

**Rockingham Planning Commission  
Metropolitan Planning Organization  
Pavement and Bridge Condition and Congestion Performance Targets**

*October 2018*

**Summary**

Table 1 below identifies NHDOT adopted 2 and 4-year performance targets and establishes comparable MPO targets for the nine metrics that measure pavement condition, bridge condition, and travel time reliability. *For the purposes of establishing baseline conditions and targets for the first performance period, the MPO is agreeing to support the State of New Hampshire Performance Targets in the areas of pavement condition, bridge condition, and travel time reliability.* In doing so, the MPO is agreeing to plan and program projects so that they contribute toward the accomplishment of the relevant State DOT target for that performance measure.

**Table 1: Baseline Estimates and Targets**

Area	System & Measure	NHDOT			MPO		
		Baseline Estimate <sup>1</sup>	2-Year Target	4-Year Target	Baseline Estimate <sup>1</sup>	4-Year Target	Current Status
Pavement Condition	Interstate: Good Condition	96.7%	N/A	95.0%	96.5%	<b>95.0%</b>	 1.6% above target
	Interstate: Poor Condition	0.2%	N/A	0.8%	0.2%	<b>0.8%</b>	 75% above target
	Non-Interstate NHS: Good	70.1%	65.0%	65.0%	75.7%	<b>65%</b>	 16.5% above target
	Non-Interstate NHS: Poor	9.8%	12.0%	12.0%	7.2%	<b>12%</b>	 40% above target
Bridge Condition	NHS: Good Condition	57.0%	57.0%	57.0%	37.7%	<b>57.0</b>	 34% under target
	NHS: Poor Condition	7.0%	7.0%	7.0%	8.1%	<b>7.0</b>	 15.7% under target
Travel Time Reliability	Interstate: Person Miles	99.4%	95.0%	95.0%	100%	<b>95%</b>	 5.3% above target
	Non-Interstate NHS: Person Miles	87.8%	85.0%	85.0%	89.8%	<b>85%</b>	 5.6% above target
	Interstate: TTR	1.35	1.50	1.50	1.41	<b>1.50</b>	 6% above target

<sup>1</sup>NHDOT utilizes 2016 as the base year for Pavement and Bridge Condition while RPC utilizes 2017 values for baseline estimates. Both RPC and NHDOT utilize 2017 values as the baseline for Travel Time Reliability measures.



Exceeding Target



Meeting Target



Not meeting Target

**Background**

On May 20<sup>th</sup>, 2017 the Federal Highway Administration (FHWA) final rules on “National Performance Management Measures; Assessing Pavement Condition for the National Highway Performance Program and Bridge Condition for the National Highway Performance Program” (referred to as “PM2”) and “National Performance Management Measures; Assessing Performance of the National Highway System, Freight Movement on the Interstate System,

and Congestion Mitigation and Air Quality Improvement Program” (referred to as “PM3”) went into effect starting the clock for States and MPOs to establish baseline conditions and performance targets for these programs. The rule requires State Departments of Transportation to set 2-year and 4-year targets for PM2 and PM3 measures by May 20, 2018, and Metropolitan Planning Organizations (MPOs) to set 4-year regional targets within 180 days after that. Targets are to be established for nine measures within the three performance areas:

### **Pavement Condition (PM2)**

- ***Percentage of pavements of the Interstate System in Good condition:*** Initially this utilizes the International Roughness Index (IRI) and pavements with an IRI value of under 95 are considered in “Good” condition. Starting in 2020 this measure will also be incorporating “Full Distress” metrics and these are described further in the Target Development section of this document.
- ***Percentage of pavements of the Interstate System in Poor condition:*** Initially this utilizes IRI only and pavements with an IRI value of greater than 170 are considered in “Poor” condition. Starting in 2020 this measure will also be incorporating “Full Distress” metrics and these are described further in the Target Development section of this document.
- ***Percentage of pavements of the non-Interstate National Highway System (NHS) in Good condition:*** Initially this utilizes the International Roughness Index (IRI) and pavements with an IRI value of under 95 are considered in “Good” condition. Starting in 2020 this measure will also be incorporating “Full Distress” metrics and these are described further in the Target Development section of this document.
- ***Percentage of pavements of the non-Interstate NHS in Poor condition:*** Initially this utilizes IRI only and pavements with an IRI value of greater than 170 are considered in “Poor” condition. Starting in 2020 this measure will also be incorporating “Full Distress” metrics and these are described further in the Target Development section of this document.

### **Bridge Condition (PM2)**

- ***Percentage of NHS bridges classified as in Good condition:*** Classification is based on National Bridge Inventory (NBI) condition ratings for bridge deck, superstructure, substructure, and culvert and the lowest rating of any of those components determines the overall rating of the bridge. Ratings greater than or equal to 7 are considered in “Good” condition.
- ***Percentage of NHS bridges classified as in Poor condition:*** Classification is based on National Bridge Inventory (NBI) condition ratings for bridge deck, superstructure, substructure, and culvert and the lowest rating of any of those components determines the overall rating of the bridge. Ratings less than or equal to 4 are considered in “Poor” condition.

### **Travel Time Reliability (PM3)**

- ***Interstate Travel Time Reliability Measure:*** Percent of person-miles traveled on the Interstate that are reliable. This is defined as the ratio of 80<sup>th</sup> percentile travel times (longer) to a 50<sup>th</sup> percentile (normal) travel time for each segment and are collected into annual totals to determine the overall percentage of reliable travel.
- ***Non-Interstate National Highway System (NHS) Travel Time Reliability Measure:*** Percent of person-miles traveled on the non-interstate NHS that are reliable. This is defined as the ratio of 80<sup>th</sup> percentile travel times (longer) to a 50<sup>th</sup> percentile (normal) travel time for each segment and are collected into annual totals to determine the overall percentage of reliable travel.
- ***Freight Reliability Measure:*** Truck Travel Time Reliability (TTTR) Index. TTTR is derived by dividing the 95<sup>th</sup> percentile travel time by the 50<sup>th</sup> percentile (normal) travel time for each segment for five periods of the day and the largest ratio is multiplied by the length of the segment. The sum of all length-weighted segments is then divided by the total length of Interstate in the state/region.

Data for the establishment of these measures is provided from three sources:

- **Highway Performance Monitoring System (HPMS):** A database compiled by the Federal Highway Administration that contains inventory information for the Nation's Federal-Aid eligible public roads including extent, condition, performance, use, and operating characteristics. HPMS data are used for assessing and reporting highway system performance related to safety and pavement condition. The roadway condition data submitted to HPMS is collected by NHDOT annually utilizing a specially equipped van.
- **National Bridge Inventory (NBI):** A database compiled by the Federal Highway Administration with information on all bridges and tunnels in the United States that have roads passing above or below. Information includes the design of the bridge, dimensions of the usable portion, as well as condition of the structure. This information is utilized in the calculation of the bridge condition measures. Bridge condition data is collected by NHDOT during annual (or more frequent) inspections and submitted to the NBI annually.
- **National Performance Management Research Data Set v2 (NPMRDS):** A national data set of average travel times on the National Highway system for use in performance measure and management activities. This information is used to calculate travel time reliability measures and is collected via cell phone location information, GPS systems, and location trackers in trucks.

### **Implementation**

FHWA has included in the final rule both "phase-in" requirements and "transition" provisions as states move towards collecting the information required to fully utilize the pavement conditions metrics and the general impact of these allowances are shown in Table 2 below. Because the first State DOT target reporting date is October 1, 2018, not all states may have completed their first "Full distress and IRI" data collection cycle for deriving baseline conditions. FHWA is allowing states and MPOs to "phase-in" this requirement by requiring only the IRI measurement to establish the baseline estimate and 4-year during the first reporting period. At the same time, due to the lack of data in some states, FHWA has allowed a "transition period" where the states are not required to set 2-Year targets for the pavement condition measures. This transition period ends at the mid-point target updates that will occur in 2020 and from that point on, the states will be required to establish 2 and 4-year targets and utilize the full spectrum of pavement condition metrics to establish overall conditions and anticipated targets. The bridge and congestion measures are not subject to the "phase-in" or "transition" provisions and must be fully implemented starting this year.

### **Target Development**

States are required to establish 2-year and 4-year targets for Pavement Condition, Bridge Condition, and Travel Time Reliability reporting progress on a biennial basis beginning in May 2018. MPOs are required to establish 4-year targets only for those same measures within 180 days of the State target setting.

**Table 2: PM2 & PM3 Implementation**

Measure	First Performance		Two-Year Target	Four Year Target
	Period (Interim)	Final		
Interstate: Good Condition	IRI Only (2018)	IRI + Full Distress Metrics	DOT (Starting 2020)	DOT/MPO
Interstate: Poor Condition	IRI Only (2018)	IRI + Full Distress Metrics	DOT (Starting 2020)	DOT/MPO
Non-Interstate NHS: Good	IRI Only (2018)	IRI + Full Distress Metrics	DOT	DOT/MPO
Non-Interstate NHS: Poor	IRI Only (2018)	IRI + Full Distress Metrics	DOT	DOT/MPO
NHS: Good Condition	NBI Condition Ratings		DOT	DOT/MPO
NHS: Poor Condition	NBI Condition Ratings		DOT	DOT/MPO
Interstate: Person Miles	Travel Time Reliability		DOT	DOT/MPO
Non-Interstate NHS: Person Miles	Travel Time Reliability		DOT (Starting 2020)	DOT/MPO
Interstate: TTTR	Truck Travel Time Reliability		DOT	DOT/MPO

**Pavement Conditions**

Pavement Condition data is collected by NHDOT annually through specialized equipment mounted to a vehicle. Data is collected in 0.1 mile increments for all segments of the National Highway System in New Hampshire. For the first 4-year targets, pavement condition will be measured based on only the International Roughness Index (IRI), however over the next two years a transition will be made to incorporate all four required components so that the 2020 update will include “full distress and IRI” measures:

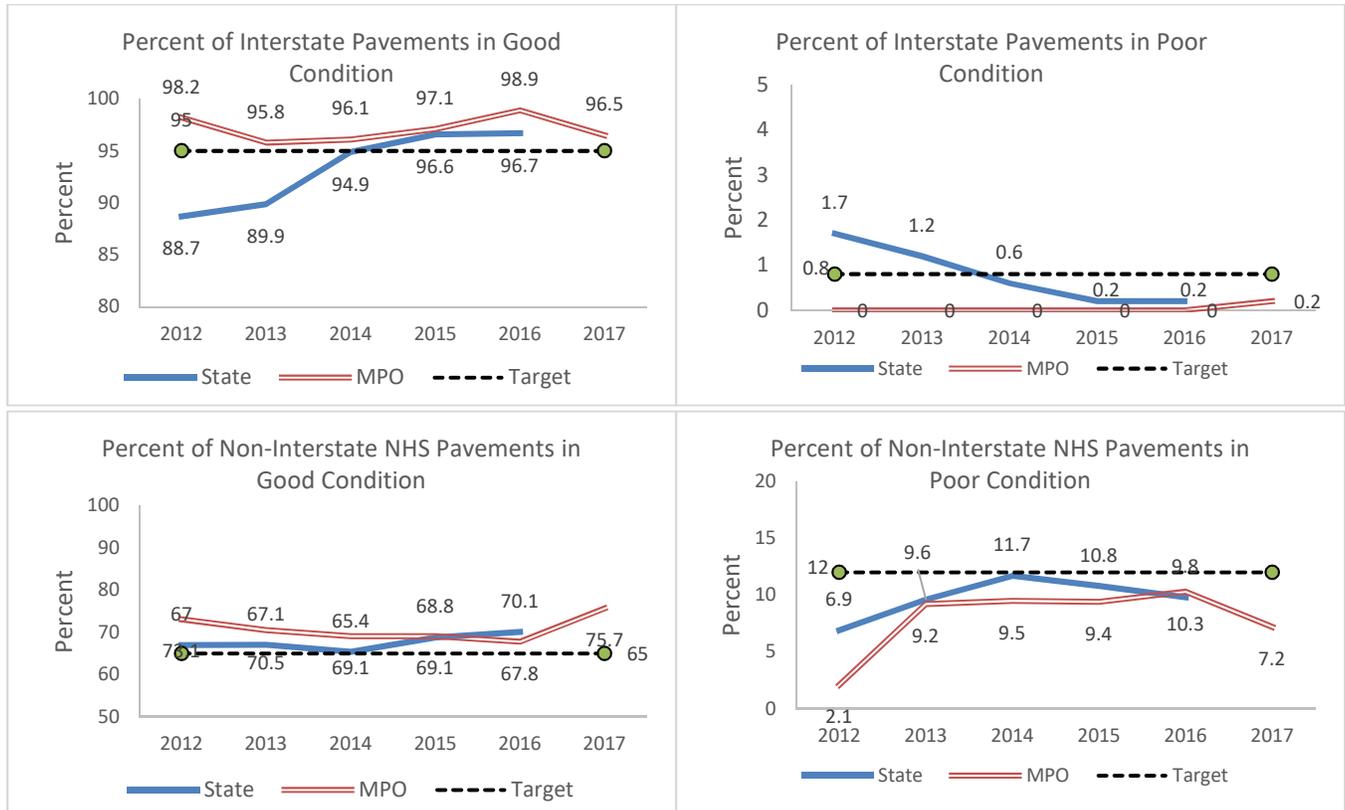
- **International Roughness Index (IRI):** A statistic used to estimate the amount of roughness in a measured longitudinal profile.
- **Rutting:** A measure of longitudinal surface depressions in the pavement
- **Cracking:** The percentage of the surface with unintentional breaks
- **Present Serviceability Rating (PSR):** An observation-based system used to rate pavements for roadways with speed limits that are less than 40MPH.

The result is that the initial 4-year targets set for pavement condition may be substantially different than those set for future 2 and 4-year periods. FHWA is allowing this transition and phase-in period as many states have not historically collected all of the information required to make the calculations for rutting, cracking, and PSR and therefore do not have the information available to establish baseline conditions and set targets.

**Table 3 – Interstate and Non-Interstate NHS Baseline Pavement Conditions (IRI Only)**

Year	Interstate – Good		Interstate – Poor		Non-Interstate NHS – Good		Non-Interstate NHS – Poor	
	State	MPO	State	MPO	State	MPO	State	MPO
2012	88.7%	98.2%	1.7%	0.0%	67.0%	73.1%	6.9%	2.1%
2013	89.9%	95.8%	1.2%	0.0%	67.1%	70.5%	9.6%	9.2%
2014	94.9%	96.1%	0.6%	0.0%	65.4%	69.1%	11.7%	9.4%
2015	96.6%	97.1%	0.2%	0.0%	68.8%	69.1%	10.8%	9.4%
<b>2016</b>	<b>96.7%</b>	<b>98.9%</b>	<b>0.2%</b>	<b>0.0%</b>	<b>70.1%</b>	<b>67.8%</b>	<b>9.8%</b>	<b>10.3%</b>
2017		96.5%		0.2%		75.7%		7.2%

The interim targets for the first performance reporting period are based on IRI data collected by NHDOT and the data that forms the basis for the performance targets is included in Table 3. The data from 2016 is utilized as the baseline year and the other values aid in establishing trends that can be used to guide future year targets.

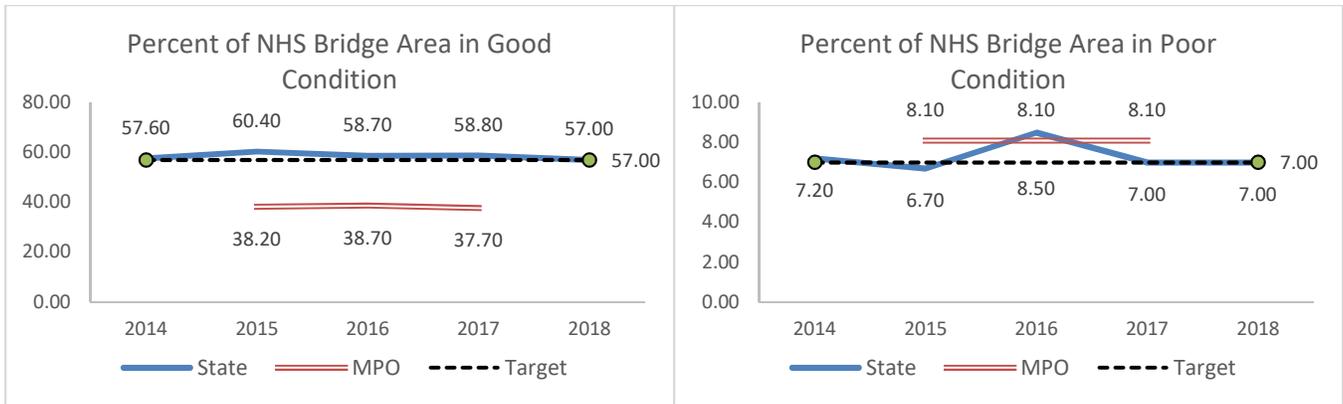


### Bridge Conditions

Bridge Condition data is collected by NHDOT through the regular inspection of bridges and includes all structures that meet the federal definition of a bridge. Conditions are reported in square feet of deck area and are based on the condition of the deck, superstructure, and substructure, or culvert. Each of those 3 bridge components is evaluated and the lowest rating determines the overall bridge rating. Overall ratings of 7 or better indicate that the bridge is in “Good” condition, while overall ratings of 4 or less indicate that the bridge is in “Poor” condition.

**Table 4 – NHS Baseline Bridge Conditions**

Year	Square Feet Good Condition		Percentage Good Condition		Square Feet Poor Condition		Percentage Poor Condition	
	State	MPO	State	MPO	State	MPO	State	MPO
2014	4,065,483		57.6%		507,047		7.2%	
2015	4,307,170	483,095	60.4%	38.2%	477,966	102,976	6.7%	8.1%
2016	4,193,582	489,372	58.7%	38.7%	609,634	102,976	8.5%	8.1%
2017	4,198,111	476,982	58.8%	37.7%	500,965	102,976	7.0%	8.1%
2018	4,090,340		57.0%		500,663		7.0%	



Based on currently available information, the NHS bridges in the MPO region are in overall worse condition than the state as a whole. The region currently has a smaller percentage of bridge area in good condition and a larger percentage in poor condition. There are currently a number of projects in the region that are addressing the condition of bridges on the National Highway System. The replacement of the Sarah Mildred Long Bridge between Portsmouth and Kittery and the I-95 Taylor River Bridge in Hampton Falls were both completed in 2018 and have not shown up in the data yet. In addition, the I-95 bridge over the Piscataqua River between Portsmouth and Kittery is slated for rehabilitation starting in 2019.

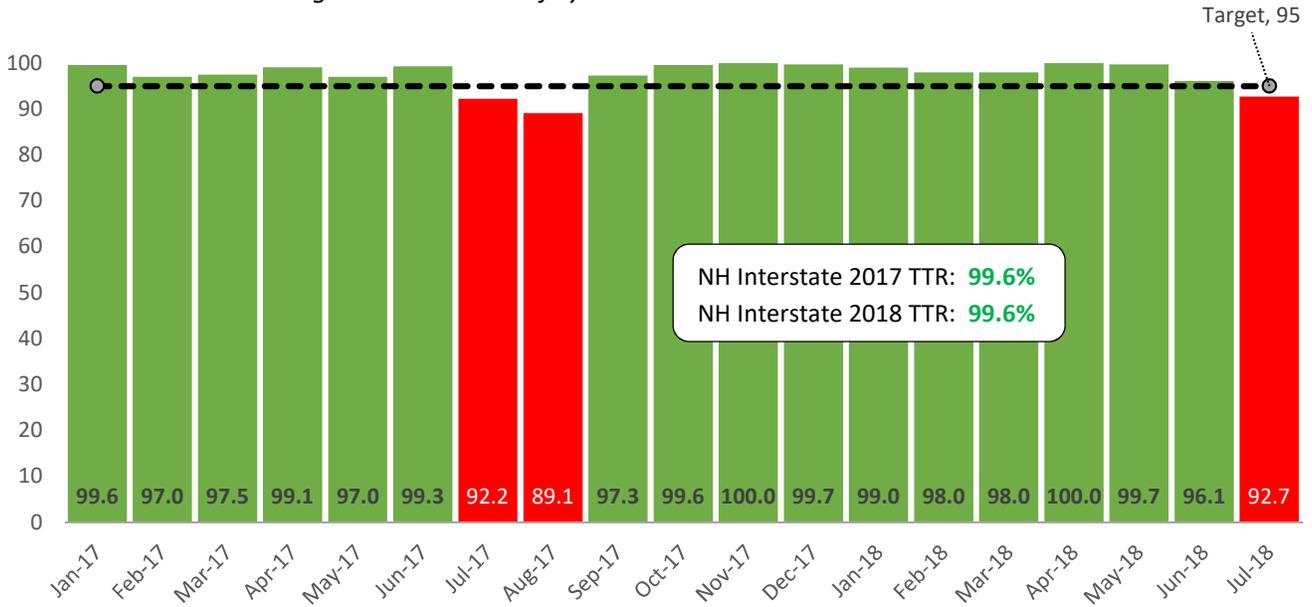
### Travel Time Reliability

Travel Time Reliability data is collected utilizing vehicle probe data in the National Performance Measure Research Data Set (NPMRDS). This data consists of average travel times for each segment of the National Highway System and is calculated at 5 minute intervals for each day of the year and aggregated to different levels for the purposes of calculating travel time reliability measures.

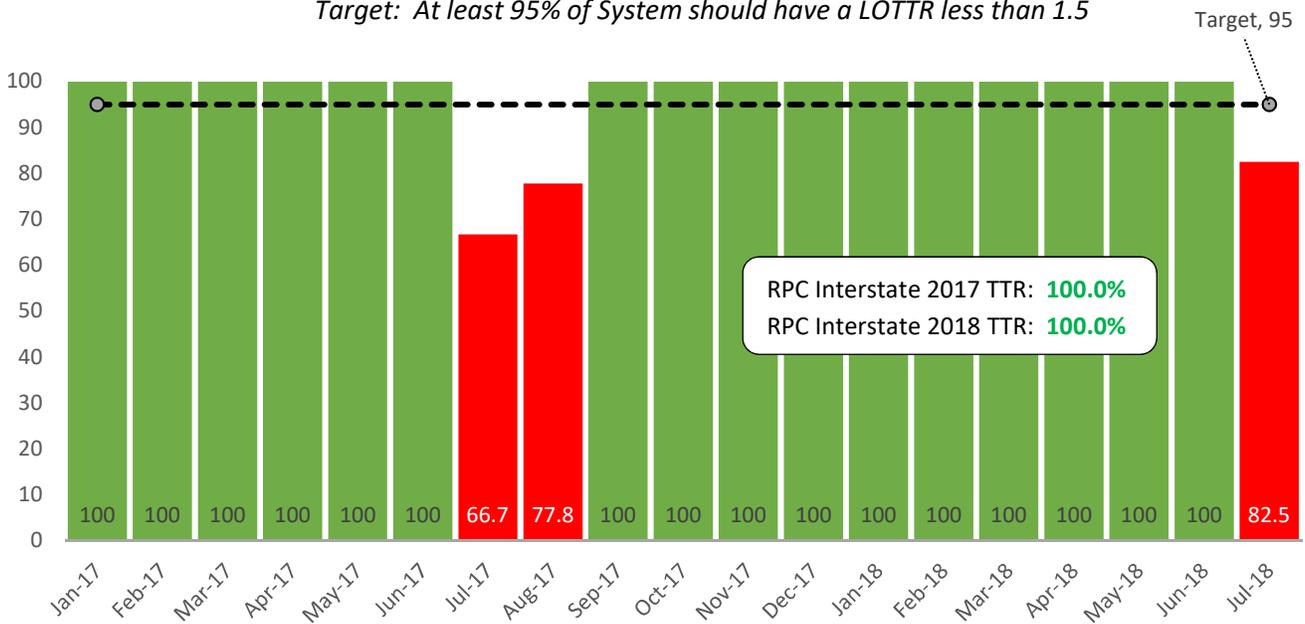
For Interstate Travel Time Reliability and Non-Interstate NHS Travel Time Reliability, data is collected in 15 minute segments between 6:00 AM and 8:00 PM daily. The 80<sup>th</sup> percentile travel times (longer) are then divided by the 50<sup>th</sup> percentile (normal) travel time and periods where this ratio is less than 1.5 are considered “reliable”. These are converted to person-miles and collected into monthly and annual totals to determine the overall percentage of reliable travel. The goal is for all segments to be “reliable” at a rate that is greater than or equal to the target value over the course of the year. The figures on the following pages show New Hampshire and MPO region specific monthly Travel Time Reliability for the Interstate System (page 7), Non-interstate National Highway System (page 8), as well as overall values for 2017 and 2018 to date.

Truck Travel Time Reliability (TTTR), the Freight Reliability measure, is calculated somewhat differently. For TTTR, the 95<sup>th</sup> percentile travel time is divided by the 50<sup>th</sup> percentile (normal) travel time for each segment during each of 5 periods: weekday morning peak (6-10 AM), midday (10AM-4PM), and afternoon peak (4-8PM), weekends (6AM-8PM), and overnights for all days (8PM-6AM). The largest ratio for each day is multiplied by the length of the segment. The sum of all length-weighted segments is then divided by the total length of interstate in the state/region. The goal in this instance is that the interstate system has truck travel times that are less than 1.5 times the “normal” travel time over the course of the year. The figures on page 9 show Truck Travel Time Reliability for New Hampshire and the MPO region by month and annual totals for 2017 and 2018 to date.

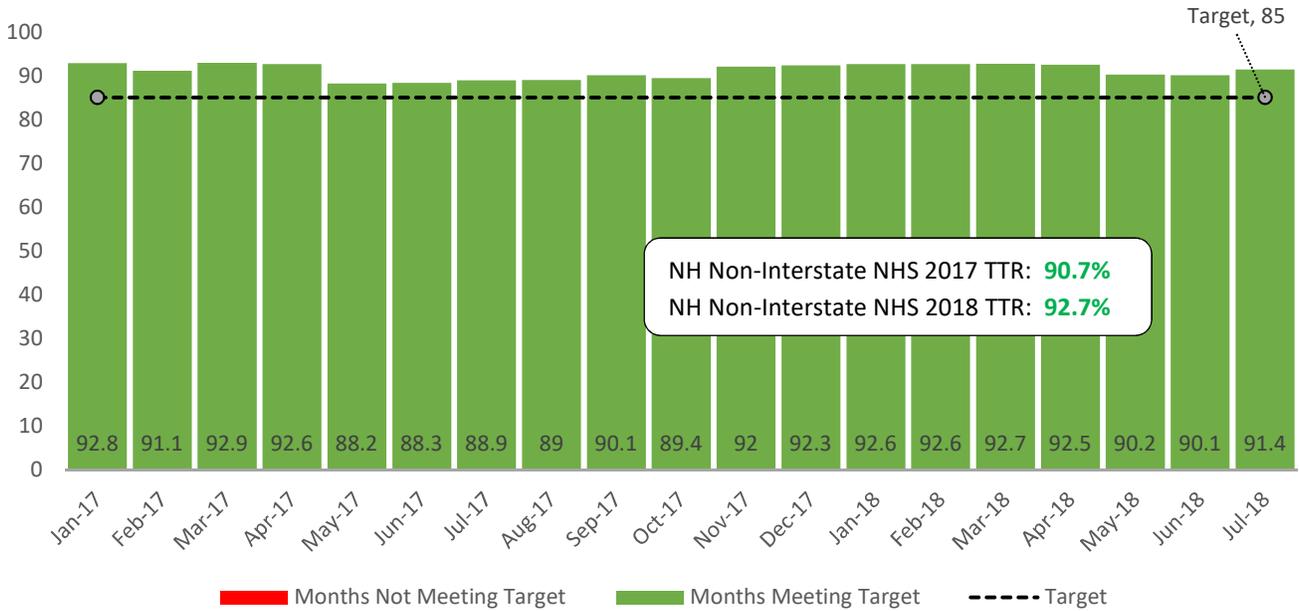
New Hampshire 2017-2018 Interstate Level of Travel Time Reliability Index (LOTTR)  
 Target: At least 95% of System should have a LOTTR less than 1.5



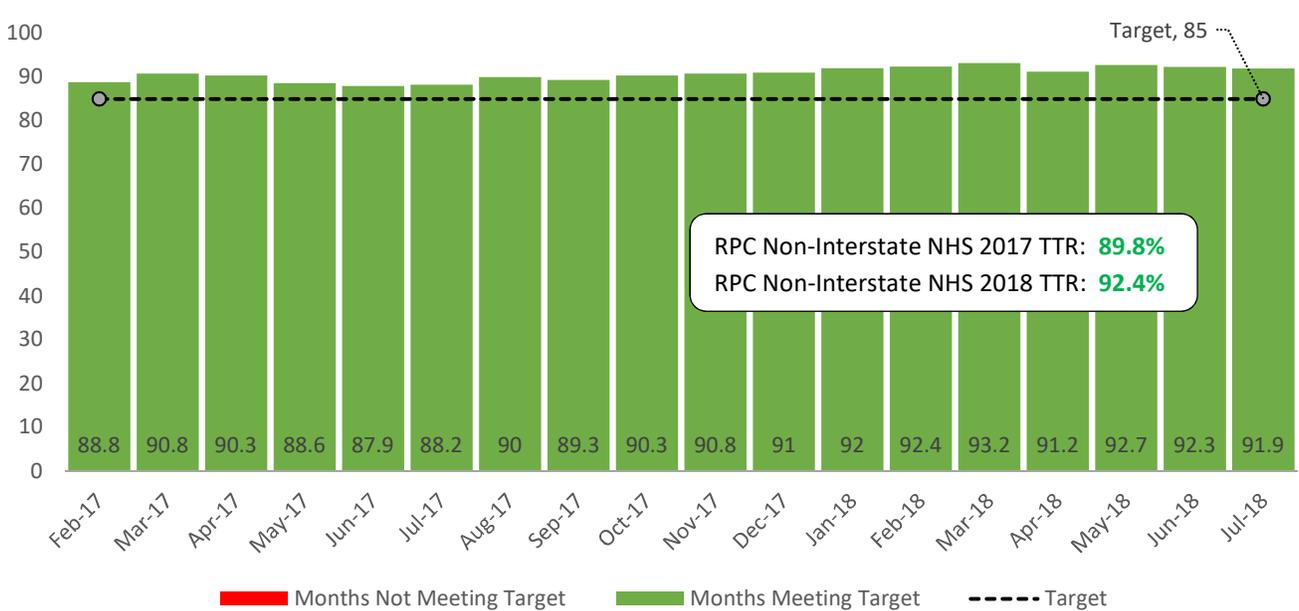
RPC 2017-2018 Interstate Level of Travel Time Reliability Index (LOTTR)  
 Target: At least 95% of System should have a LOTTR less than 1.5



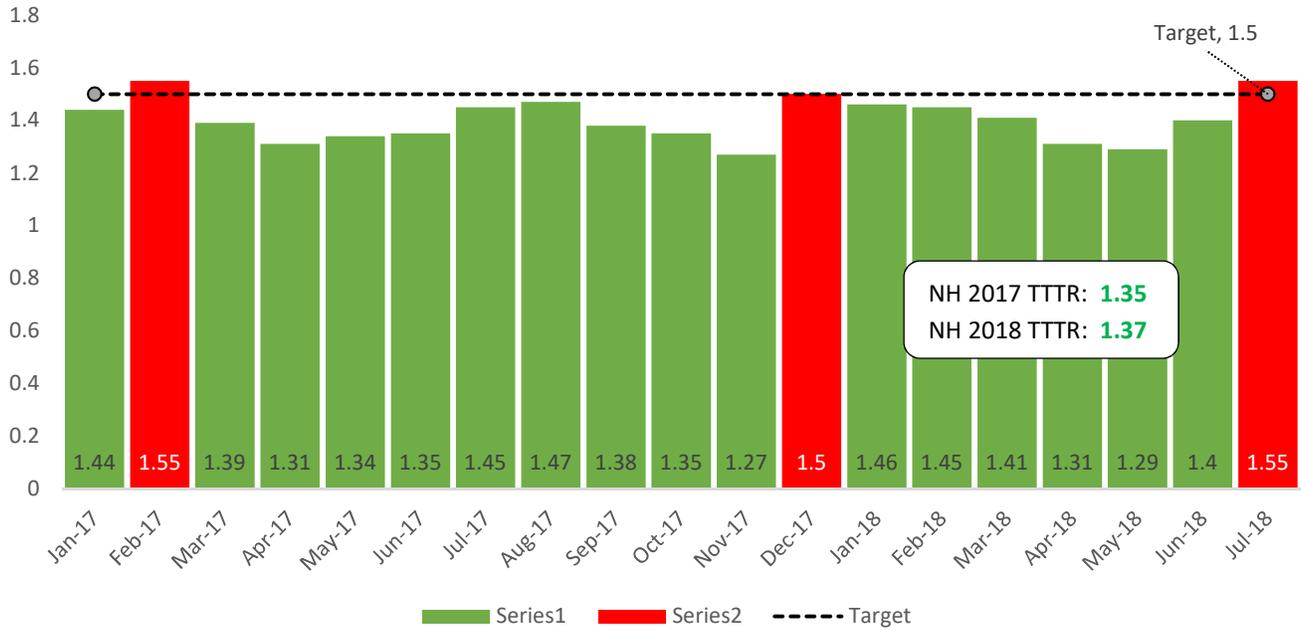
**New Hampshire Non-Interstate National Highway System (NHS)  
Level of Travel Time Reliability Index (LOTTR)  
Target: At least 85% of the system should have a LOTTR less than 1.5**



**RPC Non-Interstate National Highway System (NHS)  
Level of Travel Time Reliability Index (LOTTR)  
Target: At least 85% of the system should have a LOTTR less than 1.5**



New Hampshire 2017 Truck Travel Time Reliability Index (TTTR)  
 Target: The System should have a TTTR of less than 1.5



RPC 2017 Truck Travel Time Reliability Index (TTTR)  
 Target: The System should have a TTTR of less than 1.5

