

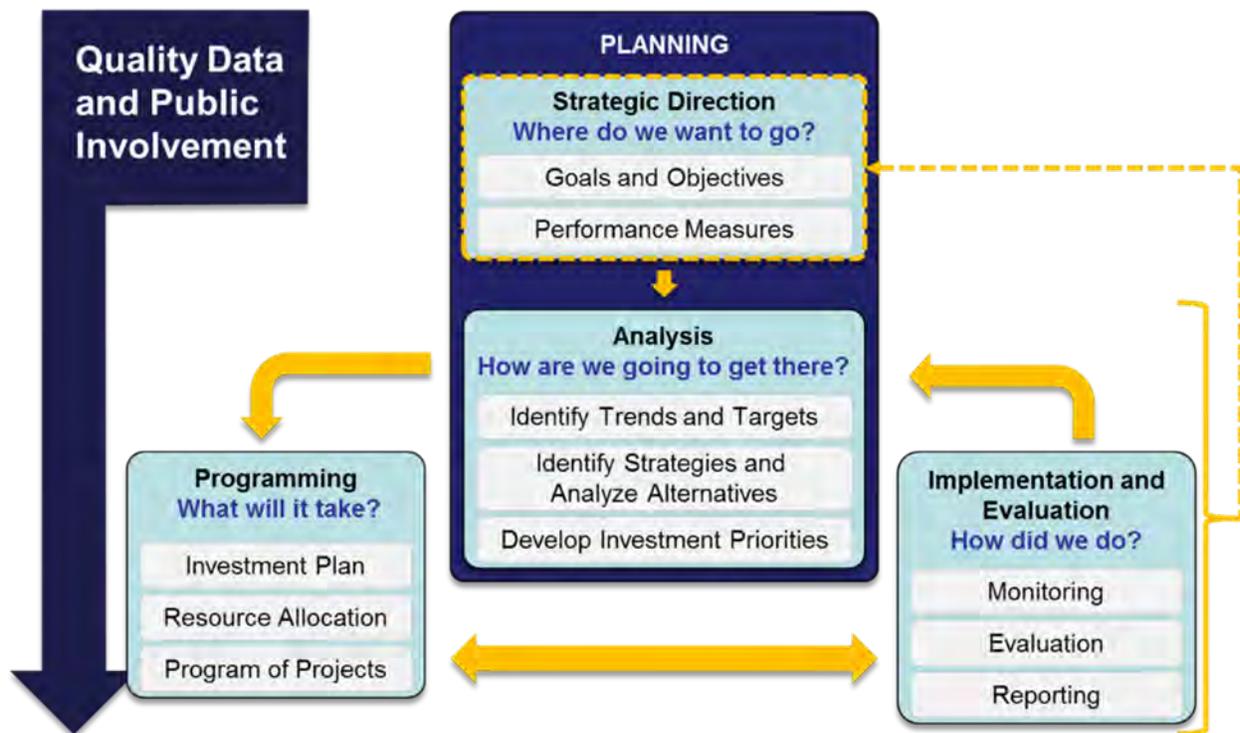
# APPENDIX F.

## SYSTEM PERFORMANCE REPORT

### Background

MPOs must include a system performance report in the LRTP that describes the condition and performance of the transportation system with respect to required performance targets, and reports on progress achieved in meeting the targets in comparison with baseline data and previous system performance reports.<sup>3</sup> The importance of this is depicted in Figure F-1.

FIGURE F-1: PERFORMANCE-BASED PLANNING PROCESS



Source: FHWA TPM

<sup>3</sup> 23 CFR 450.324 (f)(4).

Pursuant to the Moving Ahead for Progress in the 21st Century Act (MAP-21) and carried through into the Fixing America's Surface Transportation (FAST) Act, Metropolitan Planning Organizations (MPOs) must employ a transportation performance management approach in carrying out their federally-required planning and programming activities. Chapter 23 part 150(b) of the *United States Code* includes the following seven national performance goals for the Federal-Aid Highway Program:

- **Safety.** To achieve a significant reduction in traffic fatalities and serious injuries on all public roads.
- **Capital Assets Condition.** To maintain the highway infrastructure and transit capital asset systems in a state of good repair.
- **Congestion Reduction.** To achieve a significant reduction in congestion on the National Highway System (NHS).
- **System Reliability.** To improve the efficiency of the surface transportation system.
- **Freight Movement and Economic Vitality.** To 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.** To enhance the performance of the transportation system while protecting and enhancing the natural environment.
- **Reduced Project Delivery Delays.** To reduce project costs, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion through eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agencies' work practice.

For public transportation, transportation performance management shall be utilized to advance the general policy and purposes of the public transportation program as included in 49USC §5301(a) and (b).

The BMTS LRTP *Moving Our Future Forward 2045* follows the performance-based planning process proposed by FHWA.

The BMTS LRTP *Moving Our Future Forward 2045* was adopted on September 24, 2020. As such, it includes performance targets for the measures associated with the following performance management rulemakings:

- Highway Safety Improvement Program (HSIP) and Highway Safety.
- Transit Asset Management.
- NHS Pavement and Bridge Condition.

- System Performance/Freight/Congestion Mitigation & Air Quality Improvement (CMAQ) Program.
- The final FTA rule for Transit Safety performance is expected on July 20, 2021, and therefore not addressed in this plan.

## HSIP and Highway Safety

### Baseline Conditions

Safety is addressed in Chapter 7.0 of the LRTP.

### Performance Targets

On March 15, 2016, the Federal Highway Administration (FHWA) published the final rule for the HSIP and Safety Performance Management (Safety PM) Measures in the *Federal Register* with an effective date of April 14, 2016. Note that these metrics apply to all public roads regardless of owner or functional class.

The 2017 New York Strategic Highway Safety Plan (SHSP) is intended to reduce “the number of fatalities and serious injuries resulting from motor vehicle crashes on public roads in New York State.” The SHSP guides the New York State Department of Transportation (NYSDOT), the MPOs, and other safety partners in addressing safety and defines a framework for implementation activities to be carried out across New York State. The NYSDOT Highway Safety Improvement Program (HSIP) annual report documents the statewide performance targets.

The BMTS Policy Committee agreed to support the NYSDOT statewide 2020 targets for the following Safety PM measures based on five year rolling averages per Title 23 Part 490.207 of the *Code of Federal Regulations* on December 12, 2019 via Resolution 2019-13.

- Number of Fatalities: 1,020.
- Rate of Fatalities per 100M VMT: 0.82.
- Number of Serious Injuries 10,392.
- Rate of Serious Injuries per 100M VMT: 8.42.
- Number of Nonmotorized Fatalities and Serious Injuries: 2,557.

## Description of Progress

The BMTS LRTP *Moving Forward 2045* includes these safety goals and objectives:

**GOAL:** Provide safety and security to all users by whatever mode they choose for travel.

**OBJECTIVE:** Reduce the number and rate of crashes, fatalities, and serious injuries for all modes.

This is the first BMTS LRTP since the adoption of the final rules on system performance by FHWA and FTA. As such, it is not possible to report on progress toward achieving targets. Future iterations of the LRTP will include descriptions of progress achieved toward targets, including “information that is available at the time of the plan adoption, such as information that has been reported as part of the reports required under 23 CFR 490.107.”

## Transit Asset Management

The Federal Transit Administration (FTA) published a final Transit Asset Management (TAM) rule on July 26, 2016. The rule applies to all recipients and subrecipients of Federal transit funding that own, operate, or manage public transportation capital assets. The rule defines the term “state of good repair,” requires that public transportation providers develop and implement TAM plans, and establishes State of Good Repair (SGR) standards and performance measures for four transit asset categories: rolling stock, transit equipment, transit infrastructure, and facilities. Table F-1 identifies the federal transit asset performance measures.

**TABLE F-1: FTA TAM PERFORMANCE MEASURES**

ASSET CATEGORY	PERFORMANCE MEASURE AND ASSET CLASS
Rolling Stock	Percentage of revenue vehicles within a particular asset class that have either met or exceeded their useful life benchmark
Equipment	Percentage of non-revenue, support-service and maintenance vehicles that have met or exceeded their useful life benchmark
Infrastructure	Percentage of track segments with performance restrictions
Facilities	Percentage of facilities within an asset class rated below condition 3.0 on the Transit Economic Requirements Model (TERM) scale

Source: FTA

## Baseline Conditions

Table F-2 presents the baseline performance/conditions for transit assets owned by Broome County, the transit provider in the BMTS planning area.

**TABLE F-2: BASELINE TRANSIT ASSET PERFORMANCE/CONDITION**

ASSET CATEGORY - PERFORMANCE MEASURE	ASSET CLASS	NUMBER	AVERAGE AGE	PERCENT EXCEEDING USEFUL LIFE BENCHMARK
<b>Rolling Stock</b>				
Age - % of revenue vehicles within a particular asset class that have met or exceeded their Useful Life Benchmark (ULB)	Bus	47	12.2	29.8%
	Cutaway Bus	11	7.0	36.3%
	Other: Trolley bus	1	20	100%
<b>Equipment</b>				
Age - % of non-revenue vehicles within a particular asset class that have met or exceeded their ULB	Non-Revenue/Service Automobile Trucks and other Rubber Tire Vehicles	6	5.7	67%
	Maintenance Equipment	–	–	–
<b>Facilities</b>				
Condition - % of facilities with a condition rating below 3.0 on the FTA TERM Scale	Administration	1	37	0%
	Maintenance	1	37	0%
	Parking Structures	–	–	–
	Passenger Facilities	1	8	0%
	Shelter	Not listed in TAM		

Source: Broome County Department of Public Transportation

## Performance Targets

Broome County has set transit asset targets. MPOs can either agree to program projects that will support the transit provider’s targets or set their own separate regional targets for the MPO’s planning area.

The Broome County Department of Public Transportation set the transit asset targets listed in Table F-3. The BMTS Policy Committee agreed to support these transit asset targets on March 1, 2018 via Resolution 2018-03.

**TABLE F-3: TRANSIT ASSET TARGETS**

ASSET CATEGORY - PERFORMANCE MEASURE	ASSET CLASS	2021 TARGET
<b>Rolling Stock</b>		
Age - % of revenue vehicles within a particular asset class that have met or exceeded their ULB	Bus	15%
	Cutaway Bus	15%
	Other: Trolley Bus	Replace by 2022
<b>Equipment</b>		
Age - % of non-revenue vehicles within a particular asset class that have met or exceeded their ULB	Non-Revenue/Service Automobile	15%
	Trucks and other Rubber Tire Vehicles	15%
	Fareboxes	25%
	Other: Surveillance System	15%
<b>Facilities</b>		
Condition - % of facilities with a condition rating below 3.0 on the FTA TERM Scale	<b>ASSET CLASS</b>	<b>CONDITION RATING TARGET</b>
	Administration	3.0
	Maintenance	3.0
	Parking Structures	5.0
	Passenger Facilities	5.0

## Description of Progress

This is the first BMTS LRTP since the adoption of the final rules on system performance by FHWA and FTA. As such, it is not possible to report on progress toward achieving targets. Future iterations of the LRTP will include descriptions of progress achieved toward targets, including “information that is available at the time of the plan adoption, such as information that has been reported as part of the reports required under 23 CFR 490.107.”

Broome County is committed to meeting FTA life cycle requirements for rolling stock by 2022.

## Pavement and Bridge Condition Measures (PM2)

FHWA published the Pavement and Bridge Condition Performance Measures Final Rule in January 2017. This rule, which is also referred to as the PM2 rule, establishes six performance measures for pavement and bridge condition on Interstate and non-Interstate National Highway System (NHS) roads. The PM2 measures are:

- Percent of Interstate pavements in good condition.
- Percent of Interstate pavements in poor condition.
- Percent of non-Interstate NHS pavements in good condition.
- Percent of non-Interstate NHS pavements in poor condition.
- Percent of NHS bridges (by deck area) classified as in good condition.
- Percent of NHS bridges (by deck area) classified as in poor condition.

### Pavement Condition Measures

The four pavement condition measures represent the percentage of lane-miles on the Interstate and non-Interstate NHS that are in good condition or poor condition. The PM2 rule defines NHS pavement types as either asphalt, jointed concrete, or continuously reinforced concrete pavement (CRCP), and defines five pavement condition metrics that states are to use to assess pavement condition:

- **International Roughness Index (IRI).** An indicator of roughness; applicable to all three pavement types.
- **Cracking percent.** Percentage of the pavement surface exhibiting cracking; applicable to all three pavement types.
- **Rutting.** Extent of surface depressions; applicable to asphalt pavements only.
- **Faulting.** Vertical misalignment of pavement joints; applicable to jointed concrete pavements only.
- **Present Serviceability Rating (PSR).** A quality rating that is applicable only to NHS roads with posted speed limits of less than 40 miles per hour, for example toll plazas and border crossings. A state may choose to collect and report PSR for applicable segments as an alternative to the other four metrics.

For each pavement metric, a threshold is used to establish good, fair, or poor condition. Table F-4 lists the thresholds. Using these metrics and thresholds, pavement condition is assessed for each 0.1-mile section of the through travel lanes of mainline highways on the Interstate or the non-Interstate NHS, as follows:

- Asphalt segments are assessed using the IRI, cracking, and rutting metrics, while jointed concrete segments are assessed using IRI, cracking, and faulting. For these two pavement types, each segment is rated good if the rating for all three metrics are good, and poor if the ratings for two or more metrics are poor.
- Continuous concrete segments are assessed using the IRI and cracking metrics. A segment is rated good if both metrics are rated good, and poor if both metrics are rated poor.
- If a state collects and reports PSR for any applicable pavement segments, those segments are rated according to the PSR scale in Table F-4.

For all three pavement types, sections that are not good or poor are rated fair.

**TABLE F-4: PAVEMENT CONDITION METRIC PERFORMANCE THRESHOLDS**

Metric Rating	Good	Fair	Poor
IRI (inches/mile) (Applies to all pavements)	< 95	95–170	> 170
Cracking Percent (%) (Applies to all pavements)	< 5	CRCP: 5–10 Jointed: 5–15 Asphalt: 5–20	CRCP: > 10 Jointed: > 15 Asphalt: > 20
Rutting (inches) (for asphalt only)	< 0.20	0.20–0.40	> 0.40
Faulting (inches) (for jointed concrete only)	< 0.10	0.10–0.15	> 0.15

Source: FHWA

The good/poor pavement condition measures are expressed as a percentage and are determined by summing the total lane-miles of good or poor highway segments and dividing by the total lane-miles of all highway segments on the applicable system. Pavement in good condition suggests that no major investment is needed. Pavement in poor condition suggests major reconstruction investment is needed in the near term.

### Bridge Condition Measures

The two bridge condition performance measures refer to the percentage of bridges by deck area on the NHS that are in good or poor condition. Bridge owners are required to inspect bridges on a regular basis and report condition data to FHWA. The measures assess the condition of four bridge components: deck, superstructure, substructure, and culverts.

Each bridge component has a metric rating threshold to establish good, fair, or poor condition, as shown in Table F-5. Each bridge on the NHS is evaluated using these ratings. If the lowest rating of

the four metrics is greater than or equal to seven, the structure is classified as good. If the lowest rating is less than or equal to four, the structure is classified as poor. If the lowest rating is five or six, it is classified as fair.

**TABLE F-5: BRIDGE CONDITION PERFORMANCE RATING THRESHOLDS**

Metric Rating	Good	Fair	Poor
Deck	≥ 7	5 or 6	≤ 4
Superstructure	≥ 7	5 or 6	≤ 4
Substructure	≥ 7	5 or 6	≤ 4
Culvert	≥ 7	5 or 6	≤ 4

Source: FHWA

The bridge condition measures are expressed as the percent of NHS bridges in good or poor condition. The percent is determined by summing the total deck area of good or poor NHS bridges and dividing by the total deck area of the bridges carrying the NHS. Deck area is computed using structure length and either deck width or approach roadway width.

Bridges in good condition suggests that no major investment is needed. Bridges in poor condition are safe to drive on; however, they are nearing a point where substantial reconstruction or replacement is needed.

### Pavement and Bridge Condition Performance Target Requirements

Performance for the PM2 measures is assessed over a series of four-year performance periods. The first performance period began on January 1, 2018 and runs through December 31, 2021. NYSDOT must report baseline performance and targets at the beginning of each period and update performance at the midpoint and end of each performance period.

The PM2 rule requires state DOTs and MPOs to establish performance targets for all six measures and monitor progress towards achieving the targets. States must establish:

- Four-year statewide targets for the percent of Interstate pavements in good and poor condition.
- Two-year and four-year statewide targets for the percent of non-Interstate NHS pavements in good and poor condition.
- Two-year and four-year targets for the percent of NHS bridges (by deck area) in good and poor condition.

MPOs must establish four-year targets for all six measures by either agreeing to program projects that will support the statewide targets or setting quantifiable targets for the MPO’s planning area.

The two-year and four-year targets represent expected pavement and bridge condition at the end of calendar years 2019 and 2021, respectively.

## **NYSDOT Pavement and Bridge Condition Baseline Performance and Established Targets**

This system performance report discusses performance for each applicable target as well as the progress achieved by the MPO in meeting targets in comparison with system performance recorded in previous reports. The federal performance measures are new and therefore, performance of the system for each measure and associated targets have only recently been assessed and developed. Accordingly, this first LRTP system performance report highlights performance for the baseline period of 2017. NYSDOT will continue to monitor pavement and bridge condition performance and report to FHWA on a biennial basis. Future system performance reports will discuss progress towards meeting the targets since this initial baseline report.

NYSDOT established statewide PM2 targets on May 20, 2018. BMTS was then required to establish PM2 targets no later than November 16, 2018. The BMTS Policy Committee agreed to support NYSDOT's PM2 performance targets on December 13, 2018 by Resolution 2018-10. By adopting NYSDOT's targets, BMTS agrees to plan and program projects that help NYSDOT achieve these targets.

Table F-6 presents baseline performance for each PM2 measure for New York that will be supported by BMTS for its planning area as well as the two-year and four-year statewide targets established by NYSDOT.

**TABLE F-6: PAVEMENT AND BRIDGE CONDITION (PM2) PERFORMANCE AND TARGETS**

PERFORMANCE MEASURES	NEW YORK PERFORMANCE (BASELINE)	NEW YORK 2-YEAR TARGET (2019)	NEW YORK 4-YEAR TARGET (2021)
Percent of Interstate pavements in good condition	—*	—*	47.3%
Percent of Interstate pavements in poor condition	—*	—*	4.0%
Percent of non-Interstate NHS pavements in good condition	36.7%	14.6%	14.7%
Percent of non-Interstate NHS pavements in poor condition	26.7%	12.0%	14.3%
Percent of NHS bridges (by deck area) in good condition	22.8%	23.0%	24.0%
Percent of NHS bridges (by deck area) in poor condition	10.6%	11.6%	11.7%

Source: NYSDOT

\*For the first performance period only (January 1, 2018 through December 31, 2021), baseline condition and 2-year targets are not required for the Interstate pavement condition measures.

The BMTS LRTP *Moving Forward 2045* includes these goals and objectives:

**GOAL:** Provide excellent infrastructure that meets mobility needs of people and goods

**OBJECTIVE:** Maintain all elements of the regional transportation system in state of good repair

1. Continue to support NYSDOT targets for NHS Pavements and Bridges.
2. Develop and meet targets for non-State federal-aid pavements and bridges.

This is the first BMTS LRTP since the adoption of the final rules on system performance by FHWA and FTA. As such, it is not possible to report on progress toward achieving targets. Future iterations of the LRTP will include descriptions of progress achieved toward targets, including “information that is available at the time of the plan adoption, such as information that has been reported as part of the reports required under 23 CFR 490.107.”

## System Performance, Freight, and Congestion, Mitigation & Air Quality Improvement Program Measures (PM3)

On January 18, 2017, FHWA published the system performance, freight, and Congestion, Mitigation and Air Quality Improvement Program (CMAQ) Performance Measures Final Rule in the *Federal Register*. This third FHWA performance measure rule (PM3), which has an effective date of May 20, 2017, established six performance measures to assess the performance of the NHS, freight movement on the Interstate System, and traffic congestion and on-road mobile source emissions for the CMAQ Program. The performance measures are:

### **For the National Highway Performance Program (NHPP)**

1. Percent of person-miles on the Interstate system that are reliable, also referred to as Level of Travel Time Reliability (LOTTR).
2. Percent of person-miles on the non-Interstate NHS that are reliable (LOTTR).

### **For the National Highway Freight Program (NHFP)**

3. Truck Travel Time Reliability Index (TTTR).

### **For the CMAQ Program**

4. Annual hours of peak hour excessive delay per capita (PHED).
5. Percent of non-single occupant vehicle travel (Non-SOV).
6. Cumulative two-year and four-year reduction of on-road mobile source emissions for CMAQ funded projects (CMAQ Emission Reduction).

The three CMAQ performance measures listed above are applicable only to designated nonattainment areas or maintenance areas for National Ambient Air Quality Standards by the Environmental Protection Agency. BMTS meets all current air quality standards and is not subject to establishing targets for these performance measures. The remaining performance measures are described below.

### **LOTTR Measures**

Travel time reliability refers to the consistency or dependability of travel times on a roadway from day to day or across different times of the day. For example, if driving a certain route always takes about the same amount of time, that segment is reliable. It may be congested most of the time, not congested most of the time, or somewhere in between, but the conditions do not differ very much from time period to time period. On the other hand, if driving that route takes 20 minutes on some occasions but 45 minutes on other occasions, the route is not reliable.

The LOTTR is defined as the ratio of the longer travel times (80th percentile) to a normal travel time (50th percentile) over applicable roads during four time periods that cover the hours of 6:00 a.m. to 8:00 p.m. each day (AM peak, Mid-day, PM peak, and weekends). The LOTTR ratio is calculated for each roadway segment. The segment is reliable if its LOTTR is less than 1.5 during all four time periods. If one or more time periods has a LOTTR of 1.5 or above, that segment is unreliable.

The two LOTTR measures are expressed as the percent of person-miles traveled on the Interstate or non-Interstate NHS system that are reliable. By using person-miles, the measures take into account the total number of people traveling in buses, cars, and trucks over these roadway

segments. To obtain total person-miles traveled, the length of each segment is multiplied by an average vehicle occupancy for each type of vehicle on the roadway.

The sum of person-miles on reliable segments is divided by the sum of person-miles on all segments to determine the percent of person-miles traveled that are reliable.

## **TTTR Measure**

The TTTR measure assesses travel time reliability for trucks traveling on the Interstate. A TTTR ratio is generated by dividing the 95th percentile truck travel time by a normal travel time (50th percentile) for each segment of the Interstate system over five time periods throughout weekdays and weekends (AM peak, Mid-day, PM peak, weekend, and overnight). The time periods cover all hours of the day.

For each Interstate segment, the highest TTTR value among the five time periods is multiplied by the length of the segment. The sum of these length-weighted segments is then divided by the total length of Interstate to generate the TTTR Index.

### ***Travel Time Data***

The travel time data used to calculate the LOTTR and TTTR measures is provided by FHWA via the NPMRDS. This dataset contains historical travel times, segment lengths, and Annual Average Daily Traffic (AADT) for Interstate and non-Interstate NHS roads.

## **PM3 Performance Target Requirements**

Performance for the PM3 measures is assessed over a series of four-year performance periods. States must report baseline performance and targets during the first part of the performance period and update performance at the midpoint and end of each performance period.

For the LOTTR and TTTR measures, the first performance period began on January 1, 2018 and runs through December 31, 2021.

The PM3 rule requires state DOTs and MPOs to establish performance targets for each measure and monitor progress towards achieving the targets. NYSDOT must establish two-year and four-year state targets for the Interstate LOTTR, TTTR, Non-SOV Travel, and CMAQ Emission Reduction measures. For the non-Interstate NHS LOTTR and PHED measures, NYSDOT must establish four-year targets.

## **NYSDOT PM3 Baseline Performance and Established Targets**

This system performance report discusses performance for each applicable target as well as the progress achieved by the MPO in meeting targets in comparison with system performance recorded in previous reports. The federal performance measures are new and therefore, performance of the system for each measure and associated targets have only recently been assessed and developed.

Accordingly, this first LRTP system performance report highlights performance for the baseline period prior to 2018. NYSDOT will continue to monitor performance and report to FHWA on a biennial basis. Future system performance reports will discuss progress towards meeting the targets since this initial baseline report.

NYSDOT established PM3 targets on May 20, 2018. In consultation with the New York MPOs, NYSDOT subsequently recalculated and amended the State’s LOTTR targets after discovering an error in the formula used to determine the 2018 baseline. The BMTS Policy Committee was required to establish PM3 targets no later than November 16, 2018. The BMTS Policy Committee agreed to support NYSDOT’s PM3 performance Resolution 2018-10, agreeing to plan and program projects that help NYSDOT achieve the State’s targets.

Table F-7 presents baseline performance for the LOTTR and TTTR measures for New York and for the BMTS planning area as well as the two-year and four-year targets established by NYSDOT.

**TABLE F-7: SYSTEM PERFORMANCE AND FREIGHT (PM3) PERFORMANCE AND TARGETS**

PERFORMANCE MEASURES	NEW YORK PERFORMANCE (BASELINE)	NEW YORK 2-YEAR TARGET (2019)	NEW YORK 4-YEAR TARGET (2021)
Percent of person-miles on the Interstate system that are reliable (Interstate LOTTR)	81.3%	73.1%	73.0%
Percent of person-miles on the non-Interstate NHS that are reliable (Non-Interstate NHS LOTTR)	77.0%	–	63.4%
Truck travel time reliability index (TTTR)	1.38	2.00	2.11

Source: NYSDOT

The BMTS LRTP *Moving Forward 2045* supports the achievement of reliable travel time for personal and freight mobility.