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Appendix B:  
**System Performance Report**

# Introduction

## Performance-Based Planning and Programming

The Greater Madison MPO (Metropolitan Planning Organization), the MPO for the Madison Metropolitan Area has tracked transportation system performance measures for many years and included its first official list of measures in its 2035 Regional Transportation Plan (RTP) Update adopted in 2012. The MPO developed a list of congestion and reliability measures in its initial Congestion Management Process adopted in 2011, and tracked metrics for which data has been readily available. As part of the previous [RTP 2050](#) adopted in April 2017, the MPO identified seven goals consistent with the national goals above, along with associated policies, and developed a revised set of performance measures tied to these goals. While mostly based on a qualitative analysis, the multi-modal set of recommended transportation facility and service investments in the RTP 2050 were selected based on these goals and measures. For this RTP, the MPO reaffirmed the six main goals, but decided to eliminate the previous goal related to financial viability of the transportation system.

The MPO began publishing an annual Performance Measures report in 2016 for 2015 baseline data to gauge progress in

achieving the RTP goals and fulfill federal performance management requirements. A link to the 2020 report for 2019 data is at [https://www.greatermadisonmpo.org/trends/documents/2019PMR\\_FinalWeb.pdf](https://www.greatermadisonmpo.org/trends/documents/2019PMR_FinalWeb.pdf). The report for 2019 incorporates the federal measures along with numerous other regional measures tied to RTP 2050 goals. Due to the impacts of the COVID-19 pandemic in 2020, the MPO collected required data for the federal performance measures, but did not produce a Performance Measures Report in 2021 for 2020 data. The MPO plans to transition the Performance Measures report to an online data dashboard in 2022.

Federal metropolitan planning rules under the most recent federal transportation bills, including the Infrastructure Investment and Jobs Act (IIJA), also known as the Bipartisan Infrastructure Bill (BIL), require incorporation of performance-based planning and programming into the development of Metropolitan Planning Organization (MPO) Long-Range Regional Transportation Plans (LRTP) and Transportation Improvement Programs (TIP).<sup>1</sup> The goals of the new performance management process are to make the most efficient use of federal transportation funds, refocus on national goals, increase accountability and transparency, and improve decision-making.

Federal performance measures have been established to track progress in achieving national goals, which include the following:

- **Safety** - Achieve a significant reduction in traffic fatalities and serious injuries on all public roads
- **Infrastructure Condition** - Maintain the highway infrastructure asset system in a state of good repair
- **Congestion Reduction** - Achieve a significant reduction in congestion on the National Highway System (NHS)
- **System Reliability** - Improve the efficiency of the surface transportation system
- **Freight Movement and Economic Vitality** - Improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development.
- **Environmental Sustainability** - Enhance the performance of the transportation system while protecting and enhancing the natural environment

The following Transportation Systems Performance Report is divided into two sections: the first includes analysis and discussion of locally developed performance measures to evaluate the RTP's performance towards achieving plan goals; and the second includes analysis and evaluation of the plans impacts on achieving the MPO's adopted targets for the federally required transportation performance measures.

1 23 C.F.R. 450.



# Connect Greater Madison 2050 RTP Performance Measures

## New Development in Centers and Along Multimodal Transportation Corridors

This is one of the performance measures for the Capital Area Regional Planning Commission's *Regional Development Framework*, which the MPO has adopted as well given the land use/transportation connection. The Framework recommends locating 40% of all future growth within mixed-use centers and along multimodal corridors connecting centers. See Map 2-e on page 2-8 of Chapter 2 for map of existing and planned centers along with employment areas.

The growth scenario developed for the Framework upon which the MPO's RTP was based assumes that 42% of households and 38% of new jobs will occur in these centers and corridors. These percentages are higher within the City of Madison and its growth areas. CARPC intends to track this measure moving forward.

## New Development in Already-Developed Areas

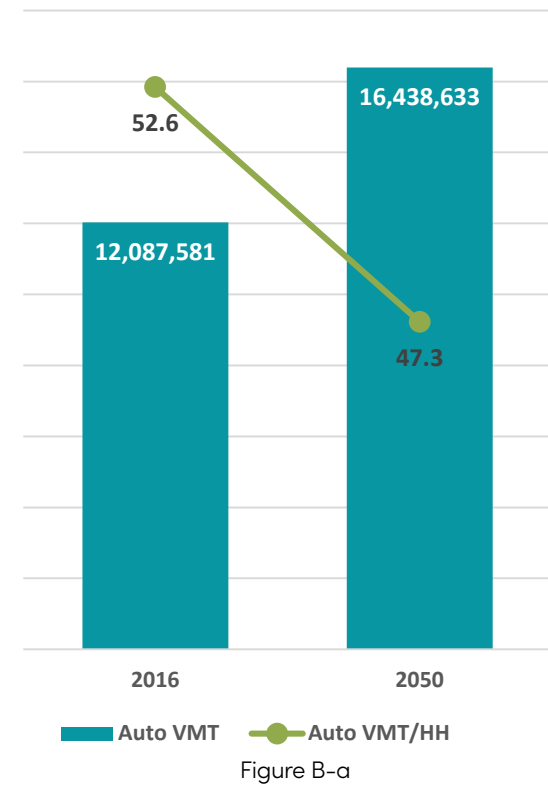
This is another performance measure for the *Regional Development Framework*, which the MPO has adopted. Infill and redevelopment increases the number of residents who have good access to jobs and services in areas that are compact, mixed, walkable and bikeable, and transit supportive. The growth scenario developed for the Framework upon which the MPO's RTP was based assumes that 42% of households and 24% of new jobs will occur in infill/redevelopment areas. Within the City of Madison, it was assumed 60% of new households would be in these areas. CARPC also intends to track this measure moving forward.

## Vehicle Miles Traveled (per Household)

With the forecast 39% increase in the number of households and 27% increase in jobs in 2050, the total number of weekday vehicle miles of travel (VMT) by personal motor vehicles is projected to increase 36% from 12.08 million in 2016 (the base year for the MPO's travel model) to 16.44 million in 2050 under the MPO Plan Scenario. While total VMT increases substantially, weekday VMT per household is forecast to decrease from 52.6 to 47.3. See Figure B-a. The decrease in VMT per household is the combined result of the growth scenario, which places households in closer proximity to jobs, services, and

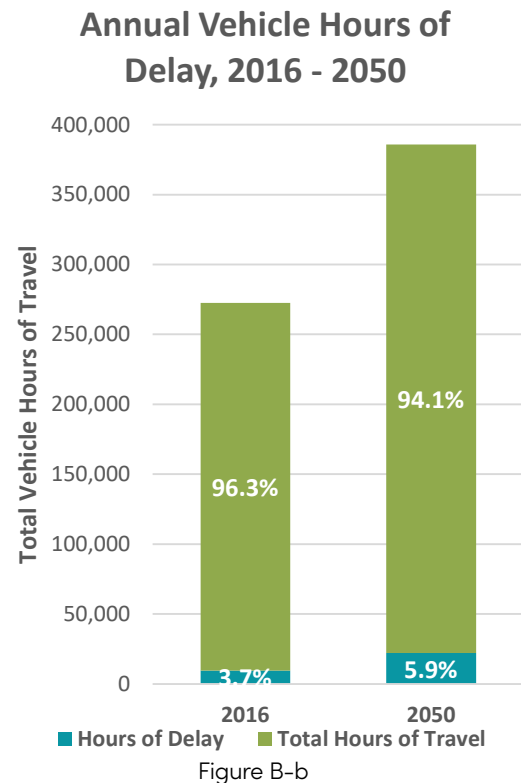
other destinations, and the ambitious planned future transit and bikeway networks. Reducing the increase in VMT further would require a large increase in car sharing (in conjunction with autonomous vehicles) and implementation of road user charges. The impact of these and other scenarios, such as continued high levels of teleworking, will be tested and report issued.

Vehicle Miles Traveled



## Vehicle Hours of Delay/ Vehicle Hours of Travel

Under the Plan Scenario, total weekday vehicle hours of travel (VHT) will increase almost 42% from 274,300 in 2016 to 388,000 in 2050. However, vehicle delay as a percent of total VHT remains low. It increases from 3.7% to just 5.9% versus 6.1% without the recommended local roadway capacity projects. See Figure B-b. It should be noted that further state highway capacity projects beyond the programmed Beltline Flex Lane project are not included in the plan at this time. Recommended projects will come



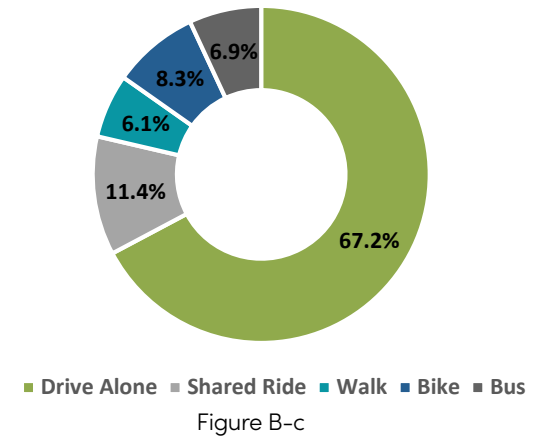
out of the current major corridor studies of the Beltline and Stoughton Road. The plan will be amended to include those projects in the future. The plan also recommends a future study in the STH 19/STH 113 corridors, which are forecast to experience significant traffic congestion (Level of Service E or worse) in the future.

## Mode of Transportation (Home-Based Work/ University Trips)

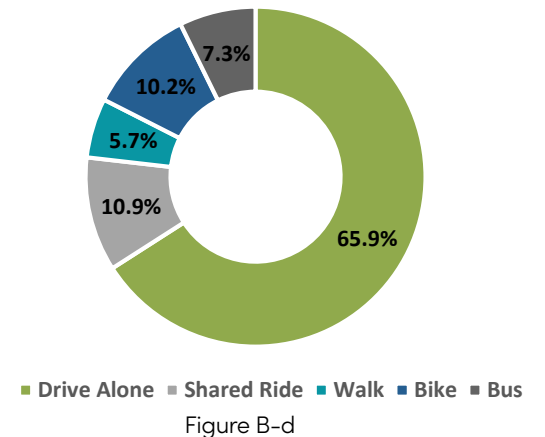
Under the Plan Scenario, home-based (e.g., home is origin or destination) work and university trips by bicycle are forecast to increase from 8.3% in 2016 to 10.9% in 2050. This is due in part to the growth scenario, which improves bike access of households to jobs and the UW campus, and the extensive planned bikeway network improvements. On-street improvements are coded into the model through changes in the bicycle level of traffic stress, which reduces “perceived” travel time by bicycle. Off-street paths and grade-separated crossings are added into the bikeway network in the model.

Under the Plan Scenario, home-based work and university trips by transit increase from 6.9% to 7.3% countywide. The overall percent transit mode and percent increase is much higher in the central Madison area and radial arterial corridors with high transit service levels. The 2050 planned future transit network includes not only the programmed East-West route and planned North-South

### Mode of Transportation for Home-Based Work/University Trips (2016 Base Year Scenario)



### Mode of Transportation for Home-Based Work/University Trips (2050)



routes, which are part of the financially constrained plan, but also the full BRT vision and other service extensions and frequency improvements totaling a 127% increase in service hours. Drive alone trips decrease from 67.2 to 65.5%, but shared-ride and walk trips decrease slightly. See Figures B-c and B-d showing Home-Based Work/University Trip mode choice for the 2016 base year and 2050.

### Mode of Transportation (Other Trips)

The bicycle mode share of all other trips decreases from 3.9% in 2016 to 3.8% in 2050 under the Plan Scenario, however the total number of bicycle trips will still increase by nearly 50% between 2016 and 2050. These include home-based shopping, school, social/recreational, and other trips and non-home based trips. The share of walk trips for these other trip purposes increases from 15.4% to 19.4%. The increase in the percentage of walk trips is due to the growth scenario, which prioritized new development in mixed-use centers and multimodal corridors and infill/redevelopment areas, placing more households within walking distance of destinations. The increase in the number of bicycle trips is due to the growth scenario and bike network improvements. The share of transit trips for these other trip purposes increases from 0.9% to 1.3%. The lower percentage of transit trips for these trip purposes reflects the difficulty of effectively

serving these trips due to their shorter distances and more spread out locations. Drive-alone trips decrease from 40.7% to 38.6%. See Figures B-e and B-f showing mode choice for the 2016 base year and 2050 for these other trip purposes.

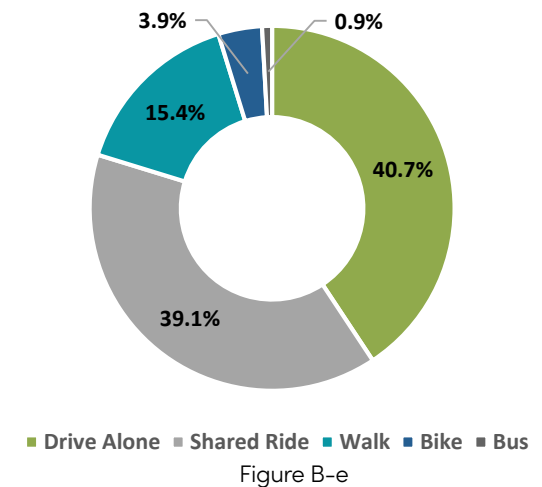
### Transit Ridership

Weekday transit ridership is forecast to increase nearly 74% from 59,000 in the 2016 Model Base Year to 102,600 under the 2050 Plan Scenario. The increase compared to a No Transit Build Scenario with the 2016 transit route system is 35%. The forecast ridership under that scenario is almost 76,000. Transfer rates are about the same for all scenarios, accounting for around 9% of trips.

As mentioned above, the Plan Scenario includes the full BRT system vision, including: (1) East/West and North/South BRT routes, with local extensions to Sun Prairie, American Center; (2) BRT route from CTH PD along Whitney Way through southwest Madison to the Atwood Ave/Cottage Grove Rd/ Milwaukee St corridors in east Madison; (3) full build-out of Middleton BRT extending to the Junction Road terminal of East/West BRT, and Middleton; (4) new local service and improved service frequency on some routes; and (5) commuter express routes serving outlying communities during peak periods. In all, this results in a 127% increase in service hours. It is important to note that only the East/West and North/South BRT routes (with local extensions to Sun Prairie, American Center, and Middleton) and a fraction of the increased service hours are part of the financially constrained plan.

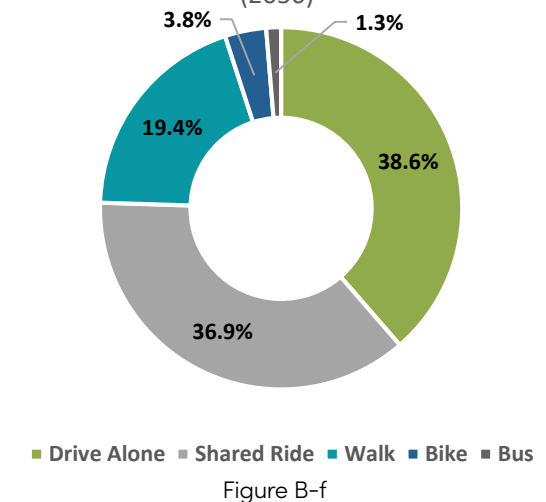
Mode of Transportation for Other Trips

(2016 Base Year Scenario)



Mode of Transportation for Other Trips

(2050)



## Frequent Transit and BRT Access

As shown in Figure B-g, under the Plan Scenario with the recommended future transit network, the number of households within ¼ mile of frequent mid-day transit service<sup>2</sup> would increase to 275% of that with the 2019 transit network from 35,600 to 97,700; similarly, the number of jobs within ¼ mile of frequent mid-day transit service would increase to 185% of that with the 2019 network from 97,600 to 180,300.

As shown in Figure B-h, under the Plan Scenario there would be a total of 126,958 households and 244,230 jobs within ½ mile of Bus Rapid Transit (BRT) service in 2050. Metro’s Bus Rapid Transit system is planned to open its first phase of service in 2024: the East/West corridor will be built out with

<sup>2</sup> Frequent transit service is defined as four or more buses per hour; Mid-day is 10 am to 2 pm.

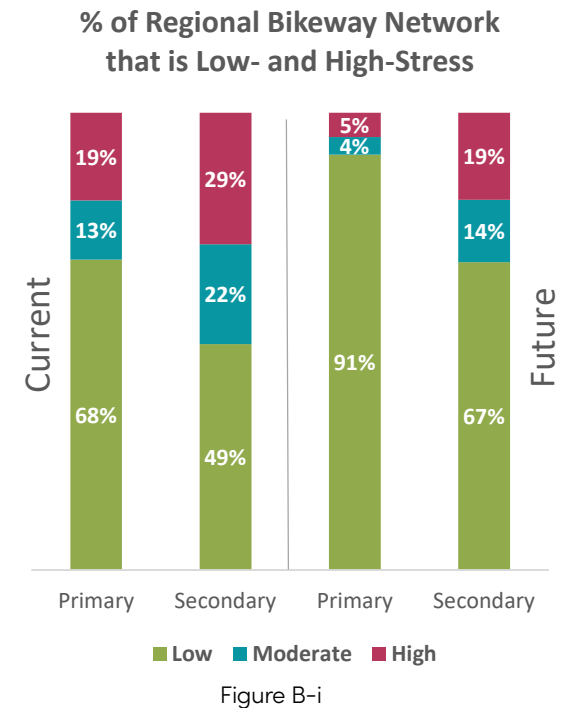
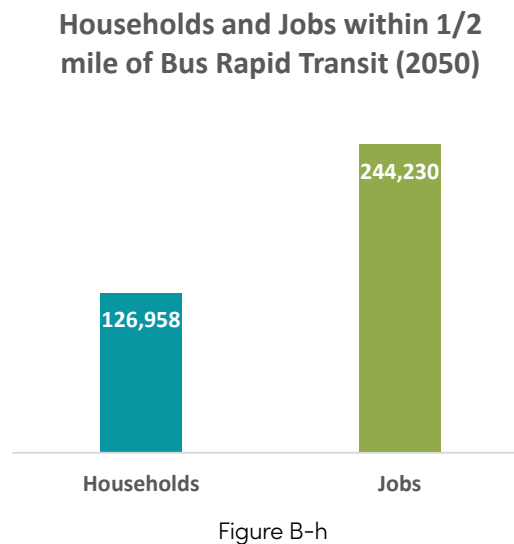
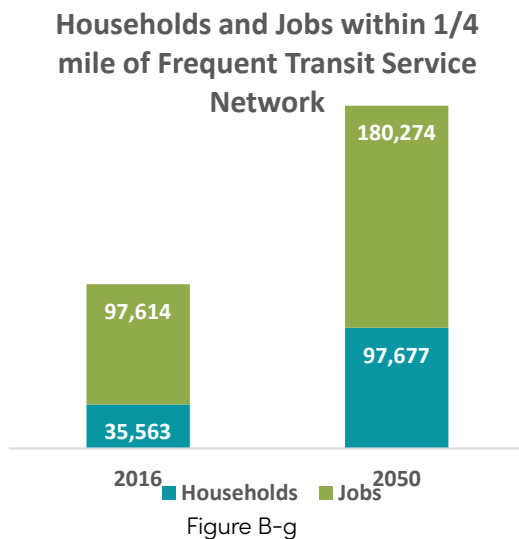
dedicated bus lanes, transit signal priority, and BRT stations; the North/South corridor will be served by articulated 60-foot buses, but will not see construction of BRT infrastructure for several years. As this system does not yet operate, the current number of households and jobs near the service is zero.

## Low Stress Bicycle Network

Building out and connecting the “low traffic stress” bicycle network is a major focus of MPO and local bicycle planning efforts. Low stress routes are those that most adult bicyclists would be comfortable using. High stress routes are those that most all bicyclists would perceive as safe and not be comfortable using, while moderate stress routes are typically higher speed, higher volume roadways with bike lanes that only more skilled, experienced adult bicyclists feel comfortable using. For more information on

the methodology for classifying streets by their level of traffic stress for bicyclists, see the MPO’s [Low Stress Bicycle Network Report](#).

Planned regional bicycle network improvements, including bike lanes, protected bicycle facilities or sidepaths on high stress streets, and new multi-use paths, will increase the percentage of the primary route regional network from 62% to 91% and the percentage of the secondary route network from 49% to 67%. The percentages of the primary and secondary networks that would be high stress drop to 5% and 19% respectively. See Figure B-i. High traffic speeds on some regional routes in rural areas make it likely that some sections will continue to be high stress in the future, even with wide paved shoulders.



# Federal Performance Measures and Targets

The performance measures established by FHWA and FTA were developed to measure the effectiveness of the following federal funding programs:

Federal Transportation Performance Measures	
Performance Measure Area	Performance Measures
<b>PM 1- Safety: FHWA Highway Safety Improvement Program (HSIP)</b>	
Number of Fatalities and Serious Injuries	Number of Fatalities
	Number of Serious Injuries
	Number of Non-Motorized Fatalities and Non-Motorized Serious Injuries
Rate of Fatalities and Serious Injuries	Rate of Fatalities per 100 Million Vehicle Miles Travelled (MVMT)
	Rate of Serious Injuries per 100 Million Vehicle Miles Travelled (MVMT)
<b>PM 2- Infrastructure Condition: FHWA National Highway Performance (NHPP)</b>	
Condition of Pavements on the Interstate System	Percentage of Pavement of the Interstate System in Good Condition
	Percentage of Pavement on the Interstate System in Poor Condition
Condition of Pavements on the National Highway System (NHS) Excluding the Interstate	Percentage of Pavement of the Non-Interstate NHS System in Good Condition
	Percentage of Pavement of the Non-Interstate NHS System in Poor Condition
Condition of Bridges on the NHS	Percentage of NHS Bridges Classified as in Good Condition
	Percentage of NHS Bridges Classified as in Poor Condition
<b>PM 3- System Reliability: FHWA National Highway Freight Program (NHFP)</b>	
Performance of the Interstate System	Percentage of the Person-Miles Traveled on the Interstate that are Reliable
Performance of the NHS Excluding the Interstate	Percentage of the Person-Miles Traveled on the Non-Interstate NHS that are Reliable
Freight Movement on the Interstate System	Truck Travel Time Reliability Index
<b>Transit Measures: FTA Section 53 Funding (5307, 5310 , 53111, 5337, 5339)</b>	
Transit Asset Management	Percentage of Revenue Vehicles Exceeding Useful Life
	Percentage of Non-Revenue Service Vehicles Exceeding Useful Life
	Percentage of Facilities Exceeding the Transit Economic Requirements Model (TERM) Scale
	Percentage of Track Segments Having Performance Restrictions

Figure B-j Federal Transportation Performance Measures and Targets

Federal Transportation Performance Measures	
Performance Measure Area	Performance Measures
Public Transportation Safety Program	Number of Reportable Fatalities
	Rate of Reportable Fatalities Per Vehicle Revenue Miles
	Number of Reportable Injuries
	Rate of Reportable Injuries per Vehicle Revenue Miles
	Number of Reportable Safety Events
	Rate of Reportable Safety Events Per VEHICLE Revenue Miles
	Mean Distance between major mechanical failures

Figure B-j Federal Transportation Performance Measures and Targets (continued)

## Setting Targets for Performance Measures

Under the federally required performance management process, targets must be set for each of the federal performance measures on a schedule based on when the measures were finalized. States must then report to the U.S. Department of Transportation (USDOT) on progress in achieving the targets on a schedule specific to each measure. At the state level, there are funding implications in cases where progress is not being made on a particular measure. State departments of transportation (DOTs) and transit agencies are to first set their performance measure targets in coordination with MPOs. In the case of DOT targets, MPOs may either choose to support the state targets or establish their own targets. In the case of the transit agency targets, MPOs may adopt the same targets or establish their own.

Given the limited amount of historical data for most of the measures and the uncertainty in what trends the data may show as more years are collected, the Greater Madison MPO has elected to support the state/transit agency targets for these measures, and to plan and program projects to contribute towards meeting these targets. The MPO approved the targets for infrastructure condition, NHS system performance, and freight through the adoption of TPB Resolution No. 145 in 2018. The annual 2022 safety targets were addressed in MPO 2021 Resolution No. 11, dated November 3, 2021 with the MPO once again has choosing to support the WisDOT safety targets. The MPO has also elected to support the Metro Transit targets for transit asset management (TAM) since Metro is the agency with expertise to best manage its assets in light of funding challenges and address safety (See MPO 2021 Resolution No. 12 for the 2022 TAM and PTASP targets).

The MPO will report annually the Madison Metropolitan Area or Dane County data for all of the federal measures and the prior year performance and overall trend as part of its annual reporting on the Performance Measures.

## Linkage of Investments to Performance Measures

The federal rules for metropolitan transportation planning require that the RTP and TIP shall include, to the maximum extent practicable, a description of the anticipated effect of the RTP and TIP toward achieving the federal transportation system performance measure (see 23 CFR 490) targets established, thereby linking investment priorities to those performance targets (23 CFR 450.326(d)).

The following section outlines the federal performance measures and current performance at the state and Madison Metropolitan Area/Dane County level,



and then discusses how the projects recommended in the RTP and supporting regional transportation planning activities will assist in achieving the federal measure targets. It is anticipated that this analysis will evolve over time as methods are developed to better quantify the impacts of planned and programmed projects on the federal performance measures.

## RTP Analysis

### PM 1- Safety

#### PERFORMANCE MEASURES AND DATA

The safety measures and the WisDOT/MPO targets for 2022 are identified in Figure B-k.

#### HIGHWAY SAFETY IMPROVEMENT PROGRAM (HSIP) PROJECT PRIORITIZATION

WisDOT evaluates potential HSIP projects by comparing the estimated crash reduction benefits expected from the project with the cost of that project. Crash reduction benefits are estimated by multiplying up to two crash modification factors (CMFs) by five years of observed crash data. CMFs and target crashes are identified by the Safety Analyst software and a spreadsheet tool developed by WisDOT to calculate the estimated crash reduction benefits. The projects approved for HSIP funding are reviewed and prioritized based on their ability to reduce crashes and their achievement of the goals of the State’s Strategic Highway Safety Plan. WisDOT is responsible for all HSIP project programming.

Safety is an important consideration in the scoping process of all projects included in the RTP. Resurfacing, recondition, and reconstruction projects can and often do include elements that improve the safety performance of roadways, such as correcting geometric design deficiencies, improved pavement traction, improved traffic flow, and improved pavement markings, signals, lighting, and signage. Figures A-a through A-d in Appendix A provide a listing of programmed and other anticipated roadway preservation and reconstruction projects. Off-street pedestrian and bicycle infrastructure improvements separate vulnerable roadway users from automobile traffic, improving pedestrian and bicyclist safety. Figure A-e provides a list of priority regional path projects. FHWA’s [Crash Modification Factors \(CMF\) Clearinghouse](#) can provide a

Safety Performance Measure	2022 Target	Dane County	
		2016-2020 Average	% Change from 2015-2019
Number of Fatalities	Reduce by 2% (584.7 or Less)	33.0	-1.2%
Fatality Rate*	Reduce by 2% (.919 or Less)	.655	1.1%
Number of Serious Injuries	Reduce by 2% (2,995.5 or Less)	203.2	0.4%
Serious Injury Rate*	Reduce by 2% (4.712 or Less)	4.038	2.8%
Number of Non-Motorized Fatalities and Serious Injuries	Reduce by 2% (358.48 or Less)	41.8	0.0%

\* Per 100 Million Vehicle Miles Traveled

Figure B-k Safety Performance Measures and Targets

comprehensive overview of the potential safety benefit of any roadway improvement.

There are eleven projects identified in the list of recommended RTP projects and studies that could qualify for HSIP funding. Current HSIP funding criteria prioritizes crash history for project selection, making it difficult to project safety needs and potential projects beyond the short term, making the program more reactionary rather than proactively addressing potential systemic safety concerns. The RTP recommends WisDOT move towards more a systemic approach to safety project selection to allow flexibility in proactively addressing safety concerns.

The RTP includes multiple other programmed and recommended roadway, bike, and pedestrian projects, which will improve safety through intersection improvements such as addition of turn lanes and signalization, addition of bike facilities, improved pedestrian crossings, and/or other safety enhancements.

### PLANNING ANALYSIS

The RTP recommends adopting a Safe System Approach for addressing safety needs on the regional roadway system through a comprehensive “4-E” approach, including:

- Continued implementation of WisDOT’s Strategic Highway Safety Plan.
- Development of a High Injury Network for use in prioritizing limited funds for safety improvements.

- Continued support for local safety initiatives such as Vision Zero.
- Continued support to the Dane County Traffic Safety Commission.
- Continued expansion of state and local safety education efforts.
- Support of local and county efforts to ensure equitable enforcement of traffic laws.
- Support of local efforts to identify corridor level systemic safety improvements, and work with WisDOT to identify changes to safety program criteria to allow funding of such projects.

The RTP also includes recommendations for improving bicyclist and pedestrian safety.

The MPO completed an intersection safety analysis in 2018 with the help of the UW-Madison Traffic Operations & Safety (TOPS) Lab for all arterial and collector roadway intersections in Dane County. The safety analysis ranks intersections by frequency, rate, and severity of crashes. This analysis flags intersections with over-represented crash histories for further detailed study and potential safety improvements. A second phase of this analysis was completed in 2021 with an updated crash prediction model, updated ranking of intersections based on 2017-’20 data, and a diagnostics tool to identify potential countermeasures. The UW-Madison TOPs Lab will also be developing a High Injury Network (HIN) for the MPO planning area in 2022. A HIN identifies

corridors that have a higher risk of serious and fatal injury within a transportation network for prioritizing for further analysis and targeted investments with the greatest promise of reducing serious and fatal injuries.

The City of Madison has added safety as a major factor in prioritizing street projects along with pavement and utility condition, using data from the MPO’s study and follow up analysis. The MPO recommends that other communities incorporate safety as an important factor in their programming of street projects. The City of Madison also hired a firm to identify potential HSIP projects, evaluating its high crash severity intersections. The city has also adopted a Vision Zero policy and plan, which includes multiple strategies and projects. The Safe Streets Madison program prioritizes implementing traffic safety measures in a fair and equitable manner to eliminate traffic deaths and serious injuries on City streets, and improving connectivity by closing gaps in the pedestrian and bicycle networks and ensuring that they are accessible for all ages and abilities. The Safe Streets Madison program consolidates the neighborhood traffic management program, pedestrian bicycle enhancements program, safe routes to school, and Vision Zero programs all under one umbrella. The City of Sun Prairie has also adopted a Vision Zero policy and is focusing on ensuring the safety of vulnerable roadway users.

The MPO is an active member of the Dane County Traffic Safety Commission (TSC). The

TSC meets quarterly to review traffic crash data in order to enhance the level of safety on all public roadways in Dane County for all roadway users. The TSC is comprised of representatives including planners and engineers, law enforcement, medical professionals and other interested community participants to foster a coordinated effort to address the “4 E’s” of road safety: Education, Enforcement, Engineering, and Emergency Care. The MPO assists with compiling crash statistics and facilitating the crash incidence review and preparing an annual crash trends report. The TSC has developed four workgroups to address recent crash trends: Risky Driver Behavior, Impaired Driving, Pedestrian Crashes, and Racial Disparities with Traffic Injuries; the MPO currently co-chairs the Risky Driver Behavior workgroup and provides data support for the other workgroup areas.

## PM 2- Infrastructure Condition

### Bridge Condition

#### PERFORMANCE MEASURES AND CONDITIONS DATA

Figure B-l shows the WisDOT/MPO targets and current conditions in the Madison Metro Area for NHS bridges in good and poor condition.

A total of 97 bridges with a deck area of 86,069 m<sup>2</sup> or 44% were in good condition in 2020, an increase from the 42% that were in good condition in 2019.

### PROJECT ANALYSIS

There are 11 bridge projects included in the RTP, including seven state bridges and four local bridges. Five of the programmed bridge projects are bridge replacements/reconstructions, and four are bridge repairs or bridge deck overlays. There is also one box culvert replacement, scheduled for 2027 and one bridge deck replacement, scheduled for 2030 on the state highway system. Not included in these totals are three bridges to be replaced (2) or repaired (1) as part of the John Nolen Drive reconstruction project. Additional bridge projects will be identified through the ongoing project programming process. See RTP Appendix A figures A-a through A-d for more project details.

## Pavement Condition

#### PERFORMANCE MEASURES AND CONDITIONS DATA

Figure B-m shows the WisDOT/MPO targets and 2019 conditions for Interstate and non-Interstate NHS roadways.<sup>3</sup> “Good condition” suggests no major investment is needed. “Poor condition” suggests major reconstruction investment is needed. The data is for International Roughness Index (IRI) only as other data on cracking and rutting is not currently available for the entire system.

Because the 2019 data is only for the IRI metric, it doesn’t represent a complete picture

<sup>3</sup> 2019 data is latest available.

Bridge Performance Measure	2019 and 2021 Target*	Madison Metro Area (2020)
Percentage of NHS Bridges in Good Condition	≥ 50%	44%
Percentage of NHS Bridges in Poor Condition	≤ 3%	1%
*Same target for two- and four-year target		

Figure B-l Bridge Performance Measures and Targets

Pavement Performance Measure	2019 and 2021 Target*	Madison Metro Area (2019)**
Percentage of Interstate Pavement in Good Condition	≥ 45%	65%
Percentage of Interstate Pavement in Poor Condition	≤ 5%	4%
Percentage of Non-Interstate NHS Pavement in Good Condition	≥ 20%	31%
Percentage of Non-Interstate NHS Pavement in Poor Condition	≤ 12%	23%
*Same target for two- and four-year target		
**Only includes the International Roughness Index (IRI) calculation		

Figure B-m Bridge Performance Measures and Targets

of the condition of the roadways. There are also some concerns about the accuracy of the data. The pavement condition rating systems historically used by WisDOT and local governments in the state provide a different picture of pavement conditions in the Madison Metro Area. WisDOT utilizes the Pavement Condition Index (PCI) system to evaluate state roadways while local governments use a simplified version of that called the Pavement Surface Evaluation Rating (PASER) system. These rating systems provide a better representation of the overall structural condition of roadways. This data is updated every other year. The most current available PCI and PASER data is from 2019 and 2020, respectively. It indicates that 59% of all major roadways (both NHS and non-NHS) within the Madison Metro area were in good or excellent condition and only 8% were in poor or very poor condition. One-hundred percent (100%) of the Interstate system was in good or very good condition.

### PROJECT ANALYSIS

As part of the Financial Capacity Analysis of the RTP, a pavement condition analysis to compare funding levels from 2015 to 2019 with the trend in pavement conditions over that same time period for all roadways by jurisdiction (state, local) and functional classification (arterial, collector, local). For the state highway system, Interstate and U.S. Highway pavement conditions in the Metropolitan Planning Area improved over this time period, while State Trunk

Highway pavement conditions got worse. There is approximately 94 centerline miles of roadway programmed for pavement repair, resurfacing, replacement, or reconstruction in the RTP, and an additional 83 centerline miles of recommended pavement repair, resurfacing, replacement, or reconstruction in the RTP (see Figures A-c and A-d in RTP Appendix A for more project information). This is only a fraction of the roadway preservation work that will be needed during the course of the plan timeframe. It is impossible to project out roadway preservation needs over such a long timeframe. An attempt was made to identify county and local arterial roadways that will likely need to be reconstructed in the future based on current conditions, age of the roadway, and planned development. The financial analysis determined that there was sufficient revenue to cover the cost of these projects along with the relatively small number of capacity expansion projects. A similar analysis was not able to be done for state highways. Additional state and local funding beyond that spent in recent years will be needed to reverse the trend of declining pavement condition on the regional roadway system with the exception of the Interstate and U.S. highways.

### INFRASTRUCTURE CONDITION PLANNING ANALYSIS

The RTP includes a recommendation to preserve and maintain the region's street and highway system in a manner that minimizes

their life cycle costs, maintains safety, and minimizes driver costs while reducing their impact on the environment. Supporting actions to achieve this recommendation include:

- Monitor regional roadway system pavement and bridge condition, and continue to coordinate with WisDOT on federal performance targets.
- Develop and implement asset management plans to assist in making cost-effective decisions concerning the maintenance and rehabilitation of roadways, bridge, and associated infrastructure.
- Provide for ongoing maintenance activities in major state and local arterial corridors planned for future potential expansion until capacity is needed and major project funding can be secured.

## PM 3: Travel Time Reliability and Freight Movement

### PERFORMANCE MEASURES AND CONDITIONS DATA

Figure B-n shows the WisDOT/MPO target level of travel time reliability and 2020 data for both the Interstate and non-Interstate NHS system.

The percent of person-miles traveled with unreliable travel times in the Madison Metro area on the Interstate and non-Interstate



NHS system exceeded the four-year targets. However, the relatively high percentage of the Madison area system that meets the reliability measure is skewed by the 4-hour peak periods used for the federal measures. For the size of the Madison area, use of a 2-hour peak period is more appropriate. Even so, congestion on the Beltline and other select arterials generally lasts less than two hours and often an hour or so.

Figure B-o shows the WisDOT/MPO target truck travel time reliability index (on the Interstate system) targets and 2020 data for Interstate freight movement.

The 2020 data shows that the Madison Metro area currently meets the two- and four-year targets for freight travel time reliability on the Interstate system. An index of 1.2 indicates a high reliability of system performance. The Interstate typically only experiences

heavy congestion and slower travel times on summer Friday nights and Sundays due to tourist traffic.

**PROJECT ANALYSIS**

The RTP includes five programmed capacity expansion projects comprising 15.5 centerline miles along with a new interchange project and includes ten potential projects (some with multiple segments) comprising 16.4 centerline miles roadway in the Madison Metropolitan Area, which would add travel lanes and improve intersections and therefore improve travel time reliability. There are also three ongoing major state highway studies that will likely result in improved capacity through new or improved interchanges, other TSM improvements, or possibly additional travel lanes.

Many of the planned roadway reconstruction projects in the RTP will include

transportation systems management (TSM) components, such as intersection design improvements, improved signals, and/or access consolidation. All of the planned collector streets identified in the plan can be considered a TSM project as these streets more efficiently distribute traffic, taking pressure off of the arterial roadways. By far the most significant of these projects is the Beltline Highway Flex Lane project, which will provide for inside hard shoulder running during periods of heavy congestion. The goal of these projects is to maximize the efficiency, safety, and utility of the transportation infrastructure. TSM considers the full range of options for maximizing the performance of existing transportation infrastructure without expanding the infrastructure itself (e.g., adding general purpose lanes, etc.). TSM strategies can include physical changes to the roadway or changes to how the roadway is used through information, signalization, incident management, and other means. The MPO's ITS Strategic Plan, incorporated into the RTP by reference, includes technology projects that will improve operations, safety, and incident management. Most of the TSM projects listed in the RTP are intended to increase vehicle throughput at intersections and reduce average delay along with improving safety.

**PLANNING ACTIVITIES**

The RTP includes the following transportation system management (TSM)

Reliability Performance Measure	2019 Target	2021 Target	Madison Metro Area (2020)
Percentage of Person-Miles Traveled on the Interstate that are Reliable	94%	90%	100%
Percentage of Person-Miles Traveled on the Non-Interstate NHS that are Reliable	N/A	86%	94%

Figure B-n Reliability Performance Measures and Targets

Reliability Performance Measure	2019 Target	2021 Target	Madison Metro Area (2020)
Truck Travel Time Reliability Index	1.4	1.6	1.2

Figure B-o Truck Travel Time Reliability Performance Measures and Targets

recommendations to help improve travel time reliability and improve freight movement:

- Implement the Congestion Management Process.
- Develop a Region Transportation Systems Management and Operations (TSMO) plan to improve traffic and transit operations and safety on the arterial roadway system.
- Implement access management plans and standard for existing and planned future arterial roadways as development and street (re)construction occur.
- Modernize the multimodal transportation network using technology.
- Implement and periodically update the Regional Intelligent Transportation Systems Strategic Plan.

## Transit Assessment Management

### PERFORMANCE MEASURES AND CONDITIONS DATA

Metro Transit completed and certified its initial Transit Asset Management (TAM) Plan in December 2018. The plan is considered a “living document” with reviews and revisions being completed on an annual basis. The initial plan incorporated Metro’s initial 2019 TAM performance measure targets for the applicable measures, which relate to the different assets, including equipment (non-revenue vehicles), rolling stock (revenue

vehicles), and facilities, which in the case of Metro is its bus maintenance garage. Metro’s TAM targets didn’t change for 2020-’21 or for 2021- ’22; Metro expects to update TAM targets in 2023. The MPO has adopted the same TAM targets as Metro.

Figure B-p shows the 2021 Metro/MPO targets and 2020 baseline conditions for Metro Transit for the three TAM performance measures related to buses, non-revenue service vehicles, and facilities, which for purposes of the TAM plan is Metro’s bus maintenance facility at 1101 E. Washington Avenue.

For buses, a 2021 target was set of having 11% of Metro’s inventory exceed the useful life benchmark (ULB) of 14 years. As of August 2021, 16% of Metro’s bus fleet exceeded the ULB. Metro currently uses 14 years as the ULB rather than the federal minimum of 12 years because Metro uses the oldest buses for school and other peak period only service and as reserves, thus limiting the number of miles on buses as they age. ULB

performance declined from 2020-’21 because the usual annual bus procurement in 2021 was deferred to support the purchase of 43 60’ articulated buses for the BRT system in the next year; the only buses added to the fleet in 2020-’21 were three all-electric Proterra buses that were scheduled for delivery in 2020 and received in 2021. The bus replacement plan calls for the annual replacement of 15 buses based on age and condition. These factors resulted in an increased fleet size and an older average vehicle age.

For non-revenue service vehicles, a 2021 target was set of having 38% of Metro’s inventory exceed the ULB of 8 years. As of August 2021, 50% of Metro’s inventory of cars, trucks, and vans exceeded their ULB. Metro developed a long-range strategic replacement plan for non-revenue vehicles in 2019, with the intention of replacing two vehicles each year; however, due to the COVID-19 pandemic, Metro did not replace any non-revenue service vehicles in 2020, which resulted in an increase in the

TAM Performance Measure	Baseline (2020)	Performance (2021)	Target (2021-22)
Percentage of Rolling Stock (Buses) that Have Met or Exceeded their Useful Life	14%	16%	11%
Percentage of Non-Revenue Service Vehicles that Have Met or Exceeded their Useful Life	55%	50% (45% by Dec. 31, 2021)	38%
Percentage of Facilities with a Condition Rating Below 3.0 on the FTA Transit Economic Requirements Model (TERM) Scale.	100%	100%	0%

Figure B-p Transit Asset Management Performance Measures and Targets

percentage of vehicles over their useful life. Two vehicles, including a very old van, were disposed of in 2021; two trucks were ordered and received in late 2021 reducing the percentage of vehicles past their ULB to 45%.

For TAM performance measure purposes, the only applicable current facility is Metro's maintenance facility. The target is to have 0% of facilities rated under 3.0 (Adequate) on the TERM scale. In 2020, the Metro facility was rated 2.5. It had been rated 1.0 (Poor), but repairs and upgrades have recently been made, including roof repairs in 2018 and a new wash bay in 2019. Construction on phased upgrades continue, with the fall 2021 TERM rating 2.7. Metro has purchased a new satellite facility on Hanson Road, which is under design for remodeling and not included in this measure as it is not yet in use, although its TERM rating as of fall 2021 was estimated to also be between 2.5 and 2.7.

### PROJECT ANALYSIS

Metro Transit has programmed funds to continue adhering to its current bus replacement schedule of 15 buses per year. Metro received a VW Settlement Grant award of \$4.8 million in 2020, which covered 10 buses, and will aid the agency in maintaining this schedule. If Metro had been able to maintain this schedule, the percentage of buses at or past their ULB would have met or dropped below the 11% target by 2021; however, Metro was not able to add new electric buses as scheduled in 2020 and

retained a bus scheduled for disposal to use in the interim. Increasing the fleet size by retaining a vehicle past its ULB negatively affected this performance measure in 2020 and exacerbated the measure in 2021 as the entire fleet aged, but the scheduled 2022 bus replacement will bring this measure under the 11% target to 9%. This improvement may be short-lived, as twice as many vehicles will hit their ULB in 2023 as have in previous years due to the procurement schedule in 2008-09.

The financial capacity analysis conducted for this report forecast bus replacement based on projected available revenues for transit vehicle purchases, adjusted annually for inflation. This available funding was allocated to purchase the maximum number of vehicles which could be afforded with that amount in the given year. The 2022 prices for vehicles were estimated as: \$500,000 for a 40-foot diesel bus; \$750,000 for a 40-foot electric bus; and \$1 million for an articulated 60-foot bus. For years beyond the current 2022-2026 TIP, bus replacement cycles were presumed to be for five consecutive years of 40-foot electric bus purchases and a single year of 60-foot electric bus purchases. This financially-constrained replacement cycle is projected to maintain a fleet size adequate for the proposed future transit network and to meet or exceed the established ULB for revenue vehicles, as shown in Figure B-q.

Metro's replacement plan for service vehicles is more flexible with funding allocated each year and a decision made annually on

which vehicles to replace based on age, repair history, and any anticipated major repairs. It is less certain whether Metro will be able to meet its performance target for service vehicles based on the funding currently programmed. Metro plans to extend the useful life benchmark for non-revenue vehicles in 2023 to reflect the fact that particular vehicle types have longer useful lives than others, which affects the average useful life expectancy for all vehicles. A detailed projection for non-revenue vehicles is beyond the scope of the RTP.

Metro's maintenance facility at 1101 E. Washington Avenue is in need of major renovation, which is underway. It is also over capacity, having been designed to serve 140 buses, but servicing over 200 buses currently. The facility had no significant upgrades since it was built 40 years ago until renovations began in 2018. Investment in the facility was delayed for years in anticipation of a relocation, but a full relocation of the facility is no longer being considered. Facility and functional issues included: inadequate ventilation, heating, and cooling; an open-air wash line creating air quality problems; needed upgrades to emergency egress lighting; confined number of work bays and poor space layout; and right-turn vs. desired left-turn circulation for buses.

A facility renovation plan was developed with the assistance of an engineering firm, Mead & Hunt, with improvements to be implemented in 6 phases starting in 2019. Roof repairs

**Projected Annual Bus Purchases and Percent of Metro Revenue Fleet Beyond Useful Life Benchmark**

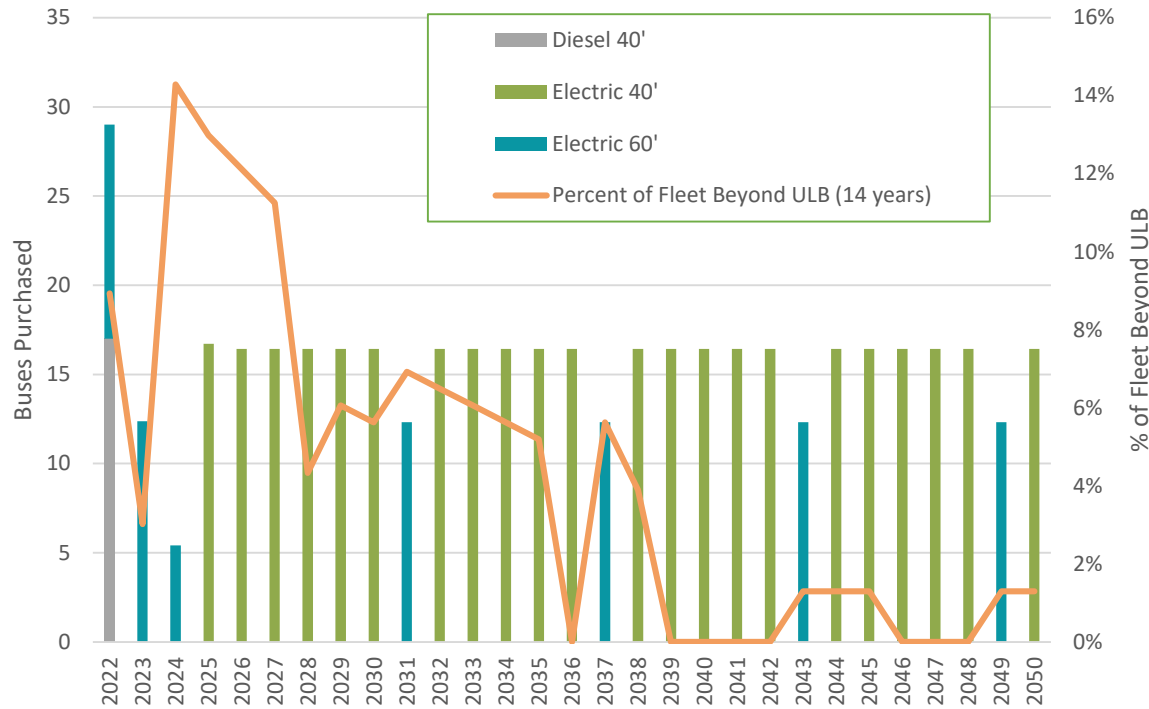


Figure B-q

were already made. Because of the need to use its federal formula funding for buses and capital maintenance, the facility renovation will be 100% locally funded. The facility renovation plan, which has been adjusted to changing conditions and to prioritize certain components is as follows<sup>4</sup>:

- 2019: Phase 1 Wash Bay Fire Alarm and Electric Bus Updates

- 2020: Phase 2 HVAC Mechanics and Storage Area
- 2021: Phase 3A Maintenance/Driver Support/Infrastructure Improvements
- 2021: Masonry Restoration to Bus Storage Area
- 2022: Design 3B Admin Improvements - Operation/Dispatch/Locker rooms; Modified in spring 2022 to include some bus storage and exterior upgrades originally included in phases 3C and 4

- 2023: Phase 3B Improvements
- Phase 3C Bus Storage; Essential components added to Phase 3B, other components no longer planned
- Phase 4 Exterior Upgrades; Essential components added to Phase 3B, other components no longer planned

Implementation of the programmed facility renovation plan will allow the facility to meet the federal performance measure target. An inventory and condition assessment completed in 2020 reflects the impact of ongoing repairs and upgrades on meeting the facility TAM performance target, with the TERM rating increasing from 1.0 to 2.0 in 2019 and to 2.5 in 2020. The estimated TERM rating in fall 2021 was 2.7.

Metro prioritized its capital investment needs and ranked replacement buses and its maintenance facility as the two highest priorities. That was followed by the addition of a satellite bus maintenance facility, which is needed to expand service, including implementation of Bus Rapid Transit. Metro was awarded a federal FTA discretionary grant for the BRT maintenance facility in 2020, and purchased a site on Hanson Road in 2021, with design currently underway. The FTA awarded another discretionary grant for the continued renovation of the East Washington Ave facility in 2022. With these major projects underway, and continued funding for minor facility upgrades included in the fiscally-constrained plan, it is projected that Metro will continue to make progress on meeting or



exceeding TAM targets during the planning horizon.

## Public Transportation Agency Safety Plan

### PERFORMANCE MEASURES AND CONDITIONS DATA

Metro Transit completed and certified its initial Public Transportation Agency Safety Plan (PTASP) in July 2020. The plan is considered a “living document” with reviews and revisions planned on an annual basis. The plan incorporates Metro’s initial 2020 PTASP performance measure targets for the applicable measures. The MPO adopted the same 2020 targets as Metro.

Figure B-r shows the 2022 Metro/MPO targets and 2020-21 baseline conditions for Metro Transit for the seven safety-related performance measures. Baseline data is not available for Paratransit due to insufficient reporting from contracted service providers to Metro, so the 2020 target is used as the baseline; reporting improvement processes are in development and baseline data will be available for Paratransit in future years.

The Metro Safety Planning Team has been planning and developing the framework for PTASP and Safety Management System Development. Although the Covid-19 pandemic has slowed progress, Metro has made steps toward meeting its overall goal of developing an agency-wide Safety Management System.

### PROJECT ANALYSIS

Safety-related projects in the Transit Capital and Transit Operating categories include preventative maintenance of transit vehicles, which is fundamental to meeting the System Reliability target, and facility renovations at Metro’s maintenance facility at 1101 E. Washington Avenue, which is in need of continued major renovation. These two issues are discussed above in the project analysis for the TAM measures.

Implementation of the programmed maintenance facility renovation plan will improve safety for Metro staff, and will help Metro continue to meet or exceed the performance targets for Fatalities, Safety Events, and System Reliability; the performance targets for Injuries Related to Riders of Vehicles in Service will not be

2021 Annual Safety Performance Targets and 2020-21 Baseline							
Mode of Service	Fatalities (total)	Fatalities (per 100000 VRM)	Injuries (total)	Injuries (per 100000 VRM)	Safety Events (total)	Safety Events (per 100000 VRM)	System Reliability (VRM/Failures)
Bus Transit – Target	0	0	15	0.23	340	5.46	65000/failure
Bus Transit – Baseline	0	0	1	0.02	174	2.90	32000/failure
ADA/Paratransit – Target	0	0	1	0.15	20	3.07	54000/failure
ADA/Paratransit – Baseline	0	0	2	0	3	0.67	54000/failure*

- Fatalities = Any fatal accident involving a Metro Transit vehicle regardless of fault
- Injuries = Any occurrence resulting in a passenger transported from the vehicle via ambulance
- Safety Events = any accident, incident, or occurrence
- VRM = vehicle revenue miles
- System Reliability = VRM between on-road, mechanical failure
- \*Paratransit System Reliability data is still being collected. Baseline reflects established 2020 target

Figure B-r Public Transportation Agency Safety Plan Performance Measures

impacted by the safety improvements at the maintenance facility. The renovation will have positive impacts on system reliability. Employees will be provided a better, more modern, and healthier place to work. A new, proper, environment will enable employees to be more productive without compromising their safety. This could improve the number of vehicles inspected on a daily basis, which would improve the spare ratio and overall road failure rate.

The 3B phase includes the operations unit areas. The biggest impact will be new driver amenities, including a break room that is the proper size to accommodate all drivers, quiet spaces and rooms to rest, kitchen amenities, and new furniture. Well-rested drivers are safe drivers. The current environment for them is sub-optimal. Operations will have a larger dispatch office and supervisor amenities to improve their working environment. This will have positive impacts to service delivery and safety. A more organized and properly sized work space will enable supervisors to work with a lower rate of error. If an operations supervisor makes a mistake, it often has an impact on service delivery. For example, when a supervisor takes a sick call from a driver but forgets to assign the work to a standby driver. That bus doesn't run or is heavily delayed which as a domino effect on the system with passenger overloads, potential safety issues with passengers or students waiting outdoors for a longer period of time, etc. A better work

environment will reduce the likelihood of this type of mistake.

As noted above, Metro was awarded a federal FTA discretionary grant for a new BRT maintenance facility in 2020, and purchased a site on Hanson Road in 2021; design for the facility remodel is currently underway. The FTA awarded another discretionary grant for the continued renovation of the East Washington Ave facility in 2022. With these major projects underway, and continued funding for minor facility upgrades included in the fiscally-constrained plan, it is projected that Metro will continue to make progress on meeting or exceeding PTASP targets during the planning horizon.