during the entire telephone conference call meeting and the identification of each party to the telephone conference shall be clearly stated prior to speaking.

CENTRAL TEXAS REGIONAL
MOBILITY AUTHORITY

February 28, 2024
AGENDA ITEM #1

Welcome and opportunity for public comment

Welcome and opportunity for public comment.
No Board action required.

CENTRAL TEXAS REGIONAL
MOBILITY AUTHORITY

February 28, 2024
AGENDA ITEM #2

Approve the minutes from the January 31, 2024 Regular Board Meeting

Strategic Plan Relevance:	Service
Department:	Legal
Contact:	Geoff Petrov, General Counsel
Associated Costs:	N/A
Funding Source:	N/A
Action Requested:	Consider and act on motion to approve minutes

Description/Background: Approve the attached draft minutes for the January 31, 2024, Regular Board Meeting.

Backup provided: Draft minutes January 31, 2024, Regular Board Meeting

MINUTES
Regular Meeting of the Board of Directors of the
CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY

Wednesday, January 31, 2024
9:00 a.m.

This was an in-person meeting. Notice of the meeting was posted January 26, 2024, online on the website of the Mobility Authority and in the Mobility Authority's office lobby at 3300 N. Interstate 35, #300, Austin, Texas 78705-1849. Chairman Jenkins, Vice Chair Nikelle Meade*, Board Members David Armbrust, Mike Doss, Heather Gaddes, Ben Thompson, and David Singleton were present.

An archived copy of the live-stream of this meeting is available at:

https://mobilityauthority.new.swagit.com/videos/296181

After noting that a quorum of the Board was present, Chairman Jenkins called the meeting to order at 9:02 a.m. and had each Board Member state their name for the record.

1. Welcome and opportunity for public comment.

   Scott Moore, City Manager, City of Manor provided comment.

   Consent Agenda

2. Approve the minutes from the December 13, 2023 Regular Board Meeting.

3. Prohibit the operation of certain vehicles on Mobility Authority toll facilities pursuant to the Habitual Violator Program.
   ADOPTED AS: **RESOLUTION NO. 24-001**

4. Approve the annual compliance report for submittal to the Texas Department of Transportation as required by 43 Texas Administrative Code §26.65.

   ADOPTED AS: **RESOLUTION NO. 24-002**

   MOTION: Approve Item Nos. 2 through 4.
   RESULT: Approved (Unanimous); 6-0
   MOTION: Heather Gaddes
   SECONDED BY: Ben Thompson
   AYE: Armbrust, Doss, Gaddes, Jenkins, Singleton, Thompson

NAY:	None.

Regular Items

5. Accept the financial statements for November 2023 and December 2023.

   Presentation by Jose Hernandez, Chief Financial Officer.

   *Note: Nikelle Meade joined the dais at 9:13 a.m.

ADOPTED AS:	**RESOLUTION NO. 24-003**
MOTION:	Accept the financial statements for November 2023 and December.
RESULT:	Approved (Unanimous); 7-0
MOTION:	David Singleton
SECONDED BY:	Mike Doss
AYE:	Armbrust, Doss, Gaddes, Jenkins, Meade, Singleton, Thompson
NAY:	None.

6. Approve and adopt the 2023 Annual Report.

   Presentation by Jori Liu, Director of Communication.

ADOPTED AS:	**RESOLUTION NO. 24-004**
MOTION:	Approve and adopt the 2023 Annual Report.
RESULT:	Approved (Unanimous); 7-0
MOTION:	David Armbrust
SECONDED BY:	David Singleton
AYE:	Armbrust, Doss, Gaddes, Jenkins, Meade, Singleton, Thompson
NAY:	None.

7. Discuss and consider approving a contract with Freeit Data Solutions, Inc. for information technology services.

   Presentation by Cory Bluhm, Assistant Director of IT and Toll Systems.

ADOPTED AS:	**RESOLUTION NO. 24-005**
MOTION:	Approve a contract with Freeit Data Solutions, Inc. for information technology services.

RESULT:	Approved (Unanimous); 7-0
MOTION:	David Singleton
SECONDED BY:	Nikelle Meade
AYE:	Armbrust, Doss, Gaddes, Jenkins, Meade, Singleton, Thompson
NAY:	None.

8. Discuss and consider approving a contract with SHI Government Solutions, Inc. for Microsoft Enterprise Software.

ADOPTED AS:	**RESOLUTION NO. 24-006**
MOTION:	Approve a contract with SHI Government Solutions, Inc. for Microsoft Enterprise Software.
RESULT:	Approved (Unanimous); 7-0
MOTION:	Heather Gaddes
SECONDED BY:	Nikelle Meade
AYE:	Armbrust, Doss, Gaddes, Jenkins, Meade, Singleton, Thompson
NAY:	None.

Briefings and Reports

9. Quarterly Reports.

   Presentation by Mike Sexton, Director of Engineering.

   A. 183A Phase III Project
   B. 183 North Mobility Project
   C. Barton Skyway Ramp Relief Project

10. Executive Director Board Report

    Presentation by James M. Bass, Executive Director.

    A. Agency performance metrics.
       i. Roadway performance
       ii. Call-Center performance

Executive Session

Chairman Jenkins announced in open session at 10:25 a.m. that the Board would recess the meeting and reconvene in Executive Session to deliberate the following items:

11. Discuss the exchange or purchase of one or more parcels or interests in real property owned by the Mobility Authority and related legal issues as authorized by §551.071 (Consultation with Attorney) and §551.072 (Deliberation Regarding Real Property; Closed Meeting).

12. Discuss legal issues related to claims by or against the Mobility Authority; pending or contemplated litigation and any related settlement offers; or other matters as authorized by §551.071 (Consultation with Attorney).

13. Discuss legal issues relating to procurement and financing of Mobility Authority transportation projects and toll system improvements, as authorized by §551.071 (Consultation with Attorney).

14. Discuss personnel matters as authorized by §551.074 (Personnel Matters).

After completing the executive session, the Board reconvened in open meeting at 11:27 a.m. and Mike Doss and David Singleton did not join the dais following Executive Session.

Regular Items

15. Adjourn meeting.

After confirming that no member of the public wished to address the Board, Chairman Jenkins declared the meeting adjourned at 11:28 a.m.

CENTRAL TEXAS REGIONAL
MOBILITY AUTHORITY

February 28, 2024
AGENDA ITEM #3

Prohibit the operation of certain vehicles on Mobility Authority toll facilities pursuant to the Habitual Violator Program

Strategic Plan Relevance:	Stewardship & Service
Department:	Operations
Contact:	Tracie Brown, Director of Operations
Associated Costs:	N/A
Funding Source:	N/A
Action Requested:	Consider and act on draft resolution

Project Description/Background: The Mobility Authority's habitual violator process prescribes two notices before habitual violator remedies go into effect. A pre-determination letter is sent 60 days before any remedies are enforced advising the customer again of their outstanding balance and providing an opportunity for resolution. Assuming no resolution, a *Notice of Determination* is mailed notifying the customer they've been determined to be a habitual violator and advising of the consequences. The customer is also informed of their right to appeal the decision and the process by which to do so.

If the customer does not contact the Authority to appeal the habitual violator determination or resolve their outstanding balance, a block is placed on the related vehicle's registration preventing renewal. The block remains in effect until all tolls and fees have been paid, a payment plan has been arranged with the Mobility Authority or the customer is determined to no longer be a habitual violator.

Previous Actions & Brief History of the Program/Project: State law provides that persons deemed to be habitual violators may also be prohibited from use of the Mobility Authority's toll facilities by order of the Board of Directors. Habitual violator customers operating a vehicle in violation of a ban are subject to a Class C misdemeanor with a fine up to $500. A second or subsequent occurrence may result in impoundment of the vehicle. Similar to registration blocks, vehicle bans remain in effect until all

outstanding amounts owed to the Authority have been resolved or the customer is no longer deemed a habitual violator.

Financing: Not applicable.

Action requested/Staff Recommendation: Staff affirms that all required steps have been followed and proper notice previously provided to customers determined to be habitual violators. To date, these customers have not appealed this determination or resolved their outstanding balances.

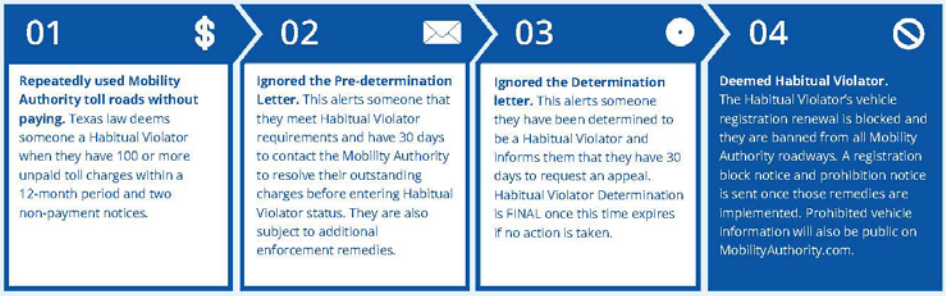
Therefore, staff recommends that the Board of Directors approve the order prohibiting certain vehicles from use of the Authority's toll facilities. Following the Board's approval of this order, a Notice of Prohibition will be mailed by first class mail advising of the ban, consequences if the ban is violated and how the customer may resolve their outstanding balance.

Backup provided: Habitual Violator Vehicle Ban FAQs
Draft Resolution

CENTRAL TEXAS REGIONAL
MOBILITY AUTHORITY

Habitual Violator Enforcement Program

Habitual Violator Process



Who is a Habitual Violator?

A Habitual Violator is defined in Section 372.106(a) of the Texas Transportation Code as (A) one who was issued at least two written notices of nonpayment that contained in aggregate 100 or more events of nonpayment within a period of one year and, (B) was issued a warning that failure to pay the amounts specified in the notices may result in the toll project entity's exercise of Habitual Violator remedies.

What enforcement remedies is the Mobility Authority implementing for Habitual Violators?

To encourage equitable payment by all customers, legislation allows for enforcement remedies up to and including vehicle registration renewal blocks, prohibiting Habitual Violator's vehicles on Mobility Authority roadways, on-road enforcement of the vehicle ban, as well as posting names to the agency website of those Habitual Violators with banned vehicles. The Mobility Authority will be implementing these remedies beginning November 2019.

How will I know I'm a Habitual Violator subject to enforcement remedies?

Habitual Violators are provided due process protections prior to any enforcement action.

- A registered vehicle owner who the Mobility Authority determines meets the Habitual Violator status is sent a letter advising them that Habitual Violator remedies may be implemented if the customer's outstanding balance is not resolved. This letter is not required by law but is sent as a courtesy to reflect the Mobility Authority's commitment to the customer.
- A registered vehicle owner who the Mobility Authority determines to be a Habitual Violator receives written notice of that determination and an opportunity for a justice of the peace hearing to challenge their Habitual Violator status.
- Habitual Violator Determination is FINAL if no action is taken, prompt in the Mobility Authority to send a Vehicle Registration Block Notice and/or a Vehicle Ban Notice. These notices urge the Habitual Violator yet again to resolve their toll debt with the Mobility Authority.
- Sufficient time is provided to respond to all notifications.

Learn more about the Habitual Violator Enforcement Program at MobilityAuthority.com

CENTRAL TEXAS REGIONAL
MOBILITY AUTHORITY

Habitual Violator Enforcement Program

How can I resolve my Habitual Violator status and settle my toll bill balance?

You can pay outstanding tolls and administrative fees with cash, money order or credit card (a payment plan may be available) by: calling the Mobility Authority Customer Service Center at 512-410-0562, online at **www.paymobilitybill.com**, or in person at our walk-up center.

Why is the Mobility Authority pursuing enforcement remedies?

The vehicle registration block and other toll enforcement actions are intended to encourage tollway drivers to pay for services rendered to ensure fairness to the overwhelming majority of drivers who pay for the service, maintenance and safety of the toll roads.

How will a person be notified that he or she is subject to enforcement remedies?

A notification letter announcing that a person has met the criteria of Habitual Violator is sent to the address in the Texas Department of Motor Vehicles (TTC 372.106) database, allowing 30 days to contact to dispute their determination as a Habitual Violator or address the account balance before remedies are applied. If the Habitual Violator does not make arrangements with the Mobility Authority during this period, they will be subject to all enforcement remedies. Additionally, notification of a registration renewal block is mailed.

Can someone dispute a toll bill?

Yes. You may contact the Mobility Authority to review all outstanding tolls and fees, correct any errors and arrange for payment to clear your status as a Habitual Violator and the block on your registration. Habitual Violators are also given an opportunity to request an administrative hearing with a justice of the peace.

How will I know or be notified that I am subject to a vehicle ban?

Habitual violators subject to vehicle ban will receive notification that they have been banned, including when the ban will take effect and instructions for how to remove their status as a Habitual Violator.

Can I dispute my toll bill that subjects me to the vehicle ban?

Yes. You may contact the Mobility Authority to review all outstanding tolls and administrative fees, correct any errors and arrange for payment to clear your status as a Habitual Violator and remove the vehicle ban.

What happens if I am banned, but get caught driving on a Mobility Authority toll road?

A person commits an offense when operating a vehicle in violation of the ban and is subject to a Class C misdemeanor with a fine up to $500. A second or subsequent occurrence of driving on the tollway in violation of a ban may result in impoundment of the vehicle.

How will the Mobility Authority know if I'm still driving (after being banned)?

Mobility Authority roads are equipped with technology that recognizes vehicle and license plates on our prohibited list. Individuals operating a prohibited vehicle on Mobility Authority roads will be reported to nearby law enforcement patrolling Mobility Authority roads.

Learn more about the Habitual Violator Enforcement Program at MobilityAuthority.com

GENERAL MEETING OF THE BOARD OF DIRECTORS
OF THE
CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY

RESOLUTION NO. 24-0XX

PROHIBITING THE OPERATION OF CERTAIN MOTOR VEHICLES ON MOBILITY AUTHORITY TOLL FACILITIES PURSUANT TO THE HABITUAL VIOLATOR PROGRAM

WHEREAS, Transportation Code, Chapter 372, Subchapter C, authorizes toll project entities, including the Central Texas Regional Mobility Authority (Mobility Authority), to exercise various remedies against certain motorists with unpaid toll violations; and

WHEREAS, Transportation Code §372.106 provides that a "habitual violator" is a registered owner of a vehicle who a toll project entity determines:

(1) was issued at least two written notices of nonpayment that contained:

(A) in the aggregate, 100 or more events of nonpayment within a period of one year, not including events of nonpayment for which: (i) the registered owner has provided to the toll project entity information establishing that the vehicle was subject to a lease at the time of nonpayment, as provided by applicable toll project entity law; or (ii) a defense of theft at the time of the nonpayment has been established as provided by applicable toll project entity law; and

(B) a warning that the failure to pay the amounts specified in the notices may result in the toll project entity's exercise of habitual violator remedies; and

(2) has not paid in full the total amount due for tolls and administrative fees under those notices; and

WHEREAS, the Mobility Authority previously determined that the individuals listed in Exhibit A are habitual violators, and these determinations are now considered final in accordance with Transportation Code, Chapter 372, Subchapter C; and

WHEREAS, Transportation Code §372.109 provides that a final determination that a person is a habitual violator remains in effect until (1) the total amount due for the person's tolls and administrative fees is paid; or (2) the toll project entity, in its sole discretion, determines that the amount has been otherwise addressed; and

WHEREAS, Transportation Code §372.110 provides that a toll project entity, by order of its governing body, may prohibit the operation of a motor vehicle on a toll project of the entity if:
(1) the registered owner of the vehicle has been finally determined to be a habitual violator; and

(2) the toll project entity has provided notice of the prohibition order to the registered owner; and

WHEREAS, the Executive Director recommends that the Board prohibit the operation of the motor vehicles listed in Exhibit A on the Mobility Authority's toll roads, including (1) 183A Toll; (2) 290 Toll; (3) 71 Toll; (4) MoPac Express Lanes; (5) 45SW Toll; and (6) 183 Toll.

NOW THEREFORE, BE IT RESOLVED that the motor vehicles listed in Exhibit A are prohibited from operation on the Mobility Authority's toll roads, effective February 28, 2024; and

BE IT FURTHER RESOLVED that the Mobility Authority shall provide notice of this resolution to the individuals listed in Exhibit A, as required by Transportation Code §372.110; and

BE IT IS FURTHER RESOLVED that the prohibition shall remain in effect for the motor vehicles listed in Exhibit A until the respective habitual violator determinations are terminated, as provided by Transportation Code §372.110.

Adopted by the Board of Directors of the Central Texas Regional Mobility Authority on the 28th day of February 2024.

Submitted and reviewed by:

James M. Bass
Executive Director

Approved:

Robert W. Jenkins, Jr.
Chairman, Board of Directors

Exhibit A

LIST OF PROHIBITED VEHICLES

(To be provided at the Board Meeting)

CENTRAL TEXAS REGIONAL
MOBILITY AUTHORITY

February 28, 2024
AGENDA ITEM #4

Approve an agreement with Lone Star Paving Company for mill and overlay work on the 45SW Maintenance Project

Strategic Plan Relevance:	Safety
Department:	Engineering
Contact:	Mike Sexton, P.E. Director of Engineering
Associated Costs:	$1,128,000.00
Funding Source:	24 Operating Budget R&R Funds
Action Requested:	Consider and act on draft resolution

Project Description/Background: The 45SW Maintenance Project is for pavement milling, asphalt overlay, and restriping at the intersection of 45SW and FM 1626. The project began design in October 2023 as a part of the Authority's maintenance program. The project will improve safety by improving the friction between vehicles' tires and the pavement surface, and halt further pavement structure degradation.

Previous Actions & Brief History of the Program/Project: In June of 2023 the Authority approved the adoption of the FY2024 Operating Budget which included renewal and replacement funds to maintain the Mobility Authority's existing assets. Final Plans were completed, and the project was advertised for bids in January 2024.

Construction Contract Procurement Timeline:

- January 11, 2024: Advertised Project
- January 29, 2024: Pre-Bid Meeting
- February 15, 2024: Bid Opening

Bids: 1 bid was received and came in as shown below.

Contractor	Bid Price	Responsive Bid
Lone Star Paving Company	$1,128,000.00	Yes

The Engineer's Estimate was $920,633.43

The bid has been reviewed by the Authority staff and the lowest responsive and responsible bidder is Lone Star Paving Company at $1,128,000.00.

Financing: FY24 Operating Budget R&R Funds

Action requested/Staff Recommendation: Staff recommends that the Board award the contract for construction of the 45SW Maintenance Project to Lone Star Paving Company and authorize the Executive Director to execute a contract with Lone Star Paving Company in an amount not to exceed $1,128,000.00 for construction of the 45SW Maintenance Project.

Backup provided: Draft Resolution
Draft Contract

GENERAL MEETING OF THE BOARD OF DIRECTORS
OF THE
CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY

RESOLUTION NO. 24-0XX

APPROVING A CONTRACT WITH LONE STAR PAVING COMPANY FOR THE SH 45SW/FM 1626 – TRAVIS/HAYS COUNTY OVERLAY PROJECT

WHEREAS, design of the 45SW Maintenance Project which consists of pavement milling, asphalt overlay, and restriping at the intersection of 45SW and FM 1626 that is part of the Mobility Authority's Maintenance Program (SH 45SW/FM 1626 – Travis/Hays County Overlay Project), began October 2023; and

WHEREAS, the Mobility Authority advertised the SH 45SW/FM 1626 – Travis/Hays County Overlay Project on January 11, 2024 and received one (1) bid by the bid opening on February 15, 2024; and

WHEREAS, the bid was reviewed by engineering staff who determined the lowest responsive and responsible bidder to be Lone Star Paving Company; and

WHEREAS, the Executive Director recommends that the Board approve a contract with Lone Star Paving Company for the SH 45SW/FM 1626 – Travis/Hays County Overlay Project in an amount not to exceed $1,128,000.00 and in the form published in the bid documents attached hereto as Exhibit A.

NOW, THEREFORE, BE IT RESOLVED, that the Board of Directors approves a contract with Lone Star Paving Company for the SH 45SW/FM 1626 – Travis/Hays County Overlay Project in an amount not to exceed $1,128,000.00 and hereby authorizes the Executive Director to finalize and execute the contract in the form published in the bid documents attached hereto as Exhibit A.

Adopted by the Board of Directors of the Central Texas Regional Mobility Authority on the 28th day of February 2024.

Submitted and reviewed by:

James M. Bass
Executive Director

Approved:

Robert W. Jenkins, Jr.
Chairman, Board of Directors

Exhibit A

CENTRAL TEXAS REGIONAL
MOBILITY AUTHORITY

SH 45SW/FM 1626 – Travis/Hays County Overlay Project

CTRMA Contract No.: 2445SW10601M

Bid Documents
Addendum #1 – 01/26/2024
Addendum #2 – 01/30/2024

Advertisement: January 11, 2024
Pre-Qualification Deadline: 12:00 PM January 31, 2024
Bid Date: 2:00 PM February 15, 2024

Central Texas Regional Mobility Authority

SH 45SW/FM 1626 – Travis/Hays County
Overlay Project

CTRMA CONTRACT NO. 2445SW10601M

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BID DOCUMENTS
CONTRACT AND CONTRACT BOND
SPECIAL PROVISIONS
SPECIAL SPECIFICATIONS
PLANS

January 12, 2024

Central Texas Regional Mobility Authority

SH 45SW/FM 1626 – TRAVIS/HAYS COUNTY OVERLAY PROJECT

CTRMA CONTRACT NO. 2445SW10601M

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CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY

SH 45SW/FM 1626 – TRAVIS/HAYS COUNTY OVERLAY PROJECT

CTRMA CONTRACT NO. 2445SW10601M

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INVITATION TO BID

Electronic proposal forms for the above project shall be submitted via the project's CivCast https://www.civcastusa.com/project/6581ec9e90f39bedde0c2359/summary to the Central Texas Regional Mobility Authority (Authority), by **2:00 PM local time, February 15, 2024**. The bids will be publicly posted via the project's CivCast website within 48 hours after the bids are opened.

The contractor will have twenty (20) working days after the date stated in the written Full Notice to Proceed to achieve full completion of all work. The Authority reserves the right to make changes in the work to complete the contract, as defined in the specifications.

1 A Full NTP will be issued no later than 180 calendar days after award for the Contractor to begin work. Time charges will begin accruing upon issuance of the Full NTP.

The complete list of quantities is located in the Bid Form. The principal items of work are as follows:

- TOM Asphalt
- Planing Asphalt Pavement
- Pavement Markings

The Official Bid Form for this Contract will be made available to prospective bidders who have met all prequalification requirements on or before 5:00 PM local time, on February 1, 2024 via the project's CivCastUSA website https://www.civcastusa.com/project/6581ec9e90f39bedde0c2359/summary.

Prequalification requirements:

- Be registered with State of Texas,
- Be fully prequalified by Texas Department of Transportation (TxDOT),
- Have a bidding capacity per TxDOT prequalification system of $1,000,000
- Submit a valid Non-Collusion Affidavit, Debarment Affidavit, and Child Support Statement,

The deadline for meeting the prequalification requirements and still obtaining an Official Bid Form is January 31, 2024 at Noon.

The Authority cannot be held liable in the event a party is unable to submit a valid bid due to delay in the prequalification procedure. Securing prequalification through TxDOT and the timing thereof, shall at all times be the sole responsibility of the Prospective Bidder.

Complete Contract documents will be available on January 11, 2024 for potential bidders and others through the Authority's website (www.mobilityauthority.com) and CivCast's website https://www.civcastusa.com/project/6581ec9e90f39bedde0c2359/summary.

this Contract, are available on line at the Texas Department of Transportation (TxDOT) website (https://www.txdot.gov/business/resources/txdot-specifications.html).

The contract will be awarded in accordance with the Authority's Procurement policy. A copy of the Procurement Policy is available online at the Authority website: (https://www.mobilityauthority.com/about/policy-disclaimers/code).

For more information, please submit a question to the project team through CivCast.com.

Each bid must be accompanied by a Bid Guaranty consisting of a Bid Bond (on the form provided) in the amount of at least five percent (5%) of the Total Bid Amount. The apparent low bidder shall deliver the original sealed Bid Bond to CTRMA within five (5) calendar days of such notification.

CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY
James Bass, Executive Director
Austin, Texas

Central Texas Regional Mobility Authority

SH 45SW/FM 1626 – TRAVIS/HAYS COUNTY OVERLAY PROJECT

CTRMA CONTRACT NO. 2445SW10601M

****

BID DOCUMENT CHECKLIST

Prior to submitting a bid, prospective bidders should review the checklist below to ensure that the bid is accepted and not declared nonresponsive. No joint venture participants will be allowed.

Bid Document:

- Are you aware if your affiliates are bidding on the same project?
- Are you pre-qualified by TxDOT through the Confidential Questionnaire process and have a bidding capacity of $1,000,000?
- Have you submitted a valid Non-Collusion Affidavit, Debarment Affidavit, and Child Support Statement in order to receive an Official Bid Form?

Bid Document Preparation:

- Is the bid being submitted on the Official Bid Form via the CivCast website?
- Are you submitting only one bid for this project?
- Is the bid signed by your company representative or each joint venture participant?
- Have you entered prices for all bid items?
- Does the bid document contain all items included in the Official Bid Form?
- Does the bid document contain a total bid value?
- Is the bid free of any additional conditions not included in the bid document provided to you?
- Have you electronically submitted a complete and executed Bid Bond?
- Have you acknowledged each Addendum on CivCast?

Bid Bonds:

- Is the bid bond signed by the surety?
- Is the bid bond signed by the company representative?
- Is the exact name of the contractor(s) listed as the principal?
- Is the impressed surety seal affixed to the bid bond?
- Does the name on the surety seal match the name of the surety on the bond?
- Is the bond dated on or earlier than the letting date of the project?
- Is the signer for the surety listed on the power of attorney attached to the bond?
- Is the surety authorized to issue the bond?

Bid Document Submission:

- Are you aware of the time and date deadline for submission for the bid document?
- Are you submitting a complete bid document?

SH 45SW/FM 1626 – TRAVIS/HAYS COUNTY
OVERLAY PROJECT
Unofficial Bid Form

To receive Official Bid Form, request via the project's CivCast website.

	ITEM NO.	DESC. CODE	DESCRIPTION	UNIT	QTY	UNIT PRICE
	0134	6001	BACKFILL (TY A)	STA	60.00	
	0351	6002	FLEXIBLE PAVEMENT STRUCTURE REPAIR (6")	SY	2200.00	
1	0354	6203	PLANE ASPH CONC PAV (1" TO 1 1/2")	SY	22558.00	
	0500	6001	MOBILIZATION	LS	1.00	
	0502	6001	BARRICADES, SIGNS AND TRAFFIC HANDLING	MO	1.00	
	0506	6039	TEMP SEDMT CONT FENCE (REMOVE)	LF	528.00	
	0506	6043	BIODEG EROSN CONT LOGS (REMOVE)	LF	875.00	
	0506	6045	BIODEG EROSN CONT LOGS (INSTL) (6")	LF	875.00	
	0506	6047	TEMP SDMNT CONT FENCE (INLET PROTECTION)	LF	528.00	
2	0662	6109	WK ZN PAV MRK SHT TERM (TAB)TY W	EA	1000.00	
2	0662	6111	WK ZN PAV MRK SHT TERM (TAB)TY Y-2	EA	300.00	
	0666	6018	REFL PAV MARK TY I (W)6" (DOT)(100MIL)	LF	96.00	
	0666	6030	REFL PAV MRK TY I (W)8"(DOT)(100MIL)	LF	176.00	
	0666	6036	REFL PAV MRK TY I (W)8"(SLD)(100MIL)	LF	2860.00	
	0666	6048	REFL PAV MRK TY I (W)24"(SLD)(100MIL)	LF	56.00	
	0666	6054	REFL PAV MRK TY I (W)(ARROW)(100MIL)	EA	11.00	
	0666	6072	REFL PAV MRK TY I(W)(LNDP ARW)(100MIL)	EA	4.00	
	0666	6078	REFL PAV MRK TY I (W)(WORD)(100MIL)	EA	11.00	
	0666	6147	REFL PAV MRK TY I (Y)24"(SLD)(100MIL)	LF	140.00	
	0666	6167	REFL PAV MRK TY II (W) 6" (BRK)	LF	1630.00	
	0666	6170	REFL PAV MRK TY II (W) 6" (DOT)	LF	96.00	
	0666	6174	REFL PAV MRK TY II (W) 6" (SLD)	LF	3439.00	
	0666	6176	REFL PAV MRK TY II (W) 8" (DOT)	LF	176.00	
	0666	6178	REFL PAV MRK TY II (W) 8" (SLD)	LF	2860.00	
	0666	6182	REFL PAV MRK TY II (W) 24" (SLD)	LF	56.00	
	0666	6184	REFL PAV MRK TY II (W) (ARROW)	EA	11.00	
	0666	6190	REFL PAV MRK TY II (W) (LNDP ARW)	EA	4.00	
	0666	6192	REFL PAV MRK TY II (W) (WORD)	EA	11.00	
	0666	6205	REFL PAV MRK TY II (Y) 6" (BRK)	LF	68.00	
	0666	6210	REFL PAV MRK TY II (Y) 6" (SLD)	LF	4756.00	
	0666	6214	REFL PAV MRK TY II (Y) 24" (SLD)	LF	140.00	
2	0666	6306	RE PM W/RET REQ TY I (W)6"(BRK)(100MIL)	LF	1630.00	
	0666	6343	REF PRO PAV MRK TY I (W)6"(SLD)(100MIL)	LF	3439.00	
	0666	6346	REF PRO PAV MRK TY I (Y)6"(BRK)(100MIL)	LF	68.00	
	0666	6347	REF PROF PAV MRK TY I(Y)6"(SLD)(100MIL)	LF	4756.00	
	0672	6007	REFL PAV MRKR TY I-C	EA	3.00.	
	0672	6009	REFL PAV MRKR TY II-A-A	EA	32.00	
	0672	6010	REFL PAV MRKR TY II-C-R	EA	325.00	
1	3081	6007	TOM-C PG76-22 SAC-A	TON	1309.00	
	3084	6001	BONDING COURSE	GAL	2707.00	
	6001	6001	PORTABLE CHANGEABLE MESSAGE SIGN	DAY	30.00	
	6185	6002	TMA (STATIONARY)	DAY	20.00	
	6185	6003	TMA (MOBILE OPERATION)	HR	40.00	
	7685	0001	INSTL DEL ASSM (D-SW)SZ PEXCO FG 300 36" (Y-POST)	EA	22.00	
	7685	0002	INSTL DEL ASSM (D-SW)SZ PEXCO FG 300 36" (W-POST)	EA	22.00	
2			CONTINGENCY ALLOWANCE	LS	1.00	$150,000.00
2			FORCE ACCOUNT	LS	1.00	$28,000.00

(**NOTE:** Bidders shall **not** remove this bidding form from attached documents.)

Central Texas Regional Mobility Authority

SH 45SW/FM 1626 – TRAVIS/HAYS COUNTY
OVERLAY PROJECT
CTRMA CONTRACT NO. 2445SW10601M

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SH 45SW/FM 1626 – TRAVIS/HAYS COUNTY
OVERLAY PROJECT

To the Central Texas Regional Authority
3300 N I-35, Suite 300
Austin, Texas 78705

Gentlemen:

I/we, the undersigned, declare: that no other person, firm or corporation is interested in this Bid; that I/we have carefully examined the Plans, Standard Specifications, Special Provisions, and all other documents pertaining to this Contract which form a part of this Bid as if set forth at length herein; that I/we understand that the quantities of items shown herein below are approximate only; that I/we have examined the location of the proposed work; that I/we agree to bind myself/ourselves, upon award to me/us by the Central Texas Regional Authority under this Bid, to enter into and execute a Contract, for the project named above; that I/we agree to start work within thirty (30) calendar days after the date stated in the written Notice-to-Proceed (Item 8.1 of the Specifications), to furnish all necessary materials, provide all necessary labor, equipment, tools and plant, pay for all required insurance, bonds, permits, fees and service, and do all required work in strict compliance with the terms of all documents comprising said Contract, and to fully complete the entire project within twenty (20) working days after Notice-to-Proceed; and that I/we agree to accept as full compensation for the satisfactory prosecution of this project the contractual bid amount after it is adjusted based on the terms and conditions specified in the contract.

The quantities shown in the above schedule of items are considered to be approximate only and are given as the basis for comparison of bids. The Authority may increase or decrease the amount of any item or portion of the work as may be deemed necessary or expedient. Any increase or decrease in the amount of any item or portion of work will be added or deducted from the total Contract bid price based on the terms and conditions specified in TxDOT Specification Item 4. It is understood that payment for this project will be by unit prices bid.

The cost of any work performed, materials furnished, services provided, or expenses incurred, whether or not specifically delineated in the Contract documents but which are incidental to the scope and plans, intent, and completion of this Contract, have been included in the price bid for the various items scheduled hereinabove.

Accompanying this Bid is a bid guaranty consisting of a Bid Bond (on the form provided) in the amount of at least five percent (5%) of the Official Total Bid Amount. It is hereby understood and agreed that said Bid Bond is to be forfeited as liquidated damages in the event that, on the basis of this Bid, the Authority should award this Contact to me/us and that I/we should fail to execute and deliver said Contract and the prescribed Contract Bond, together with the proof of proper insurance coverage and other necessary documents, all within fifteen (15) calendar days after award of the Contract; otherwise, said check or bond is to be returned to the undersigned.

Business Name of Bidder _____

Type of Organization
Individual □
Partnership □
Corporation □

Address of Bidder: _____

_____

Signature of Owner,
Partner or Corp. Officer: _____
Title: _____
Date: _____

Central Texas Regional Mobility Authority

SH 45SW/FM 1626 – TRAVIS/HAYS COUNTY
OVERLAY PROJECT

CTRMA CONTRACT NO. 2445SW10601M

****

NON-COLLUSION AFFIDAVIT

STATE OF _____)

COUNTY OF _____)

I, _____, of the City of _____, County of _____and State of _____, being of full age and duly sworn according to law on my oath depose and say:

That I am _____(Title) of _____, the Bidder making the Bid submitted to the Central Texas Regional Mobility Authority, on the 15th day of February, 2024, for Contract No. 2445SW10601M in connection with SH 45SW/FM 1626 – Travis/Hays County Overlay Project; that I executed the said Bid with full authority to do so;

The said Bidder has not, directly or indirectly, entered into any combination or arrangement with any person, firm or corporation or entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free, competitive bidding or which would increase the cost of construction or maintenance in connection with the said Contract; that no person or selling agency has been employed or retained to solicit or secure the said Contract upon an agreement or understanding for a commission, percentage, brokerage or contingent fee, except bona fide full-time employees;

And that said Bidder is or has been a member of the following highway contractors' association during the preceding twelve months:

Name of Association	Location of Principal Office
_____	_____
_____	_____
_____	_____

I further warrant that all statements contained in said Bid and in this Affidavit are true and correct and made with full knowledge that the said Authority relies upon the truth of the statements contained in said Bid and in this Affidavit in awarding the said Contract.

Sworn to and subscribed
before me this_____
day of _____,
20___.

By:_____
Person Signing Bid

Print Name:_____
Title:_____

_____
Notary Public

My commission expires:_____

Central Texas Regional Mobility Authority

_____

SH 45SW/FM 1626 – TRAVIS/HAYS COUNTY
OVERLAY PROJECT

CTRMA CONTRACT NO. 2445SW10601M

****

DEBARMENT AFFIDAVIT

STATE OF _____)

COUNTY OF _____)

I, _____, of the City of _____, County of _____ and State of _____, being of full age and duly sworn according to law on my oath depose and say:

That I am _____(Title) of _____, the Bidder making the Bid submitted to the Central Texas Regional Mobility Authority, on the 15th day of February, 2024, for Contract No. 2445SW10601M in connection with the SH 45SW/FM 1626 – Travis/Hays County Overlay Project; that I executed the said Bid with full authority to do so;

The said Bidder has not been excluded or disqualified from doing business on State or Federal projects;

And that said Bidder is or has been a member of the following highway contractors' association during the preceding twelve months:

Name of Association	Location of Principal Office
_____	_____
_____	_____
_____	_____

I further warrant that all statements contained in said Bid and in this Affidavit are true and correct and made with full knowledge that the said Authority relies upon the truth of the statements contained in said Bid and in this Affidavit in awarding the said Contract.

Sworn to and subscribed
before me this_____
day of _____,
20___.

By:_____
Person Signing Bid

Print Name:_____
Title:_____

_____
Notary Public

My commission expires:_____

CHILD SUPPORT STATEMENT

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

CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY

CHILD SUPPORT STATEMENT FOR NEGOTIATED CONTRACTS AND GRANTS

Under Family Code, Section 231.006, Name of Individual

Certifies that Name of Business, Vendor #,

as of Date is eligible to receive a grant, loan or payment and acknowledges that any contract may be terminated and payment may be withheld if this certification is inaccurate.

List below the name and social security number of the individual or sole proprietor and each partner, shareholder, or owner with an ownership interest of at least 25% of the business entity submitting the bid or application. This form must be updated whenever any party obtains a 25% ownership interest in the business entity.

NAME (*please print legibly, if handwritten*)	**SOCIAL SECURITY NUMBER**

Family Code, Section 231.006, specifies that a child support obligor who is more than thirty (30) days delinquent in paying child support and a business entity in which the obligor is a sole proprietor, partner, shareholder, or owner with an ownership interest of at least 25% is not eligible to receive payments from state funds under a contract to provide property, materials, or services; or receive a state-funded grant or loan.

A child support obligor or business entity ineligible to receive payments described above remains ineligible until all arrearage have been paid or the obligor is in compliance with a written repayment agreement or court order as to any existing delinquency.

Except as provided in Family Code, Section 231.302(d), a social security number is confidential and may be disclosed only for the purposes of responding to a request for information from an agency operating under the provisions of Subchapters A and D of Title IV of the federal Social Security Act (42 U.S.C. Sections 601 et seq. and 651 et seq.)

CERTIFICATION TO NOT BOYCOTT ISRAEL

Pursuant to Texas Government Code 2271.002, the Mobility Authority must include a provision requiring a written verification that the Contractor does not boycott Israel and will not boycott Israel during the term of the Contract. By signing the contract, the Contractor certifies that it does not boycott Israel and will not boycott Israel during the term of this contract.

Violation of this certification may result in action by the Mobility Authority.

CERTIFICATION TO NOT DISCRIMINATE AGAINST FIREARM ENTITIES OR FIREARM TRADE ASSOCIATIONS

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

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

This provision applies to a contract that:

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

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

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

CERTIFICATION TO NOT BOYCOTT ENERGY COMPANIES

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

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

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

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

Central Texas Regional Mobility Authority

SH 45SW/FM 1626 – TRAVIS/HAYS COUNTY OVERLAY PROJECT

CTRMA CONTRACT NO. 2445SW10601M

****

BID BOND

KNOW ALL PERSONS MEN BY THESE PRESENTS, that_____, as Principal/Contractor, and _____, as Surety, legally authorized to do business in the State of Texas, are held and firmly bounded unto the Central Texas Regional Mobility Authority, as Authority, in the amount of at least five percent (5%) percent of the Total Bid amount, on which the Contract is awarded lawful money of the United States of America, for the payment of which, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally and firmly by these presents:

WHEREAS, the Contractor is herewith submitting its Bid for Contract No. 2445SW10601M, entitled SH 45SW/FM 1626 – Travis/Hays County Overlay Project, and

NOW, THEREFORE, the condition of this obligation is such, that if the Contractor shall be awarded the Contract upon said Bid and shall, within fifteen (15) calendar days after the date of written notice of such award, enter into and deliver a signed Contract and the prescribed Performance Bond for the faithful performance of the Contract, together with the required proof of proper insurance coverage and other necessary documents, then this obligation shall be null and void; otherwise, to remain in full force and effect, and the Contractor and Surety will pay unto the Authority the difference in money between the amount of the Total Amount written in the Bid of said Contractor and the amount for which the Authority may legally contract with another party to perform the said work, if the latter amount be in excess of the former; but in no event shall the Surety's liability exceed the penal sum hereof.

SIGNED AND SEALED this _____day of _____. 20____.

PRINCIPAL/CONTRACTOR

_____
Business Name

_____
Address

Witness or Attest:

_____

_____

By:_____
Title:

(Affix Corporate Seal Here)

SURETY:

_____
Business Name

_____
Address

Witness or Attest:

_____

_____

By:_____
Title:

(Attach evidence of Power of Attorney)

(Affix Corporate Seal Here)

Central Texas Regional Mobility Authority

SH 45SW/FM 1626 – TRAVIS/HAYS COUNTY OVERLAY PROJECT

CTRMA CONTRACT NO. 2445SW10601M

****

CONTRACT AGREEMENT

THIS AGREEMENT, made this ___day of _____, 20_, between the Central Texas Regional Mobility Authority, 3300 N. I-35, Suite 300, Austin, Texas, 78705, hereinafter called the "Authority" and _____, or his, its or their successors, executors, administrators and assigns, hereinafter called the Contractor.

WITNESSETH, that the Contractor agrees with the Authority for the consideration herein mentioned, and at his, its or their own proper cost and expense, to do all the work and furnish all the materials, equipment, teams and labor necessary to prosecute and complete and to extinguish all liens therefore, Contract No. 2445SW10601M, entitled SH 45SW/FM 1626 – Travis/Hays County Overlay Project, in the manner and to the full extent as set forth in the Plans, Standard Specifications, Special Provisions, Bid (for the basis of award stated herein below) and other documents related to said Contract which are on file at the office of the Authority and which are hereby adopted and made part of this Agreement as completely as if incorporated herein, and to the satisfaction of the Authority or its duly authorized representative who shall have at all times full opportunity to inspect the materials to be furnished and the work to be done under this Agreement.

This Contract is awarded on the basis of the official total Bid Amount based on the unit prices bid of_____dollars and _____Cents ($_____).

In consideration of the foregoing premise, the Authority agrees to pay the Contractor for all items of work performed and materials furnished at the amount of the unit prices bid therefore in the Bid submitted for this Contract, subject to any percentage reductions in the total Contract amount that may be named in the Bid corresponding to the basis of award stated in the above paragraph, and subject to the conditions set forth in the Specifications.

The Contractor agrees as follows:

a. I/WE will not discriminate against any employee or applicant for employment because of race, religion, color, sex or national origin, except where religion, sex or national origin is a bona fide occupational qualification reasonably necessary to the normal operation of the Contractor.

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

c. I/WE agree to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.

d. I/WE in any solicitations or advertising for employees placed by or on behalf of itself, will state that it is an equal opportunity employer.

e. I/WE agree to adhere to all federal/state regulations including, but not limited to, American Disabilities Act, Equal Employment Opportunity, submitting certified payrolls, and participating in Contractor/Subcontractor labor standard reviews.

f. Notices and advertisements and solicitations placed in accordance with applicable state and federal law, rule or regulation, shall be deemed sufficient for the purposes of meeting the requirements of this section.

g. Contract Time - The contractor will have twenty (20) working days after the date stated in the written Full Notice-to-Proceed to Fully complete the project.

h. Failure by Contractor to fulfill these requirements is a material breach of the Contract, which may result in the termination of this Contract, or such other remedy, as the Authority deems appropriate.

IN WITNESS WHEREOF, the parties hereto have duly executed this Agreement the day and year written above.

Sworn to and Subscribed

before me this_____
day of _____, 20___.

_____
Notary Public

My commission expires:

_____

CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY

By:_____
James Bass
Executive Director

CONTRACTOR:

_____

Business Name

_____

Address

_____

Sworn to and subscribed
before me this _____
day of_____,20___.

_____

by:_____

Notary Public

Title

My commission expires:

_____

(Affix Corporate Seal Here)

INFORMATION ABOUT PROPOSER ORGANIZATION

Proposer's business address:

(No.)	(Street)	(Floor or Suite)

(City)	(State or Providence)	(ZIP or Postal Code)	(Country)

State or County of Incorporation/Formation/Organization: _____

Signature block for a corporation or limited liability company:

Company: _____

By: _____

Printed Name: _____

Title: _____

Additional Requirements:

A. If the proposer is a corporation, enter state or country of incorporation in addition to the business address. If the proposer is a partnership, enter state or country of formation. If the proposer is a limited liability company, enter state or country of organization.

B. Describe in detail the legal structure of the entity making the Bid. If the proposer is a partnership, attach full name and addresses of all partners and the equity ownership interest of each entity, provide the aforementioned incorporation, formation and organization information for each general partner and attach a letter from each general partner stating that the respective partner agrees to be held jointly and severally liable for any and all of the duties and obligations of the proposer under the Bid and under any contract arising therefrom. If the proposer is a limited liability entity, attach full names and addresses of all equity holders and other financially responsible entities and the equity ownership interest of each entity. If the proposer is a limited liability company, include an incumbency certificate executed by a Secretary thereof in the form set on the following page listing each officer with signing authority and its corresponding office. Attach evidence to the Bid and to each letter that the person signing has authority to do so.

C. With respect to authorization of execution and delivery of the Bid and the Agreements and validity thereof, if any signature is provided pursuant to a power of attorney, a copy of the power of attorney shall be provided as well as a certified copy of corporate or other appropriate resolutions authorizing said power of attorney. If the Proposer is a corporation, it shall provide evidence of corporate authorization in the form of a resolution of its governing body certified by an appropriate officer of the corporation. If the Proposer is a limited liability company, evidence of authorization would be in the form of a limited company resolution and a managing member resolution providing such authorization, certified by an appropriate officer of the managing member. If the Proposer is a partnership, evidence of authorization shall be provided for the governing body of the Proposer and for the governing bodies of each of its general partners, at all tiers, and in all cases certified by an appropriate officer.

D. The Proposer must also identify those persons authorized to enter discussions on its behalf with the Authority in connection with this Bid, the Project, and The Agreement. The Proposer shall submit with its Bid a power of attorney executed by the Proposer and each member, partner of the Proposer, appointing and designating one or more individuals to act for and bind the Proposer in all matters relating to the Bid.

INCUMBENCY CERTIFICATE

The undersigned hereby certifies to the Central Texas Regional Mobility Authority that he/she is the duly elected and acting _____ Secretary of _____ (the "Company"), and that, as such, he/she is authorized to execute this Incumbency Certificate on behalf of the Company, and further certifies that the persons named below are duly elected, qualified and acting officers of the Company, holding on the date hereof the offices set forth opposite their names.

NAME:	OFFICE:
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

IN WITNESS WHEREOF, the undersigned has executed this Incumbency Certificate this _____ day of _____.

_____

_____ Secretary

Central Texas Regional Mobility Authority

SH 45SW/FM 1626 – TRAVIS/HAYS COUNTY
OVERLAY PROJECT

CTRMA CONTRACT NO. 2445SW10601M

****

PERFORMANCE BOND

STATE OF TEXAS
COUNTY OF _____

KNOW ALL MEN BY THESE PRESENTS: That _____

_____of the City of _____

County of _____, and State of _____, as principal, and

_____
authorized under the laws of the State of Texas to act as surety on bonds for principals, are held and firmly bound unto the Central Texas Regional Mobility Authority (Authority), in the penal sum of

_____Dollars

($_____) for the payment whereof, the said Principal and Surety bind themselves, their heirs, administrators, executors, successors, jointly and severally, by these presents:

WHEREAS, the Principal has entered into a certain written contract with the Authority, dated the _____day of _____, 20____ (the "Contract"), to which the said Contract, along with the Contract Documents referenced therein are hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said Principal shall faithfully perform said Agreement and shall in all respects duly and faithfully observe and perform all and singular the covenants, conditions and agreements in and by the Contract agreed and covenanted by the Principal to be observed and performed, and according to the true intent and meaning of said Contract and the Contract Documents hereto annexed, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, HOWEVER, that this bond is executed pursuant to the provisions of Chapter 2253 of the Texas Government Code, as amended and all liabilities on this bond shall be determined in accordance with the provisions of said Chapter to the same extent as if it were copied at length herein.

SURETY, for value received, stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Agreement or to the work performed thereunder, or to the Contract Documents referenced therein, shall in anyway affect the obligations on this bond, and it does hereby waive notice of such change, extension of time, alteration or addition to the terms on the Agreement, or to the work to be performed thereunder.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____day of _____, 20__.

_____	_____
PRINCIPAL	SURETY
_____	_____
SIGNATURE	SIGNATURE
_____	_____
NAME & TITLE	NAME & TITLE
_____	_____
ADDRESS	ADDRESS
_____	_____
(_____)_____	(_____)_____
PHONE NUMBER	PHONE NUMBER

The name and address of the Resident Agency of Surety is:

_____

_____

(_____)_____	_____
PHONE NUMBER	SIGNATURE OF LICENSED LOCAL RECORDING AGENT appointed to countersign on behalf of Surety (Required by Art. 21.09 of the Insurance Code)

****

I,_____, having executed Bonds
SIGNATURE

for _____do hereby affirm I have
NAME OF SURETY

verified that said Surety is now certified with Authority from either: (a) the Secretary of the Treasury of the United States if the project funding includes Federal monies; or (b) the State of Texas if none of the project funding is from Federal sources; and further, said Surety is in no way limited or restricted from furnishing Bond in the State of Texas for the amount and under conditions stated herein.

Central Texas Regional Mobility Authority

SH 45SW/FM 1626 – TRAVIS/HAYS COUNTY
OVERLAY PROJECT

CTRMA CONTRACT NO. 2445SW10601M

****

PAYMENT BOND

STATE OF TEXAS
COUNTY OF _____

KNOW ALL MEN BY THESE PRESENTS: That _____

_____of the City of _____

County of _____, and State of _____, as Principal (hereinafter referred to as the "Principal"), and

_____
authorized under the laws of the State of Texas to act as Surety on bonds for principals (hereinafter referred to as the "Surety"), are held and firmly bound unto Central Texas Regional Mobility Authority, (hereinafter referred to as the "Authority"), in the penal sum of

_____Dollars

($_____) for the payment whereof, the said Principal and Surety bind themselves, their heirs, administrators, executors, successors and assigns, jointly and severally, by these presents:

WHEREAS, the Principal has entered into a certain written contract with the Authority, dated the _____day of _____, 20____ (the "Contract"), to which the said Contract, along with the Contract Documents referenced therein are hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said Principal shall pay all claimants supplying labor and material to him or a subcontractor in the prosecution of the Work provided for in said Contract, then, this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, HOWEVER, that this bond is executed pursuant to the provisions of Chapter 2253 of the Texas Government Code, as amended and all liabilities on this bond shall be determined in accordance with the provisions of said Chapter to the same extent as if it were copied at length herein.

SURETY, for value received, stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the Work performed thereunder, or to the other Contract Documents accompanying the same, shall in anyway affect its obligation on this bond, and it does hereby waive notice of such change, extension of time, alteration or addition to the terms of the Contract, or to the work to be performed thereunder or to the other Contract Documents accompanying the same.

IN WITNESS WHEREOF, the said Principal and Surety have signed and sealed this instrument this _____day of _____, 20___.

_____	_____
PRINCIPAL	SURETY
_____	_____
SIGNATURE	SIGNATURE
_____	_____
NAME & TITLE	NAME & TITLE
_____	_____
ADDRESS	ADDRESS
_____	_____
(_____)_____	(_____)_____
PHONE NUMBER	PHONE NUMBER

The name and address of the Resident Agency of Surety is:

_____

_____

(_____)_____	_____
PHONE NUMBER	SIGNATURE OF LICENSED LOCAL RECORDING AGENT appointed to countersign on behalf of Surety (Required by Art. 21.09 of the Insurance Code)

Central Texas Regional Mobility Authority

SH 45SW/FM 1626 – TRAVIS/HAYS COUNTY
OVERLAY PROJECT

CTRMA CONTRACT NO. 2445SW10601M

****

RECEIPT OF ADDENDA

Receipt of addendum, if issued, must be acknowledged electronically on the CivCast website.

Failure to confirm receipt of all addenda issued will result in the bid being deemed non-responsive.

Signature Date

Central Texas Regional Mobility Authority

SH 45SW/FM 1626 – TRAVIS/HAYS COUNTY OVERLAY PROJECT

CTRMA CONTRACT NO. 2445SW10601M

****

ENGINEER'S SEALS

The enclosed Specifications, Special Provisions, General Notes, and Specification Data in this document have been selected by me, or under my responsible supervision as being applicable to this project.

PREPARED BY:

AtkinsRéalis

TBPE REG. #F-474

11801 Domain Blvd., Suite 500
Austin, Texas, 78758
512-327-6840 PH
512-327-2453 FX

Alteration of a sealed document without proper notification to the responsible engineer is an offence under the Texas Engineering Practice Act.

GENERAL NOTES:

Item	Description	**Rate
3081	**Thin Overlay Mixtures (TOM)** SAC A	116.0LB/SY/IN
3084	**Bonding Course**	0.12 GAL/SY

** For Informational Purposes Only

GENERAL

The "Engineer" shall be the Central Texas Regional Mobility Authority's (Mobility Authority) consultant identified by the Mobility Authority at the Pre-Construction Meeting.

The contractor will be given written Notice to Proceed (NTP) to begin work on this project.

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

Perform work during good weather. If work is damaged by a weather event, the Contractor is responsible for all costs associated with replacing damaged work.

If work is performed at Contractor's option, when inclement weather is impending, and the work is damaged by subsequent precipitation, the Contractor is responsible for all costs associated with replacing the work, if required.

Remove and replace, at the Contractor's expense, and as directed by the Engineer, all defective work, which was caused by the Contractor's workforce, materials, or equipment.

The roadbed will be free of organic material prior to placing any section of the pavement structure.

Equip all construction equipment used in roadway work with highly visible omnidirectional flashing warning lights.

Contractor is responsible for verifying the location of all utilities (overhead and underground) and notifying the Engineer of any discrepancies before beginning construction. Contractor shall contact utility companies 48 hours prior to construction and take "caution" in areas where utilities are close together to avoid damaging the utilities.

Both TxDOT owned and CTRMA owned Intelligent Transportation Systems (ITS) Infrastructure may exist within the limits of this project and the system must remain operational throughout construction. The exact location of ITS Infrastructure is not known. Backbone and hub communication fiber links are critical and must be maintained during the duration of the project. Proposed and temporary ITS and toll systems shall operate as a coherent system. Short periods for switchovers must be scheduled with TxDOT and the Mobility Authority and should occur at night. Power and communications to ITS and toll devices must be maintained. Changeovers for both temporary and permanent ITS must be scheduled with TxDOT and the Mobility Authority and provide 30 calendar days advance written notice prior to modifying the ITS or toll system.

Use caution if working in these areas to avoid damaging or interfering with existing facilities and infrastructure. Repair any damage to the ITS, toll system, and infrastructure within 8 hours of occurrence at no cost to TxDOT/Mobility Authority. In the event of TxDOT system damage, notify TxDOT at (512) 974-0883 and the Toll Operations Division at (512) 874-9177 within one hour of occurrence. In the event of Mobility Authority system damage, notify the Mobility Authority Director of Operations at (512) 996-9778 within one hour of occurrence. Failure of the Contractor to repair damage within 8 hours of occurrence to any infrastructure that conveys any corridor information to TxDOT/Mobility Authority will result in the Contractor being billed for the full cost of emergency repairs performed by others. Upon completion of installation of permanent fiber optic duct bank and cable and switchover from temporary to permanent has been made, remove all temporary optic cable, timber poles, messenger cable and ground boxes. Temporary conduit to existing ground boxes shall be separated from existing ground boxes and access port to ground box shall be repaired. Provide notification to TxDOT and the Mobility Authority 48 hours in advance of changeovers for both temporary and permanent ITS and provide anticipated

duration of down time.

Meet weekly with the Engineer to notify of planned work for the upcoming week. Provide a weekly "look ahead", as well as all work performed over the past week.

Coordinate and obtain approval for all work over existing roadway.

The Project Superintendent will always be available to contact when work is being performed, including subcontractor work.

Provide a smooth, clean sawcut along the existing pavement structure, as directed. Consider subsidiary to the pertinent Items.

Construct all manholes/valves to final pavement elevations prior to the placement of final surface. If the manholes/valves are going to be exposed to traffic, place temporary asphalt around the manhole/valve to provide a 50:1 taper. The asphalt taper is subsidiary to the ACP work.

Supply litter barrels in enough numbers at locations as directed to control litter within the project. Consider subsidiary to pertinent Items.

Use a self-contained vacuum broom to sweep the roadway and keep it free of sediment as directed. The contractor will be responsible for any sweeping above and beyond the normal maintenance required to keep fugitive sediment off the roadway as directed by the Engineer.

Damage to existing pipes and SET's due to Contractor operations will be repaired at Contractor's expense.

All locations used for storing construction equipment, materials, and stockpiles of any type, within the right of way, will be as directed. Use of right of way for these purposes will be restricted to those locations where driver sight distance to businesses and side street intersections is not obstructed and at other locations where an unsightly appearance will not exist. The Contractor will not have exclusive use of right of way but will cooperate in the use of the right of way with the city/county and various public utility companies as required.

Protect all areas of the right of way (ROW) that are not included in the actual limits of proposed construction areas. Exercise care to prevent damage of trees, vegetation and other natural surroundings. Areas not to be disturbed will be as directed by the Engineer. Restore any area disturbed by the Contractor's operations to a condition as good as, or better than, before the beginning of work.

During evacuation periods for Hurricane events the Contractor will cooperate with the Mobility Authority and TxDOT for the restricting of Lane Closures and arranging for Traffic Control to facilitate Coastal Evacuation Efforts.

Overhead and underground utilities may exist in the vicinity of the project. The exact location of underground utilities may not be known. Refer to ITEM 5 – CONTROL OF THE WORK, for utility rates. If working near power lines, comply with the appropriate sections of Local Legal Requirements, Texas State Law, and Federal Regulations relating to the type of work involved.

Contractor is responsible for all toll charges incurred by Contractor vehicles.

Coordinate and obtain approval for all bridgework over existing roadways.

ITEM 4 – SCOPE OF WORK

Final clean up will include the removal of excess material considered detrimental to vegetation growth along the front slope of the ditch. Materials, as specified by the Engineer, will be removed at the Contractor's expense.

ITEM 5 – CONTROL OF THE WORK

Provide a 48 hour advance email notice to AUS_Locate@TxDOT.gov to request illumination, traffic signal, ITS, or toll equipment utility locates on TxDOT's system. Provide
a 2-week advance notice to the Engineer to request locates on the Mobility Authority's system.
If this Agreement authorizes the Authority or its contractor to perform any work on State right of way. Before the Mobility Authority or its contractor begins work on State right of way, the entity performing the work shall provide TxDOT with a fully executed copy of TxDOT's Form 1560 Certificate of Insurance verifying the existence of coverage in the amounts and types specified on the Certificate of Insurance for all persons and entities working on State right of way. This coverage shall be maintained until all work on TxDOT right

of way is complete. If coverage is not maintained, all work on State right of way shall cease immediately, and TxDOT may recover damages and all costs of completing the work.

Electronic Shop Drawing Submittals.
Submit electronic shop drawing submittals using the Mobility Authority's Electronic Data Management System (EDMS), which will be established for the Project prior to commencing construction. Submittals will be addressed to the Construction, Engineering and Inspections (CE&I) Firm's Resident Engineer (RE) and additional staff, as appropriate.

ITEM 6 - CONTROL OF MATERIALS
Give a minimum of 5 business day notice for materials, which require inspection at the Plant.

ITEM 7 – LEGAL RELATIONS AND RESPONSIBILITIES
Refer to the Environmental Permits, Issues and Commitments (EPIC) plan sheets for additional requirements and permits.
When any abandoned well is encountered, cease construction operations in this area and notify the Engineer who will coordinate the proper plugging procedures. A water well driller licensed in the State of Texas must be used to plug a well.
Erosion control and stabilization measures must be initiated immediately in portions of the site where construction activities have temporarily ceased and will not resume for a period exceeding 14 calendar days. Track all exposed soil, stockpiles, and slopes. Tracking consists of operating 2 tracked vehicle or equipment up and down the slope, leaving track marks perpendicular to the direction of the slope. Re-track slopes and stockpiles after each rain event or every 14 days, whichever occurs first. This work is subsidiary.

Do not park equipment where driver sight distance to businesses and side street intersections is obstructed, especially after work hours. If it is necessary to park where drivers' views are blocked, make every effort to flag traffic accordingly. Give the traveling public priority.

Perform maintenance of vehicles or equipment at designated maintenance sites. Keep a spill kit on-site during fueling and maintenance. This work is subsidiary.

Collect wastewater generated on-site by chemical toilets and transport off the recharge zone and dispose of properly.

Maintain positive drainage for permanent and temporary work for the duration of the project. Be responsible for any items associated with the temporary or interim drainage and all related maintenance. This work is subsidiary.

Suspend all activities near any significant recharge features, such as sinkholes, caves, or any other subterranean openings that are discovered during construction or core sampling. Do not proceed until the designated Geologist or TCEQ representative is present to evaluate and approve remedial action.

Locate aboveground storage tanks kept on-site for construction purposes in a contained area as to not allow any exposure to soils. The containment will be sized to capture 150% of the total capacity of the storage tanks.

For projects with PSLs in Edwards Aquifer Recharge/Contributing Zone or in USACE Jurisdictional Area:

Project Specific Location PSL in Edwards Aquifer Recharge and Contributing Zone.
Obtain written approval from the Engineer for all on or off right of way PSLs not specifically addressed in the plans. Provide a signed SW3P sketch of the location 30 business days prior to use of the PSL. Include a list of materials, equipment and portable facilities that will be stored at the PSL.

PSL in USACE Jurisdictional Area.
Do not initiate activities in a PSL associated with a U.S. Army Corps of Engineers (USACE) jurisdictional area that have not been previously evaluated by the USACE as part of the permit review of this project. Such activities include, but are not limited to, haul roads, equipment staging areas, borrow and disposal sites. Associated defined here means materials are delivered to or from the PSL. The jurisdictional area includes all waters of the U.S. including wetlands or associated wetlands affected by activities associated

with this project. Special restrictions may be required for such work. Consult with the USACE regarding activities, including PSLs that have not been previously evaluated by the USACE. Provide the Department with a copy of all USACE coordination and approvals before initiating activities.

Proceed with activities in PSLs that do not affect a USACE jurisdictional area if self-determination has been made that the PSL is non-jurisdictional or proper clearances have been obtained in USACE jurisdictional areas or have been previously evaluated by the USACE as part of the permit review of this project. Document any determinations that PSL activities do not affect a USACE jurisdictional area. Maintain copies of PSL determinations for review by the Department or any regulatory agency. The Contractor must document and coordinate with the USACE, if required, before any excavation material hauled from or embankment material hauled into a USACE jurisdictional area by either (1) or (2) below.

1. **Restricted Use of Materials for the Previously Evaluated Permit Areas.** When an area within the project limits has been evaluated by the USACE as part of the permit process for this project:
    a. suitable excavation of required material in the areas shown on the plans and cross sections as specified in Standard Specification Item 110, Excavation is used for permanent or temporary fill within a USACE jurisdictional area;

    b. suitable embankment from within the USACE jurisdictional area is used as fill within a USACE evaluated area;

    c. Unsuitable excavation or excess excavation that is disposed of at an approved location within a USACE evaluated area.

2. **Contractor Materials from Areas Other than Previously Evaluated Areas.** Provide the Department with a copy of all USACE coordination and approvals before initiating any activities in a jurisdictional area within the project limits that has not been evaluated by the USACE or for any off right of way locations used for the following, but not limited to, haul roads, equipment staging areas, borrow and disposal sites:

    a. Standard Specification Item 132, Embankment is used for temporary or permanent fill within a USACE jurisdictional area;

    b. Unsuitable excavation or excess excavation that is disposed of outside a USACE evaluated area.

Work over or near Bodies of Water (lakes, rivers, ponds, creeks, dry waterways, etc.).

Keep on site a universal spill kit adequate for the body of water and the work being performed. Debris is not allowed to fall into a body of-water.. Debris that falls into the floodway must be removed at the end of each work week or prior to a rain event. This work is subsidiary.

Migratory Birds and Bats.

Migratory birds and bats may be nesting within the project limits and concentrated on roadway structures such as bridges and culverts. Remove all old and unoccupied migratory bird nests from any structures, trees, etc. between September 16 and February 28. Prevent migratory birds from re-nesting between March 1 and September 15. Prevention shall include all areas within 25 ft. of proposed work. All methods used for the removal of old nesting areas and the prevention of re-nesting must be submitted to TxDOT 30 business days prior to begin work. This work is subsidiary.

If active nests are encountered on-site during construction, all construction activity within 25 ft. of the nest must stop. Contact the Engineer to determine how to proceed.

No extension of time or compensation payment will be granted for a delay or suspension of work caused by migratory birds or bats. This work is subsidiary.

Law Enforcement Personnel.

Submit charge summary and invoices using the Department forms.

Patrol vehicles must be clearly marked to correspond with the officer's agency and equipped with appropriate lights to identify them as law enforcement. For patrol vehicles not owned by a law enforcement agency, markings will be retroreflective and legible from 100 ft. from both sides and the rear of the vehicle. Lights will be high intensity and visible from all angles.

No payment will be made for law enforcement personnel needed for moving equipment or payment for drive time to/from the event site.

If the Contractor has a field office, provide an office location for a supervisory officer when event requires a supervising officer. This work is subsidiary.

A maximum combined rate of $70 per hour for the law enforcement personnel and the patrol vehicle will be allowed. Any scheduling fee is subsidiary per Standard Specification 502.4.2.

Cancel law enforcement personnel when the event is canceled. Cancellation, minimums or “show up” fees will not be paid when cancellation is made 12 hours prior to beginning of the event. Failure to cancel within 12 hours will not be cause for payment for cancellation, minimums, or "show up" time. Payment of actual “show up” time to the event site due to cancellation will be on a case-by-case basis at a maximum of 2 hours per officer. Contractor must use CTRMA provided form to be reimbursed.

Alterations to the cancellation and maximum rate must be approved by the Engineer or pre-determined by official policy of the officers governing authority.

Back Up Alarm.
For hours 9 P to 5 A, utilize a non-intrusive, self-adjusting noise level reverse signal alarm. This is not applicable to hotmix or seal coat operations. This is subsidiary.

ITEM 8 – PROSECUTION AND PROGRESS
Work Shall be completed within 20 working days of the issuance of Notice to Proceed. Contract time charges will be accrued through the Contractor’s completion of the final punch list.

Working days will be charged based on a standard workweek. Working days will be charged Monday through Friday, excluding national or state holidays, if weather or other conditions permit the performance of the principal unit of work underway, as determined by the Engineer, for a continuous period of at least 7 hr. between 7:00 A.M. and 6:00 P.M., unless otherwise shown in the Contract. The Contractor has the option of working on Saturdays or state holidays. Provide sufficient advance notice to the Engineer when scheduling work on Saturdays. Work on Sundays and national holidays will not be permitted without written permission of the Engineer. If work requiring an Inspector to be present is performed on a Saturday, Sunday, or holiday, and weather or other conditions permit the performance of work for 7 hr. between 7:00 A.M. and 6:00 P.M., a working day will be charged.

Work is allowed to be performed during the nighttime, with prior approval, per Article 8.3. Electronic versions of schedules will be saved in native format and delivered in both native and PDF formats.

Provide via email work week look-ahead schedule in Gantt chart format. Submit weekly prior to the project meeting or by noon on Friday, whichever comes first. Designate each activity as night or day shift and include the name of the foreman or contractor. The chart shall have a specific section dedicated solely to lane closures and detours. Each lane closure and detour shall be an individual item on the schedule.

Maintain a Project Fact Sheet to be reviewed and distributed by the Mobility Authority. Update the fact sheet monthly and submit via email to the Engineer by 10th day of each month. Include a supplemental sheet with pictures of previous month’s major items and description of the work shown in the picture. The fact sheet template will be provided by the Mobility Authority.

Lane Closure Assessments will be assessed as shown in the **Table 1** below.

Any unauthorized lane closures will result in an assessment to the Contractor of $1,000 per lane per hour or the assigned LCA in the Table, whichever is the higher amount.

All Lane Closure Assessments for the Contractor will be added or subtracted from the value of the Payment Application for that associated period.

Table 1 Lane Closure Assessment Rates

Late Charges (Per Lane)				
Lane Rental Period	**SH 45 Mainlanes and Ramps**		**FM 1626 Mainlanes and Ramps**	
	Lane	**Shoulder**	**Lane**	**Shoulder**
0-15 Minutes	$1,000	$1,000	$1,000	$1,000
15-30 Minutes	$2,000	$2,000	$2,000	$2,000
30-45 Minutes	$3,000	$3,000	$3,000	$3,000
45-60 Minutes	$4,000	$4,000	$4,000	$4,000
Every Additional 15-Minute Interval after 1-Hour	$2,000	$2,000	$2,000	$2,000

For example: If the contractor has one southbound lane of traffic closed on FM 1626 until Monday at 5:32 a.m., the contractor is 32 minutes outside of the allowable lane closure period. The late charges will be accrued as follows:

1 lane closed × [$1,000 + $1,000 + $1,000] = $3,000

Emergency lane closures are not subject to lane closure charge assessments. Emergency lane closures are defined as closures caused by circumstances other than those caused by the contractor and shall be approved by the authority.

Refer to Table 2. Allowable Lane Closure of Item 502 – Barricades, Signs, and Traffic Handling for available lane closure times.

Lane Closure Assessments will apply to the shoulder of the main lane and general-purpose lanes.

ITEM 9 – MEASURMENT AND PAYMENT

Provide full-time, off duty, uniformed, certified peace officers in officially marked vehicles, as part of traffic control operations, as directed by the Engineer.

Show proof of certification by the Texas Commission on Law Enforcement Standards.

No payment will be made for peace officers unless the Contractor completes the proper Department tracking form. Submit invoices that agree with the tracking form for payment at the end of each month, when approved services were provided. Request the tracking form from the Department.

No payment for officers used for moving equipment without prior written approval.

Cancel “Off-Duty” Peace Officers and their Motor Vehicle Units when the Scheduled lane closures are canceled. Failure to cancel the Off-Duty Officers and their respective Motor Vehicle Units will not be the cause for payment, by Mobility Authority, for “Show Up” time.

ITEM 134 - BACKFILLING PAVEMENT EDGES

If seal coat is final surface, install backfill prior to placing seal coat.

For all backfill, compact using a light pneumatic roller, install at 3:1 slope to tie into existing terrain, and apply at rate of 0.12 GAL/SY a typical erosion control material per Item 300.

For TY A backfill, furnish flexible base meeting the requirement for any type or grade, except Grade 4, in accordance with Item 247.

Compressive strengths and wet ball mill for flexible base are waived for this item. Alternate materials include RAP, salvaged material from Item 105, and salvaged material from Item 351. The alternate materials are not required to be tested but visually verified as 100% passing a 2.5 in. sieve.

ITEM 300s – ASPHALTS, OILS, AND EMULSIONS

Asphalt season is May 1 thru September 15. Emulsified Asphalt season is April 1 thru October 15.

ITEM 351 – FLEXIBLE PAVEMENT STRUCTURE REPAIR

Use materials and lift thickness per SS3076. Type C and D mixes will receive an underseal per SS 3085 if the repair surface is the final surface. This work is subsidiary.

Unless otherwise shown on the plans, use the following for repairs:
Type C and D mix will use PG 76 -22 and will be placed with a paver.
Type B mix will use PG 64 -22 and may use a blade to place the mix.
For up to 2 in. deep repairs use Type D PG 76-22 SAC B.
For up to 6 in. deep repairs use Type C PG 76-22 SAC B.
For greater than 6 in. deep repairs use 2 in. Type C or D surface and Type B for the bottom lifts.
For greater than 6 in. deep repairs will be milled then overlaid, adjust the depth of the Type C or D to provide Type C or D to a depth 1.5 in. below the bottom of the milling.

ITEM 354 - PLANING AND TEXTURING PAVEMENT

Contractor retains ownership of salvaged materials.
Unless shown on the plans, mill and resurface the work area during each shift on roadways with ADT greater than 20,000 or if milling will expose the flex base or subgrade per the typical section. Unless shown on the plans, mill and resurface a work area within 5 days for roadways with ADT 20,000 or less.
Taper permanent transverse faces 50 ft. per 1 in. Taper temporary transverse faces 25 ft. per 1 in. Taper permanent longitudinal faces 6 ft. per 1 in. HMA may be used as temporary tapers. Provide minimum 1 in. butt joints at bridge ends and paving ends. This work is subsidiary.

Milled surfaces directly covered by a mat thickness of 1 in. or less shall produce a milled texture with a ridge to valley depth (RVD) no greater than 0.25 in. (6.5 mm).

Micro-milling equipment may use a drum narrower than 12 ft.

ITEMS 347/3081 - THIN OVERLAY MIXTURES (TOM)

For SAC A, blending SAC B aggregate with an RSSM greater than the SAC A rating or 10, whichever is greater, is prohibited.
Furnish non-tracking tack coat or tack applied using a Spray Paver.

When using a Thermal Imaging System follow the Weather Condition requirements for When Not Using a Thermal Imaging System.

Produce mixture with a Department approved WMA additive or process to facilitate compaction when the haul distance is greater than 40 miles or when the air temperature is 70°F and falling. WMA processes such as water or foaming processes are not allowed under these circumstances.

Water flow rate will exceed 120 seconds when tested using Tex-246-F. Perform water flow rate testing once per lot.

ITEM 502 - BARRICADES, SIGNS, AND TRAFFIC HANDLING

Table 2

Roadway	Limits	Allowable Closure Time
45SW	Loop 1 to FM 1626	9 P to 5 A
FM 1626	Lakewood Drive to Big Valley Drive	9 P to 5 A
All	Within 200' of a signalized intersection	9 P to 5 A
All	All (Full Closure, see allowable work below)	11 P to 4 A

Table 2 (Mobile Operations)

Roadway	Allowable Sun Night thru Fri Noon	Allowable Sat thru Sun Morn
Within Austin City Limits	10 A to 2 P and 7 P to 6 A	7 P to 10 A
Outside Austin City Limits	9 A to 3 P and 7 P to 7 A	6 P to 11 A

For roadways without defined allowable closure times, nighttime lane closures will be allowed from 8 P to 5 A.

Unless stated, daytime or Friday night lane closures will not be allowed and one lane in each direction will remain open at all times for all roadways

Full closures only allowed for roadways with frontage roads or if a designated detour route is provided in the plans.

No closures will be allowed on the weekends, working day prior, and working day after the National Holidays defined in the Standard Specifications, Good Friday, and Easter weekend.
No closures will be allowed 1 P.M. to 11 P.M. the Sunday of the Super Bowl. No closures will be allowed on Friday and the weekends for Formula 1 at Circuit of the Americas, Austin City Limits Fest, South by Southwest, Republic of Texas Rally, UT home football games, Rodeo Austin, State of Texas sales tax holiday, or other special events that could be impacted by the construction. All lanes will be open by noon of the day before these special events.
To account for directional traffic volumes, begin and end times of closures may be shifted equally by the Engineer. The closure duration will remain. Added compensation is not allowed.

Submit an emailed request for a lane closure (LCN) to the Mobility Authority/TxDOT. The email will be submitted in the format provided by the Mobility Authority. Receive concurrence prior to implementation. Submit a cancellation of lane closures a minimum of 18 hours prior to implementation. Blanket requests for extended periods are not allowed. Max duration of a request is 2 weeks prior to requiring resubmittal. Provide 2-hour notice prior to implementation and immediately upon removal of the closure.

Time charges will not be suspended during the large and special events listed below. These events are provided in the contract to allow scheduling of work around these lane closure restrictions.

All lanes will be open by noon of the day before the large events listed in below table. No closures will be allowed on Friday and the weekends for projects within 20 miles of these large events:

Table 3 (Large Events)

Event	City	Dates
Formula 1 @ COTA	Austin	Annually (See Event Website)
Moto GP @ COTA	Austin	Annually (See Event Website)
ACL Fest	Austin	Annually (See Event Website)
SXSW	Austin	Annually (See Event Website)
ROT Rally	Bastrop	Annually (See Event Website)
UT Football Games	Austin	Annually (See Event Website)
Sales Tax Holiday	All	Annually (See Event Website)
Rodeo Austin	Austin	Annually (See Event Website)

All lanes will be open by noon of the day before the special events listed in below table. No closures will be allowed on Friday and the weekends for projects within 10 miles of these special events:

Table 4 (Special Events)

Event	City
Wiener Dog Races	Buda
Founders Day Festival	Dripping Springs
Christmas on Mercer	Dripping Springs
Christmas Nights of FBG Lights	Fredericksburg
Lady of Guadalupe Procession	Fredericksburg
Eaker BBQ Competition	Fredericksburg
Founders Day Ceremony	Fredericksburg
Crawfish Festival	Fredericksburg
Red Poppy Festival	Georgetown
Wine and Music Festival	Georgetown
Fair and Rodeo	Liberty Hill
Lakefest Boat Races	Marble Falls
Pie in the Sky	Kyle
Texas State Graduation Fall	San Marcos
Texas State Graduation Spring	San Marcos

All the large and special events listed in the above tables occur annually. Coordinate with the Department and review the city/event website to plan around the future events.
No closures will be allowed during the upcoming eclipses on April 8, 2024. All lanes will be open from noon April 5th to noon April 9th. Time charges will not be suspended during this event.

To account for directional traffic volumes, begin and end times of closures may be shifted equally by the Engineer. The closure duration will remain. Added compensation is not allowed.

One-way traffic control, including work performed under Item 510, must be set up to provide a maximum of 20 minutes of delay to the traveling public.

Submit an emailed request for a lane closure (LCN) to the Engineer. Receive concurrence prior to implementation. Submit a cancellation of lane closures a minimum of 18 hours prior to implementation. Blanket requests for extended periods are not allowed. Max duration of a request is 2 weeks prior to requiring resubmittal.

Provide 2-hour notice prior to implementation and immediately upon removal of the closure.

For roadways listed in Table 1: Submit the request 96 hours prior to implementation.

For roadways not listed in Table 1: Submit the request a minimum of 48 hours prior to the closure and by the following deadline immediately prior to the closure: 11A on Tuesday or 11A on Friday.
For all roadways: Submit request for traffic detours and full roadway closures 168 hours prior to implementation. Submit request for nighttime work 96 hours to implementation date.

Cancellations of accepted closures (not applicable to full closures or detours) due to weather will not require resubmission in accordance with the above restrictions if the work is completed during the next allowable closure time.

Closures that conflict with adjacent contractor will be prioritized according to critical path work per latest schedule. Conflicting critical path or non-critical work will be approved for first LCN submitted. Denial of a closure due to prioritization or other reasons will not be reason for time suspension, delay, overhead, etc.

Meet with the Engineer prior to lane closures to ensure that sufficient equipment, materials, devices, and workers will be used. Take immediate action to modify current and future traffic control, if at any time the queue becomes greater than 20 minutes.

Consider inclement weather prior to implementing the lane closures. Do not set up traffic control when the pavement is wet.

Cover, existing small, large, and overhead signs that conflict with traffic control. Cover large and overhead signs to remain using latest standard TS-CD. This work is subsidiary.

Install all permanent signs, delineation, and object markers required for the operation of the roadway before opening to traffic. Use of temporary mounts is allowed or may be required until the permanent mounts are installed or not impacted by construction. Maintain the temporary mounts. This work is subsidiary.

Edge condition treatment types must be in accordance with the TxDOT standard. Installation and removal of a safety slope is subsidiary.

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

ITEM 506 - TEMPORARY EROSION, SEDIMENTATION, AND ENV CONTROLS

If SW3P plan sheets are not provided, place the control measures as directed.
Install, maintain, remove control measures in areas of the right of way utilized by the Contractor that are outside the limits of disturbance required for construction. Permanently stabilize the area. This work is subsidiary.

ITEM 585 - RIDE QUALITY FOR PAVEMENT SURFACES

Use Surface Test Type B Pay Schedule 3 to evaluate ride quality of travel lanes, in accordance with Item 585, "Ride Quality for Pavement Surfaces."

ITEMS 600s & 6000s –LIGHTING, SIGNING, MARKINGS, AND SIGNALS

Use materials from Material Producer List as shown on the TxDOT website (TxDOT.gov > Business > Resources). Furnish new material as required per Standard Specification.Meet the requirements of the NEC, Texas MUTCD, TxDOT standards, and TxDOT Standard Specifications. Notify the Engineer if existing elements to remain do not meet code or specification.

ITEM 658 – DELINEATOR AND OBJECT MARKER ASSEMBLIES

Installation and maintenance of portable CTB reflectors will be subsidiary to the barrier.
Flexible posts YFLX and WFLX must be tubular in shape. The "flat" flexible posts are not allowed.
CTB delineators must be placed on top of the CTB.
Notify the Engineer at least 24 hours in advance of installing delineator assemblies. Obtain approval by the Engineer of delineator locations before placement.

ITEM 662, 666, & 672 - PAVEMENT MARKINGS & MARKERS

Notify the Engineer at least 24 hours in advance of removing existing striping and placing pavement markings & markers.

Apply markings during good weather unless otherwise directed. If markings are placed at Contractor's option, when inclement weather is impending, and the markings are damaged by subsequent precipitation, the Contractor is responsible for all costs associated with replacing the markings.

Unless the striping design differs from the existing striping location, place the new striping to match the existing striping.

Reference the following As-Built Plans for additional information on striping layouts:

SH45SW: CSJ 1200-07-001.

Proposed crosswalk markings shall be the High-Visibility Longitudinal Crosswalk pattern in accordance with TxDOT Standard PM(4)-20.

ITEM 662 - WORK ZONE PAVEMENT MARKINGS

Notify the Engineer at least 24 hours in advance of work for this item.
Maintain removable and short-term markings daily. Remove within 48 hours after permanent striping has been completed.
Foil backed pavement markings will not be allowed.

Work zone pavement markings shall be replaced at the Contractor's expense in the event that 14 days has expired since the application of the surface treatment or permanent pavement markings.

Item 668 is not allowed for use as Item 662.

ITEM 666 - RETROREFLECTORIZED PAVEMENT MARKINGS
Notify the Engineer at least 24 hr. before beginning work.

Place longitudinal markings nightly for roadways with AADT greater than 100,000. Replace missing or damaged tabs nightly. If using tabs, place longitudinal markings weekly by 5 AM Friday for all weekday work and by 5 AM Monday for all weekend work. Failure to maintain tabs or place longitudinal markings by deadline will require nightly placement of longitudinal markings.

Place longitudinal markings no later than 7 calendar days after placement of the surface for roadways with AADT greater than 20,000.
Place longitudinal markings within 10 calendar days of placing surface for roadways with ADT greater than 5,000.
Pavement Sealer will cure 48 hours prior to placing TY I markings. Roadway surface will cure 72 hours prior to placing TY I.

When the raised portion of a profile marking is placed as a separate operation from the pavement marking, the raised portion must be placed first then covered with TY I.

When using black shadow to cover existing stripe apply a non-retroreflective angular abrasive bead drop. The marking color shall be adjusted to resemble the pavement color. If Item 677 is not used prior to placement of black shadow, scrape the top of the marking with a blade or large piece of equipment unless surface is a seal coat. The scraping of the marking is subsidiary.

Placement of markings using mobile operations will be limited to non-peak hours.

ITEM 677 - ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS
Notify the Engineer at least 24 hours in advance of work for this item.

Removal of pavement markers and markings on asphalt surfaces to be overlayed is subsidiary to Item 3081.

Remove and dispose of off the ROW any existing raised pavement markers and pavement markings before beginning surfacing operations. Remove the existing traffic buttons and pavement markers, daily, as work progresses and as directed. This work is subsidiary.

Elimination using a pavement marking will not be allowed in lieu of methods listed in specification.

Remove pavement markings on concrete surfaces by a blasting method. Flail milling will be allowed when total quantity of removal on concrete surfaces is less than 1000 ft.

ITEM 3084 – BONDING COURSE
The minimum application rates are listed in Table BC. Miscellaneous Tack is allowed for use with dense-graded Type B HMA. If a tack bid item is not provided, use bonding course item.

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

Table BC

Material	Minimum Application Rate (gal. per square yard)
Tracking-Resistant Asphalt Interlayer	0.06
Spray Applied Underseal Membrane	0.10

Table BCS (For Informational Tests)

Material	Target Shear Bond Strength (Tex-249-F psi)
SMA – Stone-Matrix Asphalt	60.0
PFC – Permeable Friction Course	N/A
All Other Materials	40.0

ITEM 6001 – PORTABLE CHANGEABLE MESSAGE SIGN

Provide 2 "Electronic" Portable Changeable Message Sign(s) (EPCMS) as part of the traffic control operations and provide another one that is available to utilize when a backup is needed. Consider the one designated for backup as subsidiary to the various Items of the project. All EPCMS will be exclusive to this project, unless otherwise approved. Placement location and message as directed.

Place appropriate number of "Electronic" Portable Changeable Message Signs (EPCMS) at locations requiring lane closures for one-week prior to the closures, or as directed. Obtain approval for the actual message that will appear on the boards. If more than two phases of a message are required per board, provide additional EPCMS's to meet the two-phases-per-board requirement. Provide a replacement within 12 hours. EPCMS will be available for traffic control, event notices, roadway conditions, service announcements, etc.

ITEM 6185 – TRUCK MOUNTED ATTENUATOR AND TRAILER ATTENUATOR

The TMA/TA shall be used when installing and removing TCP setup. The same TMA/TA used for the TCP installation/removal shall be used and paid in the same manner as the TCP setup.

The contractor will be responsible for determining if one or more operations will be ongoing at the same time to determine the total number of TMA/TA required for the work.

TMA/TAs used to protect damaged attenuators will be paid by the day using the force account item for the repair.

Shadow Vehicle with TMA is required for setup/removal of traffic control devices.

Central Texas Regional Mobility Authority

SH 45SW/FM 1626 – TRAVIS/HAYS COUNTY OVERLAY PROJECT

CTRMA CONTRACT NO. 2445SW10601M

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SPECIFICATION LIST

PREFACE:

The "Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges" of the Texas Department of Transportation, 2014, as amended and augmented by the Supplemental Specifications following, shall govern the performance of the Contract. These specifications hereby are made a part of the Contract as fully and with the same effect as if set forth at length herein.

Attention is directed to the fact that any other documents printed by the Texas Department of Transportation modifying or supplementing said "Standard Specifications", such as Standard Supplemental Specifications, Special Provisions (by the Department), Notice to Bidders, etc., do not form a part of this Contract nor govern its performance, unless specifically so-stated in the Supplemental Specifications herein contained.

Attention is directed to the use of “Proposal” in standard TxDOT documents included in this contract (Standard Specifications, Special Provisions, & Special Specifications) is equivalent to “Bid” in the Mobility Authority's documents. This shall be accounted for when working contract documents prepared by the Mobility Authority with those standards prepared by TxDOT.

Attention is directed to the use of “Department” in standard TxDOT documents included in this contract (Standard Specifications, Special Provisions, & Special Specifications) is equivalent to “Mobility Authority” in the Mobility Authority's documents.

References made to specific section numbers in these Special Provisions, or in any of the various documents which constitute the complete Contract Documents, shall, unless otherwise denoted, be construed as referenced to the corresponding section of the "Standard Specifications" issued by the Texas Department of Transportation in 2014.

CONTROL :
CTRMA CONTRACT NO :

24-45SW-106-01-M

HIGHWAY : 45SW TOLL

COUNTY : TRAVIS, HAYS

CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY GOVERNING SPECIFICATIONS AND SPECIAL PROVISIONS

(STANDARD SPECIFICATIONS, SPECIAL PROVISIONS, AND SPECIAL SPECIFICATIONS)

WHERE DISCREPANCIES OCCUR BETWEEN THE TECHNICAL SPECIFICATIONS, THE FOLLOWING DESCENDING ORDER OF PRIORITY SHALL GOVERN: (1) SPECIAL CONDITIONS, (2) SPECIAL PROVISIONS TO SPECIAL SPECIFICATIONS, (3) SPECIAL SPECIFICATIONS, (4) SPECIAL PROVISIONS, AND (5) STANDARD SPECIFICATIONS.

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

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

ITEMS 1-9 GENERAL REQUIREMENTS AND COVENANTS

ITEM 134 BACKFILING PAVEMENT EDGES

ITEM 300 ASPHALTS, OILS, AND EMULSIONS

ITEM 320 EQUIPMENT FOR ASPHALT CONCRETE PAVEMENT (210)(504)(520)

ITEM 351 FLEXIBLE PAVEMENT STRUCTURE REPAIR

ITEM 354 PLANING AND TEXTURING PAVEMENT

ITEM 500 MOBILIZATION

ITEM 502 BARRICADES, SIGNS, AND TRAFFIC HANDLING

ITEM 506 TEMPORARY EROSION, SEDIMENTATION, AND ENVIRONMENTAL CONTROLS

ITEM 585 RIDE QUALITY FOR PAVEMENT SURFACES

ITEM 658 DELINEATORS AND OBJECT MARKER ASSEMBLIES

ITEM 662 WORK ZONE PAVEMENT MARKINGS (666)(672)(677)

ITEM 666 RETROREFLECTORIZED PAVEMENT MARKINGS (316)(502)(662)(677)(678)

ITEM 672 RAISED PAVEMENT MARKERS (677)(678)

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

SPECIAL PROVISION TO ITEM 000 (000---002---RMA)

SPECIAL PROVISION TO ITEM 000 (000---008)

SPECIAL PROVISION TO ITEM 000 (000---011---RMA)

SPECIAL PROVISION TO ITEM 000 (000---659)

SPECIAL PROVISION TO ITEM 000 (000---954---RMA)

SPECIAL PROVISION TO ITEM 001 (001---001---RMA)

SPECIAL PROVISION TO ITEM 002 (002---005---RMA)

SPECIAL PROVISION TO ITEM 002 (002---015)

SPECIAL PROVISION TO ITEM 003 (003---005---RMA)

SPECIAL PROVISION TO ITEM 003 (003---011)

SPECIAL PROVISION TO ITEM 004 (004---001---RMA)

SPECIAL PROVISION TO ITEM 005 (005---001---RMA)

SPECIAL PROVISION TO ITEM 005 (005---002)

SPECIAL PROVISION TO ITEM 005 (005---003)

SPECIAL PROVISION TO ITEM 006 (006---001---RMA)

SPECIAL PROVISION TO ITEM 006 (006---001)

SPECIAL PROVISION TO ITEM 006 (006---012)

SPECIAL PROVISION TO ITEM 007 (007---003---RMA)

SPECIAL PROVISION TO ITEM 007 (007---004)

SPECIAL PROVISION TO ITEM 007 (007---008)

SPECIAL PROVISION TO ITEM 007 (007---011)

SPECIAL PROVISION TO ITEM 008 (008---002---RMA)

SPECIAL PROVISION TO ITEM 008 (008---009---RMA)

SPECIAL PROVISION TO ITEM 008 (008---030)

SPECIAL PROVISION TO ITEM 008 (008---033)

SPECIAL PROVISION TO ITEM 009 (009---001---RMA)

SPECIAL PROVISION TO ITEM 009 (009---011)

SPECIAL PROVISION TO ITEM 300 (300---020)

SPECIAL PROVISION TO ITEM 502 (502---008)

SPECIAL PROVISION TO ITEM 502 (506---002)

SPECIAL PROVISION TO ITEM 666 (666---007)

SPECIAL SPECIFICATIONS:

ITEM 3076 DENSE-GRADED HOT-MIX ASPHALT

ITEM 3081 THIN OVERLAY MIXTURE

ITEM 3084 BONDING COURSE

ITEM 3096 ASPHALTS, OILS, AND EMULSIONS

ITEM 6001 PORTABLE CHANGEABLE MESSAGE SIGN

ITEM 6185 TRUCK MOUNTED ATTENUATOR AND TRAILER ATTENUATIOR

GENERAL:

THE ABOVE-LISTED SPECIFICATION ITEMS ARE THOSE UNDER WHICH PAYMENT IS TO BE MADE. THESE, TOGETHER WITH SUCH OTHER PERTINENT ITEMS, IF ANY, AS MAY BE REFERRED TO IN

THE ABOVE-LISTED SPECIFICATION ITEMS, AND INCLUDING THE SPECIAL PROVISIONS LISTED ABOVE, CONSTITUTE THE COMPLETE SPECIFICATIONS FOR THIS PROJECT.

Special Provision to Item 000
Nondiscrimination

1. DESCRIPTION

The Contractor agrees, during the performance of the service under this Agreement, that the Contractor shall provide all services and activities required in a manner that complies with the Civil Rights Act of 1964, as amended, the Rehabilitation Act of 1973, Public Law 93-1122, Section 504, the provisions of the Americans with Disabilities Act of 1990, Public Law 101-336 (S.933], and all other federal and state laws, rules, regulations, and orders pertain to equal opportunity in employment, as if the Contractor were an entity bound to comply with these laws. The Contractor shall not discriminate against any employee or applicant for employment based on race, religion, color, sex, national origin, age or handicapped condition.

2. DEFINITION OF TERMS

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

3. NONDISCRIMINATION PROVISIONS

During the performance of this Contract, the Contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "Contractor") agrees as follows:

3.1. **Compliance with Regulations**. The Contractor (hereinafter includes consultants) will comply with the Acts and the Regulations relative to Nondiscrimination in Federally-assisted programs of the U.S. Department of Transportation, the Federal Highway Administration, as they may be amended from time to time, which are herein incorporated by reference and made a part of this Contract.

3.2. **Nondiscrimination**. The Contractor, with regard to the work performed by it during the Contract, will not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The Contractor will not participate directly or indirectly in the discrimination prohibited by the Acts and the Regulations, including employment practices when the Contract covers any activity, project, or program set forth in Appendix B of 49 CFR Part 21.

3.3. **Solicitations for Subcontracts, Including Procurements of Materials and Equipment:** In allsolicitations, either by competitive bidding, or negotiation made by the Contractor for work to be performed under a subcontract, including procurements of materials, or leases of equipment, each potential subcontractor or supplier will be notified by the Contractor of the Contractor's obligations under this Contract and the Acts and the Regulations relative to Nondiscrimination on the grounds of race, color, or nationalorigin.

3.4. **Information and Reports:** The Contractor will provide all information and reports required by the Acts, the Regulations, and directives issued pursuant thereto and will permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Recipient or the Federal Highway Administration to be pertinent to ascertain compliance with such Acts, Regulations, and instructions. Where any information required of a Contractor is in the exclusive possession of another who fails or refuses to furnish the information, the Contractor will so certify to the Recipient or the Federal Highway Administration, as appropriate, and will set forth what efforts it has made to obtain the information.

3.5. **Sanctions for Noncompliance**. In the event of a Contractor's noncompliance with the Nondiscrimination provisions of this Contract, the Recipient will impose such Contract sanctions as it or the Federal Highway Administration may determine to be appropriate, including, but not limited to:

- withholding payments to the Contractor under the Contract until the Contractor complies, and/or
- cancelling, terminating, or suspending a Contract, in whole or in part.

3.6. **Incorporation of Provisions**. The Contractor will include the provisions of paragraphs (3.1) through (3.6) in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Acts, the Regulations, and directives issued pursuant thereto. The Contractor will take action with respect to any subcontract or procurement as the Recipient or the Federal Highway Administration may direct as a means of enforcing such provisions including sanctions for noncompliance. Provided, that if the Contractor becomes involved in, or is threatened with litigation by a subcontractor, or supplier because of such direction, the Contractor may request the Recipient to enter into any litigation to protect the interests of the Recipient. In addition, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.

4. PERTINENT NONDISCRIMINATION AUTHORITIES:

During the performance of this Contract, the Contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "Contractor") agrees to comply with the following nondiscrimination statutes and authorities; including but not limited to:

4.1. Title VI of the Civil Rights Act of 1964 (42 U.S.C. § 2000d et seq., 78 stat. 252), (prohibits discrimination on the basis of race, color, national origin); and 49 CFR Part 21.

4.2. The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (42 U.S.C. § 4601), (prohibits unfair treatment of persons displaced or whose property has been acquired because of Federal or Federal-aid programs and projects);

4.3. Federal-Aid Highway Act of 1973, (23 U.S.C. § 324 et seq.), (prohibits discrimination on the basis of sex);

4.4. Section 504 of the Rehabilitation Act of 1973, (29 U.S.C. § 794 et seq.), as amended, (prohibits discrimination on the basis of disability); and 49 CFR Part 27;

4.5. The Age Discrimination Act of 1975, as amended, (42 U.S.C. § 6101 et seq.), (prohibits discrimination on the basis of age);

4.6. Airport and Airway Improvement Act of 1982, (49 U.S.C. § 4 71, Section 4 7123), as amended, (prohibits discrimination based on race, creed, color, national origin, or sex);

4.7. The Civil Rights Restoration Act of 1987, (PL 100-209), (Broadened the scope, coverage and applicability of Title VI of the Civil Rights Act of 1964, The Age Discrimination Act of 1975 and Section 504 of the Rehabilitation Act of 1973, by expanding the definition of the terms "programs or activities" to include all of the programs or activities of the Federal-aid recipients, subrecipients and Contractors, whether such programs or activities are Federally funded or not);

4.8. Titles II and III of the Americans with Disabilities Act, which prohibit discrimination on the basis of disability in the operation of public entities, public and private transportation systems, places of public accommodation, and certain testing entities (42 U.S.C. §§ 12131-12189) as implemented by Department of Transportation regulations at 49 C.F.R. parts 37 and 38;

4.9. The Federal Aviation Administration's Nondiscrimination statute (49 U.S.C. § 47123) (prohibits discrimination on the basis of race, color, national origin, and sex);

4.10. Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which ensures discrimination against minority populations by discouraging programs,

policies, and activities with disproportionately high and adverse human health or environmental effects on minority and low-income populations;

4.11. Executive Order 13166, Improving Access to Services for Persons with Limited English Proficiency, and resulting agency guidance, national origin discrimination includes discrimination because of limited English proficiency (LEP). To ensure compliance with Title VI, you must take reasonable steps to ensure that LEP persons have meaningful access to your programs (70 Fed. Reg. at 74087 to 74100);

4.12. Title IX of the Education Amendments of 1972, as amended, which prohibits you from discriminating because of sex in education programs or activities (20 U .S.C. 1681 et seq).

Special Provision to Item 000
Special Labor Provisions for State Projects

1. GENERAL

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

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

2. MINIMUM WAGES, HOURS AND CONDITIONS OF EMPLOYMENT

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

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

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

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

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

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

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

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

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

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

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

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

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

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

3. RECORD AND INSPECTIONS

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

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

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

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

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

Special Provision to Item 000
Buy America

Steel and iron products to be incorporated into the project must be of domestic origin. All manufacturing processes for steel and iron products to be incorporated into the project must take place domestically, including donated material.

Reminders:

Depending on the Steel/iron item received at the project, described below are the requirements for acceptance.

1. **Steel and Iron Items Inspected and Tested by CSTIM&P**

- The project engineer receives CST/M&P Structural Test Reports as proof of compliance with the requirements of the specification.
- CST/M&P obtains from the supplier a completed Form 1818 (D-9-USA-1), "Material Statement" with attached MTRs, certifications, galvanizing reports, etc.

2. **Steel and Iron Items Received and Sampled by the Project Engineer for Testing by CSTIM&P**

- The project engineer submits samples with the required documentation obtained from the supplier (completed Form 1818 (D-9-USA-1) with attached MTRs, certifications, galvanizing reports, etc.) to CST/M&P for testing.
- CSTM&P issues a CST/M&P General Test Report for all passing material (proof of compliance with the requirements of the specifications).

3. **Steel and Iron Items Received, Inspected, and Accepted by the Project Engineer**

- The project engineer obtains from the supplier the completed Form 1818 (D-9-USA-1) with attached MTRs, certifications, galvanizing reports, etc.
- CST/M&P assists the project engineer when requested.

4. **Steel and Iron Items Received from Regional or District Warehouse (Pretested) Stock**

- The project engineer obtains documentation verifying the material was obtained from a regional or district warehouse.
- CSTM&P, when requested to inspect and test, obtains from the supplier the completed Form 1818 (D-9-USA-1) with attached MTRs, etc.

Special Provision 000
Notice of Contractor Performance Evaluations

1. GENERAL

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

2. DEFINITIONS

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

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

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

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

3. CONTRACTOR EVALUATIONS

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

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

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

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

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

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

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

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

4. DIVISION OVERSIGHT

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

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

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

5. PERFORMANCE REVIEW COMMITTEE

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

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

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

6. APPEALS PROCESS

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

Special Provision 000
Certificate of Interested Parties (Form 1295)

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

- at contract execution for contracts awarded by the Mobility Authority (if requested);
- at any time there is an increase of $300,000 or more to an existing contract (change orders, extensions, and renewals); or
- at any time there is a change to the information in Form 1295, when the form was filed for an existing contract.

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

Special Provision to Item 1
Abbreviations and Responsibilities

Item 1, "Abbreviations and Definitions," of the Standard Specifications, is hereby amended with respect to the clauses cited below, and no other clauses or requirements of this Item are waived or changed hereby.

Article 1. is supplemented with the following:

1.0. General Statement:

For this Contract, the Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges, November 1, 2014 (the "Texas Standard Specifications"), all documents referenced therein, and all manuals, bulletins, supplements, specifications, and similar materials issued by the Texas Department of Transportation ("TxDOT"), or any predecessor or successor thereto, which are applicable to this Contract, are hereby modified with respect to the terms cited below and no others are changed hereby.

> The term "State", "State of Texas", "State Highway Agency", "State Highway Department Of Texas", "State Department of Highways and Public Transportation", "Texas State Department Of Highways and Public Transportation", "Texas Department of Transportation", "Department", "Texas Turnpike Authority", "State Department of Highways and Public Transportation Commission", "Texas Department of Transportation Commission", "Texas Transportation Commission", or "State Highway Commission", shall, in the use of The Texas Standard Specifications, Special Provisions and Special Specifications and General Notes and Specification Data pertaining thereto, and required contract provisions for Federal-Aid construction contracts, for all work in connection with Central Texas Regional Mobility Authority, projects and all extensions enlargements, expansions, improvements, and rehabilitations thereto, be deemed to mean Central Texas Regional Mobility Authority, unless the context clearly indicates a contrary meaning.

Article 2, "Abbreviations," is supplemented with the following:

> CTRMA Central Texas Regional Mobility Authority

Article 3.28., "Commission", is voided and replaced by the following:

> 3.28. Commission. The Central Texas Regional Mobility Authority Board or authorized representative.

Article 3.32., "Construction Contract", is voided and replaced by the following:

> 3.32. Construction Contract. The agreement between the Central Texas Regional Mobility Authority and the Contractor establishing the obligations of the parties for furnishing of materials and performance of the work prescribed in the Contract Documents.

Article 3.45., "Debar (Debarment)", is voided and replaced by the following:

> 3.45. Debar (Debarment). Action taken by the Mobility Authority, federal government or state government pursuant to regulation that prohibits a person or company from entering into a Contract, or from participating as a subcontractor, or supplier of materials or equipment used in a highway improvement Contract as defined in Transportation Code, Chapter 223, Subchapter A.

Article 3.47., "Department", is voided and replaced by the following:

3.47. Department. Central Texas Regional Mobility Authority, unless the context clearly indicates a contrary intent and meaning.

Article 3.48., "Departmental Material Specifications", is voided and replaced by the following:

3.48. Departmental Material Specifications (DMS). Reference specifications for various materials published by the Texas Department of Transportation Construction Division.

Article 3.54., "Engineer", is hereby deleted and replaced by the following:

3.54 Engineer. The Central Texas Regional Mobility Authority Coordinator or their duly authorized representative.

Article 3.73., "Letting Official", is hereby deleted and replaced by the following:

3.73. Letting Official. An employee of the Central Texas Regional Mobility Authority empowered by the Central Texas Regional Mobility Authority to officially receive bids and close the receipt of bids at a letting.

Article 3.79., "Manual of Testing Procedures", is voided and replaced by the following:

3.79. Manual of Testing Procedures. Texas Department of Transportation manual outlining test methods and procedures maintained by the Materials and Pavements Section of the Construction Division.

Article 3.102., "Proposal Form", is voided and replaced by the following:

3.012. Proposal Form. The document issued by the Central Texas Regional Mobility Authority for a proposed Contract that includes:

- the specific locations (except for non-site-specific work) and description of the proposed work;
- an estimate of the various quantities and kinds of work to be performed or materials tobe furnished;
- a schedule of items for which unit prices are requested;
- the number of working days within which the work is to be completed (or reference to the requirements); and
- the special provisions and special specifications applicable to the proposed Contract.

Article 3.108., "Referee Tests", is voided and replaced by the following:

3.108. Referee Tests. Tests requested to resolve differences between Contractor and Engineer test results. The referee laboratory is the Texas Department of Transportation Construction Division Materials and Pavement Section, or mutually agreed to 3rd party commercial laboratory.

Article 3.129., "State", is voided and replaced by the following:

3.129. State. Central Texas Regional Mobility Authority.

3.156. Mobility Authority. The Central Texas Regional Mobility Authority, an agency created under Texas Transportation Code Chapter 370 and approved by the Texas Transportation Commission, together with its members, partners, employees, agents officers, directors, shareholders, representatives, consultants, successors, and assigns. The Mobility Authority's principal office is presently located at 3300 N. I-35, Suite 300, Austin, Texas 78705.

3.157. Bid Form. The form provided by the Mobility Authority used by the bidder to submit a bid. Electronic bid forms for the project shall be submitted via the project's CivCast website.

3.158. Full Completion of all Work (or to Fully Complete all Work). The completion of all work specified under this Contract as evidenced by the Formal Acceptance thereof by the Mobility Authority.

3.159. Standards. Whenever the Plans and/or Specifications refer to "Standard Sheets" or "Design Details" such reference shall be construed to mean the set of drawings issued by the Design Divisions, Texas Department of Transportation, and entitled "Standard Sheets". Only those standards or standard drawings specifically referred to by number on the Plans or in the various Contract Documents are applicable to work on this Contract.

Whenever in the various Contract Documents term, "Department" or "State" appears, it shall be replaced by the term," Central Texas Regional Mobility Authority." Similarly, the term, "Executive Director" shall be replaced by the term, "Central Texas Regional Mobility Authority Coordinator".

Whenever in the Texas Department of Transportation Specifications and Standard Drawings the term, "Department" or "Texas Department of Transportation" appears, it shall be replaced by the term, "Central Texas Regional Mobility Authority," except in references to said Texas Department of Transportation as being the author of certain Specifications and Standard Drawings, and in reference to said Department as the agency prequalifying prospective Bidders.

Whenever in the Texas Department of Transportation Specifications and Standard Drawing the term, "District Engineer" appears, it shall be replaced by the term, "Central Texas Regional Mobility Authority Coordinator.

Special Provision to Item 2
Instructions to Bidders

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

Article 2.3., "Issuing Proposal Forms," first two sentences are replaced with the following:

Mobility Authority will issue an Official Bid Form to a prequalified Bidders. The online bid form will be made available to the prequalified bidders on the CivcastUSA website: https://www.civcastusa.com/project/6581ec9e90f39bedde0c2359/summary

Prequalification requirements:

- Be registered with State of Texas,
- Be fully prequalified by Texas Department of Transportation (TxDOT),
- Have a bidding capacity per TxDOT prequalification system of $1,000,000,
- Email a valid Non-Collusion Affidavit, Debarment Affidavit, and Child Support Statement to Jose.JaimesHernandez@atkinsrealis.com and Junaid.Akhtar@atkinsrealis.com and include a phone number, email address and physical address for point of contact.

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

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

- The Contractor has been defaulted in accordance with Article 8.7., "Default of Contract" (a default for performance) on a previous Contract with the Department within the last 3 years
- The Contractor is not in compliance with Texas Government Code Sections 2155.089 and 2262.055.

Special Provision to Item 2
Instructions to Bidders

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

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

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

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

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

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

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

If the apparent low Bidder does not appear in the DHS E-Verify system before award, the Contractor must submit documentation showing that they are compliant within 5 calendar days after bid opening. A Contractor that fails to comply or respond within the deadline will be declared nonresponsive. The Bidder forfeiting the proposal guaranty will not be considered in future proposals for the same work unless there has been a substantial change in the scope of the work.

The Department may recommend that the Commission:

- reject all bids, or
- award the Contract to the new apparent low Bidder, if the Department is able to verify the Bidder's participation in the DHS E-Verify system.

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

- the new apparent low Bidder will not be deemed nonresponsive,
- the new apparent low Bidder's guaranty will not be forfeited,
- the Department will reject all bids,
- the new apparent low Bidder will remain eligible to receive future proposals for the same project, and
- the proposal guaranty of the original low bidder will become the property of the State, not as a penalty, but as liquidated damages.

Special Provision to Item 3
Award and Execution of Contract

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

Article 1, "Award of Contract," is deleted in its entirety and replaced with the following:

The Mobility Authority will award or reject the Contract within 60 calendar days after the opening of the proposal at the sole discretion of the Mobility Authority.

Article 4.3., "Insurance," is supplemented by the following:

The Contractor shall be the named insured, and the following entities shall be additional insureds on a primary and non-contributory basis: Central Texas Regional Mobility Authority, Texas Department of Transportation.

These entities shall be additional insureds to this policy with respect to liability arising out of the acts, errors, and omissions of any member of the Contractor and Subcontractors whether occurring on or off of the site, notwithstanding any other provisions of the Contract Documents, the project policy shall not be canceled, except for non-payment of premium, fraud, material misrepresentation, or noncompliance with reasonable loss control recommendations.

The Authority Board, the Authority, Texas Department of Transportation, the State of Texas, the Commission and their respective successors, assigns, officeholders, officers, directors, commissioners, consultants and employees shall be listed as "additional insureds" with respect to any insurance for which the contractor must obtain an "additional insured" rider or amendment.

Table 2 is deleted in its entirety and replaced with the following:

Type of Insurance	Amount of Coverage
Commercial General Liability Insurance	Including products/completed operations liability and contractual liability , in the amount of $1,000,000 per occurrence for bodily injury and property damage
Business Automobile Policy	In the amount of $1,000,000 per occurrence for bodily injury and property damage
Workers' Compensation	Providing statutory benefits, and Employers Liability with limits of $1,000,000
Excess Liability Insurance	In the amount of $5,000,000 per occurrence and aggregate

Special Provision to Item 3
Award and Execution Contract

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

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

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

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

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

Special Provision to Item 4

Scope of Work

Item 4, "Scope of Work," of the Standard Specifications, is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

Article 4.4., "Changes in the Work," Delete the following paragraph:

> "If the changes in quantities or the alternations do not significantly change the character of the work under the Contract, the altered work will be paid for at the Contract unit price. If the changes in quantities or the alterations significantly change the character of the work, the Contract will be amended by a change order. If no unit price exists, this will be considered extra work and the Contract will be amended by a change order. Provide cost justification as requested, in an acceptable format. Payment will not be made for anticipated profits on work that is eliminated."

and replace with the following:

> "The Engineer may require deviations to the Work through a written directive. Payment for the deviations and quantity overruns will be made through the Contingency Allowance. Deviations and quantity overruns will be paid for at the unit prices submitted at the bidding stage. Deviations requiring new unit prices will be negotiated and made through the Contingency Allowance. Costs exceeding the Contingency Allowance will be addressed using the change order process.
>
> Upon completion of the Work, the total contract value will be adjusted to provide for the difference, if any, between the total amount of expenditures from the Contingency Allowance and the original amount of the Contingency Allowance. The Contractor is not entitled to all or any part of an unexpended balance of the Contingency Allowance.
>
> When changes are made that do not fall under the Contingency Allowance, the Contract will be amended by a Change Order. Provide cost justification as requested, in an acceptable format. Payment will not be made for anticipated profits on work that is eliminated."

Article 4.6., "Requests for Additional Compensation and Damages," is supplemented by the following:

> "Contractor shall not be eligible for Change Order(s) for additional compensation for additional costs, including costs for developing and executing a Recovery Schedule(s), and delay and disruption damages, or additional Days incurred directly or indirectly from the virus known as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and the disease known as COVID-19, including any disruptions to, and delays or interruptions in, construction of the Project in accordance with the Contract and any approved Baseline Schedule."

Special Provision to Item 5
Control of the Work

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

Article 5.12., "Final Acceptance," is supplemented by the following:

Contractor warrants all materials and workmanship and that the work is in conformance with the Bid Documents and Plans included in this Contract for a period of one year from the date of the Certificate of Final Acceptance of the entire project. Said warranty binds Contractor to correct any work that does not conform with such Bid Documents and Plans or defects in workmanship or materials furnished under this Contract which may be discovered within said one year period. Contractor must, at its own expense, correct any such defect within 30 days after receiving written notice of such defect from Mobility Authority by repairing the same to the condition called for in the Contract. Should Contractor fail or refuse to repair such defect within said 30-day period or to provide acceptable assurances that such repair work will be completed within a reasonable time thereafter, Mobility Authority may repair or cause to be repaired any such defect by calling the Contractor's Warranty Bond.

Special Provision to Item 5
Control of the Work

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

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

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

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

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

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

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

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

Special Provision to Item 5
Control of the Work

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

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

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

Special Provision to Item 6
Control of Materials

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

Article 4., "Sampling, Testing, and Inspection," is supplemented by the following:

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

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

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

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

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

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

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

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

AGGREGATES		
Tex-400-A	Sampling Flexible Base, Stone, Gravel, Sand, and Mineral Aggregates	3
Tex-410-A	Abrasion of Coarse Aggregate Using the Los Angeles Machine	5
Tex-411-A	Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate	12
Tex-461-A	Degradation of Coarse Aggregate by Micro-Deval Abrasion	5
CHEMICAL		
Tex-612-J	Acid Insoluble Residue for Fine Aggregate	4
GENERAL		
HMA Production Specialist [TxAPA – Level 1-A] ($/hr)		
HMA Roadway Specialist [TxAPA – Level 1-B] ($/hr)		
Technician Travel/Standby Time ($/hr)		
Per Diem ($/day – meals and lodging)		
Mileage Rate ($/mile from closest CL location)		

Note 1– Turn-Around Time includes test time and time for travel/sampling and reporting.
Note 2 – These tests require turn-around times meeting the governing specifications. Provide test results within the stated turn-around time. CL is allowed one additional day to provide the signed and sealed report.

Special Provision to Item 6
Control of Materials

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Special Provision to Item 7
Legal Relations and Responsibilities

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

Article 7.3., "Laws To Be Observed", Article 7.5., "Patented Devices", Article 7.12., "Responsibility For Hazardous Materials", and Article 7.15., "Responsibility For Damage Claims", "State" is voided and replaced by "Central Texas Regional Mobility Authority and TxDOT".

Article 7.3., "Laws To Be Observed," is supplemented by the following:

By entering into Contract, the Contractor agrees to provide or make available to the Department records, including electronic records related to the Contract for a period of 3 years after the final payment. No person or entity other than TxDOT may claim third -party beneficiary status under this Contract or any of its provisions, nor may any non-party sue for personal injuries or property damage under this Contract.

Article 7.15., "Responsibility For Damage Claims," the last paragraph is deleted and not replaced.

Special Provision to Item 7
Legal Relations and Responsibilities

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

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

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

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

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

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

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

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

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

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

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

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

Special Provision to Item 7
Legal Relations and Responsibilities

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

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

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

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

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

Special Provision to Item 007
Legal Relations and Responsibilities

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Minimum curriculum for Contractor-provided training is as follows:

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

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

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

Special Provision to Item 8
Prosecution and Progress

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

Article 8.5., "Project Schedules" is supplemented by the following

The progress schedule required for this project is the critical path method schedule (CPM schedule) as described herein. The Contractor shall prepare and submit for review and acceptance a cost loaded schedule of proposed working progress for the entire contract duration. The Engineer will provide a template with milestones from other contracts and non-construction activities for the Contractor to use in the development of their schedule. The Engineer shall also provide a Work Breakdown Structure (WBS) as well as the required report layouts for the Contractor to use to develop the progress schedule for this Contract.

Immediately after receipt of notice of award, the Division Engineer and the Contractor will establish a mutually agreeable date on which the preconstruction meeting will be held. The Contractor's project superintendent and other individuals representing the Contractor who are knowledgeable of the Contractor's proposed progress schedule or who will be in charge of major items of the work shall attend the preconstruction conference.

After work on the project has begun, construction conferences will be held periodically. The construction conferences are to be scheduled at times that are mutually agreeable to both the project superintendent and the Resident Engineer. It shall be the superintendent's responsibility to attend the conferences.

Section 8.5.2 "Progress Schedule" is supplemented by the following:

The Contractor shall provide a schedule that shows the various activities of Work in sufficient detail to demonstrate a reasonable and workable plan to complete the Project by the Original Contract Completion Date and any interdependent milestones identified by the Engineer or required by Contract. Show the order and interdependence of activities and the sequence for accomplishing the Work. Describe all activities in sufficient detail so that the Engineer can readily identify the Work and measure the progress of each activity.

Section 8.5.3 "Schedule Format" is supplemented by the following:

The Contractor shall use a compatible version of Oracle Primavera P6 or comparable scheduling software to generate the CPM schedule. It is the Contractor's responsibility to verify with the Engineer the software and version being used for this project and shall maintain the required version for the entire contract duration. The use of Microsoft Project and Primavera Project Planner (P3) and other scheduling software is prohibited.

The progress schedule shall contain the following Administrative Identifier Information:

(1) Project Name
(2) Contract Number
(3) Date of Contract
(4) Construction Completion Date
(5) Contractor's Name
(6) Contractor's Contact Information

The CPM schedule must reflect the scope of work and include the following:

(1) Clear identification of tasks to be completed based on Section or Special Provisions included in the Project Manual and as listed in Pay Items, including subcontractor work activities.
(2) Include calculations of resources required (Cost, Labor, Equipment) for constructing all facilities within the Contract duration. Specific calculations shall be provided to show quantities, manpower / crews, and equipment to support the critical path. The Contractor shall be capable of calculating the maximum crew size anticipated if any activities become critical, so the Contractor is prepared when a critical path changes or a new pathoccurs.
(3) Float for each Activity.
(4) Activities for submittals (shop drawings).
(5) Punchlist activities with sufficient duration for the Engineer's inspection and acceptance before the final completion date
(6) Activities for submittal review time by the Engineer, including time range showing start and end dates.
(7) Working and shop drawing preparation, submittal, and review for acceptance.
(8) Material and equipment procurement, fabrication and delivery; identify any long lead items as separate activities.
(9) Owner furnished and/or installed materials and equipment shall be identified as separate activities.
(10) NTP / Start of construction
(11) Required phasing
(12) Maintenance of traffic requirements as required by the contract (if any)
(13) Intermediate completion dates (if any)
(14) Identified interdependent milestones (if any)
(15) Seasonal limitation/observation periods/moratoriums
(16) Beginning and end of each traffic control work area and road openings
(17) Other similar activities and project milestones established in the Contract Documents.
(18) Substantial Completion Date
(19) Final Acceptance Date
(20) All required Reports layouts as requested by the Engineer

Section 8.5.4 "Activity Format" is supplemented by the following:

Activity requirements are discussed in further detail as follows:

(1) Activity Identification (ID) - Assign each activity a unique identification number. The format for the identification number will be provided by the Engineer. All activities must begin with the same activity ID prefix as provided by the Engineer.
(2) Activity Description - Assign each activity an unambiguous descriptive word or phrase. For example, use "Excavate Area A," not "Start Excavation."
(3) Activity Codes – The Engineer will provide the activity code dictionary in the template. The Contractor will assign the appropriate codes to each activity.
(4) Activity Original Duration - Assign a planned duration in working days for each activity. Do not exceed a duration of 10 working days for any activity unless accepted by the Engineer. Each activity shall have a minimum duration of 1 working day. Do not represent the maintenance of traffic, erosion control, and other similar items as single activities extending to the Completion Date. Break these Contract Items into component activities in order to meet the duration requirements of this paragraph.
(5) Finish-to-Start Relationships - Unless allowed in writing by the Engineer, use only finish-to-start relationships with no leads or lags to link activities. All activities, except the first activity, shall have a predecessor(s). All activities, except the final activity, shall have a successor(s).
(6) Calendars – The Engineer will provide pre-defined calendars as part of the template. The Contractor shall assign these pre-defined calendars to the appropriate activities. The Contractor may create new project specific

calendars to represent their standard work schedule using the pre-defined calendars as a basis. The Contractor may not edit pre-defined calendars.

(7) Constraints – Unless allowed in writing by the Engineer, do not use constraints in the schedule.

(8) Resources – Manpower and equipment shall be reflected for all activities. Incidental costs to construction shall be equally spread out across all activities. Front loaded schedules are not allowed.

(9) The schedule shall show the total cost of performing each activity and shall include the total labor, material, equipment and general conditions.

(10) The sum of cost for all activities shall equal the total Contract.

(11) The summed value of that portion of the activities allocated to each Contract bid item shall equal the total value of the corresponding Contract bid item.

(12) The Contractor shall allocate a value for unit price or lump sum contract bid items to each activity in the schedule. No Lump sum amounts should exceed $100,000.

Section 8.5.5.2 "Critical Path Method" The first paragraph is voided and replaced by the following:

The Contractor shall submit the baseline CPM schedule in a bar chart format showing the critical path in red, using both hard copy and in electronic formats. Electronic formats shall be compatible with the Engineer's computer systems. Also, submit the following information:

(1) Written narrative – Explains the sequence of work, the controlling operations, intermediate completion dates, milestones, project phasing, anticipated work schedule and estimated resources. In addition, explain how permit requirements, submittal tracking and coordination with subcontractors, utility companies, railroads and other third party entities will be performed. The narrative shall itemize and describe the critical path (i.e. access limitations, constraints, shift work), and compare early and late date or Contract Milestone activities, and describe any critical resources.

(2) CPM Schedule in a Bar Chart Format – Include the Administrative Identifier Information discussed above on the first page of the schedule. For each activity on the chart, indicate the Activity ID, Activity Description, Original Duration, Remaining Duration, Changes to Duration, Total Float, Early Start Date, Early Finish Date, and Calendar Name. Use arrows to show the relationships among activities.

(3) Identify the critical path of the project on the bar chart. The critical path is defined as; 1) the sequence of activities that must be completed "on time" to ensure that the project finished on time. 2) the longest path of activities in the project that determines the project finish date.

(4) No more than 10% of activities may be critical or near critical. Critical Activities will have a total float equal to zero. "Near critical" is defined as float in the range of 1 to 10 working days.

(5) Six Week Look Ahead CPM Schedule in a Bar Chart Format – This schedule will have all the same requirements of the CPM schedule in bar chart format except that it shall be limited to those activities that have an early start or early finish within a six-week period of the data date.

(6) Logic Diagram – Submit a diagram in PERT chart format showing the logic of the CPM schedule.

(7) Activity ID Sort – Submit a listing of all activities included in the CPM schedule sorted by ascending Activity Identification Number.

(8) Total Float Sort – Submit a listing of all activities included in the CPM schedule sorted by increasing total float and by early start date.

(9) All float belongs to the Project and is a shared commodity between the Contractor and the Mobility Authority and is not for the exclusive use or benefit of either party. The Contractor shall notify the Engineer in writing for acceptance before using any float.

(10) Detailed Predecessor/Successor Sort – Submit a listing of all activities included in the CPM schedule indicating the activities that immediately precede and immediately succeed that activity in the schedule logic.

(11) Scheduling Statistics Report – Submit a report of CPM schedule statistics, including number of activities, number of activities on the longest path, number of started activities, number of completed activities, number of relationships, percent complete, and number and type of constraints.

(12) A resource curves / Metric tracking reports (EVM) corresponding to the milestones and work activities established above.

Section 8.5.5.2.2 "Baseline Schedule" The second paragraph is voided and replaced by the following:

The Contractor shall submit a progress schedule for the entire duration of the Contract to the Engineer 30 calendars days following the contract award date. After review of the schedule the Engineer shall schedule a Baseline CPM Schedule meeting with the Contractor to review the schedule and identify any changes or corrections. Within 7 calendar days of the CPM Schedule meeting, the Contractor shall make any necessary adjustments to address all review comments and resubmit network diagrams and reports for the Engineer's review. The complete baseline schedule shall be submitted and accepted no later than (45) forty-five days after contract award date. The complete progress schedule shall be accepted by the Engineer before any payments will be processed for the project.

Section 8.5.5.2.3 "Progress Schedule" is supplemented by the following

The Engineer may withhold pay estimates if the updated CPM schedule is not submitted as required by this section. For each updated CPM schedule, identify the actual start and finish dates for all completed activities, the actual start date and remaining duration for all activities in progress, the difference in duration of all activities since the last update and any exceptional reports associated with the update. Only accepted changes will be incorporated into the monthly progress schedule update. The schedule should represent the actual work performed and should be progressed with actuals for all the schedule activities. The final schedule will be utilized as the project actual "As Built" schedule.

Provide a written narrative that identifies any changes or shifts in the critical path and submit reasons for the changes or shifts in the critical path. Identify any changes in logic for the updated CPM schedule and submit reasons for changes to the schedule logic. In addition to the written narrative, submit the following with each updated CPM schedule:

(1) CPM Schedule in Bar Chart Format
(2) Four Week Look Ahead CPM Schedule in Bar Chart Format
(3) Logic Diagram
(4) Activity ID Sort
(5) Total Float Sort
(6) Detailed Predecessor/Successor Sort
(7) Schedule Metrics and Earned Value (Schedule, Cost, Labor) Reports

The Contractor must submit a statement that there were no changes in the schedule logic, activity durations, or calendars since the previous update in lieu of submission of items (3), (5), and (6). Acceptance of schedule updates by the Engineer does not revise the Contract Documents.

A monthly schedule update meeting shall be held each month following Notice to Proceed to review monthly schedule update submittals, critical path items and recovery schedules. The Contractor shall be represented in the meeting by the Contractor's scheduler, project manager and general superintendent. As necessary the Contractor may be also asked to attend a coordination meeting to discuss the schedule impacts to other contractors.

If the Project completion date changes or if the project schedule overrun is anticipated to exceed 5%, the Contractor shall submit a revised progress schedule to the Engineer for review and acceptance. If plan revisions are anticipated to change the sequence of construction in such a manner as will affect the progress, but not the completion date, then the Contractor may submit a revised progress schedule for review and acceptance. The Project completion date shall remain unchanged.

Section 8.5.5.3 "Notice of Potential Time Impact" is supplemented by the following

"Contractor shall not be eligible for Change Order(s) for additional compensation for additional costs, including costs for developing and executing a Recovery Schedule(s), and delay and disruption damages, or additional Days incurred directly or indirectly from the virus known as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and the disease known as COVID-19, including any disruptions to, and delays or interruptions in, construction of the Project in accordance with the Contract and any approved Baseline Schedule."

Section 8.5.5 "Schedule Types" is supplemented by the following:

Section 8.5.5.5 Recovery Schedule

If the progress schedule projects a finish date for the Project beyond the original Completion Date, the Contractor shall submit a revised schedule showing a plan to finish by the original Completion Date. The Mobility Authority will withhold Pay Estimates until the Engineer accepts the revised schedule. No additional compensation for developing and executing a recovery schedule(s) shall be reimbursed to the Contractor. The Engineer will use the schedule to evaluate time extensions and associated costs requested by the Contractor.

(1) In the event Work or related construction activities shown on the Contractor's Progress Schedule fall behind schedule to the extent that dates established as contractual Completion Dates are in jeopardy, the Contractor shall prepare and submit to the Engineer, at no additional cost or time to the Mobility Authority, a Recovery Schedule showing intent to remedy delays and to regain originally scheduled time of completion of Work within a timely manner. This includes delays due to unforeseen conditions.

(2) Recovery Schedule shall be submitted in such form and detail appropriate to the delay or delays, explaining and displaying how the Contractor intends to reschedule those activities and reestablish compliance with the accepted baseline Construction Progress Schedule during the immediate subsequent pay period or as permitted by Engineer. This shall include a schedule diagram comparing the original and the revised sequence of activities, identifying all affected activities.

(3) Upon determining the requirement for a Recovery Schedule:

a. Within five (5) calendar days, the Contractor shall present to Engineer a proposed Recovery Schedule. The Recovery Schedule shall represent the Contractor's best judgment as to how to best reorganize the Work and achieve progress to comply with the accepted Construction Progress Schedule.

b. Changes to Contractor's means and methods, such as increased labor force, working hours, overtime, additional equipment and other means shall not constitute the basis for changes to the Contract Sum or Contract Time.

c. Recovery Schedule shall show remedies to bring Work back on schedule up-to-date within the immediate subsequent pay period.

d. The Recovery Schedule shall be prepared to a similar level of detail as the Construction Progress Schedule.

e. Five (5) calendar days prior to the expiration of the Recovery Schedule, Contractor shall document to the Engineer that the Work schedule has regained, or is on-track to regain, compliance with the Construction Progress Schedule.

(4) Failure to submit Recovery Schedule in a timely manner may result in Termination of the Contract for Cause as determined by the Engineer.

(5) Failure to achieve compliance with the accepted Construction Progress Schedule despite implementing Recovery Schedule may result in Termination of the Contract for Cause as determined by the Engineer.

(6) Termination of Contract For Cause: In the event Contractor defaults on the terms of the Contract, including failure to maintain the Construction Progress Schedule, Engineer will assess the level of completion of the Work achieved by the Contractor and compare amount of available funds against anticipated costs required for the Mobility Authority to complete the Work, including anticipated Liquidated Damages resulting from delay, if any. Engineer will determine amount of payment due to Contractor for Work completed prior to date of Termination of Contract for Cause, if any. In the event available funds are not sufficient for the Mobility Authority to complete the Work, the Mobility Authority will withhold such funds from the amount due the Contractor.

(7) If, in the opinion of the Engineer, the Contractor has sufficiently regained compliance with the Construction Progress Schedule, the use of the Construction Progress Schedule will be resumed. Contractor shall update and submit the Construction Progress Schedule clearly identifying Work to date and how the Contractor intends to achieve timely completion for the remainder of the Work in accordance with the Construction Documents.

Special Provision to Item 8
Prosecution and Progress

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

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

Begin work within 30 calendar days of Notice to Proceed. Notice to Proceed may be deferred up to 180 days from CTRMA Board award of the contract. Do not begin work before this period unless authorized in writing by the Engineer.

Special Provision to Item 8
Prosecution and Progress

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

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

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

Special Provision to Item 8
Prosecution and Progress

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

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

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

Special Provision to Item 9

Measurement and Payment

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

Article 9.5., "Progress Payments," Delete this section of the Specifications in its entirety and substitute with the following:

Partial payments will be made once each month covering work performed and materials complete-in-place in accordance with the Contract. The invoice form to be submitted each month will be provided to the Contractor in Microsoft Excel format. The Contractor must be able to use Microsoft Excel to complete the invoice form. Partial payments will be made on the value of work performed based on approximate estimates prepared by the Engineer, provided, however, that no estimate shall be certified or payment made where the net amount receivable by the Contractor is less than Five-hundred Dollars ($500.00).

The Engineer will review the partial payment estimate with the Contractor's representative prior to each partial payment.

Total Contract value shall be considered to mean the original amount of the Contract, except when the Contract is increased or decreased by a supplemental agreement in which case the adjusted total shall be used.

The Mobility Authority reserves the right to withhold the payment of any partial or final estimate voucher or any sum or sums thereof from such vouchers in the event of the failure of the Contractor to promptly make payment to all persons supplying equipment, tools or materials, or for any labor used by the Contractor in the prosecution of the work provided for in the Contract, and for any other cause as determined by the Mobility Authority in its sole discretion, including overpayment on previous partial payments.

Article 9.8., "Retainage," is supplemented with the following:

The Mobility Authority shall not withhold funds from payments to be made to Contractor for the Work until such time as 95% of the Adjusted Contract Price has been paid to the Contractor. Following completion of and payment for 95% of the Adjusted Contract Price, the Mobility Authority shall withhold, the remaining 5% of the Adjusted Contract Price pursuant to the terms described below.

The remaining 5% for the Work, subject to reduction as specified below, shall be held by the Mobility Authority until Final Acceptance. At such time, and provided the Contractor is not in breach or default hereunder, the Mobility Authority shall release to Contractor all withheld in connection with the Work other than amounts applied to the payment of Losses or which the Mobility Authority deems advisable, in its sole discretion, to retain to cover any existing or threatened claims. The Contractor must further warrant, to the satisfaction of the Mobility Authority, that there are no outstanding claims or liens by any subcontractors or other parties with respect to the Work.

The prime contractor shall make full payment of amounts due to subcontractors within 10 calendar days following the satisfactory completion of the subcontractor's work. Satisfactory completion of the subcontractor's work shall be defined as approval, acceptance, and payment for the subcontractor's work by the Mobility Authority including the submittal and acceptance of all information, deliverables or other documents required by the contract.

Prior to the release of the remaining 5% by the Mobility Authority pursuant to the terms hereof, such amounts shall be held by the Mobility Authority. Upon the release of the remaining 5%, the Contractor shall not be entitled to any interest income that has accrued upon the amounts of the remaining 5% released to Contractor.

Article 9.9., "Payment Provisions for Subcontractors," is supplemented with the following:

The Mobility Authority may pursue actions against the Contractor, including withholding of estimates and suspending the work, for noncompliance with the subcontract requirements of this Section upon receipt of written notice with sufficient details showing the subcontractor has complied with contractual obligations as described in this Article.

These requirements apply to all tiers of subcontractors. Incorporate the provisions of this Article into all subcontract or material purchase agreements.

Special Provision to Item 9
Measurement and Payment

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

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

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

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

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

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

  Standby rate = (FHWA hourly rate - operating costs) × 50%

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

Special Provision to Item 300
Asphalt, Oils, and Emulsions

Item 300, “Asphalt, Oils, and Emulsions” of the Standard Specifications is replaced by Special Specification 3096, “Asphalts, Oils, and Emulsions.” All Item 300 Special Provisions are no longer available, beginning with the April 2022 letting.

Special Provision to Item 502
Barricades, Signs and Traffic Handling

Item 502, "Barricades, Signs and Traffic Handling" of the Standard Specifications, is hereby amended with respect to the clauses cited below, and no other clauses or requirements of this Item are waived or changed hereby.

Article 502.1., "Description," is supplemented by the following:

Temporary work-zone (TWZ) traffic control devices manufactured after December 31, 2019, must have been successfully tested to the crashworthiness requirements of the 2016 edition of the Manual for Assessing Safety Hardware (MASH). Such devices manufactured on or before this date and successfully tested to NCHRP Report 350 or the 2009 edition of MASH may continue to be used throughout their normal service lives. An exception to the manufacture date applies when, based on the project's date of letting, a category of MASH-2016 compliant TWZ traffic control devices are not approved, or are not self-certified after the December 31, 2019, date. In such case, devices that meet NCHRP-350 or MASH-2009 may be used regardless of the manufacture date.

Such TWZ traffic control devices include: portable sign supports, barricades, portable traffic barriers designated exclusively for use in temporary work zones, crash cushions designated exclusively for use in temporary work zones, longitudinal channelizers, truck and trailer mounted attenuators. Category I Devices (i.e., lightweight devices) such as cones, tubular markers and drums without lights or signs attached however, may be self-certified by the vendor or provider, with documentation provided to Department or as are shown on Department's Compliant Work Zone Traffic Control Device List.

Article 502.4., "Payment," is supplemented by the following:

Truck mounted attenuators and trailer attenuators will be paid for under Special Specification, "Truck Mounted Attenuator (TMA) and Trailer Attenuator (TA)." Portable Changeable Message Signs will be paid for under Special Specification, "Portable Changeable Message Sign." Portable Traffic Signals will be paid for under Special Specification, "Portable Traffic Signals."

Special Provision to Item 506

Temporary Erosion, Sedimentation, and Environmental Controls

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

Article 506.1., "Description," is voided and replaced by the following:

Install, maintain, and remove erosion, sedimentation, and environmental control measures to prevent or reduce the discharge of pollutants in accordance with the Storm Water Pollution Prevention Plan (SWP3) or as directed. Ensure the installation and maintenance of control measures is performed in accordance with the manufacturer's or designer's specifications. Erosion and sediment control devices must be selected from the "Erosion Control Approved Products" or "Sediment Control Approved Products" lists. Perform work in a manner to prevent degradation of receiving waters, facilitate project construction, and comply with applicable federal, state, and local regulations.

Article 506.3., "Qualifications, Training, and Employee Requirements," is voided and not replaced.

Section 506.4.1., "Contractor Responsibilities," Section 506.4.2., "Implementation," and Section 506.4.3., "General," are voided and replaced by the following:

4.1. **Contractor Responsibilities**. Implement the SWP3 for the project site in accordance with the plans and specifications, and as directed. Coordinate storm water management with all other work on the project. Develop and implement an SWP3 for project-specific material supply plants within and outside of the Department's right of way in accordance with the specific or general storm water permit requirements. Prevent water pollution from storm water associated with construction activity from entering any surface water or private property on or adjacent to the project site.

4.2. **Implementation**.

4.2.1. **Commencement**. Implement the SWP3 as shown and as directed. Contractor proposed recommendations for changes will be allowed as approved. Do not implement changes until approval has been received and changes have been incorporated into the plans by the Engineer. Minor adjustments to meet field conditions are allowed and will be recorded by the Engineer in the SWP3.

Implement control measures before the commencement of activities that result in soil disturbance. Phase and minimize the soil disturbance to the areas shown on the plans. Coordinate temporary control measures with permanent control measures and all other work activities on the project to assure economical, effective, safe, continuous water pollution prevention. Provide control measures that are appropriate to the construction means, methods, and sequencing allowed by the Contract.

Do not prolong final grading and shaping. Preserve vegetation where possible throughout the project and minimize clearing, grubbing, and excavation within stream banks, bed, and approach sections.

4.3. **General**.

4.3.1. **Temporary Alterations or Control Measure Removal**. Altering or removal of control measures is allowed when control measures are restored within the same working day.

4.3.2. **Stabilization**. Initiate stabilization for disturbed areas no more than 14 days after the construction activities in that portion of the site has temporarily or permanently ceased. Establish a uniform vegetative cover or use another stabilization practice as approved.

4.3.3. **Finished Work**. Upon the Engineer's acceptance of vegetative cover or other stabilization practice, remove and dispose of all temporary control measures unless otherwise directed. Complete soil disturbing activities and establish a uniform perennial vegetative cover. A project will not be considered for acceptance until a vegetative cover of 70% density of existing adjacent undisturbed areas is obtained or equivalent permanent stabilization is obtained as approved.

4.3.4. **Restricted Activities and Required Precautions**. Do not discharge onto the ground or surface waters any pollutants such as chemicals, raw sewage, fuels, lubricants, coolants, hydraulic fluids, bitumens, or any other petroleum product. Operate and maintain equipment on site in a manner as to prevent actual or potential water pollution. Manage, control, and dispose of litter on site such that no adverse impacts to water quality occur. Prevent dust from creating a potential or actual unsafe condition, public nuisance, or condition endangering the value, utility, or appearance of any property. Wash out concrete trucks only in approved contained areas. Use appropriate controls to minimize the offsite transport of suspended sediments and other pollutants if it is necessary to pump or channel standing water (i.e. dewatering). Prevent discharges that would contribute to a violation of Edwards Aquifer Rules, water quality standards, the impairment of a listed water body, or other state or federal law.

Section 506.4.4., "Installation, Maintenance, and Removal Work." The first paragraph is voided and replaced by the following.

Perform work in accordance with the SWP3, and according to the manufacturers' guidelines. Install and maintain the integrity of temporary erosion and sedimentation control devices to accumulate silt and debris until soil disturbing activities are completed and permanent erosion control features are in place or the disturbed area has been adequately stabilized as determined by the Engineer.

Section 506.4.5., "Monitoring and Documentation," is voided and not replaced.

Section 506.6.5.2., "Maintenance Earthwork for Erosion and Sediment Control for Cleaning and/or Restoring Control Measures," is voided and replaced by the following:

Earthwork needed to remove and obliterate of erosion-control features will not be paid for directly but is subsidiary to pertinent Items unless otherwise shown on the plans.

Sprinkling and rolling required by this Item will not be paid for directly but will be subsidiary to this Item.

Special Provision to Item 666
Retroreflectorized Pavement Markings

Item 666, "Retroreflectorized Pavement Markings," of the Standard Specifications is amended with respect to the clauses cited below. No other clauses or requirements of this Item are waived or changed.

Section 2.3., "Glass Traffic Beads." The first paragraph is voided and replaced by the following:

Furnish drop-on glass beads in accordance with DMS-8290, "Glass Traffic Beads," or as approved. Furnish a double-drop of Type II and Type III drop-on glass beads for longitudinal pavement markings where each type bead is applied separately in equal portions (by weight), unless otherwise approved. Apply the Type III beads before applying the Type II beads. Furnish Type II beads for work zone pavement markings and transverse markings or symbols.

Section 4.3.1., "Type I Markings.," is supplemented by the following:

4.3.1.3. Spot Striping. Perform spot striping on a callout basis with a minimum callout quantity as shown on the plans.

Section 4.3.2., "Type II Markings.," is supplemented by the following:

4.3.2.1. Spot Striping. Perform spot striping on a callout basis with a minimum callout quantity as shown on the plans.

Section 4.4., "Retroreflectivity Requirements.," is voided and replaced by the following.

Type I markings for Contracts totaling more than 20,000 ft. of pavement markings must meet the following minimum retroreflectivity values for all longitudinal edgeline, centerline or no passing barrier-line, and lane line markings when measured any time after 3 days, but not later than 10 days after application.

- White markings: 250 millicandelas per square meter per lux (mcd/m^2/lx)
- Yellow markings: 175 mcd/m^2/lx

Retroreflectivity requirements for Type I markings are not required for Contracts with less than 20,000 ft. of pavement markings or Contracts with callout work, unless otherwise shown on the plans.

Section 4.5., "Retroreflectivity Measurements.," is voided and replaced by the following:

Use a mobile retroreflectometer to measure retroreflectivity for Contracts totaling more than 50,000 ft. of pavement markings, unless otherwise shown on the plans. For Contracts with less than 50,000 ft. of pavement markings, mobile or portable retroreflectometers may be used at the Contractor's discretion. Coordinate with and obtain authorization from the Engineer before starting any retroreflectivity data collection.

Section 4.5.1., "Mobile Retroreflectometer Measurements." The last paragraph is voided and replaced by the following.

Restripe again at the Contractor's expense with a minimum of 0.060 in. (60 mils) of Type I marking material if the average of these measurements falls below the minimum retroreflectivity requirements. Take measurements every 0.1 miles a minimum of 10 days after this third application within that mile segment for that series of markings. If the markings do not meet minimum retroreflectivity after this third application, the Engineer may require removal of all existing markings, a new application as initially specified, and a repeat of the application process until minimum retroreflectivity requirements are met.

Section 4.5.2., "Portable Retroreflectometer Measurements." The first and second paragraphs are voided and replaced by the following.

Provide portable measurement averages for every 1.0 mile unless otherwise specified or approved. Take a minimum of 20 measurements for each 1-mi. section of roadway for each series of markings (e.g., edgeline, center skip line, each line of a double line) and direction of traffic flow when using a portable reflectometer. Measure each line in both directions for centerlines on two-way roadways (i.e., measure both double solid lines in both directions and measure all center skip lines in both directions). The spacing between each measurement must be at least 100 ft. The Engineer may decrease the mileage frequency for measurements if the previous measurements provide satisfactory results. The Engineer may require the original number of measurements if concerns arise.

Restripe at the Contractor's expense with a minimum of 0.060 in. (60 mils) of Type I marking material if the averages of these measurements fail. Take a minimum of 10 more measurements after 10 days of this second application within that mile segment for that series of markings. Restripe again at the Contractor's expense with a minimum of 0.060 in. (60 mils) of Type I marking material if the average of these measurements falls below the minimum retroreflectivity requirements. If the markings do not meet minimum retroreflectivity after this third application, the Engineer may require removal of all existing markings, a new application as initially specified, and a repeat of the application process until minimum retroreflectivity requirements are met.

Section 4.6. "Performance Period." The first sentence is voided and replaced by the following:

All longitudinal markings must meet the minimum retroreflectivity requirements within the time frame specified. All markings must meet all other performance requirements of this specification for at least 30 calendar days after installation.

Article 6. "Payment." The first two paragraphs are voided and replaced by the following.

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Pavement Sealer" of the size specified; "Retroreflectorized Pavement Markings" of the type and color specified and the shape, width, size, and thickness (Type I markings only) specified, as applicable; "Retroreflectorized Pavement Markings with Retroreflective Requirements" of the types, colors, sizes, widths, and thicknesses specified; "Retroreflectorized Profile Pavement Markings" of the various types, colors, shapes, sizes, and widths specified; or "Reflectorized Pavement Marking (Call Out)" of the shape, width, size, and thickness (Type I markings only) specified, as applicable; or "Pavement Sealer (Call Out)" of the size specified.

This price is full compensation for materials, application of pavement markings, equipment, labor, tools, and incidentals.

Special Specification 3076
Dense-Graded Hot-Mix Asphalt

1. DESCRIPTION

Construct a hot-mix asphalt (HMA) pavement layer composed of a compacted, dense-graded mixture of aggregate and asphalt binder mixed hot in a mixing plant. Payment adjustments will apply to HMA placed under this specification unless the HMA is deemed exempt in accordance with Section 3076.4.9.4., "Exempt Production."

2. MATERIALS

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

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

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

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

For sources not listed on the Department's BRSQC:

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

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

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

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

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

2.1.1.2. **Micro-Deval Abrasion**. The Engineer will perform a minimum of one Micro-Deval abrasion test in accordance with Tex-461-A for each coarse aggregate source used in the mixture design that has a Rated Source Soundness Magnesium (RSSM) loss value greater than 15 as listed in the BRSQC. The Engineer will perform testing before the start of production and may perform additional testing at any time during production. The Engineer may obtain the coarse aggregate samples from each coarse aggregate source or may require the Contractor to obtain the samples. The Engineer may waive all Micro-Deval testing based on a satisfactory test history of the same aggregate source.

The Engineer will estimate the magnesium sulfate soundness loss for each coarse aggregate source, when tested, using the following formula:

$$Mg_{est.} = (RSSM)(MD_{act}/RSMD)$$

where:
$Mg_{est.}$ = magnesium sulfate soundness loss
$MD_{act.}$ = actual Micro-Deval percent loss
RSMD = Rated Source Micro-Deval

When the estimated magnesium sulfate soundness loss is greater than the maximum magnesium sulfate soundness loss specified, the coarse aggregate source will not be allowed for use unless otherwise approved. The Engineer will consult the Soils and Aggregates Section of the Materials and Tests Division, and additional testing may be required before granting approval.

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

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

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

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

Table 1
Aggregate Quality Requirements

Property	Test Method	Requirement
Coarse Aggregate		
SAC	Tex-499-A (AQMP)	As shown on the plans
Deleterious material, %, Max	Tex-217-F, Part I	1.5
Decantation, %, Max	Tex-217-F, Part II	1.5
Micro-Deval abrasion, %	Tex-461-A	Note 1
Los Angeles abrasion, %, Max	Tex-410-A	40
Magnesium sulfate soundness, 5 cycles, %, Max	Tex-411-A	30
Crushed face count,[2] %, Min	Tex-460-A, Part I	85
Flat and elongated particles @ 5:1, %, Max	Tex-280-F	10
Fine Aggregate		
Linear shrinkage, %, Max	Tex-107-E	3
Sand equivalent, %, Min	Tex-203-F	45

1. Used to estimate the magnesium sulfate soundness loss in accordance with Section 3076.2.1.1.2., "Micro-Deval Abrasion."
2. Only applies to crushed gravel.

Table 2
Gradation Requirements for Fine Aggregate

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

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

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

Table 3
Gradation Requirements for Mineral Filler

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

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

2.4. **Asphalt Binder**. Furnish the type and grade of performance-graded (PG) asphalt specified on the plans.

2.5. **Tack Coat**. Furnish CSS-1H, SS-1H, or a PG binder with a minimum high-temperature grade of PG 58 for tack coat binder in accordance with Item 300, "Asphalts, Oils, and Emulsions." Specialized tack coat materials listed on the Department's MPL are allowed or required when shown on the plans. Do not dilute emulsified asphalts at the terminal, in the field, or at any other location before use.

2.6. **Additives**. Use the type and rate of additive specified when shown on the plans. Additives that facilitate mixing, compaction, or improve the quality of the mixture are allowed when approved. Provide the Engineer with documentation such as the bill of lading showing the quantity of additives used in the project unless otherwise directed.

2.6.1. **Lime and Liquid Antistripping Agent**. When lime or a liquid antistripping agent is used, add in accordance with Item 301, "Asphalt Antistripping Agents." Do not add lime directly into the mixing drum of any plant where lime is removed through the exhaust stream unless the plant has a baghouse or dust collection system that reintroduces the lime into the drum.

2.6.2. **Warm Mix Asphalt (WMA)**. Warm Mix Asphalt (WMA) is defined as HMA that is produced within a target temperature discharge range of 215°F and 275°F using approved WMA additives or processes from the Department's MPL.

WMA is allowed for use on all projects and is required when shown on the plans. When WMA is required, the maximum placement or target discharge temperature for WMA will be set at a value below 275°F.

Department-approved WMA additives or processes may be used to facilitate mixing and compaction of HMA produced at target discharge temperatures above 275°F; however, such mixtures will not be defined as WMA.

2.6.3. **Compaction Aid.** Compaction Aid is defined as a chemical warm mix additive that is used to produce an asphalt mixture at a discharge temperature greater than 275°F.

Compaction Aid is allowed for use on all projects and is required when shown on the plans.

2.7. **Recycled Materials**. Use of RAP and RAS is permitted unless otherwise shown on the plans. Use of RAS is restricted to only intermediate and base mixes unless otherwise shown on the plans. Do not exceed the maximum allowable percentages of RAP and RAS shown in Table 4. The allowable percentages shown in Table 4 may be decreased or increased when shown on the plans. Determine the asphalt binder content and gradation of the RAP and RAS stockpiles for mixture design purposes in accordance with Tex-236-F, Part I. The Engineer may verify the asphalt binder content of the stockpiles at any time during production. Perform other tests on RAP and RAS when shown on the plans. Asphalt binder from RAP and RAS is designated as recycled asphalt binder. Calculate and ensure that the ratio of the recycled asphalt binder to total binder does not exceed the percentages shown in Table 5 during mixture design and HMA production when RAP or RAS is used. Use a separate cold feed bin for each stockpile of RAP and RAS during HMA production.

Surface, intermediate, and base mixes referenced in Tables 4 and 5 are defined as follows:

- **Surface**. The final HMA lift placed at the top of the pavement structure or placed directly below mixtures produced in accordance with Items 316, 342, 347, or 348;
- **Intermediate**. Mixtures placed below an HMA surface mix and less than or equal to 8.0 in. from the riding surface; and
- **Base**. Mixtures placed greater than 8.0 in. from the riding surface. Unless otherwise shown on the plans, mixtures used for bond breaker are defined as base mixtures.

2.7.1. **RAP**. RAP is salvaged, milled, pulverized, broken, or crushed asphalt pavement. Fractionated RAP is defined as a stockpile that contains RAP material with a minimum of 95.0% passing the 3/8-in. or 1/2-in. sieve, before burning in the ignition oven, unless otherwise approved. The Engineer may allow the Contractor to use an alternate to the 3/8-in. or 1/2-in. screen to fractionate the RAP.

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

Do not use Department- or Contractor-owned RAP contaminated with dirt or other objectionable materials. Do not use Department- or Contractor-owned RAP if the decantation value exceeds 5% and the plasticity index is greater than 8. Test the stockpiled RAP for decantation in accordance with Tex-406-A, Part I. Determine the plasticity index in accordance with Tex-106-E if the decantation value exceeds 5%. The decantation and plasticity index requirements do not apply to RAP samples with asphalt removed by extraction or ignition.

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

Table 4
Maximum Allowable Amounts of RAP[1]

Maximum Allowable Fractionated RAP (%)		
Surface	**Intermediate**	**Base**
15.0	25.0	30.0

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

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

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

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

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

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

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

Table 5
Allowable Substitute PG Binders and Maximum Recycled Binder Ratios

Originally Specified PG Binder	Allowable Substitute PG Binder for Surface Mixes	Allowable Substitute PG Binder for Intermediate and Base Mixes	Maximum Ratio of Recycled Binder[1] to Total Binder (%)		
			Surface	Intermediate	Base
76-22[4,5]	70-22	70-22	10.0	20.0	25.0
70-22[2,5]	N/A	64-22	10.0	20.0	25.0
64-22[2,3]	N/A	N/A	10.0	20.0	25.0
76-28[4,5]	70-28	70-28	10.0	20.0	25.0
70-28[2,5]	N/A	64-28	10.0	20.0	25.0
64-28[2,3]	N/A	N/A	10.0	20.0	25.0

1. Combined recycled binder from RAP and RAS. RAS is not permitted in surface mixtures unless otherwise shown on the plans.
2. Binder substitution is not allowed for surface mixtures.
3. Binder substitution is not allowed for intermediate and base mixtures.
4. Use no more than 10.0% recycled binder in surface mixtures when using this originally specified PG binder.
5. Use no more than 20.0% recycled binder when using this originally specified PG binder for intermediate mixtures. Use no more than 25.0% recycled binder when using this originally specified PG binder for base mixtures.

3. EQUIPMENT

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

4. CONSTRUCTION

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

4.1. **Certification**. Personnel certified by the Department-approved hot-mix asphalt certification program must conduct all mixture designs, sampling, and testing in accordance with Table 6. Supply the Engineer with a list of certified personnel and copies of their current certificates before beginning production and when personnel changes are made. Provide a mixture design developed and signed by a Level 2 certified specialist. Provide Level 1A certified specialists at the plant during production operations. Provide Level 1B certified specialists to conduct placement tests. Provide AGG101 certified specialists for aggregate testing.

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

Test Description	Test Method	Contractor	Engineer	Level[1]
1. Aggregate and Recycled Material Testing				
Sampling	Tex-221-F	✓	✓	1A/AGG101
Dry sieve	Tex-200-F, Part I	✓	✓	1A/AGG101
Washed sieve	Tex-200-F, Part II	✓	✓	1A/AGG101
Deleterious material	Tex-217-F, Parts I & III	✓	✓	AGG101
Decantation	Tex-217-F, Part II	✓	✓	AGG101
Los Angeles abrasion	Tex-410-A		✓	TxDOT
Magnesium sulfate soundness	Tex-411-A		✓	TxDOT
Micro-Deval abrasion	Tex-461-A		✓	AGG101
Crushed face count	Tex-460-A	✓	✓	AGG101
Flat and elongated particles	Tex-280-F	✓	✓	AGG101
Linear shrinkage	Tex-107-E	✓	✓	AGG101
Sand equivalent	Tex-203-F	✓	✓	AGG101
Organic impurities	Tex-408-A	✓	✓	AGG101
2. Asphalt Binder & Tack Coat Sampling				
Asphalt binder sampling	Tex-500-C, Part II	✓	✓	1A/1B
Tack coat sampling	Tex-500-C, Part III	✓	✓	1A/1B
3. Mix Design & Verification				
Design and JMF changes	Tex-204-F	✓	✓	2
Mixing	Tex-205-F	✓	✓	2
Molding (TGC)	Tex-206-F	✓	✓	1A
Molding (SGC)	Tex-241-F	✓	✓	1A
Laboratory-molded density	Tex-207-F, Parts I & VI	✓	✓	1A
Rice gravity	Tex-227-F, Part II	✓	✓	1A
Ignition oven correction factors[2]	Tex-236-F, Part II	✓	✓	2
Indirect tensile strength	Tex-226-F	✓	✓	1A
Hamburg Wheel test	Tex-242-F	✓	✓	1A
Boil test	Tex-530-C	✓	✓	1A
4. Production Testing				
Selecting production random numbers	Tex-225-F, Part I		✓	1A
Mixture sampling	Tex-222-F	✓	✓	1A/1B
Molding (TGC)	Tex-206-F	✓	✓	1A
Molding (SGC)	Tex-241-F	✓	✓	1A
Laboratory-molded density	Tex-207-F, Parts I & VI	✓	✓	1A
Rice gravity	Tex-227-F, Part II	✓	✓	1A
Gradation & asphalt binder content[2]	Tex-236-F, Part I	✓	✓	1A
Control charts	Tex-233-F	✓	✓	1A
Moisture content	Tex-212-F, Part II	✓	✓	1A/AGG101
Hamburg Wheel test	Tex-242-F	✓	✓	1A
Micro-Deval abrasion	Tex-461-A		✓	AGG101
Boil test	Tex-530-C	✓	✓	1A
Abson recovery	Tex-211-F		✓	TxDOT
5. Placement Testing				
Selecting placement random numbers	Tex-225-F, Part II		✓	1B
Trimming roadway cores	Tex-251-F, Parts I & II	✓	✓	1A/1B
In-place air voids	Tex-207-F, Parts I & VI	✓	✓	1A
In-place density (nuclear method)	Tex-207-F, Part III	✓		1B
Establish rolling pattern	Tex-207-F, Part IV	✓		1B
Control charts	Tex-233-F	✓	✓	1A
Ride quality measurement	Tex-1001-S	✓	✓	Note 3
Segregation (density profile)	Tex-207-F, Part V	✓	✓	1B
Longitudinal joint density	Tex-207-F, Part VII	✓	✓	1B
Thermal profile	Tex-244-F	✓	✓	1B
Shear Bond Strength Test	Tex-249-F		✓	TxDOT

1. Level 1A, 1B, AGG101, and 2 are certification levels provided by the Hot Mix Asphalt Center certification program.
2. Refer to Section 3076.4.9.2.3., "Production Testing," for exceptions to using an ignition oven.
3. Profiler and operator are required to be certified at the Texas A&M Transportation Institute facility when Surface Test Type B is specified.

4.2. **Reporting and Responsibilities**. Use Department-provided templates to record and calculate all test data, including mixture design, production and placement QC/QA, control charts, thermal profiles, segregation density profiles, and longitudinal joint density. Obtain the current version of the templates at http://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/forms/site-manager.html or from the Engineer. The Engineer and the Contractor will provide any available test results to the other party when requested. The maximum allowable time for the Contractor and Engineer to exchange test data is as given in Table 7 unless otherwise approved. The Engineer and the Contractor will immediately report to the other party any test result that requires suspension of production or placement, a payment adjustment less than 1.000, or that fails to meet the specification requirements. Record and electronically submit all test results and pertinent information on Department-provided templates.

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

Table 7
Reporting Schedule

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

1. These tests are required on every sublot.
2. Optional test. When performed on split samples, report the results as soon as they become available.
3. To be performed at the frequency specified in Table 16 or as shown on the plans.
4. To be reported as soon as the results become available.
5. 2 days are allowed if cores cannot be dried to constant weight within 1 day.

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

Use the procedures described in Tex-233-F to plot the results of all quality control (QC) and quality assurance (QA) testing. Update the control charts as soon as test results for each sublot become available. Make the control charts readily accessible at the field laboratory. The Engineer may suspend production for failure to update control charts.

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

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

4.3.1. **Project Personnel**. For project personnel, include:

- a list of individuals responsible for QC with authority to take corrective action;
- current contact information for each individual listed; and
- current copies of certification documents for individuals performing specified QC functions.

4.3.2. **Material Delivery and Storage**. For material delivery and storage, include:

- the sequence of material processing, delivery, and minimum quantities to assure continuous plant operations;
- aggregate stockpiling procedures to avoid contamination and segregation;
- frequency, type, and timing of aggregate stockpile testing to assure conformance of material requirements before mixture production; and
- procedure for monitoring the quality and variability of asphalt binder.

4.3.3. **Production**. For production, include:

- loader operation procedures to avoid contamination in cold bins;
- procedures for calibrating and controlling cold feeds;
- procedures to eliminate debris or oversized material;
- procedures for adding and verifying rates of each applicable mixture component (e.g., aggregate, asphalt binder, RAP, RAS, lime, liquid antistrip, WMA);
- procedures for reporting job control test results; and
- procedures to avoid segregation and drain-down in the silo.

4.3.4. **Loading and Transporting**. For loading and transporting, include:

- type and application method for release agents; and
- truck loading procedures to avoid segregation.

4.3.5. **Placement and Compaction**. For placement and compaction, include:

- proposed agenda for mandatory pre-paving meeting, including date and location;
- proposed paving plan (e.g., paving widths, joint offsets, and lift thicknesses);
- type and application method for release agents in the paver and on rollers, shovels, lutes, and other utensils;
- procedures for the transfer of mixture into the paver, while avoiding segregation and preventing material spillage;
- process to balance production, delivery, paving, and compaction to achieve continuous placement operations and good ride quality;
- paver operations (e.g., operation of wings, height of mixture in auger chamber) to avoid physical and thermal segregation and other surface irregularities; and
- procedures to construct quality longitudinal and transverse joints.

4.4. **Mixture Design**.

4.4.1. **Design Requirements**. The Contractor will design the mixture using a Superpave Gyratory Compactor (SGC). A Texas Gyratory Compactor (TGC) may be used when shown on the plans. Use the dense-graded design procedure provided in Tex-204-F. Design the mixture to meet the requirements listed in Tables 1, 2, 3, 4, 5, 8, 9, and 10.

4.4.1.1. **Design Number of Gyrations (Ndesign) When The SGC Is Used**. Design the mixture at 50 gyrations (Ndesign). Use a target laboratory-molded density of 96.0% to design the mixture; however, adjustments can be made to the Ndesign value as noted in Table 9. The Ndesign level may be reduced to at least 35 gyrations at the Contractor's discretion.

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

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

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

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

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

Sieve Size	B Fine Base	C Coarse Surface	D Fine Surface	F Fine Mixture
2"	–	–	–	–
1-1/2"	100.0[1]	–	–	–
1"	98.0–100.0	100.0[1]	–	–
3/4"	84.0–98.0	95.0–100.0	100.0[1]	–
1/2"	–	–	98.0–100.0	100.0[1]
3/8"	60.0–80.0	70.0–85.0	85.0–100.0	98.0–100.0
#4	40.0–60.0	43.0–63.0	50.0–70.0	70.0–90.0
#8	29.0–43.0	32.0–44.0	35.0–46.0	38.0–48.0
#30	13.0–28.0	14.0–28.0	15.0–29.0	12.0–27.0
#50	6.0–20.0	7.0–21.0	7.0–20.0	6.0–19.0
#200	2.0–7.0	2.0–7.0	2.0–7.0	2.0–7.0
Design VMA, % Minimum				
–	13.0	14.0	15.0	16.0
Production (Plant-Produced) VMA, % Minimum				
–	12.5	13.5	14.5	15.5

1. Defined as maximum sieve size. No tolerance allowed.

Table 9
Laboratory Mixture Design Properties

Mixture Property	Test Method	Requirement
Target laboratory-molded density, % (SGC)	Tex-207-F	96.0
Design gyrations (Ndesign for SGC)	Tex-241-F	50[1]
Indirect tensile strength (dry), psi	Tex-226-F	85–200[2]
Boil test[3]	Tex-530-C	–

1. Adjust within a range of 35–100 gyrations when shown on the plans or specification or when mutually agreed between the Engineer and Contractor.
2. The Engineer may allow the IDT strength to exceed 200 psi if the corresponding Hamburg Wheel rut depth is greater than 3.0 mm and less than 12.5 mm.
3. Used to establish baseline for comparison to production results. May be waived when approved.

Table 10
Hamburg Wheel Test Requirements

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

1. When the rut depth at the required minimum number of passes is less than 3 mm, the Engineer may require the Contractor to increase the target laboratory-molded density (TGC) by 0.5% to no more than 97.5% or lower the Ndesign level (SGC) to at least 35 gyrations.
2. May be decreased to at least 5,000 passes when shown on the plans.
3. May be decreased to at least 10,000 passes when shown on the plans.

4.4.1.2. **Target Laboratory-Molded Density When The TGC Is Used**. Design the mixture at a 96.5% target laboratory-molded density. Increase the target laboratory-molded density to 97.0% or 97.5% at the Contractor's discretion or when shown on the plans or specification.

4.4.2. **Job-Mix Formula Approval**. The job-mix formula (JMF) is the combined aggregate gradation, target laboratory-molded density (or Ndesign level), and target asphalt percentage used to establish target values for hot-mix production. JMF1 is the original laboratory mixture design used to produce the trial batch. When WMA is used, JMF1 may be designed and submitted to the Engineer without including the WMA additive. When WMA is used, document the additive or process used and recommended rate on the JMF1 submittal. The Engineer and the Contractor will verify JMF1 based on plant-produced mixture from the trial batch unless otherwise approved. The Engineer may accept an existing mixture design previously used on a Department project and may waive the trial batch to verify JMF1. The Department may require the Contractor to reimburse the Department for verification tests if more than 2 trial batches per design are required.

4.4.2.1. **Contractor's Responsibilities**.

4.4.2.1.1. **Providing Gyratory Compactor**. Use a SGC calibrated in accordance with Tex-241-F to design the mixture in accordance with Tex-204-F, Part IV, for molding production samples. Locate the SGC, if used, at the Engineer's field laboratory and make the SGC available to the Engineer for use in molding production samples. Furnish a TGC calibrated in accordance with Tex-914-K when shown on the plans to design the mixture in accordance with Tex-204-F, Part I, for molding production samples.

4.4.2.1.2. **Gyratory Compactor Correlation Factors**. Use Tex-206-F, Part II, to perform a gyratory compactor correlation when the Engineer uses a different gyratory compactor. Apply the correlation factor to all subsequent production test results.

4.4.2.1.3. **Submitting JMF1**. Furnish a mix design report (JMF1) with representative samples of all component materials and request approval to produce the trial batch. Provide approximately 10,000 g of the design mixture if opting to have the Department perform the Hamburg Wheel test on the laboratory mixture, and request that the Department perform the test.

4.4.2.1.4. **Supplying Aggregates**. Provide approximately 40 lb. of each aggregate stockpile unless otherwise directed.

4.4.2.1.5. **Supplying Asphalt**. Provide at least 1 gal. of the asphalt material and enough quantities of any additives proposed for use.

4.4.2.1.6. **Ignition Oven Correction Factors**. Determine the aggregate and asphalt correction factors from the ignition oven in accordance with Tex-236-F, Part II. Provide correction factors that are not more than 12 months old. Provide the Engineer with split samples of the mixtures before the trial batch production, including all additives (except water), and blank samples used to determine the correction factors for the ignition oven used for QA testing during production. Correction factors established from a previously approved mixture design may be used for the current mixture design if the mixture design and ignition oven are the same as previously used, unless otherwise directed.

4.4.2.1.7. **Boil Test**. Perform the test and retain the tested sample from Tex-530-C until completion of the project or as directed. Use this sample for comparison purposes during production. The Engineer may waive the requirement for the boil test.

4.4.2.1.8. **Trial Batch Production**. Provide a plant-produced trial batch upon receiving conditional approval of JMF1 and authorization to produce a trial batch, including the WMA additive or process if applicable, for verification testing of JMF1 and development of JMF2. Produce a trial batch mixture that meets the requirements in Table 4, Table 5, and Table 11. The Engineer may accept test results from recent production of the same mixture instead of a new trial batch.

4.4.2.1.9. **Trial Batch Production Equipment**. Use only equipment and materials proposed for use on the project to produce the trial batch.

4.4.2.1.10. **Trial Batch Quantity**. Produce enough quantity of the trial batch to ensure that the mixture meets the specification requirements.

4.4.2.1.11. **Number of Trial Batches**. Produce trial batches as necessary to obtain a mixture that meets the specification requirements.

4.4.2.1.12. **Trial Batch Sampling**. Obtain a representative sample of the trial batch and split it into 3 equal portions in accordance with Tex-222-F. Label these portions as “Contractor,” “Engineer,” and “Referee.” Deliver samples to the appropriate laboratory as directed.

4.4.2.1.13. **Trial Batch Testing**. Test the trial batch to ensure the mixture produced using the proposed JMF1 meets the mixture requirements in Table 11. Ensure the trial batch mixture is also in compliance with the Hamburg Wheel requirement in Table 10. Use a Department-approved laboratory to perform the Hamburg Wheel test on the trial batch mixture or request that the Department perform the Hamburg Wheel test. The Engineer will be allowed 10 working days to provide the Contractor with Hamburg Wheel test results on the trial batch. Provide the Engineer with a copy of the trial batch test results.

4.4.2.1.14. **Development of JMF2**. Evaluate the trial batch test results after the Engineer grants full approval of JMF1 based on results from the trial batch, determine the optimum mixture proportions, and submit as JMF2. Adjust the asphalt binder content or gradation to achieve the specified target laboratory-molded density. The asphalt binder content established for JMF2 is not required to be within any tolerance of the optimum asphalt binder content established for JMF1; however, mixture produced using JMF2 must meet the voids in mineral aggregates (VMA) requirements for production shown in Table 8. If the optimum asphalt binder content for JMF2 is more than 0.5% lower than the optimum asphalt binder content for JMF1, the Engineer may perform or require the Contractor to perform Tex-226-F on Lot 1 production to confirm the indirect tensile strength does not exceed 200 psi. Verify that JMF2 meets the mixture requirements in Table 5.

4.4.2.1.15. **Mixture Production**. Use JMF2 to produce Lot 1 as described in Section 3076.4.9.3.1.1., “Lot 1 Placement,” after receiving approval for JMF2 and a passing result from the Department’s or a Department-approved

laboratory's Hamburg Wheel test on the trial batch. If desired, proceed to Lot 1 production, once JMF2 is approved, at the Contractor's risk without receiving the results from the Department's Hamburg Wheel test on the trial batch.

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

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

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

- be provided to the Engineer in writing before the start of a new lot;
- be numbered in sequence to the previous JMF;
- meet the mixture requirements in Table 4 and Table 5;
- meet the master gradation limits shown in Table 8; and
- be within the operational tolerances of JMF2 listed in Table 11.

4.4.2.1.18. **Requesting Referee Testing**. Use referee testing, if needed, in accordance with Section 3076.4.9.1., "Referee Testing," to resolve testing differences with the Engineer.

Table 11
Operational Tolerances

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

1. Contractor may request referee testing only when values exceed these tolerances.
2. When within these tolerances, mixture production gradations may fall outside the master grading limits; however, the % passing the #200 will be considered out of tolerance when outside the master grading limits.
3. Only applies to mixture produced for Lot 1 and higher.
4. Test and verify that Table 8 requirements are met.

4.4.2.2. **Engineer's Responsibilities**.

4.4.2.2.1. **Gyratory Compactor**. For SGC mixtures designed in accordance with Tex-204-F, Part IV, the Engineer will use a Department SGC, calibrated in accordance with Tex-241-F, to mold samples for laboratory mixture design verification. For molding trial batch and production specimens, the Engineer will use the Contractor-provided SGC at the field laboratory or provide and use a Department SGC at an alternate location. The Engineer will make the Contractor-provided SGC in the Department field laboratory available to the Contractor for molding verification samples.

For TGC mixtures designed in accordance with Tex-204-F, Part I, the Engineer will use a Department TGC, calibrated in accordance with Tex-914-K, to mold samples for trial batch and production testing. The Engineer will make the Department TGC and the Department field laboratory available to the Contractor for molding verification samples, if requested by the Contractor.

4.4.2.2.2. **Conditional Approval of JMF1 and Authorizing Trial Batch**. The Engineer will review and verify conformance of the following information within 2 working days of receipt:

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

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

Unless waived, the Engineer will determine the Micro-Deval abrasion loss in accordance with Section 3076.2.1.1.2., "Micro-Deval Abrasion." If the Engineer's test results are pending after two working days, conditional approval of JMF1 will still be granted within two working days of receiving JMF1. When the Engineer's test results become available, they will be used for specification compliance.

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

4.4.2.2.3. **Hamburg Wheel Testing of JMF1**. If the Contractor requests the option to have the Department perform the Hamburg Wheel test on the laboratory mixture, the Engineer will mold samples in accordance with Tex-242-F to verify compliance with the Hamburg Wheel test requirement in Table 10.

4.4.2.2.4. **Ignition Oven Correction Factors**. The Engineer will use the split samples provided by the Contractor to determine the aggregate and asphalt correction factors for the ignition oven used for QA testing during production in accordance with Tex-236-F, Part II. Provide correction factors that are not more than 12 months old.

4.4.2.2.5. **Testing the Trial Batch**. Within 1 full working day, the Engineer will sample and test the trial batch to ensure that the mixture meets the requirements in Table 11. If the Contractor requests the option to have the Department perform the Hamburg Wheel test on the trial batch mixture, the Engineer will mold samples in accordance with Tex-242-F to verify compliance with the Hamburg Wheel test requirement in Table 10.

The Engineer will have the option to perform the following tests on the trial batch:

- Tex-226-F, to verify that the indirect tensile strength meets the requirement shown in Table 9; and
- Tex-530-C, to retain and use for comparison purposes during production.

4.4.2.2.6. **Full Approval of JMF1**. The Engineer will grant full approval of JMF1 and authorize the Contractor to proceed with developing JMF2 if the Engineer's results for the trial batch meet the requirements in Table 11. The Engineer will notify the Contractor that an additional trial batch is required if the trial batch does not meet these requirements.

4.4.2.2.7. **Approval of JMF2**. The Engineer will approve JMF2 within one working day if the mixture meets the requirements in Table 5 and the gradation meets the master grading limits shown in Table 8. The asphalt binder content established for JMF2 is not required to be within any tolerance of the optimum asphalt binder content established for JMF1; however, mixture produced using JMF2 must meet the VMA requirements shown in Table 8. If the optimum asphalt binder content for JMF2 is more than 0.5% lower than the optimum asphalt binder content for JMF1, the Engineer may perform or require the Contractor to perform Tex-226-F on Lot 1 production to confirm the indirect tensile strength does not exceed 200 psi.

4.4.2.2.8. **Approval of Lot 1 Production**. The Engineer will authorize the Contractor to proceed with Lot 1 production (using JMF2) as soon as a passing result is achieved from the Department's or a Department-approved laboratory's Hamburg Wheel test on the trial batch. The Contractor may proceed at its own risk with Lot 1 production without the results from the Hamburg Wheel test on the trial batch.

If the Department's or Department-approved laboratory's sample from the trial batch fails the Hamburg Wheel test, the Engineer will suspend production until further Hamburg Wheel tests meet the specified values. The Engineer may require up to the entire sublot of any mixture failing the Hamburg Wheel test be removed and replaced at the Contractor's expense.

4.4.2.2.9. **Approval of JMF3 and Subsequent JMF Changes**. JMF3 and subsequent JMF changes are approved if they meet the mixture requirements shown in Table 4, Table 5, and the master grading limits shown in Table 8, and are within the operational tolerances of JMF2 shown in Table 11.

4.5. **Production Operations**. Perform a new trial batch when the plant or plant location is changed. Take corrective action and receive approval to proceed after any production suspension for noncompliance to the specification. Submit a new mix design and perform a new trial batch when the asphalt binder content of:

- any RAP stockpile used in the mix is more than 0.5% higher than the value shown on the mixture design report; or
- RAS stockpile used in the mix is more than 2.0% higher than the value shown on the mixture design report.

4.5.1. **Storage and Heating of Materials**. Do not heat the asphalt binder above the temperatures specified in Item 300, "Asphalts, Oils, and Emulsions," or outside the manufacturer's recommended values. Provide the Engineer with daily records of asphalt binder and hot-mix asphalt discharge temperatures (in legible and discernible increments) in accordance with Item 320, "Equipment for Asphalt Concrete Pavement," unless otherwise directed. Do not store mixture for a period long enough to affect the quality of the mixture, nor in any case longer than 12 hr. unless otherwise approved.

4.5.2. **Mixing and Discharge of Materials**. Notify the Engineer of the target discharge temperature and produce the mixture within 25°F of the target. Monitor the temperature of the material in the truck before shipping to ensure that it does not exceed the maximum production temperatures listed in Table 12 (or 275°F for WMA). The Department will not pay for or allow placement of any mixture produced above the maximum production temperatures listed in Table 12.

Table 12
Maximum Production Temperature

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

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

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

Control the mixing time and temperature so that substantially all moisture is removed from the mixture before discharging from the plant. Determine the moisture content, if requested, by oven-drying in accordance with

Tex-212-F, Part II, and verify that the mixture contains no more than 0.2% of moisture by weight. Obtain the sample immediately after discharging the mixture into the truck, and perform the test promptly.

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

Use equipment for hauling as defined in Section 3076.4.7.3.3., "Hauling Equipment." Use other hauling equipment only when allowed.

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

Prepare the surface by removing raised pavement markers and objectionable material such as moisture, dirt, sand, leaves, and other loose impediments from the surface before placing mixture. Remove vegetation from pavement edges. Place the mixture to meet the typical section requirements and produce a smooth, finished surface with a uniform appearance and texture. Offset longitudinal joints of successive courses of hot-mix by at least 6 in. Place mixture so that longitudinal joints on the surface course coincide with lane lines and are not placed in the wheel path, or as directed. Ensure that all finished surfaces will drain properly. Place the mixture at the rate or thickness shown on the plans. The Engineer will use the guidelines in Table 13 to determine the compacted lift thickness of each layer when multiple lifts are required. The thickness determined is based on the rate of 110 lb./sq. yd. for each inch of pavement unless otherwise shown on the plans.

Table 13
Compacted Lift Thickness and Required Core Height

Mixture Type	Compacted Lift Thickness Guidelines		Minimum Untrimmed Core Height (in.) Eligible for Testing
	Minimum (in.)	Maximum (in.)	
B	2.50	5.00	1.75
C	2.00	4.00	1.50
D	1.50	3.00	1.25
F	1.25	2.50	1.25

4.7.1. **Weather Conditions**.

4.7.1.1. **When Using a Thermal Imaging System**. Place mixture when the roadway surface is dry and the roadway surface temperature is at or above the temperatures listed in Table 14A. The Engineer may restrict the Contractor from paving surface mixtures if the ambient temperature is likely to drop below 32°F within 12 hr. of paving. Place mixtures only when weather conditions and moisture conditions of the roadway surface are suitable as determined by the Engineer. Provide output data from the thermal imaging system to demonstrate to the Engineer that no recurring severe thermal segregation exists in accordance with Section 3076.4.7.3.1.2., "Thermal Imaging System."

Table 14A
Minimum Pavement Surface Temperatures

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

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

4.7.1.2. **When Not Using a Thermal Imaging System**. When using a thermal camera instead of the thermal imaging system, place mixture when the roadway surface temperature is at or above the temperatures listed in Table 14B unless otherwise approved or as shown on the plans. Measure the roadway surface temperature with a hand-held thermal camera or infrared thermometer. The Engineer may allow mixture placement to begin before the roadway surface reaches the required temperature if conditions are such that the roadway surface will reach the required temperature within 2 hr. of beginning placement operations. Place mixtures only when weather conditions and moisture conditions of the roadway surface are suitable as determined by the Engineer. The Engineer may restrict the Contractor from paving if the ambient temperature is likely to drop below 32°F within 12 hr. of paving.

Table 14B
Minimum Pavement Surface Temperatures

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

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

4.7.2. **Tack Coat**.

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

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

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

4.7.3. **Lay-Down Operations**. Use the placement temperatures in Table 15 to establish the minimum placement temperature of the mixture delivered to the paver.

Table 15
Minimum Mixture Placement Temperature

High-Temperature Binder Grade[1]	Minimum Placement Temperature (Before Entering Paver)[2,3]
PG 64	260˚F
PG 70	270˚F
PG 76	280˚F

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

4.7.3.1. **Thermal Profile**. Use a hand-held thermal camera or a thermal imaging system to obtain a continuous thermal profile in accordance with Tex-244-F. Thermal profiles are not applicable in areas described in Section 3076.4.9.3.1.4., "Miscellaneous Areas."

4.7.3.1.1. **Thermal Segregation**.

4.7.3.1.1.1. **Moderate**. Any areas that have a temperature differential greater than 25°F, but not exceeding 50°F, are deemed as moderate thermal segregation.

4.7.3.1.1.2. **Severe**. Any areas that have a temperature differential greater than 50°F are deemed as severe thermal segregation.

4.7.3.1.2. **Thermal Imaging System**. Review the output results when a thermal imaging system is used, and provide the automated report described in Tex-244-F to the Engineer daily unless otherwise directed. Modify the paving process as necessary to eliminate any recurring (moderate or severe) thermal segregation identified by the thermal imaging system. The Engineer may suspend paving operations if the Contractor cannot successfully modify the paving process to eliminate recurring severe thermal segregation. Density profiles are not required and not applicable when using a thermal imaging system. Provide the Engineer with electronic copies of all daily data files that can be used with the thermal imaging system software to generate temperature profile plots daily or upon completion of the project or as requested by the Engineer.

4.7.3.1.3. **Thermal Camera**. When using a thermal camera instead of the thermal imaging system, take immediate corrective action to eliminate recurring moderate thermal segregation when a hand-held thermal camera is used. Evaluate areas with moderate thermal segregation by performing density profiles in accordance with Section 3076.4.9.3.3.2., "Segregation (Density Profile)." Provide the Engineer with the thermal profile of every sublot within one working day of the completion of each lot. When requested by the Engineer, provide the thermal images generated using the thermal camera. Report the results of each thermal profile in accordance with Section 3076.4.2., "Reporting and Responsibilities." The Engineer will use a hand-held thermal camera to obtain a thermal profile at least once per project. No production or placement payment adjustments greater than 1.000 will be paid for any sublot that contains severe thermal segregation. Suspend operations and take immediate corrective action to eliminate severe thermal segregation unless otherwise directed. Resume operations when the Engineer determines that subsequent production will meet the requirements of this Section. Evaluate areas with severe thermal segregation by performing density profiles in accordance with Section 3076.4.9.3.3.2., "Segregation (Density Profile)." Remove and replace the material in any areas that have both severe thermal segregation and a failing result for Segregation (Density Profile) unless otherwise directed. The sublot in question may receive a production and placement payment adjustment greater than 1.000, if applicable, when the defective material is successfully removed and replaced.

4.7.3.2. **Windrow Operations**. Operate windrow pickup equipment so that when hot-mix is placed in windrows, substantially all the mixture deposited on the roadbed is picked up and loaded into the paver.

4.7.3.3. **Hauling Equipment**. Use belly dumps, live bottom, or end dump trucks to haul and transfer mixture; however, with exception of paving miscellaneous areas, end dump trucks are only allowed when used in conjunction with an MTD with remixing capability or when a thermal imaging system is used unless otherwise allowed.

4.7.3.4. **Screed Heaters**. Turn off screed heaters to prevent overheating of the mat if the paver stops for more than 5 min. The Engineer may evaluate the suspect area in accordance with Section 3076.4.9.3.3.4., "Recovered Asphalt Dynamic Shear Rheometer (DSR)," if the screed heater remains on for more than 5 min. while the paver is stopped.

4.8. **Compaction**. Compact the pavement uniformly to contain between 3.8% and 8.5% in-place air voids. Take immediate corrective action to bring the operation within 3.8% and 8.5% when the in-place air voids exceed the range of these tolerances. The Engineer will allow paving to resume when the proposed corrective action is likely to yield between 3.8% and 8.5% in-place air voids.

Obtain cores in areas placed under Exempt Production, as directed, at locations determined by the Engineer. The Engineer may test these cores and suspend operations or require removal and replacement if the in-place air voids are less than 2.7% or more than 9.9%. Areas defined in Section 3076.4.9.3.1.4., "Miscellaneous Areas," are not subject to in-place air void determination.

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

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

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

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

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

4.9. **Acceptance Plan**. Payment adjustments for the material will be in accordance with Article 3076.6., "Payment."

Sample and test the hot-mix on a lot and sublot basis. Suspend production until test results or other information indicates to the satisfaction of the Engineer that the next material produced or placed will result in payment factors of at least 1.000, if the production payment factor given in Section 3076.6.1., "Production Payment Adjustment Factors," for two consecutive lots or the placement pay factor given in Section 3076.6.2., "Placement Payment Adjustment Factors," for two consecutive lots is below 1.000.

4.9.1. **Referee Testing**. The Materials and Tests Division is the referee laboratory. The Contractor may request referee testing if a "remove and replace" condition is determined based on the Engineer's test results, or if the differences between Contractor and Engineer test results exceed the maximum allowable difference shown in Table 11 and the differences cannot be resolved. The Contractor may also request referee testing if the Engineer's test results require suspension of production and the Contractor's test results are within specification limits. Make the request within five working days after receiving test results and cores from the Engineer. Referee tests will be performed only on the sublot in question and only for the particular tests in question. Allow 10 working days from the time the referee laboratory receives the samples for test results to

be reported. The Department may require the Contractor to reimburse the Department for referee tests if more than three referee tests per project are required and the Engineer's test results are closer to the referee test results than the Contractor's test results.

The Materials and Tests Division will determine the laboratory-molded density based on the molded specific gravity and the maximum theoretical specific gravity of the referee sample. The in-place air voids will be determined based on the bulk specific gravity of the cores, as determined by the referee laboratory and the Engineer's average maximum theoretical specific gravity for the lot. With the exception of "remove and replace" conditions, referee test results are final and will establish payment adjustment factors for the sublot in question. The Contractor may decline referee testing and accept the Engineer's test results when the placement payment adjustment factor for any sublot results in a "remove and replace" condition. Placement sublots subject to be removed and replaced will be further evaluated in accordance with Section 3076.6.2.2., "Placement Sublots Subject to Removal and Replacement."

4.9.2. **Production Acceptance**.

4.9.2.1. **Production Lot**. A production lot consists of four equal sublots. The default quantity for Lot 1 is 1,000 tons; however, when requested by the Contractor, the Engineer may increase the quantity for Lot 1 to no more than 4,000 tons. The Engineer will select subsequent lot sizes based on the anticipated daily production such that approximately three to four sublots are produced each day. The lot size will be between 1,000 tons and 4,000 tons. The Engineer may change the lot size before the Contractor begins any lot.

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

4.9.2.1.1. **Incomplete Production Lots**. If a lot is begun but cannot be completed, such as on the last day of production or in other circumstances deemed appropriate, the Engineer may close the lot. Adjust the payment for the incomplete lot in accordance with Section 3076.6.1., "Production Payment Adjustment Factors." Close all lots within five working days unless otherwise allowed.

4.9.2.2. **Production Sampling**.

4.9.2.2.1. **Mixture Sampling**. Obtain hot-mix samples from trucks at the plant in accordance with Tex-222-F. The sampler will split each sample into three equal portions in accordance with Tex-200-F and label these portions as "Contractor," "Engineer," and "Referee." The Engineer will perform or witness the sample splitting and take immediate possession of the samples labeled "Engineer" and "Referee." The Engineer will maintain the custody of the samples labeled "Engineer" and "Referee" until the Department's testing is completed.

4.9.2.2.1.1. **Random Sample**. At the beginning of the project, the Engineer will select random numbers for all production sublots. Determine sample locations in accordance with Tex-225-F. Take one sample for each sublot at the randomly selected location. The Engineer will perform or witness the sampling of production sublots.

4.9.2.2.1.2. **Blind Sample**. For one sublot per lot, the Engineer will obtain and test a "blind" sample instead of the random sample collected by the Contractor. Test either the "blind" or the random sample; however, referee testing (if applicable) will be based on a comparison of results from the "blind" sample. The location of the Engineer's "blind" sample will not be disclosed to the Contractor. The Engineer's "blind" sample may be randomly selected in accordance with Tex-225-F for any sublot or selected at the discretion of the Engineer. The Engineer will use the Contractor's split sample for sublots not sampled by the Engineer.

4.9.2.2.2. **Informational Shear Bond Strength Testing.** Select one random sublot from Lot 2 or higher for shear bond strength testing. Obtain full depth cores in accordance with Tex-249-F. Label the cores with the Control Section Job (CSJ), producer of the tack coat, mix type, shot rate, lot, and sublot number and provide to the

Engineer. The Engineer will ship the cores to the Materials and Tests Division or district laboratory for shear bond strength testing. Results from these tests will not be used for specification compliance.

4.9.2.2.3. **Asphalt Binder Sampling**. Obtain a 1-qt. sample of the asphalt binder witnessed by the Engineer for each lot of mixture produced. The Contractor will notify the Engineer when the sampling will occur. Obtain the sample at approximately the same time the mixture random sample is obtained. Sample from a port located immediately upstream from the mixing drum or pug mill and upstream from the introduction of any additives in accordance with Tex-500-C, Part II. Label the can with the corresponding lot and sublot numbers, producer, producer facility location, grade, district, date sampled, and project information including highway and CSJ. The Engineer will retain these samples for one year. The Engineer may also obtain independent samples. If obtaining an independent asphalt binder sample and upon request of the Contractor, the Engineer will split a sample of the asphalt binder with the Contractor.

At least once per project, the Engineer will collect split samples of each binder grade and source used. The Engineer will submit one split sample to MTD to verify compliance with Item 300, “Asphalts, Oils, and Emulsions” and will retain the other split sample for one year.

4.9.2.3. **Production Testing**. The Contractor and Engineer must perform production tests in accordance with Table 16. The Contractor has the option to verify the Engineer’s test results on split samples provided by the Engineer. Determine compliance with operational tolerances listed in Table 11 for all sublots.

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

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

Table 16
Production and Placement Testing Frequency

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

1. For production defined in Section 3076.4.9.4., "Exempt Production," the Engineer will test one per day if 100 tons or more are produced. For Exempt Production, no testing is required when less than 100 tons are produced.
2. Not required when a thermal imaging system is used.
3. Testing performed by the Materials and Tests Division or designated laboratory.
4. Obtain witnessed by the Engineer. The Engineer will retain these samples for one year.
5. The Engineer may reduce or waive the sampling and testing requirements based on a satisfactory test history.
6. Testing performed by the Materials and Tests Division or District for informational purposes only.

4.9.2.4. **Operational Tolerances**. Control the production process within the operational tolerances listed in Table 11. When production is suspended, the Engineer will allow production to resume when test results or other information indicates the next mixture produced will be within the operational tolerances.

4.9.2.4.1. **Gradation**. Suspend operation and take corrective action if any aggregate is retained on the maximum sieve size shown in Table 8. A sublot is defined as out of tolerance if either the Engineer's or the Contractor's test results are out of operational tolerance. Suspend production when test results for gradation exceed the operational tolerances in Table 11 for three consecutive sublots on the same sieve or four consecutive sublots on any sieve unless otherwise directed. The consecutive sublots may be from more than one lot.

4.9.2.4.2. **Asphalt Binder Content**. A sublot is defined as out of operational tolerance if either the Engineer's or the Contractor's test results exceed the values listed in Table 11. No production or placement payment adjustments greater than 1.000 will be paid for any sublot that is out of operational tolerance for asphalt binder content. Suspend production and shipment of the mixture if the Engineer's or the Contractor's asphalt binder content deviates from the current JMF by more than 0.5% for any sublot.

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

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

meet the minimum VMA requirement for production listed in Table 8 based on the Engineer's VMA determination.

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

4.9.2.4.4. **Hamburg Wheel Test**. The Engineer may perform a Hamburg Wheel test at any time during production, including when the boil test indicates a change in quality from the materials submitted for JMF1. In addition to testing production samples, the Engineer may obtain cores and perform Hamburg Wheel tests on any areas of the roadway where rutting is observed. Suspend production until further Hamburg Wheel tests meet the specified values when the production or core samples fail the Hamburg Wheel test criteria in Table 10. Core samples, if taken, will be obtained from the center of the finished mat or other areas excluding the vehicle wheel paths. The Engineer may require up to the entire sublot of any mixture failing the Hamburg Wheel test to be removed and replaced at the Contractor's expense.

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

4.9.2.5. **Individual Loads of Hot-Mix**. The Engineer can reject individual truckloads of hot-mix. When a load of hot-mix is rejected for reasons other than temperature, contamination, or excessive uncoated particles, the Contractor may request that the rejected load be tested. Make this request within 4 hr. of rejection. The Engineer will sample and test the mixture. If test results are within the operational tolerances shown in Table 11, payment will be made for the load. If test results are not within operational tolerances, no payment will be made for the load.

4.9.3. **Placement Acceptance**.

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

4.9.3.1.1. **Lot 1 Placement**. Placement payment adjustments greater than 1.000 for Lot 1 will be in accordance with Section 3076.6.2., "Placement Payment Adjustment Factors"; however, no placement adjustment less than 1.000 will be assessed for any sublot placed in Lot 1 when the in-place air voids are greater than or equal to 2.7% and less than or equal to 9.9%. Remove and replace any sublot with in-place air voids less than 2.7% or greater than 9.9%.

4.9.3.1.2. **Incomplete Placement Lots**. An incomplete placement lot consists of the area placed as described in Section 3076.4.9.2.1.1., "Incomplete Production Lots," excluding areas defined in Section 3076.4.9.3.1.4., "Miscellaneous Areas." Placement sampling is required if the random sample plan for production resulted in a sample being obtained from an incomplete production sublot.

4.9.3.1.3. **Shoulders, Ramps, Etc**. Shoulders, ramps, intersections, acceleration lanes, deceleration lanes, and turn lanes are subject to in-place air void determination and payment adjustments unless designated on the plans as not eligible for in-place air void determination. Intersections may be considered miscellaneous areas when determined by the Engineer.

4.9.3.1.4. **Miscellaneous Areas**. Miscellaneous areas include areas that typically involve significant handwork or discontinuous paving operations, such as temporary detours, driveways, mailbox turnouts, crossovers, gores, spot level-up areas, and other similar areas. Temporary detours are subject to in-place air void determination when shown on the plans. Miscellaneous areas also include level-ups and thin overlays when the layer thickness specified on the plans is less than the minimum untrimmed core height eligible for testing shown in Table 13. The specified layer thickness is based on the rate of 110 lb./sq. yd. for each inch of

pavement unless another rate is shown on the plans. When "level up" is listed as part of the item bid description code, a payment adjustment factor of 1.000 will be assigned for all placement sublots as described in Article 3076.6, "Payment." Miscellaneous areas are not eligible for random placement sampling locations. Compact miscellaneous areas in accordance with Section 3076.4.8., "Compaction." Miscellaneous areas are not subject to in-place air void determination, thermal profiles testing, segregation (density profiles), or longitudinal joint density evaluations.

4.9.3.2. **Placement Sampling**. The Engineer will select random numbers for all placement sublots at the beginning of the project. The Engineer will provide the Contractor with the placement random numbers immediately after the sublot is completed. Mark the roadway location at the completion of each sublot and record the station number. Determine one random sample location for each placement sublot in accordance with Tex-225-F. Adjust the random sample location by no more than necessary to achieve a 2-ft. clearance if the location is within 2 ft. of a joint or pavement edge.

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

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

Trim the cores immediately after obtaining the cores from the roadway in accordance with Tex-251-F if the core heights meet the minimum untrimmed value listed in Table 13. Trim the cores on site in the presence of the Engineer. Use a permanent marker or paint pen to record the lot and sublot numbers on each core as well as the designation as Core A or B. The Engineer may require additional information to be marked on the core and may choose to sign or initial the core. The Engineer will take custody of the cores immediately after witnessing the trimming of the cores and will retain custody of the cores until the Department's testing is completed. Before turning the trimmed cores over to the Engineer, the Contractor may wrap the trimmed cores or secure them in a manner that will reduce the risk of possible damage occurring during transport by the Engineer. After testing, the Engineer will return the cores to the Contractor.

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

Decide whether to include the pair of cores in the air void determination for that sublot if the core height before trimming is less than the minimum untrimmed value shown in Table 13. Trim the cores as described above before delivering to the Engineer if electing to have the cores included in the air void determination. Deliver untrimmed cores to the Engineer and inform the Engineer of the decision to not have the cores included in air void determination if electing to not have the cores included in air void determination. The placement pay factor for the sublot will be 1.000 if cores will not be included in air void determination.

Instead of the Contractor trimming the cores on site immediately after coring, the Engineer and the Contractor may mutually agree to have the trimming operations performed at an alternate location such as a field laboratory or other similar location. In such cases, the Engineer will take possession of the cores

immediately after they are obtained from the roadway and will retain custody of the cores until testing is completed. Either the Department or Contractor representative may perform trimming of the cores. The Engineer will witness all trimming operations in cases where the Contractor representative performs the trimming operation.

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

4.9.3.3. **Placement Testing**. Perform placement tests in accordance with Table 16. After the Engineer returns the cores, the Contractor may test the cores to verify the Engineer's test results for in-place air voids. The allowable differences between the Contractor's and Engineer's test results are listed in Table 11.

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

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

4.9.3.3.2. **Segregation (Density Profile)**. Test for segregation using density profiles in accordance with Tex-207-F, Part V when using a thermal camera insead of the thermal imaging system. Density profiles are not required and are not applicable when using a thermal imaging system. Density profiles are not applicable in areas described in Section 3076.4.9.3.1.4., "Miscellaneous Areas."

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

- the paver stops due to lack of material being delivered to the paving operations and the temperature of the uncompacted mat before the initial break down rolling is less than the temperatures shown in Table 17;
- areas that are identified by either the Contractor or the Engineer with thermal segregation;,
- any visibly segregated areas that exist.

Table 17
Mimimum Uncompacted Mat Temperature Requiring a Segregation Profile

High-Temperature Binder Grade[1]	Minimum Temperature of the Uncompacted Mat Allowed Before Initial Break Down Rolling[2,3,4]
PG 64	<250˚F
PG 70	<260˚F
PG 76	<270˚F

1. The high-temperature binder grade refers to the high-temperature grade of the virgin asphalt binder used to produce the mixture.
2. Segregation profiles are required in areas with moderate and severe thermal segregation as described in Section 3076.4.7.3.1.3.
3. Minimum uncompacted mat temperature requiring a segregation profile may be reduced 10°F if using a chemical WMA additive as a compaction aid.
4. When using WMA, the minimum uncompacted mat temperature requiring a segregation profile is 215°F.

Provide the Engineer with the density profile of every sublot in the lot within one working day of the completion of each lot. Report the results of each density profile in accordance with Section 3076.4.2., "Reporting and Responsibilities."

The density profile is considered failing if it exceeds the tolerances in Table 18. No production or placement payment adjustments greater than 1.000 will be paid for any sublot that contains a failing density profile. When a hand-held thermal camera is used instead of a thermal imaging system, the Engineer will measure the density profile at least once per project. The Engineer's density profile results will be used when available. The Engineer may require the Contractor to remove and replace the area in question if the area fails the density profile and has surface irregularities as defined in Section 3076.4.9.3.3.5., "Irregularities." The sublot in question may receive a production and placement payment adjustment greater than 1.000, if applicable, when the defective material is successfully removed and replaced.

Investigate density profile failures and take corrective actions during production and placement to eliminate the segregation. Suspend production if 2 consecutive density profiles fail unless otherwise approved. Resume production after the Engineer approves changes to production or placement methods.

Table 18
Segregation (Density Profile) Acceptance Criteria

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

4.9.3.3.3. **Longitudinal Joint Density**.

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

4.9.3.3.3.2. **Record Tests**. Perform a joint density evaluation for each sublot at each pavement edge that is or will become a longitudinal joint. Joint density evaluations are not applicable in areas described in Section 3076.4.9.3.1.4., "Miscellaneous Areas." Determine the joint density in accordance with Tex-207-F, Part VII. Record the joint density information and submit results on Department forms to the Engineer. The evaluation is considered failing if the joint density is more than 3.0 pcf below the density taken at the core random sample location and the correlated joint density is less than 90.0%. The Engineer will make independent joint density verification at least once per project and may make independent joint density verifications at the random sample locations. The Engineer's joint density test results will be used when available.

Provide the Engineer with the joint density of every sublot in the lot within one working day of the completion of each lot. Report the results of each joint density in accordance with Section 3076.4.2., "Reporting and Responsibilities."

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

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

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

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

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

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

For exempt production, the Contractor is relieved of all production and placement sampling and testing requirements, except for coring operations when required by the Engineer. The production and placement pay factors are 1.000 if the specification requirements listed below are met, all other specification requirements are met, and the Engineer performs acceptance tests for production and placement listed in Table 16 when 100 tons or more per day are produced.

- produce, haul, place, and compact the mixture in compliance with the specification and as directed;
- control mixture production to yield a laboratory-molded density that is within ±1.0% of the target laboratory-molded density as tested by the Engineer;
- compact the mixture in accordance with Section 3076.4.8., "Compaction;" and
- when a thermal imaging system is not used, the Engineer may perform segregation (density profiles) and thermal profiles in accordance with the specification.

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

5. MEASUREMENT

5.1. **Dense Graded Hot-Mix Asphalt.** Hot mix will be measured by the ton of composite hot-mix, which includes asphalt, aggregate, and additives. Measure the weight on scales in accordance with Item 520, "Weighing and Measuring Equipment."

5.2. **Tack Coat.** Tack coat will be measured at the applied temperature by strapping the tank before and after road application and determining the net volume in gallons from the calibrated distributor. The Engineer will witness all strapping operations for volume determination. All tack, including emulsions, will be measured by the gallon applied.

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

6. PAYMENT

The work performed and materials furnished in accordance with this Item and measured as provided under Section 3076.5.1, "Measurement," will be paid for at the unit bid price for "Dense Graded Hot-Mix Asphalt" of the mixture type, SAC, and binder specified. These prices are full compensation for surface preparation, materials, placement, equipment, labor, tools, and incidentals.

The work performed and materials furnished in accordance with this Item and measured as provided under Article 3076.5.2, "Measurement," will be paid for at the unit bid price for "Tack Coat" of the tack coat provided. These prices are full compensation for materials, placement, equipment, labor, tools, and incidentals. Payment adjustments will be applied as determined in this Item; however, a payment adjustment factor of 1.000 will be assigned for all placement sublots for "level ups" only when "level up" is listed as part of the item bid description code. A payment adjustment factor of 1.000 will be assigned to all production and placement sublots when "exempt" is listed as part of the item bid description code, and all testing requirements are met.

Payment for each sublot, including applicable payment adjustments greater than 1.000, will only be paid for sublots when the Contractor supplies the Engineer with the required documentation for production and placement QC/QA, thermal profiles, segregation density profiles, and longitudinal joint densities in accordance with Section 3076.4.2., "Reporting and Responsibilities." When a thermal imaging system is used, documentation is not required for thermal profiles or segregation density profiles on individual sublots; however, the thermal imaging system automated reports described in Tex-244-F are required.

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

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

6.1. **Production Payment Adjustment Factors**. The production payment adjustment factor is based on the laboratory-molded density using the Engineer's test results. The bulk specific gravities of the samples from each sublot will be divided by the Engineer's maximum theoretical specific gravity for the sublot. The individual sample densities for the sublot will be averaged to determine the production payment adjustment factor in accordance with Table 19 for each sublot, using the deviation from the target laboratory-molded density defined in Table 9. The production payment adjustment factor for completed lots will be the average of the payment adjustment factors for the four sublots sampled within that lot.

Table 19
Production Payment Adjustment Factors for Laboratory-Molded Density[1]

Absolute Deviation from Target Laboratory-Molded Density	Production Payment Adjustment Factor (Target Laboratory-Molded Density)
0.0	1.050
0.1	1.050
0.2	1.050
0.3	1.044
0.4	1.038
0.5	1.031
0.6	1.025
0.7	1.019
0.8	1.013
0.9	1.006
1.0	1.000
1.1	0.965
1.2	0.930
1.3	0.895
1.4	0.860
1.5	0.825
1.6	0.790
1.7	0.755
1.8	0.720
> 1.8	Remove and replace

1. If the Engineer's laboratory-molded density on any sublot is less than 95.0% or greater than 98.0%, take immediate corrective action to bring the mixture within these tolerances. The Engineer may suspend operations if the Contractor's corrective actions do not produce acceptable results. The Engineer will allow production to resume when the proposed corrective action is likely to yield acceptable results.

6.1.1. **Payment for Incomplete Production Lots**. Production payment adjustments for incomplete lots, described under Section 3076.4.9.2.1.1., "Incomplete Production Lots," will be calculated using the average production payment factors from all sublots sampled.

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

6.1.2. **Production Sublots Subject to Removal and Replacement**. If after referee testing, the laboratory-molded density for any sublot results in a "remove and replace" condition as listed in Table 19, the Engineer may require removal and replacement or may allow the sublot to be left in place without payment. The Engineer may also accept the sublot in accordance with Section 3076.5.3.1., "Acceptance of Defective or Unauthorized Work." Replacement material meeting the requirements of this Item will be paid for in accordance with this Section.

6.2. **Placement Payment Adjustment Factors**. The placement payment adjustment factor is based on in-place air voids using the Engineer's test results. The bulk specific gravities of the cores from each sublot will be divided by the Engineer's average maximum theoretical specific gravity for the lot. The individual core densities for the sublot will be averaged to determine the placement payment adjustment factor in accordance with Table 20 for each sublot that requires in-place air void measurement. A placement payment adjustment factor of 1.000 will be assigned to the entire sublot when the random sample location falls in an area designated on the plans as not subject to in-place air void determination. A placement payment adjustment factor of 1.000 will be assigned to quantities placed in areas described in Section 3076.4.9.3.1.4., "Miscellaneous Areas." The placement payment adjustment factor for completed lots will be the average of the placement payment adjustment factors for up to four sublots within that lot.

Table 20
Placement Payment Adjustment Factors for In-Place Air Voids

In-Place Air Voids	Placement Pay Adjustment Factor	In-Place Air Voids	Placement Pay Adjustment Factor
< 2.7	Remove and Replace	6.4	1.042
2.7	0.710	6.5	1.040
2.8	0.740	6.6	1.038
2.9	0.770	6.7	1.036
3.0	0.800	6.8	1.034
3.1	0.830	6.9	1.032
3.2	0.860	7.0	1.030
3.3	0.890	7.1	1.028
3.4	0.920	7.2	1.026
3.5	0.950	7.3	1.024
3.6	0.980	7.4	1.022
3.7	0.998	7.5	1.020
3.8	1.002	7.6	1.018
3.9	1.006	7.7	1.016
4.0	1.010	7.8	1.014
4.1	1.014	7.9	1.012
4.2	1.018	8.0	1.010
4.3	1.022	8.1	1.008
4.4	1.026	8.2	1.006
4.5	1.030	8.3	1.004
4.6	1.034	8.4	1.002
4.7	1.038	8.5	1.000
4.8	1.042	8.6	0.998
4.9	1.046	8.7	0.996
5.0	1.050	8.8	0.994
5.1	1.050	8.9	0.992
5.2	1.050	9.0	0.990
5.3	1.050	9.1	0.960
5.4	1.050	9.2	0.930
5.5	1.050	9.3	0.900
5.6	1.050	9.4	0.870
5.7	1.050	9.5	0.840
5.8	1.050	9.6	0.810
5.9	1.050	9.7	0.780
6.0	1.050	9.8	0.750
6.1	1.048	9.9	0.720
6.2	1.046	> 9.9	Remove and Replace
6.3	1.044		

6.2.1. **Payment for Incomplete Placement Lots**. Payment adjustments for incomplete placement lots described under Section 3076.4.9.3.1.2., "Incomplete Placement Lots," will be calculated using the average of the placement payment factors from all sublots sampled and sublots where the random location falls in an area designated on the plans as not eligible for in-place air void determination.

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

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

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

6.2.2. **Placement Sublots Subject to Removal and Replacement**. If after referee testing, the placement payment adjustment factor for any sublot results in a "remove and replace" condition as listed in Table 20, the Engineer will choose the location of two cores to be taken within 3 ft. of the original failing core location. The Contractor will obtain the cores in the presence of the Engineer. The Engineer will take immediate possession of the untrimmed cores and submit the untrimmed cores to the Materials and Tests Division, where they will be trimmed if necessary and tested for bulk specific gravity within 10 working days of receipt.

The bulk specific gravity of the cores from each sublot will be divided by the Engineer's average maximum theoretical specific gravity for the lot. The individual core densities for the sublot will be averaged to determine the new payment adjustment factor of the sublot in question. If the new payment adjustment factor is 0.700 or greater, the new payment adjustment factor will apply to that sublot. If the new payment adjustment factor is less than 0.700, no payment will be made for the sublot. Remove and replace the failing sublot, or the Engineer may allow the sublot to be left in place without payment. The Engineer may also accept the sublot in accordance with Section 3076.5.3.1., "Acceptance of Defective or Unauthorized Work." Replacement material meeting the requirements of this Item will be paid for in accordance with this Section.

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

TAP = (A+B)/2

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

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

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

Special Specification 3081
Thin Overlay Mixtures

1. DESCRIPTION

Construct a thin surface course composed of a compacted mixture of aggregate and asphalt binder mixed hot in a mixing plant. Produce a thin overlay mixture (TOM) with a minimum lift thickness of 1/2 in. for a Type F mixture and 3/4 in. for a Type C mixture.

2. MATERIALS

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

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

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

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

For sources not listed on the Department's BRSQC:

- build an individual stockpile for each material;
- request the Department test the stockpile for specification compliance;
- approved only when tested by the Engineer;
- once approved, do not add material to the stockpile unless otherwise approved; and
- allow 30 calendar days for the Engineer to sample, test, and report results.

Blending Class A and Class B Aggregates. Class B aggregate meeting all other requirements in Table 1 may be blended with a Class A aggregate to meet requirements for Class A materials. When blending Class A and B aggregates to meet a Class A requirement, ensure that at least 50% by weight, or volume if required, of all aggregates used in the mixture design retained on the No. 8 sieve comes from the Class A aggregate source, unless otherwise shown on the plans. Blend by volume if the bulk specific gravities of the Class A and B aggregates differ by more than 0.300. Class B aggregate may be disallowed when shown on the plans.

The Engineer may perform tests at any time during production, when the Contractor blends Class A and B aggregates to meet a Class A requirement, to ensure that at least 50% by weight, or volume if required, of the material retained on the No. 8 sieve comes from the Class A aggregate source. The Engineer will use the Department's mix design template, when electing to verify conformance, to calculate the percent of Class A aggregate retained on the No. 8 sieve by inputting the bin percentages shown from readouts in the control room at the time of production and stockpile gradations measured at the time of production. The Engineer may determine the gradations based on either washed or dry sieve analysis from samples obtained from individual aggregate cold feed bins or aggregate stockpiles. The Engineer may perform spot checks using the gradations supplied by the Contractor on the mixture design report as an input for the template; however, a failing spot check will require confirmation with a stockpile gradation determined by the Engineer.

2.1.1.1. **Micro-Deval Abrasion**. The Engineer will perform a minimum of one Micro-Deval abrasion test in accordance with Tex-461-A for each coarse aggregate source used in the mixture design that has a Rated Source Soundness Magnesium (RSSM) loss value greater than 15 as listed in the BRSQC, unless otherwise directed. The Engineer will perform testing before the start of production and may perform additional testing at any time during production. The Engineer may obtain the coarse aggregate samples from each coarse aggregate source or may require the Contractor to obtain the samples. The Engineer may waive all Micro-Deval testing based on a satisfactory test history of the same aggregate source.

The Engineer will estimate the magnesium sulfate soundness loss for each coarse aggregate source, when tested, using the following formula:

$$Mg_{est.} = (RSSM)(MD_{act}/RSMD)$$

where:
Mg_{est} = magnesium sulfate soundness loss
$RSSM$ = Rated Source Soundness Magnesium
MD_{act} = actual Micro-Deval percent loss
$RSMD$ = Rated Source Micro-Deval

When the estimated magnesium sulfate soundness loss is greater than the maximum magnesium sulfate soundness loss specified, the coarse aggregate source will not be allowed for use unless otherwise approved. The Engineer will consult the Soils and Aggregates Section of the Materials and Tests Division, and additional testing may be required before granting approval.

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

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

2.1.3. **Fine Aggregate**. Fine aggregates consist of manufactured sands and screenings. Natural sands are not allowed in any mixture. Fine aggregate stockpiles must meet the fine aggregate properties in Table 1 and the gradation requirements in Table 2. Supply fine aggregates that are free from organic impurities. The Engineer may test the fine aggregate in accordance with Tex-408-A to verify the material is free from organic impurities. Use fine aggregate from coarse aggregate sources that meet the requirements shown in Table 1 unless otherwise approved.

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

Table 1
Aggregate Quality Requirements

Property	Test Method	Requirement
Coarse Aggregate		
SAC	Tex-499-A (AQMP)	A[1]
Deleterious material, %, Max	Tex-217-F, Part I	1.5
Decantation, %, Max	Tex-217-F, Part II	1.5
Micro-Deval abrasion, %	Tex-461-A	Note 2
Los Angeles abrasion, %, Max	Tex-410-A	30
Magnesium sulfate soundness, 5 cycles, %, Max	Tex-411-A	20
Crushed face count,[3] %, Min	Tex-460-A, Part I	95
Flat and elongated particles @ 5:1, %, Max	Tex-280-F	10
Fine Aggregate		
Methylene Blue Value, mg/g, Max	Tex-252-F	10.0
Sand equivalent, %, Min	Tex-203-F	30

1. Surface Aggregate Classification of "A" is required unless otherwise shown on the plans.
2. Used to estimate the magnesium sulfate soundness loss in accordance with Section 3081.2.1.1.2., "Micro-Deval Abrasion."
3. Only applies to crushed gravel.

Table 2
Gradation Requirements for Fine Aggregate

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

2.2. **Mineral Filler**. Mineral filler consists of finely divided mineral matter such as agricultural lime, crusher fines, or hydrated lime. Mineral filler is allowed unless otherwise shown on the plans. Fly ash is not permitted unless otherwise shown on the plans. Use no more than 2% hydrated lime unless otherwise shown on the plans. Test all mineral fillers except hydrated lime and fly ash in accordance with Tex-252-F to ensure specification compliance. The plans may require or disallow specific mineral fillers. Provide mineral filler, when used, that:

- is sufficiently dry, free-flowing, and free from clumps and foreign matter as determined by the Engineer;
- does not exceed a Methylene Blue Value of 5.0 mg/g when tested in accordance with Tex-252-F; and
- meets the gradation requirements in Table 3, unless otherwise shown on the plans.

Table 3
Gradation Requirements for Mineral Filler

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

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

2.4. **Asphalt Binder**. Furnish performance-graded (PG) asphalt binder with a high temperature grade of PG 76 and a low temperature grade as shown on the plans, in accordance with Section 300.2.10., "Performance- Graded Binders."

2.5. **Tack Coat**. Furnish CSS-1H, SS-1H, or a PG binder with a minimum high-temperature grade of PG 58 for tack coat binder in accordance with Item 300, "Asphalts, Oils, and Emulsions." Specialized tack coat materials listed on the Deparment's MPL are allowed or required when shown on the plans. Do not dilute emulsified asphalts at the terminal, in the field, or at any other location before use.

2.6. **Additives**. Provide the Engineer with documentation such as the bill of lading showing the quantity of additives used in the project unless otherwise directed.

2.6.1. **Lime and Liquid Antistripping Agent**. When lime or a liquid antistripping agent is used, add in accordance with Item 301, "Asphalt Antistripping Agents." Use no more than 1% hydrated lime when using crushed gravel. Do not add lime directly into the mixing drum of any plant where lime is removed through the exhaust stream unless the plant has a baghouse or dust collection system that reintroduces the lime into the drum.

2.6.2. **Compaction Aid.** Compaction Aid is defined as a department-approved chemical warm mix additive denoted as "chemical additive" on the Department's materials producer list (MPL) that is used to facilitate mixing and compaction of HMA.

Compaction Aid is allowed for use on all projects. Compaction aid is required when shown on the plans or as required in Section 3079.4.7.1.

Warm mix foaming processes, denoted as "foaming process" on the Department-approved MPL, may be used to facilitate mixing and compaction of HMA; however warm mix foaming processes are not defined as a Compaction Aid.

2.7. **Recycled Materials**. Recycled materials are not allowed for use.

3. EQUIPMENT

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

4. CONSTRUCTION

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

4.1. **Certification**. Personnel certified by the Department-approved hot-mix asphalt certification program must conduct all mixture designs, sampling, and testing in accordance with Table 4. Supply the Engineer with a list of certified personnel and copies of their current certificates before beginning production and when personnel changes are made. Provide a mixture design developed and signed by a Level 2 certified specialist. Provide Level 1A certified specialists at the plant during production operations. Provide Level 1B certified specialists to conduct placement tests. Provide AGG101 certified specialists for aggregate testing.

Table 4
Test Methods, Test Responsibility, and Minimum Certification Levels

Test Description	Test Method	Contractor	Engineer	Level[1]
1. Aggregate Testing				
Sampling	Tex-221-F	✓	✓	1A/AGG101
Dry sieve	Tex-200-F, Part I	✓	✓	1A/AGG101
Washed sieve	Tex-200-F, Part II	✓	✓	1A/AGG101
Deleterious material	Tex-217-F, Part I	✓	✓	AGG101
Decantation	Tex-217-F, Part II	✓	✓	AGG101
Los Angeles abrasion	Tex-410-A		✓	TxDOT
Magnesium sulfate soundness	Tex-411-A		✓	TxDOT
Micro-Deval abrasion	Tex-461-A		✓	AGG101
Crushed face count	Tex-460-A	✓	✓	AGG101
Flat and elongated particles	Tex-280-F	✓	✓	AGG101
Sand equivalent	Tex-203-F	✓	✓	AGG101
Organic impurities	Tex-408-A	✓	✓	AGG101
Methylene blue test	Tex-252-F	✓	✓	TxDOT
2. Asphalt Binder & Tack Coat Sampling				
Asphalt binder sampling	Tex-500-C, Part II	✓	✓	1A/1B
Tack coat sampling	Tex-500-C, Part III	✓	✓	1A/1B
3. Mix Design & Verification				
Design and JMF changes	Tex-204-F	✓	✓	2
Mixing	Tex-205-F	✓	✓	2
Molding (TGC)	Tex-206-F	✓	✓	1A
Molding (SGC)	Tex-241-F	✓	✓	1A
Laboratory-molded density	Tex-207-F, Parts I & VI	✓	✓	1A
Rice gravity	Tex-227-F, Part II	✓	✓	1A
Drain-down	Tex-235-F	✓	✓	1A
Ignition oven correction factors[2]	Tex-236-F, Part II	✓	✓	2
Indirect tensile strength	Tex-226-F	✓	✓	1A
Overlay test	Tex-248-F		✓	TxDOT
Hamburg Wheel test	Tex-242-F	✓	✓	1A
Boil test	Tex-530-C	✓	✓	1A
4. Production Testing				
Selecting production random numbers	Tex-225-F, Part I		✓	1A
Mixture sampling	Tex-222-F	✓	✓	1A/1B
Molding (TGC)	Tex-206-F	✓	✓	1A
Molding (SGC)	Tex-241-F	✓	✓	1A
Laboratory-molded density	Tex-207-F, Parts I & VI	✓	✓	1A
Rice gravity	Tex-227-F, Part II	✓	✓	1A
Gradation & asphalt binder content[2]	Tex-236-F, Part I	✓	✓	1A
Drain-down	Tex-235-F	✓	✓	1A
Control charts	Tex-233-F	✓	✓	1A
Moisture content	Tex-212-F, Part II	✓	✓	1A/AGG101
Hamburg Wheel test	Tex-242-F	✓	✓	1A
Overlay test	Tex-248-F	✓	✓	TxDOT
Micro-Deval abrasion	Tex-461-A		✓	AGG101
Boil test	Tex-530-C	✓	✓	1A
Absorption recovery	Tex-211-F		✓	TxDOT
5. Placement Testing				
Establish rolling pattern	Tex-207-F, Part IV	✓		1B
In-place density (nuclear method)	Tex-207-F, Part III	✓		1B
Control charts	Tex-233-F	✓	✓	1A
Ride quality measurement	Tex-1001-S	✓	✓	Note 3
Thermal profile	Tex-244-F	✓	✓	1B
Water flow test	Tex-246-F	✓	✓	1B

1. Level 1A, 1B, AGG101, and 2 are certification levels provided by the Hot Mix Asphalt Center certification program.
2. Refer to Section 3081.4.9.2.3., "Production Testing" for exceptions to using an ignition oven.
3. Profiler and operator are required to be certified at the Texas A&M Transportation Institute facility when Surface Test Type B is specified.

4.2. **Reporting and Responsibilities**. Use Department-provided templates to record and calculate all test data, including mixture design, production and placement QC/QA, control charts, and thermal profiles. Obtain the current version of the templates at http://www.txdot.gov/inside-txdot/forms-publications/consultants-contractors/forms/site-manager.html or from the Engineer. The Engineer and the Contractor will provide any available test results to the other party when requested. The maximum allowable time for the Contractor and Engineer to exchange test data is as given in Table 5 unless otherwise approved. The Engineer and the Contractor will immediately report to the other party any test result that requires suspension of production or placement or that fails to meet the specification requirements. Record and electronically submit all test results and pertinent information on Department-provided templates.

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

Table 5
Reporting Schedule

Description	Reported By	Reported To	To Be Reported Within
Production Quality Control			
Gradation[1]	Contractor	Engineer	1 working day of completion of the sublot
Asphalt binder content[1]			
Laboratory-molded density[2]			
Moisture content[3]			
Boil test[3]			
Production Quality Assurance			
Gradation[3]	Engineer	Contractor	1 working day of completion of the sublot
Asphalt binder content[3]			
Laboratory-molded density[1]			
Hamburg Wheel test[4]			
Overlay test[4]			
Boil test[3]			
Binder tests[4]			
Placement Quality Control			
Thermal profile[1]	Contractor	Engineer	1 working day of completion of the lot
Water flow[1]			
Placement Quality Assurance			
Thermal profile[3]	Engineer	Contractor	1 working day of completion of the lot
Aging ratio[4]			
Water flow			

1. These tests are required on every sublot.
2. Optional test. When performed on split samples, report the results as soon as they become available.
3. To be performed at the frequency specified in Table 13 or as shown on the plans.
4. To be reported as soon as the results become available.

Use the procedures described in Tex-233-F to plot the results of all quality control (QC) and quality assurance (QA) testing. Update the control charts as soon as test results for each sublot become available. Make the control charts readily accessible at the field laboratory. The Engineer may suspend production for failure to update control charts.

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

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

4.3.1. **Project Personnel**. For project personnel, include:

- a list of individuals responsible for QC with authority to take corrective action;
- current contact information for each individual listed; and
- current copies of certification documents for individuals performing specified QC functions.

4.3.2. **Material Delivery and Storage**. For material delivery and storage, include:

- the sequence of material processing, delivery, and minimum quantities to assure continuous plant operations;
- aggregate stockpiling procedures to avoid contamination and segregation;
- frequency, type, and timing of aggregate stockpile testing to assure conformance of material requirements before mixture production; and
- procedure for monitoring the quality and variability of asphalt binder.

4.3.3. **Production**. For production, include:

- loader operation procedures to avoid contamination in cold bins;
- procedures for calibrating and controlling cold feeds;
- procedures to eliminate debris or oversized material;
- procedures for adding and verifying rates of each applicable mixture component (e.g., aggregate, asphalt binder, lime, liquid antistrip, compaction aid, foaming process);
- procedures for reporting job control test results; and
- procedures to avoid segregation and drain-down in the silo.

4.3.4. **Loading and Transporting**. For loading and transporting, include:

- type and application method for release agents; and
- truck loading procedures to avoid segregation.

4.3.5. **Placement and Compaction**. For placement and compaction, include:

- proposed agenda for mandatory pre-paving meeting, including date and location;
- proposed paving plan (e.g., production rate, paving widths, joint offsets, and lift thicknesses);
- type and application method for release agents in the paver and on rollers, shovels, lutes, and other utensils;
- procedures for the transfer of mixture into the paver, while avoiding physical and thermal segregation and preventing material spillage;
- process to balance production, delivery, paving, and compaction to achieve continuous placement operations and good ride quality;
- paver operations (e.g., speed, operation of wings, height of mixture in auger chamber) to avoid physical and thermal segregation and other surface irregularities; and
- procedures to construct quality longitudinal and transverse joints.

4.4. **Mixture Design**.

4.4.1. **Design Requirements**. The Contractor may design the mixture using a Texas Gyratory Compactor (TGC) or a Superpave Gyratory Compactor (SGC) unless otherwise shown on the plans. Use the typical weight design example given in Tex-204-F, Part I, when using a TGC. Use the Superpave mixture design procedure provided in Tex-204-F, Part IV, when using a SGC. Design the mixture to meet the requirements listed in Tables 1, 2, 3, 6, and 7.

4.4.1.1. **Target Laboratory-Molded Density When The TGC Is Used**. Design the mixture at a 97.5% target laboratory-molded density or as noted in Table 7.

4.4.1.2. **Design Number of Gyrations (Ndesign) When The SGC Is Used**. Design the mixture at 50 gyrations (Ndesign). Use a target laboratory-molded density of 96.0% to design the mixture; however, adjustments can be made to the Ndesign value as noted in Table 7. The Ndesign level may be reduced to no less than 35 gyrations at the Contractor's discretion.

Use an approved laboratory from the Department's MPL to perform the Hamburg Wheel test, and the Department will perform the Overlay test and provide results with the mixture design, or provide the

laboratory mixture and request that the Department perform the Hamburg Wheel test and Overlay test. The Engineer will be allowed 10 working days to provide the Contractor with Hamburg Wheel test and Overlay test results on the laboratory mixture design.

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

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

- the combined aggregate gradation, source, specific gravity, and percent of each material used;
- the target laboratory-molded density (or Ndesign level when using the SGC);
- results of all applicable tests;
- the mixing and molding temperatures;
- the signature of the Level 2 person or persons that performed the design;
- the date the mixture design was performed; and
- a unique identification number for the mixture design.

Table 6
Master Gradation Limits (% Passing by Weight or Volume) and Volumetric Requirements

Sieve Size	Coarse (TOM-C)	Fine (TOM-F)
1/2"	100.0[1]	100.0[1]
3/8"	95.0–100.0	98.0–100.0
#4	40.0–60.0	70.0–95.0
#8	17.0–27.0	40.0–65.0
#16	5.0–27.0	20.0–45.0
#30	5.0–27.0	10.0–35.0
#50	5.0–27.0	10.0–20.0
#200	5.0–9.0	2.0–12.0
Asphalt Binder Content,[2] % Min		
-	6.0	6.5
Design VMA,[3] % Min		
-	16.0	16.5
Production (Plant-Produced) VMA,[3] % Min		
-	15.5	16.0

1. Defined as maximum sieve size. No tolerance allowed.
2. Unless otherwise shown on the plans or approved by the Engineer.
3. Voids in Mineral Aggregates (VMA).

Table 7
Mixture Design Properties

Mixture Property	Test Method	Requirement
Target laboratory-molded density, % (TGC)	Tex-207 F	97.5[1]
Design gyrations (Ndesign for SGC)	Tex-241-F	50[2]
Hamburg Wheel test, passes at 12.5 mm rut depth for PG 76 mixtures	Tex-242-F	20,000 Min
Overlay test, Critical Fracture Energy, lb.-in/sq. in	Tex-248-F	1.5 Min
Overlay test, Crack Progression Rate	Tex-248-F	0.40 Max
Drain-down, %	Tex-235-F	0.20 Max

1. Unless otherwise shown on the plans or approved by the Engineer. Laboratory-molded density requirement using the TGC may be waived when approved by the Engineer.
2. May be adjusted within the range of 35–100 gyrations when shown on the plans or specification or when mutually agreed between the Engineer and Contractor. Laboratory-molded density requirement using the SGC may be waived when approved by the Engineer.

4.4.1 **Job-Mix Formula Approval**. The job-mix formula (JMF) is the combined aggregate gradation, target laboratory-molded density (or Ndesign level), and target asphalt percentage used to establish target values for hot-mix production. JMF1 is the original laboratory mixture design used to produce the trial batch. When a compaction aid or foaming process is used, JMF1 may be designed and submitted to the Engineer without including the compaction aid or foaming process. When a compaction aid or foaming process is used,

document the compaction aid or foaming process used and recommended rate on the JMF1 submittal. The Engineer and the Contractor will verify JMF1 based on plant-produced mixture from the trial batch unless otherwise approved. The Engineer may accept an existing mixture design previously used on a Department project and may waive the trial batch to verify JMF1. The Department may require the Contractor to reimburse the Department for verification tests if more than 2 trial batches per design are required.

4.4.2.1. **Contractor's Responsibilities**.

4.4.2.1.1. **Providing Gyratory Compactor**. Use a TGC calibrated in accordance with Tex-914-K when electing or required to design the mixture in accordance with Tex-204-F, Part I, for molding production samples. Furnish an SGC calibrated in accordance with Tex-241-F when electing or required to design the mixture in accordance with Tex-204-F, Part IV, for molding production samples. Locate the SGC if used, at the Engineer's field laboratory and make the SGC available to the Engineer for use in molding production samples.

4.4.2.1.2. **Gyratory Compactor Correlation Factors**. Use Tex-206-F, Part II, to perform a gyratory compactor correlation when the Engineer uses a different gyratory compactor. Apply the correlation factor to all subsequent production test results.

4.4.2.1.3. **Submitting JMF1**. Furnish a mix design report (JMF1) with representative samples of all component materials and request approval to produce the trial batch. Provide approximately 25 lb. of the design mixture if opting to have the Department perform the Hamburg Wheel test on the laboratory mixture, and request that the Department perform the test. Provide approximately 60 lb. of the design mixture to perform the Overlay test.

4.4.2.1.4. **Supplying Aggregates**. Provide approximately 40 lb. of each aggregate stockpile unless otherwise directed.

4.4.2.1.5. **Supplying Asphalt**. Provide at least 1 gal. of the asphalt material and sufficient quantities of any additives proposed for use.

4.4.2.1.6. **Ignition Oven Correction Factors**. Determine the aggregate and asphalt correction factors from the ignition oven in accordance with Tex-236-F, Part II. Provide correction factors that are not more than 12 months old. Provide the Engineer with split samples of the mixtures before the trial batch production, including all additives (except water), and blank samples used to determine the correction factors for the ignition oven used for QA testing during production. Correction factors established from a previously approved mixture design may be used for the current mixture design if the mixture design and ignition oven are the same as previously used and the correction factors are not more than 12 months old, unless otherwise directed.

4.4.2.1.7. **Boil Test**. Perform the test and retain the tested sample from Tex-530-C until completion of the project or as directed. Use this sample for comparison purposes during production. The Engineer may waive the requirement for the boil test.

4.4.2.1.8. **Trial Batch Production**. Provide a plant-produced trial batch upon receiving conditional approval of JMF1 and authorization to produce a trial batch, including the compaction aid or foaming process, if applicable, for verification testing of JMF1 and development of JMF2. Produce a trial batch mixture that meets the requirements in Table 8. The Engineer may accept test results from recent production of the same mixture instead of a new trial batch.

Obtain and provide approximately 60 lb. of trial batch mixture in a sealed container, box, or bags labeled with the CSJ number, mixture type, and date for the Overlay test.

4.4.2.1.9. **Trial Batch Production Equipment**. Use only equipment and materials proposed for use on the project to produce the trial batch.

4.4.2.1.10. **Trial Batch Quantity**. Produce enough quantity of the trial batch to ensure that the mixture meets the specification requirements.

4.4.2.1.11. **Number of Trial Batches**. Produce trial batches as necessary to obtain a mixture that meets the

specification requirements.

4.4.2.1.12. **Trial Batch Sampling**. Obtain a representative sample of the trial batch and split it into 3 equal portions in accordance with Tex-222-F. Label these portions as "Contractor," "Engineer," and "Referee." Deliver samples to the appropriate laboratory as directed

4.4.2.1.13. **Trial Batch Testing**. Test the trial batch to ensure the mixture produced using the proposed JMF1 meets the mixture requirements in Table 8. Ensure the trial batch mixture is also in compliance with the requirements in Tables 6 and 7. Use a Department-approved laboratory listed on the MPL to perform the Hamburg Wheel test on the trial batch mixture or request that the Department perform the Hamburg Wheel test. Obtain and provide approximately 60 lb. of trial batch mixture in sealed containers, boxes, or bags labeled with the CSJ, mixture type, lot, and sublot number in accordance with Tex 222-F for the Overlay test. The Engineer will be allowed 10 working days to provide the Contractor with Hamburg Wheel test and Overlay test results on the trial batch. Provide the Engineer with a copy of the trial batch test results.

4.4.2.1.14. **Development of JMF2**. Evaluate the trial batch test results after the Engineer grants full approval of JMF1 based on results from the trial batch, determine the optimum mixture proportions, and submit as JMF2. Adjust the asphalt binder content or gradation to achieve the specified target laboratory-molded density. The mixture produced using JMF2 must meet the requirements in Tables 6 and 7. Verify that JMF2 meets the operation tolerances of JMF1 listed in Table 8.

4.4.2.1.15. **Mixture Production**. Use JMF2 to produce Lot 1 after receiving approval for JMF2 and a passing result from the Department's or a Department-approved laboratory's Hamburg Wheel test and the Department's Overlay test on the trial batch. If desired, proceed to Lot 1 production, once JMF2 is approved, at the Contractor's risk without receiving the results from either the Department's Hamburg Wheel test or Overlay test on the trial batch.

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

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

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

- be provided to the Engineer in writing before the start of a new lot;
- be numbered in sequence to the previous JMF;
- meet the master gradation limits shown in Table 6; and
- be within the operational tolerances of JMF2 listed in Table 8.

4.4.2.1.18. **Requesting Referee Testing**. Use referee testing, if needed, in accordance with Section 3081.4.9.1., "Referee Testing," to resolve testing differences with the Engineer.

Table 8
Operational Tolerances

Description	Test Method	Allowable Difference between JMF2 and JMF1 Target[1]	Allowable Difference from Current JMF and JMF2[2]	Allowable Difference between Contractor and Engineer[3]
Individual % retained for #8 sieve and larger	Tex-200-F or Tex-236-F	Must be Within Master Grading Limits in Table 6	±3.0[4,5]	±5.0
Individual % retained for sieves smaller than #8 and larger than #200			±3.0[4,5]	±3.0
% passing the #200 sieve			±2.0[4,5]	±1.6
Asphalt binder content, %[6]	Tex-236-F	±0.3	±0.3[5]	±0.3
Laboratory-molded density, %	Tex-207-F	±1.0	±1.0	±1.0
Laboratory-molded bulk specific gravity		N/A	N/A	±0.020
VMA, % min	Tex-204-F	Note 7	Note 7	N/A
Theoretical maximum specific (Rice) gravity	Tex-227-F	N/A	N/A	±0.020
Drain-down, %	~~Tex-235-F~~	Note 8	Note 8	N/A

1. JMF1 is the approved laboratory mixture design used for producing the trial batch. JMF2 is the approved mixture design developed from the trial batch used to produce Lot 1.
2. Current JMF is JMF3 or higher. JMF3 is the approved mix design used to produce Lot 2.
3. Contractor may request referee testing only when values exceed these tolerances.
4. When within these tolerances, mixture production gradations may fall outside the master grading limits; however, the % passing the #200 will be considered out of tolerance when outside the master grading limits.
5. Only applies to mixture produced for Lot 1 and higher.
6. Binder content is not allowed to be outside the limits shown in Table 6. May be obtained from asphalt meter readouts as determined by the Engineer.
7. Verify that Table 6 requirements are met.
8. Verify that Table 7 requirements are met.

4.4.2.2. **Engineer's Responsibilities**.

4.4.2.2.1. **Gyratory Compactor**. For mixtures designed in accordance with Tex-204-F, Part I, the Engineer will use a Department TGC, calibrated in accordance with Tex-914-K, to mold samples for trial batch and production testing. The Engineer will make the Department TGC and the Department field laboratory available to the Contractor for molding verification samples, if requested by the Contractor.

For mixtures designed in accordance with Tex-204-F, Part IV, the Engineer will use a Department SGC, calibrated in accordance with Tex-241-F, to mold samples for laboratory mixture design verification. For molding trial batch and production specimens, the Engineer will use the Contractor-provided SGC at the field laboratory or provide and use a Department SGC at an alternate location. The Engineer will make the Contractor-provided SGC in the Department field laboratory available to the Contractor for molding verification samples.

4.4.2.2.2. **Conditional Approval of JMF1 and Authorizing Trial Batch**. The Engineer will review and verify conformance of the following information within 2 working days of receipt:

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

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

Unless waived, the Engineer will determine the Micro-Deval abrasion loss in accordance with Section 3081.2.1.1.2., "Micro-Deval Abrasion." If the Engineer's test results are pending after 2 working days,

conditional approval of JMF1 will still be granted within 2 working days of receiving JMF1. When the Engineer's test results become available, they will be used for specification compliance.

The Contractor is authorized to produce a trial batch after the Engineer grants conditional approval of JMF1.

4.4.2.2.3. **Hamburg Wheel and Overlay Testing of JMF1**. If the Contractor requests the option to have the Department perform the Hamburg Wheel test on the laboratory mixture, the Engineer will mold samples in accordance with Tex-242-F to verify compliance with the Hamburg Wheel test requirement in Table 7. The Engineer will perform the Overlay test and mold samples in accordance with Tex-248-F to verify compliance with the Overlay test requirements in Table 7. The Engineer will be allowed 10 working days to provide the Contractor with Hamburg Wheel and Overlay test results on the laboratory mixture design.

4.4.2.2.4. **Ignition Oven Correction Factors**. The Engineer will use the split samples provided by the Contractor to determine the aggregate and asphalt correction factors for the ignition oven used for QA testing during production in accordance with Tex-236-F, Part II. Provide correction factors that are not more than 12 months old.

4.4.2.2.5. **Testing the Trial Batch**. Within 1 full working day, the Engineer will sample and test the trial batch to ensure that the mixture meets the requirements in Table 8. The Engineer will mold samples in accordance with Tex-242-F if the Contractor requests the option to have the Department perform the Hamburg Wheel test on the trial batch mixture to verify compliance with Hamburg Wheel test requirements in Table 7. The Engineer will mold samples for the Overlay test in accordance with Tex-248-F to verify compliance with the Overlay test requirement in Table 7.

The Engineer will have the option to perform the following test on the trial batch:

- Tex-530-C, to retain and use for comparison purposes during production.

4.4.2.2.6. **Full Approval of JMF1**. The Engineer will grant full approval of JMF1 and authorize the Contractor to proceed with developing JMF2 if the Engineer's results for the trial batch meet the requirements in Tables 6 and 7. The Engineer will notify the Contractor that an additional trial batch is required if the trial batch does not meet these requirements.

4.4.2.2.7. **Approval of JMF2**. The Engineer will approve JMF2 within one working day if the mixture meets the requirements in Table 6, 7, and 8.

4.4.2.2.8. **Approval of Lot 1 Production**. The Engineer will authorize the Contractor to proceed with Lot 1 production (using JMF2) as soon as a passing result is achieved from the Department's or a Department-approved laboratory's Hamburg Wheel test and the Department's Overlay test on the trial batch. The Contractor may proceed at its own risk with Lot 1 production without the results from the Hamburg Wheel test and Overlay test on the trial batch.

If the Department's or Department-approved laboratory's sample from the trial batch fails the Hamburg Wheel test or Overlay test, the Engineer will suspend production until further Hamburg Wheel tests or Overlay tests meet the specified values. The Engineer may require up to the entire sublot of any mixture failing the Hamburg Wheel test or Overlay test to be removed and replaced at the Contractor's expense.

4.4.2.2.9. **Approval of JMF3 and Subsequent JMF Changes**. JMF3 and subsequent JMF changes are approved if they meet the master grading limits and asphalt binder content shown in Table 6 and are within the operational tolerances of JMF2 shown in Table 8.

4.5. **Production Operations**. Perform a new trial batch when the plant or plant location is changed. Take corrective action and receive approval to proceed after any production suspension for noncompliance to the specification.

4.5.1. **Storage and Heating of Materials**. Do not heat the asphalt binder above the temperatures specified in Item 300, "Asphalts, Oils, and Emulsions," or outside the manufacturer's recommended values. Provide the Engineer with daily records of asphalt binder and hot-mix asphalt discharge temperatures (in legible and discernible increments) in accordance with Item 320, "Equipment for Asphalt Concrete Pavement," unless otherwise directed. Do not store mixture for a period long enough to affect the quality of the mixture, nor in any case longer than 12 hr. unless otherwise approved.

4.5.2. **Mixing and Discharge of Materials**. Notify the Engineer of the target discharge temperature and produce the mixture within 25°F of the target. Monitor the temperature of the material in the truck before shipping to ensure that it does not exceed the maximum production temperatures listed in Table 9. The Department will not pay for or allow placement of any mixture produced above the maximum production temperatures listed in Table 9.

Table 9
Maximum Production Temperature

High-Temperature Binder Grade[1]	Maximum Production Temperature
PG 76	345˚F

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

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

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

Use equipment for hauling as defined in Section 3081.4.7.3.3., "Hauling Equipment." Use other hauling equipment only when allowed.

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

Prepare the surface by removing raised pavement markers and objectionable material such as moisture, dirt, sand, leaves, and other loose impediments from the surface before placing mixture. Remove vegetation from pavement edges. Place the mixture to meet the typical section requirements and produce a smooth, finished surface with a uniform appearance and texture. Place mixture so that longitudinal joints on the surface course coincide within 6-in. of lane lines and are not placed in the wheel path, or as directed, and offset longitudinal joints of successive courses of hot-mix by at least 6-in. Ensure that all finished surfaces will drain properly. Place the mixture at the rate or thickness shown on the plans. The Engineer will use the guidelines in Table 10 to determine the compacted lift thickness. The thickness determined is based on the rate of 110–115 lb./sq. yd. for each inch of pavement unless otherwise shown on the plans.

Table 10
Compacted Lift Thickness

	Compacted Lift Thickness[1]	
Mixture Type	Minimum (in.)	Maximum (in.)
TOM-C	0.75	1.25
TOM-F	0.5	1.00

1. Compacted target lift thickness will be specified on the plans.

4.7.1. **Weather Conditions**.

4.7.1.1. **When Using a Thermal Imaging System**. The Contractor may pave any time the roadway is dry and the roadway surface temperature is at least 60°F unless otherwise approved or as shown on the plans; however, the Engineer may restrict the Contractor from paving surface mixtures if the ambient temperature is likely to drop below 32°F within 12 hr. of paving. Place mixtures only when weather conditions and moisture conditions of the roadway surface are suitable as determined by the Engineer. Provide output data from the thermal imaging system to demonstrate to the Engineer that no recurring severe thermal segregation exists in accordance with Section 3081.4.7.3.1.2., "Thermal Imaging System."

Produce mixture with a target discharge temperature higher than 300°F and with a compaction aid to facilitate compaction when the air temperature is 70°F and falling

4.7.1.2. **When Not Using a Thermal Imaging System**. When using a thermal camera in lieu of the thermal imaging system, place mixture when the roadway surface temperature is at or above 70°F unless otherwise approved or as shown on the plans. Measure the roadway surface temperature with a hand-held thermal camera or infrared thermometer. Place mixtures only when weather conditions and moisture conditions of the roadway surface are suitable as determined by the Engineer. The Engineer may restrict the Contractor from paving if the air temperature is 70°F and falling.

Produce mixture with a target discharge temperature higher than 300°F and with a compaction aid to facilitate compaction when the air temperature is 70°F and falling.

4.7.2. **Tack Coat**.

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

4.7.2.2. **Sampling.** The Engineer will obtain at least one sample of the tack coat binder per project in accordance with Tex-500-C, Part III, and test it to verify compliance with Item 300, "Asphalts, Oils, and Emulsions." The Engineer will notify the Contractor when the sampling will occur and will witness the collection of the sample from the asphalt distributor immediately before use. Label the can with the corresponding lot and sublot numbers, producer, producer facility, grade, district, date sampled, and project information including highway and CSJ. For emulsions, the Engineer may test as often as necessary to ensure the residual of the emulsion is greater than or equal to the specification requirement in Item 300, "Asphalts, Oils, and Emulstions."

4.7.3. **Lay-Down Operations**. Use the placement temperatures in Table 11 to establish the minimum placement temperature of mixture delivered to the paving operation.

Table 11
Minimum Mixture Placement Temperature

High-Temperature Binder Grade[1]	Minimum Placement Temperature (Before Entering Paving Operation)[2,3]
PG 76	280˚F

1. The high-temperature binder grade refers to the high-temperature grade of the virgin asphalt binder used to produce the mixture.
2. The mixture temperature must be measured using a hand-held thermal camera or infrared thermometer nearest to the point of entry of the paving train.
3. Minimum placement temperatures may be reduced 10°F if using a compaction aid.

4.7.3.1. **Thermal Profile**. Use a hand-held thermal camera or a thermal imaging system to obtain a continuous thermal profile in accordance with Tex-244-F.

4.7.3.1.1. **Thermal Segregation**

4.7.3.1.1.1. **Moderate**. Any areas that have a temperature differential greater than 25°F, but not exceeding 50°F, are deemed as having moderate thermal segregation.

4.7.3.1.1.1. **Severe**. Any areas that have a temperature differential greater than 50°F are deemed as having severe thermal segregation.

4.7.3.1.2. **Thermal Imaging System**. Review the output results when a thermal imaging system is used, and provide the report described in Tex-244-F to the Engineer daily. Modify the paving process as necessary to eliminate any recurring (moderate or severe) thermal segregation identified by the thermal imaging system. Recurring severe thermal segregation is defined as having more than 10% severe segregation within the Lot..

The Engineer may suspend subsequent paving operations if the Contractor cannot successfully modify the paving process to eliminate recurring severe or moderate thermal segregation.

Provide the Engineer with electronic copies of all daily data files that can be used with the thermal imaging system software to generate temperature profile plots daily or as requested by the Engineer.

4.7.3.1.3. **Thermal Camera**. When using a thermal camera in lieu of the thermal imaging system, take immediate corrective action to eliminate recurring moderate thermal segregation when a hand-held thermal camera is used. Evaluate areas with moderate thermal segregation by performing water flow testing in accordance to Tex-246-F and verify the water flow is greater than 120 sec. Provide the Engineer with the thermal profile of every sublot within one working day of the completion of each lot. When requested by the Engineer, provide the electronic files generated using the thermal camera. Report the results of each thermal profile in accordance with Section 3081.4.2., "Reporting and Responsibilities." The Engineer will use a hand-held thermal camera to obtain a thermal profile at least once per project, unless the thermal imaging system is used. Suspend operations and take immediate corrective action to eliminate severe thermal segregation unless otherwise directed. Resume operations when the Engineer determines that subsequent production will meet the requirements of this Section. Evaluate areas with severe thermal segregation by performing water flow testing in accordance to Tex-246-F and verify the water flow is greater than 120 sec. Remove and replace the material in any areas that have both severe thermal segregation and a failing result for water flow test unless otherwise directed.

4.7.3.2. **Windrow Operations**. Operate windrow pickup equipment so that when hot-mix is placed in windrows, substantially all the mixture deposited on the roadbed is picked up and loaded into the paver.

4.7.3.3. **Hauling Equipment**. Use belly dumps, live bottom, or end dump trucks to haul and transfer mixture. End dump trucks are only allowed when used in conjunction with an MTD with remixing capability unless otherwise allowed.

4.7.3.4. **Screed Heaters**. Turn off screed heaters to prevent overheating of the mat if the paver stops for more than 5 min. The Engineer may evaluate the suspect area in accordance with Section 3081.4.9.3.1.1., "Recovered Asphalt Dynamic Shear Rheometer (DSR)," if the screed heater remains on for more than 5 min. while the

paver is stopped.

4.8. **Compaction**. Roll the freshly placed mixture with as many steel-wheeled rollers as necessary to ensure adequate compaction without excessive breakage of the aggregate and to provide a smooth surface and uniform texture. Operate each roller in static mode for TOM-F mixtures only. Do not use pneumatic-tire rollers. Use the control strip method given in Tex-207-F, Part IV, to establish the rolling pattern. Thoroughly moisten the roller drums with a soap and water solution to prevent adhesion. Use only water or an approved release agent on rollers, tamps, and other compaction equipment unless otherwise directed.

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

Use Tex-246-F to measure water flow to verify the mixture is adequately compacted. Measure the water flow once per sublot at locations directed by the Engineer. Take additional water flow measurements when the minimum temperature of the uncompacted mat is below the temperature requirements in Table 12.

Table 12
Minimum Uncompacted Mat Temperature Requiring Additional Water Flow Measurements

High-Temperature Binder Grade[1]	Minimum Temperature of the Uncompacted Mat Allowed Before Initial Break Down Rolling[2,3]
PG 76	<270˚F

1. The high-temperature binder grade refers to the high-temperature grade of the virgin asphalt binder used to produce the mixture.
2. The surface of the uncompacted mat must be measured using a hand-held thermometer or infrared thermometer.
3. Minimum uncompacted mat temperature requiring a water flow measurement may be reduced 10°F if using a compaction aid.

Use Tex-246-F to measure water flow to verify the mixture is adequately compacted at confined longitudinal joints as directed by the Engineer.

The water flow rate should be greater than 120 sec. Investigate the cause of the water flow rate test failures and take corrective actions during production and placement to ensure the water flow rate is greater than 120 sec. Suspend production if 2 consecutive water flow rate tests fail unless otherwise approved. Resume production after the Engineer approves changes to production or placement methods.

Complete all compaction operations before the pavement temperature drops below 180°F unless otherwise allowed. The Engineer may allow compaction with a light finish roller operated in static mode for pavement temperatures below 180°F when approved.

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

4.9. **Acceptance Plan**. Sample and test the hot-mix asphalt on a lot and sublot basis.

4.9.1. **Referee Testing**. The Materials and Tests Division is the referee laboratory. The Contractor may request referee testing if the differences between Contractor and Engineer test results exceed the maximum allowable difference shown in Table 8 and the differences cannot be resolved. The Contractor may also request referee testing if the Engineer's test results require suspension of production and the Contractor's test results are within specification limits. Make the request within 5 working days after receiving test results from the Engineer. Referee tests will be performed only on the sublot in question and only for the particular tests in question. Allow 10 working days from the time the referee laboratory receives the samples for test results to be reported. The Department may require the Contractor to reimburse the Department for referee tests if more than 3 referee tests per project are required and the Engineer's test results are closer to the referee test results than the Contractor's test results.

The Materials and Tests Division will determine the laboratory-molded density based on the molded specific gravity and the maximum theoretical specific gravity of the referee sample.

4.9.2. **Production Acceptance**.

4.9.2.1. **Production Lot**. A production lot consists of 4 equal sublots. The default quantity for Lot 1 is 500 tons; however, when requested by the Contractor, the Engineer may increase the quantity for Lot 1 to no more than 2,000 tons. The Engineer will select subsequent lot sizes based on the anticipated daily production such that approximately 3 to 4 sublots are produced each day. The lot size will be between 500 tons and 2,000 tons. The Engineer may change the lot size before the Contractor begins any lot.

4.9.2.1.1. **Incomplete Production Lots**. If a lot is begun but cannot be completed, such as on the last day of production or in other circumstances deemed appropriate, the Engineer may close the lot. Close all lots within 5 working days unless otherwise allowed.

4.9.2.2. **Production Sampling**.

4.9.2.2.1. **Mixture Sampling**. Obtain hot-mix samples from trucks at the plant in accordance with Tex-222-F. The sampler will split each sample into 3 equal portions in accordance with Tex-200-F and label these portions as "Contractor," "Engineer," and "Referee." The Engineer will perform or witness the sample splitting and take immediate possession of the samples labeled "Engineer" and "Referee." The Engineer will maintain the custody of the samples labeled "Engineer" and "Referee" until the Department's testing is completed.

4.9.2.2.1.1. **Random Sample**. At the beginning of the project, the Engineer will select random numbers for all production sublots. Determine sample locations in accordance with Tex-225-F. Take one sample for each sublot at the randomly selected location. The Engineer will perform or witness the sampling of production sublots.

4.9.2.2.1.1. **Blind Sample**. For one sublot per lot, the Engineer will obtain and test a "blind" sample instead of the random sample collected by the Contractor. Test either the "blind" or the random sample; however, referee testing (if applicable) will be based on a comparison of results from the "blind" sample. The location of the Engineer's "blind" sample will not be disclosed to the Contractor. The Engineer's "blind" sample may be randomly selected in accordance with Tex-225-F for any sublot or selected at the discretion of the Engineer. The Engineer will use the Contractor's split sample for sublots not sampled by the Engineer.

4.9.2.2.2. **Asphalt Binder Sampling**. Obtain a 1-qt. sample of the asphalt binder witnessed by the Engineer for each lot of mixture produced. The Contractor will notify the Engineer when the sampling will occur. Obtain the sample at approximately the same time the mixture random sample is obtained. Sample from a port located immediately upstream from the mixing drum or pug mill and upstream from the introduction of any additives in accordance with Tex-500-C, Part II. Label the can with the corresponding lot and sublot numbers, producer, producer facility location, grade, district, date sampled, and project information including highway and CSJ. The Engineer will retain these samples for one year. The Engineer may also obtain independent samples. If obtaining an independent asphalt binder sample and upon request of the Contractor, the Engineer will split a sample of the asphalt binder with the Contractor.

At least once per project, the Engineer will collect split samples of each binder grade and source used. The Engineer will submit one split sample to the Materials and Tests Division to verify compliance with Item 300, "Asphalts, Oils, and Emulsions" and will retain the other split sample for one year.

4.9.2.3. **Production Testing**. The Contractor and Engineer must perform production tests in accordance with Table 13. The Contractor has the option to verify the Engineer's test results on split samples provided by the Engineer. Determine compliance with operational tolerances listed in Table 8 for all sublots.

Take immediate corrective action if the Engineer's laboratory-molded density on any sublot is less than 95.0% or greater than 98.0% when using the SGC or less than 96.5% or greater than 98.5% when using the TGC, to bring the mixture within these tolerances. The Engineer may suspend operations if the Contractor's corrective actions do not produce acceptable results. The Engineer will allow production to resume when the proposed corrective action is likely to yield acceptable results.

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

allowed.

Table 13
Production and Placement Testing Frequency

Description	Test Method	Minimum Contractor	Minimum Engineer
Individual % retained for #8 sieve and larger	Tex-200-F or Tex-236-F	1 per sublot	1 per 12 sublots[1]
Individual % retained for sieves smaller than #8 and larger than #200			
% passing the #200 sieve			
Laboratory-molded density	Tex-207-F	N/A	1 per sublot[1]
Laboratory-molded bulk specific gravity			
VMA	Tex-204-F		
Moisture content	Tex-212-F, Part II	When directed	
Theoretical maximum specific (Rice) gravity	Tex-227-F, Part II	N/A	1 per sublot[1]
Asphalt binder content[2]	Tex-236-F, Part I	1 per sublot	1 per lot[1]
Overlay test[3]	Tex-248-F	N/A	1 per project
Hamburg Wheel test	Tex-242-F	N/A	1 per project
Thermal profile	Tex-244-F	1 per sublot[4,5,6]	1 per project[5]
Asphalt binder sampling and testing	Tex-500-C, Part II	1 per lot (sample only)[7]	1 per project
Tack coat sampling and testing	Tex-500-C, Part III	N/A	1 per project
Boil test[8]	Tex-530-C	1 per sublot[9]	1 per project
Water flow	Tex-246-F		

1. For production defined in Section 3081.4.9.4., "Exempt Production," the Engineer will test one per day if 100 tons or more are produced. For Exempt Production, no testing is required with less than 100 tons are produced.
2. May be obtained from asphalt flow meter readout as determined by the Engineer.
3. Testing performed by the Materials and Tests Division on sample obtained from Lot 2 or higher.
4. To be performed in the presence of the Engineer when a thermal camera is used, unless otherwise approved.
5. Not required when a thermal imaging system is used.
6. When using the thermal imaging system, the test report must include the temperature measurements taken continuously for the entire lot in accordance with Tex-244-F.
7. Obtain samples witnessed by the Engineer. The Engineer will retain these samples for one year.
8. The Engineer may reduce or waive the sampling and testing requirements based on a satisfactory test history.
9. To be performed in the presence of the Engineer, unless otherwise directed.

4.9.2.4. **Operational Tolerances**. Control the production process within the operational tolerances listed in Table 8. When production is suspended, the Engineer will allow production to resume when test results or other information indicates the next mixture produced will be within the operational tolerances.

4.9.2.4.1. **Gradation**. Suspend operation and take corrective action if any aggregate is retained on the maximum sieve size shown in Table 6. A sublot is defined as out of tolerance if either the Engineer's or the Contractor's test results are out of operational tolerance. Suspend production when test results for gradation exceed the operational tolerances in Table 8 for 3 consecutive sublots on the same sieve or 4 consecutive sublots on any sieve unless otherwise directed. The consecutive sublots may be from more than one lot.

4.9.2.4.2. **Asphalt Binder Content**. A sublot is defined as out of operational tolerance if either the Engineer's or the Contractor's test results exceed the values listed in Table 8. Suspend production when 2 or more sublots within a lot are out of operational tolerance or below the minimum asphalt binder content specified in Table 6 unless otherwise directed. Suspend production and shipment of mixture if the Engineer's or Contractor's asphalt binder content deviates from the current JMF by more than 0.5% for any sublot or is less than the minimum asphalt content allowed in Table 6.

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

Take immediate corrective action if the VMA value for any sublot is less than the minimum VMA requirement for production listed in Table 6. Suspend production and shipment of the mixture if the Engineer's VMA results on 2 consecutive sublots are below the minimum VMA requirement for production listed in Table 6.

Suspend production and shipment of the mixture if the Engineer's VMA result is more than 0.5% below the

minimum VMA requirement for production listed in Table 6. In addition to suspending production, the Engineer may require removal and replacement or may allow the sublot to be left in place without payment.

4.9.2.4.4. **Hamburg Wheel and Overlay Test**. The Engineer may perform a Hamburg Wheel or Overlay test on plant produced mixture at any time during production. In addition to testing production samples, the Engineer may obtain cores and perform the Hamburg Wheel test on any area of the roadway where rutting is observed. Suspend production until further Hamburg Wheel or Overlay tests meet the specified values when the production or core samples fail to meet the Hamburg Wheel or Overlay test criteria in Table 7. Core samples, if taken, will be obtained from the center of the finished mat or other areas excluding the vehicle wheel paths. The Engineer may require up to the entire sublot of any mixture failing the Hamburg Wheel or Overlay test to be removed and replaced at the Contractor's expense.

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

4.9.2.5. **Individual Loads of Hot-Mix**. The Engineer can reject individual truckloads of hot-mix. When a load of hot-mix is rejected for reasons other than temperature, contamination, or excessive uncoated particles, the Contractor may request that the rejected load be tested. Make this request within 4 hr. of rejection. The Engineer will sample and test the mixture. If test results are within the operational tolerances shown in Table 8, payment will be made for the load. If test results are not within operational tolerances, no payment will be made for the load.

4.9.3. **Placement Acceptance**.

4.9.3.1. **Placement Lot**. A placement lot consists of 4 placement sublots. A placement sublot consists of the area placed during a production sublot.

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

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

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

4.9.4. **Exempt Production**. When the anticipated daily production is less than 100 tons, all QC and QA sampling and testing are waived. The Engineer may deem the mixture as exempt production for the following conditions:

- anticipated daily production is more than 100 tons but less than 250 tons;
- total production for the project is less than 2,500 tons;
- when mutually agreed between the Engineer and the Contractor; or
- when shown on the plans.

For exempt production, the Contractor is relieved of all production and placement sampling and testing requirements. All other specification requirements apply, and the Engineer will perform acceptance tests for production and placement listed in Table 13.

For exempt production:

- produce, haul, place, and compact the mixture as directed by the Engineer; and
- control mixture production to yield a laboratory-molded density that is within ±1.0% of the target density as tested by the Engineer.

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

5. MEASUREMENT

5.1. **TOM Hot-Mix Asphalt.** TOM hot-mix will be measured by the ton of composite mixture, which includes asphalt, aggregate, and additives. Measure the weight on scales in accordance with Item 520, "Weighing and Measuring Equipment."

5.2. **Tack Coat.** Tack coat will be measured at the applied temperature by strapping the tank before and after road application and determining the net volume in gallons from the calibrated distributor. The Engineer will witness all strapping operations for volume determination. All tack, including emulsions, will be measured by the gallon applied.

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

6. PAYMENT

The work performed and materials furnished in accordance with this Item and measured as provided under Section 3081.5.1., "Measurement," will be paid for at the unit bid price for "TOM Mix" of the mixture type, SAC, and binder specified. These prices are full compensation for surface preparation, removing pavement marking and markers, materials, placement, equipment, labor, tools, and incidentals.

The work performed and materials furnished in accordance with this Item and measured as provided under Section 3081.5.2., "Measurement," will be paid for at the unit bid price for "Tack Coat" of the tack coat provided. These prices are full compensation for materials, placement, equipment, labor, tools, and incidentals.

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

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

Special Specification 3084
Bonding Course

1. DESCRIPTION

Construct a bonding course where improved bonding is needed using a Tracking-Resistant Asphalt Interlayer (TRAIL) or a Spray Applied Underseal Membrane, applied before the placement of a new hot-mix asphalt concrete pavement.

2. MATERIALS

2.1. Furnish the materials for one of the following two options:

2.1.1. **TRAIL.** Furnish asphalt material described as "tack" for typical use in the TRAIL Material Producer List. Do not dilute emulsified asphalts at the terminal, in the field, or at any other location before use.

2.1.2. **Spray Applied Underseal Membrane.** Furnish asphalt material meeting the requirements of Special Specification 3002, "Spray Applied Underseal Membrane." Do not dilute emulsified asphalts at the terminal, in the field, or at any other location before use.

2.2. Furnish the material for applying tack coat to all miscellaneous contact surfaces when approved by the Engineer:

2.2.1. **Miscellaneous Tack.** FurnishTRAIL asphalt, CSS-1H, SS-1H, or a PG binder with a minimum high-temperature of PG 58 for tack coat binder in accordance with Item 300, "Asphalts, Oils, and Emulsions." Do not dilute emulsified asphalts at the terminal, in the field, or at any other location before use.

2.3. **Sampling**. The Engineer will witness the collection of at least one sample of each asphalt binder per project in accordance with Tex-500-C, Part III, and test it to verify compliance with Item 300, "Asphalts, Oils, and Emulsions" or Special Specification 3002, "Spray Applied Underseal Membrane."

3. EQUIPMENT

3.1. **TRAIL.** Provide the equipment recommended by the producer.

3.2. **Spray Applied Underseal Membrane.** Provide in accordance with Special Specification 3002, "Spray Applied Underseal Membrane."

4. CONSTRUCTION

4.1. **Preparation.** Remove existing raised pavement markers. Repair any damage incurred by removal as directed. Remove dirt, dust, or other harmful material before sealing. When shown on the plans, remove vegetation and blade pavement edges. When approved by the Engineer, apply a thin, uniform coating of Miscellaneous Tack to all miscellaneous contact surfaces such as curbs, structures, and manholes. Prevent splattering of the tack coat when placed adjacent to curb, gutter, and structures.

4.2. **Test Strips.** When required by the Engineer, perform a test strip of TRAIL at a location on or near the project as directed. Allow the strip to cure for a maximum of 30 min. Drive over the test strip with equipment used during laid-down construction to simulate the effect of paving equipment. There should be no evidence of tracking or picking up of the TRAIL material on the wheels of the equipment.

4.3. **TRAIL.** Perform the following construction methods when applying a TRAIL for a bonding course:

4.3.1. **Placement.** Uniformly apply the TRAIL material to all areas where mix will be placed, including joints, at the rate shown on the plans or as directed, within 15°F of the approved temperature, and not above the maximum allowable temperature. Unless otherwise directed, uniformly apply the TRAIL material at a minimum rate specified on the plans. The Engineer may adjust the application rate, taking into consideration the existing pavement surface conditions.

4.4. **Spray Applied Underseal Membrane.** Place in accordance with Special Specification 3002, "Spray Applied Underseal Membrane."

4.4.1. **Placement.** Do not allow any loose mixture onto the prepared surface before application of the membrane. Unless otherwise directed, uniformly apply the membrane to all areas where mix will be placed, including joints, at the rate shown on the plans. Unless otherwise directed, uniformly apply the membrane at the minimum rate specified on the plans. The Engineer may adjust the application rate, taking into consideration the existing pavement surface conditions.

4.5. **Informational Shear Test.** Obtain one set of full depth core specimens per project in accordance with Tex-249-F within one working day of the time the lot placement is completed. The Engineer will select the core locations. Provide the cores to the Engineer in a container labeled with the Control-Section-Job (CSJ) and lot number. The district will determine the shear bond strength between the two bonded pavement layers in accordance with Tex-249-F. Results from these tests will not be used for specification compliance.

4.6. **Quality Control.** Stop application if it is not uniform due to streaking, ridging, pooling, or flowing off the roadway surface. Verify equipment condition, operating procedures, application temperature, and material properties. Determine and correct the cause of non-uniform application.

The Engineer may perform independent tests to confirm contractor compliance and may require testing differences or failing results to be resolved before resuming production.

The Engineer may stop the application and require construction of test strips at the Contractor's expense if any of the following occurs:

- Non-uniformity of application continues after corrective action;
- Evidence of tracking or picking up of the TRAIL;
- In 3 consecutive shots, application rate differs by more than 0.02 gal. per square yard from the rate directed; or
- Any shot differs by more than 0.04 gal. per square yard from the rate directed.

The Engineer will approve the test strip location. The Engineer may require additional test strips until surface treatment application meets specification requirements.

5. MEASUREMENT

5.1. **Volume**. The asphalt material, including all components, will be measured at the applied temperature by strapping the tank before and after road application and determining the net volume from the calibrated distributor. The Engineer will witness all strapping operations for volume determination. All asphalt material, including emulsions, will be measured by the gallon applied.

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

6. PAYMENT

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit bid price for "Bonding Course." These prices are full compensation

for all materials, Miscellaneous Tack used for miscellaneous contact surfaces, equipment, labor, tools, and incidentals necessary to complete the work.

Special Specification 3096
Asphalts, Oils, and Emulsions

1. DESCRIPTION

Provide asphalt cements, cutback and emulsified asphalts, performance-graded asphalt binders, and other miscellaneous asphalt materials as specified on the plans.

2. MATERIALS

Provide asphalt materials that meet the stated requirements when tested in conformance with the referenced Department, AASHTO, and ASTM test methods. Use asphalt containing recycled materials only if the recycled components meet the requirements of Article 6.9., "Recycled Materials." Provide asphalt materials that the Department has preapproved for use in accordance with Tex-545-C, "Asphalt Binder Quality Program."

Inform the Department of all additives or modifiers included in the asphalt binder as part of the facility quality plan, as required by Tex-545-C, "Asphalt Binder Quality Program," and provide that information to Department personnel. The Department reserves the right to prohibit the use of any asphalt additive or modifier.

Limit the use of polyphosphoric acid to no more than 0.5% by weight of the asphalt binder.

The use of re-refined engine oil bottoms is prohibited.

Acronyms used in this Item are defined in Table 1.

Table1
Acronyms

Acronym	Definition
Test Procedure Designations	
Tex	Department
T or R	AASHTO
D	ASTM
Polymer Modifier Designations	
P	polymer-modified
SBR or L	styrene-butadiene rubber (latex)
SBS	styrene-butadiene-styrene block co-polymer
TR	tire rubber (from ambient temperature grinding of truck and passenger tires)
AC	asphalt cement
AE	asphalt emulsion
AE-P	asphalt emulsion prime
A-R	asphalt-rubber
C	cationic
EAP&T	emulsified asphalt prime and tack
EBL	emulsified bonding layer
FDR	full depth reclamation
H-suffix	harder residue (lower penetration)
HF	high float
HY	high yield
MC	medium-curing
MS	medium-setting
PCE	prime, cure, and erosion control
PG	performance grade
RC	rapid-curing
RS	rapid-setting
S-suffix	stockpile usage
SCM	special cutback material
SS	slow-setting
SY	standard yield
TRAIL	tracking resistant asphalt interlayer

2.1. **Asphalt Cement**. Provide asphalt cement that is homogeneous, water-free, and nonfoaming when heated to 347°F, and meets the requirements in Table 2.

Table 2
Asphalt Cement

Property	Test Procedure	Viscosity Grade									
		AC-0.6		AC-1.5		AC-3		AC-5		AC-10	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Viscosity 140°F, poise 275°F, poise	T 202	 40 0.4	 80 –	 100 0.7	 200 –	 250 1.1	 350 –	 400 1.4	 600 –	 800 1.9	 1,200 –
Penetration, 77°F, 100g, 5 sec.	T 49	350	–	250	–	210	–	135	–	85	–
Flash point, C.O.C., °F	T 48	425	–	425	–	425	–	425	–	450	–
Solubility in trichloroethylene, %	T 44	99.0	–	99.0	–	99.0	–	99.0	–	99.0	–
Spot test	Tex-509-C	Neg.		Neg.		Neg.		Neg.		Neg.	
Tests on residue from RTFOT: Viscosity, 140°F, poise Ductility,[1] 77°F 5 cm/min., cm	T 240 T 202 T 51	 – 100	 180 –	 – 100	 450 –	 – 100	 900 –	 – 100	 1,500 –	 – 100	 3,000 –

1. If AC-0.6 or AC-1.5 ductility at 77°F is less than 100 cm, material is acceptable if ductility at 60°F is more than 100 cm.

2.2. **Polymer-Modified Asphalt Cement**. Provide polymer-modified asphalt cement that is smooth, homogeneous, and meets the requirements Table 3. Supply samples of the base asphalt cement and polymer additives if requested.

Table 3
Polymer-Modified Asphalt Cement

Property	Test Procedure	Polymer-Modified Viscosity Grade											
		AC-12-5TR		NT-HA[1]		AC-15P		AC-20XP		AC-10-2TR		AC-20-5TR	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Polymer		TR		–		SBS		SBS		TR		TR	
Polymer content, % (solids basis)	Tex-533-C or Tex-553-C	5.0	–	–	–	3.0	–	–	–	2.0	–	5.0	–
Dynamic shear, G*/sinδ, 82°C, 10 rad/s, kPa	T 315			1.0	–								
Dynamic shear, G*/sinδ, 64°C, 10 rad/s, kPa	T 315	–	–	–	–	–	–	1.0	–	–	–	1.0	–
Dynamic shear, G*/sinδ, 58°C, 10 rad/s, kPa	T 315	1.0	–	–	–	–	–	–	–	1.0	–	–	–
Viscosity 140°F, poise 275°F, poise	 T 202 T 202	 1,200	 –	 –	 4,000	 1,500 –	 – 8.0	 2,000 –	 – –	 1,000 –	 – 8.0	 2,000 –	 – 10.0
Penetration, 77°F, 100 g, 5 sec.	T 49	110	150	–	25	100	150	75	115	95	130	75	115
Ductility, 5cm/min., 39.2°F, cm	T 51					–	–	–	–	–	–	–	–
Elastic recovery, 50°F, %	Tex-539-C	55	–			55	–	55	–	30	–	55	–
Softening point, °F	T 53	113	–	170	–	–	–	120	–	110	–	120	–
Polymer separation, 5 hr.	Tex-540-C	None				None		None		None		None	
Flash point, C.O.C., °F	T 48	425	–	425	–	425	–	425	–	425	–	425	–
Tests on residue from RTFOT aging and pressure aging:	T 240 and R 28												
Creep stiffness S, -18°C, MPa m-value, -18°C	T 313	 – 0.300	 300 –	 – –	 – –	 – 0.300	 300 –	 – 0.300	 300 –	 – 0.300	 300 –	 – 0.300	 300 –

1. Non-Tracking Hot Applied Tack Coat - TRAIL product

2.3. **Cutback Asphalt**. Provide cutback asphalt that meets the requirements of Tables 4, 5, and 6, for the specified type and grade. Supply samples of the base asphalt cement and polymer additives if requested.

Table 4
Rapid-Curing Cutback Asphalt

Property	Test Procedure	Type–Grade					
		RC-250		RC-800		RC-3000	
		Min	Max	Min	Max	Min	Max
Kinematic viscosity, 140°F, cSt	T 201	250	400	800	1,600	3,000	6,000
Water, %	D95	–	0.2	–	0.2	–	0.2
Flash point, T.O.C., °F	T 79	80	–	80	–	80	–
Distillation test:	T 78						
Distillate, percentage by volume of total distillate to 680°F							
to 437°F		40	75	35	70	20	55
to 500°F		65	90	55	85	45	75
to 600°F		85	–	80	–	70	–
Residue from distillation, volume %		70	–	75	–	82	–
Tests on distillation residue:							
Viscosity, 140°F, poise	T 202	600	2,400	600	2,400	600	2,400
Ductility, 5 cm/min., 77°F, cm	T 51	100	–	100	–	100	–
Solubility in trichloroethylene, %	T 44	99.0	–	99.0	–	99.0	–
Spot test	Tex-509-C	Neg.		Neg.		Neg.	

Table 5
Medium-Curing Cutback Asphalt

Property	Test Procedure	Type–Grade							
		MC-30		MC-250		MC-800		MC-3000	
		Min	Max	Min	Max	Min	Max	Min	Max
Kinematic viscosity, 140°F, cSt	T 201	30	60	250	500	800	1,600	3,000	6,000
Water, %	D95	–	0.2	–	0.2	–	0.2	–	0.2
Flash point, T.O.C., °F	T 79	95	–	122	–	140	–	149	–
Distillation test:	T 78								
Distillate, percentage by volume of total distillate to 680°F									
to 437°F		–	35	–	20	–	–	–	–
to 500°F		30	75	5	55	–	40	–	15
to 600°F		75	95	60	90	45	85	15	75
Residue from distillation, volume %		50	–	67	–	75	–	80	–
Tests on distillation residue:									
Viscosity, 140°F, poise	T 202	300	1,200	300	1,200	300	1,200	300	1,200
Ductility, 5 cm/min., 77°F, cm	T 51	100	–	100	–	100	–	100	–
Solubility in trichloroethylene, %	T 44	99.0	–	99.0	–	99.0	–	99.0	–
Spot test	Tex-509-C	Neg.		Neg.		Neg.		Neg.	

Table 6
Special-Use Cutback Asphalt

Property	Test Procedure	Type–Grade					
		MC-2400L		SCM I		SCM II	
		Min	Max	Min	Max	Min	Max
Kinematic viscosity, 140°F, cSt	T 201	2,400	4,800	500	1,000	1,000	2,000
Water, %	D95	–	0.2	–	0.2	–	0.2
Flash point, T.O.C., °F	T 79	150	–	175	–	175	–
Distillation test:	T 78						
Distillate, percentage by volume of total distillate to 680°F							
to 437°F		–	–	–	–	–	–
to 500°F		–	35	–	0.5	–	0.5
to 600°F		35	80	20	60	15	50
Residue from distillation, volume %		78	–	76	–	82	–
Tests on distillation residue:							
Polymer		SBR		–		–	
Polymer content, % (solids basis)	Tex-533-C	2.0	–	–	–	–	–
Penetration, 100 g, 5 sec., 77°F	T 49	150	300	180	–	180	–
Ductility, 5 cm/min., 39.2°F, cm	T 51	50	–	–	–	–	–
Solubility in trichloroethylene, %	T 44	99.0	–	99.0	–	99.0	–

2.4. **Emulsified Asphalt**. Provide emulsified asphalt that is homogeneous, does not separate after thorough mixing, and meets the requirements for the specified type and grade in Tables 7, 8, 9, 10, and 10A-C.

Table 7
Emulsified Asphalt

Property	Test Procedure	Type–Grade									
		Rapid-Setting		Medium-Setting				Slow-Setting			
		HFRS-2		MS-2		AES-300		SS-1		SS-1H	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Viscosity, Saybolt Furol	T 72										
77°F, sec.		–	–	–	–	75	400	20	100	20	100
122°F, sec.		150	400	100	300	–	–	–	–	–	–
Sieve test, %	T 59	–	0.1	–	0.1	–	0.1	–	0.1	–	0.1
Miscibility	T 59	–		–		–		Pass		Pass	
Cement mixing, %	T 59	–	–	–	–	–	–	–	2.0	–	2.0
Coating ability and water resistance:	T 59										
Dry aggregate/after spray		–		–		Good/Fair		–		–	
Wet aggregate/after spray		–		–		Fair/Fair		–		–	
Demulsibility, 35 mL of 0.02 N $CaCl_2$, %	T 59	50	–	–	30	–	–	–	–	–	–
Storage stability, 1 day, %	T 59	–	1	–	1	–	1	–	1	–	1
Freezing test, 3 cycles[1]	T 59	–		Pass		–		Pass		Pass	
Distillation test:	T 59										
Residue by distillation, % by wt.		65	–	65	–	65	–	60	–	60	–
Oil distillate, % by volume of emulsion		–	0.5	–	0.5	–	5	–	0.5	–	0.5
Tests on residue from distillation:											
Penetration, 77°F, 100 g, 5 sec.	T 49	100	140	120	160	300	–	120	160	70	100
Solubility in trichloroethylene, %	T 44	97.5	–	97.5	–	97.5	–	97.5	–	97.5	–
Ductility, 77°F, 5 cm/min., cm	T 51	100	–	100	–	–	–	100	–	80	–
Float test, 140°F, sec.	T 50	1,200	–	–	–	1,200	–	–	–	–	–

1. Applies only when the Engineer designates material for winter use.

Table 8
Cationic Emulsified Asphalt

Property	Test Procedure	Type–Grade											
		Rapid-Setting				Medium-Setting				Slow-Setting			
		CRS-2		CRS-2H		CMS-2		CMS-2S		CSS-1		CSS-1H	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Viscosity, Saybolt Furol	T 72												
77°F, sec.		–	–	–	–	–	–	–	–	20	100	20	100
122°F, sec.		150	400	150	400	100	300	100	300	–	–	–	–
Sieve test, %	T 59	–	0.1	–	0.1	–	0.1	–	0.1	–	0.1	–	0.1
Cement mixing, %	T 59	–	–	–	–	–	–	–	–	–	2.0	–	2.0
Coating ability and water resistance:	T 59												
Dry aggregate/after spray		–		–		Good/Fair		Good/Fair		–		–	
Wet aggregate/after spray		–		–		Fair/Fair		Fair/Fair		–		–	
Demulsibility, 35 mL of 0.8% Sodium dioctyl sulfosuccinate, %	T 59	70	–	70	–	–	–	–	–	–	–	–	–
Storage stability, 1 day, %	T 59	–	1	–	1	–	1	–	1	–	1	–	1
Particle charge	T 59	Positive		Positive		Positive		Positive		Positive		Positive	
Distillation test:													
Residue by distillation, % by wt.	T 59	65	–	65	–	65	–	65	–	60	–	60	–
Oil distillate, % by volume of emulsion		–	0.5	–	0.5	–	7	–	5	–	0.5	–	0.5
Tests on residue from distillation:													
Penetration, 77°F, 100 g, 5 sec.	T 49	120	160	70	110	120	200	300	–	120	160	70	110
Solubility in trichloroethylene, %	T 44	97.5	–	97.5	–	97.5	–	97.5	–	97.5	–	97.5	–
Ductility, 77°F, 5 cm/min., cm	T 51	100	–	80	–	100	–		–	100	–	80	–

Table 9
Polymer-Modified Emulsified Asphalt

Property	Test Procedure	Type–Grade									
		Rapid-Setting		Medium-Setting				Slow-Setting			
		HFRS-2P		AES-150P		AES-300P		AES-300S		SS-1P	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Viscosity, Saybolt Furol	T 72										
77°F, sec.		–	–	75	400	75	400	75	400	30	100
122°F, sec.		150	400					–	–	–	–
Sieve test, %	T 59	–	0.1	–	0.1	–	0.1	–	0.1	–	0.1
Miscibility	T 59	–		–		–		–		Pass	
Coating ability and water resistance:											
Dry aggregate/after spray	T 59	–		Good/Fair		Good/Fair		Good/Fair		–	
Wet aggregate/after spray		–		Fair/Fair		Fair/Fair		Fair/Fair		–	
Demulsibility, 35 mL of 0.02 N $CaCl_2$, %	T 59	50	–	–	–	–	–	–	–	–	–
Storage stability, 1 day, %	T 59	–	1	–	1	–	1	–	1	–	1
Breaking index, g	Tex-542-C	–	–								
Distillation test:[1]	T 59										
Residue by distillation, % by wt.		65	–	65	–	65	–	65	–	60	–
Oil distillate, % by volume of emulsion		–	0.5	–	3	–	5	–	7	–	0.5
Tests on residue from distillation:											
Polymer content, wt. % (solids basis)	Tex-533-C	3.0	–	–	–	–	–	–	–	3.0	–
Penetration, 77°F, 100 g, 5 sec.	T 49	90	140	150	300	300	–	300	–	100	140
Solubility in trichloroethylene, %	T 44	97.0	–	97.0	–	97.0	–	97.0	–	97.0	–
Viscosity, 140°F, poise	T 202	1,500	–	–	–	–	–	–	–	1,300	–
Float test, 140°F, sec	T 50	1,200	–	1,200	–	1,200	–	1,200	–	–	–
Ductility,[2] 39.2°F, 5 cm/min., cm	T 51	50	–	–	–	–	–	–	–	50	–
Elastic recovery,2 50°F, %	Tex-539-C	55	–	–	–	–	–	–	–	–	–
Tests on RTFO curing of distillation residue	T 240										
Elastic recovery, 50°F, %	Tex-536-C	–	–	50	–	50	–	30	–	–	–

1. Exception to T 59: Bring the temperature on the lower thermometer slowly to 350°F ±10°F. Maintain at this temperature for 20 min. Complete total distillation in 60 min. (±5 min.) from the first application of heat.
2. HFRS-2P must meet one of either the ductility or elastic recovery requirements.

Table 10
Polymer-Modified Cationic Emulsified Asphalt

Property	Test Procedure	Type–Grade											
		Rapid-Setting						Medium-Setting				Slow-Setting	
		CRS-2P		CHFRS-2P		CRS-2TR		CMS-1P[3]		CMS-2P[3]		CSS 1P	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
Viscosity, Saybolt Furol	T 72												
77°F, sec.		–	–	–	–	–	–	10	100	–	–	20	100
122°F, sec.		150	400	100	400	150	500	–	–	50	400	–	–
Sieve test, %	T 59	–	0.1	–	0.1	–	0.1	–	0.1	–	0.1	–	0.1
Demulsibility, 35 ml of 0.8% sodium dioctyl sulfosuccinate, %	T 59	70	–	60	–	40	–	–	–	–	–	–	–
Storage stability, 1 day, %	T 59	–	1	–	1	–	1	–	1	–	1	–	1
Breaking index, g	Tex-542-C	–	–	–	–	–	–	–	–	–	–	–	–
Particle charge	T 59	Positive		Positive		Positive		Positive		Positive		Positive	
Distillation test[1]:	T 59												
Residue by distillation, % by weight		65	–	65	–	65	–	30	–	60	–	62	–
Oil distillate, % by volume of emulsion		–	0.5	–	0.5	–	3	–	0.5	–	0.5	–	0.5
Tests on residue from distillation:													
Polymer content, wt. % (solids basis)	Tex-533-C	3.0	–	3.0	–	5.0[7]	–	–	–	–	–	3.0	–
Penetration, 77°F, 100 g, 5 sec.	T 49	90	150	80	130	90	150	30	–	30	–	55	90
Viscosity, 140°F, poise	T 202	1,300	–	1,300	–	1,000	–	–	–	–	–	–	–
Solubility in trichloroethylene, %	T44	97.0	–	95.0	–	98	–	–	–	–	–	97.0	–
Softening point, °F	T 53	–	–	–	–	–	–	–	–	–	–	135	–
Ductility, 77°F, 5 cm/min., cm	T 51	–	–	–	–	40	–	–	–	–	–	70	–
Float test, 140°F, sec.	T 50	–	–	1,800	–	–	–	–	–	–	–	–	–
Ductility,[2] 39.2°F, 5 cm/min., cm	T 51	50	–	–	–	–	–	–	–	–	–	–	–
Elastic recovery,[2] 50°F, %	Tex-539-C	55	–	55	–	–	–	–	–	–	–	–	–
Tests on residue from evaporative recovery:	R 78, Procedure B												
Nonrecoverable creep compliance of residue, 3.2 kPa, 52°C, kPa-1	T 350	–	–	–	–	–	–	–	2.0	–	4.0	–	–
Tests on rejuvenating agent:													
Viscosity, 140°F, cSt	T 201	–	–	–	–	–	–	50	175	50	175	–	–
Flash point, C.O.C., °F	T 48	–	–	–	–	–	–	380	–	380	–	–	–
Saturates, % by weight	D 2007	–	–	–	–	–	–	–	30	–	30	–	–
Solubility in n-pentane, % by weight	D 2007	–	–	–	–	–	–	99	–	99	–	–	–
Tests on rejuvenating agent after RTFO	T 240												
Weight Change, %		–	–	–	–	–	–	–	6.5	–	6.5	–	–
Viscosity Ratio		–	–	–	–	–	–	–	3.0	–	3.0	–	–
Tests on latex[4]:													
Tensile strength, die C dumbbell, psi	D 412[5]	–	–	–	–	–	–	800	–	800	–	–	–
Change in mass after immersion in rejuvenating agent, %	D 471	–	–	–	–	–	–	–	40[6]	–	40[6]	–	–

1. Exception to T 59: Bring the temperature on the lower thermometer slowly to 350°F (±0°F). Maintain at this temperature for 20 min. Complete total distillation in 60 min. (±5 min.) from the first application of heat.
2. CRS-2P must meet one of either the ductility or elastic recovery requirements.
3. With all precertification samples of CMS-1P or CMS-2P, submit certified test reports showing that the rejuvenating agent and latex meet the stated requirements. Submit samples of these raw materials if requested by the Engineer.
4. Preparation of latex specimens: use any substrate and recovery method which produces specimens of uniform dimensions and which delivers enough material to achieve desired residual thickness.
5. Cut samples for tensile strength determination using a crosshead speed of 20 in. per minute.
6. Specimen must remain intact after exposure and removal of excess rejuvenating agent.
7. Modifier type is tire rubber.

Table 10A
Non-Tracking Tack Coat Emulsion[1]

Property	Test Procedure	NT-HRE		NT-RRE		NT-SRE	
		Min	Max	Min	Max	Min	Max
Viscosity, Saybolt Furol 77º F, sec.	T 72	15	–	15	–	10	100
Storage stability, 1 Day, %	T 59	–	1	–	1	–	1
Settlement, 5-day, %	T 59	–	5	–	5	–	5
Sieve test, %	T 59	–	0.30	–	0.30	–	0.1
Distillation test:[2]	T 59						
Residue by distillation, % by wt.		50	–	58	–	50	–
Oil distillate, by volume of emulsion		–	1.0	–	1.0	–	1.0
Test on residue from distillation:							
Penetration, 77ºF, 100 g, 5 sec.	T 49	–	20	15	45	40	90
Solubility in trichloroethylene, %	T 44	97.5	–	97.5	–	97.5	–
Softening point, ºF	T 53	150	–	–	–	–	–
Dynamic shear, G*/sin(δ), 82°C, 10 rad/s, kPa	T 315	1.0	–	–	–	–	–

1. Due to the hardness of the residue, these emulsions should be heated to 120-140°F before thoroughly mixing as the emulsion is being prepared for testing.
2. Exception to T 59: Bring the temperature on the lower thermometer slowly to 350ºF ± 10ºF. Maintain at this temperature for 20 min. Complete total distillation in 60 ± 5 min. from first application of heat.

Table10B
Spray Applied Underseal Membrane Polymer-Modified Emulsions (EBL)

Property	Test Procedure	Min	Max
Viscosity @ 77°F, SSF	T 72	20	100
Storage Stability[1], %	T 59	–	1
Demulsibility[2] Anionic emulsions – 35 mL of 0.02 N CaCl2, % Cationic emulsions – 35 mL of 0.8% sodium dioctyl sulfosuccinate, %	T 59	55	–
Sieve Test[3], %	T 59	–	0.05
Distillation Test[4]	T 59		
Residue by distillation, % by wt.		63	
Oil portion of distillate, % by vol.			0.5
Test on Residue from Distillation			
Elastic Recovery @ 50°F, 50 mm/min., %	Tex-539-C	60	–
Penetration @ 77°F, 100 g, 5 sec., 0.1 mm	T 49	80	130

1. After standing undisturbed for 24 hr., the surface must be smooth, must not exhibit a white or milky colored substance, and must be a homogeneous color throughout.
2. Material must meet demulsibility test for emulsions.
3. May be required by the Engineer only when the emulsion cannot be easily applied in the field.
4. The temperature on the lower thermometer should be brought slowly to 350°F ± 10°F and maintained at this temperature for 20 min. The total distillation should be completed in 60 ± 5 min. from the first application of heat.

Table 10C
Full-Depth Reclamation Emulsion (FDR EM)

Property	Test Procedure	Standard Yield (SY)		High Yield (HY)	
		Min	Max	Min	Max
Sieve test, %	T 59	–	0.1	–	0.1
Viscosity Saybolt Furol @ 77°F, sec.	T 59	20	100	20	100
Distillation test[1]:	T 59				
Residue by distillation, % by wt.		60	–	63	–
Oil portion of distillate, % by vol.		–	0.5	–	0.5
Test on residue from distillation:	T 49				
Penetration @ 77°F, dmm		55	95	120	–
Test on rejuvenating agent:					
BWOA, %[2]	***	–	–	2	–
Viscosity @ 140°F, cSt	T 201	–	–	50	175
Flash Point, COC, °F	T 48	–	–	380	–
Solubility in n-pentane, % by wt.	D2007	–	–	99	–

1. The temperature on the lower thermometer should be brought slowly to 350°F ±10°F and maintained at this temperature for 20 min. The total distillation should be completed in 60 ± 5 min. from the first application of heat.
2. BWOA = By weight of asphalt. Provide a manufacturer's certificate of analysis (COA) with the percent of rejuvenator added.

2.5. **Specialty Emulsions.** Provide specialty emulsion that is either asphalt-based or resin-based and meets the requirements of Table 11 or Table 11A.

Table 11
Specialty Emulsions

Property	Test Procedure	Type–Grade					
		Medium-Setting				Slow-Setting	
		AE-P		EAP&T		PCE[1]	
		Min	Max	Min	Max	Min	Max
Viscosity, Saybolt Furol	T 72						
77°F, sec.		–	–	–	–	10	100
122°F, sec.		15	150	–	–	–	–
Sieve test, %	T 59	–	0.1	–	0.1	–	0.1
Miscibility[2]	T 59	–		Pass		Pass	
Demulsibility, 35 mL of 0.10 N $CaCl^2$, %	T 59	–	70	–	–	–	–
Storage stability, 1 day, %	T 59	–	1	–	1	–	–
Particle size,[5] % by volume < 2.5 μm	Tex-238-F[3]	–	–	90	–	90	–
Asphalt emulsion distillation to 500°F followed by Cutback asphalt distillation of residue to 680°F:	T 59 & T 78						
Residue after both distillations, % by wt.		40	–	–	–	–	–
Total oil distillate from both distillations, % by volume of emulsion		25	40	–	–	–	–
Residue by distillation, % by wt.	T 59	–	–	60	–	–	–
Residue by evaporation,[4] % by wt.	T 59	–	–	–	–	60	–
Tests on residue after all distillations:							
Viscosity, 140°F, poise	T 202	–	–	800	–	–	–
Kinematic viscosity,[5] 140°F, cSt	T 201	–	–	–	–	100	350
Flash point C.O.C., °F	T 48	–	–	–	–	400	–
Solubility in trichloroethylene, %	T 44	97.5	–	–	–	–	–
Float test, 122°F, sec.	T 50	50	200	–	–	–	–

1. Supply with each shipment of PCE:
   - a copy of a lab report from an approved analytical lab, signed by a lab official, indicating the PCE formulation does not meet any characteristics of a Resource Conservation Recovery Act (RCRA) hazardous waste;
   - a certification from the producer that the formulation supplied does not differ from the one tested and that no listed RCRA hazardous wastes or Polychlorinated Biphenyls (PCBs) have been mixed with the product; and
   - a Safety Data Sheet.
2. Exception to T 59: In dilution, use 350 mL of distilled or deionized water and a 1,000-mL beaker.
3. Use Tex-238-F, beginning at "Particle Size Analysis by Laser Diffraction," with distilled or deionized water as a medium and no dispersant, or use another approved method.
4. Exception to T 59: Leave sample in the oven until foaming ceases, then cool and weigh.
5. PCE must meet either the kinematic viscosity requirement or the particle size requirement.

Table 11A
Hard Residue Surface Sealant

Property	Test Procedure	Min	Max
Viscosity, Krebs unit, 77ºF, Krebs units	D 562	45	75
Softening point, ºF	Tex-505-C[1]	250	–
Uniformity	D 2939	Pass[2]	
Resistance to heat	D 2939	Pass[3]	
Resistance to water	D 2939	Pass[4]	
Wet flow, mm	D 2939	–	0
Resistance to Kerosene (optional)[5]	D 2939	Pass[6]	
Ultraviolet exposure, UVA-340, 0.77 W/m^2, 50°C chamber, 8 hr. UV lamp, 5 min. spray, 3 hr. 55 min. condensation, 1,000 hr. total exposure[7]	G 154	Pass[8]	
Abrasion loss, 1.6 mm thickness, liquid only, %	ISSA TB-100	–	1.0
Residue by evaporation, % by weight	D 2939	33	–
Tests on residue from evaporation: Penetration, 77ºF, 100 g, 5 sec. Flash point, Cleveland open cup, °F	 T 49 T 48	 15 500	 30
Tests on base asphalt before emulsification Solubility in trichloroethylene, %	 T 44	 98	 –

1. Cure the emulsion in the softening point ring in a 200°F ± 5°F oven for 2 hr.
2. Product must be homogenous and show no separation or coagulation that cannot be overcome by moderate stirring.
3. No sagging or slippage of film beyond the initial reference line.
4. No blistering or re-emulsification.
5. Recommended for airport applications or where fuel resistance is desired.
6. No absorption of Kerosene into the clay tile past the sealer film. Note sealer surface condition and loss of adhesion.
7. Other exposure cycles with similar levels of irradiation and conditions may be used with Department approval.
8. No cracking, chipping, surface distortion, or loss of adhesion. No color fading or lightening.

2.6. **Recycling Agent**. Recycling agent and emulsified recycling agent must meet the requirements in Table 12. Additionally, recycling agent and residue from emulsified recycling agent, when added in the specified proportions to the recycled asphalt, must meet the properties specified on the plans.

Table 12
Recycling Agent and Emulsified Recycling Agent

Property	Test Procedure	Recycling Agent		Emulsified Recycling Agent (ARA-1)		Polymer Modified Emulsified Recycling Agent (ARA-1P)	
		Min	Max	Min	Max	Min	Max
Viscosity, Saybolt Furol, 77°F, sec.	T 72	–	–	15	100	15	110
Sieve test, %	T 59	–	–	–	0.1	–	0.1
Miscibility[1]	T 59	–		No coagulation			
Residue by evaporation,[2] % by wt.	T 59	–	–	60	–	–	–
Distillation test: Residue by distillation, % by wt. Oil distillate, % by volume of emulsion	T 59					 60 –	 65 2
Penetration of Distillation Residue at 39.2°F, 100 g, 5 sec.	T 49					110	190
Tests on recycling agent or residue from evaporation: Flash point, C.O.C., °F Kinematic viscosity, 140°F, cSt 275°F, cSt	 T 48 T 201	 400 75 –	 – 200 10.0	 400 75 –	 – 200 10.0	 400	 –

1. Exception to T 59: Use 0.02 N CaCl2 solution in place of water.
2. Exception to T 59: Maintain sample at 300°F until foaming ceases, then cool and weigh.

2.7. **Crumb Rubber Modifier**. Crumb rubber modifier (CRM) consists of automobile and truck tires processed by ambient temperature grinding.

CRM must be:

- free from contaminants including fabric, metal, and mineral and other nonrubber substances;
- free-flowing; and
- nonfoaming when added to hot asphalt binder.

Ensure rubber gradation meets the requirements of the grades in Table 13 when tested in accordance with Tex-200-F, Part I, using a 50-g sample.

Table 13
CRM Gradations

Sieve Size (% Passing)	Grade A		Grade B		Grade C		Grade D	Grade E
	Min	Max	Min	Max	Min	Max		
#8	100	–	–	–	–	–	As shown on the plans	As approved
#10	95	100	100	–	–	–		
#16	–	–	70	100	100	–		
#30	–	–	25	60	90	100		
#40	–	–	–	–	45	100		
#50	0	10	–	–	–	–		
#200	–	–	0	5	–	–		

2.8. **Crack Sealer**. Provide polymer-modified asphalt-emulsion crack sealer meeting the requirements of Table 14. Provide rubber-asphalt crack sealer meeting the requirements of Table 15.

Table 14
Polymer-Modified Asphalt-Emulsion Crack Sealer

Property	Test Procedure	Min	Max
Rotational viscosity, 77°F, cP	D 2196, Method A	10,000	25,000
Sieve test, %	T 59	–	0.1
Storage stability, 1 day, %	T 59	–	1
Evaporation Residue by evaporation, % by wt.	Tex-543-C	 65	 –
Tests on residue from evaporation: Penetration, 77°F, 100 g, 5 sec. Softening point, °F Ductility, 39.2°F, 5 cm/min., cm	 T 49 T 53 T 51	 35 140 100	 75 – –

Table 15
Rubber-Asphalt Crack Sealer

Property	Test Procedure	Class A		Class B	
		Min	Max	Min	Max
CRM content, Grade A or B, % by wt.	Tex-544-C	22	26	–	–
CRM content, Grade B, % by wt.	Tex-544-C	–	–	13	17
Virgin rubber content,[1] % by wt.		–	–	2	–
Flash point,[2] C.O.C., °F	T 48	400	–	400	–
Penetration,[3] 77°F, 150 g, 5 sec.	T 49	30	50	30	50
Penetration,[3] 32°F, 200 g, 60 sec.	T 49	12	–	12	–
Softening point, °F	T 53	–	–	170	–
Bond Test, non-immersed, 0.5 in specimen, 50% extension, 20°F[4]	D5329	–		Pass	

1. Provide certification that the Min % virgin rubber was added.
2. Agitate the sealing compound with a 3/8- to 1/2 in. (9.5- to 12.7 mm) wide, square-end metal spatula to bring the material on the bottom of the cup to the surface (i.e., turn the material over) before passing the test flame over the cup. Start at one side of the thermometer, move around to the other, and then return to the starting point using 8 to 10 rapid circular strokes. Accomplish agitation in 3 to 4 sec. Pass the test flame over the cup immediately after stirring is completed.
3. Exception to T 49: Substitute the cone specified in D 217 for the penetration needle.
4. Allow no crack in the crack sealing materials or break in the bond between the sealer and the mortar blocks over 1/4 in. deep for any specimen after completion of the test.

2.9. **Asphalt-Rubber Binders**. Provide asphalt-rubber (A-R) binders that are mixtures of asphalt binder and CRM, which have been reacted at elevated temperatures. Provide A-R binders meeting D6114 and containing a minimum of 15% CRM by weight. Provide Types I or II, containing CRM Grade C, for use in hot-mixed aggregate mixtures. Provide Types II or III, containing CRM Grade B, for use in surface treatment binder. Ensure binder properties meet the requirements of Table 16.

Table 16
A-R Binders

Property	Test Procedure	Binder Type					
		Type I		Type II		Type III	
		Min	Max	Min	Max	Min	Max
Apparent viscosity, 347°F, cP	D2196, Method A	1,500	5,000	1,500	5,000	1,500	5,000
Penetration, 77°F, 100 g, 5 sec.	T 49	25	75	25	75	50	100
Penetration, 39.2°F, 200 g, 60 sec.	T 49	10	–	15	–	25	–
Softening point, °F	T 53	135	–	130	–	125	–
Resilience, 77°F, %	D5329	25	–	20	–	10	–
Flash point, C.O.C., °F	T 48	450	–	450	–	450	–
Tests on residue from Thin-Film Oven Test: Retained penetration ratio, 39.2°F, 200 g, 60 sec., % of original	T 179 T 49	75	–	75	–	75	–

2.10. **Performance-Graded Binders**. Provide PG binders that are smooth and homogeneous, show no separation when tested in accordance with Tex-540-C, and meet the requirements of Table 17.

Separation testing is not required if:

- a modifier is introduced separately at the mix plant either by injection in the asphalt line or mixer,
- the binder is blended on site in continuously agitated tanks, or
- binder acceptance is based on field samples taken from an in-line sampling port at the hot-mix plant after the addition of modifiers.

Table 17
Performance-Graded Binders

Property and Test Method	Performance Grade																		
	PG 58			PG 64				PG 70				PG 76				PG 82		
	-22	-28	-34	-16	-22	-28	-34	-16	-22	-28	-34	-16	-22	-28	-34	-16	-22	-28
Average 7-day max pavement design temperature, °C[1]	58			64				70				76				82		
Min pavement design temperature, °C[1]	-22	-28	-34	-16	-22	-28	-34	-16	-22	-28	-34	-16	-22	-28	-34	-16	-22	-28
Original Binder																		
Flash point, T 48, Min, °C	230																	
Viscosity, T 316[2, 3]: Max, 3.0 Pa·s, test temperature, °C	135																	
Dynamic shear, T 315[4]: G*/sin(δ), Min, 1.00 kPa, Max, 2.00 kPa[7], Test temperature @ 10 rad/sec., °C	58			64				70				76				82		
Elastic recovery, D6084, 50°F, % Min[8]	–	–	30	–	–	30	50	–	30	50	60	30	50	60	70	50	60	70
Rolling Thin-Film Oven (Tex-506-C)																		
Mass change, T 240, Max, %	1.0																	
Dynamic shear, T 315: G*/sin(δ), Min, 2.20 kPa, Max, 5.00 kPa[7], Test temperature @ 10 rad/sec., °C	58			64				70				76				82		
MSCR, T350, Recovery, 0.1 kPa, High Temperature, % Min[8]	–	–	20	–	–	20	30	–	20	30	40	20	30	40	50	30	40	50
Pressure Aging Vessel (PAV) Residue (R 28)																		
PAV aging temperature, °C	100																	
Dynamic shear, T 315: G*sin(δ), Max, 5,000 kPa Test temperature @ 10 rad/sec., °C	25	22	19	28	25	22	19	28	25	22	19	28	25	22	19	28	25	22
Creep stiffness, T 313[5, 6]: *S*, max, 300 MPa, *m*-value, Min, 0.300 Test temperature @ 60 sec., °C	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18
Direct tension, T 314[6]: Failure strain, min, 1.0% Test temperature @ 1.0 mm/min., °C	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18	-24	-6	-12	-18

1. Pavement temperatures are estimated from air temperatures and using an algorithm contained in a Department-supplied computer program, may be provided by the Department, or by following the procedures outlined in AASHTO MP 2 and PP 28.
2. This requirement may be waived at the Department's discretion if the supplier warrants that the asphalt binder can be adequately pumped, mixed, and compacted at temperatures that meet all applicable safety, environmental, and constructability requirements. At test temperatures where the binder is a Newtonian fluid, any suitable standard means of viscosity measurement may be used, including capillary (T 201 or T 202) or rotational viscometry (T 316).
3. Viscosity at 135°C is an indicator of mixing and compaction temperatures that can be expected in the lab and field. High values may indicate high mixing and compaction temperatures. Additionally, significant variation can occur from batch to batch. Contractors should be aware that variation could significantly impact their mixing and compaction operations. Contractors are therefore responsible for addressing any constructability issues that may arise.
4. For quality control of unmodified asphalt binder production, measurement of the viscosity of the original asphalt binder may be substituted for dynamic shear measurements of G*/sin(δ) at test temperatures where the asphalt is a Newtonian fluid. Any suitable standard means of viscosity measurement may be used, including capillary (T 201 or T 202) or rotational viscometry (T 316).
5. Silicone beam molds, as described in AASHTO TP 1-93, are acceptable for use.
6. If creep stiffness is below 300 MPa, direct tension test is not required. If creep stiffness is between 300 and 600 MPa, the direct tension failure strain requirement can be used instead of the creep stiffness requirement. The m value requirement must be satisfied in both cases.
7. Maximum values for unaged and RTFO aged dynamic shear apply only to materials used as substitute binders, as described in Item 340, "Dense-Graded Hot-Mix Asphalt (Small Quantity)", Item 341, "Dense-Graded Hot-Mix Asphalt, and Item 344, "Superpave Mixtures."
8. Elastic Recovery (ASTM D6084) is not required unless MSCR (AASHTO T 350) is less than the minimum % recovery. Elastic Recovery must be used for the acceptance criteria in this instance.

3. EQUIPMENT

Provide all equipment necessary to transport, store, sample, heat, apply, and incorporate asphalts, oils, and emulsions.

4. CONSTRUCTION

Typical Material Use. Use materials shown in Table 18, unless otherwise determined by the Engineer.

Table18
Typical Material Use

Material Application	Typically Used Materials
Hot-mixed, hot-laid asphalt mixtures	PG binders, A-R binders Types I and II
Surface treatment	AC-5, AC-10, AC-15P, AC-20XP, AC-10-2TR, AC-20-5TR, HFRS-2, MS-2, CRS-2, CRS-2H, CRS-2TR, CMS-2P HFRS-2P, CRS-2P, CHFRS-2P, A-R binders Types II and III
Surface treatment (cool weather)	AC12-5TR, RC-250, RC-800, RC-3000, MC-250, MC-800, MC-3000, MC-2400L, CMS-2P
Precoating	AC-5, AC-10, PG 64-22, SS-1, SS-1H, CSS-1, CSS-1H
Tack coat	PG Binders, SS-1H, CSS-1H, EAP&T, TRAIL, EBL
Fog seal	SS-1, SS-1H, CSS-1, CSS-1H, CMS-1P
Hot-mixed, cold-laid asphalt mixtures	AC-0.6, AC-1.5, AC-3, AES-300, AES-300P, CMS-2, CMS-2S
Patching mix	MC-800, SCM I, SCM II, AES-300S
Recycling	AC-0.6, AC-1.5, AC-3, AES-150P, AES-300P, recycling agent, emulsified recycling agent
Crack sealing	SS-1P, polymer mod AE crack sealant, rubber asphalt crack sealers (Class A, Class B)
Microsurfacing	CSS-1P
Prime	MC-30, AE-P, EAP&T, PCE
Curing membrane	SS-1, SS-1H, CSS-1, CSS-1H, PCE
Erosion control	SS-1, SS-1H, CSS-1, CSS-1H, PCE
FDR -Foaming	PG 64-22, FDR EM-SY, FDR EM-HY

4.1. **Storage and Application Temperatures**. Use storage and application temperatures in accordance with Table 19. Store and apply materials at the lowest temperature yielding satisfactory results. Follow the manufacturer's instructions for any agitation requirements in storage. Manufacturer's instructions regarding recommended application and storage temperatures supersede those of Table 19.

Table19
Storage and Application Temperatures

Type-Grade	Application		Storage Max (°F)
	Recommended Range (°F)	Max Allowable (°F)	
AC-0.6, AC-1.5, AC-3	200–300	350	350
AC-5, AC-10	275–350	350	350
AC-15P, AC-20-5TR, AC12-5TR and AC10-2TR	300–375	375	360
RC-250	125–180	200	200
RC-800	170–230	260	260
RC-3000	215–275	285	285
MC-30, AE-P	70–150	175	175
MC-250	125–210	240	240
MC-800, SCM I, SCM II	175–260	275	275
MC-3000, MC-2400L	225–275	290	290
HFRS-2, MS-2, CRS-2, CRS-2H, HFRS-2P, CRS-2P, CMS-2, CMS-2S, AES-300, AES-300S, AES-150P, AES-300P, CRS-2TR	120–160	180	180
SS-1, SS-1H, CSS-1, CSS-1H, PCE, EAP&T, SS-1P, RS-1P, CRS-1P, CSS-1P, recycling agent, emulsified recycling agent, polymer mod AE crack sealant	50–130	140	140
PG binders	275–350	350	350
Rubber asphalt crack sealers (Class A, Class B)	350–375	400	–
A-R binders Types I, II, and III	325–425	425	425

5. MEASUREMENT AND PAYMENT

The work performed, materials furnished, equipment, labor, tools, and incidentals will not be measured or paid for directly but is subsidiary or is included in payment for other pertinent Items.

Special Specification 6001
Portable Changeable Message Sign

1. DESCRIPTION

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

2. MATERIALS

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

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

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

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

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

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

The following are descriptions for 3 screen types of PCMS:

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

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

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

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

3. CONSTRUCTION

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

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

4. MEASUREMENT

This Item will be measured by each PCMS or by the day used. All PCMS units must be set up on a work area and operational before a calendar day can be considered measurable. When measurement by the day is specified, a day will be measured for each PCMS set up and operational on the worksite.

5. PAYMENT

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Portable Changeable Message Sign." This price is full compensation for PCMS units; set up; relocating; removing; replacement parts; batteries (when required); fuel, oil, and oil filters (when required); cellular telephone charges (when required); software; and equipment, materials, tools, labor, and incidentals.

Special Specification 6185

Truck Mounted Attenuator (TMA) and Trailer Attenuator (TA)

1. DESCRIPTION

Furnish, operate, maintain and remove upon completion of work, Truck Mounted Attenuator (TMA) or Trailer Attenuator (TA).

2. MATERIALS

Furnish, operate and maintain new or used TMAs or TAs. Assure used attenuators are in good working condition and are approved for use. A list of approved TMA/TA units can be found in the Department's Compliant Work Zone Traffic Control Devices List. The host vehicle for the TMA and TA must weigh a minimum of 19,000 lbs. Host vehicles may be ballasted to achieve the required weight. Any weight added to the host vehicle must be properly attached or contained within it so that it does not present a hazard and that proper energy dissipation occurs if the attenuator is impacted from behind by a large truck. The weight of a TA will not be considered in the weight of the host vehicle but the weight of a TMA may be included in the weight of the host vehicle. Upon request, provide either a manufacturer's curb weight or a certified scales weight ticket to the Engineer.

3. CONSTRUCTION

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

Maintain the TMA/TAs in good working condition. Replace damaged TMA/TAs as soon as possible.

4. MEASUREMENT

4.1. **Truck Mounted Attenuator/Trailer Attenuator (Stationary).** This Item will be measured by the each or by the day. TMA/TAs must be set up in a work area and operational before a calendar day can be considered measurable. When measurement by the day is specified, a day will be measured for each TMA/TA set up and operational on the worksite.

4.2. **Truck Mounted Attenuator/Trailer Attenuator (Mobile Operation).** This Item will be measured by the hour. The time begins once the TMA/TA is ready for operation at the predetermined site and stops when notified by the Engineer. A minimum of 4 hr. will be paid each day for each operating TMA/TA used in a mobile operation.

5. PAYMENT

The work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for "Truck Mounted Attenuators/Trailer Attenuators (Stationary)," or "Truck Mounted Attenuators/Trailer Attenuators (Mobile Operation)." This price is full compensation for furnishing TMA/TA: set up; relocating; removing; operating; fuel; and equipment, materials, tools, labor, and incidentals.

CENTRAL TEXAS REGIONAL
MOBILITY AUTHORITY

February 28, 2024
AGENDA ITEM #5

Approve Amendment No. 3 to the First Amended and Restated Maintenance Services Contract for the Central Texas Regional Mobility Authority Toll Collection system with Kapsch TrafficCom USA, Inc. to remove scope for intelligent transportation systems services and maintenance

Strategic Plan Relevance:	Service & Stewardship
Department:	Operations
Contact:	Greg Mack, Director of IT & Toll Systems
Associated Costs:	Reduction of $22,670.06 to the Kapsch TrafficCom toll system monthly maintenance cost
Funding Source:	Operating Budget
Action Requested:	Consider and act on draft resolution

Background: Kapsch TrafficCom USA, Inc. serves as the Mobility Authority's system integrator. In this role, Kapsch is tasked with installing and maintaining the Authority's toll system equipment hardware, software, and intelligent transportation systems (ITS). Kapsch also provides license plate image review and transcription services necessary to facilitate the billing of the Authority's Pay By Mail toll transactions as well as traffic management operations support.

In January 2023 the Mobility Authority issued a Request for Proposal for an Intelligent Transportation System (ITS) performance-based maintenance services agreement to cover all existing and future ITS elements on the Mobility Authority's system. Three firms submitted proposals in response to the RFP - Kapsch TrafficCom USA, Inc., Lumin8 Transportation Technologies, LLC, and SICE Inc.

After an evaluation of the responses and pricing, Kapsch TrafficCom USA, Inc. received the highest rating. The *Intelligent Transportation System (ITS) Performance Based*

Maintenance Services Agreement between Kapsch TrafficCom USA, Inc. and the Mobility Authority was executed on October 31, 2023.

Action Requested: Staff proposes the following changes to the *Kapsch Restated Maintenance Agreemen*t to remove ITS-related contract scope:

- Section M12.0 of the Scope of Work Summary - remove key performance indicators #8 (MVD), #15 (Availability), #16 (Availability), and #18 (Availability).
- The KPI Reporting and Management Plan - remove key performance indicators #8 (MVD), #15 (Availability), #16 (Availability), and #18 (Availability).
- Schedule 1.5 Maintenance Services Contract for Toll Collection System – delete pricing for ITS Maintenance and the related ITS bill of quantities.

Due to these revisions, the Kapsch toll system monthly maintenance cost will decrease by $22,670.06.

Previous Actions: The Central Texas Regional Mobility Authority executed a contract with Caseta Technologies, Inc. on April 27, 2005, for the design, procurement, and installation of a toll collection system on the Authority's turnpike system. Kapsch TrafficCom USA, Inc. is the successor in interest to the contract with Caseta Technologies, Inc.

In November 2019 the Mobility Authority's Board approved a Restated Maintenance Agreement with Kapsch TrafficCom for enhanced toll system maintenance services for the roadside lane equipment, project host system, intelligent transportation systems (ITS), wrong way detection and communication infrastructure installed by Kapsch TrafficCom USA for all CTRMA toll facilities.

The first amendment to the Restated Maintenance Agreement was approved in November 2020. This amendment altered the hours of the traffic & incident management operations staff. Amendment No. 2 to the Kapsch Restated Maintenance Agreement acknowledged a change in transaction processing responsibilities from Kapsch to ETCC.

Financing: Not Applicable

Staff Recommendation: Staff recommends approval of Amendment No. 3 to the Kapsch Restated Maintenance Agreement.

Backup provided: Draft Resolution
Amendment Change Summary

GENERAL MEETING OF THE BOARD OF DIRECTORS
OF THE
CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY

RESOLUTION NO. 24-0XX

APPROVING AMENDMENT NO. 3 TO THE FIRST AMENDED AND RESTATED MAINTENANCE SERVICES CONTRACT WITH KAPSCH TRAFFICCOM USA, INC.

WHEREAS, by Resolution No. 19-072 dated November 20, 2019, the Central Texas Regional Mobility Authority (Mobility Authority) approved an Amended and Restated Maintenance Services Contract (Maintenance Services Contract) with Kapsch TrafficCom USA, Inc. (Kapsch); and

WHEREAS, by Resolution No. 20-077 dated November 18, 2020, the Mobility Authority approved Amendment No. 1 to the Maintenance Services Contract with Kapsch to modify the hours of Kapsch staff present at the Mobility Authority's Traffic and Incident Management Center; and

WHEREAS, by Resolution No. 22-030, dated June 29, 2022, the Mobility Authority approved Amendment No. 2 to the Maintenance Services Contract with Kapsch to revise certain key performance indicators and to implement changes regarding inventory reports submission, system availability and response time per maintenance event category; and

WHEREAS, under the Maintenance Services Contract, Kapsch was tasked with installing and maintaining the Mobility Authority's toll intelligent transportation system; and

WHEREAS, the Mobility Authority issued a Request for Proposal (RFP) for an Intelligent Transportation System (ITS) performance-based maintenance services agreement to provide for all existing and future ITS elements on the Mobility Authority's system; and

WHEREAS, three firms, including Kapsch, submitted proposals in response to the RFP; and

WHEREAS, by Resolution No. 23-045, dated October 25, 2023, the Mobility Authority approved an agreement with Kapsch for ITS performance-based maintenance services; and

WHEREAS, the Executive Director has negotiated proposed Amendment No. 3 to the Maintenance Services Contract to remove scope of work and pricing related to ITS performance-based maintenance services, a copy of which is attached hereto as Exhibit A.

NOW THEREFORE BE IT RESOLVED that the Board of Directors hereby approves Amendment No. 3 to the Amended and Restated Maintenance Services Contract with Kapsch TrafficCom USA, Inc. to remove scope of work and pricing related to ITS performance-based maintenance services, in the form or substantially the same form attached hereto as Exhibit A.

Adopted by the Board of Directors of the Central Texas Regional Mobility Authority on the 28th day of February 2024.

Submitted and reviewed by:

_____

James M. Bass
Executive Director

Approved:

_____

Robert W. Jenkins, Jr.
Chairman, Board of Directors

Exhibit A

CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY

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AMENDMENT NO 3 TO THE FIRST AMENDED AND RESTATED MAINTENANCE SERVICES CONTRACT FOR THE CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY TOLL COLLECTION SYSTEM

THIS AMENDMENT No. 3 TO THE AMENDED AND RESTATED MAINTENANCE SERVICES CONTRACT ("Amendment No. 3") is made to be effective as of the 1st day of December 2023, (the "Effective Date") by and between the Central Texas Regional Mobility Authority ("the Authority" or "CTRMA"), a political subdivision of the State of Texas, and Kapsch TrafficComm USA, Inc. ("Contractor" or "Kapsch") with offices located at 8201 Greensboro Drive, Suite 1002, McLean, Virginia 22102002, McLean, VA 22102.

WHEREAS, by Resolution No. 19-072 dated November 20, 2019, the Central Texas Regional Mobility Authority approved an Amended and Restated Maintenance Services Contract with Kapsch TrafficCom USA, Inc. ("Maintenance Services Contract"); and

WHEREAS, by Resolution No. 20-077 dated November 20, 2020, the Board of Directors of the Authority approved a Second Amendment to the Maintenance Services Contract to update the hours for TIM operations; and

WHEREAS, by Resolution No. 22-030 dated June 29, 2022, the Board of Directors of Authority approved an Amendment to the Maintenance Services Contract to update certain Key Performance Indicators; and

WHEREAS, pursuant to Resolution No. 24-0XXX dated February 28, 2024, the Board of Directors of Authority authorized this Amendment No. 3 to the Maintenance Services Contract for the removal of scope of work and pricing related to ITS performance-based maintenance services.

NOW, THEREFORE, for and in consideration of the mutual covenants and conditions herein contained, and other good and valuable consideration the receipt and sufficiency of which are hereby acknowledged, the CTRMA and the Contractor hereby agree as follows:

Section M12.0 of the Scope of Work Summary is amended to remove key performance indicators #8 (MVD), #15 (Availability), #16 (Availability), and #18 (Availability) in recognition of the Authority's separate Intelligent Transportation Systems (ITS) Performance Based Maintenance Contract executed October 31, 2023.

Schedule 1.5 Maintenance Services Contract for Toll Collection System is amended to remove pricing for ITS Maintenance and the related ITS bill of quantities.

The KPI Reporting and Management Plan appended to the Restated Maintenance Services Contract is amended to remove key performance indicators #8 (MVD), #15 (Availability), #16 (Availability), and #18 (Availability).

IN WITNESS WHEREOF, the parties hereto have executed this Amendment No. 3 to the Maintenance Services Contract as of the date first above written.

CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY

By: _____
James Bass, Executive Director

KAPSCH TRAFFICCOM USA, INC.

By: _____

Name: _____

Title: _____

ATTACHMENTS:

Attachment M-1 Scope of Work_rev020824
KPI Reporting and Management Plan_rev0200824
Schedule 1.5 Maintenance Services Contract for Toll Collection System_rev020824

Attachment M-1
Revised February 2024

TOLL COLLECTION SYSTEM MAINTENANCE SERVICES

SCOPE OF WORK

Attachment M-1

Revised February 2024

CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY

TOLL COLLECTION SYSTEM MAINTENANCE SERVICES

SCOPE OF WORK

M1.0 General

M1.01. Background

The Central Texas Regional Mobility Authority (CTRMA) designated the US183-A Turnpike Project as the first priority for implementation in conjunction with the TxDOT plans for development of the Central Texas Turnpike Project (CTTP). Subsequent to the implementation of the design/build process for the US183-A Turnpike Project, the Capital Area Metropolitan Planning Organization (CAMPO) approved the implementation of the proposed Toll Implementation Plan to construct additional capacity on various segments of highway network in the CAMPO Long-Range Plan as toll road facilities as part of the CTRMA Turnpike System. Several of the toll road segments are in various stages of project development, in design or construction by TxDOT, and it is intended that these proposed segments as identified in ***Attachment D*** also will be implemented by the CTRMA as parts of its Turnpike System. The Toll Collection System for the various segments of the CTRMA Turnpike System as shown in ***Attachment D*** includes various combinations of Electronic Toll Collection (ETC), and Express ETC.

M1.02. Summary Scope of Work

The Contractor shall maintain the portions of the Toll Collection System that have received Acceptance as they come on line until Project Acceptance at which time the entire CTRMA Toll Collection System shall be under the Maintenance Services Agreement ("the Maintenance Contract"). For the purpose of scoping the work and the fee structure, the two phases of the Project are considered separate.

M2.0 Scope of Work Elements

M2.01. Scope of Work

The Contractor's responsibilities shall include preventive, predictive, corrective and emergency maintenance of the entire CTRMA Toll Collection System.

1. **Lane Systems**
   - In-lane Toll Collection System Software
   - Lane Controllers
   - AVI System
   - AVC System
   - VES Equipment and Computers
   - Equipment in road-side cabinets

2. **Plaza System**
   - Toll Collection System Software
   - Plaza Computer Systems (Operating System, Database, Disks, etc)
   - Plaza Workstations
   - Emergency Generators
   - UPS
   - Communications Equipment

3. **Host System**
   - Toll Collection System Software including MOMS and Security Access Software
   - Host Computer Systems (Operating System, Database, Tape Library, Disks etc.)
   - Security Access System
   - Communications Equipment
   - Host Workstations
   - Host Printers and other Toll Collection Equipment

M3.0 MoPac Express Lane Operations and Staffing

The following overview outlines the basic concept of the MoPac Operations, Image Review and Maintenance and Support of the MoPac Express Lanes Project (Express Lanes). Once the project is in revenue collection The Express Lanes are Intended to serve as a reliable north-south travel option along MoPac from Parmer Lane to Lady Bird Lake.

This Scope of Work includes the services, provided by Kapsch TrafficCom USA (formerly known as Schneider Electric) as the Tolls Systems Integrator (TSI), associated with maintenance and operation of the MoPac Managed Lanes project which Includes the Express Lanes Command Center (ELCC), Image Review, Trip Building and monitoring and maintenance of the Express Lanes. The TSI is responsible for the operation and maintenance of the variable tolling system (Toll System) and related Intelligent Transportation Systems in support of the Toll Management System (TMS) described in Toll System and Toll-related ITS

Design, Installation, and Testing, Work Authorization 10 (WA#10). The TMS components include, but not limited to closed circuit television (CCTV) cameras, traffic detection system (TDS), variable toll message signs (VT'MS), VTMS cameras and VTMS Automatic Vehicle Identification (AVI) equipment. The TSI shall meet the Service Level Agreements and Key Performance Indicators provided in Exhibit 5-1: Service level Agreements and Key Performance Indicators within WA#10. For Maintenance, the TSI's duties, Responsibilities and Liabilities in regard to Performance Measurements are contained within the Maintenance Contract, executed March 3, 2007; Sections 7 Contractor Representations and Warranties and 10.0 Performance Measurement.

The Express Lanes will be in operation and collecting tolls 24 hours a day, 7 days a week, 365 days a year based on current approved business rules, with the exception of limited periodic maintenance intervals.

The Mobility Authority will be responsible for operations of the EXPRESS LANES.

M3.01. Scope of Work Summary

This Scope of Work covers two tasks outlined below:

Task 1 – Operations: Manage and operate the Express Lanes Command Center (ELCC) located at 104 North Lynnwood Trail, Cedar Park, Texas 78613, for the purposes of monitoring, supporting Austin Public Safety staff in returning the Express Lanes to normal operational flow, image review and trip building. The term of the Operations Contract shall be for an initial period of one (1) year (the "Initial Term"), commencing on the Effective Date of Day One of Toll Revenue Collection. The Initial Term shall be extended automatically for successive periods of one (1) year each unless and until terminated otherwise. The Operations Contract may be terminated by either party upon the expiration of the Initial Term or any subsequent one-year extension of this Operations Contract, provided that at least ninety (90) days' written notice is given to the other party prior to the expiration of the Initial Term and any additional subsequent terms.

Task 2 – Maintenance: Provide monitoring, operations and maintenance support for roadside and Intelligent Transportation (ITS) Equipment identified in WA #10, Exhibit A; Section A3.04, to monitor and validate the accurate operations of the Express Lanes, the Project Host and the Toll System

M3.01.01. Task 1 - Operations

- The TSI shall staff the ELCC during peak hours and in operations from 5:30 am – 8 pm, 5 days a week excluding holidays in accordance with the Work Breakdown Structure and Staffing Plan (Exhibit B). In no event shall the TSI operator leave the ELCC unstaffed during an emergency, active event or incident, even at the end of a shift.

- This task consists of work necessary to provide on-site monitoring of the ELCC and the systems, variable pricing engine, toll rates, performance of manual tasks necessary for the system's effective operation, and the operations of the ELCC.
- TSI shall provide on-site monitoring and traffic control device operation. TSI shall provide the required level of personnel necessary to cover shifts. Shifts can be split or modified, as long as the appropriate staffing levels are maintained
- TSI shall provide continuous monitoring of the variable pricing engine results, participate and lead toll rate discussions, provide tuning and configuration updates to the parameters required to meet the CTRMA goals.
- TSI shall provide on-site monitoring of closed-circuit television, police radio channels, public safety computer-aided dispatch terminals, Internet-based information sources and software programs
- The Express Lanes will be operated with variable pricing. Operators will strive to maintain reliable travel conditions through the use of variable tolls, established to proactively monitor demand on the facility. Reliable travel conditions are defined as Level of Service (LoS) C or better, with average speeds of 53 mph or higher.
- Express Lanes operations will be monitored, and pricing may be adjusted manually if necessary, to achieve the desired effect on traffic. However, it is the intent the system will operate in an automated manner, to the extent possible, under normal traffic conditions. Traffic sensors will be used to monitor continuously the operating conditions of the EXPRESS LANES and a variable toll rate will be calculated to manage demand, in order to maintain an acceptable LoS.

Operations Staffing

TSI shall provide the services including, but not limited to, management, administrative and technical aspects of the Operations Contract. All activities are required to be tracked, meeting minutes produced, and coordination activities documented.

TSI shall provide CTRMA with Operations Manager for the life of the Contract, as well as an Operations Supervisor for the Operations staff. Any changes to the TSI Operations Manager or any of the other indicated personnel in this Contract shall be subject to review and approval by CTRMA in writing. The hiring and training timeline of these personnel is referenced in the Work Breakdown Structure and Staffing Plan (Attachment A)

A3.2 ELCC Supervisor and Operators

TSI shall provide the names and resumes for all management positions. TSI shall provide the names for all non-management positions. Operations staff classifications will include the following TSI positions, as a minimum:

1. ELCC Shift Supervisor
2. ELCC Operators (2)

In addition to a ELCC Shift Supervisor, initially it is anticipated that there will be 2 full-time equivalent ELCC Operators covering the following shifts, 13 hours per day and five (5) days per week:

1. Morning shift: 5:30 AM to 1:30 PM
2. Afternoon shift: 12:00 Noon to 8:00 PM

Purpose

The primary purpose of the Operations Staffing is to provide a weekday AM and PM peak staff to operate the EXPRESS LANES, which includes:

1. Monitor, direct, and administer the personnel designated to operate and support the Tolling, TMS, and Managed Lanes system.
2. Perform traffic incident detection and verification using the TMS and available tools.
3. Provide reporting and announcement of roadwork, incidents and events.
4. Support the CTECC by reporting incidents when detected, as well as support First Responders in incident management and recovery.
5. Coordinate operations & roadwork information with various partner agencies.
6. Provide training of staff and updates of procedures to facilitate the improvement of operations and day-to–day interaction.
7. Provide support during emergencies, storms, and other significant events.
8. Support the development of continuous improvement processes through performance measures and self-assessments.
9. Furnish materials, supplies, tools, equipment, labor, and other incidentals necessary for the work in accordance with project documents.

Duties

- The duties for Task 1 consist of all work necessary to manage all of the Personnel included, but not limited to, general oversight of ELCC operators, Quality Assurance and Quality Control, operational assistance during emergencies; weather-related storms, and other significant events as well as general contract administration. It also includes participation in meetings by the TSI.
- TSI personnel shall be scheduled to work Monday through Friday from 5:30am – 8:00pm. In no event shall the TSI operator leave the ELCC unstaffed during an emergency, active event or incident, even at the end of a shift.

Sub-Task Descriptions for Task 1 - Operations:

a. TSI shall employ, train, supervise, and schedule ELCC operators. The hiring and training timeline of these personnel is referenced in Exhibit B, MoPac Staffing Plan. This shall include accommodating vacations, sick leave, and other absences of CTRMA Operations personnel by providing adequate training and supervision of relief operators, and on-call personnel.

b. TSI Operations personnel shall be responsible for issuing a work order for equipment repair and helping to establish priorities for repair of failed equipment shall also be considered part of this task.

c. TSI shall attend regular meetings with CTRMA to cooperatively identify and prioritize work to be performed.

d. TSI shall maintain records and documentation as directed to support the overall operations of the ELCC and provide data for documenting performance measures and progress.

e. TSI shall participate in post-incident debriefings with all appropriate Agencies involved in managing such major traffic incident, to determine whether existing operating procedures should be changed.

f. TSI personnel assigned to this task shall be available to respond to electronic notifications within one hour during off-duty hours to provide assistance as appropriate. In the event of a significant incident or situation outside of the scope of the Standard Operating Procedures.

g. TSI shall provide adequate staff and resources for all tasks and activities throughout the duration of the contract, including planned and unplanned staff absences, emergencies, storms, and other significant events.

h. TSI shall prepare and submit monthly invoices and progress reports in accordance with applicable CTRMA requirements. Clerical/Administrative support staff will prepare consultant invoices, reports, forms, letters, and any other official project related correspondences, as well as hiring of staff and or other personnel related duties. The Clerical/Administrative support staff are not expected to have ELCC-related activities as a full-time task nor are they to be based at the TIMC.

i. During peak periods, on holiday weekends, special events, and/or emergency conditions, greater levels of staffing may be required by CTRMA. If CTRMA deems additional TSI personnel are necessary to operate the expanded functions of the MoPac project, the TSI shall provide extra staff (provided a minimum of four-hour notice is provided) for the short-term. In no event shall the TSI operator leave the ELCC unstaffed during an emergency, active event or incident, even at the end of a shift. If CTRMA determines the additional ELCC staff will be a permanent position requirement, the staffing level shall be adjusted via supplemental agreement. Additional pricing estimates shall be provided upon request.

j. TSI shall participate in the monitoring of traffic incidents by issuing appropriate notifications to the CTECC and activating motorist information resources from the ELCC during the previously given hours of operation. All other times the CTECC will be monitoring for incidents. Problems encountered with any of the systems must be reported immediately to the appropriate systems support personnel as described in the Standard Operating Procedures. TSI shall update social media as defined in the Standard Operating Procedures on behalf of the CTRMA.

k. TSI shall provide coordinated monitoring of incidents with CTRMA and outside agency personnel. Incident monitoring shall be performed in accordance with the Standard Operating Procedures.

l. TSI shall answer phone inquiries and coordinate incident-related activities with operational partners and provide them with the necessary information about traffic conditions. Telephone calls from the media shall be referred to appropriate CTRMA Personnel.

m. TSI shall perform Trip verification activities, inspection of queued images within 48 hours to verify posting of toll rates and charges for trips.

n. TSI shall perform Trip verification activities, including visual inspection and verification of toll charges for Trips within 72 hours as described in the Image Review Operational Procedures.

o. TSI will provide Image Reviewed plates for trip building purpose and image-based tolling that will be sent directly to Image Billing vendor as described in the Image Review Operational Procedures.

M3.01.02. <u>Task 2 - Maintenance</u>

- TSI shall provide monitoring, support and maintenance for all items installed and integrated as part of the MIP. These items include, but not limited to items identified in WA #10, Exhibit A, Appendix F and Exhibit H: four (4) gantry locations for toll system installation, Variable toll message signs (VTMS) and VTMS cameras, traffic detection systems, CCTV cameras, Project Host, servers, generators, uninterruptable power supplies, toll collection equipment, cameras, switches, cabling, Violation Enforcement System, software and configuration items for Automatic Vehicle Identification, Automatic Vehicle Detection System, Image Capture and Processing System, Digital Video Audit System.
- TSI shall ensure the MoPac Express Lanes system meets the Service Level Agreements and Key Performance Indicators identified and agreed to in Work Authorization #10, Section 5 Performance Requirements.

Sub-Task Descriptions for Task 2 – Maintenance:

a. Four toll collection points are defined on the MoPac Expressway. TSI will be responsible for maintaining the entirety of the Express Lanes, including all components provided directly by the system integration contract with Kapsch TrafficCom.

b. On-site monitoring of traffic control device operation, managed lanes, and variable message sign system of the systems includes monitoring of and dialog with, but not limited to:

   i. The relevant software program and the associated/related field equipment; and
   ii. The software computer programs that allow operators to create/activate/deactivate messages on variable message signs. Each of these sets of computer programs provides for operator dialogue using computer terminals.

M3.02. <u>Contract Support</u>

This task covers work by TSI to update Standard Operating Procedure manuals for use in day-to-day operations and to provide necessary training. CTRMA shall review and approve proposed training procedures. TSI shall provide materials to CTRMA documenting the training of personnel. This task also includes proactively assisting CTRMA in minimizing the impact of construction, maintenance, and other activities on the motoring public.

5.1 Sub-Task Descriptions for Support Task:

a. TSI shall work with CTRMA to develop and update the Standard Operating Procedures (SOP) Manuals for use. Due to the nature of operations, this shall be an ongoing task that will take place at any time an SOP needs to be updated. TSI shall, at a minimum, review all SOPs on a semi-annual basis and provide CTRMA with recommendations for changes to address current operational conditions.

b. TSI shall provide training to new operations personnel and in-service training to existing staff. The training shall be based on the current CTRMA SOP manuals. Training shall be provided on an as-needed basis as TSI staff is transitioned into the project; when new or significant changes are applied to SOPs or software programs; or when individual operator performance indicates the need for remedial training. Training shall include formal classroom style exercises and hands-on training. The training shall provide for knowledge checks to ensure they are competent prior to their being assigned to the operations tasks. Training shall also include side-by-side mentoring in

the form of assignment to the operations tasks for at least one week under the supervision of a Supervisor. This applies to both new operators and operators for whom remedial training is required.

c. In order to keep the staff current with their abilities, TSI shall conduct "in-service" training to all staff. This shall be in the form of written exercises, or other CTRMA approved methods, and shall take place at least once per month.

d. Maintenance Personnel and other entities with approved, planned lane closures on State Highways will send information to the TMC describing the details of the activities and lane closures in advance of the closure. TSI personnel will enter this information into the TMS software, prepare DMS plans for the work, and forward non-maintenance work and DMS plan information to appropriate CTRMA personnel, in accordance with Standard Operating Procedures.

e. On a daily basis, TSI personnel shall review systematically the roadwork information received at the ELCC and identify those locations competing needs for lane closures exist. TSI personnel shall notify the appropriate parties when a conflict is identified. It will be the responsibility of the competing parties to resolve the conflict.

f. On a daily basis, and in accordance with Standard Operating Procedures, TSI personnel shall prepare and distribute a summary report of the scheduled roadwork and send roadwork notifications to CTRMA personnel.

M3.03. PERFORMANCE MANAGEMENT

TSI shall carry out all Work in accordance with the Project Schedule and in a prompt, skillful and careful manner, using qualified personnel and in accordance with the "Standard of Care" defined as that level of care and skill ordinarily exercised by other employees currently practicing in the same locality under similar conditions. Employees shall perform the Work in a manner that is coordinated with contractor activities on the Project, and in accordance with the terms and conditions of this Work Authorization and the Agreement.

TSI will ensure that operators are compliant with established corporate policy regarding performance evaluation, training, and mentoring. Performance reviews and improvement will also be in accordance with established corporate guidelines.

M3.04. Staffing Management

TSI shall ensure employees meet the following minimum requirements:

1) Current driver license or Texas Identification (ID) card in accordance with the Texas Statutes.
2) Minimum age of eighteen (18) years old.
3) Proof of education, certifications, diploma(s), degree(s), professional affiliation(s).
4) Document the minimum of the last five (5) employment positions unless having worked less after graduating high school or college.

TSI shall conduct reference checks on all TSI personnel proposed to be used on/during this Contract and will keep all reference records on file and available to CTRMA for the Contract period.

TSI, during the Contract period, shall, prior to hiring, have resumes of all proposed staff and all new hires along with copies of Driver's Licenses or State of Texas issued ID on file for CTRMA review.

M4.0 Maintenance Plan

The Contractor shall create a Maintenance Plan that covers all aspects of the CTRMA Toll Collection System pertinent to the Scope of Work.

The Maintenance Plan will be updated periodically by mutual agreement of the parties as they deem reasonably necessary.

M4.01. Coverage

The Contractor will provide maintenance services on a seven (7) day a week/twenty-four (24) hours a day basis with the following response and repair times depending on severity of incident, except where otherwise specified in an approved roadway maintenance manual.

- A Priority 1 Maintenance Event is defined as any malfunction or fault that will result in the immediate loss of revenue and/or hazard to personnel.
- Priority 2 Maintenance Event is defined as any malfunction or fault that will not result in immediate loss of revenue but will/may impact operational performance.
- A Priority 3 Maintenance Event is defined as any action or event reported that will/may impact operational performance, has potential of degrading the System performance, and has no impact to revenue collection.

For purposes of the above, response time is defined as the period beginning when the Contractor is notified of a problem and ending when the Contractor's maintenance technician creates a ticket. Repair time is defined as the period beginning when the

Contractor's ticket is acknowledged and ending when the fault is corrected. Response and repair time for every maintenance event will be recorded and made available to the CTRMA.

For all remote Express Toll Locations on the State Highway System, the Contractor shall work with CTRMA in scheduling and coordinating any maintenance, adjustments, and repair activities involving active traffic lanes for setting up the lane and accessing the equipment in the lane. All maintenance, adjustments, and repair activities within State highways will be subject to the review and approval by TxDOT and the CTRMA.

M4.02. Notification Procedures

The Contractor may be notified of Toll Collection System malfunctions, problems, and discrepancies in several different ways. There can be verbal notification from a CTRMA employee, written notification from an authorized CTRMA employee, verbal notification from CSC/VPC staff, and MOMS messages from the MOMS or other MOMS notification system (i.e., automatic paging, etc.).

In all cases, it shall be the responsibility of the Contractor to log all reported problems with all pertinent information concerning the problem into MOMS. After receiving notification, the Contractor shall confirm the problem directly with the reporting individual or other CTRMA personnel at the location of the problem. The Contractor shall then dispatch the appropriate maintenance personnel to resolve the problem.

M4.02.01. Verbal Notification

Verbal notification of a maintenance call shall be defined as in-person, telephone, or pager call, and subsequent return telephone call by the Contractor. In all cases, the first conversation with or page of the Contractor shall signify the start of response time for purposes of measuring the Contractor's response time.

M4.02.02. Written Notification

Written notification shall be defined as a written description of a problem, typically provided by the CTRMA or the VPC.

M4.02.03. MOMS Notification

MOMS notification shall consist of the MOMS software identifying a problem with the system. MOMS message information shall be provided in the maintenance reports, as described elsewhere in this document.

M5.0 Spare Parts

Spare parts prior to Project Acceptance will be procured through the Toll Collection System Contract. Notwithstanding anything to the contrary in this specification, the Contractor shall purchase on behalf of the CTRMA (and at the CTRMA's expense) an initial stock of spare parts and equipment for the Toll Collection System at such time as the CTRMA and the Contractor shall mutually agree at the cost of such spare parts and equipment without any 10% mark-up.

M5.01. Procurement

The Contractor shall purchase all spares on behalf of the CTRMA in a manner to ensure that the CTRMA obtains the benefit of all warranties associated with such spares. The cost of the spare parts shall not include any mark up and shall be agreed to prior to the Effective Date. The Contractor shall maintain and track the inventory of all spares and consumables for the CTRMA using the MOMS and shall provide the CTRMA with a list itemizing all spares and consumables in the CTRMA's inventory as reasonably requested, but not more frequently than once a month. All of the CTRMA's spares and consumables shall be maintained by the Contractor free and clear of all liens and encumbrances of any kind whatsoever at locations to be agreed upon between the CTRMA and the Contractor. The CTRMA shall have the right to inspect the spares and consumables inventory during normal business hours and shall give the Contractor written notice any time the CTRMA removes any of its spares or consumables.

M5.02. Inventory Management

The Contractor's performance of the Maintenance Services is predicated on there being an adequate spares inventory available. The Contractor shall provide no less frequently than annually a list of recommended spares quantities, and it is the CTRMA's responsibility to approve the purchase of the spares to be made. The CTRMA will hold harmless the Contractor in the event spares are not available as a consequence of the CTRMA's not accepting the Contractor's recommended quantity of spares. The Contractor shall hold harmless the CTRMA in the event spares and/or consumables are not available as a consequence of the Contractor's failure to purchase the spares and/or consumables ordered by the CTRMA.

The Contractor shall be responsible for providing all miscellaneous repair parts and materials costing less than $20 per item, at its own expense, which shall include, but not be limited to, fuses, touch-up paint, screws and nuts, wire, connectors, cables, labels, and insulating tape, as required, to comply with the requirements of these specifications. The Contractor will provide normal shop consumables (e.g., solder, lubricants, cleaning rags, etc.) and spares costing less than $20 per item, excluding toll system consumables (e.g., magnetic media, batteries, receipt printer paper, light bulbs, etc.), at no additional cost to the CTRMA.

The Contractor shall cooperate with and assist the CTRMA as reasonably necessary to ensure that all spare parts, equipment and other CTRMA owned property stored or

otherwise located on the Contractor's leased property shall not be subject to any risk of being confiscated, claimed, attached, or withheld by the Contractor's landlord, any of the Contractor's creditors or any similar risk. This cooperation shall include, but not be limited to, affixing appropriate labeling to all such property. The Contractor's Maintenance Facility and/or any location where CTRMA equipment is stored shall be secured and connected to the Security Access System. It is also recommended that the Contractor's Maintenance Facility be part of the CTRMA network and all Contractor access to the CTRMA System be made through this network. It is the Contractor's responsibility to ensure that the Contractor Maintenance Staff have access to the MOMS and all the required connections are established.

M6.0 Staffing

As of the Effective Date, the Contractor shall have the following full-time personnel situated in Austin. Changes in the scope of work, including, but not limited, to the addition or subtraction of lanes and/or equipment may cause changes in the staffing levels.

- Maintenance Manager (who shall be responsible for overseeing the performance of the Service)
- Maintenance Technicians
- Network/System Engineer (can be remote)

An office housing the administrative functions and the central repair depot (including the spares warehouse) will be located in the Austin metropolitan area.

A senior employee of the Contractor shall be identified with overall responsibility for overseeing the performance of the Maintenance Contract and managing the Maintenance Services.

The Contractor shall ensure that the field maintenance team has technical support in the areas of radio frequency, hardware, systems, communications and software.

M7.0 Personnel Training

The Contractor's field technicians shall have completed training courses, as evidenced by the resumes provided by the Contractor to the CTRMA, prior to being assigned to work on the CTRMA Toll Collection System. The Contractor shall provide for any necessary supplemental training of all maintenance technicians for the Toll Collection System, which shall be scheduled such that it will be completed no later than one (1) week prior to field installation of the any new lane configurations. The training shall consist of a minimum of two (2) weeks of both hands-on classroom instruction and on-the-job training.

M7.01. Staff Assignments

Maintenance staff shall be part of the Contractor's field installation team to obtain first-hand experience with the equipment.

The Contractor's Maintenance Technicians responsible for the field repairs shall be trained for major module/PC board swap-out. The Contractor's Technicians, because of experience at the bench level, shall also be trained to repair equipment at the component level as needed.

M7.02. Training Materials

Training materials shall consist of maintenance manuals, vendor manuals and other documentation that may be provided by the Contractor or by the CTRMA, as well as classroom training materials to be developed by the Contractor.

M7.03. Training Program

The content of the training course shall contain but not be limited to the following:

- Use of maintenance documentation such as maintenance manuals, drawings, parts lists and vendor manuals
- A maintenance program showing personnel assignments, transportation requirements and communications
- Systems overview
- Theory, use, preventive maintenance, troubleshooting, diagnostics, repair and testing of the lane to plaza to host interaction ("System"), lane to plaza interaction ("Sub-system"), and repairs to equipment or components (assembly/ sub-assembly/ component), and lane operations
- System preventive maintenance at the host, plaza and lane levels, including schedules
- Maintenance facilities (including equipment)
- Corrective and emergency maintenance procedures (troubleshooting, diagnostics, repair, testing and post-maintenance)
- Spare parts and spare equipment provisioning
- Use of maintenance tools
- Response times, expected repair times
- Maintenance facility procedures
- Maintenance forms and maintenance reports

The Contractor's Maintenance Manager shall attend the training course with the Maintenance Technicians and the CTRMA staff shall also attend the training. The Contractor shall establish procedures for training new-hire or replacement personnel

and shall provide refresher training for the existing maintenance force. New hire or replacement personnel shall receive the same hands-on classroom and on-the-job training as specified in this section before being assigned official maintenance duties.

The Contractor shall keep training records on all maintenance personnel. The CTRMA shall be allowed to audit maintenance personnel qualifications and training records at any time during this Contract.

The Contractor shall supply training procedures for maintenance personnel for CTRMA approval not less than 60 days prior to the training start date.

M8.0 Safety

The Contractor shall adhere to the CTRMA's safety procedures set forth in the Maintenance Plan.

M9.0 Reporting Requirements

The CTRMA and its Representatives shall always have access to all service records.

M9.01. Field/Shop Maintenance Records

The Contractor shall maintain current and accurate records for all field and shop maintenance work. The Contractor shall prepare a service report every time service is performed for corrective or emergency work and such information shall be entered MOMS. The report shall include, but not be limited to notification time, notification procedure (verbal, written, or MOMS), plaza ID and lane number (if in-lane equipment) or equipment location, toll collector's ID number (if a collector is in the lane), equipment description, work or service performed, reported fault, parts used and the time the service was started and completed. One copy of all service reports and records shall be forwarded to the CTRMA once every month. All preventive and predictive maintenance activities shall be reported in the same manner as corrective and emergency maintenance work.

M9.02. Summary Reports

Monthly maintenance summary reports shall be prepared and submitted to the CTRMA. These reports shall include, but not be limited to, average repair times, failure statistics, spare parts and spare equipment used, spare parts and spare equipment disposition (i.e. returned to manufacturer for repair, in maintenance shop for repair, etc.), total down time of the equipment and other summary information for all classes of equipment.

M10.0 System Documentation

The Contractor shall maintain one full set of all Toll Collection System documentation including, but not limited to, as-built drawings, toll equipment service manuals, computer manuals, software documentation, parts lists and other data as may be required for record purposes at the toll

maintenance shop. In addition, one (1) versioned set of complete documentation shall be maintained by the Contractor in a documentation management system.

The Contractor shall furnish all maintenance personnel with appropriate System documentation as may be required to perform their respective duties.

All System documentation shall be recorded at the toll maintenance shop. The documentation provided and/or assembled under the Maintenance Contract shall be considered proprietary and confidential. The Contractor's employees shall not reproduce the documentation or discuss the contents of the documentation with the CTRMA toll collectors or other unauthorized personnel.

M11.0 Performance Measurement

The CTRMA will review the Contractor's performance on a monthly basis, utilizing the monthly summary reports provided by the Contractor, in addition to input from the CTRMA staff. Performance will be measured by:

- Comparing response times and repair time in each "Priority" category described under "Coverage" in Subsection M3.01 for the current month, year to date, and since Notice to Proceed for this Maintenance Contract with the requirements specified in the Technical Requirements.
- Failure to keep accurate records or otherwise improperly reporting maintenance activities.
- Review of spare parts and spare equipment availability

Commented [JS1]: No longer average, if measured per event

As described in the Restated Maintenance Agreement, the Contractor will be notified in writing of deficient performance and shall take corrective actions.

M12.0 Key Performance Indicators

Kapsch proposes the following Key Performance Indicator (KPI) measurements for Maintenance services. These KPIs are measurable values that demonstrate achievement of key business objectives, while also including either liquidated damages for missed targets or lost revenue.

Audits conducted by CTRMA or its third party vendor will be completed according to the schedule set forth below or at CTRMA's discretion.

KPI ID	KPI Name	Key Performance Indicator Description	KPI	Maximum Liquidated Damages (per calendar month)	Testing Frequency
1	AVD	The vehicle detection subsystem shall detect 99.90% of vehicles passing through the Toll Zone once and only once under all conditions within the	99.90%	$200 per gantry location, per each 0.1% below threshold	Audits by CTRMA, and executed by CTRMA, shall be evenly

		Design specification described in the requirements, including vehicles in the shoulders and straddling the lane and shoulder. Kapsch will reconcile discrepancies from CTRMA audits. Variance may be dependent on vehicle volume.			spread over the course of 12-months (e.g., approximately 1/12th of locations audited each month), with minimum transaction count of 3,000, as determined by 90% audit confidence as a threshold.
2	AVC	The AVC subsystem shall correctly classify 99.50% of all detected vehicles at speeds from 5 mph up to and including 100 mph, including vehicles straddling the lanes. Shoulders are excluded from this calculation. Kapsch will reconcile discrepancies from CTRMA audits. Variance may be dependent on vehicle volume.	99.50%	$200 per gantry location, per each 0.1% below threshold	Audits by CTRMA, and executed by CTRMA, shall be evenly spread over the course of 12-months (e.g., approximately 1/12th of locations audited each month), with minimum transaction count as determined by 90% audit confidence as a threshold.
3	AVI	The AVI subsystem will correctly detect, read and assign to the correct vehicle 99.90% of all properly installed Transponders on all detected vehicles at speeds from 5 mph up to and including 100 mph, including vehicles in the shoulders and straddling the lanes.	99.90%	$200 per gantry location, per each 0.1% below threshold	Audits by CTRMA, and executed by CTRMA, shall be evenly spread over the course of 12-months (e.g., approximately 1/12th of locations audited each month), with minimum transaction count of 5,500, as determined by 90% audit

					confidence as a threshold.
4	LPIC	The LPIC subsystem will capture one front human readable license plate image or one rear human readable license plate image and associated to the correct vehicle for 99.00% of all detected vehicles traveling at speeds from 5 mph up to and including 100 mph, including vehicles straddling the lane and shoulder.	99.00%	Estimated revenue loss (calculated using liquidation rate), per gantry location, for performance below threshold.	Monthly
5	IR	For transactions rejected by the manual review process, less than 1.00% shall have incorrect code-off results.	<1.00%	$200 per each 0.1% below threshold	Quarterly performance audit, to be executed by Kapsch, with minimum transaction count of 1,500 per Code-Off category, as determined by audit confidence as a threshold.
6	Trip	99.50% of all transactions shall be correctly assembled into trips.	99.50%	$200 per roadway direction, per each 0.1% below threshold	Monthly
7	Trip Processing	100% of all trips shall be transmitted to the CTRMA Data Platform System (DPS) within six (6) calendar days of the exit transaction of the trip.	100%	1. For lost or uncollectable transactions: a) Actual revenue above $5,000 AND b) any direct damages associated with the loss. 2. For transactions transmitted >6 days and <=30 days, AND result in revenue generation: a) 10% of actual revenue AND b) any direct damages associated with the delay. 3. For transactions older than 30 calendar days: a) Actual revenue above $5,000 AND b) any direct damages associated with the loss.	Monthly

~~8~~	~~MVD~~	~~The volume provided by Traffic Detection Systems (MVD) shall be 95.00% accurate.~~	~~95.00%~~	~~$200 per MVD, per each 0.1% below threshold~~	~~Annual performance audit, to be executed by Kapsch, for a minimum of 5 minutes and minimum vehicle count of 30, per MVD, as determined by audit confidence as a threshold.~~
9	Non-EL Transaction Processing	100% of all non-EL transactions shall be transmitted to the CTRMA Data Platform System (DPS) within three (3) calendar days of the transaction date.	100%	1. For lost or uncollectable transactions: a) Actual revenue above $5,000 AND b) any direct damages associated with the loss. 2. For transactions transmitted >3 days and <=30 days, AND result in revenue generation: a) 10% of actual revenue AND b) any direct damages associated with the delay. 3. For transactions older than 30 calendar days: a) Actual revenue above $5,000 AND b) any direct damages associated with the loss.	Monthly
10	IR	For transactions requiring a manual review process, 99.50% shall be completed, AND returned, within 72 hours from the time the image review request was received.	99.50%	1. For Image Reviews completed >72 hours and <= 10 days: a) $200 per each 0.1% below threshold. 2. For Image Reviews completed >10 days and <= 30 days, AND result in revenue generation: a) 10% of actual revenue AND b) any direct damages associated with the delay.	Monthly

				3. For lost or uncollectable Image Review transactions: a) Actual revenue above $5,000 AND b) any direct damages associated with the loss 4. For transactions older than 30 calendar days: a) Actual revenue above $5,000 AND b) any direct damages associated with the loss	
11	Reports	1. Monthly Maintenance Report, accurately detailing system performance relative to all Project KPIs, shall be submitted to CTRMA each month. 2. Monthly Inventory Report, to be exported directly from MOMs, accurately detailing the location, count, and serial numbers of all the CTRMA hardware, including retired hardware (if applicable), spares and Return Material Authorization (RMA) hardware for the previous calendar month. 3. Contractor to provide complete reports, cover page, table of contents, and summaries, format to be agreed upon by Contractor and CTRMA.	By the 15th of the following month	Cannot invoice for monthly maintenance without submitting these reports.	Monthly
12	Availability	Each ETC lane shall be available 99.50% of the time. An available lane is defined as a lane with the ability to collect revenue either through image capture or tag read and association.	99.50%	Lost or delayed transactions as a result of ETC lane unavailability shall be included in, and calculated per, KPI #7 (Trip Processing) or KPI #9 (Non-EL Transaction Processing).	Monthly
13	Availability	The Host Level system shall be available 99.50% of the time. An available host is defined as a fully operating host such that Reports, ROMS, and transaction processing are online (with the exception of	99.50%	$200 per each 0.1% below threshold	Monthly

		approved downtime for maintenance purposes).			
14	Availability	Express Lanes CCTV shall be available 99.50% of the time, excluding scheduled maintenance.	Express: 99.50%	$200 per each 0.5% below threshold	Monthly
~~15~~	~~Availability~~	~~Non-Express CCTV shall be available 95.00% of the time, excluding scheduled maintenance.~~	~~Non-Express: 95.00%~~	~~$200 per each 0.5% below threshold~~	~~Monthly~~
~~16~~	~~Availability~~	~~DMS shall be available 95.00% of the time, excluding scheduled maintenance.~~	~~95.00%~~	~~$200 per each 0.5% below threshold~~	~~Monthly~~
17	Availability	Express MVDs shall be available 99.50% of the time per segment, excluding scheduled maintenance.	Express: 99.50%	Express: $100 per each 0.5% below threshold per segment.	Monthly
~~18~~	~~Availability~~	~~MVDs shall be available 95.00% of the time per device, excluding scheduled maintenance.~~	~~Non-express: 95.00%~~	~~Non-Express: $100 per each 0.5% below threshold per device.~~	~~Monthly~~
19	VTMS Availability	The VTMS System will be available as outlined below, excluding scheduled maintenance. Availability of 99.95%, with a 15 minute grace period for emergency maintenance.	99.95%, 15 min. grace excluded	Actual revenue above $5,000 (calculated using liquidation rate).	Monthly
20	VTMS Accuracy	The System will post and maintain the correct toll rate to the VTMS 99.90% of the time per VTMS under all conditions within the Design specification described in the requirements.	99.90%	$200 per each 0.5% below threshold	Monthly
21	Time to Respond – Priority 1	All priority 1 tickets must be acknowledged within 1 hour of ticket creation. A Priority 1 Maintenance Event is defined as any malfunction or fault that will result in the immediate loss of revenue and/or hazard to personnel.	N/A	$100 per each event > 1 hour	Monthly
22	Time to Repair - Priority 1	All priority 1 tickets must be repaired within 4 hours of ticket acknowledgement.	N/A	$200 per each event > 4 hour	Monthly
23	Time to Respond – Priority 2	All priority 2 tickets must be acknowledged within 1 hour of ticket creation. Priority 2 Maintenance Event is defined as any malfunction or fault that will not result in immediate	N/A	$75 per each event > 1 hour	Monthly

		loss of revenue but will/may impact operational performance.			
24	Time to Repair - Priority 2	All priority 2 tickets must be repaired within 12 hours of ticket acknowledgement.	N/A	$150 per each event > 12 hour	Monthly
25	Time to Respond – Priority 3	All priority 3 tickets must be acknowledged within 1 hour of ticket creation. A Priority 3 Maintenance Event is defined as any action or event reported that will/may impact operational performance, has potential of degrading the System performance, and has no impact to revenue collection.	N/A	$25 per each event > 1 hour	Monthly
26	Time to Repair - Priority 3	All priority 3 tickets must be repaired within 36 hours of ticket acknowledgement.	N/A	$50 per each event > 36 hour	Monthly
27	Inventory	All CTRMA hardware, to include those currently installed, maintained as spares, and Return Material Authorization (RMA) (if applicable), shall be included in an Annual Physical Inventory Audit Program, as agreed upon by the contractor and CTRMA.	Due yearly with February MMR	Cannot invoice for monthly maintenance without submitting Inventory Audit.	Annually

M13.0 Confidentiality

The Contractor shall keep all information regarding its activities pursuant to this Contract confidential and will communicate such information only with authorized CTRMA personnel or CTRMA designated representatives.

[END OF SECTION]

Central Texas Regional Mobility Authority - Maintenance Open Road Tolling

KPI Reporting And Management Plan

KPI-RAMP

~~Doc No.: NAMCPRJ-1472315366-637~~

~~Version: 1.3~~

Document Control

Document Name	CTRMA Maintenance ORT - KPI Reporting And Management Plan
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Rev #	Change Reason	Quality Control	Quality Assurance	Completed
1.0	Initial Version	Mark Stewart	Samuel Herbert	03-10-2020
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1.3	Content Revision	Mark Stewart	Samuel Herbert	06-17-2022

Reference to the status- and version administration:

Status:

Draft	the document is being processed
Released	the document has been checked and released, it can only be modified if the version number is updated.
Final	the document is complete

Versions:

1.0, 1.1, etc.	"**Released**" versions
2.0	Accepted version with the status "**Final**"
2.1, 2.2, etc.	Minor revisions, supplements to version 2.0

Reference to the data classification	
Public	No restriction
Internal	Restricted to internal and external Kapsch employees (default)
Confidential	**Restricted to selected active directory and/or SharePoint groups,**
Secret	Restricted to selected employees, server encryption needed

Table of Contents

List of Tables

0 Introduction

This Key Performance Indicator (KPI) Reporting and Management Plan describes how performance indicators will be monitored, calculated, audited, and reported to support KPI Reporting and Liquidated Damage (LD) assessment.

0.1 Abbreviations

The following table contains a list of important abbreviations used within this document.

Abbreviation	Description
AVC	Automatic Vehicle Classification
AVD	Automatic Vehicle Detection
AVI	Automatic Vehicle Identification
CCTV	Closed Circuit Television
CTRMA	Central Texas Regional Mobility Authority
DB	Database
DMS	Dynamic Message Sign
DPS	Data Platform System
DVAS	Digital Video Audit System
DVR	Digital Video Recorder
ETC	Electronic Toll Collection
ICS	Image Capture Station
KPI	Key Performance Indicator
LD	Liquidated Damage
LPIC	License Plate Image Capture
MMR	Monthly Maintenance Report
MPH	Miles Per Hour
MVD	Microwave Vehicle Detection
PBM	Pay By Mail
RMA	Return Material Authorization
ROMS	Remote Operations and Maintenance System
SLA	Service Level Agreement
SNTPD	Simple Network Time Protocol Daemon

Abbreviation	Description
TB	Tag Based
TCS	Toll Collection System
TVL	Tag Validation List
VES	Violation Enforcement System
VMS	Video Monitoring System
VTMS	Variable Toll Message Sign
ZC	Zone Controller

Table 1 List of used Abbreviations

0.2 List of referenced documents

The following table contains a list of documents referenced by this document.

Ref. No.	Doc. No.	Doc. Type	Document Title
[1]	NAMCPRJ-149165766-142	PDF	12_1_FINAL_AIS_Kapsch_Restated_Maint_Agreement_KapschSigned_20191216

Table 2 List of referenced documents

0.3 Revenue Calculation Parameters

The following parameters guide the calculation of revenue;

- Actual revenue calculated using 100% of AVI and I-Toll transactions and Pay by Mail transactions at the liquidation rate
- Pay by Mail revenue value should be calculated as 10% of affected transactions calculated using the AVI rate (i-Toll transactions), and the remaining 90% is calculated using the current Pay by Mail toll rate factor (e.g. AVI toll rate *1.5)
- Liquidation rate (e.g. 0.5) to be evaluated at the beginning of each Fiscal Year based on the prior year's results and applied to the estimated Pay by Mail revenue loss amount
- For lost or uncollectable transactions, transactions older than 30 calendar days are considered ineligible for billing due to age

1 KPI #1 – Automatic Vehicle Detection (AVD)

1.1 Description

The vehicle detection subsystem shall detect 99.90% of vehicles passing through the Toll Zone once and only once under all conditions within the design specification described in the requirements, including vehicles in the shoulders and straddling the lane and shoulder. Kapsch will reconcile discrepancies from CTRMA audits. Variance may be dependent on vehicle volume.

1.2 KPI Goal

The KPI goal is 99.90%.

1.3 Maximum Liquidated Damages

Maximum liquidated damages are $200 per gantry location, per each 0.1% below threshold.

1.4 Testing Frequency

Audits by CTRMA and executed by CTRMA, shall be evenly spread over the course of 12-months (e.g. approximately 1/12th of locations audited each month), with a minimum transaction count as determined by 90% confidence and a statistically significant sample size, as shown in Table 3, to show KPI compliance.

Minimum Required Samples
3,000

Table 3 KPI#1 Minimum Required Samples

1.5 Testing Process

The current testing process is a monthly audit, where CTRMA will perform a manual review of host reports, matched against Digital Video Audit System (DVAS) footage or third-party video surveillance, to ensure all vehicles traversing the roadway are detected and have transactions created for them within the host reports.

1.6 Measurement Method

$$Measured\ Accuracy\ per\ Gantry\ Location = \left[1 - \left(\frac{Detection\ Errors}{Total\ Number\ of\ Vehicles\ at\ Audited\ Gantry}\right)\right] \times 100$$

1. System reports (e.g., Traffic Reports - Lane Image Tool Report) available for audit period.
2. Video of traffic through the gantry provides determination of vehicle presence.
3. Human review of gantry video determines detection errors and transaction count.
4. Excludes:

    a) Undetected motorcycles straddling lanes as known system deficiency.
    b) Vehicles traveling in the wrong direction.
    c) Vehicles in tow using rope, chains, or other unorthodox methods.

1.7 Example KPI Calculation

In this example scenario, assume that during the audit period, and at the audited gantry, there were 5,000 Total Number of Vehicles identified in the corresponding Traffic Report. During manual review of video footage, 37 Detection Errors were identified when comparing DVAS footage or third-party video surveillance to system reports (e.g., Traffic Reports).

- Total Number of Vehicles Through Audited Gantry = 5,000
- Detection Errors = 37

$$Measured\ Accuracy = \left[1 - \left(\frac{37}{5{,}000}\right)\right] \times 100 = 99.26\%$$

$$Liquidated\ Damages = \frac{(0.999 - 0.992)}{0.001} \times \$200 = \$1400$$

2 KPI #2 – Automatic Vehicle Classification (AVC)

2.1 Description

The AVC subsystem shall correctly classify 99.50% of all detected vehicles at speeds from 5 mph up to and including 100 mph, including vehicles straddling the lanes. Shoulders are excluded from this calculation. Kapsch will reconcile discrepancies from CTRMA audits. Variance may be dependent on vehicle volume.

2.2 KPI Goal

The KPI goal is 99.50%.

2.3 Maximum Liquidated Damages

Maximum liquidated damages are $200 per gantry location, per each 0.1% below threshold.

2.4 Testing Frequency

Audits by CTRMA and executed by CTRMA, shall be evenly spread over the course of 12-months (e.g. approximately 1/12th of locations audited each month), with a minimum transaction count as determined by 90% confidence and a statistically significant sample size, as shown in Table 4, to show KPI compliance.

Minimum Required Samples
3,000

Table 4 KPI#2 Minimum Required Samples

2.5 Testing Process

The current testing process is a monthly audit. In this audit, CTRMA will perform a manual review of host reports matched against DVAS and/or third-party video, to ensure all vehicles reported in the host are properly classified.

2.6 Measurement Method

$$Measured\ Accuracy\ per\ Gantry\ Location = \left[1 - \left(\frac{Axle\text{-}Based\ Classification\ Errors}{Total\ Number\ of\ Vehicles\ at\ Audited\ Gantry}\right)\right] \times 100$$

1. System report (Traffic Reports - Lane Image Tool Report) available for audit period.
2. Video of traffic through the gantry provides determination of vehicle classification via axle counts per vehicle.
3. Human review of gantry video determines classification errors and transaction count.
4. Excludes:

    a) Undetected motorcycles straddling lanes as known system deficiency.
    b) Vehicles traveling in the wrong direction.
    c) Vehicles in tow using rope, chains, or other unorthodox methods.
    d) Vehicles traveling in lanes not outfitted with classification hardware.
    e) Undetected vehicles (the system cannot classify a vehicle it does not detect)

2.7 Example KPI Calculation

In this example scenario, assume that during the audit period, and at the audited gantry, there were 5,000 Total Number of Vehicles identified in the corresponding Traffic Report. During manual review of video footage, 37 Axle-Based Classification Errors were identified when comparing DVAS footage or third-party video surveillance to system reports (e.g., Traffic Reports).

- Total Number of Vehicles Through Audited Gantry = 5,000
- Axle-Based Classification Errors = 37

$$Measured\ Accuracy\ = \left[1 - \left(\frac{37}{5{,}000}\right)\right] \times 100 = \ 99.26\%$$

$$Liquidated\ Damages\ = \frac{(0.995 - 0.992)}{0.001} \times \$200 = \ \$600$$

3 KPI #3 – Automatic Vehicle Identification (AVI)

3.1 Description

The AVI subsystem will correctly detect, read, and assign to the correct vehicle 99.90% of all properly installed transponders on all detected vehicles at speeds from 5 mph up to and including 100 mph, including vehicles in the shoulders and straddling the lanes.

3.2 KPI Goal

The KPI goal is 99.90%.

3.3 Maximum Liquidated Damages (per calendar month)

Maximum liquidated damages are $200 per gantry location, per each 0.1% below threshold.

3.4 Testing Frequency

Audits by CTRMA and executed by CTRMA, shall be evenly spread over the course of 12-months (e.g. approximately 1/12th of locations audited each month), with a minimum transaction count as determined by 90% confidence and a statistically significant sample size, as shown in Table 5, to show KPI compliance.

Minimum Required Samples
5,500

Table 5 KPI#3 Minimum Required Samples

3.5 Testing Process

For AVI Detect and Read Accuracy:

1. Kapsch provides a report that displays all vehicle transactions per gantry. From this data set, the transactions are filtered for tag reads and non-tag read vehicle transactions.
2. Another filter query removes transactions with an indicated vehicle speed between 5 MPH to 100 MPH.
3. From this data set, transactions with the same transponder are matched with other vehicle transactions that occurred on the same roadway, on the same day.
4. The accuracy is calculated by counting the number of vehicles charged as an iToll at a gantry that had a tag read on the same roadway, on the same day, as an error. This value is then divided by the total number of vehicles at that plaza on that day.
5. Kapsch provides a report that includes transactions and all images captured for each transaction occurring within a CTRMA selected time (audit period). Only AVI transactions will be used. All non-AVI transactions shall be removed.
6. Transactions are matched with other vehicle transactions that occurred on the roadway in the same audit period.

7. However, if the images from both initial transactions show different vehicles, images from a third transaction for the audited transponder are compared.

    a) If the images from this third transaction match the audited transaction, the audit will consider the audited transponder correctly correlated to the transaction.
    b) If the images from the third transaction do not match the audited transaction, the audit shall consider the audited transponder to have an AVI correlation error.
    c) If the transactions are spurious or buffered tags that are clearly correlation errors, they are counted (e.g., missed association or cross lane reads).

3.6 Measurement Method

$$Measured\ Accuracy\ per\ Gantry\ Location = \left\{1 - \left[\frac{(Detection\ and\ Read\ Errors) + (Correrlation\ Errors)}{(Detection\ and\ Read\ Audited\ Samples) + (Correlation\ Audited\ Samples)}\right]\right\} \times 100$$

1. The Number of Detection and Read Errors and Correlations Errors is the number of vehicles with an iToll transaction that was also identified to have a separate successful tag transaction at a minimum of one other gantry on the same roadway during the same day.
2. Detection and Read Audited Samples and Correlation Audited Samples are the total number of vehicles passing through the plaza.
3. Excludes vehicles:

    a) Traveling in the wrong direction
    b) Transactions with no images
    c) Transponders with only one transaction
    d) Transactions where cannot be reliably demonstrated to be the same or a different vehicle, due to such factors as image quality or obscured plate numbers

3.7 Example KPI Calculation

In this example scenario, assume that during the audit period, and at the audited gantry, there were 5,000 Total Number of Vehicles identified in the corresponding Detailed Transaction Report. An Ad-Hoc Query flagged 187 iTolls as Missed AVI Reads and Correlations as there were corresponding tag reads at another plaza on the same day.

- Total Number of Vehicles at Audited Gantry = 5,000
- Total Number of Missed AVI Reads and Correlations = 187

$$Measured\ Accuracy = \left[1 - \left(\frac{187}{5{,}000}\right)\right] \times 100 = 96.26\%$$

$$Liquidated\ Damages = \frac{(0.999 - 0.962)}{0.001} \times \$200 = \$7{,}400$$

4 KPI #4 – License Plate Image Capture (LPIC)

4.1 Description

The LPIC subsystem will capture one front, human-readable license plate image or one rear, human-readable license plate image and associate it to the correct vehicle for 99.00% of all detected vehicles traveling at speeds from 5 mph up to and including 100 mph, including vehicles straddling the lane and shoulder.

4.2 KPI Goal

The KPI goal is 99.00%.

4.3 Maximum Liquidated Damages

Estimated revenue loss is calculated using liquidation rate, per gantry location, for performance below the threshold.

4.4 Testing Frequency

Testing will occur monthly.

4.5 Testing Process

For LPIC Capture and Association:

1. View the Code Offs by Lane Report for the roadway and audit period that is being verified. Use the first day of the month as the start date, and the last day of the month as the end date. Repeat this process for all roadways.
2. View each report and isolate “Camera issue at lane” code off rows for each plaza/lane.
3. Record “Total TRX”, “Total Toll”, and “Total Pct” for all camera issues at the lane code off.
4. The Image Capture accuracy will be the reflected in the report and can be identified by the formula below.

4.6 Measurement Method

$$Measured\ Accuracy\ per\ Gantry = 100 - (\text{Camera Issue at Lane Code Off Total Pct})$$

Exclusions include the following:

1. Undetected motorcycles straddling lanes as a known system deficiency.
2. Vehicles traveling in the wrong direction.
3. Vehicles in tow using rope, chains, or other unorthodox methods.
4. Vehicles with missing, damaged, or obstructed license plates.
5. Vehicles with unreadable temporary license plates.
6. Motorcycles with unreadable license plates.

7. Out of State license plates that were unidentifiable.

Note: This metric only evaluates legally mounted license plates and plates that are deemed to be unidentifiable due strictly to camera issues. These are code-offs conditions and will remain in the sample set.

Camera issues include the following:

1. Blurred image
2. Cut-off image (timing)
3. Images with no vehicles (timing)
4. Over/under exposure
5. Camera angle

4.7 Example KPI Calculation

In this example scenario, assume that during the audit period, and at the audited gantry, there were 2,000 Camera Issue at Lane Code Offs, equaling a total toll value of $2,400, and a total percentage of 1.49%, as identified in the Code Offs by Lane report. The total transactions, prior to code offs, are included in the reports calculation; thus, the listed failure rate of 1.49% can be used independently to determine KPI achievement.

- Total Count of Camera Issue at Lane Code Off transactions = 2,000
- Total Toll of Camera Issue at Lane Code Off transactions = $2,400
- Total Percentage of Camera Issue at Lane Code Off transactions = 1.49%

$$Measured\ Accuracy\ = 100 - 1.49\% = 98.51\%$$

$$Transactions\ Below\ Threshold\ = \frac{\left[2{,}000\ x\ \frac{(1.49 - 1.00)}{100}\right]}{\left(\frac{1.49}{100}\right)} = 658$$

$$Total\ Toll\ Below\ Threshold\ = \left(\frac{\$2{,}400}{2{,}000}\right) x\ 658 = \$789.60$$

$$Average\ Toll\ per\ Transaction\ = \left(\frac{\$789.60}{658}\right) = \$1.20$$

$$Pay\ by\ Mail\ Revenue\ Value\ AVI\ (iToll) = \frac{(658\ x\ 10\%)\ x\ \$1.20}{1.5} = \$52.64 Pay\ by\ Mail\ Revenue\ Value$$

$$= \left((658\ x\ 90\%)\ x\ \$1.20\right) x\ 0.5 = \$355.32$$

$$\boldsymbol{Total\ Pay\ by\ Mail\ Revenue\ Value\ = \$52.64\ (AVI) + \$355.32\ (PBM) = \$407.96}$$

5 KPI #5 – IR

5.1 Description

For transactions rejected by the manual review process, less than 1.00% shall have incorrect code-off results.

5.2 KPI Goal

The KPI goal is <1.00%.

5.3 Maximum Liquidated Damages

Maximum liquidated damages are $200, per each 0.1% below threshold.

5.4 Testing Frequency

Audits by CTRMA, at their discretion, will be executed by CTRMA, with a minimum transaction count as determined by a statistically significant sample size, as shown in Table 6, to show KPI compliance.

Minimum Required Samples per Code Off Category
1,500

Table 6 KPI#5 Minimum Required Samples

5.5 Testing Process

The current testing process is a quarterly audit, where validation will be conducted on a randomized set of coded off transactions. This subset of transactions is manually reviewed by the Kapsch Transaction Validation Team to ensure coded off transactions are given the proper code off, and to identify any valid transactions that were erroneously coded off.

Quarterly Audit Schedule:

Quarter	Review Period	Audit Due Date
1	January 1st – March 31st	April MMR
2	April 1st – June 30th	July MMR
3	July 1st – September 30th	October MMR
4	October 1st – December 31st	January MMR

Table 7 KPI#5 Quarterly Audit Schedule

5.6 Measurement Method

$$Measured\ Accuracy = \left[1 - \left(\frac{Pursuable\ Code\ Offs + Incorrect\ Code\ Offs}{Total\ Manually\ Audited\ Coded\ Off\ Images}\right)\right] \times 100$$

1. Obtain a random sample set of manually reviewed coded off transactions.
2. Verify the image code off is not pursuable (license plate number or jurisdiction unclear)

5.7 Verify a valid code off reason was applied. Example KPI Calculation

In this example scenario, assume that during the audit period, there were 5,000 Manually Audited Coded Off Images. When reviewing the images, there were 25 code offs that were pursuable and 125 code offs that were categorized incorrectly.

- Total Number Manually Audited Coded Off Images = 5,000
- Total Number of Pursuable Coded Off Images = 25
- Total Number of Incorrectly Coded Off Images = 125

$$Measured\ Accuracy = \left[1 - \left(\frac{25 + 125}{5{,}000}\right)\right] \times 100 = 97.00\%$$

$$Liquidated\ Damages = \frac{(0.99 - 0.97)}{0.001} \times \$200 = \$4{,}000$$

6 KPI #6 – Trip

6.1 Description

99.50% of all transactions shall be correctly assembled into trips.

6.2 KPI Goal

The KPI goal is 99.50%.

6.3 Maximum Liquidated Damages

Maximum liquidated damages are $200 per roadway direction, per each 0.1% below threshold.

6.4 Testing Frequency

Testing will occur monthly.

6.5 Testing Process

Testing is performed through an Ad-Hoc Query.

The test will evaluate a “correctly assembled trip” using Trip Accuracy and Fare assignment. A vehicle’s identification will be evaluated by using both Tag, if present, and LPN information.

The inspection of a vehicle’s identification can identify two failure types: split trip and combined vehicle information. A split trip represents a vehicle reporting on two or more distinct trips, instead of being combined into a singular trip. A combined vehicle information failure represents two distinct vehicles included in a singular trip.

Trip building validation will be conducted by verifying that all transactions with a matching plate or tag value, between 21 minutes before trip start time, through 21 minutes after the trip end time, are all included within a singular trip. Once it is verified that the trip’s vehicle did not pass another toll point prior to or after the formed trip, the trip may be considered complete.

Fare assignment will be evaluated by comparing the Toll Rate Sign Posting Report to Entry Point Tolling location. The rate that was active on the sign will be compared to entry point and assigned fare to validate accuracy.

6.6 Measurement Method

$$Measured\ Accuracy\ per\ Roadway\ Direction = \left[1 - \left(\frac{Total\ Incorrectly\ Assembled\ Trips}{Total\ Audited\ Trips}\right)\right] \times 100$$

1. The number of incorrectly assembled trips will be identified by the sum of audited trips that failed to achieve both trip accuracy and correct fare assignment.
2. Total number of trips will be the count of trips evaluated.

6.7 Example KPI Calculation

In this example scenario, assume that during the audit period, and per audited roadway direction, there were 9,000 trips evaluated. Of those evaluated, 125 trips failed either trip accuracy or correct fare assignment.

- Total Number of Incorrectly Assembled Trips = 125
- Total Number of Trips = 9,000

$$Measured\ Accuracy = \left[1 - \left(\frac{125}{9{,}000}\right)\right] \times 100 = 98.61\%$$

$$Liquidated\ Damages = \frac{(0.995 - 0.986)}{0.001} \times \$200 = \$1{,}800$$

7 KPI #7 – Trip Processing

7.1 Description

100% of all trips shall be transmitted to the CTRMA Data Platform System (DPS) within six (6) calendar days of the exit transaction of the trip.

7.2 KPI Goal

The KPI goal is 100%.

7.3 Maximum Liquidated Damages (per calendar month)

Maximum liquidated damages for lost or uncollectable transactions:

1. Actual revenue above $5,000, AND
2. Any direct damages associated with the loss

Maximum liquidated damages for transactions transmitted > 6 days and <= 30 days, AND the result in revenue generation:

1. 10% of actual revenue, AND
2. Any direct damages associated with the delay

Maximum liquidated damages for transactions older than 30 calendar days:

3. Actual revenue above $5,000, AND
4. Any direct damages associated with the loss

Note: Actual revenue value should be calculated using 100% of AVI and i-Toll transactions, and Pay by Mail transactions at the liquidation rate (to be validated every new fiscal year).

7.4 Testing Frequency

Testing will occur monthly.

7.5 Testing Process

Testing is performed through an Ad-Hoc Query.

7.6 Measurement Method

$$Measured\ Accuracy\ =$$

$$\left\{1-\left[\frac{Count\ of\ Mopac\ DB\ Trips-(Count\ of\ CTRMA\ DB\ Trips\ -Count\ of\ CTRMA\ DB\ Trips\ >\ 6\ Days\ and\ \leq 30\ Days)}{Count\ of\ Mopac\ DB\ Trips}\right]\right\}\times 100$$

1. Count of Mopac DB Trips will be the total count of Mopac Trips in the Mopac DB.
2. Count of CTRMA DB Trips will be the total count of Mopac Trips that are found in the CTRMA DB.
3. The >6 Days will be determined by evaluating the Mopac Trip exit timestamp as the start time, and the RTRAN transmission timestamp, to the DPS, as the stop time.

7.7 Example KPI Calculation

In this example scenario, assume that during the audit period, there were 50,000 valid Mopac Trips found in the Mopac DB. Using the same sample set, there were a total of 50,000 Mopac Trips located in the CTRMA DB. Of those 50,000 Mopac Trips, 7,500 exceeded the 6 day RTRAN transmission time limit. Of the 7,500 trips that failed the KPI, 4,000 were AVI or iTolls, and 3,500 were Pay by Mail (PBM). The 4,000 AVI transactions totaled $8,400 while the 3,500 PBM transactions totaled $12,600.

- Total Count of Mopac Trips in Mopac DB = 50,000
- Total Count of Mopac Trips in CTRMA DB = 50,000
- Total Count of Mopac Trips in CTRMA DB > 6 Days and <= 30 Days = 7,500
- Total Count of Mopac Trips in CTRMA DB <= 6 Days = (50,000 – 7,500) = 42,500
- Total Count of Mopac Trips Delayed > 6 Days and <= 30 Days = 7,500

$$Measured\ Accuracy\ =\ \left\{1-\left[\frac{50{,}000-(50{,}000-7{,}500)}{50{,}000}\right]\right\}\times 100\ =\ 85.00\%$$

Actual Revenue Value = $8,400 + ($12,600 x 0.5) = $14,700

$$\boldsymbol{Liquidated\ Damages}\ =\ \$\mathbf{14{,}700}\ \boldsymbol{x}\ \mathbf{10}\%\ =\ \$\mathbf{1{,}470}$$

8 KPI #8 – Microwave Vehicle Detection (MVD)

8.1 Description

The volume of MVD data provided by the Traffic Detection System will be 95.00% accurate.

8.2 KPI Goal

The KPI goal is 95.00%.

8.3 Maximum Liquidated Damages (per calendar month)

Maximum liquidated damages are $200 per MVD, per each 0.1% below threshold.

8.4 Testing Frequency

Kapsch will execute an annual performance audit.

8.5 Testing Process

The current testing process is a yearly audit of all MVDs, performed by Kapsch, that will verify MVDs through comparing volume provided by the physical device (observed via the HDSmart Utility), and the volume counted through DVAS footage or third-party video surveillance. Each MVD will be audited for a minimum of five minutes, with a minimum count of 30 vehicles. The results will be annotated on the MVD Calibration Verification Sheet (see Appendix A). Any devices that fail to meet KPIs will be re-audited the following month.

Yearly Audit Schedule:

Review Period	Audit Due Date
October 1st – October 31st	November MMR

Table 8 KPI#8 Yearly Audit Schedule

8.6 Measurement Method

$$Measured\ Accuracy\ per\ MVD = \left[1 - \left(\frac{Observed\ Traffic\ Volume - MVD\ Reported\ Traffic\ Volume}{Observed\ Traffic\ Volume}\right)\right] \times 100$$

1. Observed Traffic Volume is the total observed traffic volume passing the audited MVD.
2. MVD Reported Traffic Volume is the total traffic volume captured by the MVD, via the HDSmart Utility, at the audited MVD.
3. Exceptions:

    a) Any MVD disabled for predictive or preventative maintenance.
    b) Any MVDs in non-working conditions pending repair of a damaged component. Example KPI Calculation.
    c) Any MVD which is unavailable during the auditing period, will have an individual audit conducted within 30 days of becoming available.

In this example scenario, assume that during the audit period, and per the audited MVD, there were 5,000 vehicles observed through the recorded video feed for the audited MVD location. Using the same time period and location, there were a total of 4,500 vehicles captured by the MVD through the HDSmart Utility.

- Total Observed Traffic Volume at MVD Location = 5,000
- Total MVD Reported Traffic Volume at MVD Location = 4,500

$$Measured\ Accuracy = \left[1 - \left(\frac{5000 - 4500}{5000}\right)\right] \times 100 = 90.00\%$$

$$Liquidated\ Damages = \frac{(0.950 - 0.900)}{0.001} \times \$200 = \$10{,}000$$

9 KPI #9 – Non-EL Transaction Processing

9.1 Description

100% of all Non-EL transactions shall be transmitted to the CTRMA DPS within three (3) calendar days of the transaction date.

9.2 KPI Goal

The KPI goal is 100%.

9.3 Maximum Liquidated Damages (per calendar month)

Maximum liquidated damages for lost or uncollectable transactions:

1. Actual revenue above $5,000, AND
2. Any direct damages associated with the loss

Maximum liquidated damages for transactions transmitted > 3 days and <= 30 days, AND result in revenue generation:

1. 10% of actual revenue, AND
2. Any direct damages associated with the delay

Maximum liquidated damages for transactions older than 30 calendar days:

1. Actual revenue above $5,000, AND
2. Any direct damages associated with the loss

Note: Actual revenue value should be calculated using 100% of AVI and i-Toll transactions, and PBM transactions at the liquidation rate (to be validated every new fiscal year).

9.4 Testing Frequency

Testing will occur monthly.

9.5 Testing Process

Testing is performed through an Ad-Hoc Query

9.6 Measurement Method

$$Measured\ Accuracy = \left[1 - \left(\frac{Count\ of\ Transactions > 3\ Days\ and \leq 30\ Days}{Count\ of\ Total\ Transactions\ Created}\right)\right] \times 100$$

1. The count of transactions > 3 Days and <= 30 Days will be the number of transactions initially transmitted to the DPS, in the RTRAN file, within this timeframe.
2. To determine if the 3 day time limit was achieved, the transaction timestamp (lane date) will represent the start time, and the RTRAN file transmission timestamp will represent the end time.
3. The count of total transactions will be all created transactions within the annotated periods above.

9.7 Example KPI Calculation

In this example scenario, assume that during the audit period, there were 50,000 transactions created. Using the same sample set, it was found that 10,000 transactions were transmitted to the DPS, in the initial RTRAN file, outside the 3 day time limit. Of the 10,000 transactions, 6,000 were AVI or iToll, and 4,000 were PBM. The 6,000 AVI transactions totaled $4,800 while the 4,000 PBM transactions totaled $4,800.

- Total Count of Transactions = 50,000
- Total Count of Transactions Transmitted > 3 Days and <= 30 Days = 10,000

$$Measured\ Accuracy = \left[1 - \left(\frac{10{,}000}{50{,}000}\right)\right] \times 100 = 80.00\%$$

Actual Revenue Value = $4,800 + ($4,800 x 0.5) = $7,200

$$\boldsymbol{Liquidated\ Damages} = \$\mathbf{7{,}200}\ \boldsymbol{x}\ \mathbf{10}\% = \$\mathbf{720}$$

10 KPI #10 – IR

10.1 Description

For transactions requiring a manual review process, 99.50% shall be completed, AND returned, within 72 hours from the time the image review request was received.

10.2 KPI Goal

The KPI goal is 99.50%.

10.3 Maximum Liquidated Damages (per calendar month)

Maximum liquidated damages for Image Reviews completed > 72 hours and <= 10 days:

1. $200 per each 0.1% below threshold.

Maximum liquidated damages for Image Reviews completed > 10 days and <= 30 days, AND result in revenue generation:

1. 10% of actual revenue, AND
2. Any direct damages associated with the delay

Maximum liquidated damages for lost or uncollectable Image Review transactions:

1. Actual revenue above $5,000, AND
2. Any direct damages associated with the loss

Maximum liquidated damages for transactions older than 30 calendar days:

1. Actual revenue above $5,000, AND
2. Any direct damages associated with the loss

Note: Actual revenue value should be calculated using 100% of AVI and i-Toll transactions, and Pay by Mail transactions at the liquidation rate (to be validated every new fiscal year).

10.4 Testing Frequency

Testing will occur monthly.

10.5 Testing Process

Testing is performed through an Ad-Hoc Query.

10.6 Measurement Method

$$Measured\ Accuracy\ = \left[1 - \left(\frac{Total\ Manual\ Image\ Review\ Results\ Returned > 72\ Hours\ and \leq 10\ Days}{Total\ Manual\ Image\ Review\ Requests\ Received}\right)\right] \text{x } 100$$

1. Total manual Image Review requests received is the total amount of image review requests received from the DPS, in an IREQ file.
2. Total manual Image Review results returned > 72 hours and <= 10 days will be the number of image review results returned to the DPS, in an ITRAN, within this timeframe.
3. To determine if Image Review timeframes were achieved, the IREQ receipt timestamp will represent the start time, and the ITRAN file transmission timestamp will represent the end time.

10.7 Example KPI Calculation

In this example scenario, assume that during the audit period, there were 250,000 manual Image Review requests received in an IREQ file. Using the same sample set, there were a total of 246,000 manual Image Review results returned in an ITRAN file within the 72-hour time limit. Of the remaining 4,000 manual Image Review requests, 2,000 were completed and results returned > 72 hours and <= 10 days. The final 2,000 manual Image Review requests were completed and returned > 10 days and <= 30 days. Of the 2,000 transactions, 1,200 were AVI or iToll, and 800 were PBM. The 1,200 AVI transactions totaled $960 while the 800 PBM transactions totaled $1,450.

- Total Count of Manual Image Review Requests Received = 250,000
- Total Count of Manual Image Review Results Returned < 72 Hours = 246,000
- Total Count of Manual Image Review Results Returned > 72 Hours and <= 10 Days = 2,000
- Total Count of Manual Image Review Results Returned > 10 Days and <= 30 Days = 2,000

$$Measured\ Accuracy\ = \left[1 - \left(\frac{2{,}000}{250{,}000}\right)\right] \times 100\ =\ 99.20\%$$

$$Liquidated\ Damages\ for\ Image\ Review\ Results\ Returned > 72\ Hours\ and \leq 10\ Days\ = \frac{(0.995 - 0.992)}{0.001} \times \$200 = \$600$$

$$Actual\ Revenue\ Value\ for\ Image\ Review\ Results\ Returned > 10\ Days\ and \leq 30\ Days\ = \$960 + (\$1{,}450\ x\ 0.5) = \$1{,}685$$

$$Liquidated\ Damages\ for\ Image\ Review\ Results\ Returned > 10\ Days\ and \leq 30\ Days\ = \$1{,}685\ x\ 10\% = \$168.50$$

$$\boldsymbol{Total\ Liquidated\ Damages\ for\ Image\ Review\ Results\ Returned > 72\ Hours\ = \$600 + \$168.50 = \$768.50}$$

11 KPI #11 – Reports

11.1 Description

The Monthly Maintenance Report, accurately detailing system performance relative to all Project KPIs, shall be submitted to CTRMA each month. The Monthly Inventory Report, to be exported directly from the Remote Operations and Maintenance System (ROMS), accurately details the location, count, and serial numbers of all the CTRMA hardware, including retired hardware (if applicable), spares and Return Material Authorization (RMA) hardware for the previous calendar month. Kapsch is to provide complete reports, which include a cover page, table of contents, and summaries, in a format to be agreed upon by Kapsch and CTRMA.

11.2 KPI Goal

All elements described in Section 11.1 will be submitted to CTRMA by the 15th of the following month.

11.3 Maximum Liquidated Damages (per calendar month)

Kapsch cannot invoice for the monthly maintenance fee without submitting these reports.

11.4 Testing Frequency

Testing will occur monthly.

11.5 Testing Process

n/a

12 KPI #12 – ETC Availability

12.1 Description

Each ETC lane shall be available 99.50% of the time. An available lane is defined as a lane with the ability to collect revenue either through image capture or tag read and association.

12.2 KPI Goal

The KPI goal is 99.50%.

12.3 Maximum Liquidated Damages

Lost or delayed transactions as a result of ETC lane unavailability shall be included in, and calculated per, KPI #7 (Trip Processing) or KPI #9 (Non-EL Transaction Processing).

12.4 Testing Frequency

Testing will occur monthly.

12.5 Testing Process

The Toll Zone Equipment Availability KPI will be measured using the ROMS Downtime Analysis Report, as configured and agreed upon by Kapsch and CTRMA.

12.5.1 Applicability

The Toll Zone Equipment Availability KPI is applicable as follows:

MOPAC

1. Shoulder Lane Availability
    a. 1 of 2 Cameras are operational **AND**
    b. 1 of 2 SICKs are operational
2. Non-Shoulder Lane Availability
    a. 1 of 2 Cameras are operational **AND**
    b. 1 of 2 SICKs are operational **OR**
    c. Tag Reader is operational
3. All Lane Availability
    a. 1 of 2 ZC Applications are running and creating accurate vehicle transactions **AND**
    b. 1 of 2 ICS Servers is online and receiving images from cameras

All Other Roadways

1. Shoulder Lane Availability
    a. 1 of 2 Cameras are operational **AND**
    b. Idris is operational
2. Non-Shoulder Lane Availability
    a. 1 of 2 Cameras are operational **AND**
    b. Idris is operational **OR**
    c. Tag Reader is operational
3. All Lane Availability
    a. 1 of 2 ZC Applications are running and creating accurate vehicle transactions **AND**
    b. 1 of 2 ICS Servers is online and receiving images from cameras

12.6 Measurement Method

$$Measured\ Accuracy\ per\ ETC\ Lane = \left[1 - \left(\frac{Total\ Lane\ Unavailability\ Time\ Per\ Plaza}{Total\ Time\ in\ Audit\ Period}\right)\right] \times 100$$

1. Total lane unavailability time per plaza will be the cumulative downtime that meets the defined unavailability criteria listed in this KPI.
2. Total time in audit period is the total days, hours, and or minutes within the corresponding audit time frame.
3. The following excluded downtime examples will be captured within ROMS to adjust system availability calculations automatically:

    a) Inaccessibility due to hazardous conditions
    b) Downtime for scheduled maintenance
    c) External forces which cause equipment damage
    d) Inaccessibility due to CTRMA driven operational considerations, even though device has failed.

12.7 Example KPI Calculation

In this example scenario, assume that during the audit period, Lane X was unavailable, as defined in the availability criteria of this KPI, for a cumulative total of 6 hours and 35 minutes. The Total Time in Audit Period was 720 hours.

- Total Lane Unavailability = 6 hours, 35 minutes (395 min)
- Total Time in Audit Period = 720 hour (43,200 min)

$$Measured\ Accuracy\ =\ \left[1-\left(\frac{395}{43200}\right)\right]\times 100\ =\ 99.09\%$$

12.8 Estimated Revenue Loss Measurement Method

For the purpose of quantifying lost revenue, the calculated liquidation rate, as referenced in this document, will utilize the following parameters:

1. Identify the revenue loss timeframe
    a) Determine total allowable unavailable time for audit period
    b) Determine when total allowable unavailability time has been exhausted
    c) Determine adjusted start time and end time of lost revenue event that is subject to liquidated damages
2. Identify the historical transaction volume, rate, and type of the referenced plaza/lane for the liable timeframe for the lost revenue incident.
3. Historical transaction data will be for the identical day of the week and identical time of day for the prior three weeks.
4. Historical transaction data will be evaluated to determine percentage of tag based (TB) transactions vs PBM transactions.
5. Identify current Liquidation Rate (maintained by CTRMA).

The estimated revenue loss will use the following calculation methods:

$$Allowable\ Unavailable\ Time\ =\ Total\ Time\ in\ Audit\ Period-\left(0.995(Total\ Time\ in\ Audit\ Period)\right)$$
$$Adjusted\ Unavailable\ Time\ =\ Unavailable\ Time-Allowable\ Unavailable\ Time$$
$$Revenue\ Loss\ Start\ Time\ =\ Start\ Time\ of\ Unavailability+Allowable\ Unavailable\ Time$$
$$Revenue\ Loss\ End\ Time\ =\ Revenue\ Loss\ Start\ Time+Adjusted\ Unavailable\ Time$$
$$Estimated\ Revenue\ Loss\ =$$
$$\{Liquidation\ Rate\ (Avg\ PBM\ Transactions\ x\ Avg\ PBM\ Toll\ Rate)\}+(Avg\ TB\ Transactions\ x\ Avg\ TB\ Toll\ Rate)$$

12.9 Example Estimated Revenue Loss Calculation

In this example scenario, assume that during the audit period, Lane X was unavailable, as defined in the availability criteria of this KPI, for a cumulative total of 6 hours and 35 minutes (395 minutes). The Total Time in Audit Period was 720 hours (43,200 minutes).

$$Allowable\ Unavailable\ Time\ = 43{,}200\ minutes - \big(0.995(43{,}200)\big) = 216\ minutes$$

$$Adjusted\ Unavailable\ Time\ = 395\ minutes - 216\ minutes\ = 175\ minutes$$

$$Revenue\ Loss\ Start\ Time\ = 08{:}35AM + 216\ minutes\ = 12{:}11PM$$

$$Revenue\ Loss\ End\ Time\ = 12{:}11PM + 175\ minutes\ = 03{:}06PM$$

$$Estimated\ Revenue\ Loss\ = \{0.50\ (412\ x\ \$1.85)\} + (515\ x\ \$1.25) = \$1{,}024.85$$

Note: Reference KPI #7 (Trip Processing) and KPI #9 (Non-EL Transaction Processing) for the inclusion of any liquidated damages.

13 KPI #13 – ETC Host Availability

13.1 Description

The Host Level system shall be available 99.50% of the time. An available host is defined as a fully operating host such that reports, ROMS, and transaction processing are online (with the exception of approved downtime for maintenance purposes).

13.2 KPI Goal

The KPI goal is 99.50%.

13.3 Maximum Liquidated Damages

Maximum liquidated damages are $200 per each 0.1% below threshold.

13.4 Testing Frequency

Testing will occur monthly.

13.5 Testing Process

The ETC Host Availability KPI will be measured using the ROMS Downtime Analysis Report, as configured and agreed upon by Kapsch and CTRMA.

13.5.1 Applicability

The ETC Host Availability KPI is applicable as follows:

> For the purpose of this KPI, the ETC Host includes the systems, applications, and processes listed below:

- Database
- Toll Host (Reports)
- ROMS (Engine, DB, UI)
- Application Server
- VES Server
- Host Server
- Inserters (Host, ICS, ROMS)

> Calculated unavailability will only apply when both the primary ETC Host and secondary ETC Host have failed or are unavailable.

13.6 Measurement Method

$$Measured\ Accuracy = \left[1 - \left(\frac{Total\ ETC\ Host\ Unavailability\ Time}{Total\ Time\ in\ Audit\ Period}\right)\right] \times 100$$

1. Total ETC Host unavailability time will be the cumulative downtime that meets the defined unavailability criteria listed in this KPI.
2. Total Time in Audit Period is the total days, hours, and or minutes within the corresponding audit time frame.
3. The following excluded downtime examples will be captured within ROMS to adjust system availability calculations automatically:

    a) Inaccessibility due to hazardous conditions
    b) Downtime for scheduled maintenance
    c) External forces which cause equipment damage
    d) Inaccessibility due to CTRMA driven operational considerations, even though device has failed.

13.7 Example KPI Calculation

In this example scenario, assume that during the audit period, primary and secondary ETC Hosts were both unavailable, as defined in the availability criteria of this KPI, for a cumulative total of 6 hours and 35 minutes. Total Time in Audit Period was 720 hours.

- Total Host Unavailability = 6 hours, 35 minutes (395 min)
- Total Time in Audit Period = 720 hour (43,200 min)

$$Measured\ Accuracy\ = \left[1 - \left(\frac{395}{43200}\right)\right] \times 100\ =\ 99.09\%$$

$$Liquidated\ Damages\ = \frac{(0.995 - 0.990)}{0.001} \times \$200 = \$1{,}000$$

14 KPI #14 – Express Closed-Circuit Television (CCTV) Availability

14.1 Description

Express CCTV shall be available 99.50% of the time, excluding scheduled maintenance.

14.2 KPI Goal

The KPI goal is 99.50%.

14.3 Maximum Liquidated Damages.

Maximum liquidated damages are $200 per each 0.5% below threshold.

14.4 Testing Frequency

Testing will occur monthly.

14.5 Testing Process

The Express CCTV Availability KPI will be measured using the ROMS Downtime Analysis Report, as configured and agreed upon by Kapsch and CTRMA.

14.6 Measurement Method

$$Measured\ Accuracy = \left[1 - \left(\frac{Total\ Express\ CCTV\ Unavailability\ Time}{Total\ Time\ in\ Audit\ Period}\right)\right] \times 100$$

1. Total Express CCTV Unavailability Time will be the cumulative downtime of each Express CCTV during the audit period.
2. Total Time in Audit Period is the total days, hours, and/or minutes within the corresponding audit time frame.
3. The following excluded downtime examples will be captured within ROMS to adjust system availability calculations automatically:

    a) Inaccessibility due to hazardous conditions
    b) Downtime for scheduled maintenance
    c) External forces which cause equipment damage
    d) Inaccessibility due to CTRMA driven operational considerations, even though device has failed.

14.7 Example KPI Calculation

In this example scenario, assume that during the audit period, Express CCTV #1 & #2 were unavailable for a cumulative total of 6 hours and 35 minutes. The Total Time in Audit Period was 720 hours.

- Total Express CCTV Unavailability = 6 hours, 35 minutes (395 min)
- Total Time in Audit Period = 720 hour (43,200 min)

$$Measured\ Accuracy = \left[1 - \left(\frac{395}{43200}\right)\right] \times 100 = 99.09\%$$

$$Liquidated\ Damages = \frac{(0.995 - 0.990)}{0.005} \times \$200 = \$200$$

~~15 KPI #15 Non-Express CCTV Availability~~

~~15.1 Description~~

~~Non-Express CCTV shall be available 95.00% of the time, excluding scheduled maintenance.~~

~~15.2 KPI Goal~~

~~The KPI goal is 95.00%.~~

~~15.3 Maximum Liquidated Damages.~~

~~Maximum liquidated damages are $200 per each 0.5% below threshold.~~

~~15.4 Testing Frequency~~

~~Testing will occur monthly.~~

~~15.5 Testing Process~~

~~The Non-Express CCTV Availability KPI will be measured using the ROMS Downtime Analysis Report, configured and agreed upon by Kapsch and CTRMA.~~

15.6 Measurement Method

$$Measured\ Accuracy = \left[1 - \left(\frac{Total\ Non\ Express\ CCTV\ Unavailability\ Time}{Total\ Time\ in\ Audit\ Period}\right)\right] \times 100$$

1. Total Non-Express CCTV Unavailability Time will be the cumulative downtime of each Non-Express CCTV during audit period.
2. Total Time in Audit Period is the total days, hours, and or minutes within the corresponding audit time frame.
3. The following excluded downtime examples will be captured within ROMS to adjust system availability calculations automatically:

    a) Inaccessibility due to hazardous conditions
    b) Downtime for scheduled maintenance
    c) External forces which cause equipment damage
    d) Inaccessibility due to CTRMA driven operational considerations, even though device has failed.

15.7 Example KPI Calculation

In this example scenario, assume that during the audit period, Non-Express CCTV #1 & #2 were unavailable for a cumulative total of 6 hours and 35 minutes. The Total Time in Audit Period was 720 hours.

- Total Non-Express CCTV Unavailability = 6 hours, 35 minutes (395 min)
- Total Time in Audit Period = 720 hour (43,200 min)

$$Measured\ Accuracy = \left[1 - \left(\frac{395}{43200}\right)\right] \times 100 = 99.09\%$$

$$Liquidated\ Damages = \frac{(0.950 - 0.990)}{0.005} \times \$200 = \$0$$

~~16 KPI #16 – Dynamic Message Sign (DMS) Availability~~

~~16.1 Description~~

~~DMS shall be available 95.00% of the time, excluding scheduled maintenance.~~

~~16.2 KPI Goal~~

~~The KPI goal is 95.00%.~~

~~16.3 Maximum Liquidated Damages.~~

~~Maximum liquidated damages are $200 per each 0.5% below threshold.~~

~~16.4 Testing Frequency~~

~~Testing will occur monthly.~~

~~16.5 Testing Process~~

~~The DMS Availability KPI will be measured using the ROMS Downtime Analysis Report, configured and agreed upon by Kapsch and CTRMA.~~

16.6 Measurement Method

$$Measured\ Accuracy = \left[1 - \left(\frac{Total\ DMS\ Unavailability\ Time}{Total\ Time\ in\ Audit\ Period}\right)\right] \times 100$$

1. Total DMS Unavailability Time will be the cumulative downtime of each DMS during audit period.
2. Total Time in Audit Period is the total days, hours, and or minutes within the corresponding audit time frame.
3. The following excluded downtime examples will be captured within ROMS to adjust system availability calculations automatically:

    a) Inaccessibility due to hazardous conditions
    b) Downtime for scheduled maintenance
    c) External forces which cause equipment damage
    d) Inaccessibility due to CTRMA driven operational considerations, even though device has failed.

16.7 Example KPI Calculation

In this example scenario, assume that during the audit period, DMS #1 & #2 were unavailable for a cumulative total of 6 hours and 35 minutes. The Total Time in Audit Period was 720 hours.

- Total DMS Unavailability = 6 hours, 35 minutes (395 min)
- Total Time in Audit Period = 720 hour (43,200 min)

$$Measured\ Accuracy = \left[1 - \left(\frac{395}{43200}\right)\right] \times 100 = 99.09\%$$

$$Liquidated\ Damages = \frac{(0.950 - 0.990)}{0.005} \times \$200 = \$0$$

17 KPI #17 – Express MVD Availability

17.1 Description

Express MVDs shall be available 99.50% of the time per segment, excluding scheduled maintenance.

17.2 KPI Goal

The KPI goal is 99.50%.

17.3 Maximum Liquidated Damages

Maximum liquidated damages are: $100 per each 0.5% below threshold, per segment.

17.4 Testing Frequency

Testing will occur monthly.

17.5 Testing Process

The Express MVD's Availability KPI will be measured using the ROMS Downtime Analysis Report, as configured and agreed upon by Kapsch and CTRMA.

17.6 Measurement Method

$$Measured\ Accuracy\ per\ Segment = \left[1 - \left(\frac{Total\ Express\ MVD\ Unavailability\ Time}{Total\ Time\ in\ Audit\ Period}\right)\right] \times 100$$

1. Total Express MVD Unavailability Time will be the cumulative downtime of each Express MVD, per segment, during audit period.
2. Total time in audit period is the total days, hours, and or minutes within the corresponding audit time frame.
3. The following excluded downtime examples will be captured within ROMS to adjust system availability calculations automatically:

    a) Inaccessibility due to hazardous conditions
    b) Downtime for scheduled maintenance
    c) External forces which cause equipment damage
    d) Inaccessibility due to CTRMA driven operational considerations, even though device has failed.

17.7 Example KPI Calculation

In this example scenario, assume that during the audit period, Express MVD #1 and #2, of segment #4, was unavailable for a cumulative total of 6 hours and 35 minutes. Total Time in Audit Period was 720 hours.

- Total Express MVD Unavailability = 6 hours, 35 minutes (395 min)
- Total Time in Audit Period = 720 hour (43,200 min)

$$Measured\ Accuracy = \left[1 - \left(\frac{395}{43200}\right)\right] \times 100 = 99.09\%$$

$$Liquidated\ Damages = \frac{(0.995 - 0.990)}{0.005} \times \$100 = \$100$$

~~18 KPI #18 Non-Express MVD Availability~~

~~18.1 Description~~

~~Non-Express MVDs shall be available 95.00% of the time per device, excluding scheduled maintenance.~~

~~18.2 KPI Goal~~

~~The KPI goal is 95.00%.~~

~~18.3 Maximum Liquidated Damages~~

~~Maximum liquidated damages are: $100 per each 0.5% below threshold per device.~~

~~18.4 Testing Frequency~~

~~Testing will occur monthly.~~

~~18.5 Testing Process~~

~~The Non-Express MVD's Availability KPI will be measured using the ROMS Downtime Analysis Report, configured and agreed upon by Kapsch and CTRMA.~~

18.6 Measurement Method

$$Measured\ Accuracy\ per\ Device = \left[1 - \left(\frac{Total\ Non\ Expess\ MVD\ Unavailability\ Time}{Total\ Time\ in\ Audit\ Period}\right)\right] \times 100$$

1. Total Non-Express MVD Unavailability Time will be the cumulative downtime of each Non-Express MVD during audit period.
2. Total Time in Audit Period is the total days, hours, and or minutes within the corresponding audit time frame.
3. The following excluded downtime examples will be captured within ROMS to adjust system availability calculations automatically:

    a) Inaccessibility due to hazardous conditions
    b) Downtime for scheduled maintenance
    c) External forces which cause equipment damage
    d) Inaccessibility due to CTRMA driven operational considerations, even though device has failed.

18.7 Example KPI Calculation

In this example scenario, assume that during the audit period, Non-Express MVD #1 was unavailable for a cumulative total of 6 hours and 35 minutes. Total Time in Audit Period was 720 hours.

- Total Non-Express MVD Unavailability = 6 hours, 35 minutes (395 min)
- Total Time in Audit Period = 720 hour (43,200 min)

$$Measured\ Accuracy = \left[1 - \left(\frac{395}{43200}\right)\right] \times 100 = 99.09\%$$

$$Liquidated\ Damages = \frac{(0.950 - 0.990)}{0.005} \times \$100 = \$0$$

19 KPI #19 – Variable Toll Message Sign (VTMS) Availability

19.1 Description

The Variable Toll Message Sign (VTMS) System will be available as outlined below, excluding scheduled maintenance. It will have an availability of 99.95%, with a 15-minute grace period for emergency maintenance.

19.2 KPI Goal

The KPI goal is 99.95%, with the exclusion of a 15-minute grace period.

19.3 Maximum Liquidated Damages

Maximum liquidated damages are actual revenue above $5,000 (calculated using liquidation rate).

19.3.1 Liquidated Damages Calculation Method

For the purpose of calculating liquidated damages of actual revenue, said revenue shall be otherwise deemed uncollectable by CTRMA. Uncollectable revenue will utilize the following calculation example:

$$Liquidated\ Damages = Liquidation\ Rate\ (PBM\ Expected\ Revenue) + (TB\ Expected\ Revenue)$$

****Current Liquidation Rate maintained by CTRMA****

19.4 Testing Frequency

Testing will occur monthly.

19.5 Testing Process

The VTMS's Availability KPI will be measured using the ROMS Downtime Analysis Report, configured and agreed upon by Kapsch and CTRMA.

19.6 Measurement Method

$$Measured\ Accuracy = \left[1 - \left(\frac{Total\ VTMS\ Unavailability\ Time - 15\ Minute\ Grace\ Period\ per\ Occurrence}{Total\ Time\ in\ Audit\ Period}\right)\right] \times 100$$

1. Total VTMS Unavailability Time will be the cumulative downtime of each VTMS during audit period.
2. Total Time in Audit Period is the total days, hours, and or minutes within the corresponding audit time frame.
3. A 15-minute grace period, per occurrence, will be deducted from the total unavailable time.
4. The following excluded downtime examples will be captured within ROMS to adjust system availability calculations automatically:

    a) Inaccessibility due to hazardous conditions
    b) Downtime for scheduled maintenance
    c) External forces which cause equipment damage
    d) Inaccessibility due to operational considerations, even though device has failed.

19.7 Example KPI Calculation

In this example scenario, assume that during the audit period, VTMS #1 was unavailable for a cumulative total of 6 hours and 35 minutes. Of the cumulative unavailable time, two hours was excluded downtime due to the sum of eight separate, 15-minute grace periods. Total time in audit period was 720 hours.

- Total VTMS Unavailability = 6 hours, 35 minutes (395 min)
- Total Grace Period Time = 2 hours (120 min)
- Adjusted Unavailability = 4 hours, 35 minutes (275 min)
- Total Time in Audit Period = 720 hour (43,200 min)

$$Measured\ Accuracy\ = \left[1 - \left(\frac{395 - 120}{43200}\right)\right] \times 100\ =\ 99.36\%$$

19.8 Estimated Revenue Loss Measurement Method

For the purpose of quantifying lost revenue, the calculated liquidation rate as referenced in this document, will utilize the following parameters:

1. Identify the revenue loss timeframe
    a) Determine total allowable unavailable time for audit period
    b) Determine when total allowable unavailability time has been exhausted
    c) Determine adjusted start time and end time of lost revenue event that is subject to liquidated damages
2. Identify the historical transaction volume, rate, and type of the referenced plaza/lane for the liable timeframe for the lost revenue incident.
3. Historical transaction data will be for the identical day of the week and identical time of day, for the prior three weeks.
4. Historical transaction data will be evaluated to determine percentage of TB transactions vs PBM transactions.
5. Identify current Liquidation Rate (maintained by CTRMA).

The estimated revenue loss will use the following calculation methods:

$$Allowable\ Unavailable\ Time\ =\ Total\ Time\ in\ Audit\ Period - \left(0.9995(Total\ Time\ in\ Audit\ Period)\right)$$
$$Adjusted\ Unavailable\ Time\ =\ Unavailable\ Time - Allowable\ Unavailable\ Time$$
$$Revenue\ Loss\ Start\ Time\ =\ Start\ Time\ of\ Unavailability + Allowable\ Unavailable\ Time$$
$$Revenue\ Loss\ End\ Time\ =\ Revenue\ Loss\ Start\ Time + Adjusted\ Unavailable\ Time$$
$$Estimated\ Revenue\ Loss\ =$$
$$\{Liquidation\ Rate\ (Avg\ PBM\ Transactions\ x\ Avg\ PBM\ Toll\ Rate)\} + (Avg\ TB\ Transactions\ x\ Avg\ TB\ Toll\ Rate)$$

19.9 Example Estimated Revenue Loss Calculation

In this example scenario, assume that during the audit period, Lane X was unavailable, as defined in the availability criteria of this KPI, for a cumulative total of 6 hours and 35 minutes (395 minutes). The Total Time in Audit Period was 720 hours (43,200 minutes).

$$Allowable\ Unavailable\ Time\ =\ 43{,}200\ minutes - \left(0.9995(43{,}200)\right)\ =\ 21\ minutes$$
$$Adjusted\ Unavailable\ Time\ =\ 395\ minutes - 21\ minutes\ =\ 374\ minutes$$
$$Revenue\ Loss\ Start\ Time\ =\ 08{:}35AM\ +\ 21\ minutes\ =\ 08{:}56\ AM$$
$$Revenue\ Loss\ End\ Time\ =\ 08{:}56\ AM\ +\ 374\ minutes\ =\ 03{:}10PM$$
$$Estimated\ Revenue\ Loss\ =\ \{0.50\ (412\ x\ \$1.85)\}\ +\ (515\ x\ \$1.25)\ =\ \$1{,}024.85$$

20 KPI #20 – VTMS Accuracy

20.1 Description

The system will post and maintain the correct toll rate to the VTMS 99.90% of the time, per VTMS, under all conditions within the design specification described in the requirements.

20.2 KPI Goal

The KPI goal is 99.90%.

20.3 Maximum Liquidated Damages

Maximum liquidated damages are $200 per each 0.5% below threshold.

20.4 Testing Frequency

Testing will occur monthly.

20.5 Testing Process

Testing is performed through an Ad-Hoc Query, in addition to the ROMS Downtime Analysis Report, as configured and agreed upon by Kapsch and CTRMA.

Accuracy of the VTMS will be evaluated for the following criteria:

- Rate sent from the trip engine matches the rate displayed on VTMS
- Default rates shown on VTMS

20.6 Measurement Method

$$Measured\ Accuracy\ per\ VTMS = \left[1 - \left(\frac{Total\ Time\ of\ Incorrectly\ Displayed\ Toll\ Rate\ per\ VTMS}{Total\ Time\ in\ Audit\ Period}\right)\right] \times 100$$

1. Total Time of Incorrectly Displayed Toll Rate per VTMS will be the cumulative time that each VTMS presented an incorrect toll rate during the audit period.
2. Total Time in Audit Period is the total days, hours, and or minutes within the corresponding audit time frame.
3. The following excluded downtime examples will be captured within ROMS to adjust system availability calculations automatically:

    a) Inaccessibility due to hazardous conditions
    b) Downtime for scheduled maintenance
    c) External forces which cause equipment damage
    d) Inaccessibility due to operational considerations, even though device has failed.

20.7 Example KPI Calculation

In this example scenario, assume that during the audit period, VTMS #1 posted an inaccurate toll rate for a cumulative total of 6 hours and 35 minutes. The Total Time in Audit Period was 720 hours.

- Total Time of Incorrectly Displayed Toll Rates per VTMS = 6 hours, 35 minutes (395 min)
- Total Time in Audit Period = 720 hour (43,200 min)

$$Measured\ Accuracy\ = \left[1 - \left(\frac{395}{43200}\right)\right] \times 100\ =\ 99.08\%$$

$$Liquidated\ Damages\ = \frac{(0.999 - 0.990)}{0.005} \times \$200 = \$400$$

21 KPI #21 – Time to Respond – Priority 1

21.1 Description

All Priority 1 tickets must be acknowledged within one (1) hour of ticket creation. A Priority 1 Maintenance Event is defined as any malfunction or fault that will result in the immediate loss of revenue and/or hazard to personnel.

21.2 KPI Goal

N/A

21.3 Maximum Liquidated Damages

Maximum liquidated damages are $100 per each event > 1 hour.

21.4 Testing Frequency

Testing will occur monthly.

21.5 Applicability

Time to Respond – Priority 1 KPI is applicable as follows:

- Emergency events that are directly impacting safety, or issues in which revenue and/or data loss has occurred, is imminent, or is reasonably expected to occur if repair, restoration, or remediation is not completed.

21.6 Testing Process

Measured per event, based on the ROMS Service Level Agreement (SLA) Detail Report

21.6.1 Exclusion for safety

If there are reasonable instances in which a technician cannot respond—if that response would put themselves, the travelling public, or any other being in harm or impending danger—the technician will be expected to wait until they can safely assess, access, and respond to the incident. This will be recorded in the daily log, and this time will be excluded from the calculation of this KPI.

21.7 Measurement Method

$$P1\ Response\ Time\ =\ (Time_{Acknowledged}) - (Time_{Created})$$

21.8 Example KPI Calculation

In this example scenario, assume that during the audit period, there were 10 P1 tickets that had a response time > 1 hour.

$$Total\ Sum\ of\ P1\ Tickets\ with\ Response\ Time\ >\ 1\ hour\ =\ 10$$

$$Liquidated\ Damages\ =\ 10\ x\ \$100\ =\ \$1{,}000$$

22 KPI #22 – Time to Repair – Priority 1

22.1 Description

All Priority 1 tickets must be repaired within four (4) hours of ticket acknowledgement.

22.2 KPI Goal

N/A

22.3 Maximum Liquidated Damages

Maximum liquidated damages are $200 per each event > 4 hours.

22.4 Testing Frequency

Testing will occur monthly.

22.5 Applicability

Time to Repair – Priority 1 KPI is applicable as follows:

- Emergency events that are directly impacting safety, or issues in which revenue and/or data loss has occurred, is imminent, or is reasonably expected to occur if repair, restoration, or remediation is not completed.

22.6 Testing Process

This KPI is measured per event, based on the ROMS Service Level Agreement (SLA) Detail Report.

22.6.1 Exclusion for safety

If there are reasonable instances in which a technician cannot respond—if that response would put themselves, the travelling public, or any other being in harm or impending danger—the technician will be expected to wait until they can safely assess, access, and respond to the incident. This will be recorded in the daily log, and this time will be excluded from the calculation of this KPI.

22.7 Measurement Method

$$P1\ Repair\ Time\ =\ \left(Time_{Repaired}\right) -\ \left(Time_{Acknowledged}\right)$$

22.8 Example KPI Calculation

In this example scenario, assume that during the audit period, there were 10 P1 tickets that had a repair time > 4 hours.

$$Total\ Sum\ of\ P1\ Tickets\ with\ Repair\ Time\ >\ 4\ hours\ =\ 10$$

$$Liquidated\ Damages\ =\ 10\ x\ \$200\ =\ \$2{,}000$$

23 KPI #23 – Time to Respond – Priority 2

23.1 Description

All Priority 2 tickets must be acknowledged within one (1) hour of ticket creation. A Priority 2 Maintenance Event is defined as any malfunction or fault that will not result in immediate loss of revenue but will/may impact operational performance.

23.2 KPI Goal

N/A

23.3 Maximum Liquidated Damages

Maximum liquidated damages are $75 per each event > 1 hour.

23.4 Testing Frequency

Testing will occur monthly.

23.5 Applicability

Time to Respond – Priority 2 KPI is applicable as follows:

- Non-critical issues in which revenue and/or data loss is not reasonably expected to occur if repair, restoration, or remediation is not completed.

23.6 Testing Process

This KPI is measured per each event, based on the ROMS SLA Detail Report.

23.6.1 Exclusion for safety

If there are reasonable instances in which a technician cannot respond—if that response would put themselves, the travelling public, or any other being in harm or impending danger—the technician will be expected to wait until they can safely assess, access, and respond to the incident. This will be recorded in the daily log, and this time will be excluded from the calculation of this KPI.

23.7 Measurement Method

$$P2\ Response\ Time\ =\ (Time_{Acknowledged}) - (Time_{Created})$$

23.8 Example KPI Calculation

In this example scenario, assume that during the audit period, there were 10 P2 tickets that had a response time > 1 hour.

$$Total\ Sum\ of\ P2\ Tickets\ with\ Response\ Time\ >\ 1\ hour\ =\ 10$$

$$Liquidated\ Damages\ =\ 10\ x\ \$75\ =\ \$750$$

24 KPI #24 – Time to Repair – Priority 2

24.1 Description

All Priority 2 tickets must be repaired within 12 hours of ticket acknowledgement.

24.2 KPI Goal

N/A

24.3 Maximum Liquidated Damages

Maximum liquidated damages are $150 per each event > 12 hours.

24.4 Testing Frequency

Testing will occur monthly.

24.5 Applicability

Time to Repair – Priority 2 KPI is applicable as follows;

- Non-critical issues in which revenue and/or data loss is not reasonably expected to occur if repair, restoration, or remediation is not completed.

24.6 Testing Process

This KPI is measured per each event, based on the ROMS SLA Detail Report.

24.6.1 Exclusion for safety

If there are reasonable instances in which a technician cannot respond--if that response would put themselves, the travelling public, or any other being in harm or impending danger--the technician will be expected to wait until they can safely assess, access, and respond to the incident. This will be recorded in the daily log, and this time will be excluded from the calculation of this KPI.

24.7 Measurement Method

$$P2\ Repair\ Time\ =\ \left(Time_{Repaired}\right) - \left(Time_{Acknowledged}\right)$$

24.8 Example KPI Calculation

In this example scenario, assume that during the audit period, there were 10 P2 tickets that had a repair time > 12 hours.

$$Total\ Sum\ of\ P2\ Tickets\ with\ Repair\ Time\ >\ 12\ hours\ =\ 10$$

$$Liquidated\ Damages\ =\ 10\ x\ \$150\ =\ \$1{,}500$$

25 KPI #25 – Time to Respond – Priority 3

25.1 Description

All Priority 3 tickets must be acknowledged within one (1) hour of ticket creation. A Priority 3 Maintenance Event is defined as any action or event reported that will/may impact operational performance, has the potential to degrade the system performance, and has no impact to revenue collection.

25.2 KPI Goal

N/A

25.3 Maximum Liquidated Damages

Maximum liquidated damages are $25 per each event > 1 hour.

25.4 Testing Frequency

Testing will occur monthly.

25.5 Applicability

Time to Respond – Priority 3 KPI is applicable as follows;

Any action or event reported that will/may impact operational performance, has potential of degrading the System performance, and has no impact to revenue collection.

25.6 Testing Process

This KPI is measured per each event, based on the ROMS SLA Detail Report.

25.6.1 Exclusion for safety

If there are reasonable instances in which a technician cannot respond—if that response would put themselves, the travelling public, or any other being in harm or impending danger—the technician will be expected to wait until they can safely assess, access, and respond to the incident. This will be recorded in the daily log, and this time will be excluded from the calculation of this KPI.

25.7 Measurement Method

$$P3\ Response\ Time\ =\ (Time_{Acknowledged}) - (Time_{Created})$$

25.8 Example KPI Calculation

In this example scenario, assume that during the audit period, there were 10 P3 tickets that had a response time > 1 hour.

$$Total\ Sum\ of\ P3\ Tickets\ with\ Response\ Time\ >\ 1\ hour\ =\ 10$$

$$Liquidated\ Damages\ =\ 10\ x\ \$25\ =\ \$250$$

26 KPI #26 – Time to Repair – Priority 3

26.1 Description

All Priority 3 tickets must be repaired within 36 hours of ticket acknowledgement.

26.2 KPI Goal

N/A

26.3 Maximum Liquidated Damages

Maximum liquidated damages are $50 per each event > 36 hours.

26.4 Testing Frequency

Testing will occur monthly.

26.5 Applicability

Time to Repair – Priority 3 KPI is applicable as follows;

- Any action or event reported that will/may impact operational performance, has potential of degrading the System performance, and has no impact to revenue collection.

26.6 Testing Process

This KPI is measured per each event, based on the ROMS SLA Detail Report.

26.6.1 Exclusion for safety

If there are reasonable instances in which a technician cannot respond—if that response would put themselves, the travelling public, or any other being in harm or impending danger—the technician will be expected to wait until they can safely assess, access, and respond to the incident. This will be recorded in the daily log and this time will be excluded from the calculation of this KPI.

26.7 Measurement Method

$$P3\ Repair\ Time\ =\ \left(Time_{Repaired}\right) -\ \left(Time_{Acknowledged}\right)$$

26.8 Example KPI Calculation

In this example scenario, assume that during the audit period, there were 10 P3 tickets that had a repair time > 36 hours.

$$Total\ Sum\ of\ P3\ Tickets\ with\ Repair\ Time\ >\ 36\ hours\ =\ 10$$

$$Liquidated\ Damages\ =\ 10\ x\ \$50\ =\ \$500$$

27 KPI #27 – Inventory

27.1 Description

All CTRMA hardware, including that which is currently installed, maintained as spares, and RMA (if applicable), shall be included in an Annual Physical Inventory Audit Program, as agreed upon by Kapsch and CTRMA.

27.2 KPI Goal

All elements described in Section 27.1 shall be inventoried annually and submitted with the yearly February Monthly Maintenance Report (MMR).

27.3 Maximum Liquidated Damages (per calendar month)

Kapsch cannot invoice for the monthly maintenance fee without submitting this audit.

27.4 Testing Frequency

Testing will occur annually.

27.5 Testing Process

n/a

-END OF DOCUMENT-

Appendix A Appendix A MVD Calibration Verification Sheet

The MVD Calibration Verification Sheet is displayed on the following pages.

MVD Calibration Verification Sheet

Detector ID	05100 - NB	**Associated Cabinet**	DP1
Mounting Height		**Setback**	

TEST SETUP

References	*1. Wavetronix MVD Calibration Guide*
Requirements	**(modified) - ITS-327 (4.18.8.1**) Total traffic and per lane volume must be within 10% of visually confirmed counts. *Note: 5% stated erroneously in spec. HDSmart datasheet states 90% accuracy (10% of visually confirmed counts), not 95%.* **ITS-329 (4.18.8.3)** Occupancy must be within 10% of field verified calculations. **ITS-331 (4.18.8.4)** These requirements apply to all MVD locations. Testing must require the use of live traffic. **ITS-332 (4.18.8.5)** The MVD shall provide full coverage of the managed lanes, general purpose lanes, frontage roads, and all ramps.
Pre-Requisites	*1. Initial MVD alignment procedure completed (per wavetronix mvd calibration guide).* *2. MVD configured for coverage of all required lanes and bin classes (per mvd configuration datasheet).* *3. Live traffic on the roadway.*
Test Setup Instructions	*1. One or more persons as needed to cover all lanes during volume and bin testing.* *2. One person with accurate watch synchronized (+/- 1 sec) to MVD time.* *3. Laptop connected to MVD via HDSmart configuration utility to review MVD data log. Also must be in close proximity to other test personnel during the test.*

MVD Calibration Verification Sheet

MVD Configuration

With laptop logged in to MVD via HDSmart utility, check all configuration settings are correct, per the mvd configuration sheet and mvd lane configuration list.	*Configuration Verified* ☐

VEHICLE COUNT VERIFICATION

1. Using the thumb clicker, count cars in assigned lane for a minimum 5 minute period (note: 5 cars minimum must be counted). Record total counts to the right.

Note: Two people will be simultaneously counting up to 2 lanes each.

Note: In addition to counting for a mimimum of 5 minutes, a minimum of 5 vehicles must be counted for each lane to get an acceptable sample size.

2. Record values reported by the MVD the right.

3. Calculate and record Difference and %Accuracy values.

LANE 1 (closest lane) COUNTS

Start Time	*Clicker*	*MVD*	*End Time*	*Difference*	*% Accuracy*
2:04pm	30	29	2:08pm	1	96.7%

LANE 2 COUNTS

Start Time	*Clicker*	*MVD*	*End Time*	*Difference*	*% Accuracy*
2:08pm	30	26	2:12pm	4	86.7%

LANE 3 COUNTS

Start Time	*Clicker*	*MVD*	*End Time*	*Difference*	*% Accuracy*
2:12pm	30	26	2:16pm	4	86.7%

LANE 4 COUNTS

Start Time	*Clicker*	*MVD*	*End Time*	*Difference*	*% Accuracy*
				0	#DIV/0!

LANE 5 (furthest lane) COUNTS

Start Time	*Clicker*	*MVD*	*End Time*	*Difference*	*% Accuracy*
				0	#DIV/0!

Total Volume Counts
1. Add up and record clicker values from lane#s 1-4 above.
2. Record values reported by the MVD to the right.
3. Calculate and record Difference and %Accuracy values.

Total Counts (add clicker counts above, compare with total volume logged by MVD)

Start Time	*Clicker*	*MVD*	*End Time*	*Difference*	*% Accuracy*
2:04pm	90	81	2:16pm	9	90.0%

MVD Calibration Verification Sheet

Test Lead Signature	Kevin Pruitt	**Date Completed**	22-Nov-21

END OF DATA SHEET

SCHEDULE 1.5

MAINTENANCE SERVICES CONTRACT FOR TOLL COLLECTION SYSTEM

PRICE SCHEDULE

This section provides descriptions of the Method of Measurement and the Basis of Payment to complete the work for maintenance services on the toll collection systems on the CTRMA's Toll Road System.

1. Hourly Rates

The Hourly Rates proposed for Amendment No. 6 proposed are FY 2022 Fully Loaded Rates.

Item Description / Position Title	FY 2019	FY 2020	FY 2021	FY 2022
	2.00%	*N/A*	*3.00%*	***9.10%***
Software Engineer	$ 157.59	$ 157.59	$162.32	**$182.40**
System / Hardware Engineer	$ 172.52	$ 172.52	$177.70	**$199.69**
Technician	$ 120.90	$ 120.90	$124.53	**$139.94**
Database Administrator	$ 224.14	$ 224.14	$230.86	**$259.42**
Documentation Clerk	$ 161.66	$ 161.66	$166.51	**$187.11**
Testing Engineer	$ 171.17	$ 171.17	$176.31	**$198.12**
Project Manager	$ 224.14	$ 224.14	$230.86	**$259.42**
Network Administrator	$ 156.22	$ 156.22	$160.91	**$180.82**
Business Analyst	$ 157.59	$ 157.59	$162.32	**$182.40**

2. Amendment No. 6 Maintenance Contract Pricing

A. Monthly Maintenance Services for 183A Toll Phases I& II, 290 Toll Phase I - III, 71 Toll, MoPac Express Lane, 45 SW Toll, 183 South Toll Phases I - II

The monthly fee for maintaining 183A Toll, 290 Toll, 71 Toll, MoPac Express Lane, 45 SW Toll and 183 South Toll projects, including Plaza System; Host System; Communications Equipment: all ETC Toll Lanes and related intelligent transportation systems (ITS); and System Administration ~~and the complete Intelligent Transportation Systems (ITS)~~ as furnished and installed shall be measured on a per month basis. Each per month unit shall include furnishing all labor, materials, and support services to perform Maintenance Services for that month in conformance with the requirements of the Specifications, the specified requirements of the ITS equipment for applicable roadways, and as accepted by the CTRMA.

Amendment No. 5 Maintenance Contract Pricing	Monthly	Annual
183-A, 290-E, TX-71, Mopac Express Lanes, 45SW and 183S	$474,623.17	$5,695,478.04

Amendment No. 6 Maintenance Contract Pricing	Monthly	Annual
183-A, 290-E, SH-71, Mopac Express Lanes, 45SW, 183S ~~and additional ITS~~	$486,726.51	$5,840,718.12

Monthly Support for Maintenance of 183-A, 290-E, TX-71, Mopac Express Lanes, 45SW, 183S and additional ITS	
Software Engineers	4 FTEs
Systems Administration	2 FTEs
Business Analyst	1 FTE
Maintenance Technicians	7 FTEs
TOTAL	14 FTEs

B. TMC Operations Support

Amendment No. 6 adjusts pricing for the TIM Center Operations to facilitate adding or removing staff as CTRMA expands. CTRMA anticipates the use of four (4) operators in fiscal year 2022. The monthly pricing per FTE is $9,782.48.

TMC Operations Support				
Description	**Unit** *(hrs.)*	**2022 CPI Adjusted Rate**	**TMC Operation**	
			Qty	*Per Month*
Operations Support	173	$56.55	4	$39,129.90

3. Out of Scope Services

The hourly rates for out of scope services pursuant to Section 11 of the Toll Collection System Maintenance Services Contract are reflected in the FY 22 fully loaded rates, outlined in Section 1.

4. Other Direct Costs

Other Direct Costs (ODCs) are the reasonable actual direct incremental costs incurred by the Contractor for the performance of the applicable Work that are directly attributable to such Work. ODCS may include leasing, fuel, repairs, tolls, etc. associated with maintenance vehicle costs. ODCs also cover consumables maintenance technicians may use in performing their duties.

Role	FY 2019	FY 2020	FY 2021	FY 2022
	2.00%	*N/A*	*3.00%*	***9.10%***
Technicians ODCs	$2,169.31	$2,169.31	$2,234.39	**$2,437.72**

~~5. ITS Maintenance~~

~~A. Cost Breakdown~~

~~Amendment No. 6 adjusts pricing for all furnished and installed ITS equipment to facilitate adding or subtracting of said equipment over the course of this Maintenance Services Contract. Costs per device are on a per month basis and included in Amendment No. 6 Maintenance Contract Pricing as outlined in Section 2.~~

~~ITS Cost per Device~~	~~FY 2019~~	~~FY 2020~~	~~FY 2021~~	~~FY 2022~~
	~~N/A~~	~~N/A~~	~~N/A~~	~~9.10%~~
~~CCTV~~	~~$112.00~~	~~$112.00~~	~~$112.00~~	~~$122.19~~
~~DMS~~	~~$133.00~~	~~$133.00~~	~~$133.00~~	~~$145.10~~
~~VTMS~~	~~$140.00~~	~~$140.00~~	~~$140.00~~	~~$152.74~~
~~MVDs~~	~~$108.00~~	~~$108.00~~	~~$108.00~~	~~$117.83~~

~~B. ITS Bill of Quantities~~

~~ITS Project~~	~~CCTV~~	~~VTMS~~	~~DMS~~	~~MVDs~~
~~290-E~~	~~13~~	~~0~~	~~2~~	~~34~~
~~MoPac~~	~~30~~	~~5~~	~~0~~	~~58~~
~~SH71~~	~~1~~	~~0~~	~~0~~	~~0~~
~~45SW~~	~~10~~	~~0~~	~~2~~	~~11~~
~~183S~~	~~14~~	~~0~~	~~5~~	~~29~~
~~183A~~	~~42~~	~~0~~	~~2~~	~~11~~
~~**Total**~~	~~**110**~~	~~**5**~~	~~**11**~~	~~**143**~~

6. Toll System Maintenance

Amendment No. 6 adjusts the pricing of monthly fees for maintaining 183A Toll, 290 Toll, 71 Toll, MoPac Express Lane, 45 SW Toll and 183 South Toll projects. The pricing, displayed below as a per lane fee, includes all required systems to support transaction capture, transaction creation and transaction transmission. These systems include the Plaza System, Host System, Communications Equipment, ETC Toll Lanes and System Administration. The maintenance fee cost breakdown is to facilitate the adding or subtracting of ETC Toll Lanes over the course of this Maintenance Services Contract.

					Toll Project Maintenance	
Toll Project	**Lanes**	**Fee per Lane**	**Toll System Maintenance**	**ITS Maintenance**	**Monthly**	**Annually**
290-E	43	$2,097.54	$90,194.22	$5,884.89	$96,079.11	$1,152,949.32
MoPac	7	$8,166.85	$57,167.95	$11,263.54	$68,431.49	$821,177.88
SH71	6	$1,633.37	$9,800.22	$122.19	$9,922.41	$119,068.92
45SW	6	$2,450.06	$14,700.36	$2,808.23	$17,508.59	$210,103.08
183S	37	$4,083.41	$151,086.17	$5,853.23	$156,939.40	$1,883,272.80
183A	40	$3,278.18	$131,127.20	$6,718.31	$137,845.51	$1,654,146.12
Total	**139**		**$454,076.36**	**$32,650.39**	**$486,726.51**	**$5,840,718.12**

CENTRAL TEXAS REGIONAL
MOBILITY AUTHORITY

February 28, 2024
AGENDA ITEM #6

Accept the financial statements for January 2024

Strategic Plan Relevance:	Stewardship
Department:	Finance
Contact:	José Hernández, Chief Financial Officer
Associated Costs:	N/A
Funding Source:	N/A
Action Requested:	Consider and act on draft resolution

Project Description/Background: Presentation and acceptance of the financial statements for January 2024.

Previous Actions & Brief History of the Program/Project: N/A

Financing: N/A

Action requested/Staff Recommendation: Accept the financial statements for January 2024.

Backup provided: Draft Resolution
Draft financial statements for January 2024

MEETING OF THE BOARD OF DIRECTORS
OF THE
CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY

RESOLUTION NO. 24-0XX

ACCEPT THE FINANCIAL STATEMENTS FOR JANUARY 2024

WHEREAS, the Central Texas Regional Mobility Authority (Mobility Authority) is empowered to procure such goods and services as it deems necessary to assist with its operations and to study and develop potential transportation projects, and is responsible to insure accurate financial records are maintained using sound and acceptable financial practices; and

WHEREAS, close scrutiny of the Mobility Authority's expenditures for goods and services, including those related to project development, as well as close scrutiny of the Mobility Authority's financial condition and records is the responsibility of the Board and its designees through procedures the Board may implement from time to time; and

WHEREAS, the Board has adopted policies and procedures intended to provide strong fiscal oversight and which authorize the Executive Director, working with the Mobility Authority's Chief Financial Officer, to review invoices, approve disbursements, and prepare and maintain accurate financial records and reports; and

WHEREAS, the Executive Director, working with the Chief Financial Officer, has reviewed and authorized the disbursements necessary for the month of January 2024 and has caused financial statements to be prepared and attached to this resolution as Exhibit A.

NOW THEREFORE, BE IT RESOLVED, that the Board of Directors accepts the financial statements for January 2024, attached hereto as Exhibit A.

Adopted by the Board of Directors of the Central Texas Regional Mobility Authority on the 28th day of February 2024.

Submitted and reviewed by:

_____
James M. Bass
Executive Director

Approved:

_____
Robert W. Jenkins, Jr.
Chairman, Board of Directors

Exhibit A

Central Texas Regional Mobility Authority
Income Statement
For the Period Ending January 31, 2024

	Budget Amount FY 2024	Actual Year to Date	Percent of Budget	Actual Prior Year to Date
REVENUE				
Operating Revenue				
Toll Revenue	153,792,700	90,915,619	59.12%	81,813,824
Video Tolls	64,352,000	33,898,583	52.68%	37,872,216
Fee Revenue	12,962,900	7,396,112	57.06%	7,385,860
Total Operating Revenue	**231,107,600**	**132,210,314**	**57.21%**	**127,071,901**
Other Revenue				
Interest Income	24,905,700	28,267,905.40	113.50%	15,831,522
Grant Revenue	945,500	179,309.93	18.96%	267,971
Misc Revenue	230,000	9,346.62	4.06%	16,467
Total Other Revenue	**26,081,200**	**28,456,562**	**109.11%**	**16,115,960**
TOTAL REVENUE	**257,188,800**	**160,666,876**	**62.47%**	**143,187,860**
EXPENSES				
Salaries and Benefits				
Salary Expense - Regular	4,871,464	2,383,807	48.93%	2,105,892
Salary Reserve	80,000	-	-	-
TCDRS	1,591,401	1,139,615	71.61%	612,673
FICA	249,197	102,496	41.13%	88,369
FICA MED	70,635	34,529	48.88%	30,719
Health Insurance Expense	584,446	267,780	45.82%	235,916
Life Insurance Expense	3,817	1,928	50.50%	2,477
Auto Allowance Expense	10,200	5,695	55.83%	5,313
Other Benefits	166,290	75,106	45.17%	46,458
Unemployment Taxes	5,760	-	-	(1,583)
Total Salaries and Benefits	**7,633,210**	**4,010,955**	**52.55%**	**3,126,232**
Administrative				
Administrative and Office Expenses				
Accounting	9,500	5,046	53.11%	4,508
Auditing	245,000	133,467	54.48%	138,655
Financial Advisors	162,000	97,200	60.00%	115,200
Human Resources	37,500	1,199	3.20%	49,753
Legal	70,000	8,437	12.05%	22,184
IT Services	365,000	107,470	29.44%	271,014
Internet	150	-	-	-
Software Licenses	1,167,000	980,142	83.99%	411,775
Cell Phones	27,800	16,476	59.27%	9,530
Local Telephone Service	2,000	1,273	63.64%	55,845
Overnight Delivery Services	250	-	-	40
Copy Machine	10,000	8,904	89.04%	8,904
Repair & Maintenance-General	10,000	10,339	103.39%	-

Central Texas Regional Mobility Authority
Income Statement
For the Period Ending January 31, 2024

	Budget Amount FY 2024	Actual Year to Date	Percent of Budget	Actual Prior Year to Date
Meeting Facilities	2,000	-	-	-
Community Meeting / Events	-	5,050	-	-
Meeting Expense	13,750	5,017	36.49%	6,524
Toll Tag Expense	3,000	300	10.00%	300
Parking / Local Ride Share	3,550	88	2.48%	444
Mileage Reimbursement	4,350	539	12.40%	678
Insurance Expense	651,000	376,865	57.89%	324,650
Rent Expense	562,540	301,884	53.66%	381,803
Building Parking	3,500	432	12.35%	1,020
Total Legal Services	488,000	252,988	51.84%	150,576
Total Administrative and Office Expenses	**3,837,890**	**2,313,115**	**60.27%**	**1,953,402**
Office Supplies				
Books & Publications	5,090	2,237	43.95%	1,367
Office Supplies	8,250	431	5.22%	1,526
Misc Office Equipment	4,500	989	21.98%	8,470
Computer Supplies	202,100	57,193	28.30%	194,006
Copy Supplies	1,000	-	-	-
Other Reports - Printing	1,500	43	2.88%	-
Office Supplies - Printed	2,000	1,922	96.11%	1,041
Postage Expense	550	597	108.56%	244
Total Office Supplies	**224,990**	**63,412**	**28.18%**	**206,655**
Communications and Public Relations				
Graphic Design Services	75,000	-	-	-
Website Maintenance	464,000	269,656	58.12%	32,577
Research Services	150,000	-	-	-
Communications and Marketing	400,000	28,990	7.25%	-
Advertising Expense	500,000	182,260	36.45%	115,477
Direct Mail	40,000	-	-	-
Video Production	160,000	-	-	29,097
Photography	25,000	885	3.54%	11,895
Radio	50,000	-	-	-
Other Public Relations	22,500	5,000	22.22%	1,200
Promotional Items	20,000	2,867	14.33%	12,682
Annual Report printing	1,300	-	-	-
Direct Mail Printing	17,500	-	-	-
Other Communication Expenses	15,000	-	-	19,018
Total Communications and Public Relations	**1,940,300**	**489,658**	**25.24%**	**221,946**

Central Texas Regional Mobility Authority
Income Statement
For the Period Ending January 31, 2024

	Budget Amount FY 2024	Actual Year to Date	Percent of Budget	Actual Prior Year to Date
Employee Development				
Subscriptions	750	139	18.53%	1,278
Agency Memberships	88,440	48,327	54.64%	60,479
Continuing Education	14,800	500	3.38%	650
Professional Development	20,150	2,289	11.36%	4,275
Other Licenses	2,500	197	7.88%	577
Seminars and Conferences	104,100	5,570	5.35%	42,623
Travel	110,500	27,317	24.72%	4,698
Total Employee Development	**341,240**	**84,338**	**24.72%**	**114,580**
Financing and Banking Fees				
Trustee Fees	62,000	39,500	63.71%	43,000
Bank Fee Expense	3,240	3,786	116.84%	706
Continuing Disclosure	7,000	9,903	141.46%	9,018
Arbitrage Rebate Calculation	16,300	16,105	98.80%	16,300
Rating Agency Expense	45,000	45,000	100.00%	43,000
Total Financing and Banking Fees	**133,540**	**114,293**	**85.59%**	**112,024**
Total Administrative	**6,477,960**	**3,064,817**	**47.31%**	**2,608,606**
Operations and Maintenance				
Operations and Maintenance Consulting				
GEC-Trust Indenture Support	1,131,395	413,167	36.52%	419,419
GEC-Financial Planning Support	275,000	156,112	56.77%	153,097
GEC-Toll Ops Support	1,584,000	451,435	28.50%	432,160
GEC-Roadway Ops Support	1,605,500	435,430	27.12%	543,315
GEC-Technology Support	679,526	496,701	73.10%	253,465
GEC-Public Information Support	200,000	106,637	53.32%	87,071
GEC-General Support	1,631,820	619,971	37.99%	408,820
General System Consultant	1,381,000	542,773	39.30%	493,086
Traffic Modeling	125,000	-	-	-
Traffic and Revenue Consultant	1,010,000	264,793	26.22%	595,200
Total Operations and Maintenance Consulting	**9,623,241**	**3,487,018**	**36.24%**	**3,385,634**
Roadway Operations and Maintenance				
Roadway Maintenance	3,431,819	1,848,357	53.86%	1,652,492
Landscape Maintenance	2,789,256	1,616,353	57.95%	2,154,895
Signal & Illumination Maint	25,000	-	-	-
Maintenance Supplies-Roadway	400,000	48,337	12.08%	-
Tools & Equipment Expense	-	20	-	444
Gasoline	30,000	10,463	34.88%	10,747
Repair & Maintenance - Vehicles	10,000	3,262	32.62%	(5,926)

Central Texas Regional Mobility Authority
Income Statement
For the Period Ending January 31, 2024

	Budget Amount FY 2024	Actual Year to Date	Percent of Budget	Actual Prior Year to Date
Natural Gas	2,500	10,204	408.17%	3,333
Electricity - Roadways	250,000	158,219	63.29%	160,866
Total Roadway Operations and Maintenance	**6,938,575**	**3,695,216**	**53.26%**	**3,976,852**
Toll Processing and Collection Expense				
Image Processing	3,000,000	1,571,570	52.39%	1,930,594
Tag Collection Fees	11,500,000	6,301,038	54.79%	5,757,258
Court Enforcement Costs	10,000	-	-	-
ETC Incentive	500,000	-	-	-
Total Processing and Collection Expense	**15,010,000**	**7,872,608**	**52.45%**	**7,687,852**
Toll Operations Expense				
Generator Fuel	3,000	1,072	35.74%	853
Fire & Burglar Alarm	500	288	57.57%	288
Refuse	2,360	1,166	49.40%	1,122
Telecommunications	60,000	83,942	139.90%	2,240
Water - Irrigation	7,500	5,522	73.63%	4,520
Electricity	750	452	60.30%	461
ETC Spare Parts Expense	100,000	118,576	118.58%	-
Repair & Maintenance Toll Equip	50,000	65,066	130.13%	78,097
Law Enforcement	600,000	273,786	45.63%	251,655
ETC Maintenance Contract	6,450,000	3,295,833	51.10%	4,102,246
Transaction Processing Maintenance Contract	2,000,000	1,022,480	51.12%	-
ETC Toll Management Center System Operation	2,885,054	481,038	16.67%	357,620
ETC Development	650,000	79,241	12.19%	34,175
ETC Testing	225,000	-	-	-
Total Toll Operations Expense	**13,034,164**	**5,428,463**	**41.65%**	**4,833,277**
Total Operations and Maintenance	**44,605,980**	**20,483,305**	**45.92%**	**19,883,615**
Other Expenses				
Special Projects and Contingencies				
HERO	200,000	93,439	46.72%	86,234
Special Projects	100,000	-	-	-
71 Express Net Revenue Payment	5,000,000	1,107,067	22.14%	3,334,734
Customer Relations	10,000	-	-	-
Technology Initiatives	185,000	-	-	43,834
Other Contractual Svcs	390,000	104,500	26.79%	211,140
Contingency	200,000	-	-	-
Total Special Projects and Contingencies	**6,085,000**	**1,305,006**	**21.45%**	**3,675,942**
TOTAL OPERATING EXPENSE	**64,802,150**	**28,864,083**	**44.54%**	**29,294,394**

Central Texas Regional Mobility Authority
Income Statement
For the Period Ending January 31, 2024

	Budget Amount FY 2024	Actual Year to Date	Percent of Budget	Actual Prior Year to Date
Non Cash Expenses				
Amortization Expense				
Amortization Expense - Software	1,300,000	8,466	0.65%	745,346
Amortization Expense - Right to Use Asset - Leases	350,000	128,688	36.77%	-
Amortization Expense - Refundings	2,000,000	3,621,195	181.06%	3,147,906
Subtotal Amortization Expense	**3,650,000**	**3,758,349**	**102.97%**	**3,893,252**
Depreciation Expense				
Dep Expense - Furniture & Fixtures	-	-	-	1,525
Dep Expense - Equipment	477,000	363,245	76.15%	-
Dep Expense - Autos & Trucks	46,000	17,739	38.56%	31,121
Dep Expense - Buildng & Toll Fac	188,000	103,103	54.84%	103,103
Dep Expense - Highways & Bridges	48,610,000	30,145,409	62.01%	29,529,234
Dep Expense - Toll Equipment	4,000,000	1,771,822	44.30%	2,139,513
Dep Expense - Signs	2,000,000	705,223	35.26%	593,000
Dep Expense - Land Improvements	885,000	343,937	38.86%	516,212
Depreciation Expense - Computers	-	-	-	63,512
Undevelopable Projects	-	(1,570)	-	-
Subtotal Depreciation Expense	**56,206,000**	**33,448,907**	**59.51%**	**32,977,218**
Total Non Cash Expenses	**59,856,000**	**37,207,256**	**62.16%**	**36,870,470**
Non Operating Expenses				
Bond Issuance Expense	1,250,000	-	-	308,173
Loan Fee Expense	40,000	-	-	32,000
Interest Expense - Debt Obligations	95,964,098	46,573,892	48.53%	44,953,187
CAMPO RIF Payment	6,000,000	6,000,000	100.00%	5,000,000
Community Initiatives	645,000	5,000	0.78%	22,500
Total Non Operating Expenses	**103,899,098**	**52,578,892**	**50.61%**	**50,315,859**
TOTAL EXPENSES	**228,557,248**	**118,650,230**	**51.91%**	**116,480,724**
Net Income	**28,631,552**	**42,016,645**		**26,707,136**

Central Texas Regional Mobility Authority
Balance Sheet
as of January 31, 2024

	as of 01/31/2024	as of 01/31/2023
ASSETS		
Current Assets		
Cash		
Regions Operating Account	$ 14,351	$ 1,564,203
Cash in TexStar	889,514	43,462
Regions Payroll Account	109,426	102,511
Restricted Cash		
Goldman Sachs FSGF 465	374,481,474	1,068,614,662
Restricted Cash - TexSTAR	59,343,177	13,560,169
Overpayments account	-	291,024
Total Cash and Cash Equivalents	**434,837,942**	**1,084,176,031**
Accounts Receivables		
Accounts Receivable - Net	5,125,449	2,770,089
Due From Other Agencies	360,522	68,894
Due From TTA	560,488	1,072,795
Due From NTTA	1,528,427	1,185,338
Due From HCTRA	2,275,284	3,861,175
Due From TxDOT	1,467,763	164,602
Interest Receivable	576,951	693,342
Total Receivables	**11,894,884**	**9,816,236**
Short Term Investments		
Treasuries	224,312,531	-
Agencies	339,998,036	-
Total Short Term Investments	**564,310,567**	**-**
Total Current Assets	**1,011,043,393**	**1,093,992,267**
Construction in Progress	**446,278,584**	**309,857,937**
Capital Assets (Net of Depreciation and Amortization)		
Depreciable Assets		
Computers	-	34,995
Furniture and Fixtures	-	653
Equipment	1,037,843	9,624
Autos and Trucks	29,142	62,761
Buildings and Toll Facilities	4,126,858	4,313,916
Highways and Bridges	1,696,024,645	1,687,635,239
Toll Equipment	17,269,840	19,459,680
Signs	11,057,710	12,853,738
Land Improvements	4,970,397	5,683,057

Central Texas Regional Mobility Authority
Balance Sheet
as of January 31, 2024

	as of 01/31/2024	as of 01/31/2023
Right of way	88,149,606	88,149,606
Leasehold Improvements	-	19,286
Intangible Assets		
Computer Software	-	1,059,480
Right to Use Assets		
Leases	1,158,193	-
Total Fixed Assets	**1,823,824,236**	**1,819,282,037**
Other Assets		
Intangible Assets-Net	165,192,538	172,144,278
2005 Bond Insurance Costs	-	3,125,752
Prepaid Insurance	461,980	392,247
Deferred Outflows (pension related)	2,738,023	675,913
Pension Asset	1,046,634	2,549,818
Total Other Assets	**169,439,175**	**178,888,008**
Total Assets	**$ 3,450,585,388**	**$ 3,402,020,249**
LIABILITIES		
Current Liabilities		
Accounts Payable	20,898,247	15,393,652
Construction Payable	9,713,260	5,217,075
Overpayments	-	294,629
Interest Payable	7,299,949	6,329,349
TCDRS Payable	63,663	76,511
Due to other Agencies	7,624	15,153
Due to TTA	634,852	592,076
Due to HCTRA	153,565	132,984
Due to Other Entities	118,029	55,330
71E TxDOT Obligation - ST	6,544,570	5,152,841
Total Current Liabilities	**45,433,760**	**33,259,600**
Long Term Liabilities		
Compensated Absences	222,277	240,954
Right to Use Obligations - Lease	1,286,881	-
Deferred Inflows (pension related)	1,378,935	1,481,361
Long Term Payables	**2,888,093**	**1,722,315**

Central Texas Regional Mobility Authority
Balance Sheet
as of January 31, 2024

	as of 01/31/2024	as of 01/31/2023
Bonds Payable		
Senior Lien Revenue Bonds:		
Senior Lien Revenue Bonds 2010	98,592,443	91,506,338
Senior Lien Revenue Bonds 2011	9,542,723	15,786,767
Senior Lien Revenue Bonds 2015	10,000,000	10,000,000
Senior Lien Refunding Revenue Bonds 2016	47,045,000	59,340,000
Senior Lien Revenue Bonds 2018	44,345,000	44,345,000
Senior Lien Revenue Bonds 2020A	50,265,000	50,265,000
Senior Lien Refunding Bonds 2020B	54,305,000	54,970,000
Senior Lien Refunding Bonds 2020C	133,210,000	138,435,000
Senior Lien Revenue Bonds 2020E	167,160,000	167,160,000
Senior Lien Revenue Bonds 2021B	255,075,000	255,075,000
Senior Lien Refunding Bonds 2021D	274,150,000	274,625,000
Senior Lien Refunding Bonds 2021E	329,545,000	332,585,000
Senior Lien Premium 2016 Revenue Bonds	6,402,307	7,103,571
Sn Lien Revenue Bond Premium 2018	2,727,717	2,994,290
Senior Lien Revenue Bond Premium 2020A	11,037,139	11,247,218
Senior Lien Refunding Bond Premium 2020B	10,924,453	11,459,528
Senior Lien Revenue Bonds Premium 2020E	23,139,893	24,855,280
Senior Lien Revenue Bonds Premium 2021B	52,579,505	53,253,278
Senior Lien Refunding Bonds Premium 2021D	43,480,371	44,138,000
Total Senior Lien Revenue Bonds	**1,623,526,552**	**1,649,144,272**
Sub Lien Revenue Bonds:		
Sub Lien Refunding Bonds 2016	69,055,000	71,435,000
Sub Lien Refunding Bonds 2020D	93,430,000	97,440,000
Subordinated Lien BANs 2020F	110,875,000	110,875,000
Subordinate Lien Refunding Bonds 2020G	61,570,000	61,570,000
Subordinated Lien BANs 2021C	244,185,000	244,185,000
Sub Refunding 2016 Prem/Disc	4,542,769	5,318,000
Subordinated Lien BANs 2020F Premium	3,669,293	7,672,157
Subordinated Lien Refunding Bonds Premium 2020G	6,528,597	6,932,569
Sub Lien BANS 2021C Premium	22,200,726	29,812,403
Total Sub Lien Revenue Bonds	**616,056,385**	**635,240,129**

Central Texas Regional Mobility Authority
Balance Sheet
as of January 31, 2024

	as of 01/31/2024	as of 01/31/2023
Other Obligations		
TIFIA Note 2021	363,072,484	355,184,077
71E TxDOT Obligation - LT	49,167,292	55,077,264
Regions 2022 MoPac Loan	23,765,900	24,690,900
Total Other Obligations	**436,005,676**	**434,952,241**
Total Long Term Liabilities	**2,678,476,706**	**2,721,058,957**
Total Liabilities	**2,723,910,466**	**2,754,318,558**
NET ASSETS		
Contributed Capital	121,462,104	121,462,104
Net Assets Beginning	563,196,173	499,532,451
Current Year Operations	42,016,645.08	26,707,136
Total Net Assets	**726,674,922**	**647,701,692**
Total Liabilities and Net Assets	**$ 3,450,585,388**	**$ 3,402,020,249**

Central Texas Regional Mobility Authority
Statement of Cash Flow
as of January 2024

Cash flows from operating activities:	
Receipts from toll revenues	142,476,387
Receipts from Other Sources	188,657
Payments to vendors	(41,976,554)
Payments to employees	(4,035,071)
Net cash flows provided by (used in) operating activities	96,653,419
Cash flows from capital and related financing activities:	
Payment on Intangible assets	(3,621,195)
Interest Expense	(80,057,660)
Issuance Expense	(3,508,621)
Payments on bonds / loans	(40,512,212)
RIF Contribution	(6,000,000)
Acquisition of capital assets - non project	(5,899,085)
Acquisitions of construction in progress	(88,492,557)
Net cash flows provided by (used in) capital and related financing activities	(228,091,330)
Cash flows from investing activities:	
Interest income	28,151,515
Purchase of investments	(344,003,389)
Net cash flows provided by (used in) investing activities	(315,851,875)
Net increase (decrease) in cash and cash equivalents	(447,289,785)
Cash and cash equivalents at beginning of period	894,022,611
Cash and cash equivalents at end of period	446,732,826
Reconciliation of change in net assets to net cash provided by operating activities:	
Operating income	42,016,645
Adjustments to reconcile change in net assets to net cash provided by operating activities:	
Depreciation and amortization	37,207,256
Changes in assets and liabilities:	
Decrease in accounts receivable	10,266,074
Increase in prepaid expenses and other assets	(314,887)
Decrease in accrued expenses	(10,832,654)
Decrease in Interest expense	46,578,892
Increase in interest receivable	(28,267,905)
Total adjustments	54,636,774
Net cash flows provided by (used in) operating activities	$ 96,653,419
Reconciliation of cash and cash equivalents:	
Unrestricted cash and cash equivalents	12,908,175
Restricted cash and cash equivalents	433,824,651
Total	446,732,826

Investments by Fund

Fund	TexSTAR	TexSTAR-Trustee	Goldman Sachs	Agencies/ Treasuries	Balance
Renewal and Replacement Fund	8.67		14,458.13		14,466.80
Grant Fund	487,389.26		10,259,996.41		10,747,385.67
Senior Debt Service Reserve Fund	1,057,786.62		9,340,549.48	104,521,880.18	114,920,216.28
2010 Senior Lien Debt Service			814,718.75		814,718.75
2011 Sr Debt Service t			652,094.72		652,094.72
2013 Sr Debt Service t			42,898.50		42,898.50
2013 Sub Debt Service			33,762.48		33,762.48
2013 Sub Debt Service Reserve Fund	837,039.68		131.56		837,171.24
2015 Sr Debt Service			4,221,975.73		4,221,975.73
2016 Sr Lien Rev Refunding Debt Service			2,494,877.70		2,494,877.70
2016 Sub Lien Rev Refunding Debt Service			433,527.03		433,527.03
2016 Sub Lien Rev Refunding DSR			933,190.64	6,537,152.75	7,470,343.39
Operating Fund	2,724,480.60	889,514.25	17,987,521.28		21,601,516.13
Revenue Fund			10,080,374.32		10,080,374.32
General Fund	52,116,962.43		32,036,365.38	104,438,059.91	188,591,387.72
71E Revenue Fund			35,962,621.19		35,962,621.19
MoPac Revenue Fund			-		-
MoPac General Fund			14,453,667.67		14,453,667.67
MoPac Operating Fund			1,718,093.86		1,718,093.86
MoPac Loan Repayment Fund			807,429.40		807,429.40
2015B Project	375,162.74		6,770,036.23		7,145,198.97
2015 TIFIA Project	745,319.95		9,961,846.08	30,000,000.00	40,707,166.03
2011 Sr Financial Assistance Fund	16.57		127.51		144.08
2018 Sr Lien Debt Service			272,594.82		272,594.82
2018 Sr Lien Project Cap I			-		-
2018 Sr Lien Project	999,010.69		13,453,858.29		14,452,868.98
2020A Senior Lien Debt Service			214,523.74		214,523.74
2020B Senior Lien Debt Service			285,059.57		285,059.57
2020C Senior Lien Debt Service			764,354.83		764,354.83
2020D Sub Lien Debt Service			530,790.30		530,790.30
2020D Sub Debt Service Reserve Fund			864,474.54	7,805,555.52	8,670,030.06
2020E Senior Lien Project			75,086,175.00	50,000,000.00	125,086,175.00
2020E Senior Lien Project Cap Interest			11,724,196.81		11,724,196.81
2020F Sub Lien Project			-		-
2020F Sub Lien Deb Service			440,376.70		440,376.70
2020G Sub Lien Debt Service			202,769.88		202,769.88
2020G Sub Lien Debt Service Reserve			1,326,073.45	2,927,083.32	4,253,156.77
2021A Sub Lien Debt Service Reserve			1,407,593.63	19,497,222.20	20,904,815.83
2021A Sub Debt Service			2,274,145.19		2,274,145.19
2021B Senior Lien Cap I Project Fund			25,146,828.28		25,146,828.28
2021B Senior Lien Project			4,657,362.03	238,583,613.11	243,240,975.14
2021B Senior Lien Cap I Debt Service Acct			5,866,900.00		5,866,900.00
2021C Sub Lien Cap I Project Fund			1,426.02		1,426.02
2021C Sub Lien Project			57,933,360.69		57,933,360.69
2021C Sub Lien Debt Service			930,638.70		930,638.70
2021D Senior Lien Debt Service			999,294.02		999,294.02
2021E Senior Lien Debt Service			1,107,063.83		1,107,063.83
Totals	**59,343,177.21**	**889,514.25**	**364,510,124.37**	**564,310,566.99**	**989,053,382.82**

CTRMA INVESTMENT REPORT

Month Ending January 31, 2024

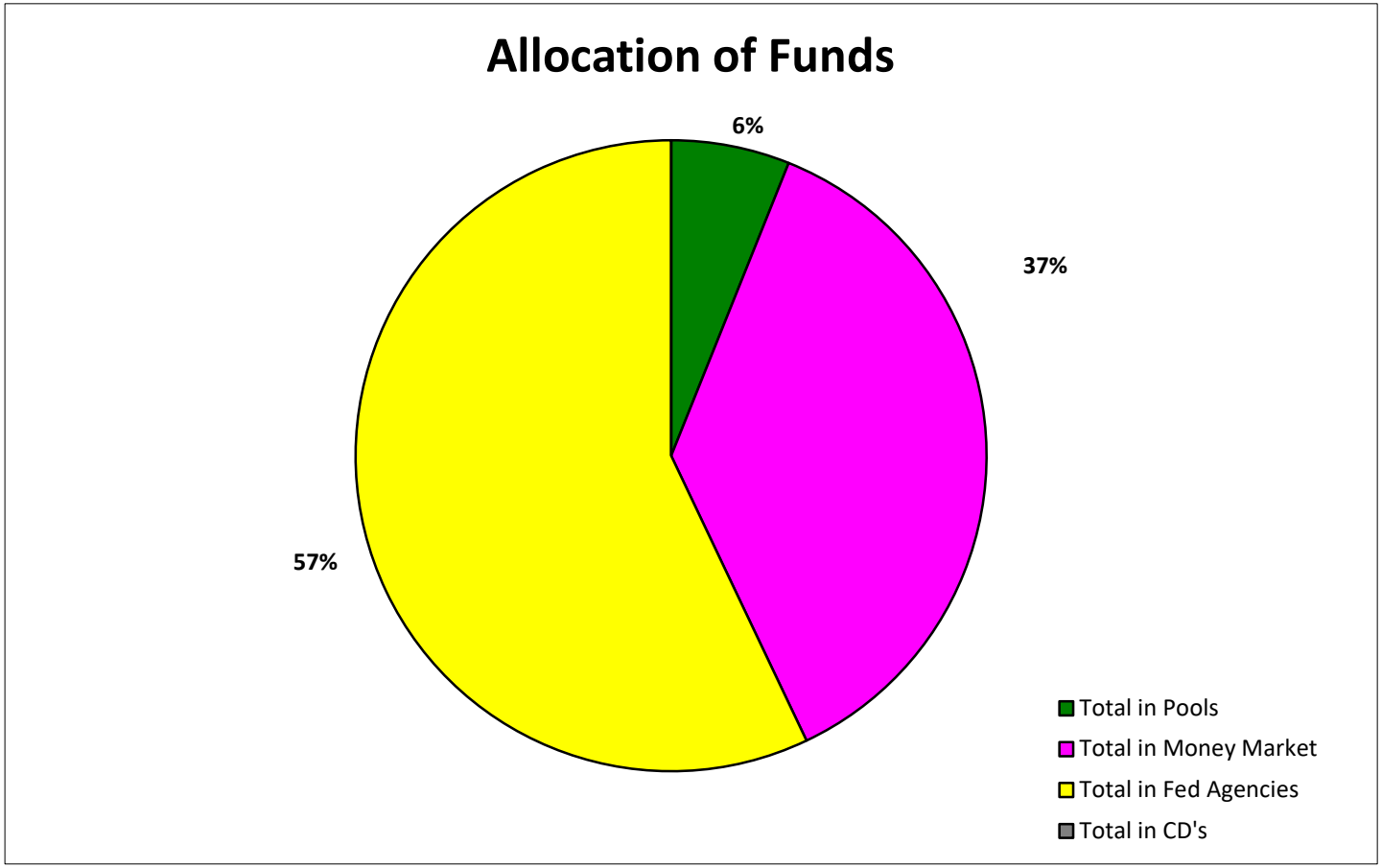
	Balance 1/1/2024	Accrued Interest	Additions	Cash Transfers	Withdrawals	Balance 1/31/2024	Rate Jan
Amount in Trustee TexStar							
2011 Sr Lien Financial Assist Fund	16.53	0.04				16.57	5.32%
2013 Sub Lien Debt Service Reserve	833,275.18	3,764.50				837,039.68	5.32%
General Fund	51,882,570.77	234,391.66				52,116,962.43	5.32%
Trustee Operating Fund	5,711,353.63	13,126.97		(3,000,000.00)		2,724,480.60	5.32%
Renewal and Replacement	8.66	0.01				8.67	5.32%
TxDOT Grant Fund	485,197.27	2,191.99				487,389.26	5.32%
Senior Lien Debt Service Reserve Fund	1,053,029.32	4,757.30				1,057,786.62	5.32%
2015B Sr Ln Project	373,475.48	1,687.26				375,162.74	5.32%
2015C TIFIA Project	741,967.95	3,352.00				745,319.95	5.32%
2018 Sr Lien Project	994,517.72	4,492.97				999,010.69	5.32%
	62,075,412.51	267,764.70	-	(3,000,000.00)	-	59,343,177.21	
Amount in TexStar Operating Fund	381,264.85	8,249.40		3,000,000.00	2,500,000.00	889,514.25	5.32%
Goldman Sachs							
Operating Fund	13,925,891.12	63,123.05	1,911.32	4,000,000.00	3,404.21	17,987,521.28	5.21%
2020A Senior Lien Debt Service	1,256,625.00	5,086.24		209,437.50	1,256,625.00	214,523.74	5.21%
2020B Senior Lien Debt Service	1,995,150.00	8,222.07		276,837.50	1,995,150.00	285,059.57	5.21%
2020C Senior Lien Debt Service	7,114,568.12	29,866.50		734,488.33	7,114,568.12	764,354.83	5.21%
2020D Sub Lien Debt Service	5,485,616.54	23,091.40		507,698.90	5,485,616.54	530,790.30	5.21%
2020D Sub Debt Service Reserve Fund	8,663,283.34	6,746.72			7,805,555.52	864,474.54	5.21%
2020E Sr Lien Project	78,561,450.14	354,725.99			3,830,001.13	75,086,175.00	5.21%
2020E Sr Ln Project Cap Interest	15,374,508.07	68,388.74		(3,718,700.00)		11,724,196.81	5.21%
2020E Sr Lien Debt Service	0.00	-		3,718,700.00	3,718,700.00	-	5.21%
2020F Sub Lien Project	0.00	-				-	5.21%
2020F Sub Lien Debt Service	2,771,875.00	11,222.76		429,153.94	2,771,875.00	440,376.70	5.21%
2020G Sub Lien Debt Service	1,276,300.00	5,167.48		197,602.40	1,276,300.00	202,769.88	5.21%
2020G Sub Debt Service Reserve Fund	4,246,189.87	6,966.90			2,927,083.32	1,326,073.45	5.21%
2021A Sub Debt Service Reserve Fund	1,386,686.13	20,907.50				1,407,593.63	5.21%
2021A TIFIA Sub Lien Debt Service Acct	1,755,246.48	6,485.81		512,412.90		2,274,145.19	5.21%
2021A TIFIA Sub Lien Debt Service Acct	84.49	-		(84.49)		-	5.21%
2021B Senior Lien Cap I Project Fund	36,717,302.74	163,325.54		(11,733,800.00)		25,146,828.28	5.21%
2021B Senior Lien Project	106,825,851.10	475,200.04	945,000.00		103,588,689.11	4,657,362.03	5.21%
2021B Senior Lien Cap I Debt Service	0.00	-		5,866,900.00	5,866,900.00	-	5.21%
2021B Senior Lien Cap I Debt Service Acct	0.00			5,866,900.00		5,866,900.00	5.21%
2021C Sub Lien Cap I Project Fund	1,419.70	6.32				1,426.02	5.21%
2021C Sub Lien Project	66,835,434.10	315,533.09			9,217,606.50	57,933,360.69	5.21%
2021C Sub Lien Debt Service	6,104,625.00	24,817.92		905,820.78	6,104,625.00	930,638.70	5.21%
2021D Senior Lien Debt Service	6,097,000.00	24,794.02		974,500.00	6,097,000.00	999,294.02	5.21%
2021E Senior Lien Debt Service	7,906,566.41	32,670.63		1,074,393.20	7,906,566.41	1,107,063.83	5.21%
2011 Sr Financial Assistance Fund	0.00	127.51				127.51	5.21%
2010 Senior DSF	64,432.02	286.73		750,000.00		814,718.75	5.21%
2011 Senior Lien Debt Service	7,225,000.00	30,844.72		621,250.00	7,225,000.00	652,094.72	5.21%
2013 Senior Lien Debt Service	42,708.45	190.05				42,898.50	5.21%
2013 Sub Debt Service Reserve Fund	130.98	0.58				131.56	5.21%
2013 Subordinate Debt Service	33,612.90	149.58				33,762.48	5.21%
2015A Sr Lien Debt Service	4,327,717.21	19,258.52		125,000.00	250,000.00	4,221,975.73	5.21%
2015B Project	6,964,963.52	31,178.32			226,105.61	6,770,036.23	5.21%
2015C TIFIA Project	9,918,784.66	43,061.42				9,961,846.08	5.21%
2016 Sr Lien Rev Refunding Debt Service	14,369,169.25	63,828.24		1,612,148.96	13,550,268.75	2,494,877.70	5.21%
2016 Sub Lien Rev Refunding Debt Service	3,996,131.25	16,706.36		416,820.67	3,996,131.25	433,527.03	5.21%
2016 Sub Lien Rev Refunding DSR	7,463,672.46	6,670.93			6,537,152.75	933,190.64	5.21%
2018 Sr Lien Project Cap I	0.00	3.37		(3.37)		-	5.21%
2018 Sr Lien Debt Service	1,108,625.00	4,487.28		268,107.54	1,108,625.00	272,594.82	5.21%
2018 Sr Lien Project	13,394,277.99	59,580.30				13,453,858.29	5.21%
TxDOT Grant Fund	10,214,541.28	45,455.13				10,259,996.41	5.21%
Renewal and Replacement	11.68	0.13	14,456.88	1,204,825.00	1,204,835.56	14,458.13	5.21%
Revenue Fund	9,207,998.51	44,127.44	18,756,457.48	(17,853,564.17)	74,644.94	10,080,374.32	5.21%
General Fund	31,126,892.13	140,913.74		1,314,478.62	545,919.11	32,036,365.38	5.21%
Senior Lien Debt Service Reserve Fund	9,288,481.35	52,068.13				9,340,549.48	5.21%
71E Revenue Fund	34,855,588.49	154,024.28	414,417.44	664,403.66	125,812.68	35,962,621.19	5.21%
MoPac Revenue Fund	1,448,659.46	4,699.00	468,915.63	(1,922,274.09)		-	5.21%
MoPac General Fund	12,552,674.46	55,838.33		1,845,154.88		14,453,667.67	5.21%
MoPac Operating Fund	1,175,559.38	6,019.02		800,000.00	263,484.54	1,718,093.86	5.21%
MoPac Loan Repayment Fund	858,494.15	3,819.03		331,391.34	386,275.12	807,429.40	5.21%
	553,939,799.93	2,429,686.86	20,601,158.75	-	212,460,521.17	364,510,124.37	
Amount in Fed Agencies and Treasuries							
Amortized Principal	443,457,162.29		120,853,404.70			564,310,566.99	
Certificates of Deposit							
Total in Pools - TxStar	62,456,677.36	276,014.10	-	-	2,500,000.00	60,232,691.46	
Total in GS FSGF	553,939,799.93	2,429,686.86	20,601,158.75	-	212,460,521.17	364,510,124.37	
Total in Fed Agencies and Treasuries	443,457,162.29	-	120,853,404.70	-	-	564,310,566.99	
Total Invested	1,059,853,639.58	2,705,700.96	141,454,563.45	-	214,960,521.17	989,053,382.82	

All Investments in the portfolio are in compliance with the CTRMA's Investment policy and the relevent provisions of the Public Funds Investment Act Chapter 2256.023

José Hernández, CFO

Ann Zigmond, Controller

1/31/2024


Allocation of Funds
6%
37%
57%
Total in Pools
Total in Money Market
Total in Fed Agencies
Total in CD's

Goldman Sachs County Road Escrow Funds

	Balance 1/1/2024	Additions	Accrued Interest	Withdrawals	Balance 1/31/2024
Travis County Escrow Fund - Elroy Road	3,045,743.31		13,571.43	2,431.86	3,056,882.88
Travis County Escrow Fund - Ross Road	166,602.42		741.78	277.94	167,066.26
Travis County Escrow Fund - Old San Antonio Road	26,751.10		121.41	32.66	26,839.85
Travis County Escrow Fund - Old Lockhart Road	132,179.07		587.96		132,767.03
Travis County Escrow Fund - County Line Road	5,924,298.15	124.11	26,358.25	12,346.56	5,938,433.95
Travis County Escrow Fund - South Pleasant Valley Road	297,263.70		1,347.68	3,834.09	294,777.29
Travis County Escrow Fund - Thaxton Road	96,919.33		442.26	4,050.67	93,310.92
Travis County Escrow Fund - Pearce Lane Road	264,548.35		1,196.30	4,473.28	261,271.37
	9,954,305.43	**124.11**	**44,367.07**	**27,447.06**	**9,971,349.55**

Bank	FUND	Agency	CUSIP #	Yield to Maturity	Purchased	Matures	Market Value
1001021533	2020E PRJ	Federal Home Loan Bank	3130AWVK3	5.50%	8/10/2023	2/14/2024	50,000,000.00
1001021273	2021BPROJ	Federal Home Loan Bank	3130AWWB2	5.50%	8/11/2023	2/15/2024	50,000,000.00
1001021273	2021BPROJ	Federal Home Loan Bank	3130AWWB2	5.50%	8/11/2023	2/15/2024	50,000,000.00
6180005349	2015TIFIAP	Federal Home Loan Bank	3130AWM31	5.46%	7/12/2023	6/12/2024	30,005,100.00
6180000120	GENERAL	Treasury	91282CCG4	5.23%	6/20/2023	6/15/2024	44,893,872.50
6180000059	SENLIENDSR	Federal Agricultural Mortgage Corp	31422x4e9	5.30%	6/21/2023	6/21/2024	44,913,150.00
1001021273	2021BPROJ	Federal Home Loan Bank	3130AWM64	5.40%	7/12/2023	7/12/2024	35,006,300.00
6180000120	GENERAL	Federal Home Loan Bank	3130AV5N8	5.00%	7/3/2023	12/13/2024	9,962,200.00
6180000120	GENERAL	Federal Home Loan Bank	3130AV5N8	5.00%	7/3/2023	12/13/2024	9,962,200.00
6180000059	SENLIENDSR	Federal Home Loan Bank	3130AV5N8	5.00%	6/23/2023	12/31/2024	19,913,600.00
6180000120	GENERAL	Federal Agricultural Mortgage Corp	31422X4D1	4.77%	6/23/2023	6/23/2025	19,923,200.00
6180000059	SENLIENDSR	Federal Agricultural Mortgage Corp	31422X4D1	4.77%	6/23/2023	6/23/2025	19,923,200.00
6180000059	SENLIENDSR	Treasury	912796Y45	5.22%	12/27/2023	6/27/2024	19,504,000.00
1001021543	2021A DSRF	Treasury	912796Y45	5.22%	12/28/2023	6/27/2024	19,504,000.00
6180000120	GENERAL	Treasury	912796Y45	5.22%	12/27/2023	6/27/2024	19,504,000.00
1001017484	2020D SSUB DSRF	Treasury	912796Y45	5.21%	1/4/2024	6/27/2024	7,835,760.00
1001021540	2020G SUB DSRF	Treasury	912796Y45	5.21%	1/4/2024	6/27/2024	2,938,410.00
6180006366	2016D SUB DSRF	Treasury	912796Y45	5.21%	1/4/2024	6/27/2024	6,562,449.00
1001021273	2021B SR Lien Proj	Treasury	912797HF7	5.32%	1/9/2024	4/11/2024	24,746,500.00
1001021273	2021B SR Lien Proj	Treasury	912797HF7	5.36%	1/9/2024	4/11/2024	29,695,800.00
1001021273	2021B SR Lien Proj	Treasury	912797HF7	5.36%	1/10/2024	4/11/2024	24,746,500.00
1001021273	2021B SR Lien Proj	Federal Home Loan Bank	313384VU0	5.34%	1/9/2024	4/19/2024	24,715,750.00
							564,255,991.50

						Interest Income		
Bank	FUND	COST	Cummulative Amortization	Book Value	Maturity Value	Accrued Interest	Amortization	Interest Earned
1001021533	2020E PRJ	50,000,000.00		50,000,000.00	50,000,000.00			
1001021273	2021BPROJ	50,000,000.00		50,000,000.00	50,000,000.00			-
1001021273	2021BPROJ	50,000,000.00		50,000,000.00	50,000,000.00			
6180005349	2015TIFIAP	30,000,000.00		30,000,000.00	30,000,000.00			682,500.00
6180000120	GENERAL	44,963,937.40		44,963,937.40	47,150,000.00	3,864.75		62,802.25
6180000059	SENLIENDSR	45,000,000.00		45,000,000.00	45,000,000.00			1,192,500.00
1001021273	2021BPROJ	35,000,000.00		35,000,000.00	35,000,000.00			-
6180000120	GENERAL	9,960,128.90		9,960,128.90	10,000,000.00	27,777.78		277,777.78
6180000120	GENERAL	9,960,128.90		9,960,128.90	10,000,000.00	27,777.78		277,777.78
6180000059	SENLIENDSR	20,000,000.00		20,000,000.00	20,000,000.00	22,222.22		522,222.22
6180000120	GENERAL	20,000,000.00		20,000,000.00	20,000,000.00			477,000.00
6180000059	SENLIENDSR	20,000,000.00		20,000,000.00	20,000,000.00			477,000.00
6180000059	SENLIENDSR	19,499,657.96		19,499,657.96	20,000,000.00			
1001021543	2021A DSRF	19,497,222.20		19,497,222.20	20,000,000.00			
6180000120	GENERAL	19,494,444.40		19,494,444.40	20,000,000.00			
1001017484	2020D SSUB DSRF	7,805,555.52		7,805,555.52	8,000,000.00			
1001021540	2020G SUB DSRF	2,927,083.32		2,927,083.32	3,000,000.00			
6180006366	2016D SUB DSRF	6,537,152.75		6,537,152.75	6,700,000.00			
1001021273	2021B SR Lien Proj	24,670,333.25		24,670,333.25	25,000,000.00			
1001021273	2021B SR Lien Proj	29,600,950.00		29,600,950.00	30,000,000.00			
1001021273	2021B SR Lien Proj	24,671,704.86		24,671,704.86	25,000,000.00			
1001021273	2021B SR Lien Proj	24,640,625.00		24,640,625.00	25,000,000.00			
		564,228,924.46	-	564,228,924.46	569,850,000.00	81,642.53	-	3,969,580.03

TexSTAR

MONTHLY NEWSLETTER JANUARY 2024

PERFORMANCE

As of January 31, 2024

Current Invested Balance	$ 11,483,316,119.03
Weighted Average Maturity (1)	39 Days
Weighted Average Life (2)	73 Days
Net Asset Value	1.000037
Total Number of Participants	1024
Management Fee on Invested Balance	0.06%*
Interest Distributed	$ 50,806,428.34
Management Fee Collected	$ 564,152.73
% of Portfolio Invested Beyond 1 Year	5.12%
Standard & Poor's Current Rating	AAAm

Rates reflect historical information and are not an indication of future performance.

January Averages

Average Invested Balance	$ 11,119,642,564.86
Average Monthly Yield, on a simple basis	5.3200%
Average Weighted Maturity (1)	42 Days
Average Weighted Life (2)	77 Days

Definition of Weighted Average Maturity (1) & (2)

(1) This weighted average maturity calculation uses the SEC Rule 2a-7 definition for stated maturity for any floating rate instrument held in the portfolio to determine the weighted average maturity for the pool. This Rule specifies that a variable rate instruction to be paid in 397 calendar days or less shall be deemed to have a maturity equal to the period remaining until the next readjustment of the interest rate.
(2) This weighted average maturity calculation uses the final maturity of any floating rate instruments held in the portfolio to calculate the weighted average maturity for the pool.

The maximum management fee authorized for the TexSTAR Cash Reserve Fund is 12 basis points. This fee may be waved in full or in part in the discretion of the TexSTAR co-administrators at any time as provided for in the TexSTAR Information Statement.

NEW PARTICIPANTS

We would like to welcome the following entities who joined the TexSTAR program in January:

* Ben Bolt Palito Blanco Independent School District * City of La Joya

HOLIDAY REMINDER

In observance of Presidents' Day, T**exSTAR will be closed Monday, February 19, 2024.** All ACH Transactions initiated on Friday, February 16th will settle on Tuesday, February 20th.

ECONOMIC COMMENTARY

Market review

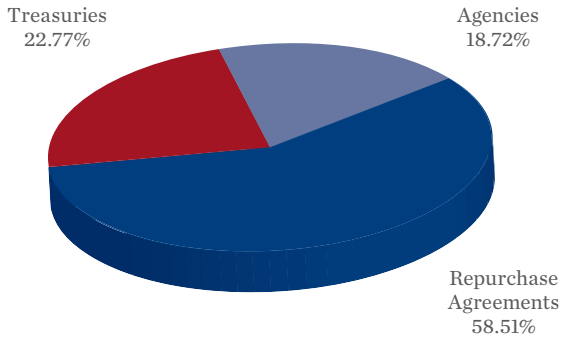
While 2024 is only one month old, it has been a very busy handful of weeks. With geopolitical tensions on the boil, major moves in markets and a slew of upbeat economic data, January has been a wild ride. As a result, it is worth unpacking some of the things that have helped to define the first month of the new year. Economic indicators remained robust. December employment numbers handily beat expectations, showing job gains of 216,000 and an unemployment rate steady at 3.7%. Meanwhile, December inflation modestly reaccelerated, thanks to gains in energy prices, to 3.4% year-over-year (y/y); shelter inflation stayed quite sticky. 4Q 2023 GDP was also of note, considerably stronger than consensus and showing full year growth of 3.1%, significantly above the Federal Reserve's forecast. The economy expanded at an impressive 3.3% annualized rate in 4Q23, a deceleration from a very strong third quarter but well above consensus expectations of 2.0%. Many of the underlying details looked strong; but consumption, again, powered the economy in both goods and services. The biggest upside surprise was trade, a notoriously volatile component of GDP, which rose at a 6.3% annualized pace. The U.S. consumer continued to be supported by a strong labor market. The Job Openings and Layover Turnover Survey (JOLTS) in December showed the level of job openings rebounding to 9.026mm, from the revised 8.925mm in November, pointing to continued strength.

Labor market strength allowed the Fed to hone in on inflation, which showed further evidence of moderation in December. Headline CPI rose 0.3%month-over-month (m/m) and 3.4% y/y, while core inflation maintained its 0.3% m/m pace, easing slightly to 3.9% y/y. Shelter remained the largest contributor to inflation, rising 0.5% m/m, although real-time data on rents continue to suggest a slowdown ahead. Core services ex-shelter remained elevated, supported by airline fares, medical care services and a 20.3% y/y jump in auto insurance prices. Meanwhile, the Fed's preferred measure of inflation, the Personal Consumption Expenditures Price Index (PCE), rose 0.2% m/m on both the headline and core measures, bringing the year ago figures to 2.6% and 2.9% respectively.

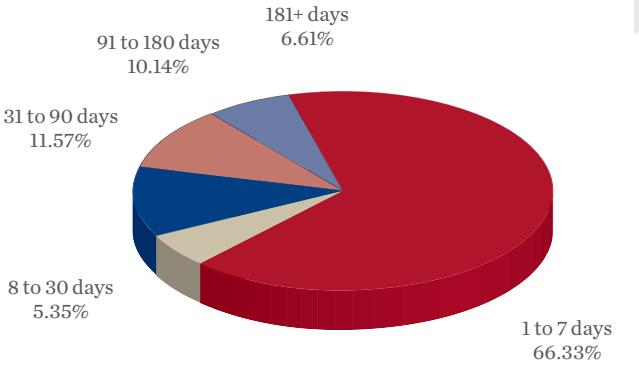
(continued page 4)

INFORMATION AT A GLANCE

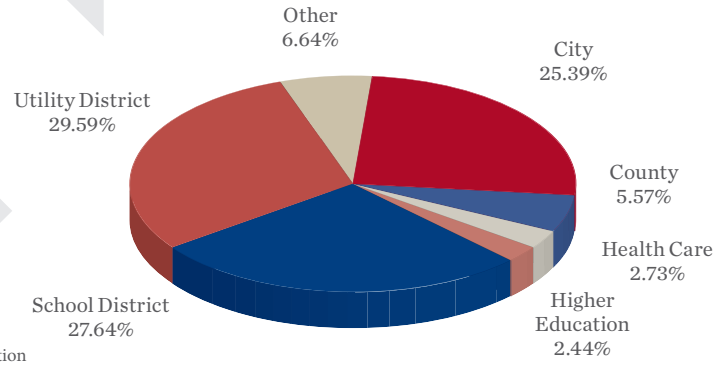
PORTFOLIO BY TYPE OF INVESTMENT AS OF JANUARY 31, 2024



PORTFOLIO BY MATURITY AS OF JANUARY 31, 2024 (1)



DISTRIBUTION OF PARTICIPANTS BY TYPE AS OF JANUARY 31, 2024



(1) Portfolio by Maturity is calculated using WAM (1) definition for stated maturity. See page 1 for definition

HISTORICAL PROGRAM INFORMATION

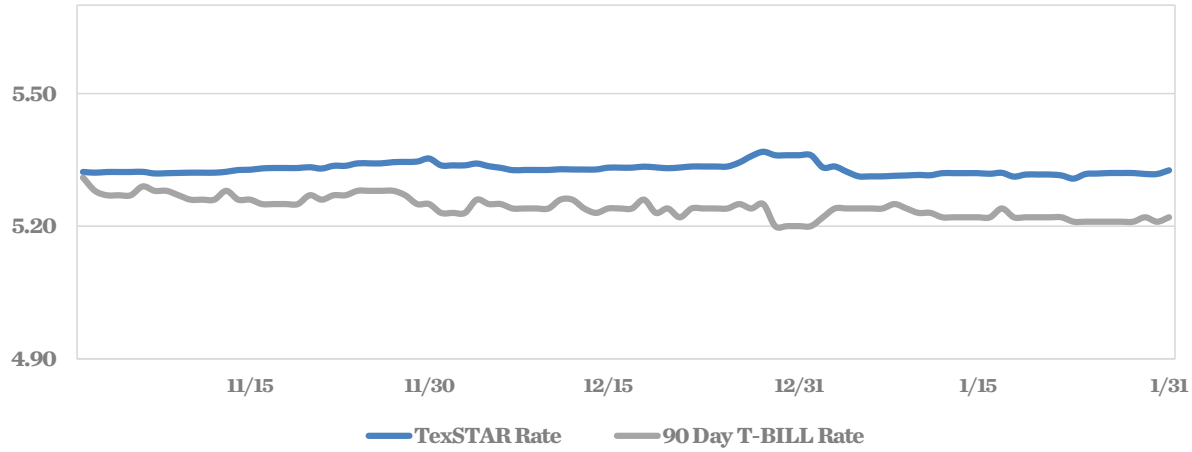
MONTH	AVERAGE RATE	BOOK VALUE	MARKET VALUE	NET ASSET VALUE	WAM (1)	WAL (2)	NUMBER OF PARTICIPANTS
Jan 24	5.3200%	$11,483,316,119.03	$11,483,741,551.85	1.000037	42	77	1024
Dec 23	5.3378%	10,557,076,424.02	10,557,101,303.24	0.999972	44	85	1037
Nov 23	5.3307%	10,148,883,026.83	10,148,191,305.12	0.999931	33	74	1034
Oct 23	5.3231%	10,017,668,653.01	10,016,121,800.83	0.999845	29	69	1031
Sep 23	5.3105 %	9,992,445,950.80	9,990,730,955.61	0.999816	29	56	1028
Aug 23	5.2974%	10,207,693,267.12	10,205,377,223.94	0.999773	26	49	1023
Jul 23	5.1148%	10,852,471,505.08	10,849,665,890.42	0.999741	22	47	1021
Jun 23	5.0764%	10,475,876,514.08	10,473,945,855.73	0.999806	22	50	1020
May 23	5.0471%	10,704,350,596.85	10,702,720,616.60	0.999847	20	45	1019
Apr 23	4.8292%	10,940,711,794.05	10,941,057,413.24	1.000031	17	42	1017
Mar 23	4.6066%	11,042,113,205.98	11,042,864,910.32	1.000029	11	39	1012
Feb 23	4.4919%	10,962,890,240.57	10,961,778,645.78	0.999898	9	38	1008

PORTFOLIO ASSET SUMMARY AS OF JANUARY 31, 2024

	BOOK VALUE	MARKET VALUE
Uninvested Balance	$ 679.83	$ 679.83
Accrual of Interest Income	14,558,309.71	14,558,309.71
Interest and Management Fees Payable	(50,645,134.09)	(50,645,134.09)
Payable for Investment Purchased	(100,000,000.00)	(100,000,000.00)
Repurchase Agreement	6,798,822,999.85	6,798,822,999.85
Government Securities	4,820,579,263.73	4,821,004,696.55
TOTAL	**$ 11,483,316,119.03**	**$ 11,483,741,551.85**

Market value of collateral supporting the Repurchase Agreements is at least 102% of the Book Value. The portfolio is managed by J.P. Morgan Chase & Co. and the assets are safekept in a separate custodial account at the Federal Reserve Bank in the name of TexSTAR. The only source of payment to the Participants are the assets of TexSTAR. There is no secondary source of payment for the pool such as insurance or guarantee. Should you require a copy of the portfolio, please contact TexSTAR Participant Services.

TEXSTAR VERSUS 90-DAY TREASURY BILL



This material is for information purposes only. This information does not represent an offer to buy or sell a security. The above rate information is obtained from sources that are believed to be reliable; however, its accuracy or completeness may be subject to change. The TexSTAR management fee may be waived in full or in part at the discretion of the TexSTAR co-administrators and the TexSTAR rate for the period shown reflects waiver of fees. This table represents historical investment performance/return to the customer, net of fees, and is not an indication of future performance. An investment in the security is not insured or guaranteed by the Federal Deposit Insurance Corporation or any other government agency. Although the issuer seeks to preserve the value of an investment of $1.00 per share, it is possible to lose money by investing in the security. Information about these and other program details are in the fund's Information Statement which should be read carefully before investing. The yield on the 90-Day Treasury Bill ("T-Bill Yield") is shown for comparative purposes only. When comparing the investment returns of the TexSTAR pool to the T-Bill Yield, you should know that the TexSTAR pool consists of allocations of specific diversified securities as detailed in the respective Information Statements. The T-Bill Yield is taken from Bloomberg Finance L.P. and represents the daily closing yield on the then current 90-Day T-Bill. The TexSTAR yield is calculated in accordance with regulations governing the registration of open-end management investment companies under the Investment Company Act of 1940 as promulgated from time to time by the federal Securities and Exchange Commission.

DAILY SUMMARY FOR JANUARY 2024

DATE	MNY MKT FUND EQUIV. [SEC Std.]	DAILY ALLOCATION FACTOR	INVESTED BALANCE	MARKET VALUE PER SHARE	WAM DAYS (1)	WAL DAYS (2)
1/1/2024	5.3606%	0.000146866	$10,557,076,424.02	0.999972	45	84
1/2/2024	5.3331%	0.000146113	$10,813,191,999.61	0.999944	44	82
1/3/2024	5.3352%	0.000146171	$10,880,011,133.56	0.999961	44	81
1/4/2024	5.3234%	0.000145847	$11,132,571,502.79	0.999958	42	79
1/5/2024	5.3130%	0.000145561	$11,188,243,315.45	0.999960	41	78
1/6/2024	5.3130%	0.000145561	$11,188,243,315.45	0.999960	41	78
1/7/2024	5.3130%	0.000145561	$11,188,243,315.45	0.999960	41	78
1/8/2024	5.3143%	0.000145596	$11,146,391,021.52	0.999978	42	78
1/9/2024	5.3150%	0.000145617	$11,181,522,066.72	0.999969	41	78
1/10/2024	5.3162%	0.000145648	$11,035,411,381.84	0.999985	42	78
1/11/2024	5.3155%	0.000145631	$10,998,004,388.84	0.999976	41	78
1/12/2024	5.3202%	0.000145758	$11,171,018,183.02	1.000006	39	75
1/13/2024	5.3202%	0.000145758	$11,171,018,183.02	1.000006	39	75
1/14/2024	5.3202%	0.000145758	$11,171,018,183.02	1.000006	39	75
1/15/2024	5.3202%	0.000145758	$11,171,018,183.02	1.000006	39	75
1/16/2024	5.3188%	0.000145720	$11,153,241,629.70	0.999993	40	75
1/17/2024	5.3209%	0.000145778	$11,153,903,586.53	0.999973	41	75
1/18/2024	5.3124%	0.000145546	$11,096,852,212.24	0.999951	43	77
1/19/2024	5.3171%	0.000145675	$10,964,329,636.68	0.999929	44	78
1/20/2024	5.3171%	0.000145675	$10,964,329,636.68	0.999929	44	78
1/21/2024	5.3171%	0.000145675	$10,964,329,636.68	0.999929	44	78
1/22/2024	5.3150%	0.000145616	$10,944,221,786.12	0.999967	45	79
1/23/2024	5.3079%	0.000145421	$10,933,439,683.43	0.999983	46	82
1/24/2024	5.3182%	0.000145705	$11,183,934,613.94	0.999993	45	80
1/25/2024	5.3193%	0.000145734	$11,333,716,364.34	1.000009	44	78
1/26/2024	5.3205%	0.000145766	$11,272,821,292.92	0.999999	41	75
1/27/2024	5.3205%	0.000145766	$11,272,821,292.92	0.999999	41	75
1/28/2024	5.3205%	0.000145766	$11,272,821,292.92	0.999999	41	75
1/29/2024	5.3184%	0.000145710	$11,324,391,621.03	1.000019	41	75
1/30/2024	5.3183%	0.000145706	$11,397,466,508.22	1.000007	40	74
1/31/2024	5.3266%	0.000145935	$11,483,316,119.03	1.000037	39	73
Average	**5.3200%**	**0.000145755**	**$11,119,642,564.86**		**42**	**77**

TexSTAR

ECONOMIC COMMENTARY (cont.)

At its January meeting, the Federal Open Market Committee (FOMC) voted to leave the federal funds rate unchanged at a target range of 5.25%-5.50% for the fourth consecutive meeting. There were notable adjustments to the statement language, which suggested that the committee is now biased toward cutting interest rates, although it may not begin easing policy as soon as markets anticipate. In fact, Powell stated that recent data leads him to believe that a March cut is unlikely and "the committee does not expect it will be appropriate to reduce the target range" until inflation is sustainably moving to 2%. Powell also mentioned the committee will discuss balance sheet issues during the March meeting with a potential tapering of Quantitative Tightening soon after.

Rates moved higher due to stronger than expected economic data before ending the month modestly lower, while short Treasury bill yields were relatively unchanged to marginally higher. The three-month Treasury bill yield rose 2 bps on the month to 5.37%, while one-year T-bill and two-year Treasury yields fell 6 bps and 4 bps to 4.72% and 4.21%, respectively.

Outlook

January's employment report beat expectations, reflecting a very strong labor market that, despite full employment, continues to make progress on filling job openings and providing workers with solid real wage gains. At 353,000, nonfarm payrolls came in significantly above consensus estimates of 185,000, with the previous two months revised higher by 126,000. This materially changes the 3-month moving average from 165,000 as of December pre-revisions to 289,000, the highest level since March of 2023. The unemployment rate remained at 3.7%, which was a function of a stable labor force participation rate (62.5%) and a roughly flat household employment number (-31,000). Temporary workers increased slightly by 3.9k, the first rise since February 2023. Average hourly earnings came in much higher than expected at 0.60% m/m vs. 0.30% survey.

The strength of this report combined with Chair Powell's press conference after the January FOMC meeting suggests a March cut is unlikely now. Furthermore, the Fed is now predominately focused on services inflation, and these wages numbers should make them wary of cutting too soon and triggering a re-acceleration in growth before inflation is closer to their target. As a result, we see a May cut as only a 50/50 proposition and June as our base case. Only inflation falling below 2% or unemployment rising closer to 4%, would cause the Fed to cut sooner rather than later.

This information is an excerpt from an economic report dated January 2024 provided to TexSTAR by JP Morgan Asset Management, Inc., the investment manager of the TexSTAR pool.

TexSTAR

TEXSTAR BOARD MEMBERS

Monte Mercer	North Central TX Council of Government	Governing Board President
David Pate	Richardson ISD	Governing Board Vice President
David Medanich	Hilltop Securities	Governing Board Secretary
Jennifer Novak	J.P. Morgan Asset Management	Governing Board Asst. Sec./Treas
Brett Starr	City of Irving	Advisory Board
Sandra Newby	Tarrant Regional Water Dist/Non-Participant	Advisory Board
Ron Whitehead	Qualified Non-Participant	Advisory Board

HilltopSecurities
Investment Banking Solutions

J.P.Morgan
Asset Management

CENTRAL TEXAS REGIONAL
MOBILITY AUTHORITY

February 28, 2024
AGENDA ITEM #7

Discuss and consider approving a toll rate schedule for the 183A Phase III Project

Strategic Plan Relevance:	Stewardship
Department:	Finance
Contact:	Jose Hernandez, Chief Financial Officer
Associated Costs:	N/A
Funding Source:	N/A
Action Requested:	Consider and act on draft resolution

Project Description/Background: The Central Texas Regional Mobility Authority is constructing a 5.3-mile extension of the existing 10-mile 183A Toll Road north from Hero Way to north of SH 29. Together with the associated access ramps, frontage road improvements and transitions, the overall project length will be approximately 6.6 miles. The tolled lanes are within the median of TxDOT right-of-way of the existing US 183 corridor. The new toll lanes are scheduled to open no later than January 2025; however, they may open as early as July 2024.

This item establishes tolls consistent with the tolls projected in the 183A Phase III Traffic and Revenue Forecasts dated October 16, 2020, as updated annually by the traffic and revenue consultant to reflect the Mobility Authority's toll escalation policy. The toll rate table attached in the backup contains the recently updated (December 2023) toll rates for passenger cars and multiple axle vehicles by type of payment. The approved 183A Phase III Toll Rates will be published on the Mobility Authority website.

Action requested/Staff Recommendation: Staff recommends that the Board approve and adopt toll rates for the 183A Phase III Project that are consistent with the tolls identified in the 183A Phase III Project Traffic Revenue Forecasts dated October 16, 2020, as most recently updated by the Mobility Authority's traffic and revenue consultant.

Backup provided: Draft Resolution

Proposed toll rates

GENERAL MEETING OF THE BOARD OF DIRECTORS
OF THE
CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY

RESOLUTION NO. 24-0XX

ADOPTING A TOLL RATE FOR THE 183A PHASE III TOLL PROJECT

WHEREAS, the 183A Phase III Toll Project Traffic Revenue Forecast dated October 16, 2020 identified a proposed toll schedule for customers using the 183A Phase III Toll when that project is completed and open to traffic; and

WHEREAS, the 183A Phase III Toll Project Traffic Revenue Forecast has been updated annually to reflect the Mobility Authority's toll escalation policy; and

WHEREAS, the 183A Phase III Toll is anticipated to open to traffic as soon as July 2024; and

WHEREAS, the Executive Director recommends that the Board approve and adopt tolls for the 183A Phase III Toll that are consistent with the tolls identified in the 183A Phase III Toll Project Traffic Revenue Forecast as updated through December 2023, which are attached hereto as Exhibit A.

NOW THEREFORE, BE IT RESOLVED, that the Board hereby adopts the tolls identified in the 183A Phase III Toll Project Traffic Revenue Forecast as updated through December 2023, which are attached hereto as Exhibit A.

Adopted by the Board of Directors of the Central Texas Regional Mobility Authority on the 28th day of February 2024.

Submitted and reviewed by:

_____
James M. Bass
Executive Director

Approved:

_____
Robert W. Jenkins, Jr.
Chairman, Board of Directors

Exhibit A

TRAFFIC CONSULTANT CERTIFICATION
(February 2024 Toll Modification for Opening of 183A Phase III)

The undersigned is a duly authorized officer of Stantec Consulting Services Inc. serving as traffic consultant (the "Traffic Consultant") to the Central Texas Regional Mobility Authority ("Authority") pursuant to that certain Master Trust Indenture, dated as of February 1, 2005, between the Authority and Regions Bank, as successor in trust to JPMorgan Chase Bank, National Association, as Trustee (the "Master Trust Indenture"), relating to the issuance of Obligations thereunder. Any capitalized terms not otherwise defined herein have the respective meaning given to such terms in the Master Trust Indenture.

1. In accordance with Section 502 of the Master Trust Indenture, the Authority has provided us the proposed change to the Toll Rate Schedule set forth in Exhibit "A" attached hereto. In our opinion, the adoption of such proposed Toll Rate Schedule set forth in Exhibit "A" will not adversely affect the ability of the Authority to comply with its covenants in Section 502 of the Master Trust Indenture.

2. Our certification herein is based upon our opinion as to Revenues to be derived by the Authority from the ownership and operation of the System (which Revenues include investment and other income not related to Tolls that constitute the Revenues of the System as estimated by an Authorized Representative), and, to the extent necessary, a certificate of the Authorized Representative filed with the Trustee, stating the opinion of the Authority as to the amount of Operating Expenses paid or accrued during any pertinent Annual Period, assuming the proposed Toll rate schedule had been in effect during such pertinent Annual Period.

EXECUTED THIS 17th day of February, 2024

STANTEC CONSULTING SERVICES INC.

By: William Ihlo
Name: William Ihlo
Title: Principal

EXHIBIT A

Mid 2024/January 2025 183A Toll Rates - UPDATED to reflect actual 2022, 2023, and 2024 CPI increases.

Toll Location	Payment Type	2-axle	3-axle	4-axle	5-axle	6-axle
New Phase III Toll Plazas						
North Whitewing Ramps	ETC	$1.02	$2.04	$3.06	$4.08	$5.10
	PLP	$1.12	$2.24	$3.37	$4.49	$5.61
	PBM	$1.53	$3.06	$4.59	$6.12	$7.65
Whitewing ML Plaza	ETC	$1.29	$2.58	$3.87	$5.16	$6.45
	PLP	$1.42	$2.84	$4.26	$5.68	$7.10
	PBM	$1.94	$3.87	$5.81	$7.74	$9.68
South Whitewing Ramps	ETC	$0.76	$1.52	$2.28	$3.04	$3.80
	PLP	$0.84	$1.67	$2.51	$3.34	$4.18
	PBM	$1.14	$2.28	$3.42	$4.56	$5.70
San Gabriel Ramps	ETC	$0.76	$1.52	$2.28	$3.04	$3.80
	PLP	$0.84	$1.67	$2.51	$3.34	$4.18
	PBM	$1.14	$2.28	$3.42	$4.56	$5.70
San Gabriel ML Plaza	ETC	$1.09	$2.18	$3.27	$4.36	$5.45
	PLP	$1.20	$2.40	$3.60	$4.80	$6.00
	PBM	$1.64	$3.27	$4.91	$6.54	$8.18

*If Phase III opens earlier than January 2025, this toll schedule will be in effect from opening day until January 2026.

ETC = Electronic Toll Collection, transaction made with a tag/transponder
PLP = Pre-paid License Plate Account, series of license plates connected to a single ETC tag account
PBM = Pay by Mail, for customers without a ETC tag account

CENTRAL TEXAS REGIONAL
MOBILITY AUTHORITY

February 28, 2024
AGENDA ITEM #8

Discuss and consider approving an agreement with Luna Data Solutions Inc. for a video interoperability sharing solution to support regional coordination for traffic management and incident response

Strategic Plan Relevance:	Collaboration, Innovation, Safety, Service
Department:	Operations
Contact:	Tracie Brown, Director of Operations
Associated Costs:	Not to exceed lic for two years
Funding Source:	Operating
Action Requested:	Consider and act on draft resolution

Summary: The Mobility Authority's mission is to implement innovative, multi-modal transportation solutions that reduce congestion and create transportation choices that enhance the quality of life and economic vitality. In furtherance of that mission, in July 2014, CTRMA completed the construction of a traffic & incident management center (TIM Center) in Cedar Park, Texas. The Authority's TIM Center oversees traffic capacity, mobility, incident management, tolling operations, managed lanes, and maintenance operations on CTRMA-owned and operated roadways, projects, buildings, and adjacent roadways. The TIM Center has a critical role in traffic incident management and safety on Mobility Authority facilities.

The Mobility Authority developed a Traffic Incident Management and Intelligent Transportation System (TIM/ITS) Master Plan to standardize and coordinate the traffic incident management operations between regional partner agencies. The goals of this plan are to:

- reduce the impacts of incidents to travelers in the region, including reduced roadway clearance time, incident clearance time and time to return to normal;
- reduce secondary crashes in the region; and
- provide accurate and timely traveler information to travelers throughout the region.

The Mobility Authority employs a collaborative approach towards mobility management to help ensure cohesion in the region by coordinating traffic incident management operations with its regional partners. The Luna video incident sharing system (VISS) allows the Authority to facilitate this vision.

Current Action: The Luna Video Interoperability Sharing Solution (VISS) consists of installing and configuring a new commercial-off-the-shelf (COTS) software to enable video sharing functionality. This software is available from Skyline Technology Solution and provided in a managed cloud-based environment which will mitigate the installation of additional hardware and software.

The cloud-based VISS software will be connected via a safe internet circuit to the existing Mobility Authority's CCTV cameras (56 units). The CCTV cameras are connected to the Authority's TIM Center via a fiber optic network, into the current operational video system. The solution enables the Mobility Authority to share video streams with regional partners such as TxDOT, the City of Austin, or the Austin Police Department, thus improving regional coordination for traffic incident detection and response. The VISS also allows the Mobility Authority to publish and share video streams from both the PTZ and fixed CCTV cameras with both their selected regional partners and the public without the need for partners or the public to own any specific software or licenses. Similarly, the Mobility Authority can access their shared video streams when regional partners implement the same platform.

The term of the agreement is one year with a one-year renewal option. CTRMA may terminate the agreement at any time with or without cause by providing sixty (60) days written notice. The total contract value is not to exceed **$468,709.96** and is broken down as follows:

PROJECT ITEM	YEAR 1	YEAR 2 (if exercised)
All-inclusive Claris VIaaS Hosted Services SW and Maintenance (OPEX) - 100% of Annual Hosted Services – 183A Phases I & II, 290, 45SW, MoPac, 183 (56 camera feeds)	$ 88,704.00	$ 88,704.00
120 additional camera feeds @ $1,584 annually per feed		
• 183A Phase III (35 camera feeds)	55,440.00	55,440.00
• 183 North (85 camera feeds)	--------	134,640.00
DIR contract administration fee (0.0075%)	1,081.08	2,090.88
Project Contingency (10%)	14,522.08	28,087.49
ANNUAL COST	**$159,747.5**	**$308,962.37**

TOTAL NOT TO EXCEED CONTRACT VALUE	**$468,709.96**

This table outlines the maximum cost possible for this Agreement; however, the exact amount is dependent upon when the 183A Phase III and 183N construction projects are completed and the related camera feeds are ready for integration. The Operations staff will ensure that the Authority does not pay more than required for these services.

About Luna Data Solutions, Inc.: Luna Data Solutions Inc. is a women-owned, HUB certified and WBENC certified company based in Austin, Texas. Luna is an approved Texas Department of Information Resources (DIR) vendor for deliverables-based information technology services (DBITS). Luna Data Solutions' contract with DIR, contract # DIR-CP-4957, expires on December 13, 2025. Luna Data Solutions, Inc. will partner with Skyline Technology Solution to deliver the VISS to the Mobility Authority.

Previous Actions: In February 2020 the Mobility Authority Board approved an agreement with Luna Data Solutions Inc. In an amount not to exceed $253,400 through their contract with the Texas Department of Information Resources for the implementation of a cloud-based video interoperability and sharing solution in support of the Mobility Authority's traffic incident response coordination. The term of the agreement was three years with one 1-year optional extension. The original term expired on February 28, 2023, and the 1-year extension was granted resulting in a February 28, 2024, contract expiration.

Action Requested/Staff Recommendation: Staff recommends contracting with Luna Data Solution for the implementation and annual support of the Video Interoperability and Sharing Solution (VISS) through their contract with the Department of Information Resources (DIR). Pursuant to Government Code Section 2054.0565, use of the DIR contract with Luna Data Solution Inc. satisfies all competitive purchasing requirements.

Financing: Not applicable

Backup provided: Draft Resolution
Luna Data Solutions, Inc. Proposal and Clarifications
Skyline Software License Agreement

GENERAL MEETING OF THE BOARD OF DIRECTORS
OF THE
CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY

RESOLUTION NO. 24-0XX

APPROVING AN AGREEMENT WITH LUNA DATA SOLUTIONS INC. FOR THE IMPLEMENTATION AND LICENSING OF A VIDEO SHARING SYSTEM FOR REGIONAL INCIDENT RESPONSE COORDINATION

WHEREAS, the Mobility Authority is developing a Traffic Incident Management and Intelligent Transportation System Master Plan to help standardize and coordinate the regional traffic incident management operations between regional partner agencies; and

WHEREAS, Mobility Authority staff have identified video interoperability and sharing technology as a key component to support regional coordination for traffic incident response; and

WHEREAS, the Executive Director has negotiated a scope of work for the implementation and support for a cloud-based video interoperability and sharing solution (VISS) for the Mobility Authority based on the proposal received from Luna Data Solutions Inc. which is attached hereto as Exhibit A; and

WHEREAS, Luna Data Solutions Inc. currently provides services to the State of Texas through Texas Department of Information Resources (DIR) Contract No. DIR-CP-4957; and

WHEREAS, pursuant to Texas Government Code Section 2054.0565, the Mobility Authority may use the DIR contract with Luna Data Solutions Inc. for the implementation and support of a VISS without the need to seek competitive bids; and

WHEREAS, the Executive Director recommends entering into an agreement with Luna Data Solutions Inc. for the implementation and support of a VISS in an amount not to exceed $468,709.96 through their DIR contract.

NOW THEREFORE BE IT RESOLVED that the Board of Directors hereby approves the proposal from Luna Data Solutions Inc. for the implementation of a cloud-based video interoperability and sharing solution attached hereto as Exhibit A; and

BE IT FURTHER RESOLVED, that the Executive Director is authorized to enter into an agreement with Luna Data Solutions Inc. in an amount not to exceed $468,709.96 through their contract with the Department of Information Resources for the implementation of a cloud-based video interoperability and sharing solution in support of the Mobility Authority's traffic incident response coordination.

Adopted by the Board of Directors of the Central Texas Regional Mobility Authority on the 28th day of February 2024

Submitted and reviewed by:

James M. Bass
Executive Director

Approved:

Robert W. Jenkins, Jr.
Chairman, Board of Directors

Exhibit A

CENTRAL TEXAS
Regional Mobility Authority

CTRMA Solicitation
Video Interoperability and Sharing System
Amended Proposal

Luna Data Solutions Inc.
1408 W Koenig Ln Ste D
Austin, TX 78756
Primary Contact**: Dana R Jones**
(512) 784-7208
dana@lunadatasolutions.com
January 30, 2024

Contents

1 EXECUTIVE SUMMARY

Luna Data Solutions Inc. partnering with Skyline Technology Solutions is pleased to present this proposal to meet the Central Texas Regional Mobility Authority's (CTRMA) needs for a Video Interoperability and Sharing Solution (VISS). Skyline's Claris Video Interoperability as-a-Service (VIaaS) offering meets all the goals and requirements of the VISS as stated in the CTRMA Solicitation. The Luna/Skyline team will demonstrate in our proposal that we fully understand the technical and management requirements for successful performance and have the capability to meet or exceed those requirements. The Luna/Skyline team will support and manage the CTRMA IT environment from a 24/7 standpoint; this will provide CTRMA an always available and fully dedicated support partner.
The core of our managed Video Interoperability services offering is our centralized IT services. Our managed services workflow design automates and delivers consistent and predictable end results to our client's.
Our managed video streaming services has over 56,000 cameras securely shared to over 500 partner agencies in 17 states including school systems, police departments, park services, stadium authorities, hospitals, and other state, federal, and local municipalities. Skyline has developed the expertise to become the Department of Transportation (DOT) industry leader in providing live streaming video sharing systems.
The Luna/Skyline's differentiator is we are service provider network engineering experts and consulting company, managing fiber assets for states and DOTs. Having built and managed thousands of miles of fiber, lit up thousands of circuits to hundreds of agencies, along with the cyber security infrastructure for state wide enterprise networks, has put us in position to understand the challenges states have with streaming and sharing live low latency video securely in a manner acceptable to all agencies sourcing and viewing video.
As a result, Luna/Skyline has a unique VIaaS architecture approach to solve the sharing security concerns, in a scalable cloud-based manner that addresses the goals and requirements of CTRMA's VISS program.
The Luna/Skyline team understands the CTRMA goals throughout the Region are to:
• Reduce the impacts of incidents to travelers, reduced roadway clearance time, and incident clearance time.
• Reduce secondary crashes.
• Provide accurate and timely traveler information to travelers.

We believe, as we have seen with our other customers, that by CTRMA taking a collaborative approach with regional partner entities towards mobility management will help ensure cohesion in the region by coordinating traffic incident management operations with its regional partners.
Below in Section 2 we will explain the products and services that make up our Video Interoperability as a Service offering which will provide a regional platform for CTRMA to reach those goals. Following in Section 3, we address how all the requirements of the RFP will be met.

2 Solution

2.1 Skyline Video Sharing Solutions Overview

For the CTRMA Video Interoperability and Sharing System, Luna will be leveraging the Skyline Video Sharing Solution currently available as a Commercial-Off-The -Shelf product, the Claris Portal.

The Claris Portal has been implemented for interoperable video sharing solutions of similar type and of significantly larger size for nearly fourteen (14) years to state and local government agencies. Skyline's Claris Portal is currently supporting seventeen (17) State DOT's with their video sharing systems, utilizing both on-premise (or locally hosted) solutions and solutions hosted completely or partially in the cloud.

The Skyline Claris Portal is configurable to support the following requirements:

- Integration with complex IP networks including LAN and WAN to provide stable and secure transport of video stream.
- Video collection from diverse cameras, networks, and locations.
- Normalization of video to a common format that is easy to transport and share.
- Secure and efficient video distribution to the public, media, partners and first responders.
- Integrating with multiple source and destination networks.
- Web based portals providing secure access to partners and operational support.
- Innovative features to enhance the video sharing system capabilities.
- Support for smart phones and tablets.
- 24/7 monitoring and support in our Network Operations Center (NOC) and Service Desk.
- Proven enterprise level product.

The most common barriers are network security, limited bandwidth, and diverse consuming agencies. The Luna/Skyline proposes a video sharing architecture to deal directly with these challenges and has enabled many agencies to provide live streaming video to the Traffic Management Centers and first responders. The architecture/approach is broken into areas: Normalize, Stream, Manage, and Monitor.

2.2 Step 1: Normalize

The key to any video sharing system is to have a way to normalize the video to a common format, size, and compression that is easy to move around an IP network. The Transcoding Appliance was designed specifically for the purpose of normalizing live IP video streams regardless of compression (MPEG2, MPEG4, H.264), frame rate (1-30), resolution (QCIF to D1), bandwidth (96kbps to 4 mbps), and format/codec (Impath, Optelecom, Cohu, Coretec, etc.). The Transcoder converts the diverse video sources to industry standards for compression, H.264, and format, RTP (Real Time Protocol), essentially normalizing the video. The Transcoder pulls only one video stream from a source but can produce multiple video sizes of the same stream (i.e. one low bandwidth for large volume distribution efforts and one high bandwidth for internal operations and sharing with media partners).

CTRMA currently has 50 total cameras in scope, all of which are H.264 and can put overlays of text or logos if desired. Given this, the transcoding service and infrastructure is not needed for this Phase 1 deployment of these 50 cameras. Should other partner agencies have non H.264 cameras or need special overlays not supported natively on the cameras, then the Transcoders and the Normalization step will be needed for those camera feeds.

2.3 Step 2: Stream

Once the video is normalized, CTRMA will need the video to be securely distributed to the Claris video portal for the TxDOT, City of Austin, and other trusted partners such as Police and to view on any device. These groups have specific needs regarding format, quality of video, security and volume. In order to support the diverse applications, streaming appliances are strategically placed on specific network firewall DMZs providing the ability to distribute video via the Claris portal from the CTRMA, TxDOT, COA and other school or government networks. The Streaming Appliances now become the

edge distribution device for each consumer group and enable the ability to create unique sets of cameras for each and to offline those cameras when required.
This architecture also allows thousands of end users to view a single camera, while at no time will there be more than one connection to the camera, nor will the county network be consumed and burdened with providing connections to 3rd party viewers. VIaaS streaming service can scale to ingest additional source cameras with the ability to support thousands of concurrent viewers. The streaming appliance distributes video streams via Skyline's Claris Live Streaming Protocol (CLSP), RTMP, RTSP/RTP/RTCP, or HLS/HTTP live protocol based on the request received from the user's device. This allows streaming video to be viewed on virtually any device, putting real-time streaming video into the hands of decision makers and responders wherever they may be located wherever they may be located.

2.4 Step 3: Manage

Now that the video is ready for distribution, CTRMA will need the ability to manage the operations and distribution of the video. Luna will use two web-based portals created by Skyline, to handle this requirement, the **Stream Manager** and the **Claris Portal**.

2.4.1 Stream Manager

The ***Stream Manager Portal*** enables efficient and effective operation of the SFS1000 and TS1000 appliances that make up the live video sharing system. Admins can view current status reports on the Stream Manager. Stream manager consolidates real-time stream status reports into an easy to use dashboard where a single user can connect to and manage every SFS/TS device in the video sharing architecture. The Stream Manager also provides a single location for camera meta data database which is used to support API (applications polling interface) polling capabilities supplying presentation applications with real time info on every camera. Often identified as the most important function the Stream Manager performs, the ability to offline or red button camera feeds from a single point is critical. The interface allows a user to turn off specific cameras on one or multiple streaming appliances which corresponds to specific security groups. Most commonly this capability is used to offline cameras to the public and media, while maintaining streaming to internal and external partners. The Stream Manager is a key component to our video sharing architecture.

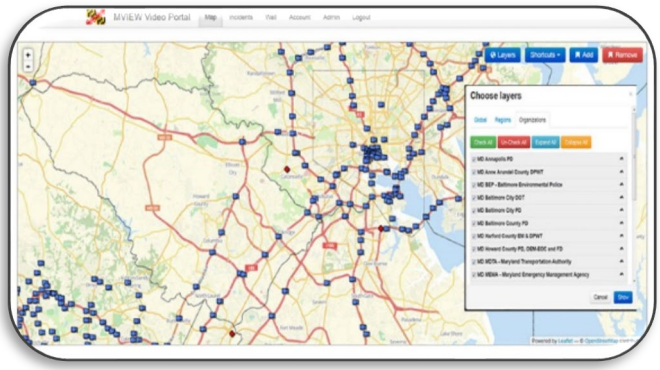
2.4.2 Claris Portal

Claris Portal provides web-based access to video content virtually anywhere. Whether out in the field, government office, or in the Traffic Management or police command center, Claris portal provides a flexible interface to view and manage video streams. Claris provides CTRMA with the ability manage access rights to their cameras and potentially partner agency cameras. All participating agencies/partners can view cameras based upon their access rights through a common portal, with no client software requirements or additional licensing fees. The Video Wall, Incident, and Map pages are three ways users can view video content in the Claris web-based portal.
The *Video Wall page* allows you to create your own dashboard with up to eighteen cameras and save your favorite configurations for quick reference. Choose from cameras organized by region or

participating agency, city or partner. Each partner can view different videos independent of any other videos that may be requested by other partners and only has access to those video streams which CTRMA provides permission to view.

The Incident page provides agencies the ability to quickly select traffic/congestion incidents as provided by ATMS or CAD applications and see the video streams coming from the nearest four cameras. Coming soon is the ability to view cameras from mobile response units based upon their real-time geo-location, giving agencies a quick bird's eye view along with an on-the-ground view of the situation.

The Map-*based page* provides the ability to quickly geo-locate cameras and other data points like traffic speeds, lane closures, incidents and other pertinent information from your ATMS or third-party provider.



Claris also provides ***administrative management tools*** that allow agencies to easily incorporate new cameras from the network and quickly share with partner agencies based upon secure access rights. CTRMA will be able to grant access within minutes and partner agencies can share and restrict access to subgroups of cameras based upon agency need.

Claris can also incorporate LDAP databases so that access credentials can be managed from a single database for agencies. Within Claris, users will only see the cameras that they were granted access to view. Cameras not within the approved device group for that partner will not be displayed. There are two levels of administration: Global and Local. A global administrator can manage the application's configuration, organizations, global device groups, and regions. A local administrator can manage users, markers, and device groups within one's own organization, produce reports, and manage the sharing of cameras and markers with users from other organizations.

2.5 Step 4: Monitor

Skyline has perfected the monitoring, maintenance, and operations of the video sharing solution over the last 10 years. The Luna/Skyline team maintains a fully functional Service Desk which meets the Information Technology Infrastructure Library (ITIL) standards. ITIL helps an IT Services company develop a baseline of processes, procedures, tasks and checklists from which it can plan, implement, and measure success. The Service desk is available by phone at any time through the use of a local or a toll-free number and provides the capabilities needed to fully support any client. These capabilities include the following:

- Proactive and first response to network and appliance monitoring and alerts.
- A documentation repository for each network and appliance infrastructure.
- A documentation repository for all standard operating procedures and policies.
- A flexible incident management system for incident and problem management and tracking.

In order to ensure reliable consistent responses for phone support, emails, and network monitoring alerts our service desk has been fortified with redundancy, including provisions for power, telephone, Internet services, and connectivity back to the data centers housing all of Skyline Technology Solutions systems and video infrastructure. Skyline also maintains a fully redundant disaster recovery office within 15 minutes of its primary offices which includes redundant telephone, network, systems, and Internet services. The Luna/Skyline team will be providing the following services for CTRMA:

- 24x7 Service Desk phone support.
- Ticketing system support w/ tracking of Incidents, Requests, and Maintenance.
- Hardware maintenance to include Firmware and Software updates.
- Onsite hot swappable spares appliance equipment.
- 48-hour hardware replacements supported with hot swappable spares.
- Emergency incident response.

2.6 Virtual Video Wall, Vero

The Vero video wall product replaces the legacy and expensive video matrix switch approach that hard wires video inputs to a set HDMI outputs to a wall of monitors. This approach limits where the wall can be seen to the local room. It also limits the number of simultaneous inputs and outputs.

Our approach is different, a web based, IP Stream based, virtual switch where any video can be matrixed on a wall of monitors. There are no limitations to counts of sources and destinations. Being virtualized and web based, allows for anyone with an account on the Vero system to bring up the Traffic Management Center wall on their browser, such as a VIP conference room, or another emergency management room, or any PC. The user can also define and select their own wall, and cycle through video tours they individually define.

The Video Wall capability is not in scope of this Proposal, however, may be of use to CTRMA as the VISS system grows.

3 Skyline Map to CTRMA VISS Requirements.

3.1 Understanding Scope

The tables below map the Skyline Video Interoperability as a Service component or feature that provides the required capability from the CTRMA VISS RFP.

Understanding Scope Requirements	Skyline Meets
the VISS shall provide a fully operational turnkey solution, including all services to design, implement, configure, and test the most effective and efficient solutions to deliver the best value for CTRMA.	Our packaging of all the architecture components described above in a single Video Interoperability as a Service offering was designed exactly for that purpose, to provide a turnkey managed solution.
CTRMA is looking at a web-based, cloud hosted solution based on existing COTS Software Solution with streaming capabilities originating in the cloud.	Skyline's Claris VIaaS is just that. A web-based cloud hosted solution for streaming is the basis for multi-agency collaboration, a primary CTRMA goal, which otherwise would not be achievable.
CTRMA is looking for minimal equipment required to be installed locally at its facilities to facilitate the delivery of streams to the cloud. Only one feed can be pulled from each camera regardless of how many end-users will be viewing the stream.	The architecture optionally would place a single SFS1000 appliance at the DMZ segment where all the video aggregates, which is understood to be at the Cedar Park TIMC. This provides a secure demarcation point to the cloud streaming service to send a single stream per camera to the cloud.
Any cloud services shall be hosted in a Tier 1 telecommunications facility with multiple power and internet backup connections	All our cloud datacenters / telecommunication centers surpass Tier 1 requirements and achieve Tier 2 and 3 with multiple power and internet redundant and alternate path connections.
The VISS will be designed to have no impact on CTRMA network security or capacity.	None of the collaborative 3rd party agencies will have any access to any component on the CTRMA network and not impact its security or bandwidth consumption. The architecture is the CTRMA local streamer device pushes a single stream per camera to the Cloud based service. It's from this cloud-based service is where the other agencies pull the stream for viewing, therefore not exposing CTRMA to any 3rd party connections.
The Contractor of the VISS shall provide any initial engineering service required to support the	As a Network Engineering company architecting, managing and monitoring

Understanding Scope Requirements	Skyline Meets
connection of the dedicated circuit, supplied by CTRMA, between the CTRMA's network and the VISS provided hosted services, and provide recommendations on the circuit capacity.	thousands of circuits for our customers, we have the skills and processes to provide the optimal engineering services for supporting the direct connection from CTRMA network to the cloud hosting facility. We understand the circuit(s) will be provisioned directly with the carriers and not in-scope of the VIaaS service. We will provide the specifications and engineering details to work with CTRMA IT and the carriers to see it is engineered and provisioned correctly.

3.2 Video Sources and Output Requirements Map.

Video Sources and Output Requirements	Skyline Meets
The contractor shall provide equipment and services to securely share live video streams from 58 CTRMA cameras to internal users, external partner agencies, and the public.	Our Streaming service scales well beyond 50 cameras and has ability to set role-based access controls on who can view the video based on agency and user account or to a public portal.
The VISS needs to incorporate video feeds from CTRMA and share video feeds with other partner agencies such as TXDOT or the City of Austin (COA) in a straightforward manner.	Our cloud based streaming service will provide access to TXDOT or COA by simply creating the organization profiles for each and user accounts in our Claris portal platform. Then share groups are defined to set who can see what streams if and when such filtering is needed.
VISS must be capable but not limited to handling and sharing simultaneous MPEG2, MPEG4, H.264 video inputs, and distributing on an industry standardized H.264 format.	The Transcoders were designed to pull in MPEG2, MPEG4, and H.264 feeds from cameras or other VMS sources and produce H.264 outputs at any standard frame rate and resolution, in real time.
VISS shall not be limited in the number of cameras to be shared or the number of simultaneous viewers of cameras. The solution shall quickly scale, allowing to add new cameras within the system.	Our SF Streamers support, depending on resolution, up to 400 simultaneous inputs and thousands of simultaneous viewers. This scales in minutes in our cloud by auto-provisioning additional streamer appliances. Adding new cameras is a simple and quick task of entering or importing the meta data describing the camera, frame rate and

Video Sources and Output Requirements	Skyline Meets
	resolution settings, GPS locations, and device group associations.
The streaming video shall be made available to end-users based upon the format required by the viewing device. Outbound video streams shall be automatically configured to Real-Time Messaging Protocol (RTMP), Real-Time Streaming Protocol (RTSP) protocols, or HTTP Live Streaming (HLS) protocol for mobile devices.	The Streamers provide different viewing formats depending whether the viewer is on an Apple device with HLS, a viewer of a web site still using RTMP Flash, a thick client viewer on RTSP so that any device and standard browsers can view the live streams.

3.3 System Administration Requirements Map.

System Administration Requirements	Skyline Meets
The VISS must be capable of quickly and simultaneously shutting down the video feeds in whole or per camera to the public while still providing access to videos for CTRMA and specified partner agencies.	The Stream Manager portal provides a systems administrator the interface to shut down in whole or per camera to the public feed while still allowing video feeds to other viewer communities such as CTRMA and other partners. This is called the "Red Button" feature with a simple click to off-line specified cameras.
The VISS shall provide administrative tools that provide CTRMA the ability to easily incorporate new cameras from the network and quickly share with its partner agencies.	The Stream Manager tool purpose is to quickly add new cameras, configure any setting, and verify the connection. These are immediately available for sharing by adding them in the appropriate device groups.
The VISS shall provide administrative tools that allow CTRMA's authorized users to grant access to whole groups of cameras, or subsets of cameras, to internal CTRMA's users and external partners, as necessary.	The Claris portal administration page defines cameras in device groups to map to partner agencies user groups for authorizing viewing permission. This is used in the Greater Washington DC area to provide secure access from over 60 video source agencies at the Federal, State, and local agencies to 160+ viewing agencies.
The VISS shall provide CTRMA the ability to group cameras into sub-groups for a specific user or all users based upon region, event, road, or other categories as defined by CTRMA.	Claris Portal provides for the definition of device groups and sub-groups for cameras that can be associated with individual or groups of users. These groups can be based on regional tags, roads, or other categories as defined by CRMTA.

System Administration Requirements	Skyline Meets
The VISS shall provide multiple levels of administration. VISS shall allow higher management control over configurations, groupings, and organization and local administration to manage users, assign credentials, produce reports. Individual users cannot have access to administrative functions.	Claris Portal has 3 primary user types; Global Administrators with complete control over the system including configurations, groupings, and organizations; Local Administrators with control limited to their agencies cameras, users, assign credentials, produce reports. ; and Individual users have no administrative right, just view rights granted to them by an administrator.

3.4 Web-Based Portal and integration with Third-Party Websites Map.

Web-Based Portal and integration with Third-Party Websites Requirements	Skyline Meets
Video streams shall be available to internal users and partner agencies via a web-based portal with user permissions assigned by CTRMA without the use of thick client proprietary, license-based software. Each user will only be able to view the specific cameras included in their user credential profile.	Claris VIaaS intent is for sharing video from any device, any agency, and any network to any device. A web-based platform is the only way to obtain that goal in a operationally effective means, where you don't need to have a thick client installed on all devices that partake in the system. That would be extremely cumbersome if not impossible in a multi- agency use case. However, every agency and every device has a browser. With Claris VIaaS, there is no need for proprietary clients, just a browser supporting HTML5. Cameras will only be viewable if the user has been granted direct permission or are a member of a user group that has been granted permission as defined in their user credentials profile.
End-users shall be able to view up to a minimum of nine (9) simultaneous videos on a single screen. The portal will provide the ability for each user to store custom views based upon the cameras that the user may need to view regularly.	Users can view more than nine (9) and typically view 12, 16 or more on their screen. They have multiple layout and size options and can map video sources to places on the screen layouts. These screen configurations can be saved and named, providing multiple pre-arranged layout presets which can be later selected for viewing.
The VISS portal shall provide multiple viewing options for video streams and ways of selecting video streams to view, including map and list based.	Claris Portal has a Map view with icons for each camera to select for viewing. Claris also has a list view for searching, sorting and filtering by multiple criteria and selecting for viewing.

Web-Based Portal and integration with Third-Party Websites Requirements	Skyline Meets
The streaming video shall be available and viewable on mobile devices.	Android devices and Apple iPhone and iPads are supported for viewing video streams.
The VISS shall be able to publish an API that allows incorporating video streams into third party websites and applications for the traveling public and other potential partners.	Skyline Claris APIs have been used by many public facing 511 web site, and internal facing 3rd party 911 CAD systems such as RapidDeploy, and 3rd party Advance Traffic Management Systems to ingest Claris Video into their web portals. This provide a simple aggregation service to the third parties for live video support.

3.5 System Reporting Requirements Map.

System Reporting Requirements	Skyline Meets
The VISS shall provide reporting capabilities that include data about 1) system usage by a user; 2) inventory of cameras and metadata; 3) inventory of user and their user levels; 4) contact information and agency name; 5) cameras viewed by a user, and 6) most utilized cameras.	Claris Portal includes a robust reporting and analytics module that has the ability to view all system data and logs in numerous outputs and visualizations that an administrator can define with a simple interface. There are pre-established reports that provide the 6 use cases listed here: 1) system usage by a user; 2) inventory of cameras and metadata; 3) inventory of user and their user levels; 4) contact information and agency name; 5) cameras viewed by a user, and 6) most utilized cameras.

3.6 Operations Support & Monitoring Requirements Map.

Operations Support & Monitoring Requirements	Skyline Meets
The Contractor shall provide 24x7x365 monitoring of the VISS, alerting CTRMA staff of dropped video feeds and loss of network connectivity to the cloud and monitor availability and quality of video streaming service.	We will leverage a Network Operation Center (NOC) / Service Desk which has been in continual operations without and interruption 24x7x365 for the past 12 years. This NOC currently supports TxDOT enterprise business network and the TxDOT Intelligent Transportation Network and provides proactive monitoring of all devices on those networks. The NOC monitors dropped video feeds, network health, and connectivity of our customers circuits and networking devices, as well as the video

Operations Support & Monitoring Requirements	Skyline Meets
	quality. Our matured ITIL based standard operating procedure ensures we respond to all alerts and notify our customers following a escalation schedule till resolution.
The contractor shall provide a 24x7x365 service desk staffed by U.S. based engineers to respond quickly to any system issues. Access to support shall be provided through both email and phone.	Our NOC / Service desk is in the US at Glen Burnie Maryland is staffed 24x7x365 by US engineers to respond quickly to all system issues. Skyline has a toll-free number 888-767-9040 and email Support@skylinenet.net and portal https://www.skylinenet.net/help to request assistance.
The contractor is required to provide an automated ticketing system to document, track, and follow-up with the customer service requests and established SLAs. The contractor shall have in place standard operating and escalation procedures to process system issues, measure performance, and abide by the agreed SLAs and KPIs.	Our Service desk has an automated ticketing system and follows ITIL defined processes to document, track, escalate incidents with disciplined follow-up processes to ensure established SLAs and KPIs are met. Our standard operating procedures have been in use and continually maturing over several years. Skyline will provide a monthly report stating performance, uptime, and incident statistics.
The contractor shall include in its response the Standard Terms and Conditions of its Support and Monitoring Service, its proposed Cloud Management Service with any established SLAs and KPIs.	The Terms and conditions of our support monitoring service are listed below.

Operational Support: The Luna/Skyline team has a 24x7 Network Operations Center / Support Center to monitor the health of the VIaaS service. This team will be alerted and create support tickets as needed. There is a support email and phone number to call them directly to report any issue with the system. Luna/Skyline team has a dedicated team of Product Technicians to support and manage the VIaaS offering. This includes promptly responding to all trouble tickets, with defined escalation procedures following ITIL practices. This team also performs the following activities as part of the Operational Support services.

- Updates for all user manuals.
- A minimum of yearly firmware and software updates for appliance and portals including all minor software releases that provide bug patches and new functionality that falls within the product roadmap.
    - Any upgrades follow a rigorous testing approach.
        - Automated and manual testing of proposed release.
        - Regression testing of release in Skyline's lab.

        - UAT for any new software release in the client's environment if required.
        - Change Control process for rolling out new release into a client's production environment.
    - Security patching - Skyline patches vulnerabilities which are identified throughout the development process. For vulnerabilities that are critical in nature, Luna/Skyline may coordinate with CTRMA to patch the system at an agreed upon time outside of the normal release cycle.
- 48-hour parts replacement for mission critical components
- ***Ticketing and Escalation*** - When a service call or email comes into the Service Desk, our employees follow a carefully scripted sequence of activities to thoroughly troubleshoot, resolve and track all communications and activities associated with the ticket. The Service Desk can support your agency's service-level requirements for video sharing program through a series of detailed steps in a Run Book created specifically for each client.
    - The process starts with the Service Desk as Tier-1 and Tier-2 support and escalates through Tier-3 and Tier-4 engineering and management support. The Service Desk has tiered teams to provide escalation responses as detailed in our Service Level Agreement.
    - The Service Desk provides an initial response to the client within five minutes of detection.
        - A ticket is created in the incident management system in order to keep a comprehensive work log detailing the history and current status of the incident.
        - Service Desk begins diagnosis of the event with the mission of determining the severity level.
        - Once the severity level is determined, the Service Desk will begin a notification process.
        - The ticket is tracked and all work on the related issue is documented within the ticket including all details through to the final resolution.
        - The operations service manager provides each client with a report indicating the actions taken, root cause and the current status of the issue.
- ***Enhancements*** - The Luna/Skyline team uses the Agile software development approach (utilizing scheduled sprints) that allows us to compartmentalize and schedule enhancements to our products. It also prevents us from doing "one-off" development exercises that are hard to update and support and can make the overall product line unreliable and hard to maintain.
    - We establish a roadmap that outlines the next 3-12 months of new features. Development sprints are scheduled on a quarterly basis and new enhancements are automatically considered to be at least one quarter out depending upon the current backlog of the team.
    - Enhancements are treated as additional small projects and will be estimated and presented to CTRMA for approval. All Enhancements to the system that are a result of requests from other DOT clients are included in the yearly O&M for CTRMA at no extra charge.
    - Functional enhancements that are considered to be highly critical to CTRMA operations are considered separately and can be scheduled into sprints on short notice upon approval of the development team and management.

4 Pricing and Schedule of Payments

The following table covers all in-scope deliverables and activities described above. The pricing is based on a one-year contract with one optional 1-year extension.

Price Item	Quantity	Price
56 Cameras, All-inclusive Claris VIaaS Hosted Services SW and Maintenance (OPEX) -100% of Annual Hosted Services on each anniversary of Acceptance	Year-1	$88,704.00
56 Cameras, All-inclusive Claris VIaaS Hosted Services SW and Maintenance (OPEX) - 100% of Annual Hosted Services on each anniversary of Acceptance	Year-2 (Optional)	$88,704.00
		Total 2 Year Contract ($177,408.00) +DIR fee of .0075%

Each additional camera will be billed at $1,584 per year or amortized at $132.00 per stream per month **plus the DIR fee of .0075

Schedule Milestone	Deliverable Name	Payment Milestone
Annual Software license fees, hosting fees, and maintenance support fees	VIaaS Hosted Services	100% of Annual Hosted Services on each anniversary of Acceptance ($88,704.00) **+DIR fee of .0075**

The CTRMA has the right to terminate this Agreement at its reasonable option, at any time with or without cause, by providing sixty (60) days written notice of such intention to terminate by stating in said notice the optional termination date. Upon such optional termination, the CTRMA shall enter into a settlement with the Contractor upon an equitable basis as determined by the CTRMA, which shall fix the value of the work performed by the Contractor prior to the optional termination date. In determining the value of the work performed, the CTRMA in all events shall compensate the Contractor for any reasonable costs or expenses actually incurred and which are attributable to the exercise of the CTRMA's optional termination, on an equitable basis as determined by the CTRMA as noted above, provided, however, that no consideration will be given to anticipated profit which the Contractor might possibly have made on the uncompleted portion of the Services.

5 Support Service & Operational Objectives

Support Service Business Hours: 8:00 AM to 5:00PM ET Monday – Friday
After Hours: All hours outside this window, and holidays.
Holidays:

New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Day after Thanksgiving, Christmas Eve, Christmas Day.

General
Specific terms/points of these objectives may be adjusted on a case-by-case basis as required based on mutual agreement by Luna and the Agency.

Exceptions
Luna/Skyline shall not provide any credits under this agreement in connection with any failure or deficiency of our provider's network caused by or associated with the following:

- Circumstances beyond reasonable control, including without limitation,
    - acts of any governmental body
    - war, insurrection, sabotage, embargo
    - "Acts of God" (i.e., fire, flood, earthquake, tornado, etc.)
    - strike or other labor disturbance
    - interruption of or delay in transportation
    - unavailability of or interruption or delay in telecommunications or third-party services,
    - failure of third-party software or inability to obtain raw materials, supplies
    - power used in or equipment needed for provision of the Service Agreement.
- Telco Failure (i.e., cutting a fiber line somewhere)
- Backbone peering point issues (PAIX)
- Scheduled maintenance for hardware/software upgrades
- DNS issues not within our direct control
- Agency acts or omissions, including without limitation,
    - any negligence, willful misconduct, or use of our services in breach of our Policy, by agency or others authorized by agency.
- DDoS attacks or any IRC related attacks

In the event of an unfortunate third-party outage (e.g., telecom provider, power service, etc.) the Luna/Skyline team owns the process as well as responsibility to continue service to their best ability should a third-party provider be unable to deliver service.

Measurement
On an average of every 5 minutes the support service polls the agency video systems components using monitors specifically for network and host server availability. The monitoring is completed using software and hardware components capable of measuring application traffic and responses. We uses a method of PING and SNMP responses, and agency acknowledges that such measurements may not measure the exact path traversed by a client's internet connection, and that such measurements constitute measurements across our network, but not other networks to which a client may connect. We reserve the right to periodically change the measurement points and methodologies it uses without notice to clients. Full network and server reporting will be posted to a location designated by the Luna/Skyline team and made available to agency. The measurement of service is computed by averaging the availability across all active servers and services (minus any equipment in maintenance).

Trusted Brands

The Luna/Skyline team commits to using name brand, trusted equipment partners to provide best in tier service. Specific brand examples include Dell, Juniper, Ciena, Aruba, Cisco, Microsoft, Apple, Axis, WTI, etc.

Hardware Failure
The Luna/Skyline team makes a commitment that all hosted equipment if found to be in a failed state will be corrected as soon as possible, and in accordance with the *Expected Response Times for Incidents and Service Requests*. Faulty hardware is rare but cannot be predicted nor avoided. We utilize only name brand hardware of the highest quality and performance. We will replace all faulty hardware affecting performance levels of equipment as soon as possible, which includes hardware issues that cause server crashes or speed issues. Hardware failure resulting in complete network/server outage/downtime will also be corrected as soon as possible. Router failure is an exception to this guarantee and may require on-site engineers or backbone provider emergency personnel to correct the problem. We will replace all faulty hardware on equipment, at no charge to agency, with an unlimited free replacement policy during the term of service. This includes parts ordered as upgrades.

Accountability
The Luna/Skyline team will discuss availability during the Monthly Status Meeting. Any actions for remediation will be proposed and discussed during the scheduled meeting. Such actions will be agreed to by both agency and vendor, as well as any plans or associated tasking.

Incident Severities
Incident Definition: An unplanned interruption to a video service or reduction in the quality of the service. The incident management process ensures that normal service operation is restored as quickly as possible and the business impact is minimized.

Severity-1 – A critical, or major incident where a severe outage spans one or many TOCs/sites, or one or many Streamers (SFS1000's) that are in a non-functional state, or all users are impacted, or an outage of a hosted application or its subsystems (i.e., Claris, Stream Manager, Map Server, etc.) or any incident during a special event.

Severity-2 – Incident resulting in an outage of one or many Transcoders (TS1000), or one Streamer (SFS1000), or an outage which impacts functionality, but the system remains usable. A degradation in functionality of the application or service, or Streamer (SFS1000).

Severity-3 – Incident affecting one stream, or a small subset of camera feeds, or an incident which results in service degradation thereof.

Service Request – Not an incident. Request in which nothing is degraded or non-functional. This is an appeal for a new account, service, information, functionality, modification of existing service, etc.

Maintenance –Not an incident, or a service request. Modification of a Production or Non-Production system that is required to keep the system functioning in an optimal and secure manner. The process utilizes the standard Change Management process (CCB) and may at times require additional documentation.

1. **Expected Response Times for Incidents and Service Requests.**

Incident Severity	Initial Response	Initial Communication	Frequency of Communication	Resolution Objective	Root Cause Analysis
Severity 1	Phone call to the submitter of the ticket within fifteen (15) minutes from receipt of system ticket, system monitor, technician discovery, or client phone call to the Service Desk. Internal Conference bridge to be opened. Basis of response is 24x7x365.	Formal email communication to client within thirty (30) minutes from confirmation/verification that the issue is a Sev-1. To be distributed no later than one (1) hour since report of issue.	Formal email communication to client within sixty (60) minutes from the previous communication.	Two (2) hours. With formal notification.	Formal email communication to client within two (2) business days from the distribution of the Resolution communication. Upon client request for a post mortem. Analysis may be performed.
Severity 2	Phone call to the submitter of the ticket within thirty (30) minutes from receipt of system ticket, system monitor, technician discovery, or client phone call to the Service Desk. In some cases, email correspondence (or via ticketing system). Basis of response is 24x7x365.	Formal email communication to client within one (1) hour from confirmation/verification that the issue is a Sev-2. To be distributed no later than one (1) hour since report of issue.	Email correspondence using the ticketing system every two (2) hours. In some cases the frequency of communication may be reduced.	One (1) business day. With email (i.e., ticket system) notification.	Formal email communication to client within two (2) business days based on a specific client request.

Incident Severity	Initial Response	Initial Communication	Frequency of Communication	Resolution Objective	Root Cause Analysis
Severity 3	Phone call within thirty (30) minutes from receipt of system ticket, system monitor, technician discovery, or client phone call to the Service Desk. Basis of response is 24x7x365.	Email correspondence using the ticketing system within one (1) business day of confirmation/verification that the issue is a Sev-3.	Email correspondence using the ticketing system once (1) per business day.	Three (3) business days. With email (i.e., ticket system) notification.	Formal email communication to client within two (2) business days based on a specific client request.
Service Request	Phone call within thirty (30) minutes from receipt of system ticket, or client phone call to the Service Desk. Basis of response is 24x7x365.	Within one (1) business day of Initial Response.	Dependent on nature of request.	Dependent on nature of request.	None.

LUNA DATA SOLUTIONS INC.

Dana R. Jones
Luna Data Solutions Inc.

2/16/2024
Date

CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY

James Bass
Executive Director

Date

DIR Vendor Agreement

This is to signify that the Central Texas Regional Mobility Authority and Luna Data Solutions Inc. have entered into an Agreement **in an amount not to exceed $468,709.96** pursuant to Texas Government Code Section 2054.0565 utilizing Texas Department of Information Resources Contract No. #DIR-CPO-4957 for the deliverable-based information technology services described in this proposal. All terms and conditions of Texas Department of Information Resources Contract No. #DIR-CPO-4957 are applicable to and made part of this agreement.

LUNA DATA SOLUTIONS

Dana R. Jones
Luna Data Solutions Inc.

2/16/2024
Date

CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY

James Bass
Executive Director

Date

Public Records Act Agreement

The Contractor acknowledges and agrees that all records, documents, drawings, plans, specifications, and other materials in the Authority's possession, including materials submitted by Contractor, are subject to the provisions of the Texas Public Information Act (see Texas Government Code § 552.001). The Contractor shall be solely responsible for all determinations made by it under such law, and for clearly and prominently marking each page or sheet of materials with "Trade Secret" or "Confidential", as it determines to be appropriate. Contractor is advised to contact legal counsel concerning such law and its application to Contractor.

If any of the materials submitted by the Contractor to the Authority are clearly and prominently labeled "Trade Secret" or "Confidential" by Contractor, the Authority will endeavor to advise Contractor of any request for the disclosure of such materials prior to making any such disclosure. Under no circumstances, however, will the Authority be responsible or liable to Contractor or any other person for the disclosure of any such labeled materials, whether the disclosure is required by law, or court order, or occurs through inadvertence, mistake, or negligence on the part of the Authority or its officers, employees, contractors, or consultants.

In the event of litigation concerning the disclosure of any material marked by Contractor as "Trade Secret" or "Confidential," the Authority's sole obligation will be as a stakeholder retaining the material until otherwise ordered by a court, and Contractor shall be fully responsible for otherwise prosecuting or defending any action concerning the materials at its sole cost and risk; provided, however, that the Authority reserves the right, in its sole discretion, to intervene or participate in the litigation in such manner as it deems necessary or desirable. All costs and fees, including reasonable attorneys' fees and costs, incurred by the Authority in connection with any litigation, proceeding or request for disclosure shall be reimbursed and paid by the Contractor.

LUNA DATA SOLUTIONS INC.	**CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY**
Dana R. Jones	James Bass
Luna Data Solutions Inc.	Executive Director
2/16/2024	
Date	Date

CENTRAL TEXAS REGIONAL
MOBILITY AUTHORITY

February 28, 2024
AGENDA ITEM #9

Discuss and consider approving Change Order No. 24 with The Lane Construction Corporation for increases in the quantity of topsoil required for the 183A Phase III project

Strategic Plan Relevance:	Regional Mobility
Department:	Engineering
Contact:	Mike Sexton, P.E., Director of Engineering
Associated Costs:	$2,373,152.50
Funding Source:	Project contingency funds
Action Requested:	Approve Change Order No. 24

Project Description/Background: The Central Texas Regional Mobility Authority is constructing a 5.3-mile extension of the existing 10-mile 183A Toll Road north from Hero Way to north of SH 29. Together with the associated access ramps, frontage road improvements and transitions, the overall project length will be approximately 6.6 miles. The tolled lanes are within the median of TxDOT right-of-way of the existing US 183 corridor. The new toll lanes are scheduled to open no later than January 2025; however, they may open as early as July 2024.

Previous Actions/Brief History of the Project/Program: Final acceptance of the Contractor's bid and approval of the contract award by the Mobility Authority's Board of Directors occurred on September 30, 2020. The Mobility Authority and the Lane Construction Corporation (Lane) executed the construction contract on October 15, 2020 (the Contract), and the Mobility Authority issued a Notice to Proceed (NTP) on March 28, 2021, which allowed for commencement of construction activities. Contract time for the 183A Phase III Project began on April 26, 2021.

Action requested: Since the value of Change Order No 24 (CO-24) exceeds $2,000,000.00, Board approval is required per Resolution No. 18-040 dated July 25, 2018. CO-24 provides compensation to Lane for a substantial topsoil quantity added to the Contract

post award. Additionally, CO-24 adds 8 days to the Contract completion milestones and includes Contractor's overhead costs associated with the additional days.

Financing: CO-24 will be funded using approved Project contingency.

Staff Recommendation: Staff recommends that the Board approve CO-24 for the 183A Phase III Project which will add an additional $2,373,152.50 to the value of the Contract.

Backup provided: Draft Resolution
Change Order No. 24

GENERAL MEETING OF THE BOARD OF DIRECTORS
OF THE
CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY

RESOLUTION NO. 24-0XX

APPROVING CHANGE ORDER NO. 24 WITH THE LANE CONSTRUCTION CORPORATION FOR THE 183A PHASE III PROJECT

WHEREAS, by Resolution No. 18-040, dated July 25, 2018, the Board of Directors established change order amounts the Executive Director is authorized to approve based on certain construction contract value limits, including a $2,000,000 maximum change order approval limit for construction contracts valued over $100,000,000; and

WHEREAS, by Resolution No. 20-063, dated September 30, 2020 the Board of Directors awarded a construction contract to The Lane Construction Corporation for the construction of the 183A Phase III Project and contingent upon receiving concurrence from the Texas Department of Transportation, authorized and directed the Executive Director to negotiate and execute a contract with the Lane Construction Corporation in an amount not to exceed $175,695,656.17; and

WHEREAS, the Executive Director and The Lane Construction Corporation have negotiated Change Order No. 24 to the construction contract in the amount of $2,373,152.50 for the added compost manufactured topsoil quantity and the time impact analysis (TIA) associated with this additional work and the addition of 8 days to the construction contract completion milestones and including The Lane Construction Corporation's overhead costs associated with the additional days a copy of which is attached hereto as Exhibit A; and

WHEREAS, the Executive Director recommends approval of proposed Change Order No. 24 to the construction contract The Lane Construction Corporation in the amount of $2,373,152.50

NOW THEREFORE, BE IT RESOLVED that the Board of Directors authorizes the Executive Director to finalize and execute proposed Change Order No. 24 to construction contract with The Lane Construction Corporation in the amount of $2,373,152.50 and in the form or substantially the same form as Exhibit A.

Adopted by the Board of Directors of the Central Texas Regional Mobility Authority on the 28th day of February 2024

Submitted and reviewed by:

James M. Bass
Executive Director

Approved:

Robert W. Jenkins, Jr.
Chairman, Board of Directors

Exhibit A

183A PH III

CHANGE ORDER #024

Amount: $2,373,152.50

Description:

Compost Manufactured Topsoil and TIA

This Change Order is being issued by the Mobility Authority to The Lane Construction Corporation in the amount of $2,373,152.50 for the added compost manufactured topsoil quantity and the time impact analysis (TIA) associated with this additional work.

This change order revises the existing compost manufactured topsoil item, adds contract time to the project, and introduces three new contract line items to compensate the Lane Construction Corporation for the additional topsoil quantity. These include Standby Equipment Costs, Daily Project Overhead incurred, and Compost Manufactured Topsoil above the 125% threshold. A Time Impact Analysis was submitted by Lane and the Mobility Authority agreed with the overall impact of 8 days to the project. The CEI team negotiated with the contractor and an agreement was reached to compensate them for standby equipment costs (per Specification Item 4.6.1) and daily project overhead reimbursed at 9% as negotiated between Lane and the Mobility Authority.

Change Order Contents:

1. Change Order Forms
2. Exhibit A – Letter Submittal for Compost Manufactured Topsoil and TIA
3. Exhibit B – Lane Pricing for Compost Manufactured Topsoil
4. Exhibit C – Lane Time Impact Analysis for Compost Manufactured Topsoil
5. Exhibit D – Lane Standby Equipment Costs

CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY

CHANGE ORDER NUMBER: 024

Project Name:	**183A Extension - Phase III**
Contract No:	**19183A24601C**
CSJ:	**0914-05-192**
Highway:	**183A**
County:	**Williamson**
TxDOT Dist:	**Austin**
FAP Number:	

1. CONTRACTOR: **The Lane Construction Corporation**

2. Change Order Work Limits: Sta. **24+45** to Sta. **377+00**

3. Type of Change(on federal-aid non-exempt projects): **Major** (Major/Minor)

4. Reasons: **1A** (3 Max. - In order of importance - Primary first)

5. Describe the work being revised:

This Change Order is being issued by the Mobility Authority to The Lane Construction Corporation for the additional quantity of compost manufactured topsoil needed due to errors in the plans. The Time Impact Analysis (TIA) for this work is also included in this Change Order.

6. Work to be performed in accordance with Items: **161-6017**

7. New or revised plan sheet(s) are attached and numbered: **N/A**

8. New general notes to the contract are attached: ☐ Yes ☑ No

9. New Special Provisions to Item No. **N/A** and Special Specification Item **N/A** are attached.

Each signatory hereby warrants that each has the authority to execute this Change Order (CO).

This Change Order Proposal includes all known and anticipated direct, indirect and consequential impacts or amounts which may be incurred as a result of the event, occurrence or matter giving rise to this change, and the Contractor has no reason to believe and does not believe that the factual basis for this Change Order is falsely represented. If the Change Order Proposal includes claims of Subcontractors or Suppliers, the Contractor has reviewed such claims and has determined in good faith that the claims are justified as to both entitlement and amount.

THE CONTRACTOR Date

By

Typed/Printed Name **Chelsea Abbott**

Typed/Printed Title **Vice President – Finance**

Date

By

Typed/Printed Name **Jose Penalver**

Typed/Printed Title **Vice President – Construction**

The following information must be provided

Time Ext. #: **2** Days added on this CO: **8**

Amount added by this change order: **$2,373,152.50**

For TxDOT/CTRMA/FHWA use only:

Current Contract Amount	$	177,035,190.45
Revised Contract Amount To Date	$	179,408,342.95
Days FHWA Non-Participating		N/A
CO Portion FHWA Non-Participating	$	-

RECOMMENDED FOR EXECUTION:

Engineer's Seal:

CTRMA Director of Engineering Date

CTRMA Deputy Executive Director Date

CEI Project Manager Date

CTRMA Executive Director Date

GEC Project Manager Date

TxDOT Representative Date

CTRMA Construction Representative Date

FHWA Area Engineer Date

183A Extension - Phase III

CHANGE ORDER NUMBER: ***024***

TABLE A: Force Account Work and Materials Placed into Stock Estimated Cost: **$0.00**

		LABOR	QTY	HOURLY RATE	TOTAL	EQUIPMENT	DAYS	HOURLY RATE	TOTAL

TABLE B: Contract Items

				ORIGINAL + PREVIOUSLY REVISED			NEW			
CHANGE ITEM	REASON CODE	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	ITEM COST	QUANTITY	UNIT PRICE	ITEM COST	OVERRUN/ UNDERRUN
0161-6017	1A	COMPOST MANUF TOPSOIL (4")	SY	224,045.00	$ 2.61	$ 584,757.45	280,056.00	$ 2.61	$ 730,946.16	$ 146,188.71
9920-9001	1A	DAILY PROJECT OVERHEAD (CMT)	Day	0.00	$ -	$ -	8.00	$ 17,948.48	$ 143,587.84	$ 143,587.84
9920-9002	1A	EQUIPMENT COSTS	LS	0.00	$ -	$ -	1.00	$ 20,776.32	$ 20,776.32	$ 20,776.32
9920-9003	1A	COMPOST MANUFACTURED TOPSOIL (>125%)	SY	0.00	$ -	$ -	227,409.00	$ 9.07	$ 2,062,599.63	$ 2,062,599.63
EXTRA WORK ITEM	REASON CODE	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	ITEM COST	QUANTITY	UNIT PRICE	ITEM COST	OVERRUN/ UNDERRUN
									$ -	
TOTALS						$ 584,757.45			$ 2,957,909.95	$ 2,373,152.50

CHANGE ORDER REASON(S) CODE CHART

1. Design Error or Omission	1A. Incorrect PS&E 1B. Other
2. Differing Site Conditions (unforeseeable)	2A. Dispute resolution (expense caused by conditions and/or resulting delay) 2B. Unavailable material 2C. New development (conditions changing after PS&E completed) 2D. Environmental remediation 2E. Miscellaneous difference in site conditions (unforeseeable)(Item 9) 2F. Site conditions altered by an act of nature 2G. Unadjusted utility (unforeseeable) 2H. Unacquired Right-of-Way (unforeseeable) 2I. Additional safety needs (unforeseeable) 2J. Other
3. CTRMA Convenience	3A. Dispute resolution (not resulting from error in plans or differing site conditions) 3B. Public relations improvement 3C. Implementation of a Value Engineering finding 3D. Achievement of an early project completion 3E. Reduction of future maintenance 3F. Additional work desired by the CTRMA 3G. Compliance requirements of new laws and/or policies 3H. Cost savings opportunity discovered during construction 3I. Implementation of improved technology or better process 3J. Price adjustment on finished work (price reduced in exchange for acceptance) 3K. Addition of stock account or material supplied by state provision 3L. Revising safety work/measures desired by the CTRMA 3M. Other
4. Third Party Accommodation	4A. Failure of a third party to meet commitment 4B. Third party requested work 4C. Compliance requirements of new laws and/or policies (impacting third party) 4D. Other
5. Contractor Convenience	5A. Contractor exercises option to change the traffic control plan 5B. Contractor requested change in the sequence and/or method of work 5C. Payment for Partnering workshop 5D. Additional safety work/measures desired by the contractor 5E. Other - Alt. design resolves previous non conformance
6. Untimely ROW/Utilities	6A. Right-of-Way not clear (third party responsibility for ROW) 6B. Right-of-Way not clear (County responsibility for ROW) 6C. Utilities not clear 6D. Other

Change Order No. 024 -- Revised Contract Amount to Date Summary

Original Contract: $ 175,695,656.17

	Amount	Description	Revised Contract Amt to Date:	
CO-001	$0.00	Pipe Encasement Steel	$	175,695,656.17
CO-002	$0.00	Baseline and Monthly Schedule Update Payments	$	175,695,656.17
CO-003	$0.00	System F Junction Box (MH F-03)	$	175,695,656.17
CO-004	$0.00	Signal Hill Shoulder Widening	$	175,695,656.17
CO-005	$0.00	System B Junction Box (MH B-J3)	$	175,695,656.17
CO-006	$58,512.78	Ranger Pond Revision (Line RP01)	$	175,754,168.95
CO-007	$40,476.70	Bryson Concrete Footing for Sister Shafts	$	175,794,645.65
CO-008	$583,458.23	Added Water Lines	$	176,378,103.88
CO-009	$0.00	Remove and Relay Pavers	$	176,378,103.88
CO-010	$0.00	Additional Waterline Support	$	176,378,103.88
CO-011	$0.00	Class A Concrete for Drilled Shaft Void Mitigation	$	176,378,103.88
CO-012	$0.00	Remove Structures (Drill Shafts)	$	176,378,103.88
CO-013	$145,626.90	TIA - Added Waterlines	$	176,523,730.78
CO-014	$0.00	Armor Curb Slot Inlets	$	176,523,730.78
CO-015	$0.00	Seward Sister Shafts (NCR-005) - Settlement	$	176,523,730.78
CO-016	$511,459.67	Large Signs and Toll Gantry Structures	$	177,035,190.45
CO-017	$0.00	Added Signal Head	$	177,035,190.45
CO-018	$0.00	Non-Epoxy Coated Soil Nail Hardware Credit	$	177,035,190.45
CO-019	$0.00	Soil Nail Mitigation - Additional Grout	$	177,035,190.45
CO-020	$0.00	MSE Backfill - Material Escalation	$	177,035,190.45
CO-021	$0.00	Lane Closure Assessment	$	177,035,190.45
CO-022	$0.00	Electrical Component Relocation	$	177,035,190.45
CO-023	$0.00	Cement Treatment	$	177,035,190.45
CO-024	$2,373,152.50	Compost Manufactured Topsoil and TIA	$	179,408,342.95

Summary Prepared by: Crisanto Pena Jr. 2/16/2024

NAME Date

Exhibit A – Letter Submittal for Compost Manufactured Topsoil and TIA

RS&H

8240 N MoPac Expressway
Suite 300
Austin, Texas 78759

Office 512-279-5427
rsandh.com

February 16, 2024

Mr. Juan Villarreal
Central Texas Regional Mobility Authority
3300 N. IH 35, Suite 300
Austin, Texas 78705

Project: **183A PH III Project**
Subject: **Proposed Change Order #024 Pricing**
Compost Manufactured Topsoil and TIA

Dear Mr. Villarreal,

RS&H, Inc., is respectfully submitting the attached Proposed Change Order for your approval. The proposed Change Order is to compensate the Lane Construction Corporation for the added compost manufactured topsoil quantity and the time impact analysis (TIA) associated with this additional work.

This change order revises the existing compost manufactured topsoil item, adds contract time to the project, and introduces three new contract line items to compensate the Lane Construction Corporation for the additional topsoil quantity. These include Standby Equipment Costs, Daily Project Overhead incurred, and Compost Manufactured Topsoil above the 125% threshold. A Time Impact Analysis was submitted by Lane and the Mobility Authority agreed with the overall impact of 8 days to the project. The CEI team negotiated with the contractor and an agreement was reached between Lane and the Mobility Authority to compensate them for standby equipment costs and daily project overhead, as allowed by Specification Items 4.6.1 and 4.6.2.

Per Specification Item 4.6.1
Standby Equipment Costs. *Payment will be made in accordance with Section 9.7.1.4.3., "Standby Equipment Costs."*

Per Specification Item 4.6.2
Project Overhead. *Project overhead is defined as the administrative and supervisory expenses incurred at the work locations. When delay to project completion occurs, reimbursement for project overhead for the Contractor will be made using the following options:*

- *reimbursed at 6% (computed as daily cost by dividing 6% of the original Contract amount by the number of original Contract work days), or*
- *actual documented costs for the impacted period.*

In lieu of the 6% option for project overhead, the Mobility Authority negotiated a 9% rate with Lane and calculated the following using this method.

Original Contract Amount	$175,695,656.17
9% of Original Contract Amount	$15,812,609.04
Original Contract Workdays	881
Reimbursable Daily Cost (9%)	$17,948.48

The CEI team conducted working sessions with Lane to determine the best path forward to properly compensate the contractor for this issue. Three new unique pay items will be added to the contract via this change order, along with revising the existing pay item by adding an additional 56,011 SY which brings it up to the 125% threshold allowed per the Specification.

Item Number	Description	Unit	Unit Price	Quantity
REVISED QUANTITY				
0161-6017	COMPOST MANUF TOPSOIL (4")	SY	2.61	56,011
ADDED ITEMS				
9920-9001	DAILY PROJECT OVERHEAD (CMT)	DAY	$17,948.48	8
9920-9002	STANDBY EQUIPMENT COSTS (CMT)	LS	$20,776.32	1
9920-9003	COMPOST MANUFACTURED TOPSOIL (>125%)	SY	$9.07	227,409

Thank you for your consideration of this matter. If you have any questions or comments concerning this change order request, please contact me at 512-739-9237.

Sincerely,

Crisanto Peña, Jr., PE
Project Manager

Exhibit B – Lane Pricing for Compost Manufactured Topsoil

Change Order Summary

Date: 11/28/2023
Project Number: CC 914-5-192
Control Number : 0914-05-192
Highway: US183

Potential Change Order # 023 **Revision #** 3

Awarded Contract Amount	**$ 175,695,656.17**
Approved Change Orders To Date Amount	**$ 1,339,534.28**
Current Contract Amount	**$ 177,035,190.45**
This Change Order Request Amount	$ 2,062,875.63

Time (Days) Requested: **TBD** (TIA to be sent under separate cover)

Time (Days) Added: **TBD** (TIA to be sent under separate cover)

Explanation for Change and Scope of Work:

Please see attached pricing associated with the additional quantity of Compost Manufactured Topsoil. Topsoil screening for imported material is subject to the on-site CEI Team's interpretation of Item 160 Article 3: "remove and dispose of objectionable material", and our quantity for this item is subject to change based on the CEI's interpretation. This PCO does not include cost associated with any additional time impact. The additional costs associated with the time impact has been submitted separately as PCO-024.

Pricing Completed By

Ben Jablonski *(Print)* *Date* 11/28/2023

(Signature) *Date*

Cost Breakdown

Compost Manufactured Topsoil

Unit Price $ 9.07 /SY

Project: *CC 914-5-192*
Control No.: *0914-05-192*
Highway *US183*
Date *28-Nov-23*

Item	Description	Quantity		Labor		Equipment		Materials / Supplies		Subcontract		Sub Total
		Quantity	UM	Unit Price	Amount	Unit Price	Amount	Unit Price	Amount	Unit Price	Amount	
	Place Onsite Topsoil (3") (>125%)	227,409	SY							$ 1.75	$ 397,965.75	$ 397,965.75
	Import Topsoil (3")	16,404	CY					$ 24.30	$ 398,605.81			$ 398,605.81
	Import Compost (1")	7,580	CY					$ 43.38	$ 328,820.40			$ 328,820.40
	Place & Blend Compost (1")	227,409	SY	$ 0.77	$ 175,518.40	$ 0.47	$ 107,709.17					$ 283,227.57
	Lane Water Truck	303	HR	$ 36.30	$ 11,006.60	$ 61.73	$ 18,717.28					$ 29,723.87
	Lane 938 Loader (for loading topsoil at offsite source)	365	HR	$ 36.30	$ 13,237.40	$ 80.17	$ 29,235.33					$ 42,472.73
	Lane D3 Dozer (for stockpiling imported topsoil)	365	HR	$ 36.30	$ 13,237.40	$ 174.63	$ 63,681.74					$ 76,919.14
	Screening Imported Topsoil (assumes 25% screening)	4,101	CY							$ 18.50	$ 75,866.33	$ 75,866.33
												$ -
												$ -
Subtotals					**$ 212,999.80**		**$ 219,343.52**		**$ 727,426.21**		**$ 473,832.08**	**$ 1,633,601.60**
Labor Burden				55%	$ 117,149.89							$ 117,149.89
Total Direct Costs					**$ 330,149.69**		**$ 219,343.52**		**$ 727,426.21**		**$ 473,832.08**	**$ 1,750,751.49**
Contractor's Markup				25%	$ 53,249.95	15%	$ 32,901.53	25%	$ 181,856.55	5%	$ 23,691.60	$ 291,699.63
Subtotals with Markup					**$ 383,399.64**		**$ 252,245.05**		**$ 909,282.76**		**$ 497,523.68**	**$ 2,042,451.12**
Bond											1.0%	$ 20,424.51
Total Change Request												**$ 2,062,875.63**

Lane Water Truck

Additional Qty	227,409	SY
Avg Prod Rate	1500	SY/Shift
# Shifts	152	
Shift Hours	1516	
Water Truck Coverage (20%)	**303**	**Hours**

Stockpiling Import Topsoil

Description	Quantity	Loads	Loads/Day	Days	**Hours**
938 Loader	16,404	1094	30	36	**364.667**
Dozer	16,404	1094	30	36	**364.667**

Topsoil Import

Quantity 16,404 CY

Delivery

15 CY/Truck

$ 214.50 /Truck Based on trucking withir 20 miles of project

$ 14.30 /CY

Material

$ 10.00 /CY Compensation for material provider

Total

$ 24.30 /CY

Total Area 3" (SY)	507,465
Total Area 4.5" (SY)	16,525
Total Topsoil (CY)	51,008
Topsoil On Site (CY)	32,604
Topsoil Haul-off (CY)	2000
Import Topsoil (CY)	**16,404**

Includes 15% Waste

Place Blend Compost

Description	Manhours	Unit Rate	Total	$/SY
Foreman	1033.7	$ 47.00	$ 48,582.83	
Laborer	2067.4	$ 24.10	$ 49,823.24	
Operator	2067.4	$ 37.30	$ 77,112.32	
Labor Total			**$ 175,518.40**	**$ 0.77**
Tractor & Disc	2067.4	$ 52.10	$ 107,709.17	
Equipment Total			**$ 107,709.17**	**$ 0.47**
Grand Total			**$ 283,227.57**	**$ 1.25**

Based on 10 hour shift

Qty	227,409	SY
Prod Rate	110	SY/HR
	1,100	SY/Shift

RANGER EXCAVATING, L.P.
5222 THUNDER CREEK RD. B-1 • AUSTIN, TEXAS 78759 • (512) 331-5551

CHANGE ORDER
#003a

May 23, 2023

To: Ben Jablonski
Lane Construction

From: Barry Egbert

Re: CTRMA 183A PH.III

Subject: Topsoil Respread @ 4" & 6"

Ben,

Per Lane's request Ranger is submitting the following prices to spread the topsoil at 4" and 6" respectively. The price for the 4" also addresses the missing quantity left out of the plans. The scope involving this change order shall match the scope listed in our contract for this project. Same exclusions apply (i.e. no raking, screening or imported topsoil).

TOPSOIL (4") (spreading onsite topsoil)	SY	509,100.00	$1.75	$890,925.00
TOPSOIL (6") (spreading onsite topsoil)	SY	16,525.00	$2.60	$42,965.00

If Ranger is required to rework any areas already topsoiled with 3" or 5", there will be an additional charge and we will re-price when we know the area affected.

If imported topsoil is required Ranger will need to re-price all the topsoil items including the current topsoil items in Ranger's contract.

In addition to the above, Ranger requests additional time be added to the contract to perform the additional work.

Sincerely,
Barry Egbert

RANGER EXCAVATING, L.P.
5222 THUNDER CREEK RD. B-1 • AUSTIN, TEXAS 78759 • (512) 331-5551

August 30, 2023

CHANGE ORDER #013

Ben Jablonski
RE: 183A PH 3 - Screen Onsite Topsoil

The following price is for screening onsite stockpiled topsoil to remove +1" material from the topsoil
The pay quantity shall be measured and agreed upon by drone flight measurements and volume calculations in advance of screening. Ranger shall be paid for all cubic yards that pass through the screen plant.

SCOPE ITEM	UNIT	APPROX QTY	UNIT $		EXTENDED
SCREEN TOPSOIL	CY	30000	$18.50	$	555,000.00
				$	-
			TOTAL:	**$**	**555,000.00**

The quantity above is an estimate of the topsoil currently stockpiled on the project. Ranger will screen the topsoil that is stockpiled on the 183A PH 3 project to remove +1" material, not all rock will be removed from the topsoil. Both parties shall agree on the stockpiles to be screened and the quantities of each stockpile in advance of screening.
The stockpiles will be measured by drone flight prior to screening the topsoil to calculate the volume in each pile. The pay quantity shall be the calculated volume prior to screening each pile.

All previous exclusion still apply to the change order, no raking or tracking of topsoil is included.

Sincerely,
Barry Egbert
Ranger Excavating

Unit price is also applicable for imported topsoil

Quote

2040 FM 969
Elgin, Texas

Date	Estimate #
7/31/2023	073123-01

Name / Address	Ship To
Lane Construction Corporation 1195 W. Goforth Rd Buda, Tx 78610	183 Expansion N US Hwy 183 Liberty Hill, Tx 78642 Zone 4

Project
183 Expansion

Description	Qty	Rate	Total
AG Compost	15,000	30.71	460,650.00
Delivery 30 CY Loads	500	380.00	190,000.00
$43.38 Delivered / CY			
Travis County ESD 12-A & State (Combined Rate)		0.00	0.00

Quotes are valid for a period of three (3) months. Please request a re-bid if needed.

Quote Total $650,650.00

$650,650.00

EquipmentWatch

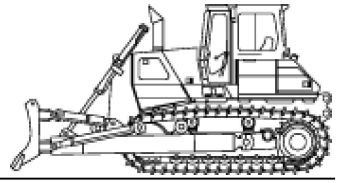
www.equipmentwatch.com
All prices shown in US dollars ($)

Rental Rate Blue Book®

May 31, 2023

Caterpillar D3
Standard Crawler Dozers

Size Class:
85 - 104 hp
Weight:
N/A



Configuration for D3

Dozer Type	**Crawler**	Horsepower	**104 hp**
Operator Protection	**ROPS/FOPS**	Power Mode	**Diesel**

Blue Book Rates

** FHWA Rate is equal to the monthly ownership cost divided by 176 plus the hourly estimated operating cost.

	Ownership Costs				Estimated Operating Costs	FHWA Rate**
	Monthly	**Weekly**	**Daily**	**Hourly**	**Hourly**	**Hourly**
Published Rates	USD $19,605.00	USD $5,490.00	USD $1,375.00	USD $205.00	USD $63.26	USD $174.65
Adjustments						
Region (Texas: 100.1%)	USD $19.60	USD $5.49	USD $1.38	USD $0.20		
Model Year (2020: 99.88%)	(USD $23.12)	(USD $6.47)	(USD $1.62)	(USD $0.24)		
Adjusted Hourly Ownership Cost (100%)	-	-	-	-		
Hourly Operating Cost (100%)					-	
Total:	**USD $19,601.49**	**USD $5,489.02**	**USD $1,374.75**	**USD $204.96**	**USD $63.26**	**USD $174.63**

Non-Active Use Rates

	Hourly
Standby Rate	USD $55.69
Idling Rate	USD $122.04

Rate Element Allocation

Element	**Percentage**	**Value**
Depreciation (ownership)	25%	USD $4,901.25/mo
Overhaul (ownership)	51%	USD $9,998.55/mo
CFC (ownership)	13%	USD $2,548.65/mo
Indirect (ownership)	11%	USD $2,156.55/mo
Fuel (operating) @ USD 4.25	17%	USD $10.67/hr

Revised Date: 2nd quarter 2023

These are the most accurate rates for the selected Revision Date(s). However, due to more frequent online updates, these rates may not match Rental Rate Blue Book Print. Visit the Cost Recovery Product Guide on our Help page for more information.

The equipment represented in this report has been exclusively prepared for KEEGAN JERABEK (ajmalek@laneconstruct.com)

EquipmentWatch

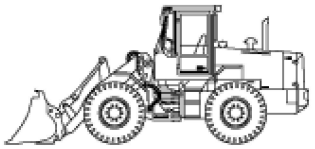
www.equipmentwatch.com
All prices shown in US dollars ($)

Rental Rate Blue Book®

May 31, 2023

Caterpillar 938M
4-Wd Articulated Wheel Loaders

Size Class:
175 - 199 hp
Weight:
N/A



Configuration for 938M

Operator Protection	**ROPS/FOPS**	Power Mode	**Diesel**

Blue Book Rates

** FHWA Rate is equal to the monthly ownership cost divided by 176 plus the hourly estimated operating cost.

	Ownership Costs				Estimated Operating Costs	FHWA Rate**
	Monthly	**Weekly**	**Daily**	**Hourly**	**Hourly**	**Hourly**
Published Rates	USD $8,540.00	USD $2,390.00	USD $600.00	USD $90.00	USD $31.48	USD $80.00
Adjustments						
Region (Texas: 100.4%)	USD $34.16	USD $9.56	USD $2.40	USD $0.36		
Model Year (2021: 99.94%)	(USD $4.75)	(USD $1.33)	(USD $0.33)	(USD $0.05)		
Adjusted Hourly Ownership Cost (100%)	-	-	-	-		
Hourly Operating Cost (100%)					-	
Total:	**USD $8,569.41**	**USD $2,398.23**	**USD $602.07**	**USD $90.31**	**USD $31.48**	**USD $80.17**

Non-Active Use Rates

	Hourly
Standby Rate	USD $24.34
Idling Rate	USD $61.97

Rate Element Allocation

Element	**Percentage**	**Value**
Depreciation (ownership)	39%	USD $3,330.60/mo
Overhaul (ownership)	33%	USD $2,818.20/mo
CFC (ownership)	16%	USD $1,366.40/mo
Indirect (ownership)	12%	USD $1,024.80/mo
Fuel (operating) @ USD 4.25	42%	USD $13.28/hr

Revised Date: 2nd quarter 2023

These are the most accurate rates for the selected Revision Date(s). However, due to more frequent online updates, these rates may not match Rental Rate Blue Book Print. Visit the Cost Recovery Product Guide on our Help page for more information.

The equipment represented in this report has been exclusively prepared for KEEGAN JERABEK (ajmalek@laneconstruct.com)

RENTAL QUOTE

9/20/23

Ewald Kubota

www.ewaldkubota.com

512/385-2800 Austin
Mon-Fri 8am-5pm Sat 8am-12Noon
www.ewaldkubota.com

Lessor Lane Construction
Address
City
Phone
Email

Model	Equipment Description		Class	Weight #	Monthly
M7060HD/LDR	Kubota 7060 Tractor		70 HP	5400	$3,000.00
	70 HP				
	7' Harrow Disc Attachment				$750.00
	✔ *5400*			***Rental Subtotal***	**$3,750.00**

Rental Period: **Daily**

Rental Periods are defined as:

Daily	-	**8 Hours**
Weekend	-	**16 Hours**
Weekly	-	**40 Hours**
Monthly	-	**160 Hours**

CC Number:

Expiration:

CSV:

CURRENT HOURS ON EQUIPMENT:	EQUIPMENT DUE BACK:

I acknowledge that I am the sole insurer of this equipment at all times and any damages will be charged to me and to the credit card on file. **I acknowledge that I will be charged a $200 cleaning fee if the rental equipment is not returned clean**. I acknowledge and agree to the rental contract as written on the revers page of this invoice

Lessor Name: Lane Construction

Lessor Signature: _____

EXEMPT AGRICULTURE PURPOSE

The Undersigned hereby has a registered sales tax exemption number on file:

Lane Construction _____
Lessor ***Signature***

Rental Subtotal	**$3,750.00**
HET	$5.22
Freight Total	$250.00
Sales Tax 10.50%	$393.75
Insurance 14.00%	
Total	$4,398.97

Exhibit C – Lane Time Impact Analysis for Compost Manufactured Topsoil

Change Order Summary

Date: 11/28/2023
Project Number: CC 914-5-192
Control Number : 0914-05-192
Highway: US183

Potential Change Order #	024	**Revision #**

Awarded Contract Amount	**$ 175,695,656.17**
Approved Change Orders To Date Amount	**$ 1,339,534.28**
Current Contract Amount	**$ 177,035,190.45**
This Change Order Request Amount	$ 164,364.14
Time (Days) Requested: **8**	

Explanation for Change and Scope of Work:

Please see attached Time Impact Analysis for the additional quantity of Compost Manufactured Topsoil. This PCO represents a daily cost of $17,948.48 (calculated by dividing 9% of the original Contract amount by the number of original Contract work days) as agreed to with CTRMA, plus the support equipment at a daily cost of $2,597.04 for 8 working days, as shown in the Time Impact Analysis, for a total cost of $164,364.14.

Pricing Completed By

Ben Jablonski *(Print)* *Date* 11/28/2023

(Signature) *Date*

Central Texas Regional Mobility Authority

Time Impact Analysis 02

Project: 183A Extension Phase 3

CSJ: 0914-05-192

Project No: CC 914-192

Table of Contents

1 Time Impact Analysis Contract Requirements

For the Time Impact Analysis, LANE will follow the requirements identified in the 2014 TXDOT Standard Specifications, Item 8 Prosecution and Progress, Article 5.5.4 Time Impact Analysis (TIA).

Item 8.5.5.4 Time Impact Analysis contains 4 Steps. The 4 Steps are described as follows:

Step 1: Establish the status of the project immediately before the impact.
Step 2: Predict the effect of the impact on the schedule update used in Step 1.
Step 3: Track the effects of the impact on the schedule during its occurrence.
Step 4: Establish the status of the project after the impact's effect has ended and provide details identifying any mitigating actions or circumstances used to keep the project ongoing during the impact period.

This Time Impact Analysis considers Steps 1 and 2 only as the work has not been completed, therefore the actual effect of the impact has not been determined. However, Lane is presenting this Time Impact Analysis in its current form to make CTRMA fully aware of the predicted time impact and its associated cost. Also, this provides CTRMA the option to settle the time and cost impacts at this time.

2 Overview

A Time Impact Analysis is being submitted for the time associated with the additional Compost Manufactured Topsoil (CMT) quantities that were added to the contract as part of NDC 009.

Lane submitted RFI 084 on September 9, 2021, identifying missing quantities for CMT. The CTRMA responded on October 1, 2021, with confirmation that the quantities for CMT shown on the plans were incorrect and additional CMT was required. Quantities were to be provided in a separate email.

NDC 009 was received on October 20, 2021, with revised plans showing the additional CMT quantities.

After NDC 009 was issued, CTRMA Representatives verbally indicated that the requirement for CMT may be removed and switch to only topsoil, however, no formal direction was provided, until the CTRMA sent a letter on June 2, 2023, requesting pricing for two options:

1. Furnishing & Placing Topsoil
2. Compost Manufactured Topsoil with additional quantities

Lane provided pricing for both options on September 1, 2023.

CTRMA responded on September 15, 2023, indicating that CTRMA has elected to proceed with Option 2 Compost Manufactured Topsoil with additional quantities. Lane has

submitted PCO-023 under separate cover to account for the additional cost associated with the quantity increase. PCO-023 does not include the cost shown in this TIA.

3 Objective/Purpose

Using the Time Impact Analysis required by the specifications, Lane will show that the additional quantities for CMT are predicted to delay multiple work areas and ultimately the overall project completion date.

4 Step 1: Establishment of the Project prior to Impact

Lane used the latest schedule submittal, *Update 28 August 2023* with a data date of August 25, 2023. As shown in Table 1 below, the state of the Project prior to the impact shows that the Substantial Completion date is July 22, 2024.

Table 1: Project Prior to Impact

US183A PH III Update 28 DD 08_25_23

Activity ID	Activity Name	Finish Date	Total Float
MS-1010	Substantial Completion (July 22, 2024)	July 22, 2024	0
MS-1120	Final Completion (October 18, 2024)	October 18, 2024	0

5 Step 2: Predict the Effect of the Impact

Lane added additional activities to the schedule to account for the additional topsoil quantities. These new activities were tied to the existing activities in the same station range to show the impact of the additional quantities. Table 2 below shows the predicted dates for the completion milestones, with a Substantial Completion date of August 1, 2024, with a negative float of 8 working days. This equals a net change of 8 working days to the completion of the Project.

Table 2: Predicted Effect of the Impact

US183A PH III Additional Topsoil Quantities

Activity ID	Activity Name	Finish Date	Total Float
MS-1010	Substantial Completion (July 22, 2024)	August 1, 2024	-8
MS-1120	Final Completion (October 18, 2024)	October 30, 2024	-8

6 Cost Justification Extended Overhead

Specification Language: *Item 4 Scope of Work Article 6.2 Project Overhead.* Reimbursement at 6% (computed as daily cost by dividing 6% of original Contract amount by the number of original Contract working days) or actual documented costs for the impact period.

Original Contract Amount: $175,695,656.17

Original Contract Working Days: 881 Working Days

6% Calculation: $11,965.65 / Day

The Time Impact Analysis, as previously indicated, shows an additional 8 working days. Lane's daily overhead cost, as calculated in the attached, is $25,462.35, which is greater than the standard 6%.

7 Cost Justification Support Equipment

LANE bid the project to have support equipment on site for the bid duration of the project. The equipment is used for yard operations, dust control, erosion control maintenance, and specialty equipment that cannot be called on and off rent at will. Due to the additional scope, the equipment will have to be on the project for an extended period of time.

Equipment Description	Qty Ea.	Hourly Rate	Added Days	Extended
Message Boards	6	$10.00	8	$3,840.00
Water Truck	1	$30.93	8	$1,979.52
Broom Tractor	1	$65.45	8	$4,188.48
Attenuator Truck	1	$16.95	8	$1,084.80
Air Compressor	2	$14.97	8	$1,916.16
CAT 315FL Excavator	1	$72.84	8	$4,661.44
CAT 299D3 Skid Steer	1	$48.53	8	$3,105.92
Subtotal				$20,776.32
1% Bond				$207.76
Total Support Equipment				$20,984.08

Exhibit D – Lane Standby Equipment Costs

Cost Justification Support Equipment

LANE bid the project to have support equipment on site for the bid duration of the project. The equipment is used for yard operations, dust control, erosion control maintenance, and specialty equipment that cannot be called on and off rent at will. Due to the delays outside of LANE's control the equipment has to be on the project for an extended period of time.

Equipment Description	Qty Ea.	Hourly Rate	Added days	Extended
Message Boards	6	$10.00	8	$3,840.00
Water Truck	1	$30.93	8	$1,979.52
Broom Tractor	1	$65.45	8	$4,188.48
Attenuator Truck	1	$16.95	8	$1,084.80
Air Compressor	2	$14.97	8	$1,916.16
CAT 315FL Excavator	1	$72.84	8	$4,661.44
CAT 299D3 Skid Steer	1	$48.53	8	$3,105.92
Total Support Equipment				$20,776.32

EquipmentWatch™

www.equipmentwatch.com

All prices shown in US dollars ($)

Rental Rate Blue Book®

April 24, 2023

Miscellaneous DSL 6X4 4000
On-Highway Water Tankers

Size Class:
200 hp & Over
Weight:
14000 lbs

Per Item 9.7.1.4.3.1 Contractor Owned Equipment
Standby will be paid at 50% (to remove operating cost) of the FHWA rental rates found in the Rental Blue Book multiplied by the regional adjustment factor and the rate adjustment factor.

Configuration for DSL 6X4 4000

Horsepower	**250.0**	Power Mode	**Diesel**
Tank Capacity	**4000.0 gal**		

Blue Book Rates

** FHWA Rate is equal to the monthly ownership cost divided by 176 plus the hourly estimated operating cost.

	Ownership Costs				Estimated Operating Costs	FHWA Rate**	
	Monthly	**Weekly**	**Daily**	**Hourly**	**Hourly**	**Hourly**	
Published Rates	USD $3,915.00	USD $1,095.00	USD $275.00	USD $41.00	USD $39.49	USD $61.73	
Adjustments							
Region (Texas: 100.6%)	USD $23.49	USD $6.57	USD $1.65	USD $0.25			
Model Year (2021: 99.95%)	(USD $2.06)	(USD $0.58)	(USD $0.14)	(USD $0.02)			
Adjusted Hourly Ownership Cost (100%)	-	-	-	-			
Hourly Operating Cost (100%)					-		
Total:	**USD $3,936.43**	**USD $1,100.99**	**USD $276.51**	**USD $41.22**	**USD $39.49**	**USD $61.86**	x 50%
							=$30.93

Non-Active Use Rates	**Hourly**
Standby Rate	USD $11.18
Idling Rate	USD $48.91

Rate Element Allocation

Element	Percentage	Value
Depreciation (ownership)	52%	USD $2,035.80/mo
Overhaul (ownership)	23%	USD $900.45/mo
CFC (ownership)	12%	USD $469.80/mo
Indirect (ownership)	13%	USD $508.95/mo
Fuel (operating) @ USD 4.25	67%	USD $26.54/hr

Revised Date: 2nd quarter 2023

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April 24, 2023

Superior Broom SM74J
Self Propelled Pavement Brooms

Size Class:
All
Weight:
N/A

Configuration for SM74J

Broom Length	**96 in**	Horsepower	**74 hp**
Power Mode	**Diesel**	Transmission	**Hydrostatic**

Blue Book Rates

** FHWA Rate is equal to the monthly ownership cost divided by 176 plus the hourly estimated operating cost.

	Ownership Costs				Estimated Operating Costs	FHWA Rate**	
	Monthly	**Weekly**	**Daily**	**Hourly**	**Hourly**	**Hourly**	
Published Rates	USD $12,880.00	USD $3,605.00	USD $900.00	USD $135.00	USD $57.68	USD $130.86	
Adjustments							
Region (Texas: 100.1%)	USD $12.88	USD $3.61	USD $0.90	USD $0.14			
Model Year (2021: 99.95%)	(USD $7.07)	(USD $1.98)	(USD $0.49)	(USD $0.07)			
Adjusted Hourly Ownership Cost (100%)	-	-	-	-			
Hourly Operating Cost (100%)					-		
Total:	**USD $12,885.81**	**USD $3,606.63**	**USD $900.41**	**USD $135.06**	**USD $57.68**	**USD $130.89**	x 50%
							=$65.45

Non-Active Use Rates	Hourly
Standby Rate	USD $36.61
Idling Rate	USD $84.84

Rate Element Allocation

Element	Percentage	Value
Depreciation (ownership)	18%	USD $2,318.40/mo
Overhaul (ownership)	61%	USD $7,856.80/mo
CFC (ownership)	10%	USD $1,288.00/mo
Indirect (ownership)	11%	USD $1,416.80/mo
Fuel (operating) @ USD 4.25	20%	USD $11.63/hr

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April 24, 2023

Miscellaneous 4X2 20KGVW DSL
On-Highway Flatbed Trucks

Size Class:
19,501 - 26,000 lbs
Weight:
6828 lbs

Configuration for 4X2 20KGVW DSL

Axle Configuration	**4X2**	Horsepower	**200.0**
Maximum Gross Vehicle Weight	**20000.0 lbs**	Power Mode	**Diesel**

Blue Book Rates

** FHWA Rate is equal to the monthly ownership cost divided by 176 plus the hourly estimated operating cost.

	Ownership Costs				Estimated Operating Costs	FHWA Rate**	
	Monthly	**Weekly**	**Daily**	**Hourly**	**Hourly**	**Hourly**	
Published Rates	USD $1,370.00	USD $385.00	USD $96.00	USD $14.00	USD $22.18	USD $29.96	
Adjustments							
Region (Texas: 100.7%)	USD $9.59	USD $2.69	USD $0.67	USD $0.10			
Model Year (2019: 99.9%)	(USD $1.43)	(USD $0.40)	(USD $0.10)	(USD $0.01)			
Adjusted Hourly Ownership Cost (100%)	-	-	-	-			
Hourly Operating Cost (100%)					-		
Total:	**USD $1,378.16**	**USD $387.29**	**USD $96.57**	**USD $14.08**	**USD $22.18**	**USD $30.01**	x 50%

=$15.00

Non-Active Use Rates	**Hourly**
Standby Rate	USD $3.92
Idling Rate	USD $24.48

Rate Element Allocation

Element	Percentage	Value
Depreciation (ownership)	50%	USD $685.00/mo
Overhaul (ownership)	25%	USD $342.50/mo
CFC (ownership)	12%	USD $164.40/mo
Indirect (ownership)	13%	USD $178.10/mo
Fuel (operating) @ USD 4.25	75%	USD $16.65/hr

Revised Date: 2nd quarter 2023

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April 24, 2023

Miscellaneous ALUMINUM-1
Crash Attenuators For Truck Mounting

Size Class:
All
Weight:
N/A

Configuration for ALUMINUM-1

Cartridge Type	**One-Piece**	Material Type	**Aluminum**
Maximum Impact	**45.0 mph**		

Blue Book Rates

** FHWA Rate is equal to the monthly ownership cost divided by 176 plus the hourly estimated operating cost.

	Ownership Costs				Estimated Operating Costs	FHWA Rate**	
	Monthly	**Weekly**	**Daily**	**Hourly**	**Hourly**	**Hourly**	
Published Rates	USD $595.00	USD $165.00	USD $41.00	USD $6.00	USD $0.50	USD $3.88	
Adjustments							
Region (Texas: 100.3%)	USD $1.78	USD $0.50	USD $0.12	USD $0.02			
Model Year (2019: 99.9%)	(USD $0.60)	(USD $0.17)	(USD $0.04)	(USD $0.01)			
Adjusted Hourly Ownership Cost (100%)	-	-	-	-			
Hourly Operating Cost (100%)					-		
Total:	**USD $596.18**	**USD $165.33**	**USD $41.08**	**USD $6.01**	**USD $0.50**	**USD $3.89**	x 50%

=$1.95

Non-Active Use Rates	**Hourly**
Standby Rate	USD $1.69
Idling Rate	USD $3.39

Rate Element Allocation

Element	Percentage	Value
Depreciation (ownership)	63%	USD $374.85/mo
Overhaul (ownership)	12%	USD $71.40/mo
CFC (ownership)	12%	USD $71.40/mo
Indirect (ownership)	13%	USD $77.35/mo

Fuel cost data is not available for these rates.

Revised Date: 2nd quarter 2023

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April 24, 2023

Caterpillar 315F L (disc. 2019)
Crawler Mounted Hydraulic Excavators

Size Class:
16.5 - 19.4 mt
Weight:
N/A

Configuration for 315F L (disc. 2019)

Bucket Capacity	**1 cu yd**	Horsepower	**97 hp**
Operating Weight	**36340 lbs**	Power Mode	**Diesel**

Blue Book Rates

** FHWA Rate is equal to the monthly ownership cost divided by 176 plus the hourly estimated operating cost.

	Ownership Costs				Estimated Operating Costs	FHWA Rate**
	Monthly	**Weekly**	**Daily**	**Hourly**	**Hourly**	**Hourly**
Published Rates	USD $15,985.00	USD $4,475.00	USD $1,120.00	USD $170.00	USD $54.66	USD $145.48
Adjustments						
Region (Texas: 100.2%)	USD $31.97	USD $8.95	USD $2.24	USD $0.34		
Model Year (2019: 100%)	-	-	-	-		
Adjusted Hourly Ownership Cost (100%)	-	-	-	-		
Hourly Operating Cost (100%)					-	
Total:	**USD $16,016.97**	**USD $4,483.95**	**USD $1,122.24**	**USD $170.34**	**USD $54.66**	**USD $145.67** x 50%

=$72.84

Non-Active Use Rates	**Hourly**
Standby Rate	USD $45.50
Idling Rate	USD $99.20

Rate Element Allocation

Element	Percentage	Value
Depreciation (ownership)	33%	USD $5,275.05/mo
Overhaul (ownership)	43%	USD $6,873.55/mo
CFC (ownership)	14%	USD $2,237.90/mo
Indirect (ownership)	10%	USD $1,598.50/mo
Fuel (operating) @ USD 4.25	15%	USD $8.19/hr

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April 24, 2023

Caterpillar 299D3
Compact Track Loaders

Size Class:
2851 - 3200 lbs
Weight:
N/A

Configuration for 299D3

Horsepower	**95 hp**	Operating Capacity (35% Of Tip Load)	**3200 lbs**
Operator Protection	**ROPS/FOPS**	Power Mode	**Diesel**

Blue Book Rates

** FHWA Rate is equal to the monthly ownership cost divided by 176 plus the hourly estimated operating cost.

	Ownership Costs				Estimated Operating Costs	FHWA Rate**
	Monthly	**Weekly**	**Daily**	**Hourly**	**Hourly**	**Hourly**
Published Rates	USD $10,485.00	USD $2,935.00	USD $735.00	USD $110.00	USD $37.46	USD $97.03
Adjustments						
Region (Texas: 100.1%)	USD $10.48	USD $2.93	USD $0.74	USD $0.11		
Model Year (2021: 99.94%)	(USD $5.81)	(USD $1.63)	(USD $0.41)	(USD $0.06)		
Adjusted Hourly Ownership Cost (100%)	-	-	-	-		
Hourly Operating Cost (100%)					-	
Total:	**USD $10,489.67**	**USD $2,936.31**	**USD $735.33**	**USD $110.05**	**USD $37.46**	**USD $97.06** x 50%
						=$48.53

Non-Active Use Rates	**Hourly**
Standby Rate	USD $29.80
Idling Rate	USD $74.53

Rate Element Allocation

Element	Percentage	Value
Depreciation (ownership)	20%	USD $2,097.00/mo
Overhaul (ownership)	53%	USD $5,557.05/mo
CFC (ownership)	11%	USD $1,153.35/mo
Indirect (ownership)	16%	USD $1,677.60/mo
Fuel (operating) @ USD 4.25	40%	USD $14.93/hr

Revised Date: 2nd quarter 2023

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CENTRAL TEXAS REGIONAL
MOBILITY AUTHORITY

February28, 2024
AGENDA ITEM #10

Discuss and consider approving Amendment No. 1 to the agreement with Great Hills Constructors for the 183 North Mobility Project to modify the early completion incentive and to add an interim milestone for early lane opening and associated incentive

Strategic Plan Relevance:	Collaboration
Department:	Engineering
Contact:	Mike Sexton, P.E., Director of Engineering
Associated Costs:	$ 0
Funding Source:	183N Project Funds
Action Requested:	Consider and act on draft resolution

Project Description/Background – The 183 North Mobility Project aims to improve mobility, reduce congestion and provide more reliable travel times for transit and emergency responders along the nine-mile stretch of US 183 between SH 45 North and MoPac. The Project includes the construction of two express lanes in each direction and the addition of non-tolled lanes to four in each direction. Express lane direct connectors will be constructed with MoPac to the south and operational improvements will be added to southbound MoPac. The Project also includes new shared use path connections and new sidewalks and cross-street connections for bicycles and pedestrians.

Previous Actions & Brief History of the Program/Project:

- April 27, 2016 - the Mobility Authority received environmental approval for the development of the 183 North Project through the issuance of a Finding of No Significant Impact (FONSI) by the Texas Department of Transportation ("TxDOT").

- April 26, 2017 - the Mobility Authority exercised its option as a local toll project

entity to develop, finance, construct, and operate the 183 North Project.

- January 31, 2019 - the Texas Transportation Commission approved the release of $104.2 million in federal funding for the non-tolled portion of the Project.

- September 11, 2019 - the Board authorized the Mobility Authority Executive Director, in coordination with the Board Chairman, to negotiate and execute a Project Development Agreement (PDA) with TxDOT for the 183 North Mobility Project. The PDA was subsequently executed on November 25, 2019. The PDA specifically anticipated a future update to the terms of the agreement after an Apparent Best Value Proposer (ABVP) was determined after proposal submission.

- February 8, 2021, the Mobility Authority Board awarded the design-build contract to the Apparent Best Value Proposer (ABVP), Great Hills Constructors, a joint venture between Archer Western Construction, LLC and Sundt Construction, Inc.

Proposed Amendment:

Contract Amendment #1 will introduce an interim completion and modified incentive payment for the early opening of an additional general-purpose lane by August 18, 2024, for a total of four in each direction of travel along the US 183 corridor.

The early incentive will make available $6,000,000 to the contractor upon opening of the additional general-purpose lanes by the interim completion date (8/18/24). Such incentive amount will be reduced by $50,000/day per direction of travel for each day past the interim completion date for which the contractor has not achieved interim completion.

Further, if the contractor achieves both interim completion and the substantial completion by the respective deadlines set forth in the contract, the contractor will receive an additional incentive payment of $2,000,000.

Finally, notwithstanding the contractor's ability to meet the interim completion deadline (and receive the $6,000,000 interim completion incentive) the incentive for early achievement of substantial completion may also include an additional $50,000/day, for each day the conditions of substantial completion are met prior to the substantial completion deadline for an amount not to exceed $2,000,000.

Additionally, the action will grant the Executive Director authority to execute change orders up to $10,000,000 in association Contract Amendment #1.

Financing: 183N Project Funds

Action requested/Staff Recommendation: Staff recommends that, contingent upon TxDOT approval, the Board authorize the executive director to execute Amendment #1, in similar form to the attached, to the Contract with Great Hills Constructors on the 183N Project.

Backup provided: Draft Resolution
Draft Contract

GENERAL MEETING OF THE BOARD OF DIRECTORS
OF THE
CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY

RESOLUTION NO. 24-0XX

APPROVING AMENDMENT NO. 1 TO THE DESIGN-BUILD CONTRACT WITH GREAT HILLS CONSTRUCTORS FOR AN INTERIM MILESTONE FOR THE 183 NORTH MOBILITY PROJECT

WHEREAS, by Resolution No. 17-023, dated April 26, 2017, the Central Texas Regional Mobility Authority Board of Directors (Board) exercised its option as a local toll project entity to develop, finance, construct, and operate the 183 North Mobility Project that includes construction of two express lanes in each direction along a 9-mile stretch of US 183 between SH 45/RM 620 and Mo Pac, the addition of a fourth general purpose lane in each direction and connections from the 183 North Express Lanes to the MoPac Express Lanes, as well as new shared use path connections, new sidewalks, and cross-street connections for bicycles/pedestrians; and

WHEREAS, by Resolution No. 21-011, the Board approved a design-build contract with Great Hills Constructors (the "Contract") to design and construct the 183 North Mobility Project; and

WHEREAS, the Executive Director and Great Hills Constructors have negotiated proposed Amendment No. 1 to the Contract to add an interim milestone for the early opening of an additional general-purpose lane for a total of four in each direction of travel along the US 183 corridor, as well as providing for related incentive payments of up to $10,000,000 for achieving the interim milestone and early completion of the 183 North Mobility Project, a copy of which is attached hereto as Exhibit A; and

WHEREAS, contingent upon receiving concurrence from the Texas Department of Transportation (TxDOT) the Executive Director recommends approval of proposed Amendment No. 1 to the Contract and that the Board authorize the Executive Director to negotiate and execute change orders with Great Hills Constructors, in amounts up to $10,000,000, pursuant to the terms of Amendment No. 1.

NOW THEREFORE, BE IT RESOLVED, that contingent upon receiving concurrence from TxDOT the Executive Director is hereby authorized and directed to finalize and execute Amendment No. 1 to the Contract on behalf of the Mobility Authority, in the form or substantially the same form attached hereto as Exhibit A; and

BE IT FURTHER RESOLVED, the Executive Director is hereby authorized to negotiate and execute change orders under Amendment No. 1 with Great Hills Constructors in amounts up to $10,000,000, pursuant to the terms of Amendment No. 1.

Adopted by the Board of Directors of the Central Texas Regional Mobility Authority on the 28th day of February 2024.

Submitted and reviewed by:

_____
James M. Bass
Executive Director

Approved:

_____
Robert W. Jenkins, Jr.
Chairman, Board of Directors

Exhibit A

AMENDMENT No. 1 to DESIGN/BUILD AGREEMENT
(183 North Project)

This Amendment No. 1 to Design-Build Agreement (the "Amendment") is made and entered into to be effective as of [____], 2024 (the "Effective Date") by and between the Central Texas Regional Mobility Authority ("Mobility Authority") and Great Hills Constructors ("DB Contractor"), with reference to the following facts:

A. Mobility Authority and DB Contractor are parties to that certain Design-Build Agreement dated as of March 2, 2021 with respect to the 183 North Mobility Project (the "DB Agreement").

B. The parties desire to provide for an interim completion of a portion of the 183 North Mobility Project, and related incentive payments.

NOW, THEREFORE, in consideration of the covenants and agreements set forth herein, the undersigned parties hereby agree as follows:

1. Defined Terms.

a. All capitalized terms used herein, unless otherwise defined in this Amendment, shall have the meanings set forth in Exhibit A to the DB Agreement.

b. The defined term "Incentive Payment" is hereby deleted from Exhibit A to the DB Agreement.

c. The following defined terms are hereby added to Exhibit A to the DB Agreement:

Early Completion Incentive Payment shall have the meaning set forth in *Section 13.4* of this DB Agreement.

Interim Completion shall mean opening to traffic four (4) general purpose lanes in the northbound direction from Loop 360 to just north of Anderson Mill Road, and the opening to traffic of four (4) general purpose lanes in the southbound direction from Lakeline Mall Drive to south of the exit to southbound MoPac.

Interim Completion Deadline shall mean the deadline for achieving Interim Completion as more fully described in *Section 5.2.2* of this DB Agreement.

Interim Completion Incentive shall mean the incentive for achieving Interim Completion as described in *Section 13.8* of this DB Agreement.

Interim Completion Incentive Payment shall have the meaning set forth in *Section 13.8* of this DB Agreement.

2. Revisions to DB Agreement Section 5.2. Section 5.2 of the DB Agreement shall be amended to read in its entirety as follows:

5.2 Guaranteed Completion

5.2.1 Completion Deadline

5.2.1.1 Subject to the adjustments of the Completion Deadline and Acceptance Deadline as provided in the Contract Documents, the DB Contractor shall achieve Substantial Completion of the Project no later than 1,519 Days after the issuance of NTP1. If the Mobility Authority elects to issue NTP3 for the Deferred Work, then the DB Contractor shall achieve Substantial Completion of the Project no later than 1,519 Days after the issuance of NTP1.

5.2.1.2 The deadline for Substantial Completion set forth above, as it may be extended hereunder, is referred to herein as the "**Completion Deadline**."

5.2.2 Interim Completion Deadline

DB Contractor shall achieve Interim Completion by no later than 1,221 Days after the issuance of NTP1. The deadline for Interim Completion is referred to herein as the "**Interim Completion Deadline**."

5.2.3 Acceptance Deadline

The DB Contractor shall achieve Final Acceptance of the Project within 120 Days after Substantial Completion of the Project. The deadline for Final Acceptance of the Project, as such deadline may be extended hereunder, is referred to herein as the "**Acceptance Deadline**."

5.2.4 No Time Extensions

Except as otherwise specifically provided in *Section 14.10*, the Mobility Authority shall have no obligation to extend the Interim Completion Deadline. Except as otherwise specifically provided in *Section 14*, the Mobility Authority shall have no obligation to extend the Completion Deadline or Acceptance Deadline, and the DB Contractor shall not be relieved of its obligations to achieve (a) the milestones described in the Project Schedule; (b) Substantial Completion of the Project by the Completion Deadline; or (c) Final Acceptance by the Acceptance Deadline.

3. Revisions to DB Agreement Section 13.4. Section 13.4 of the DB Agreement shall be amended to read in its entirety as follows:

13.4 Compensation for Early Completion

As an inducement to the DB Contractor to (a) achieve the Interim Completion Incentive described in *Section 13.8* below, and (b) complete the items set forth in *Section 20.1.1 (a) – (e)* in advance of the original Completion Deadline, the Mobility Authority

agrees to pay the DB Contractor a bonus for completing the items set forth in *Section 20.1.1 (a) – (e)* prior to the original Completion Deadline (the "**Early Completion Incentive Payment**"), as follows:

13.4.1 If the DB Contractor achieves Interim Completion, as determined by the Mobility Authority in its sole discretion, by the Interim Completion Deadline, and the items set forth in *Section 20.1.1 (a) – (e)* have occurred prior to the original Completion Deadline, the DB Contractor shall be entitled to receive (a) $2,000,000; and (b) $50,000 per Day for each Day items set forth in *Section 20.1.1 (a) – (e)* have occurred prior to the original Completion Deadline, up to a capped amount of $2,000,000 for completing the items set forth in *Section 20.1.1 (a) – (e)*.

13.4.2 If the DB Contractor does not achieve Interim Completion, as determined by the Mobility Authority in its sole discretion, by the Interim Completion Deadline, and the items set forth in *Section 20.1.1 (a) – (e)* have occurred prior to the original Completion Deadline, the DB Contractor shall be entitled to receive $50,000 per Day for each Day items set forth in *Section 20.1.1 (a) – (e)* have occurred prior to the original Completion Deadline , up to a capped amount of $2,000,000 for completing the items set forth in *Section 20.1.1 (a) – (e)*.

13.4.3 Early Completion Incentive Payments under *Section 13.4.1* shall be paid by the Mobility Authority to the DB Contractor in accordance with the Draw Request provisions contained in *Section 13.3* hereof. The Mobility Authority shall have the right to offset any amounts owing from the DB Contractor to the Mobility Authority against amounts payable under this *Section 13.4*. An amount of up to $1,000,000 in Early Completion Incentive Payments will be retained until Final Acceptance is achieved.

13.4.4 If the Completion Deadline has been extended beyond the original deadline, and the DB Contractor achieves Substantial Completion prior to said extended deadline, the DB Contractor shall be entitled to receive Early Completion Incentive Payment for Substantial Completion prior to such extended deadline and after the original Completion Deadline. The amount of such payment shall be calculated in accordance with *Section 13.4.1* (replacing reference to the "original Completion Deadline" therein with reference to the "extended Completion Deadline" and shall be subject to the other provisions of this *Section 13.4*.

4. New Section 13.8 to the DB Agreement. Section 13.8 shall be added to the DB Agreement to read in its entirety as follows:

13.8 Interim Completion Incentive

As an inducement for the DB Contractor to achieve Interim Completion, the Mobility Authority agrees to pay the DB Contractor a bonus (the "**Interim Completion Incentive Payment**"), as follows:

13.8.1 If the DB Contractor achieves Interim Completion, as determined by the Mobility Authority in its sole discretion, by the Interim Completion Deadline, the

DB Contractor shall be entitled to receive an Interim Completion Incentive Payment of $6,000,000. For each day past the Interim Completion Deadline for which the DB Contractor has not achieved Interim Completion, the amount of the Interim Completion Incentive Payment shall be reduced by $50,000 per day, per direction of travel until (a) the DB Contractor achieves Interim Completion; or (b) the amount of the Interim Completion Incentive Payment is $0.

13.8.2 The Interim Completion Incentive Payment, if any, shall be paid by the Mobility Authority to the DB Contractor in accordance with the Draw Request provisions contained in *Section 13.3* hereof. The Mobility Authority shall have the right to offset any amounts owing from the DB Contractor to the Mobility Authority against amounts payable under this *Section 13.8*.

5. Revisions to DB Agreement Section 14.1.1.1. Section 14.1.1.1 of the DB Agreement shall be amended to read in its entirety as follows:

14.1.1.1. Change Orders

The term **"Change Order"** shall mean a written amendment to the terms and conditions of the Contract Documents issued in accordance with this *Section 14*. The Mobility Authority may issue unilateral Change Orders as specified in *Section 14.2*. Change Orders may be requested by the DB Contractor only pursuant to *Section 14.3*. Change Orders may be issued for the following purposes (or combination thereof):

a) to modify the scope of the Work;

b) to revise the Interim Completion Deadline, Completion Deadline or the Acceptance Deadline;

c) to revise the DB Price; and

d) to revise other terms and conditions of the Contract Documents.

Upon the Mobility Authority's approval of the matters set forth in the Change Order form, whether it is initiated by the Mobility Authority or the DB Contractor, the Mobility Authority shall execute such Change Order form.

6. Revisions to DB Agreement Section 14.10. Section 14.10 of the DB Agreement shall be amended to read in its entirety as follows:

14.10 Force Majeure Events

Subject to the limitations contained in, and upon the DB Contractor's fulfillment of all applicable requirements of, this *Section 14*, the Mobility Authority shall issue Change Orders (a) to compensate the DB Contractor for additional costs incurred arising directly from Force Majeure Events (excluding Acceleration Costs or delay and disruption damages other than for any Force Majeure Events which are included in the definition of Mobility Authority-Caused Delay), and (b) to extend the applicable Interim Completion Deadline,

Completion Deadline, and/or Acceptance Deadline as the result of any delay in the Critical Path directly caused by a Force Majeure Event, to the extent that it is not possible to work around the problem.

14.10.1 Notwithstanding the foregoing, the DB Contractor shall be fully responsible for, and thus shall not receive a Change Order with respect to, any delays of up to 120 Days per location or an aggregate amount of 120 Days for all such delays, resulting from the need to work around locations impacted by the type of event described in clause (c) of the definition of "Force Majeure Event" (that is, the discovery of previously unknown archeological, paleontological or cultural resources on the Site). The Mobility Authority shall not be responsible for any Acceleration Costs or other costs attributable to any delays relating to such event or situation, other than any Acceleration Costs and other incremental costs directly attributable to the portion of the type of delay described above in excess of 120 Days per location or in excess of an aggregate amount of 120 Days for all such delays; provided that, the DB Contractor shall be entitled to a Change Order for additional costs and/or time only where there is a delay to the Critical Path after expiration of such 120 Day work-around period. If a delay resulting from the need to work around a previously unknown archeological, paleontological or cultural resource is concurrent with another delay which is the DB Contractor's responsibility hereunder, then such delay shall be borne 100% by the DB Contractor and shall not be counted towards the 120-Day aggregate cap. If a delay resulting from the need to work around a previously unknown archeological, paleontological or cultural resource is concurrent with another delay resulting from the need to work around another previously unknown archeological, paleontological or cultural resource, only one of the delays shall be applied to the 120-Day period of the DB Contractor's responsibility or the 120-Day aggregate cap. The foregoing shall not be deemed to preclude the DB Contractor from obtaining a Change Order with respect to any requirement that it perform mitigation measures relating to any such resources or materials which are not otherwise its responsibility under the terms of the Contract Documents.

7. <u>Revisions to DB Agreement, Exhibit C, Section 22.5.2.1</u>. Section 22.5.2.1 of Exhibit C to the DB Agreement shall be amended to read in its entirety as follows:

22.5.2.1.1 Allowable Non-Peak Lane Closures

Single-lane express lane, general purpose lanes, frontage road, shoulder, ramp, direct connector, and cross-street lane closures are permitted throughout the Project during the time frames identified in **Table 22-4**. In locations where the general purpose lanes or frontage roads have three lanes of traffic, two lanes may be closed during the periods identified in **Table 22-4**. One lane must remain open at all times unless approved by the Mobility Authority. In locations where general purpose lanes have four lanes, three lanes may be closed during the periods identified in **Table 22-4**. One lane must remain open at all times unless approved by the Mobility Authority.

Table 22-1: Allowable Non-Peak Lane Closures

Day of Week	Morning	Evening

Monday – Friday	12:00 Midnight to 5:00 AM	9:00 PM to 12:00 Midnight
Saturday & Sunday	12:00 Midnight to 8:00 AM	9:00 PM to 12:00 Midnight

8. Revisions to DB Agreement, Exhibit C, Table 22-7. Table 22-7 of Exhibit C to the DB Agreement shall be amended to read in its entirety as follows:

Table 22-1: Lane Assessment Fees – General Purpose/Frontage Roads

Direction	Segment	Exist. # of Lanes	Applicable Closures	Morning Peak Hours (5–9 AM M–F)	Midday Hours (9 AM– 3 PM M–F)	Evening Peak Hours (3–9 PM M–F)	Weekend Peak Hours (8 AM–9 PM Sat & 8 AM – 9 PM Sun)
NB	Project Limits	3	1L	$100,000	$50,000	$100,000	$100,000
NB	Project Limits	4	1L	$100,000	$50,000	$100,000	$100,000
SB	Project Limits	3	1L	$100,000	$50,000	$100,000	$100,000
SB	Project Limits	4	1L	$100,000	$50,000	$100,000	$100,000

9. DB Contractor Waiver of Disputes or Claims. DB Contractor acknowledges and attests that all PCO Notices, DB Contractor-Requested Change Orders, potential Disputes or Claims known to DB Contractor as of execution of this Amendment are stated in Attachment A to this Amendment. DB Contractor further warrants that, to the best of its knowledge, no other known changes or potential claims exist and it expressly waives its right to assert any additional Claims or Disputes arising from circumstances known or reasonably foreseeable as of the Effective Date of this Amendment. This Amendment does not limit DB Contractor from changes in the Work realized subsequent to execution of this Amendment.

10. Effect of Amendment on DB Agreement. Except as such terms are specifically modified by this Amendment, all terms and conditions of the Contract Documents (as defined in the DB Agreement) shall continue in full force and effect.

11. Counterparts. This Amendment may be executed in two or more counterparts, each of which shall be deemed an original, and all of which together shall constitute one and the same instrument.

12. Entire Agreement. This Amendment constitutes the entire and exclusive agreement between the Parties relating to the specific matters covered herein. All prior or contemporaneous oral or written agreements, understandings, representations and/or practices relative to the foregoing are hereby superseded, revoked and rendered ineffective for any purpose.

13. Texas Law. This Amendment shall be governed and construed in accordance with the laws of the State without regard to conflict of law principles.

14. Representation on Authority of Parties/Signatories. Each person signing this Agreement represents and warrants that he or she is duly authorized and has legal capacity to execute and deliver this Agreement. Each party represents and warrants to the other that the execution and delivery of the Agreement and the performance of such party's obligations hereunder have been duly authorized and that the Agreement is a valid and legal agreement binding on such party and enforceable in accordance with its terms.

IN WITNESS WHEREOF, the Parties have executed this Amendment as of the Effective Date.

DB CONTRACTOR: **GREAT HILLS CONSTRUCTORS.**

a joint venture between Archer Western Construction, LLC and Sundt Construction, Inc.

By: Archer Western Construction, LLC

By:_____

Name: Daniel P. Walsh

Title: President

By: Sundt Construction, Inc.

By:_____

Name: G. Michael Hoover

Title: President & Chief Executive Officer

MOBILITY AUTHORITY: CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY

By:_____

Name: James Bass

Title: Executive Director

Attachment A
DB Contractor Known PCO Notices, DB Contractor-Requested Change Orders, potential Disputes or Claims

Number	Description	Cost	Time	Owner Directed
2B	RM 620 Median Pond Work - Balancing Change Order	$(112,675.06)	No	Yes
RCP-002**	Revised ITS Component Locations	$1,720,210.27	48 Days	Yes
PCO-008	Toll Violation Signing	$86,388.00	No	Yes
PCO-010	ADA Compliant Driveways	$400,486.00	No	No
PCO-013	Differing Site Condition at Braker Lane (Beaird Drilling)	$35,000.00	No	No
PCO-015	Differing Site Condition at Duval Road (Beaird Drilling)	$30,000.00	No	No
PCO-016	Differing Site Condition at Oak Knoll (Beaird Drilling)	$25,000.00	No	No
PCO-017	COA Sidewalk Walls Redesign and Construction	$108,394.34	No	Yes
COR-008	COA Line Stops at Pond Springs Pond	$423,960.12	No	No
PCO-020	Expanded Toll Zone Pavement	$50,000.00	No	Yes
PCO-022	GAATN Unidentified Utility	$150,000.00	No	No
PCO-024	Differing Site Conditions at RW-37 (Keller)	$230,000.00	No	No
RCP-003	Full Color (RGB) DMS Signs	$350,000.00	No	Yes
		$3,496,763.67		
**Pending Execution as CO #9				

CENTRAL TEXAS REGIONAL
MOBILITY AUTHORITY

February 28, 2024
AGENDA ITEM #11

An update on the Mobility Authority's Habitual Violator Program and related toll nonpayment enforcement remedies

Strategic Plan Relevance:	Stewardship
Department:	Operations Department
Contact:	Tracie Brown, Director of Operations
Associated Costs:	Not Applicable
Funding Source:	Not Applicable
Action Requested:	None

Description/Background:

The Mobility Authority's Habitual Violator policy was adopted in June 2019 to address the non-payment behavior of chronic violators. The policy encourages equitable payment by toll road users while promoting electronic tag usage. Enforcement remedies under the policy include denial of motor vehicle registration, prohibiting the habitual violators' vehicle use on Mobility Authority roadways, and vehicle impoundment.

Today's briefing will provide an update on the habitual violator program's performance. The presentation will also announce plans to implement the vehicle impoundment remedy. This remedy is aimed at habitual violators who continue to utilize the Authority's toll facilities after being expressly prohibited and stopped by law enforcement multiple times.

Backup provided: Presentation

CENTRAL TEXAS REGIONAL
MOBILITY AUTHORITY

February 28, 2024
AGENDA ITEM #12
Executive Director Board Report

Strategic Plan Relevance:	Stewardship, Collaboration, Innovation, Service & Safety
Department:	Executive
Contact:	James M. Bass, Executive Director
Associated Costs:	N/A
Funding Source:	N/A
Action Requested:	Briefing and Board Discussion Only

Project Description/Background:

Executive Director Report.

A. 183 Trail Interpretive Signage and Augmented Reality Experience.
B. Agency performance metrics.
    i. Roadway Performance
    ii. Call-Center Performance

Backup provided: None

CENTRAL TEXAS REGIONAL
MOBILITY AUTHORITY

February 28, 2024
AGENDA ITEM #13
Executive Session

***Executive Session*:**

Discuss the acquisition of one or more parcels or interests in real property needed for the 183A Phase III Project and related issues, including a final agreed judgment, pursuant to §551.072 (Deliberation Regarding Real Property) and §551.071 (Consultation with Attorney).

CENTRAL TEXAS REGIONAL
MOBILITY AUTHORITY

February 28, 2024
AGENDA ITEM #14
Executive Session

***Executive Session*:**

Discuss legal issues related to claims by or against the Mobility Authority; pending or contemplated litigation and any related settlement offers; or other matters as authorized by §551.071 (Consultation with Attorney).

CENTRAL TEXAS REGIONAL
MOBILITY AUTHORITY

February 28, 2024
AGENDA ITEM #15
Executive Session

***Executive Session*:**

Discuss legal issues relating to procurement and financing of Mobility Authority transportation projects and toll system improvements, as authorized by §551.071 (Consultation with Attorney).

CENTRAL TEXAS REGIONAL
MOBILITY AUTHORITY

February 28, 2024
AGENDA ITEM #16
Executive Session

***Executive Session*:**

Discuss personnel matters as authorized by §551.074 (Personnel Matters).

CENTRAL TEXAS REGIONAL
MOBILITY AUTHORITY

February 28, 2024
AGENDA ITEM #17

Approve a final agreed judgment with Klatt Properties LP. Sprint Spectrum LP, Verizon Wireless Services LLC f/k/a Dallas MTA LP, and Wells Fargo Bank for the acquisition of Parcel 3 of the 183A Phase III Project, a 3.646-acre tract of land owned by Klatt Properties, a Texas Limited Partnership; and located at County Road 258 and 183A, Liberty Hill, Williamson County, Texas

Strategic Plan Relevance:	Stewardship
Department:	Engineering / Legal
Contact:	Mike Sexton, Director of Engineering /Geoff Petrov General Counsel
Associated Costs:	TBD
Funding Source:	Project Fund
Action Requested:	Consider and act on draft resolution

Background:

The Mobility Authority must acquire certain parcels, utility easements and/or related property interests ("Property") from real estate that abuts or is near the existing 183A Phase III Project right-of way. Each owner of a parcel or property interest identified has received an official written offer to purchase the Property for an amount determined by an independent, professional appraiser. The Mobility Authority or its agent is required to pay no less than the offer made for the Property. The parcel for your consideration and action at this meeting is:

A. Parcel 3 of the 183A Phase III Project, a 3.646-acre tract of land **owned by Klatt Properties, a Texas Limited Partnership**; and located at County Road 258 and 183A, Liberty Hill, Williamson County, Texas.

Backup provided: To be provided at the board meeting.

CENTRAL TEXAS REGIONAL
MOBILITY AUTHORITY

February 28, 2024
AGENDA ITEM #18

Adjourn Meeting

Adjourn Board Meeting.