RELIABILITY PERFORMANCE MANAGEMENT NEWSLETTER

2022-2025 PERFORMANCE PERIOD - BASELINE REPORT

Title 23 CFR §490 – National Performance Measures, Subpart E, directs MDOT and Michigan Metropolitan Planning Organizations (MPOs) to coordinate development of 2-year and 4-year predicted performance reliability targets within a defined four-year performance period in support of the national goals established by Congress in MAP-21 of 2012.

In accordance with regulation and Federal Highway Administration (FHWA) guidance, targets are data-informed, analysis driven, realistic predictions of future performance constrained to projected program funding. These short-term predictions are intended to evaluate and support the most effective investment strategies for achieving long-term performance goals and expectations in State and MPO planning documents.

The reliability measures are limited to directional mainline highways on the National Highway System (NHS), regardless of ownership, and the NHS represents a subset of the entire network managed by MDOT, MPOs and local governments.

Section 490 directs State DOTs and MPOs to use three performance measures *(Figure 1)* for assessing travel time reliability. The National Performance Management Research Data Set (NPMRDS) is vehicle probe-based travel time data used to calculate the national reliability measures. The NPMRDS is provided by the Federal Highway Administration (FHWA) for use by states and MPOs. The NPMRDS is processed through an analytical software tool known as Regional Integrated Transportation Information System (RITIS).

Level of Travel-Time Reliability (LOTTR)

Percentage of person-miles traveled on the [Interstate/Non-Interstate NHS] that are reliable

- (1) Interstate <u>and</u> (2) Non-Interstate NHS
- 2-Year and 4-Year Targets
- Four (4) Time Periods
- Fifteen (15) Minute Travel Intervals
- Longer Travel Time: 80th Percentile
- Normal Travel Time: 50th Percentile
- Threshold: Reliability <1.50
- Factors Applied: Vehicle volumes (HPMS) and Vehicle Occupancy Factor (provided by FHWA)

Truck Travel-Time Reliability (TTTR)

Interstate freight reliability, truck travel time Index

- Interstate (only)
- 2-Year and 4-Year Targets
- Five (5) Time Periods
- Fifteen (15) Minute Travel Intervals
- Longer Travel Time: 95th Percentile
- Normal Travel Time: 50th Percentile
- Threshold: None
- Factors Applied: No additional factors are applied

Figure 1: Reliability metrics/measures

Travel Time Reliability Overview

Travel time reliability measures how consistent travel between X and Y is from one day to the next. To determine reliability, data is analyzed to see how it varies over time. As directed by Section 490, travel time for each discrete segment of the National Highway System (NHS) is placed in order from the shortest time (fastest speed), which is the 1st percentile speed, to the longest time (slowest speed), which is the 100th percentile speed. Three performance measures are examined to compare the "normal" travel time, (which is defined as the 50th percentile travel time) on a segment, with either the 80th percentile or the 95th percentile travel time to determine the overall reliability. If the difference between the normal travel time and the longer travel time (80th for person-miles or 95th percentile for freight) is greater than 50 percent, then the segment is classified as unreliable.

To help explain travel time reliability, consider the following simplified hypothetical example. Suppose an individual person's normal travel time from home to work is 20 minutes. The 80th percentile is defined as one out of every five days, or approximately one time in a traditional commuter work week. If in a typical week, it takes an individual 30 minutes or longer to travel to work one or more times, then the route driven would be designated as unreliable (exceeds the 1.50 threshold). See page five for more a detailed example of the metrics/measures.

Travel Time Reliability is not the same as Congestion.

Reliability is important because travelers prefer a consistent travel time to their destination. If people understand that a route is routinely congested, they can plan accordingly. However, if a route is unreliable, they really have no consistent reference of how long it will take to get to their destination, which creates frustration. In addition, segments of roads can be both congested, and reliable (e.g., reliably congested).

50th Percentile (Average or Normal Travel Time)

80th Percentile (Longer Travel Time)
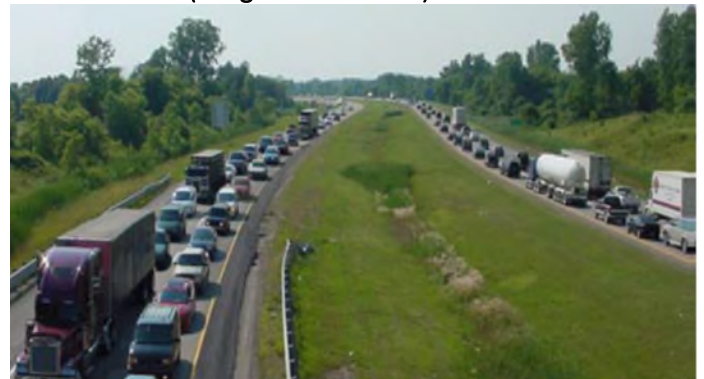
Baseline Condition

As a result of the global pandemic, Michigan (and the United States more broadly) experienced an unprecedented reduction in traffic volumes starting in early 2020. While traffic volumes have increased, through the end of 2022 reliability performance remains notably improved from pre-pandemic levels. That said, it is difficult to predict future performance with a higher-than-normal level of uncertainty. For this reason, MDOT is hesitant the 2022 baseline (2021 actual performance) will accurately reflect a sustainable expectation of future performance.

LOTTR: Reliable Person Miles
Desired Trend ⬆

Data Year/ Reporting Year	Interstate	Non-Interstate NHS
2017/2018	85.2%	84.0%
2019/2020	88.6%	88.5%
2021/2022 2022 Baseline	97.1%	94.4%

Truck Travel Time Index
Desired Trend ⬇

Data Year/ Reporting Year	Interstate
2017/2018	1.38
2019/2020	1.44
2021/2022 2022 Baseline	1.31

Note: It is important to note the NPMRDS data set continues to evolve and MDOT has found prior year reported data changes in the RITIS system. MDOT has also observed the baseline/actual performance reported by FHWA is frequently different than the RITIS system, although typically by +/- 1 point. MDOT does not have the authority to override the performance data reported by FHWA in the biennial reports. Therefore, baseline/actual performance data for MDOT required biennial reporting should be considered a snapshot of what was reported by FHWA in the respective reporting year which may be different than what RITIS reports for that year now/in the future.

Target Setting Process
These short-term predicted performance targets are intended to evaluate and support the most effective investment strategies for achieving long-term performance goals and expectations in State and MPO planning documents. Policies and investment strategies included in Michigan Mobility 2045 (state long-range transportation plan) contribute to Michigan's ability to meet the national transportation performance management goals established by Congress. In alignment with MM2045, MDOT created a new operations template program to fund projects that will improve safety and reliability while also

addressing congestion. The level of travel time reliability is a key factor in prioritizing projects and measuring anticipated investment outcomes.

For the **2022-2025 performance period**, the analysis and methods used to develop the national predicted performance reliability targets considered inputs and influences not limited to the following:

- Historical trends and current baseline. As previously noted, the 2022 baseline (2021 actual performance) is unlikely sustainable as post-pandemic traffic volumes have increased, while also acknowledging reliability remains notably improved from pre-pandemic historical trends.
- Expected outcomes from projects programmed to improve reliability (5-year program/projects).
- The next two to three years will see more RMBP construction projects on the NHS.
- Anticipated changes in use (long-term adoption of telecommuting/hybrid work, for example).
- Potential competitive funding opportunities that are not appropriate to quantify and consider in target-setting until an award has been made.
- Other factors of influence:
  - Inclement weather, especially winter weather, has a major impact on reliability.
  - The Interstate has a small percentage of segments nearing unreliable while Non-Interstate NHS has shown to be more volatile and has a higher percentage of segments nearing unreliable.
  - Freight performance as measured is more volatile due to using 95th percentile speeds.

2022-2025 Predicted Performance State Targets

Measure	2-Year	4-Year
LOTTR: Interstate	80.0%	80.0%
LOTTR: Non-Interstate NHS	75.0%	75.0%
Freight Travel Time Index	1.60	1.60

The State LOTTR predicted performance targets are improved by five percentage-points from those established for the 2018-2021 performance period. The freight Index target is also improved by .15 (from 1.75 to 1.60).

MPO Target Setting

In accordance with Section 490, MPOs have 180 days following the recording of State national performance program targets to develop and report MPO targets to MDOT. For 2022, FHWA delayed the biennial report from October 1 to December 16 therefore MPO target reporting to MDOT has respectively changed to June 14, 2023.

MPOs can satisfy the Section 490 target setting requirements by either electing to plan and program projects that support State targets, or develop a quantifiable target for the respective metropolitan planning area. MPO target elections can be made on a per measure basis. For example, an MPO can elect to support the State 2-year LOTTR Interstate target, and develop a quantifiable MPO boundary 4-year LOTTR Interstate target. That said, once target elections have been made (i.e., support State or develop MPO specific), the MPO must retain each election for the duration of the four-year performance period.

Also note, FHWA does not make a significant progress determination of MPO targets whether the MPO elects to support the State target(s) or develop MPO boundary target(s). Further, an MPO is not subject to any consequence or penalty imposed by FHWA on MDOT should a target not be achieved regardless of which target development option the MPO selected. For reference, significant progress is defined by regulation as achieving performance that is equal to or better than the target, or better than the baseline performance.

Level of Travel Time Reliability (LOTTR) Example

Segment: Longer Travel Time (80th) ÷ Normal Travel Time (50th) = # seconds ÷ # seconds = LOTTR

Monday – Friday	6am - 10am	LOTTR = 44 sec ÷ 35 sec = 1.26
	10am - 4pm	LOTTR = 1.39
	4pm – 8pm	LOTTR = **1.54**
Weekends	6am – 8pm	LOTTR = 1.31
Reliability Threshold: LOTTR below 1.50 during <u>ALL</u> of the time periods		**Segment is NOT reliable**

Measure: Percent of person-miles traveled on the [Interstate/Non-Interstate NHS] that are reliable

1. Length x Volume (AADTx365) x Occupancy = person miles
2. Σ (Reliable Person-Miles) ÷ Σ (Total Person-Miles) = Reliability

Truck Travel Time Reliability (TTTR (This is an index, not a reliability threshold) Example

Segment: Longer Travel Time (95th) ÷ Normal Travel Time (50th) = # seconds ÷ # seconds = TTTR

Monday – Friday	6am - 10am	TTTR = 72 sec ÷ 50 sec = 1.44
	10am - 4pm	TTTR = 1.39
	4pm – 8pm	TTTR = 1.49
Weekends	6am – 8pm	TTTR = 1.31
Overnight	8pm – 6am	TTTR = 1.20
Maximum TTTR		1.49

Measure: Truck Travel Time Reliability (TTTR) Index

1. Length x MaxTTTR = Length-weighted TTTR
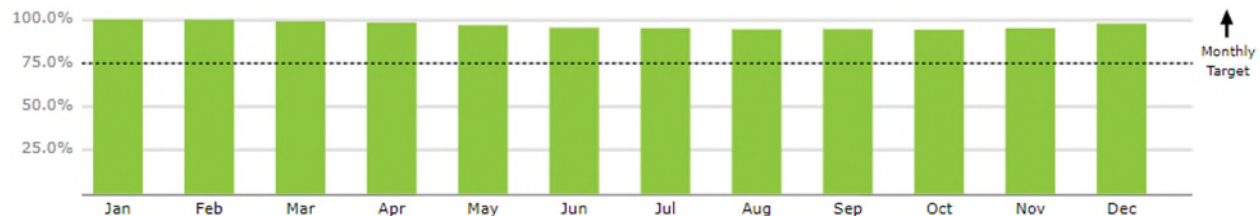2. Σ (All segment length weighted TTTR) ÷ Σ (All segment lengths)

Michigan

MAP-21 Percent of the Person-Miles Traveled on the Interstate That Are Reliable (the Interstate Travel Time Reliability measure)

2021 Target
at least
75.0%

👍 **97.1%**

Year-to-Date
2021

Target: At least 75% of the system should have a LOTTR less than 1.50

Calculated using 99.77% of miles in Michigan
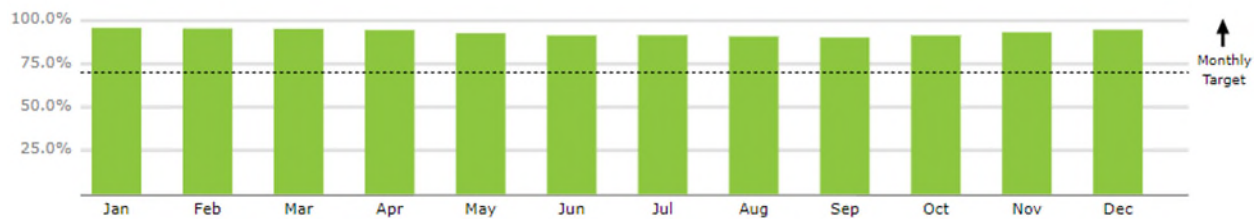
Data source: NPMRDS INRIX

Michigan
MAP-21 Percent of the Person-Miles Traveled on the Non-Interstate NHS That Are Reliable (the Non-Interstate NHS Travel Time Reliability measure)

2021 Target
at least
70.0%

👍 **94.4%**

Year-to-Date
2021

Target: At least 70% of the system should have a LOTTR less than 1.50

Calculated using 98.95% of miles in Michigan
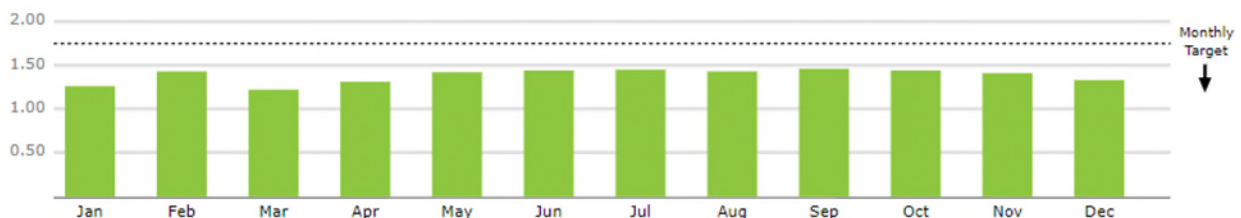
Data source: NPMRDS INRIX

Michigan
MAP-21 Truck Travel Time Reliability Index (for interstate roads only)

2021 Target
less than
1.75

👍 **1.31**

Year-to-Date
2021

Target: The system should have a TTTR less than 1.75

Calculated using 99.77% of miles in Michigan

Data source: NPMRDS INRIX

2021 MPO System Performance

MPOs can access a wealth of system performance information, including the below reliability performance, through the RITIS NPMRDS Analytics tool. At this time there is no cost to Michigan MPOs to use this valuable tool and available data can greatly benefit decision-making.

MPO/Study Area	Interstate Reliability	Non-Interstate NHS Reliability	Freight Reliability
Battle Creek Area Transportation Study	100.0%	93.6%	1.15
Bay City Area Transportation Study	100.0%	95.3%	1.56
Genesee County Metropolitan Planning Commission	100.0%	88.0%	1.20
Grand Valley Metropolitan Council	97.8%	93.4%	1.42
Kalamazoo Area Transportation Study	100.0%	93.9%	1.12
Macatawa Area Coordinating Council	100.0%	91.1%	1.35
Midland Area Transportation Study	Not Avail	99.7%	Not Avail
Region 2 Planning Commission	100.0%	92.5%	1.13
Saginaw Metropolitan Area Transportation Study	100.0%	89.1%	1.21
Southeast Michigan Council of Governments	94.8%	93.5%	1.44
Southwest Michigan Planning Commission	100.0%	95.9%	1.12
Tri-County Regional Planning Commission	99.5%	97.1%	1.30
West Michigan Shoreline Regional Dev Commission	100.0%	93.9%	1.22

The steps to access the reliability performance information is as follows:

- From the opening screen scroll down and select the "MAP-21" dashboard widget.
- Select your respective MPO from the drop-down menu titled "MPA."
- Select the measure(s) you want to include on your dashboard. Optional: The default target is 90% for LOTTR and 1.5 for TTTR. You can change these to reflect your target value or just leave the targets as-is.
- Select the year(s) you want to review; you can select multiple years for longer historical trends. [Note, you need to actually click the "Add time period" green button for each year you select, this is less intuitive.]
- Select whether you want to see the data in graph or map format.
- Select the "Add Widget" blue button.
- You can save this to your dashboard for future reference.

This is an example of what your dashboard might look like.
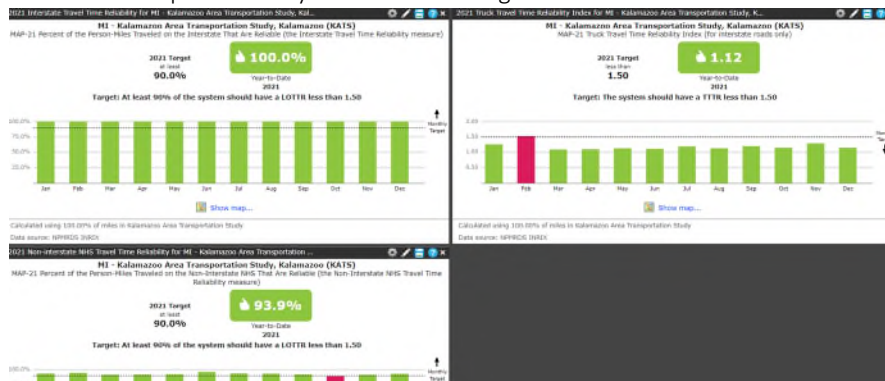
For Travel Time Reliability Technical Information, contact Lee Nederveld at (517) 202-0322 or NederveldL@michigan.gov