

2050 Metropolitan Transportation Plan

TECHNICAL REPORT #3

Transportation Performance Management

December 2023

Prepared by:





Table of Contents

1.0	Introduction	1
1.	1 National Goal Areas and Measures	1
1.	2 MPA Performance Measures – Tennessee Portion	5
1.	3 MPA Performance Measures – Kentucky Portion	11
2.0	Future MPO Actions	14
2.	1 Safety Performance (PM1)	14
2.	2 Bridge/Pavement Performance (PM2)	14
2.	3 System Performance (PM3)	15
2.	4 Transit Asset Management Performance (TAM)	16
2.	5 Transit Safety	16



1.0 Introduction

The 2050 Metropolitan Transportation Plan (MTP) follows the principles of Performance-Based Planning and Programming (PBPP) and related federal regulations described in the Infrastructure Investment and Jobs Act (IIJA). These regulations require all Metropolitan Planning Organizations (MPOs) to track specific transportation performance measures related to national goals and to either set their own targets for these measures or support state targets.

The regulations also require establishment of responsibilities related to development and maintenance of performance measures and targets between MPOs, each state's Department of Transportation (DOT), and transit agencies through Memoranda of Understanding (MOU). The MOUs were established as an agreement for cooperatively developing, sharing, and reporting information related to performance measures and performances targets.

PBPP refers to the methods transportation agencies use to apply performance management as standard practice in their planning and programming processes. The goal of PBPP is to ensure that transportation investment decisions depend on the ability to meet established goals. As a federal requirement, states will invest resources in projects to achieve individual targets that make collective progress toward national goals. MPOs, through their MTP and Transportation Improvement Program (TIP), must also work towards individual targets or supporting state targets.

This report only addresses the specific performance measures required by federal transportation performance management regulations. It also discusses future actions that the MPO can take to improve regional performance and further support state targets. A more complete assessment of current transportation conditions can be found in *Technical Report #2: State of Current System*.

1.1 National Goal Areas and Measures

Through the federal rule-making process, the Federal Highway Administration (FHWA) requires state DOTs and MPOs to monitor the transportation system using specific performance measures associated with the national goal areas prescribed in MAP-21 and continued in subsequent transportation legislation.



Safety Performance (PM1)

To achieve a significant reduction in traffic fatalities and serious injuries on all public roads

- 1. Number of fatalities
- 2. Fatality rate (per 100 million vehicle miles traveled)
- 3. Number of serious injuries
- 4. Serious injury rate (per 100 million vehicle miles traveled)
- 5. Number of non-motorized fatalities and non-motorized serious injuries

Bridge/Pavement Performance (PM2)

To maintain the highway infrastructure asset system in a state of good repair

- 1. Percentage of pavements on the Interstate System in good condition
- 2. Percentage of pavements on the Interstate System in poor condition
- 3. Percentage of pavements on the non-Interstate National Highway System (NHS) in good condition
- 4. Percentage of pavements on the non-Interstate NHS in poor condition
- 5. Percentage of NHS bridges classified as in good condition
- 6. Percentage of NHS bridges classified as in poor condition

System Performance (PM3)

- 1. Percent of person-miles traveled that are reliable (Interstate)
- 2. Percent of person-miles traveled that are reliable (non-Interstate)
- 3. Truck Travel Reliability
- 4. Percent of Non-Single Occupancy Vehicle Travel
- 5. Annual Hours of Peak-Hour Excessive Delay
- 6. Volatile Organic Compound (VOC) Reduction
- 7. Nitrogen Oxides (NOx) reduction

Transit Asset Management Performance (TAM)

Public transit fund recipients, including states, local authorities, and public transportation operators, are required to establish performance targets for safety and state of good repair. They must also develop transit asset management and safety plans and report their progress toward achieving targets. However, these operators must share information with MPOs and states so that all plans and performance reports are coordinated. The Clarksville Transit System (CTS) has developed information and targets for the following four state of good repair performance measures:



- 1. **Rolling Stock:** The percentage of revenue vehicles (by type) that exceed the useful life benchmark (ULB).
- 2. **Equipment:** The percentage of non-revenue service vehicles (by type) that exceed the ULB.
- 3. **Facilities:** The percentage of facilities (by group) that are rated less than 3.0 on the Transit Economic Requirements Model (TERM) Scale.
- 4. **Infrastructure:** The percentage of track segments (by mode) that have performance restrictions, considered to have a rating less than 3.0 on the TERM Scale.

Transit Safety

Established in previous legislation and continued in the IIJA, the Federal Transit Administration (FTA) added the new Public Transportation Agency Safety Plans (PTASP) rule. PTASP requires certain operators of public transportation systems that receive federal funds under FTA's Urbanized Area Formula Grants to develop safety plans that include the processes and procedures to implement Safety Management Systems (SMS).

As CTS receives federal financial assistance under the Urbanized Area Formula Program (49 U.S.C. § 5307) that operates public transportation, it is required to set safety performance targets for the following measures:

- 1. **Fatalities:** Total number of reportable fatalities and rate per vehicle revenue miles by mode.
- 2. Injuries: Total number of reportable injuries and rate per vehicle miles by mode.
- 3. **Safety Events:** Total number of reportable events and rate per vehicle revenue miles by mode.
- 4. System Reliability: Mean distance between major mechanical failures by mode.

Federal Requirements

Targets

- The CUAMPO is required to establish performance targets no later than 180 days after TDOT, KYTC, or CTS set their respective performance targets.
- For each performance measure, the MPO reviewed the state targets and chose whether to support them or set their own.
 - Following that, a resolution was drafted with the MPO's recommended course of action and brought to the Executive Board for approval.
- TDOT, KYTC, the CUAMPO, and CTS must coordinate performance measure targets to ensure consistency to the extent practicable.



Reporting

- The MTP update must describe the performance measures and targets, evaluate the performance of the transportation system, and report on progress made in subsequent MTP updates.
- The TIP must link investment priorities to the targets in the MTP and describe, to the extent practicable, the anticipated effect of the program on achieving established targets.
- The CUAMPO must also report to TDOT and KYTC the baseline roadway transportation system condition, performance data, and progress toward achieving targets.

Assessments

- FHWA and FTA will not directly evaluate the CUAMPO's progress toward meeting performance measure targets. However, the CUAMPO's performance will be assessed as part of regular cyclical transportation planning process reviews, including Transportation Management Area certification reviews and the Federal Planning Finding, which is associated with approval of the STIP.
- FHWA and FTA will determine if TDOT, KYTC, and CTS have met or made significant progress toward selected targets for the transportation system.

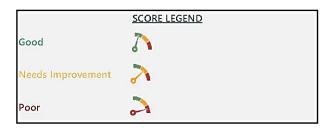
The scorecards on the following pages display the MPO's baseline performance and comparisons to state baseline performance and targets. The Clarksville Urbanized Area Metropolitan Planning Organization (CUAMPO) has chosen to support the state targets set by the Tennessee Department of Transportation (TDOT) and the Kentucky Transportation Cabinet (KYTC).



1.2 MPA Performance Measures – Tennessee Portion

CLARKSVILLE URBANIZED AREA METROPOLITAN PLANNING ORGANIZATION

Transportation Performance Management Scoreboard - Tennessee Portion of the MPA

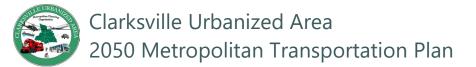


	Five-Year State Rolling Average	Five-Year MPA Rolling Average	Target	Score	Analysis Description
Number of Fatalities	1,148.6	28.6	1,346.2	7	The number of fatalities within the Tennessee portion of the MPA is a small percentage of the overall state average.
Rate of Fatalities (per 100 million Vehicle Miles Traveled)	1.417	1.723	1.642	2	The rate of fatalities within the Tennessee portion of the MPA peforms worse than the state target.
Number of Serious Injuries	5,995.6	155.4	5,995.5	7	The number of serious injuries within the Tennessee portion of the MPA is a small percentage of the overall state average.
Rate of Serious Injuries (per 100 million Vehicle Miles Traveled)	7.416	9.428	7.315	2	The rate of serious injuries within the Tennessee portion of the MPA peforms worse than the state target.
Number of Non-motorized Fatalities and Serious Injuries	546.4	14.0	704.2	7	The number of non-motorized fatalities and serious injuries within the Tennessee portion of the MPA is a small percentage of the overall state average.

Safety Performance Measures (PM1)

Source: Fatality Analysis Reporting System (FARS); Tennessee Department of Transportation (TDOT)

Transportation Performance Management Report







Source: Tennessee Department of Transportation (TDOT), National Bridge Inventory (NBI)

Transportation Performance Management Report

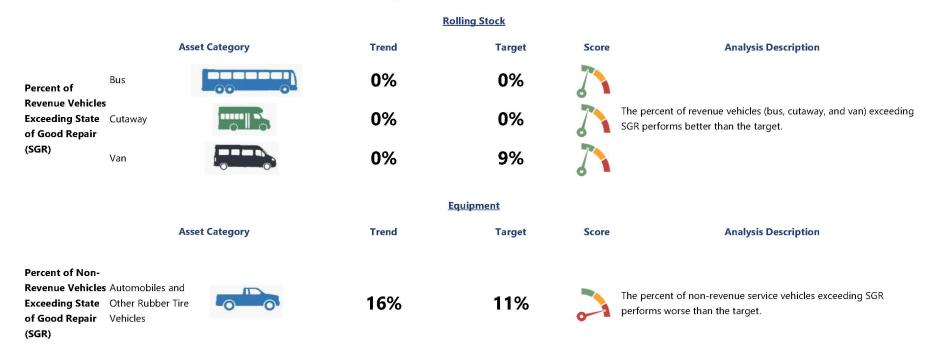


Clarksville Urbanized Area 2050 Metropolitan Transportation Plan

System Performance Measures (PM3)					
	State Trend	MPA Trend	Target	Score	Analysis Description
Percent of Person-Miles Traveled on the Interstate that are Reliable	96.0%	98.0%	83.0%	7	The percent of person-miles traveled on the Interstate within the Tennessee portion of the MPA performs better than the state target.
Percent of Person-Miles Traveled on the Non-Interstate NHS that are Reliable	93.8%	92.9%	87.5%	7	The percent of person-miles traveled on the Non-Interstate NHS within the Tennessee portion of the MPA performs better than the state target.
Truck Travel Time Reliability (TTTR) Index on the Interstate	1.25	1.66	1.37		The TTTR of the Tennessee portion of the MPA performs worse than the state target.
Peak Hour Excessive Delay (PHED)	N/A	N/A	N/A	N/A	N/A
Non-Single Occupancy Vehicle Travel (SOV)	N/A	N/A	N/A	N/A	N/A
Emmisions Reductions	N/A	N/A	N/A	N/A	N/A

Source: National Performance Management Research Data Set (NPMRDS)

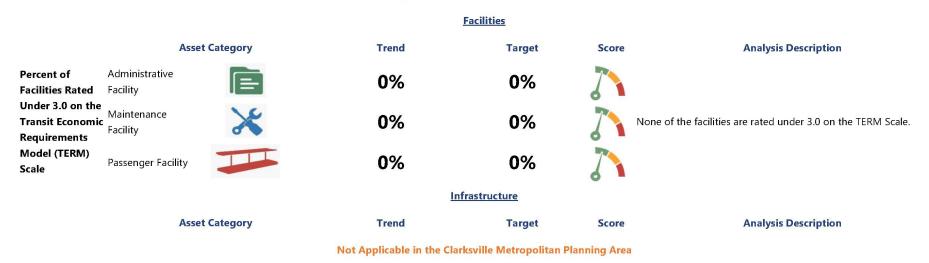




Source: Clarksville Transit System (CTS)



Transit Asset Management (TAM) (2022) Performance and Target



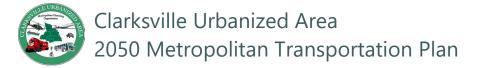
Source: Clarksville Transit System (CTS)



Clarksville Urbanized Area 2050 Metropolitan Transportation Plan

Transit Safety					
	Mode	Five-Year MPA Rolling Average	Target	Score	Analysis Description
Number of Fatalities by Mode	Bus and Demand Responsive	0.0	0.0	7	The number of fatalities in Bus and Demand Responsive Transit meets the target.
Rate of Fatalities per 100,000 Total Vehicle Revenue Miles by Mode	Bus and Demand Responsive	0.00	0.00	7	The rate of fatalities per 100,000 miles in Bus and Demand Responsive Transit meets the target.
Number of Injuries by Mode	Bus and Demand Responsive	4.2	2.3	2	The number of injuries in Bus and Demand Responsive Transit performs worse than the target.
Rate of Injuries per 100,000 Total Vehicle Revenue Miles by mode	Bus and Demand Responsive	0.27	0.15		The rate of injuries per 100,000 vehicle miles in Bus and Demand Responsive Transit performs worse than the target.
Number of Safety Events by Mode	Bus and Demand Responsive	4.6	3.1		The number of safety events in Bus and Demand Responsive Transit performs worse than the target.
Rate of Safety Events per 100,000 Total Vehicle Revenue Miles by Mode	Bus and Demand Responsive	0.30	0.20	2	The rate of safety events per 100,000 miles in Bus and Demand Responsive Transit performs worse than the target.
Mean Distance Between Major Mechanical Failures by Mode	Bus and Demand Responsive	34,462	34,364	>	The mean distance between major mechanical failures in Bus and Demand Responsive Transit performs slightly better than the target.

Source: Clarksville Transit System (CTS)



1.3 MPA Performance Measures – Kentucky Portion

CLARKSVILLE URBANIZED AREA METROPOLITAN PLANNING ORGANIZATION

Transportation Performance Management Scoreboard - Kentucky Portion of the MPA



	Five-Year State Rolling Average	Five-Year MPA Rolling Average	Target	Score	Analysis Description
Number of Fatalities	764.8	1.6	757.0	7	The number of fatalities within the Kentucky portion of the MPA is a small percentage of the overall state average.
Rate of Fatalities (per 100 million Vehicle Miles Traveled)	1.575	0.708	1.567	7	The rate of fatalities within the Kentucky portion of the MPA performs better than the state target.
Number of Serious Injuries	2,799.4	8.0	2,644.0	7	The number of serious injuries within the Kentucky portion of the MPA is a small percentage of the overall state average.
Rate of Serious Injuries (per 100 million Vehicle Miles Traveled)	5.761	3.618	5.527	7	The rate of serious injuries within the Kentucky portion of the MPA performs better than the state target.
Number of Non-motorized Fatalities and Serious Injuries	298.0	1.4	297.0	7	The number of non-motorized fatalities and serious injuries within the Kentucky portion of the MPA is a small percentage of the overall state average.

Safety Performance Measures (PM1)

Source: Fatality Analysis Reporting System (FARS); Kentucky Transportation Cabinet (KYTC)

Transportation Performance Management Report



Bridge/Pavement Performance Measures (PM2)



Source: Kentucky Transportation Cabinet (KYTC), National Bridge Inventory (NBI)



Clarksville Urbanized Area 2050 Metropolitan Transportation Plan

System Performance Measures (PM3)						
	State Trend	MPA Trend	Target	Score	Analysis Description	
Percent of Person-Miles Traveled on the Interstate that are Reliable	98.2%	61.4%	93.0%		The percent of person-miles traveled on the Interstate within the Kentucky portion of the MPA performs worse than the state target.	
Percent of Person-Miles Traveled on the Non-Interstate NHS that are Reliable	93.6%	99.9%	82.5%	7	The percent of person-miles traveled on the Non-Interstate NHS within the Kentucky portion of the MPA performs better than the state target.	
Truck Travel Time Reliability (TTTR) Index on the Interstate	1.16	2.13	1.30		The TTTR of the Kentucky portion of the MPA performs considerably worse than the state target.*	
Peak Hour Excessive Delay (PHED)	N/A	N/A	N/A	N/A	N/A	
Non-Single Occupancy Vehicle Travel (SOV)	N/A	N/A	N/A	N/A	N/A	
Emmisions Reductions	N/A	N/A	N/A	N/A	N/A	

Source: National Performance Management Research Data Set (NPMRDS)

Note*: The percent of person-miles travelled on the Interstate within the Kentucky portion of the MPA and the TTTR of the Kentucky portion of the MPA do not meet the state targets. This could have been caused by a lane closure due to road construction on I-24 Westbound between the Kentucky/Tennessee State Line and US 41A/Fort Campbell Boulevard.



2.0 Future MPO Actions

2.1 Safety Performance (PM1)

The Tennessee portion of the MPA did not meet the targets for the rate of fatalities or the rate of serious injuries. However, these results are not unexpected or uncommon for urbanized areas. To support the state targets and help improve statewide performance, the MPO must reduce fatalities and serious injuries on its roadways. The MPO should consider the following strategies to reduce fatality and serious injury rates:

- Keep roadways and bridges maintained and as congestion-free as possible.
- Work with state and local officials, as well as other safety stakeholders, to reduce fatalities and serious injuries on roadways.
- Coordinate with TDOT and KYTC to develop their respective state Highway Safety Improvement Programs (HSIP).
- Ensure that transportation projects and safety improvements are coordinated with the state Strategic Highway Safety Plans (SHSP).
- Identify safety programs that may be implemented.
- Consider how projects placed in the Transportation Improvement Program will impact safety.
- Increase the implementation of Complete Streets to reduce congestion, lower speeds, and provide safer facilities for non-motorized users.

2.2 Bridge/Pavement Performance (PM2)

Both the Tennessee and Kentucky portions of the MPA do not meet the established targets for Good Interstate pavement conditions. Additionally, the Kentucky portion of the MPA exceeds the established target for Poor Interstate pavement conditions. To improve the pavement performance, the MPO should:

- Prioritize timely repairs and pavement resurfacing on routes with deteriorating pavement conditions.
- Work with state and local stakeholders to identify and repair pavement cracking, rutting, potholes, etc.
- Reduce or eliminate heavy vehicle traffic on roadways with poor pavement conditions by establishing designated truck routes on roadways with better pavement conditions.



- Use the local Intelligent Transportation Systems (ITS) infrastructure to monitor roadway conditions and redirect drivers to less congested routes to reduce vehicle loads and pavement condition deterioration.
- Employ Travel Demand Management (TDM) strategies.

The Tennessee portion of the MPO does not meet the established targets for NHS bridges in Good condition by deck area. The MPO can support and improve the state's performance by prioritizing the repair of bridges that are not in Good condition. Bridges in Poor condition should be prioritized through the plan's operation and maintenance budget which will also increase safety and system performance and avoid costlier repairs in the future.

Where possible, the MPO should coordinate with TDOT and KYTC to apply for applicable federal grants for bridge repairs and maintenance. While there is no guarantee of receiving these funds, grants would allow the MPO to expedite bridge repairs and update as many bridges as possible to Good condition.

2.3 System Performance (PM3)

The National Performance Management Research Dataset (NPMRDS) data shows that both the Interstate and non-Interstate NHS systems within the MPA are reliable but are experiencing a decrease in reliability. The 2022 NPMRDS data showed that I-24 Westbound had several roadway segments with a Level of Travel Time Reliability (LOTTR) greater than 1.5; however, this result was likely caused by a road construction lane closure on I-24 Westbound between the Kentucky/Tennessee State Line and US 41A/Fort Campbell Boulevard.

Actions the MPO may take to continue supporting the Interstate and non-Interstate NHS reliability are:

- Encourage law enforcement to remove crashes from travel lanesto reduce congestion.
- Use ITS to advise motorists of roadway conditions and redirect drivers to less congested routes.
- Implement signal coordination projects to reduce congestion.
- Schedule roadway work at off-peak times.
- Employ Travel Demand Management strategies.



The Truck Travel Time Reliability (TTTR) for the MPA's sole Interstate, I-24, is 1.66 in the Tennessee portion of the MPA and 2.13 in the Kentucky portion of the MPA, which does not meet either state target. These results can likely be attributed to the previously mentioned construction.

Actions the MPO can take to improve the TTTR within the MPA include:

- Encourage law enforcement to remove crashes from travel lanes to reduce congestion.
- Use ITS to advise motorists of roadway conditions and redirect drivers to less congested routes.
- Implement signal coordination projects at Interstate ramps to reduce queueing and promote efficiency.
- Schedule roadway work at off-peak times.
- EmployTravel Demand Management strategies.
- Implement congestion reduction measures.
- Use ITS to advise truck drivers of roadway conditions and redirect them to less congested routes.
- Provide alternative truck routes.

2.4 Transit Asset Management Performance (TAM)

No transit vehicles operated by CTS, the public transit provider in the MPO area, exceed the State of Good Repair (SGR) targets established by the MPA. However, the non-revenue vehicles exceed their SGR targets, so CTS will need to upgrade its fleet by incorporating newer non-revenue vehicles and phasing out older vehicles.

CTS also maintains two (2) administrative facilities, two (2) maintenance facilities, and one (1) passenger facility. Of these facilities, none rate below 3.0 on the Transit Economic Requirements Model (TERM) scale. To maintain this performance, CTS should continue performing regular maintenance in the facilities to upgrade and/or fix any elements requiring repair.

2.5 Transit Safety

As CTS is a recipient and sub-recipient of federal financial assistance under the Urbanized Area Formula Program (49 U.S.C. § 5307) that operates public transportation, it is required to set safety performance targets for the following measures:



- 1. **Fatalities:** Total number of reportable fatalities and rate per vehicle revenue miles by mode.
- 2. **Injuries:** Total number of reportable injuries and rate per vehicle miles by mode.
- 3. **Safety Events:** Total number of reportable events and rate per vehicle revenue miles by mode.
- 4. System Reliability: Mean distance between major mechanical failures by mode.

The Federal Transit Administration (FTA) states that:

"Each transit provider is required to review its agency safety plan annually and update the plan, including the safety performance targets, as necessary. The MPO is not required to set new transit safety targets each year but can choose to revisit the MPO's safety targets based on the schedule for preparation of its system performance report that is part of the Metropolitan Transportation Plan (MTP). The first MPO MTP update or amendment to be approved on or after July 20, 2021, must include the adopted transit safety targets for the region."

Transit service within the MPA fails to meet some of the Public Transportation Agency Safety Plan (PTASP) safety targets. To address this issue, CUAMPO should work with CTS and consider the following actions:

- Keep the roadways and bridges maintained and as congestion-free as possible.
- Work with state and local officials, as well as other safety stakeholders and CTS, to reduce the frequency and severity of transit-related incidents.
- Coordinate with TDOT during development of the state's Highway Safety Improvement Program (HSIP) to place emphasis on transit-related safety concerns.
- Ensure that transit projects and safety improvements are coordinated with the state's Strategic Highway Safety Plan (SHSP).
- Identify safety programs and education opportunities that may be implemented by transit providers, and coordinate with state and local partners to secure funding and implementation for these programs.
- Consider how projects in the Transportation Improvement Program will improve transit service and safety.