



CENTRAL TEXAS REGIONAL
MOBILITY AUTHORITY

2021

ANNUAL REPORT OF CONDITIONS EXPRESS 1 TOLL



Prepared by:

ATKINS

Member of the SNC-Lavalin Group

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CENTRAL TEXAS REGIONAL MOBILITY AUTHORITY SYSTEM



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March 8, 2021

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Central Texas Regional Mobility Authority
3300 N. Interstate 35, Suite 300
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Subject: **2021 Annual Report of Conditions – Express 1 Toll (Mopac Express)**

Mr. Chapman:

As General Engineering Consultant to the Central Texas Regional Mobility Authority (Mobility Authority), Atkins North America, Inc. (Atkins) is pleased to submit the 2021 Annual Report of Conditions for the Express 1 Toll roadway. This report sets forth our findings as to the condition of this facility, as well as our recommendation of proper operations and maintenance of the facility during fiscal year (FY) 2022.

Atkins conducted a visual inspection of all portions of the Express 1 Toll roadway, as well as the adjacent MoPac general-purpose lanes and frontage roads, in fall 2020. Bridges are inspected as part of TxDOT's Bridge Inventory, Inspection and Appraisal Program (BRINSAP) every two years per applicable federal requirements in accordance with the National Bridge Inspection Standards (NBIS). The findings of the most recent BRINSAP inspections, conducted in 2019, were reviewed and are reflected in this report.

The following report summarizes the conditions observed and are fully reported in the 2021 Annual Detailed Inspection Report transmitted to the Mobility Authority's Director of Engineering.

We appreciate the opportunity to provide the services required of the General Engineering Consultant(s), and we wish to acknowledge the excellent cooperation of the Mobility Authority staff in the performance of these services.

Sincerely,

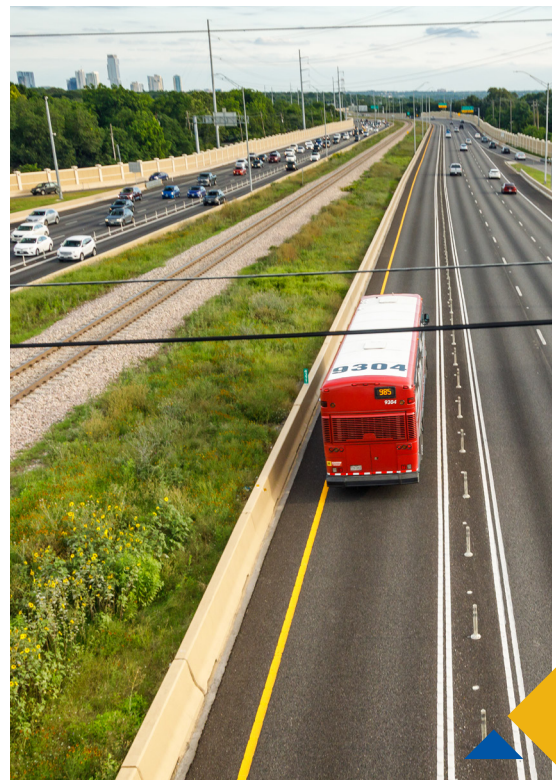
Gregory S. Blake, P.E.
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Enclosure

Cc: Tracie Brown, Director of Operations, Central Texas Regional Mobility Authority
John Jones, Roadway and Maintenance Facility Manager, Central Texas Regional Mobility Authority
Mike Sexton, P.E., Acting Director of Engineering, Central Texas Regional Mobility Authority
File

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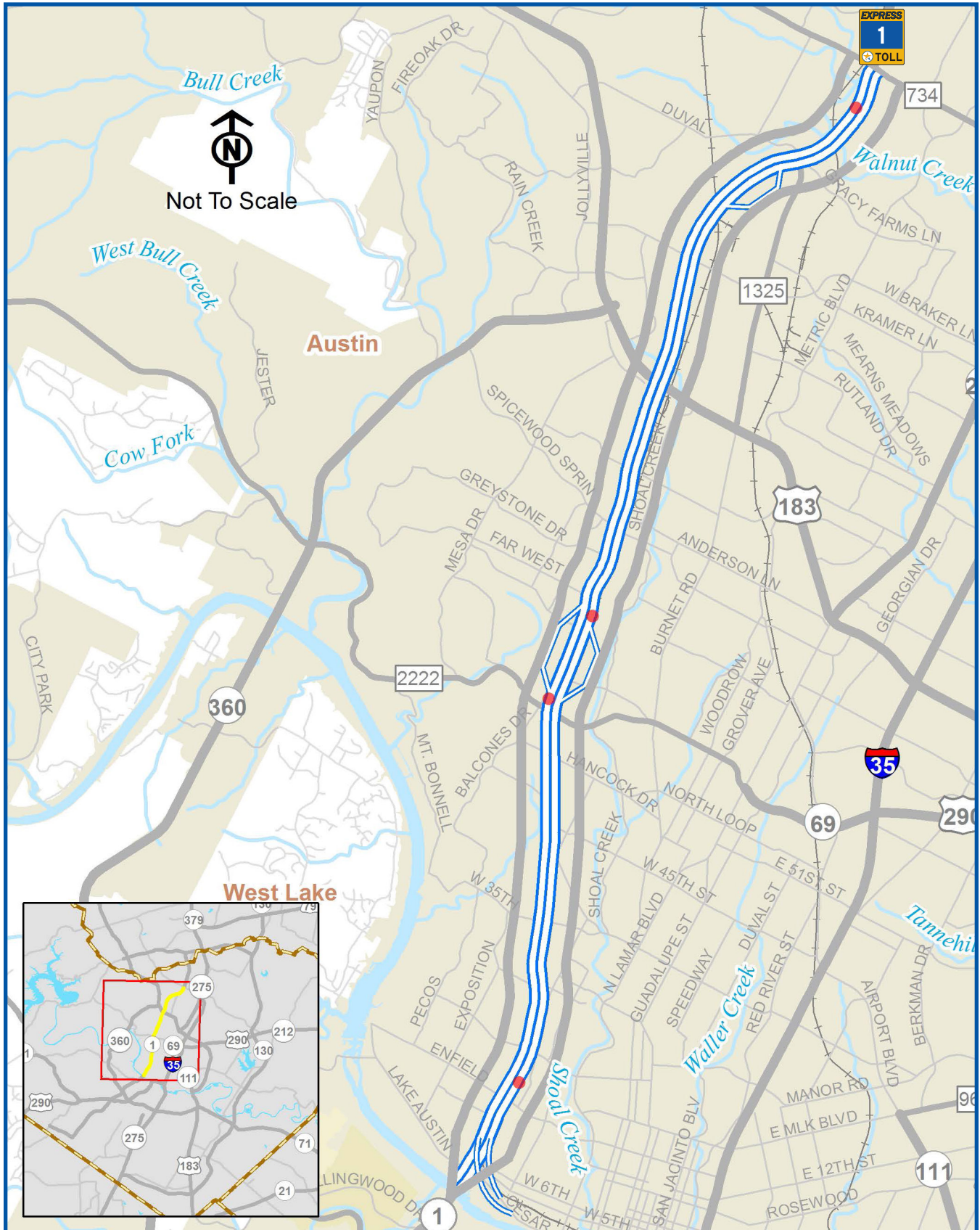
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Acronyms and Abbreviations

ACRONYMS AND ABBREVIATIONS	
AASHTO	American Association of State Highway and Transportation Officials
ASTM	American Society for Testing and Materials
BRINSAP	Bridge Inventory, Inspection and Appraisal Program
CAMPO	Capital Area Metropolitan Planning Organization
CCTV	Closed-Circuit Television
CDA	Comprehensive Development Agreement
CFR	Code of Federal Regulations
CIP	Cast in Place
CR	County Road
D/B	Design-Build
DC	Direct Connector
ETC	Electronic Toll Collection
FHWA	Federal Highway Administration
FA	Final Acceptance
FY	Fiscal Year
GEC	General Engineering Consultant
GIS	Geographic Information System
IH	Interstate Highway
ILP	In-Lane Processing
IRI	International Roughness Index
LP	Liquified Petroleum
MBGF	Metal Beam Guard Fence
MMP	Maintenance Management Plan
MSE	Mechanically Stabilized Earth
MUTCD	Manual on Uniform Traffic Control Devices
NBIS	National Bridge Inspection Standards
NEPA	National Environmental Policy Act of 1969
NFPA	National Fire Protection Association
PBMC	Performance Based Maintenance Contractor
RM	Ranch to Market Road
RPMs	Raised Pavement Markers
ROW	Right-of-Way
RSU	Roadside Unit
SGT	Single Guardrail Terminal
SH	State Highway
TAMP	Transportation Asset Management Plan
TCS	Toll Collection System
TIM	Traffic Incident & Management Center
TxDOT	Texas Department of Transportation
TTC	Texas Transportation Commission
US	United States Highway
WAN	Wide Area Network

Location Map



Executive Summary

As General Engineering Consultant (GEC) to the Central Texas Regional Mobility Authority (Mobility Authority), Atkins North America, Inc. (Atkins) is pleased to submit the 2021 Annual Report of Conditions for Express 1 Toll for fiscal year (FY) ending June 30, 2021.

The FY 2021 inspections, which included inspection of the adjacent MoPac general-purpose lanes and frontage roads, show that the condition of the Express 1 Toll corridor continues to be maintained in good repair, working order and condition. This observation was based on a general visual inspection of the roadways, buildings, overhead sign bridges, retaining walls, and toll gantries.

A Detailed Inspection Report of the inspection findings is transmitted separately to the Mobility Authority's Director of Engineering.

The overall condition of Express 1 Toll exemplifies the Mobility Authority's commitment to maintain and operate a safe and reliable toll road system for the Central Texas region.

1.0 Introduction

1.1 BACKGROUND

Atkins conducted a visual inspection of the Express 1 Toll corridor, as well as the adjacent MoPac general-purpose lanes and frontage roads, in fall 2020. The inspection was conducted to assess the general condition of roadways, buildings facilities, overhead sign bridges, retaining walls and toll gantries along the roadway and to identify any deficient elements to be restored to good working condition. This report includes conclusions and recommendations concerning the condition, maintenance, repair and operation during the ensuing FY 2022.

1.2 INSPECTION PROCESS

The inspection covered all portions of the facilities including: pavement, roadside elements, retaining and noise walls, underdeck lighting, drainage structures, signs and sign bridges, pavement markings and associated buildings and equipment. All bridges constructed on the Mobility Authority System, with the exception of the pedestrian bridges that are not located over travel lanes, are inspected as part of TxDOT's Bridge Inventory, Inspection and Appraisal Program (BRINSAP) to implement the National Bridge Inspection Standards (NBIS). These standards are issued by the Federal Highway Administration (FHWA) and discussed in detail in the Code of Federal Regulations (CFR), 23 CFR 650C. These standards require all bridges on the Texas Transportation Commission (TTC) designated State Highway System to be inventoried, inspected and appraised every two years in accordance with the Manual of Maintenance Inspection of Bridges published by the American Association of State Highway and Transportation Officials (AASHTO).

For the purpose of this report, the existing roadway conditions were rated and grouped into three major categories: (1) Pavement; (2) Roadside and (3) Miscellaneous. Each category consisted of specific features that were inspected, as shown in Table 1, page 6.

Table 1: Roadway Inspection Elements

CATEGORY	ITEM	DESCRIPTION OF INSPECTION
Pavement	Pavement & Shoulders	General condition of pavement and shoulders
	Curb/Gutter	Identification of deficiencies such as settlement, cracking, and displacement
	Joints	Identification of deficiencies including joint cracking, faulting, and surface deterioration, etc.
Roadside	Culverts	Identification of inadequate drainage at culverts, flumes, and weep holes and condition of safety treatments
	Ditches	Presence of erosion, silting, presence of debris, lack of vegetation, etc.
	Grates/Inlets/Piping	Identification of inadequate drainage at pipes, grates, and inlets
	Ponds	Identification of inadequate drainage, evidence of erosion, and malfunctioning components
Misc.	Signs	Conditions associated with mainlane and ramp signing to include damage and day and night visibility
	Pavement Graphics	Condition of pavement graphics to include day and night visibility and section loss
	Pavement Markings	Presence of wear and tear of striping and markings to include day and night visibility and section loss
	Raised Pavement Markers (RPMs)	Condition of raised pavement markers to include missing markers and proper day and night visibility
	Delineators	Condition of delineation to include missing delineators and proper day and night visibility
	Metal Beam Guard Fence (MBGF)	Condition of MBGF and its components, terminal anchors, single guardrail terminals (SGT), etc.
	Attenuators	Condition of various crash attenuation systems
	Barriers	Condition of concrete barriers and bridge rail
	Coatings	Conditions such as peeling, absent or damaged coatings on concrete traffic barrier, concrete traffic rail, or other coated surfaces
	Fence	Condition of chain-link, barbed wire, and ornamental fencing at the right-of-way (ROW), or within maintenance limits
Lighting	Conditions associated with lighting structures and their components, bridge underdeck lights, and nighttime inspections for proper operation	

Bridge inspections were conducted in 2019 by the Texas Department of Transportation (TxDOT) as part of their Bridge Inventory, Inspection and Appraisal Program (BRINSAP). The resulting reports were provided to the Mobility Authority and serve as the basis for the comments and recommendations in the bridge portion of this report.

The existing bridge conditions are rated and grouped by the following categories: (1) Deck; (2) Substructure; (3) Superstructure; (4) Channel; (5) Culverts; (6) Approaches; (7) Miscellaneous and (8) Traffic Safety. Each category consists of specific features that were inspected, as shown in Table 2, below.

Table 2: Bridge Inspection Elements

CATEGORY	DESCRIPTION OF INSPECTION
Deck	Condition of the deck surface, its associated joints, rail, sidewalks/medians, striping, and drainage on top of the bridge structure
Superstructure	Condition of concrete beams, beam connections and bearings
Substructure	Condition of columns, bents, abutments, foundations, and riprap
Channel	Condition of the stream or creek being crossed by the bridge
Culverts	Condition of the headwalls, wingwalls, slab footing, safety devices and other associated items
Approaches	Condition of the approach slabs, rail leading up to the bridge, guard fence, and retaining walls at the bridge abutments
Miscellaneous	Condition of the warning devices such as vertical under clearances, signs, illumination and utility lines
Traffic Safety	Condition of approach rails and impact attenuators

For bridges, a 10-point numerical rating scale is used to determine the severity of the asset defect, where a “9” indicates that an element is in “Excellent” condition and a “0” indicates that an element has failed, as shown in Table 3, page 7.

Table 3: Bridge Condition Assessment Rating Scale

GRADE	RATING	DESCRIPTION
9	Excellent	All elements are in excellent condition.
8	Very Good	No problems noted.
7	Good	Element has some minor problems. Minor maintenance may be needed.
6	Satisfactory	Minor deterioration of structural elements (limited). Maintenance may be needed.
5	Fair	Minor deterioration of structural elements (extensive). Minor rehabilitation may be needed.
4	Poor	Deterioration significantly affects structural capacity. Major rehabilitation may be needed.
3	Serious	Deterioration seriously affects structural capacity. Repair / rehabilitation is required immediately.
2	Critical	Element shows advanced deterioration. It may be necessary to close the bridge until repaired
1	Failing	Bridge is closed to traffic, but repairable.
0	Failed	Bridge is closed, and beyond repair.

To ensure the health of the Express 1 Toll corridor, both new and existing retaining and noise walls, as well as the various components of retaining and noise walls were rated and grouped in categories described in Table 4, below.

Table 4: Wall Inspection Components

CATEGORY	DESCRIPTION OF INSPECTION
Wall	Condition of wall face, coping, foundations, joints, panel finishes, and Cast in Place (CIP) sections
Earth	Conditions of the top slope, toe slope, backfill, CIP, and Mechanically Stabilized Earth (MSE) wall

For the purpose of this report, the existing building conditions were rated and grouped by the following categories: (1) Architectural; (2) Structural; (3) Mechanical and (4) Electrical. Each category consisted of specific features that were inspected, as shown in Table 5, below.

Table 5: Building Inspection Elements

CATEGORY	ITEM	DESCRIPTION OF INSPECTION
Architectural	Building Exterior	Condition of walls, glazing, decks, stairs, handrails, sealants, soffits, doors, paint, and signage
	Building Interior	Conditions of the lobby, finishes, stairs, doors, restrooms, security system, and ceiling tile
	Roof	Condition of the surface condition, seams, expansion joints, and access
	Drainage	Condition of the roof drains, secondary drainage, gutters, downspouts, and edge flashing
	Site	Condition of the ramps, rails, lighting, retaining walls, screen walls, landscaping, irrigation, and parking
Structural	Structural	Condition of the foundation, ground floor slab, grade beams, walls, elevated floor slabs, roof, columns, and joints
Mechanical	Mechanical	Condition of cooling and heating systems, air handlers, exhaust fans, ductwork, piping, and insulation
	Plumbing	Condition of the piping, water flow and pressure, hot water source, water pumps, natural gas plumbing, sanitary sewer plumbing, fixtures, and water softening system
	Fire Protection Systems	Condition of fire protection systems and backflow preventers
Electrical	Electrical	Condition of the primary transformer, step-down transformer, electrical room, wiring, conduits, emergency power, and communication systems

1.0 Introduction *continued*

The Overhead Sign Bridges located on each roadway were inspected as part of this report. The inspection covered the structural items of the structures, as shown in Table 6, below.

Table 6: Overhead Sign Bridge Elements

CATEGORY	DESCRIPTION OF INSPECTION
Structural	Condition of the foundation
	Condition of the concrete columns
	Condition of the truss connection to the column, including the bolts
	Condition of the arm chords on the truss

The toll system infrastructure required to accommodate the Toll Collection System (TCS) consists of various components at each remote tolling location including, but not limited to those indicated in Table 7, below.

Table 7: TCS Inspection Elements

CATEGORY	DESCRIPTION OF INSPECTION
TCS	Retaining walls and copings
	Drainage features
	Civil site work, including grading, access driveways and fencing
	Toll gantries, including foundations and gantry structures
	In-Lane Processing (ILP) Equipment Enclosures, environmental protection and climate controls for housing the electronic equipment. ILP Equipment Enclosures consist of either cabinets or communications hub buildings.
	Conduit and ground boxes providing connections between the ILPs and the Electronic Toll Collection (ETC) Lane equipment installations
	Power and Wide Area Network (WAN) communication services up to the location of the ILP enclosures
	Emergency generators and associated fuel tanks
	Signing, pavement markings, traffic barriers and other roadway appurtenances required at each remote tolling location

The assessment is based on general visual observations made in the field without conducting any detailed in-place testing. Inspection data is collected and organized in real-time by means of computer tablets pre-loaded with a GIS-based collection application for visualization and analysis. The GIS base maps and output data are spot-checked to verify accuracy and consistency. It should also be noted that the observations reflect the condition of the feature(s) on the day the inspection was performed. As such, the opinions, statements and recommendations in this report are based solely on conditions observed during the inspection. As part of this inspection, a list of roadside deficiencies is being provided to the Mobility Authority to forward to either the Performance Based Maintenance Contractor (PBMC) or the construction contractor to be addressed.

No representation or warranty is made that all defects have been discovered or that additional defects will not appear in the future. An inspection rating scale of 1 to 5 is used to determine the severity of the asset defect, shown in Table 8, page 9.

1.0 Introduction *continued*

Table 8: Condition Assessment Rating Scale

GRADE	RATING	DESCRIPTION
5	Excellent	Feature is in like-new condition. No deficiencies noted.
4	Good	Feature appearance and functionality/operability are good. No maintenance is required.
3	Degraded	Feature appearance and functionality/operability are below average. Maintenance is required, but does not require emergency repair to protect the System.
2	Unsatisfactory	Feature appearance and functionality/operability are substandard. Maintenance is required, as soon as practical (1), but does not require emergency repair to protect the System.
1	Failing	Feature appearance and functionality/operability are unacceptable. Feature has failed and may require emergency repair to protect the public or System.(2)

NOTES:

- (1) *Timeframe for which, under normal circumstances, repair work would be prioritized and scheduled.*
- (2) *The need for emergency repair should be determined based on response times set forth in maintenance protocols set forth by the Mobility Authority as appropriate for a specific deficiency.*

A rating of 5 indicates the asset is adequately performing or is in “like-new” condition and does not require maintenance action.

A rating of 4 indicates some level of degradation of the asset but has not affected performance and does not require maintenance.

A rating of 3 indicates some level of degradation of the asset performance and requires maintenance action but does not warrant expedited maintenance.

A rating of 2 indicates the defect identified is showing signs of the asset degrading to the point that it is no longer functional and requires expedited maintenance to protect the public or the System.

A rating of 1 indicates that the asset is out of service and is in need of replacement or reconstruction.

1.3 DESCRIPTION OF ROADWAY

Although not considered a system corridor, the Mobility Authority constructed, operates and maintains the Express Toll 1 roadway, an 11-mile variably-priced tolled express lane along MoPac between Cesar Chavez Street and Parmer Lane in Travis County. The express lane is located in the middle of the MoPac corridor, separated from the existing lanes by a buffer zone. Drivers are able to access the MoPac Express Lane at Cesar Chavez Street, at Far West Boulevard and Anderson Lane, or at Parmer Lane. MoPac is one of Austin’s most important arteries, serving as a key route to downtown and points beyond.



1.4 MAINTENANCE PROGRAM OVERVIEW

The Mobility Authority utilizes a System-wide PBMC to maintain its infrastructure. Also included in the PBMC are Performance-Based Maintenance services for existing and future shared use paths, trailheads and Mobility Authority building facilities, including the Traffic and Incident Management (TIM) Center adjacent to the 183A Turnpike, existing and future maintenance yard buildings, existing and future ILP enclosures, and emergency generators located at or near toll gantries. The intent of the PBMC is for the Contractor to manage and plan maintenance activities to meet the performance requirements as set forth in the contract documents. The general maintenance obligations of the PBMC are as follows:

1.0 Annual Report of Conditions

- (1) Maintain the Project and Related Transportation Facilities in a proactive and timely manner appropriate for a facility of the character of the Project.
- (2) Minimize delay and inconvenience to users and, to the extent the Contractor is able to control, users of Related Transportation Facilities.
- (3) Identify and manage incidents and correct all defects and damages from Incidents to include cleanup of spilled cargo, removal and disposal of damaged and unsalvageable materials, obtaining required permits, etc.
- (4) Monitor and observe weather and weather forecasts to proactively deploy resources to minimize delays and safety hazards due to heavy rains, snow, ice or other severe weather events.
- (5) Remove debris, including litter, graffiti, animals, and abandoned vehicles or equipment from the ROW.
- (6) Minimize the risk of damage, disturbance or destruction of third-party property during the performance of maintenance activities.
- (7) Coordinate with and enable the Mobility Authority and others with statutory duties or functions in relation to the Project or Related Transportation Facilities to perform such duties and functions.
- (8) Perform systematic Project inspections and maintenance in accordance with the provisions of Contractor's Maintenance Management Plan (MMP) to include Contractor's Safety and Health Plan and in accordance with the Contract Documents.

A new performance-based maintenance contract was procured and commenced on July 1, 2020. This contract encompasses an initial 5-year term with two optional 5-year terms.

1.5 CONDITION ASSESSMENT

The PBMC is administered by the Mobility Authority. All elements are audited, at minimum, on a monthly basis for contract compliance. In addition, the System and its performance is monitored on a daily basis. These audits are performed by way of a condition assessment consistent with parameters set forth in the PBMC. The condition assessments are conducted on 10% of the roadways on randomly selected sections. This ensures the Contractor is maintaining the facilities within the tolerances established by the performance measures.

2.0 Annual Report of Conditions

2.1 OVERVIEW OF EXPRESS 1 TOLL

Visual condition assessments were conducted based on the 5-point rating scale described in Table 8. The results of this year's annual inspection indicate that the Express 1 Toll corridor is performing as expected and is being maintained in accordance with the Mobility Authority's asset management program and is in good repair. Corrective measures are being taken to address deficiencies through the Mobility Authority System-wide PBMC.

2.2 WARRANTY PROVISIONS

The Express 1 Toll corridor was financed through grants from the Capital Area Metropolitan Planning Organization (CAMPO) and TxDOT and is therefore considered "Non-System." As part of the Design-Build (D/B) agreement, a warranty provision is in place for various items, as summarized in Table 9, page 11.

Table 9: Express 1 Toll Summary of Project Warranties

GENERAL SUBJECT	WARRANTY PERIOD AFTER FA
Flexible Pavement: Pavement Failure in Surface/Base	5 Years
Flexible Pavement: Cracking, Raveling, Flushing, Rutting, and Pop Outs	5 Years
Rigid Pavement: Cracking, Joint Deficiencies, Punch-Outs, and Surface Defects	5 Years
Buildings, Structures, Toll Structures, Gantries, and Related Facilities	5 Years
Structural Concrete	5 Years
Steel Paint System	5 Years
Settlement: New Roadway Grade	5 Years
Settlement: Noise and Retaining Walls	5 Years
Signing (Permanent)	2 Years
Traffic Signals	2 Years
Turf Establishment	2 Years
Landscaping/Tree Establishment	2 Years
Lighting	2 Years
D/B Contractor Directed Utilities Relocations	2 Years
Pavement Markings and Flexible Delineators	2 Years

2.3 PAVEMENT

Although minor issues were noted, the inspection conducted in fall 2020 did not identify a significant number of deficiencies in the pavement that would affect the safety and operations of the Express 1 Toll corridor. Deficiencies found do not fall outside of the PBMC scope and should be addressed as part of regularly scheduled maintenance activities. The most common deficiencies noted were unsealed longitudinal cracking, header joint material failure, pavement surface raveling, unsealed cracking and potholes.

2.4 ROADSIDE

Although roadside inspections were performed to evaluate the PBMC performance as part of the maintenance program, this area is adjacent to TxDOT's general-purpose lanes and frontage are not part of the Mobility Authority's financial responsibility. Deficiencies found have been included in the 2021 Annual Detailed Inspection Report. These deficiencies are within the PBMC scope and should be addressed as part of regularly scheduled maintenance activities.

2.5 MISCELLANEOUS

The PBMC includes performance measures for identifying deficiencies and work planning responsibilities for the following miscellaneous roadway inspection elements:

Deficiencies as a result of day and nighttime visual inspection indicate the pavement graphics, markings and markers show signs of wear, lack of reflectivity, or are missing and in need of replacement. As part of the PBMC contractor responsibilities, an inspection and work plan should be developed to address the deficient graphics, markings and markers.

2.0 Annual Report of Conditions *continued*

A large portion of the bollards separating the managed lanes from the general-purpose lanes were found to be non-reflective. In addition, deficiencies were noted for leaning and missing bollards. This work should be scheduled as part of the PBMC maintenance activities.

Signs were assessed by a day and a nighttime visual inspection during the fall 2020 inspections. In general, signs are in good repair. Most signs were clearly visible and legible to the inspector, however there was an instance of a missing small sign, which should be addressed as part of regularly scheduled maintenance activities.

The illumination elements were inspected for damage and to ensure proper functioning of the lights at night. In general, illumination features are in good repair. Visual inspection did not identify any deficiencies that were outside of the PBMC scope. The most common deficiencies noted were burnt-out light bulbs and damaged or missing access panels, all of which are addressed as part of regularly scheduled maintenance activities.

2.6 BRIDGES

All of the Express 1 Toll bridges were inspected and evaluated in 2019, as part of TxDOT's BRINSAP Program, which occurs every two years per federal requirements. The available findings of the most recent BRINSAP inspections were provided to the Mobility Authority and serve as the basis for the comments and recommendations for the bridge portion of this report.

Based on a review of the most recent inspection reports and visual observations, the Express 1 Toll corridor bridges are in good repair. Of the 128 total components rated for the 16 bridges on the corridor, 10% received a 6-rating. None of the components rated less than a 6. The most common deficiencies noted were hairline cracks and spalls on bridge decks, bent caps and other bridge components, minor exposure of drilled shafts due to scouring, and moderate channel scour.

2.7 RETAINING WALLS

The retaining walls on the Express 1 Toll corridor consist primarily of MSE walls. Based on visual observations, the Express 1 Toll corridor retaining walls are in good repair. Deficiencies found do not fall outside of the PBMC scope and should be addressed as part of regularly scheduled maintenance activities. The most common deficiencies noted consisted of minor cracking on panels, and vegetation and silt accumulation in drainage flumes.

2.8 OVERHEAD SIGN BRIDGES

Overhead sign bridges, which include toll gantries, sign structures and monotube sign structures were visually inspected for deficiencies associated with their foundations, anchor bolts, base plates, column supports, and arm chord connections and members.

The inspection did not reveal any unsatisfactory deficiencies in the condition and operation of the toll gantries and sign structures. The most common deficiencies noted were minor spalling in drilled shafts, and rusting and spalling in foundations.

2.9 TOLL COLLECTION SYSTEM

The basic components for the TCS are the TCS Infrastructure, the TCS Operations and Maintenance, the Customer Service Center and the Violation Processing Center. The TCS is fully interoperable with all Texas toll roads so that ETC customers from other cities, such as Houston and Dallas, can use the Mobility Authority's System and vice versa. Violation processing and collections, as well as the operation and maintenance of the toll collection systems, are provided through private contracts.

▶ 2.0 Annual Report of Conditions *continued*

The fall 2020 annual inspection performed by the GEC only included inspection of the toll Infrastructure. It did not include inspection of the tolling equipment itself. This equipment is inspected by a separate party.

The Express 1 Toll corridor includes 4 ILP cabinets, which house various ETC equipment, and are located at SB MoPac near Parmer (under the mainlane bridge over Park Bend Drive), NB MoPac at Far West Blvd, NB MoPac at 2222, and NB MoPac north of Enfield Road. Emergency generator sites serve the tolling locations. The visual inspection of the toll system infrastructure, including exterior components, finishes, lighting, structural components, electrical components, and mechanical components, indicate that primary components are in good repair. The only deficiency noted was pole-mounted lighting that was not working at the Far West ILP cabinet location. Efforts should be made to continue to keep all components clean, well maintained and secure for the TCS.

▶ 3.0 Ongoing Initiatives

The Mobility Authority has undertaken the development of the ITS Master Plan through projects to install additional ITS equipment on the Express 1 Toll corridor for the purposes of pilot evaluations and testing. The ITS expansion will consist of installation of Roadside Units (RSU) with Connected Vehicle applications, as well as fixed-view CCTV cameras. The RSUs will position the Authority to utilize the Connected Vehicle technologies and applications being brought to the automotive market. This technology allows communications directly to and from vehicles on the roadway, both receiving diagnostic data from vehicles, and delivering focused messages directly to vehicles on the roadway. Fixed-view cameras will support the pilot evaluations of automated incident detection software.

▶ 4.0 Recommendations

Although minor issues were noted along Express 1 Toll pavement, the inspection conducted in fall 2020 did not identify a significant number of deficiencies in the pavement that would affect the safety and operations of the Express 1 Toll corridor. Pavement along the Express 1 Toll corridor was found to be in good repair, with some minor deficiencies present. The most common deficiencies noted were unsealed longitudinal cracking and minor failures. Deficiencies found do not fall outside of the PBMC scope and should be addressed as part of regularly scheduled maintenance activities.

The visual Inspection of pavement graphics and markers, signs, and illumination did not identify any deficiencies that were outside of the PBMC scope. Deficiencies are addressed as part of regularly scheduled maintenance activities.

A large portion of the bollards separating the managed lanes from the general-purpose lanes were found to be non-reflective. Full replacement of these assets is recommended as part of the PBMC scope in FY 2022.



4.0 Recommendations *continued*

Bridges were inspected in 2019, as part of TxDOT's BRINSAP Program. Based on a review of the most recent inspection reports and visual observations, the Express 1 Toll corridor bridges are in good repair. The most common deficiencies noted were hairline cracks and spalls on bridge decks, bent caps and other bridge components, minor exposure of drilled shafts due to scouring, and moderate channel scour. The Mobility Authority should continue to address deficiencies as part of the bridge maintenance program.

In general, the Express 1 Toll corridor retaining walls are in good repair. The most common deficiencies noted consisted of horizontal cracking on columns, minor cracking on panels, and vegetation and silt accumulation in flumes. Deficiencies should be addressed as part of regularly scheduled maintenance activities.

Structural inspections revealed that toll gantries and overhead sign structures were in good repair. Deficiencies should be addressed as part of regularly scheduled maintenance activities.

Of the items inspected, the TCS infrastructure, including the 4 ILP sites and associated generators, were observed to be in good repair. Efforts should be made to continue to keep all components clean, well maintained and secure for the TCS. Deficiencies should be addressed as part of regularly scheduled maintenance activities.



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