PERFORMANCE MEASURES REPORT

2018

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INTRODUCTION

What are performance measures?

Performance measures are a set of baselines and targets to assist in the planning process, allowing various jurisdictions to determine where efforts are succeeding and where more resources need to be directed. The Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) created a *Performance Measures* standard through the Moving Ahead for Progress in the 21st Century Act and Fixing America's Surface Transportation Act (commonly called MAP-21 and the FAST Act, respectively).

These rules set targets to measure regional and state progress in a series of categories as they apply to the National Highway System (NHS). The NHS is over 160,000 miles of roadways, including the Interstate Highway System, important to the United States' economy, defense, and mobility. Maintenance of the NHS is a collaborative effort between the US Department of Transportation (DOT), state DOTs, Metropolitan Planning Organizations (MPOs), local authorities, and transit agencies. The Memphis Urban Area MPO contains 720 of those NHS miles. How states perform against these targets dictate how they can spend federal infrastructure funds: perform well, and more freedom is granted on projects; perform poorly, and dollars must be targeted for improving specific outcomes.

The Memphis MPO is responsible for adopting targets to measure how well the National Highway System (NHS) performs within its boundaries. The MPO has the option of adopting the same targets as its state DOTs (in Memphis MPO's case, this is Tennessee and Mississippi), or may set its own targets. For multi-state MPOs like the Memphis MPO, some targets can be separated by state, while others must be adopted for the whole region. How actual performance stacks up against targets at an MPO level has no direct effect on funding—only state-wide outcomes impact federal funding. For the transit Performance Measures (TAM and PTASP), the Memphis Area Transit Authority (MATA) sets and reports their targets, with the MPO supporting these targets through coordination and adoption.

Performance Measures: Categories and Grading

Each target receives one of three grades: (1) target met, (2) making progress, or (3) not met and not making progress. Performance measures are broken into four categories: highway safety (PM1), pavement and bridge conditions (PM2), system performance (PM3), and Transit Asset Management (TAM). The Targets in each section will include the adopted statewide baselines and figures, and observed annual figures of the MPO study area.

***Highway Safety*:** highway safety targets are concerned with motorized and non-motorized vehicle incidents on all public roads, beyond the typical scope of the NHS roads. Highway safety targets are adopted annually using a 5-year rolling average. For 2018, this is a 2013-17 average. The highway safety performance measures are:

1. Total number of traffic related fatalities on all public roads
2. Rate of traffic related fatalities on all public roads per 100 million VMT
3. Total number of traffic related serious injuries on all public roads
4. Rate of traffic related serious injuries on all public roads per 100 million VMT
5. Total number of non-motorized fatalities and serious injuries on all public roads

The data for these measures comes primarily from the Highway Performance Monitoring System (HPMS), MDOT's Safety Analysis Management System (SAMS) the Fatality Analysis Reporting System (FARS), and TDOT's Tennessee Integrated Traffic Analysis Network (TITAN). By setting these targets and tracking these performance measures, the Memphis MPO aims to improve safety in our region by identifying safety problems and incorporating efforts to improve safety in our planning processes. The MPO continues to:

- Work with the states and safety stakeholders to address areas of concern for fatalities or serious injuries within the metropolitan planning area
- Coordinate with the states and include the safety performance measures and the states' HSIP targets for those measures in the long-range regional transportation plan (RTP)
- Integrate into the metropolitan transportation planning process, the safety goals, objectives, performance measures and targets described in other state safety transportation plans and processes such as applicable portions of the HSIP, including the SHSP
- Include a description in the Transportation Improvement Program (TIP) of the anticipated effect of the TIP toward achieving HSIP targets in the RTP, linking investment priorities in the TIP to those safety targets

***Pavement and Bridge Conditions*:** pavement and bridge conditions targets are concerned with the percentage of roads (by centerline mile) and bridges (by deck area) in both good and poor conditions. These are adopted by the state over a 4-year period. The pavement and bridge condition performance measures are:

1. Percent of interstate pavement in good condition
2. Percent of interstate pavement in poor condition
3. Percent of non-interstate pavement in good condition
4. Percent of non-interstate pavement in poor condition
5. Percent of bridges in good condition
6. Percent of bridges in poor condition

The data for these measures comes from the HPMS and the National Bridge Index (NBI). The Memphis MPO has elected to support both Tennessee and Mississippi's adopted statewide targets, meaning the benchmark and target figures in the tables below are statewide, while current conditions and maps reflect the MPO study area.

System Performance: system performance targets assesses the performance of freight movement, traffic congestions and on-road mobile source emissions as a part of the CMAQ Performance Measure on the NHS. The CMAQ performance measure requires the development of a biannual CMAQ Performance Plan that provides insight on performance measure progress and potential impact on meeting progress while considering congestion, travel time reliability of interstate, non-interstate, and truck travel. The plan also includes the base level line for air quality measures such as VOC, CO, and NOx reduction. PM 3 targets are adopted every 2 and 4 years for interstate and every 4 years for non-interstate. However, the MPO adopts only the 4-year targets. The PM3 System Performance Measures are as follows:

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. VOC Reduction
7. CO Reduction
8. NOx reduction

The goal of the PM 3 targets is to ensure the goals of the National Highway Performance Measure Program (NHPP) are met and ensure the CMAQ Performance Measures are making progress towards meeting target goals throughout the performance period. The assessments provide the Memphis MPO a more comprehensive understanding of congestion and environmental impacts in the Memphis MPO planning region and aid in the investment prioritization process as the organization meet the needs of the federal performance measures.

Transit Asset Management: transit asset management is concerned with the quality of transit assets in the region. It uses measures of revenue vehicles and service vehicles by their useful life, as well as facility conditions. The assets that the transit agency must inventory, assess, and track include vehicles such as buses or trolleys, equipment, facilities such as the bus maintenance building and transit centers, and infrastructure such as bus stops or trolley catenary wire. The transit asset management performance measures are:

1. **Rolling Stock:** the percentage of revenue vehicles (by type) that exceed the useful life benchmark (ULB)

2. **Equipment:** the percentage or non-revenue services 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.

The goal of these performance measures and targets is to improve the condition of assets (leading to overall lower maintenance costs) and to prioritize investments based on accurate data and plan for the future. The MPO will incorporate these measures by linking investment priorities in the Transportation Improvement Plan (TIP) to the priorities illustrated by the targets. In addition, the MPO will coordinate with MATA in the development of the plan and targets.

Memphis MPO Study Area Map

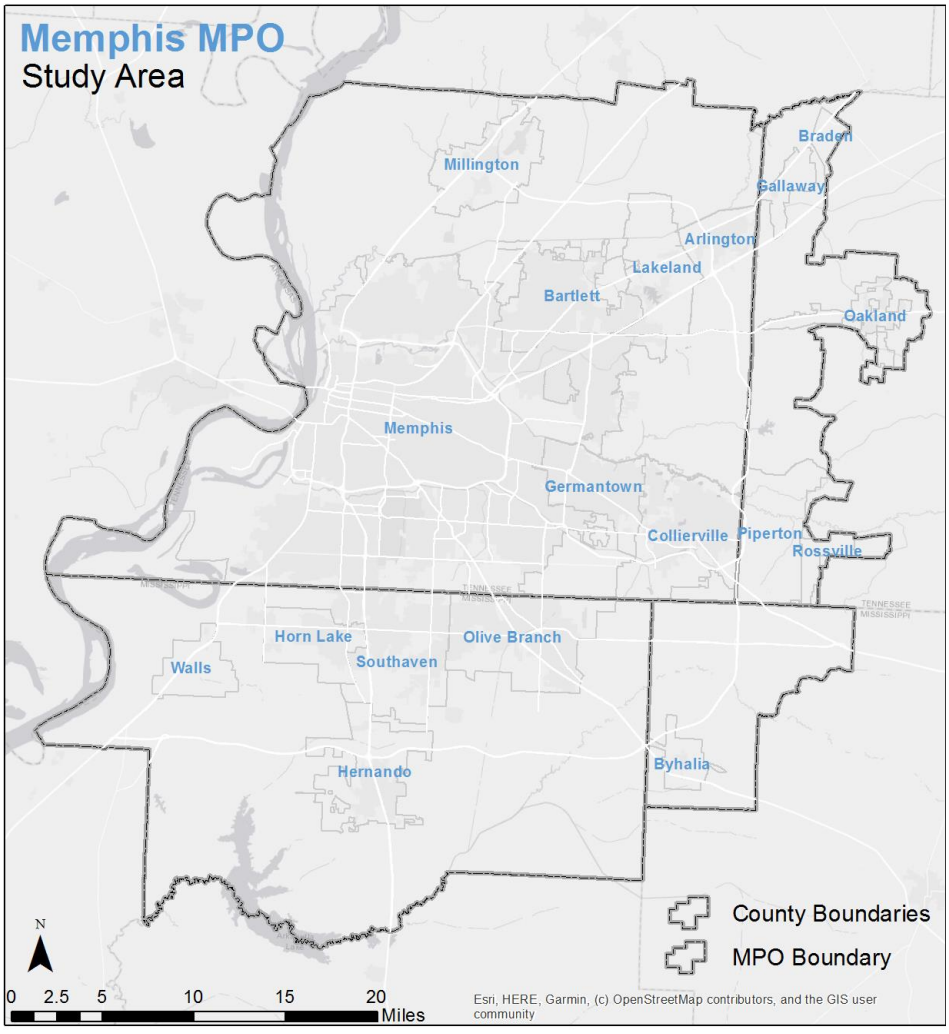


Table 1: Memphis MPO 2018 Performance Measure Status

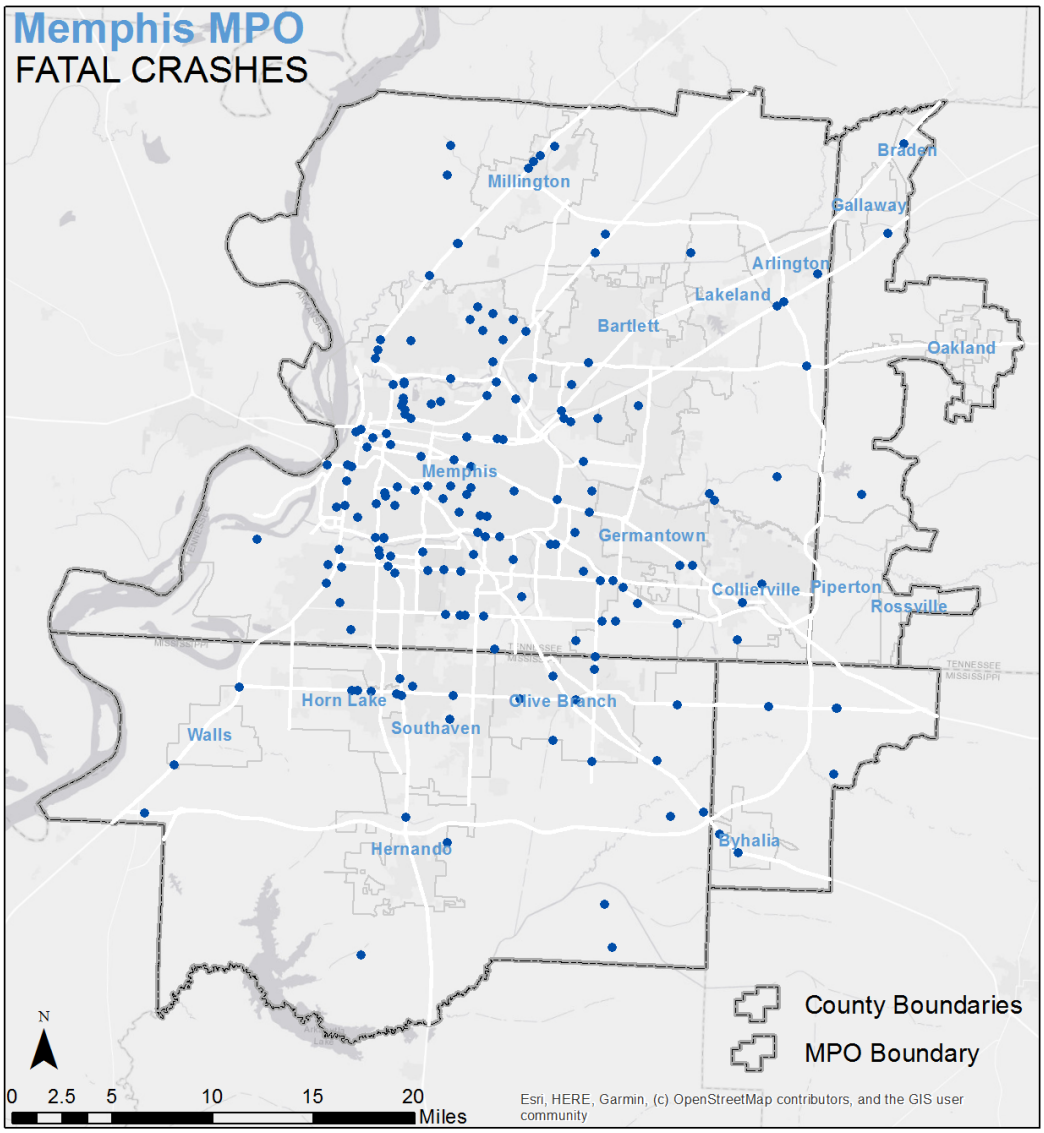
	Performance Measure	Baseline	Target*	MPO Observed (2018)	Page
Highway Safety†** **2013-17 Baseline** **2015-19 Target**	Number of fatalities	1,000.6/655.4	1022.0/697.3	214	7, 10
	Rate of fatalities per 100M VMT	1.329/1.640	1.291/1.706	1.830	10
	Number of serious injuries	7227.6/550.2	7374.6/555.5	1008	8, 10
	Rate of Traffic related serious injuries per 100M VMT	9.594/1.378	9.324/1.356	8.620	10
	Number of non-motorized fatalities and serious injuries	467.7/116.0	546.8/131.4	152	9-10
Bridge and Pavement Conditions† **2017 Baseline** **2021 target**	Percent of interstate pavement in good condition	75.6/75.0	60.0/55.0	77.7/78.7	11
	Percent of interstate pavement in poor condition	0.1/2.1	1.0/5.0	0.9/1.3	11
	Percent of non-interstate pavement in good condition	72.7/62.5	40.0/25.0	32.4/70.5	12
	Percent of non-interstate pavement in poor condition	6.7/9.3	5.0/10.0	14.0/2.1	12
	Percent of bridges in good condition	39.5/61.7	36.0/60.0	11.4/84.2	13
	Percent of bridges in poor condition	4.9/2.1	6.0/5.0	5.0/0.0	13
System Performance† **2017 Baseline** **2021 Target**	Percent of reliable interstate person-miles	87.7/93.3	83.0/93.0	91.5	14
	Percent of reliable non-interstate person-miles	NA	87.5/85.0	91.5	14
	Truck travel time reliability index	NA	1.33/1.50	1.42	15
	Percent of non-single-occupancy vehicle travel	16.6	16.5	15.9	15
	Annual hours of Peak Hour Excessive Delay	NA	18.8	8.0	15
	VOC Reduction	230.0/28.0	61.4/0.0	1.761	16
	CO Reduction	530.3/--	150.0/--	NA	16
	NOx Reduction	363.4/85.0	125.7/0.0	1.345	16

	Performance Measure	Baseline	Target*	MPO Observed (2018)	Page
Transit Asset Management 2017 Baseline 2018 Target	**Percent of revenue vehicles exceeding their Useful Life Benchmark**				
	- Streetcars	71	50	71	17
	- Regular Buses	27	20	27	17
	- MATA Plus Buses	31	20	31	17
	Percent of non-revenue vehicles exceeding their Useful Life Benchmark				
	- Trucks and wreckers	90	50	90	17
	- Auto service cars	95	50	95	17
	Percent of facilities with a TERM rating of less than 3				
	- Improvements	40	30	40	17
	- Shop and Garage	89	50	89	17
	- Structure and Building	35	30	35	17
	- Misc. Equipment	81	50	81	17
	Percent of track segments with a TERM rating of less than 3				
	- Tracks	0	0	0	17
	- Signals	100	50	100	17
	- Systems	0	0	0	17

*for measures with 2- and 4-year targets, the 4-year target was used
**MPO figures include all of Fayette and Marshall Counties
† ##/## indicates a split between Tennessee figures and Mississippi figures, respectively

PM1 – HIGHWAY SAFETY

***Performance Measure 1:** Traffic Fatalities*



Number of Traffic Fatalities on All Roads:

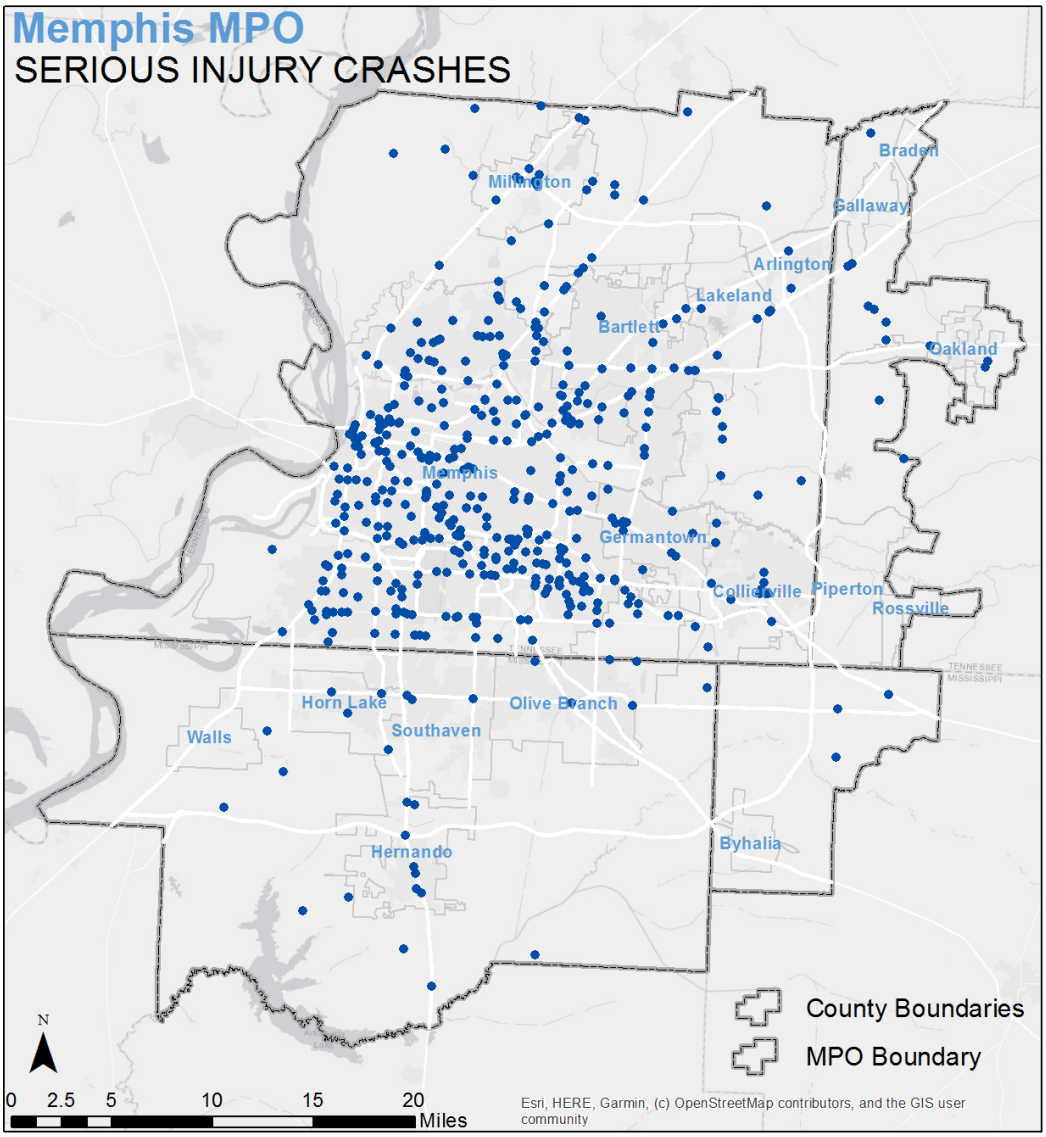
Tennessee Baseline (2013-17): 1000.6	**Target (2015-19): 1022.0**	**MPO* Observed: 172**
Mississippi Baseline (2013-17): 655.4	**Target (2015-19): 697.3**	**MPO* Observed: 42**

Fatality Rate per 100M VMT:

Tennessee Baseline (2013-17): 1.329	**Target (2015-19): 1.291**	**MPO* Observed: 1.602**
Mississippi Baseline (2013-17): 1.640	**Target (2015-19): 1.706**	**MPO* Observed: 4.380**

*includes all of Fayette and Marshall Counties

***Performance Measure 1:** Traffic Serious Injuries*



Number of Serious Injuries on All Roads:

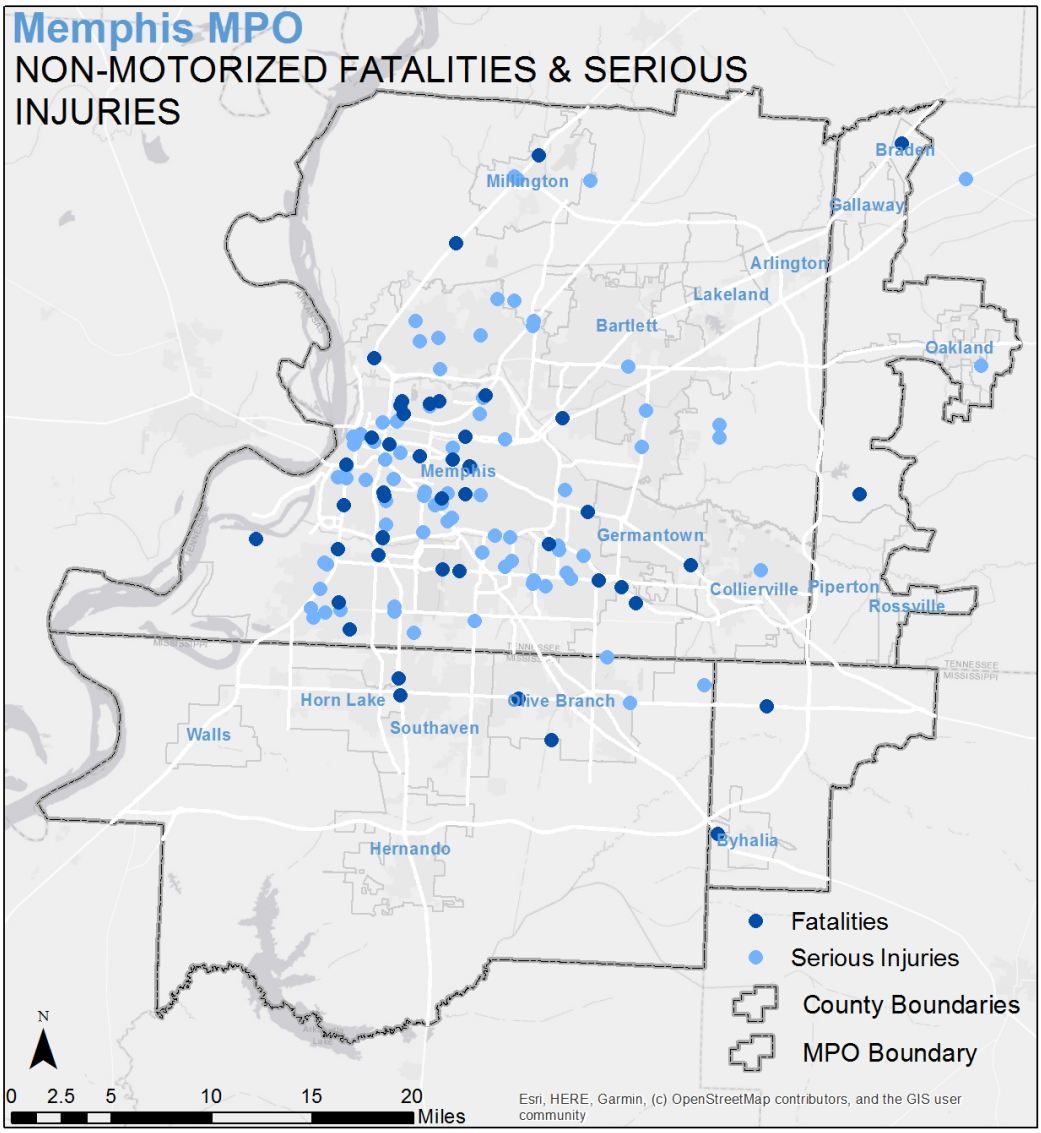
Tennessee Baseline (2013-17): 7227.6	**Target (2015-19): 7374.6**	**MPO* Observed: 971**
Mississippi Baseline (2013-17): 550.2	**Target (2015-19): 555.5**	**MPO* Observed: 37**

Rate of Serious Injuries per 100M VMT:

Tennessee Baseline (2013-17): 9.594	**Target (2015-19): 9.324**	**MPO* Observed: 9.047**
Mississippi Baseline (2013-17): 1.378	**Target (2015-19): 1.356**	**MPO* Observed: 3.850**

*includes all of Fayette and Marshall Counties

***Performance Measure 1:* Non-Motorized Serious Injuries**



Number of Non-Motorized Fatalities and Serious Injuries:

Tennessee Baseline (2013-17): 467.7 **Tennessee Target (2015-19): 546.8** **MPO* Observed: 145**

Mississippi Baseline (2013-17): 116.0 **Mississippi Target (2015-19): 131.4** **MPO* Observed: 9**

*includes all of Fayette and Marshall Counties

Table 2: Fatality and Serious Injury Baseline and Target

	Baseline (2013-2017)	Target (2015-2019)	Baseline Including 2018 Data (2014-2018)
Tennessee (TDOT)			
Number of Fatalities	1000.6	1022.0	1007.6
Fatality Rate	1.329	1.291	1.309
Number of Serious Injuries	7227.6	7374.6	6988.6
Serious Injury Rate	9.594	9.324	9.057
Number of Non-Motorized Fatalities and Serious Injuries	467.7	546.8	494.2
Mississippi (MDOT)			
Number of Fatalities	655.4	697.3	637.8
Fatality Rate	1.640	1.706	1.610
Number of Serious Injuries	550.2	555.5	649.9
Serious Injury Rate	1.378	1.356	1.640
Number of Non-Motorized Fatalities and Serious Injuries	116.0	131.4	115.0

PM1 targets set in 2018, with the baseline (5 year rolling average of 2013-2017) used to set the targets as well as the next baseline that includes 2018 data (2014-2018) for both Tennessee and Mississippi.

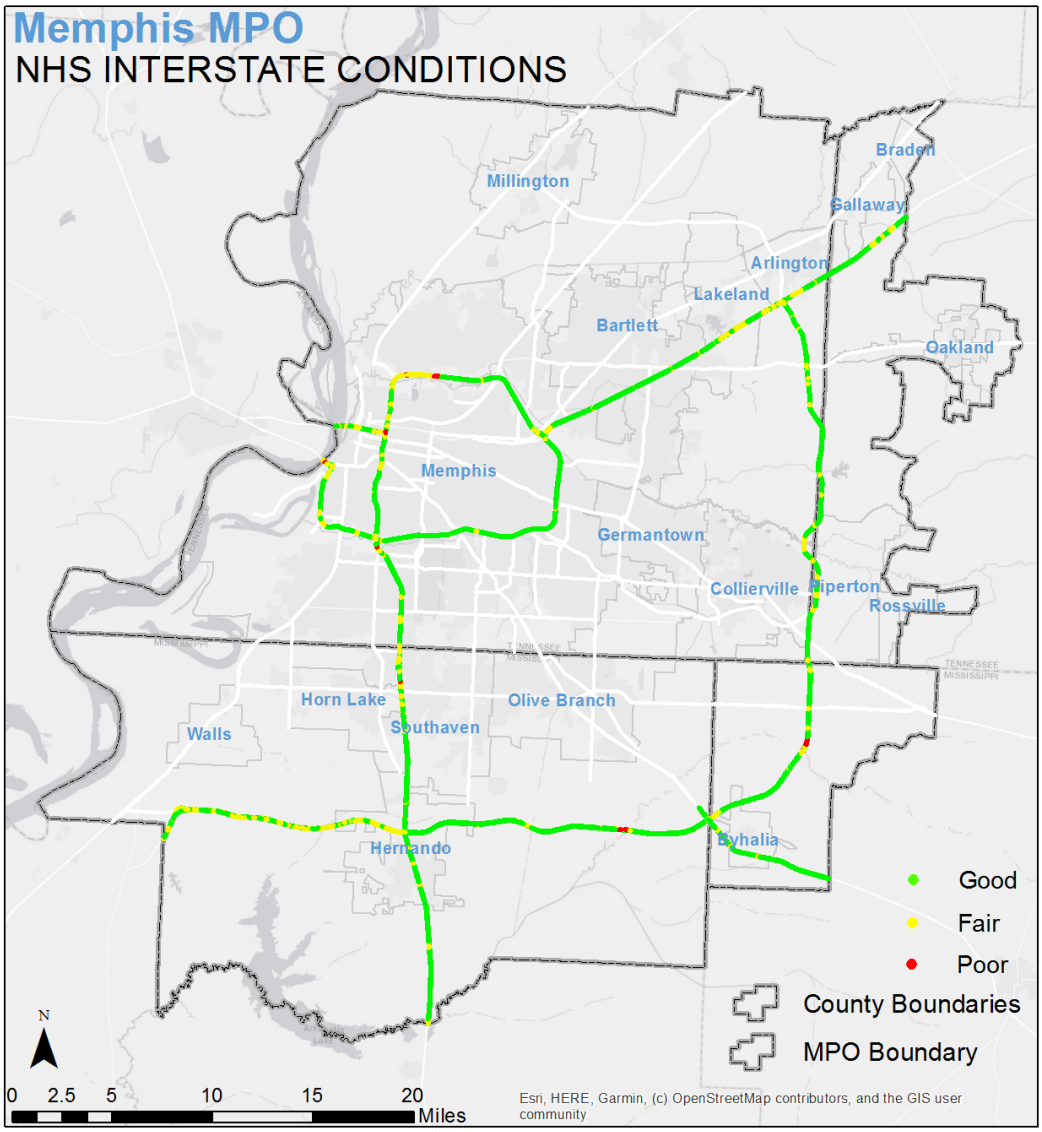
Table 3: Fatality and Serious Injury Totals

	Tennessee (TDOT)			Mississippi (MDOT)	All Combined
	Shelby County	Fayette County	Shelby and Fayette Counties	Desoto and Marshall Counties	Shelby, Fayette, Desoto, and Marshall Counties
Number of Fatalities	166	6	172	42	214
Fatality Rate	1.651	0.886	1.602	4.380	1.830
Number of Serious Injuries	928	43	971	37	1008
Serious Injury Rate	9.228	6.352	9.047	3.850	8.620
VMT (annual daily average)	27,551,684	1,854,779	29,406,463	2,629,990	32,036,453
Number of Non-Motorized Fatalities and Serious Injuries	41 fatalities; 98 serious injuries	4 fatalities; 2 serious injuries	145 fatalities and serious injuries	6 fatalities; 3 serious injuries	51 fatalities; 101 serious injuries

2018 yearly totals for fatalities, fatality rate, serious injuries, serious injury rate, Vehicle Miles Traveled, and non-motorized fatalities and serious injuries for each of the counties that comprise the MPO area. The data in this table includes the entirety of Fayette and Marshall counties rather than just the portions inside the MPO boundary due to data availability in this format.

PM2 – PAVEMENT AND BRIDGE CONDITIONS

Performance Measure 2.1: ***Interstate Pavement Conditions***



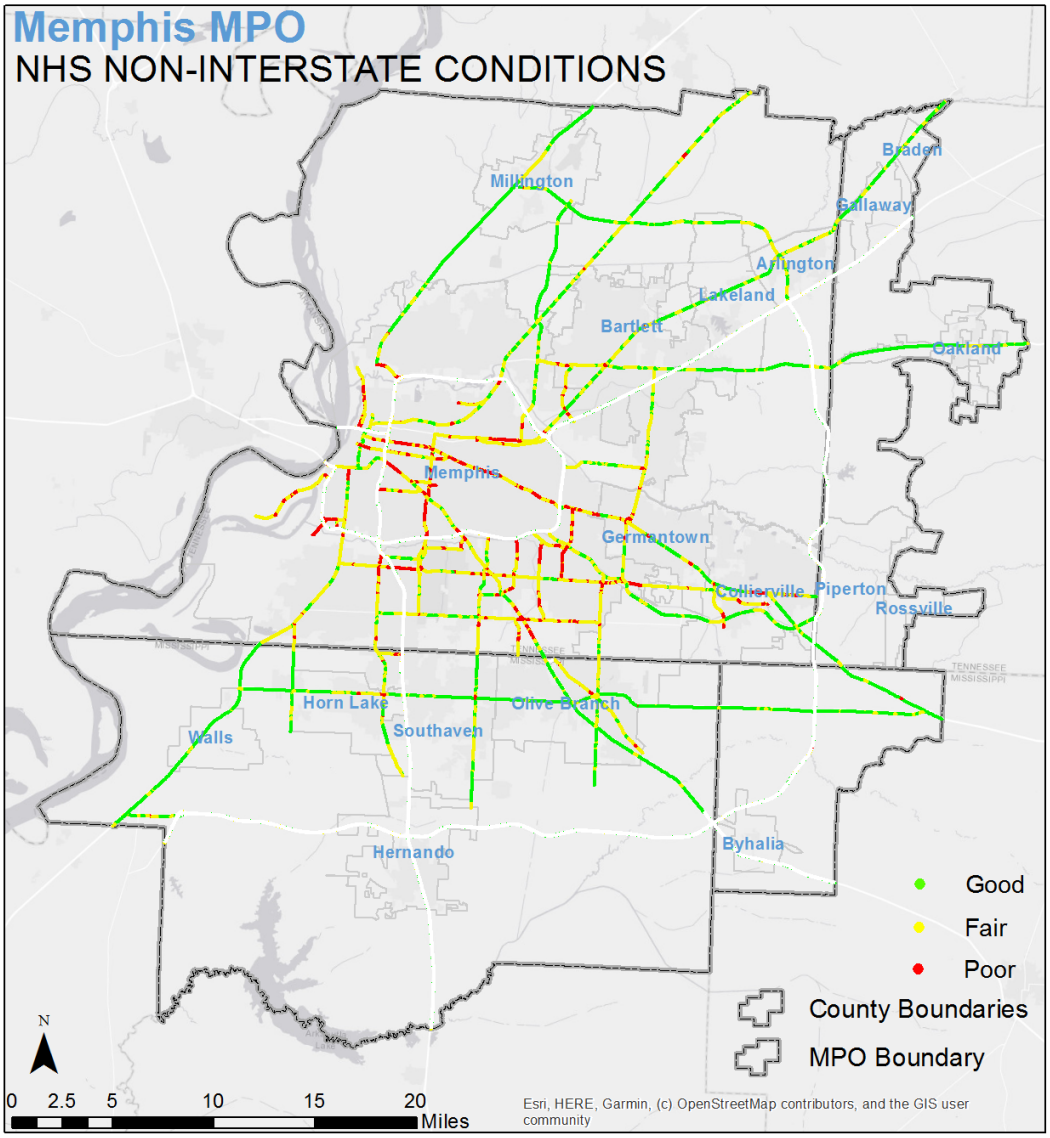
Percent of interstate pavement in good condition:

Tennessee Baseline (2017): 75.6% **Tennessee Target (2021): 60.0%** **MPO Observed: 77.7%**
Mississippi Baseline (2017): 75.0% **Mississippi Target (2021): 55.0%** **MPO Observed: 78.7%**

Percent of interstate pavement in poor condition:

Tennessee Baseline (2017): 0.1% **Tennessee Target (2021): 1.0%** **MPO Observed: 0.9%**
Mississippi Baseline (2017): 2.1% **Mississippi Target (2021): 5.0%** **MPO Observed: 1.3%**

***Performance Measure 2.2:** Non-Interstate Pavement Conditions*



Percent of non-interstate pavement in good condition:

Tennessee Baseline (2017): 72.7% **Tennessee Target (2021): 40.0%** **MPO Observed: 32.4%**

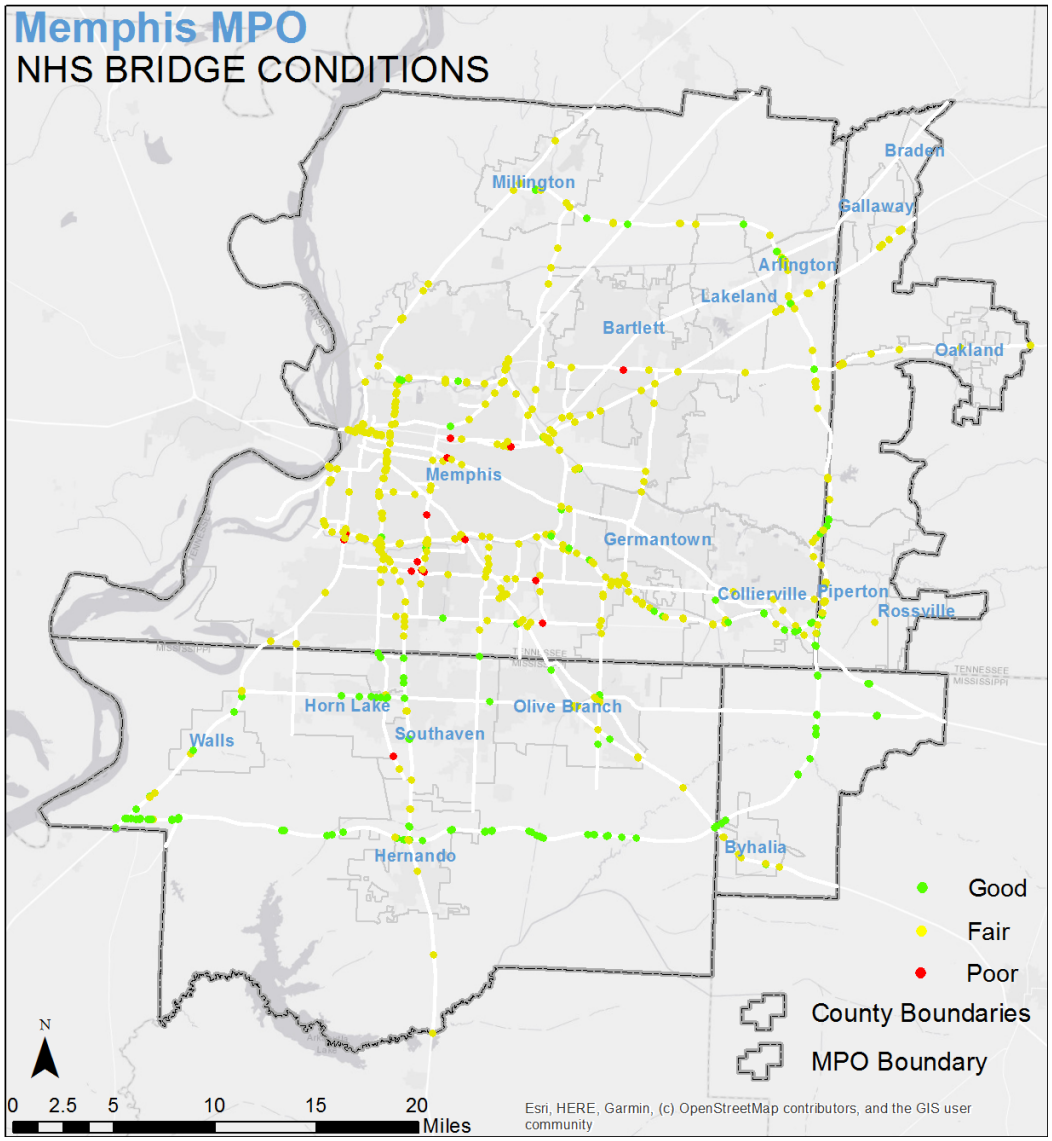
Mississippi Baseline (2017): 6.7% **Mississippi Target (2021): 25.0%** **MPO Observed: 70.5%**

Percent of non-interstate pavement in poor condition:

Tennessee Baseline (2017): 6.7% **Tennessee Target (2021): 5.0%** **MPO Observed: 14.0%**

Mississippi Baseline (2017): 9.3% **Mississippi Target (2021): 10.0%** **MPO Observed: 2.1%**

***Performance Measure 2.3:** NHS Bridge Conditions*



Percent of bridges in good condition:

Tennessee Baseline (2017): 39.5% **Tennessee Target (2021): 36.0%** **MPO Observed: 11.4%**

Mississippi Baseline (2017): 61.7% **Mississippi Target (2021): 60.0%** **MPO Observed: 84.2%**

Percent of bridges in poor condition:

Tennessee Baseline (2017): 4.9% **Tennessee Target (2021): 6.0%** **MPO Observed: 5.0%**

Mississippi Baseline (2017): 2.1% **Mississippi Target (2018): 5.0%** **MPO Observed: 0.0%**

PM3 – SYSTEM PERFORMANCE

***Performance Measure 3:** Travel Time Reliability*

Travel Time Reliability (TTR) is "consistency or dependability of travel times from day to day or across different times of the day," and the level of TTR is calculated by dividing the 80th percentile travel time by the 50th percentile travel time. A result of 1.5 or lower is considered reliable.

Table 4: Travel Time Reliability Performance Measure Targets

	Tennessee (TDOT)	Mississippi (MDOT)	Memphis (MPO)
	4-YR Target (2021)	4-YR Target (2021)	2018 Observed
Percentage of Person Miles Traveled That Are Reliable (Interstate)	83.0%	93.0%	91.5%
Percentage of Person Miles Traveled That Are Reliable (Non-Interstate)	87.5%	85.0%	91.5%

Percentage of Person Miles Traveled That Are Reliable (Interstate)

Tennessee Baseline (2017): 87.7%
Tennessee 4YR Target (2021): 83.0%
Tennessee 2YR Target (2021): 85.3%
Mississippi 2YR Target (2021): 90.0%
Mississippi Baseline (2017): 93.3%
Mississippi 4YR Target (2021): 93.0%
MPO Observed: 91.5%

Percentage of Person Miles Traveled That Are Reliable (Non-Interstate)

Tennessee Baseline (2017): N/A Tennessee 4YR Target (2021): 87.5%
Mississippi Baseline (2017): N/A Mississippi 4YR Target (2021): 85.0% MPO Observed: 91.5%

***Performance Measure 3:** Truck Travel Time Reliability Index*

The Freight Performance Measure looks at the Percentage of Interstate System mileage providing reliable truck travel time within five periods: morning peak, midday, and afternoon peak Monday – Friday, weekends and overnight for each day. TTTR is calculated by dividing the 95th percentile travel time by the 50th percentile travel time. A result of 1.5 or lower is considered reliable.

Table 5: Truck Travel Time Reliability Index Targets

	2-YR Target (2019)	4-YR Target (2021)	2018 Observed (MPO)
TDOT	1.35	1.33	1.42
MDOT	1.50	1.50	

Truck Travel Time Reliability Index
Tennessee 2YR (2019): 1.35 **Tennessee 4YR Target (2021): 1.33**
Mississippi 2YR (2019): 1.50 **Mississippi 4YR Target (2021): 1.30** **MPO Observed: 1.42**

***Performance Measure 3:** Congestion Mitigation and Air Quality Improvement*

Traffic Congestion

The Traffic Congestion subpart target applies to all urbanized areas that include NHS mileage with a population over 1 million that are, in all or part, designated as nonattainment or maintenance areas for Ozone (O3), Carbon Monoxide (CO), or Particulate Matter (PM10 and PM2.5) per National Ambient Air Quality Standards (NAAQS). The Memphis Urbanized Area, which covers parts of Tennessee, Mississippi, and Arkansas, meets this threshold and the following performance measures are applied to Memphis.

Table 6: Memphis, TN-MS-AR Urbanized Area Tri-State Targets

	Baseline (2017)	2-YR Target (2019)	4-YR Target (2021)	2018 Observed (MPO)
Annual Hours of Peak-Hour Excessive Delay per Capita	N/A	N/A	18.8	8.0
Percentage of Non-Single Occupancy Vehicle Travel	16.60%	16.50%	16.50%	15.9%

Total Emissions Reduction

The Total Emission Reduction Performance Measure applies to areas that include any part of a nonattainment or maintenance area for Ozone (O3), Carbon Monoxide (CO), or Particulate Matter (PM10 and PM2.5) per National Ambient Air Quality Standards (NAAQS). This measure is limited to these areas to further the CMAQ's program purpose of funding programs and projects that seek to satisfy the NAAQS. Being the Memphis MPO has a population greater than 1 million and is designated as maintenance for Ozone (O3) and attainment for Carbon Monoxide (CO), the following performance targets must be established.

Table 7: Emissions Targets

	Tennessee (TDOT)			Mississippi (MDOT)		
	Baseline 2014-17	2-Year Target (2018-19)	4-Year Target (2018-21)	Baseline (FY2014-17)	2-Year Target (FY2018-19)	4-Year Target (FY2018-21)
Total Emissions Reductions (VOC) kg/day	230.025	30.698	61.396	28	> 0	> 0
Total Emissions Reductions (CO) kg/day	530.282	75	150	N/A	N/A	N/A
Total Emissions Reductions (NOx) kg/day	363.399	62.84	125.68	85	> 0	> 0

TRANSIT ASSET MANAGEMENT

Table 8: Transit Asset Management Targets

	Memphis Area Transit Authority (MATA)						
	Asset Type/Group		Asset Frequency			Baseline (2018)	Target (2019)
			Total	Good Repair	Backlog		
Rolling Stock - All Revenue Vehicles % of revenue vehicles that have met/ exceeded their ULB	**Streetcars**		17	5	12	71%	50%
	Regular Buses		142	104	38	27%	20%
	MATA Plus Buses		68	47	21	31%	20%
Equipment - Non-Revenue Vehicles % of non-revenue vehicles that have met/ exceeded their ULB	**Trucks and Wreckers**		29	3	26	90%	50%
	Auto Service Cars		44	2	42	95%	50%
Facilities - All Buildings or Structures % of facilities (by group) that are rated less than 3.0 on the TERM Scale.	**Improvements**		101	61	40	40%	30%
	Shop and Garage		28	3	25	89%	50%
	Structure and Building		105	68	37	35%	30%
	Misc. Equipment		161	31	130	81%	50%
Infrastructure % of track segments (by mode) that are rated less than 3.0 on the TERM Scale. Track segments are measured to the nearest 0.01 of a mile.	**Streetcar**	**Tracks**	1	1	0	0%	0%
		Signals	1	0	1	100%	50%
		Systems	1	1	0	0%	0%

INDEX OF TERMS AND ABBREVIATIONS

MPO	Metropolitan Planning Organization
NHS	National Highway System
MAP-21	Moving Ahead for Progress in the 21st Century Act
FAST	Fixing America's Surface Transportation Act
FTA	Federal Transit Administration
FHWA	Federal Highway Administration
DOT	Department of Transportation
VMT	Vehicle Miles Traveled
PM1	Performance Measure 1: Highway Safety
PM2	Performance Measure 2: Pavement and Bridge Conditions
PM3	Performance Measure 3: System Performance
TAM	Transit Asset Management
HPMS	Highway Performance Monitoring System
SAMS	Safety Analysis Management System
FARS	Fatality Analysis Reporting System
TITAN	Tennessee Integrated Traffic Analysis Network
HSIP	Highway Safety Improvement Program
RTP	Regional Transportation Plan
TIP	Transportation Improvement Program
SHSP	Strategic Highway Safety Plan
NBI	National Bridge Index
TTRI	Travel Time Reliability Index
Person Miles	Miles traveled per person, not per vehicle
CMAQ	Congestion Mitigation and Air Quality
VOC	Volatile Organic Compounds
CO	Carbon Monoxide
NOx	Nitrogen Oxides
MATA	Memphis Area Transit Agency
ULB	Useful Life benchmark
TERM	Transit Economics Requirements Model
TPB	Transportation Policy Board