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**DEPARTMENT OF TRANSPORTATION** **[4910-22-P]**

**Federal Highway Administration**

**23 CFR Part 490**

**[Docket No. FHWA-2013-0054]**

**RIN 2125-AF54**

**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.**

**AGENCY:** Federal Highway Administration (FHWA), Department of Transportation (DOT).

**ACTION:** Notice of proposed rulemaking (NPRM).

**SUMMARY:** This NPRM is the third in a series of three related NPRMs that together establishes a set of performance measures for State departments of transportation (State DOT) and Metropolitan Planning Organizations (MPO) to use as required by Moving Ahead for Progress in the 21st Century Act (MAP-21). The measures proposed in this third NPRM would be used by State DOTs and MPOs to assess the performance of the Interstate and non-Interstate National Highway System (NHS) for the purpose of carrying out the National Highway Performance Program (NHPP); to assess freight movement on the Interstate System; and to assess traffic congestion and on-road mobile source emissions for the purpose of carrying out the Congestion Mitigation and Air Quality Improvement (CMAQ) Program. This third performance measure NPRM also includes a discussion that summarizes all three of the national performance management measures

proposed rules and the comprehensive regulatory impact analysis (RIA) to include all three NPRMs.

**DATES:** Comments must be received on or before [INSERT DATE 90 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]. Late comments will be considered to the extent practicable.

**ADDRESSES:** You may submit comments identified by the docket number FHWA-2013-0020 by any one of the following methods:

Fax: 1-202-493-2251;

Mail: U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue, SE., Washington, DC 20590;

Hand Delivery: U.S. Department of Transportation, Docket Operations, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue, SE., Washington, DC 20590, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays; or

electronically through the Federal eRulemaking Portal: http://www.regulations.gov. Follow the online instructions for submitting comments.

Instructions: All submissions must include the agency name, docket name and docket number or Regulatory Identifier Number (RIN) for this rulemaking (2125-AF54). In accordance with 5 U.S.C. 553(c), DOT solicits comments from the public to better inform its rulemaking process. The DOT posts these comments, without edit, including any personal information the commenter provides, to www.regulations.gov, as described in the system of records notice (DOT/ALL-14 FDMS), which can be reviewed at www.dot.gov/privacy.

Docket: For access to the docket to read background documents or comments received, go to http://www.regulations.gov at any time or to U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue, SE., Washington, DC 20950, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

**FOR FURTHER INFORMATION CONTACT:** For technical information: Francine Shaw Whitson, Office of Infrastructure, (202) 366-8028; for legal information: Anne Christenson, Office of Chief Counsel, (202) 366-0740, Federal Highway Administration, 1200 New Jersey Avenue, SE., Washington, DC 20590. Office hours are from 8:00 a.m. to 4:30 p.m. ET, Monday through Friday, except Federal holidays.

**SUPPLEMENTARY INFORMATION**

The FHWA has published two additional NPRMs to establish the remaining measures required under 23 U.S.C. 150(c). The first performance measure NPRM proposed establishment of measures to carry out the Highway Safety Improvement Program (HSIP) and to assess serious injuries and fatalities, both in number and expressed as a rate, on all public roads. On March 15, 2016, FHWA published a final rule (FR Vol.81 No.50) covering the safety-related elements of the Federal-aid Highway Performance Measures Rulemaking. The second performance measure NPRM proposed establishment of performance measures to assess pavement and bridge conditions on the Interstate System and non-Interstate NHS for the purpose of carrying out the NHPP. This NPRM, the third performance measure NPRM, focuses on measures for the performance of the NHS, freight movement on the Interstate System, and the CMAQ Program.

This last NPRM includes a discussion that summarizes all three of the rulemakings, both finished and underway, that will establish the measures required under 23 U.S.C. 150(c).

**Table of Contents for Supplementary Information**

## I. Executive Summary

a. Purpose of the Regulatory Action

The MAP-21(Pub. L. 112-141) transforms the Federal-aid highway program by establishing new requirements for performance management to ensure the most efficient investment of Federal transportation funds. Performance management increases the accountability and transparency of the Federal-aid highway program and provides for a framework to support improved investment decisionmaking through a focus on performance outcomes for key national transportation goals. As part of performance management, recipients of Federal-aid highway funds would make transportation investments to achieve performance targets that make progress toward the following national goals[1]:

- Congestion reduction. – To achieve a significant reduction in congestion on the NHS.

[1] These areas are listed within 23 U.S.C. 150(c), which requires the Secretary to establish measures to assess performance, condition, or emissions.

- 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.

The purpose of this rulemaking is to implement MAP-21 performance management requirements. Prior to MAP-21, there were no explicit requirements for State DOTs to demonstrate how their transportation program supported national performance outcomes. State DOTs were not required to measure condition/performance, to establish targets, to assess progress toward targets, or to report condition/performance in a nationally consistent manner that FHWA could use to assess the condition/performance of the entire system. Without States reporting on the above mentioned factors, it is difficult for FHWA to look at the effectiveness of the Federal-aid highway program as a means to address surface transportation performance at a national level.

This proposed rule is one of several rulemakings that DOT is or will be conducting to implement MAP-21's new performance management framework. The collective rulemakings will establish the regulations needed to more effectively evaluate

and report on surface transportation performance across the country. This rulemaking proposes regulations that would:

- Provide for greater consistency in the reporting of condition/performance;
- Require the establishment of targets that can be aggregated at the national level;
- Require reporting in a consistent manner on progress achievement; and
- Require State DOTs to make significant progress.

State DOTs would be expected to use the information and data generated as a result of the new regulations to better inform their transportation planning and programming decisionmaking. The new performance aspects of the Federal-aid program that would result from this rulemaking would provide FHWA the ability to better communicate a national performance story and to more reliably assess the impacts of Federal funding investments. The FHWA is in the process of creating a new public Web site to help communicate the national performance story. The Web site will likely include infographics, tables, charts, and descriptions of the performance data that the State DOTs would be reporting to FHWA.

The FHWA is required to establish performance measures through a rulemaking to assess performance in 12 areas[2] generalized as follows: 1) serious injuries per vehicle miles traveled (VMT); 2) fatalities per VMT; 3) number of serious injuries; 4) number of fatalities; 5) pavement condition on the Interstate System; 6) pavement condition on

[2] These areas are listed within 23 U.S.C. 150(c), which requires the Secretary to establish measures to assess performance or condition.

the non-Interstate NHS; 7) bridge condition on the NHS; 8) traffic congestion; 9) on-road mobile source emissions; 10) freight movement on the Interstate System; 11) performance of the Interstate System; and 12) performance of the non-Interstate NHS. This rulemaking is the third of three rulemakings that together, will establish the performance measures for State DOTs and MPOs to use to carry out Federal-aid highway programs and to assess performance in each of these 12 areas.

This rulemaking seeks to establish national measures for areas 8, 9, 10, 11, and 12, in the above list. This NPRM proposes to establish performance measures to assess the performance of the Interstate System and non-Interstate NHS for the purpose of carrying out the NHPP; to assess freight movement on the Interstate System; and to assess traffic congestion and on-road mobile source emissions for the purpose of carrying out the CMAQ program areas. The two proposed measures to assess performance of the Interstate are (1) Percent of the Interstate System providing for Reliable Travel, and (2) Percent of the Interstate System where peak hour travel times meet expectations. The two proposed measures to assess performance of the non-Interstate NHS are (1) Percent of the non-Interstate NHS providing for Reliable Travel and (2) Percent of the non-Interstate NHS where peak hour travel times meet expectations. The two proposed measures to assess freight movement on the Interstate System are (1) Percent of the Interstate System Mileage providing for Reliable Truck Travel Time, and (2) Percent of the Interstate System Mileage Uncongested. The proposed measure to assess traffic congestion is Annual Hours of Excessive Delay per Capita. Lastly, the proposed measure

to assess on-road mobile source emissions is Total Tons of Emissions Reduced from CMAQ Projects for Applicable Criteria Pollutants and Precursors.

In addition, this NPRM builds on the framework of the previous performance rulemakings and the process proposed for State DOTs and MPOs to establish targets for each of the measures; the methodology to determine whether State DOTs have achieved or made significant progress toward their NHPP or National Highway Freight Program (NHFP) targets (targets for national measures areas 5, 6, 7, 10, 11, and 12, in the above list); and the process for State DOTs to use to report on progress toward achieving their targets.

b. Summary of the Major Provisions of the Regulatory Action in Question

The first performance rule established measures to be used by State DOTs to assess performance and to carry out the HSIP; the process for State DOTs and MPOs to use to establish safety targets; the methodology to determine whether State DOTs have achieved their safety targets; and the process for State DOTs to report on progress toward achieving their safety targets. The second performance rule proposed the establishment of performance measures to be use by State DOTs to assess the condition of pavements and bridges and to carry out the NHPP.

With this third rule, FHWA proposes the establishment of: performance measures to be used by State DOTs and MPOs to assess performance of the Interstate System and non-Interstate NHS, traffic congestion, on-road mobile source emissions, and freight movement on the Interstate System; the process for State DOTs and MPOs to use to establish targets; the methodology to determine whether State DOTs have achieved or

made significant progress toward their NHPP and NHFP performance targets; and the process for State DOTs to report on progress toward achieving their targets. This NPRM includes one general information area (Subpart A) that covers definitions, target establishment, reporting on progress, and how determinations would be made on whether State DOTs have achieved or made significant progress toward NHPP and NHFP targets. Subparts E through H propose performance measures in four areas: (1) National Highway Performance Program – Performance of the NHS covered in Subpart E; (2) Freight Movement on the Interstate System, covered in Subpart F; and two measures relating to the CMAQ Program: (3) Traffic Congestion covered in Subpart G, and (4) On-Road Mobile Source Emissions, covered in Subpart H.

The FHWA had proposed in the prior performance management NPRMs to establish one common effective date for its three performance measure final rules. While FHWA recognizes that one common effective date could be easier for State DOTs and MPOs to implement, the process to develop and implement all of the Federal-aid highway performance measures required in MAP-21 has been lengthy. It is taking more than 3 years since the enactment of MAP-21 to issue all three performance measure NPRMs (the first performance management NPRM was published on March 11, 2014; the second NPRM was published on January 5, 2015). Rather than waiting for all three rules to be final before implementing the MAP-21 performance measure requirements, FHWA has decided to phase in the effective dates for the three final rules for these performance measures so that each of the three performance measures rules will have individual effective dates. This allows FHWA and State DOTs to begin implementing

some of the performance requirements much sooner than waiting for the rulemaking process to be complete for all the rules. The FHWA believes that individual implementation dates will also help State DOTs transition to performance based planning.

On March 15, 2016, FHWA published a final rule (FR Vol.81 No.50) covering the safety-related elements of the Federal-aid Highway Performance Measures Rulemaking. With the staggered effective dates, this Rule will be implemented in its entirety before the other two rules are finalized.

Based on the timing of each individual rulemaking, FHWA would provide additional guidance to stakeholders on how to best integrate the new requirements into their existing processes. Under this approach, FHWA expects that even though the implementation for each rule would occur after each final rule is published, implementation for the second and the third performance measure final rules would ultimately be aligned through a common performance period. In the second performance management measure NPRM, FHWA proposed that the first 4-year performance period would start on January 1, 2016. However, FHWA proposes in this NPRM that the first performance period would begin on January 1, 2018. This would align the performance periods and reporting requirements for the proposed measures in the second and third performance management measure NPRMs. The FHWA has placed on the docket a

timeline that illustrates how this transition could be implemented. [3] However, FHWA seeks comment from the public on what an appropriate effective date(s) could be.

*Contents of 23 CFR Part 490*

This NPRM proposes to add to Subpart A general information applicable to all of 23 CFR Part 490. This section includes requirements for data, target establishment, reporting on progress, and how to determine whether State DOTs have made significant progress toward achieving targets (for applicable measures). Subpart A also includes definitions and clarifies terminology associated with target establishment, reporting, and making significant progress for the performance measures specific to this NPRM. Subparts B, C and D were previously published in separate rulemaking documents.

Subpart B covered the proposed measures for the HSIP (RIN 2125-AF49); Subpart C proposed measures to assess pavement conditions on the NHS and the non-Interstate NHS (RIN 2125-AF53); and Subpart D proposed measures to assess bridge conditions on the NHS (RIN 2125-AF53).

Subpart E proposes a travel time reliability measure and a peak hour travel time measure to assess the performance of the Interstate System and non-Interstate NHS. Subpart F establishes a travel time reliability measure and a congestion measure to assess freight movement on the Interstate System. Subpart G proposes an excessive delay measure to assess traffic congestion to carry out the CMAQ program. Subpart H proposes measures that will be used to assess the reduction of the criteria pollutants and applicable precursors to carry out the CMAQ program.

[3] FHWA Sample MAP21 Rule Making Implementation and Reporting Dates

*Summary of 23 CFR Part 490, Subpart A*

In section 490.101, FHWA proposes to add definitions for "attainment area," "criteria pollutant," "Highway Performance Monitoring Systems (HPMS)," "freight bottleneck," "full extent," "mainline highways," "maintenance area," "measure," "metric," "Metropolitan Planning Organization (MPO)," "National Ambient Air Quality Standards (NAAQS)," "National Performance Management Research Data Set (NPMRDS)," "nonattainment area," "non-urbanized area," "reporting segment," "target," "Transportation Management Area (TMA)," "Travel Time Data Set," "Travel Time Reliability," and "Travel Time Segment," which would be applicable to all subparts within Part 490.

In section 490.103, FHWA proposes data requirements that apply to more than one subpart in Part 490. Additional proposed data requirements unique to each subpart are included and discussed in each respective subpart. This section proposes the source of urbanized area boundaries as the most recent U.S. Decennial Census unless FHWA approves adjustments to the urbanized area. These boundaries are to be reported to HPMS. The boundaries in place at the time of the Baseline Performance Report are to apply to an entire performance period. Boundaries for the nonattainment and maintenance areas are proposed to be as designated and reported by the U.S. Environmental Protection Agency (EPA) for any of the criteria pollutants applicable under the CMAQ program. The FHWA is proposing that State DOTs and MPOs use the NPMRDS to calculate the travel time and speed related metrics (a metric means a quantifiable indicator of performance or condition that is used to develop the measures

defined in this rule), unless more detailed and accurate travel time data exists locally and is approved by FHWA for use.

The NPMRDS is a dataset based on actual, observed data collected from probes, such as cell phones, navigation units, and other devices, in vehicles that travel along the NHS roadways. The dataset includes travel time information collected from probes that is available at 5 minute intervals for all segments of the Interstate and NHS where probes were present. The advent of readily available vehicle-based probe travel time data in recent years has led to a transformation in information available to the traveler and the ability for State DOTs and MPOs to develop performance measures based on this data. Because travel time data on the entire NHS is available from actual measurements tied to a date, time, and location on specific roadway segments, measuring the performance of the system, freight movement, and monitoring traffic congestion can be much more accurate, widespread, and detailed. The availability of this data also provides the potential to undertake before and after evaluations of transportation projects and strategies. These data requirements are detailed in proposed section 490.103.

The FHWA is proposing State DOTs and MPOs coordinate to develop reporting segments that would be used as the basis for calculating and reporting metrics to FHWA for the measures proposed in Subparts E, F, and G to assess the performance of the NHS, freight movement on the Interstate System, and traffic congestion. It is proposed that these reporting segments must be submitted to FHWA no later than the November 1 before the beginning of each performance period, and the same segments be used for Subparts E, F, and G for the entire performance period.

In section 490.105, FHWA proposes the minimum requirements that would be followed by State DOTs and MPOs to establish targets for all measures identified in section 490.105(c), which includes proposed measures both in this performance management NPRM and the second performance management NPRM. These requirements are being proposed to implement the 23 U.S.C. 150(d) and 23 U.S.C. 134(h)(2) target establishment provisions to provide for consistency necessary to evaluate and report progress at a State, MPO, and national level, while also providing a degree of flexibility for State DOTs and MPOs.

In section 490.107, FHWA proposes the minimum requirements that would be followed by State DOTs and MPOs in the reporting targets for all proposed measures identified in both this performance management NPRM and the second performance management NPRM.

Section 490.109 proposes the method FHWA would use to determine if State DOTs have achieved or made significant progress toward their NHPP and NHFP targets. Significant progress would be determined by comparing the established target with the measured condition/performance associated with that target. If applicable, State DOTs would have the opportunity to discuss why targets were not achieved or significant progress was not made. For the NHPP and NHFP measures, if FHWA determines that a State DOT fails to make significant progress over each of the biennial performance reporting periods, then the State DOT is required to document in their next biennial performance report, though encouraged to document sooner, the actions they will undertake to achieve their targets.

*Summary of proposed measures for this NPRM (Subparts E – H)*

The NPRM gives details on specific measures, which are proposed to be added to four new Subparts of Part 490 that include:

Subpart E) proposes two types of measures that reflect the *Travel Time Reliability* and *Peak Hour Travel Times* experienced by all traffic;

Subpart F) proposes two measures that reflect the *Travel Time Reliability* and *Congestion* experienced by freight vehicles;

Subpart G) proposes a measure that reflects the amount of *Excessive Delay* experienced by all traffic; and

Subpart H) proposes a measure that reflects the *Emission Reduction* resulting through the delivery of projects.

*Travel Time Reliability* is being proposed to reflect the consistency in expected travel times when using the highway system by comparing the longer trips experienced by users to the amount of time they would normally expect the trip to take. In Subpart E, the NPRM proposes a reliability measure that compares the longer trip travel times to the time normally expected by the typical user of the roadway. The proposal assumes the system to be "reliable" when the longer travel times are no more than 50 percent higher than what would be normally expected by users. For example, the system would be perceived as unreliable when a 40 minute expected trip would take 60 or more minutes. This proposed measure of reliability only reflects the travel times experienced during the times when the system is used the most, which is proposed to be between the hours of

6:00 a.m. to 8:00 p.m. This reliability approach is proposed to establish a measure specific to the Interstate System and the non-Interstate NHS.

Subpart F proposes a reliability measure to reflect the consistency of travel times on the system as experienced by shippers and suppliers. In this case the measure is a comparison of the longest travel times as compared to the time normally expected for the trip to take. The measure considers travel occurring at all hours of the day since this measure is designed to represent the perception of shippers and suppliers. In addition, this proposed freight movement measure is limited to the reliability of the Interstate System. As with all vehicles, the system is considered to be unreliable when the longest trip takes 50 percent more time than what would be normally expected. "Longer" and "Longest" trip travel times are described in more detail in the discussions of Section 490.505 and 490.607.

Also in Subpart E, as a complement to the reliability measure, the NPRM proposes a measure that evaluates the travel times experienced by all traffic during peak hours of the day. In contrast to the reliability measure which focuses on travel time variability, the peak hour measure is designed to measure the travel time during certain peak hours during the day, and how that compares to the desired travel time for that roadway at that time of day. The desired travel time is defined by the State DOT and MPO. It is expected that the desired time would be based on an analysis of how the roadway operates, its design features, any policy considerations, and how it functions within the larger system. As discussed previously, reliability reflects the consistency of trip time durations (e.g., A user makes a trip every morning that consistently takes 30

minutes). The peak hour travel time measure reflects the actual length of the trip compared to the desired travel time for that trip (e.g., Is the 30 minute trip duration too long for the time of day and the design of the roadway?). The peak hour measure reflects the actual travel times occurring on non-holiday weekdays during the morning and afternoon peak hours. The measure is designed to compare the longest trip time occurring during these hours to the amount of time desired to take the trip as perceived by the entities that operate the transportation system. This measurement approach is applied to the Interstate System and the non-Interstate NHS in only the largest urbanized areas in the country (those with a population of 1 million or more). The proposed measure identifies the portions of the system where actual peak hour travel times are no more than 50 percent greater than the desired time to take the trip.

As a complement to the truck reliability measure, in Subpart F the NPRM is proposing a measure that reflects where trucks are experiencing congestion on the Interstate System. This measure identifies the portions of the Interstate System where actual truck travel speeds throughout the year are at least 50 mph. This measure considers use of the system every day throughout the year.

The NPRM includes two proposed measures that would be needed to carry out the CMAQ program. The first is a measure proposed in Subpart G that reflects traffic congestion and the second is a measure proposed in Subpart H that reflects emission reductions through the delivery of CMAQ funded projects.

The proposed traffic congestion measure reflects the total amount of time during the year when highway users have experienced excessive delay. The measure identifies

times during the day when vehicles are travelling at speeds below 35 mph for freeways/expressways or 15 mph for all other NHS roadways. The proposed measure is designed to sum the additional travel times weighted by traffic volumes that occur during these excessive delay conditions throughout the year. Additionally, the measure is proposed to be expressed as a rate calculated by dividing the total excessive delay time by the population in the area.

The proposed emission reduction measure reflects the reductions in particular pollutants resulting from the delivery of CMAQ funded projects. The measure focuses on the total emissions reduced per fiscal year, by all CMAQ-funded projects by criteria pollutant and applicable precursors in nonattainment and maintenance areas.

More specific details on each of these measures, including information on the areas where the measure is applicable, are included in both the Performance Management Measure Analysis Section (Section V) and the Section-by-Section Discussion of the General Information and Proposed Performance Measures Sections (Section VI). In addition, FHWA has developed short fact sheets for each of these measures that will be available on the docket.

c. Incorporating the FAST Act

On December 4, 2015, the President signed the Fixing America's Surface Transportation (FAST) Act (Pub. L.114-94; Dec. 4, 2015) into law. For the most part, the FAST Act is consistent with the performance management elements introduced by MAP-21. For convenience, this NPRM will refer to MAP-21 throughout the preamble to

signify the fundamental changes MAP-21 made to States' authorities and responsibilities for overseeing the implementation of performance management.

For the purposes of this NPRM, the FAST Act made two relevant changes to the performance management requirements. The first is 23 U.S.C. 119(e)(7), which relates to the requirement for a significant progress determination for NHPP targets. The FAST Act amended this provision to remove the term "2 consecutive reports." The FHWA has incorporated this change into this NPRM by removing the term "2 consecutive determinations," which was proposed in section 490.107(b)(3)(ii)(G), as well as 490.109(f) of the second NPRM, published January 5, 2015, at 80 FR 326. In section 490.109(f) of the second NPRM, FHWA stated that if a State DOT does not achieve or make significant progress for its NHS performance targets for two consecutive reporting periods (4-year period), then the State DOT must document in its Biennial Report the actions it will take to achieve the targets. The FAST Act has changed this. As a result, this NPRM proposes to require State DOTs to take action when they do not make significant progress over one reporting period, which looks back over 2 years. With this change, the significant progress determination is still made every 2 years, but it looks back over a 2-year period instead of a 4-year period.

The second change the FAST Act made is the addition of 23 U.S.C. 167(j), which requires FHWA to determine if a State has made significant progress toward meeting the performance targets related to freight movement, established under section 150(d) and requires a description of the actions the State will undertake to achieve the targets if significant progress is not made. To meet the these requirements, FHWA has

incorporated language throughout this NPRM proposing to require the targets established for the measures in section 490.105(c)(6) to be included in the significant progress process and identifying the actions the State DOT will undertake to achieve the targets if significant progress is not made. The FHWA has called these the NHFP targets. The NHPP and NHFP use the same process for assessing significant progress and determining if significant progress is made.

d. Costs and Benefits

The FHWA estimated the incremental costs associated with the new requirements proposed in this regulatory action. The new requirements represent a change to the current practices of State DOTs and MPOs. The FHWA derived the costs of the new requirements by assessing the expected increase in the level of effort from labor for FHWA, State DOTs and MPOs to standardize and update data collection and reporting systems, as well as establish and report targets.

To estimate costs, FHWA multiplied the level of effort, expressed in labor hours, with a corresponding loaded wage rate[4] which varied by the type of laborer needed to perform the activity. Where necessary, capital costs were included as well. Most of these measures rely on the use and availability of NPMRDS data provided by FHWA for use by State DOTs and MPOs. Because there is uncertainty regarding the ongoing funding of NPMRDS by FHWA, FHWA estimated the cost of the proposed rule according to two scenarios. First, assuming that FHWA provides State DOTs and MPOs with the required data from NPMRDS, the 11-year undiscounted incremental costs to

[4] Bureau of Labor Statistics (BLS) Employee Cost Index, 2012.

comply with this rule are $165.3 million (Scenario 1).[5] Alternatively, under "worst case" conditions where State DOTs would be required to independently acquire the necessary data, the 11-year undiscounted incremental costs to comply with this rule are $224.5 million (Scenario 2). The total 11-year undiscounted cost is approximately 36 percent higher under Scenario 2 than under Scenario 1.

The FHWA performed three separate break-even analyses as the primary approach to quantify benefits. The FHWA focused its break-even analyses for (1) enhancing performance of the Interstate System and non-Interstate NHS by relieving congestion, and (2) improving freight movement on the value of travel time savings. The FHWA estimated the number of hours spent in congestion needed to be saved by commuters and truck drivers in order for the benefits of the rule to justify the costs. For each of these break-even analyses, FHWA presents results for both Scenario 1 (FHWA provides access to NPMRDS) and Scenario 2 (State DOTs must independently acquire the necessary data). The FHWA focused the third break-even analysis on reducing emissions. The FHWA estimated the reduction in pollutant tons needed to be achieved in order for the benefits of the rule to justify the costs.

[5] In FHWA's first two performance measure NPRMs, it assessed costs over a 10-year study period. Because FHWA is now proposing individual effective dates for each of its performance measure rules rather than a common effective date, the timing of the full implementation of the measures has shifted. Using an 11-year study period ensures that the cost assessment includes the first 2 performance periods following the effective date of the rulemaking, which is comparable to what the 10-year study period assessed in the first two NPRMs. An 11-year study period captures the first year costs related to preparing and submitting the Initial Performance Report and a complete cycle of the incremental costs that would be incurred by State DOTs and MPOs for assembling and reporting all required measures as a result of the proposed rule. The FHWA anticipates that the recurring costs beyond this timeframe would be comparable to those estimated in the 10-year period of analysis.

The aforementioned benefits are quantified within the analysis, however, there are other qualitative benefits which apply to the proposed rule as a whole that result from more informed decisionmaking on congestion and emissions-reducing project, program, and policy choices. The proposed rule also would yield greater accountability because MAP-21-mandated reporting would increase visibility and transparency of transportation decisionmaking. The data reported to FHWA by the States would be available to the public and would be used to communicate a national performance story. The FHWA is developing a public Web site to share performance related information. In addition, the proposed rule would help focus the Federal-aid highway program on achieving balanced performance outcomes.

The results of the break-even analyses quantified the dollar value of the benefits that the proposed rule must generate to outweigh the cost of the proposed rule. The FHWA believes that the proposed rule would surpass these thresholds and, as a result, the benefits of the rule would outweigh the costs.

Table 1 displays the Office of Management and Budget (OMB) A-4 Accounting Statement as a summary of the cost and benefits calculated for this rule.

## Table 1 OMB A-4 Accounting Statement

| Category | Estimates | | | Units | | | Notes |
|---|---|---|---|---|---|---|---|
| | Primary | Low | High | Year Dollar | Discount Rate | Period Covered | |
| **Benefits** | | | | | | | |
| Annualized Monetized ($millions/year) | None | None | None | NA | 7% | NA | Not Quantified |
| | None | None | None | NA | 3% | NA | |
| Annualized Quantified | None | None | None | NA | 7% | NA | Not Quantified |
| | None | None | None | NA | 3% | NA | |
| Qualitative | More informed decisionmaking on freight-, congestion-, and air quality-related project, program, and policy choices; greater accountability due to mandated reporting, increasing visibility and transparency; enhanced focus of the Federal-aid highway program on achieving balanced performance outcomes. | | | | | | Proposed Rule RIA |
| **Costs** | | | | | | | |
| Annualized Monetized ($millions/year) | Scenario 1: $15,651,062 Scenario 2: $21,194,462 | | | 2012 | 7% | 11 Years | Proposed Rule RIA |
| | Scenario 1: $15,304,231 Scenario 2: $20,760,510 | | | 2012 | 3% | 11 Years | |
| Annualized Quantified | None | None | None | 2012 | 7% | 11 Years | None |
| | None | None | None | 2012 | 3% | 11 Years | |
| Qualitative | | | | | | | |
| **Transfers** | | | | | | | |
| Federal Annualized Monetized | None | None | None | NA | 7% | NA | None |
| | None | None | None | NA | 3% | NA | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ($millions/year) | | | | | | | |
| From/To | From: | | | To: | | | |
| Other Annualized Monetized ($millions/year) | None | None | None | NA | 7% | NA | None |
| | None | None | None | NA | 3% | NA | |
| From/To | From: | | | To: | | | |
| **Effects** | | | | | | | |
| State, Local, and/or Tribal Government | Scenario 1: $15,271,675<br>Scenario 2: $21,189,733 | | | 2012 | 7% | 11 Years | Proposed Rule RIA |
| | Scenario 1: $14,931,176<br>Scenario 2: $20,756,223 | | | 2012 | 3% | 11 Years | |
| Small Business | None | | | NA | NA | NA | None |
| Wages | None | | | | | | |
| Growth | Not Measured | | | | | | |

## II. Acronyms and Abbreviations

| Acronym or Abbreviation | Term |
|---|---|
| AADT | annual average daily traffic |
| AASHTO | American Association of State Highway and Transportation Officials |
| CAA | Clean Air Act |
| CFR | Code of Federal Regulations |
| CMAQ | Congestion Mitigation and Air Quality Improvement Program |
| CO | Carbon monoxide |
| DOT | U.S. Department of Transportation |
| EO | Executive Order |
| EPA | U.S. Environmental Protection Agency |
| FAST Act | Fixing America's Surface Transportation Act |
| FHWA | Federal Highway Administration |
| FPM | Freight Performance Measurement |
| FR | Federal Register |

| Acronym or Abbreviation | Term |
|---|---|
| GHG | Greenhouse gas |
| HPMS | Highway Performance Monitoring System |
| HSIP | Highway Safety Improvement Program |
| HSP | Highway Safety Plan |
| IFR | Interim Final Rule |
| LOTTR | Level of Travel Time Reliability |
| MAP-21 | Moving Ahead for Progress in the 21st Century Act |
| MPH | Miles per hour |
| MPO | Metropolitan Planning Organizations |
| NAAQS | National Ambient Air Quality Standards |
| NCHRP | National Cooperation Highway Research Program |
| NHFP | National Highway Freight Program |
| NHPP | National Highway Performance Program |
| NHS | National Highway System |
| NHTSA | National Highway Traffic Safety Administration |
| NOx | Nitrogen oxide |
| NPMRDS | National Performance Management Research Data Set |
| NPRM | Notice of proposed rulemaking |
| $O_3$ | Ozone |
| OMB | Office of Management and Budget |
| PM | Particulate matter |
| PRA | Paperwork Reduction Act of 1995 |
| RIA | Regulatory Impact Analysis |
| RIN | Regulatory Identification Number |
| SHSP | Strategic Highway Safety Plan |
| SME | Subject matter experts |
| State DOTs | State departments of transportation |
| TMA | Transportation Management Areas |
| TMC | Traffic Message Channel |
| TTI | Texas Transportation Institute |
| U.S.C. | United States Code |
| VMT | Vehicle miles traveled |
| VOC | Volatile organic compound |

## III. Discussion of Stakeholder Engagement and Outreach

This section of the NPRM summarizes DOT's engagement and outreach with the public and with affected stakeholders during the NPRM development process and the

viewpoints they shared with DOT during these consultations. Section III includes three sub-sections:

- Sub-section A provides a general description of the stakeholder consultation process;
- Sub-section B describes the broader public consultation process; and
- Sub-section C summarizes stakeholder viewpoints shared with DOT. This sub-section is organized sequentially around the three major measurement focus areas of this rulemaking, including: 1) system performance and traffic congestion measures, 2) freight movement measures, and 3) on-road mobile source emissions measures.

Stakeholder engagement in developing the NPRMs is required by 23 U.S.C. 150(c) to enable DOT to obtain technical information as well as information on operational and economic impacts from stakeholders and the public. State DOTs, MPOs, transit agencies, and private and non-profit constituents across the country participated in the outreach efforts. A listing of each contact or series of contacts influencing the agency's position can be found in the docket.

## A. Consultation with State Departments of Transportation, Metropolitan Planning Organizations, and Other Stakeholders

In accordance with 23 U.S.C. 150(c)(1), DOT consulted regularly with affected stakeholders (including State DOTs, MPOs, industry groups, advocacy organizations, etc.) to better understand the operational and economic impact of this proposed rule. In general, these consultations included:

- Conducting listening sessions and workshops to clarify stakeholder sentiment and diverse opinions on the interpretation of technical information on the potential economic and operational impacts of implementing 23 U.S.C. 150;
- Conducting listening sessions and workshops to better understand the state-of-the-practice on the economic and operational impacts of implementing various noteworthy practices, emerging technologies, and data reporting, collection, and analysis frameworks;
- Hosting webinars with targeted stakeholder audiences to ask for their viewpoints through a chat pod or conference call;
- Attending meetings with non-DOT subject matter experts, including task forces, advocacy groups, private industry, non-DOT Federal employees, academia, etc., to discuss timelines, priorities, and the most effective methods for implementing 23 U.S.C. 150; and to discuss and collect information on the issues that need to be addressed or the questions that need to be answered in the NPRMs to facilitate efficient implementation.

**B. Broader Public Consultation**

It is DOT's policy to provide for and encourage public participation in the rulemaking process. In addition to the public participation that was coordinated in conjunction with the stakeholder consultation discussed above, DOT provided opportunities for broader public participation. The DOT invited the public to provide technical and economic information to improve the agency's understanding of a subject and the potential impacts of rulemaking. This was done by providing an email address

(performancemeasuresrulemaking@dot.gov) feature on FHWA's MAP-21 Web site to allow the public to provide comments and suggestions about the development of the performance measures and by holding national online dialogues and listening sessions to ask the public to post their ideas on national performance measures, standards, and policies. The DOT also conducted educational outreach to inform the public about transportation-related performance measures and standards, and solicited comments on them.

In accordance with 23 U.S.C. 150(c)(2)(A), FHWA will "provide States, metropolitan planning organizations, and other stakeholders not less than 90 days to comment on any regulation proposed by the Secretary…" During the notice and comment period, FHWA plans to hold public meetings to explain the provisions contained in these NPRMs, including this NPRM. All such meetings will be open to the public. However, all comments regarding the NPRM must be submitted in writing to the rulemaking docket.

**C. Summary of Viewpoints Received**

This section summarizes some of the common themes identified during the stakeholder outreach. It is important to note that some of the stakeholder comments related to more than one topic. In that case, the comments were placed under the theme most directly affected. The three themes include:

- Subparts E and G: Performance Management Measures to Assess Performance of the National Highway System and for Assessing Traffic Congestion.

- Subpart F: National Performance Management Measures to Assess Freight Movement on the Interstate System, and
- Subpart H: National Performance Management Measures for the Congestion Mitigation and Air Quality Improvement Program – On-Road Mobile Source Emissions.

**1. Summary of Viewpoints Received for Subparts E and G: Performance Management Measures to Assess Performance of the National Highway System and for Assessing Traffic Congestion.**

The FHWA separated the stakeholder comments on the performance and congestion measures into four general areas, listed below and the comments are summarized in each of those areas.

- Stakeholders' Viewpoints on Measurement Approaches
- Stakeholders' Viewpoints on Measurement Calculation Methods
- Stakeholders' Viewpoints on Measurement Principles
- Stakeholders' Viewpoints on Measurement Challenges

**a. Stakeholders' Viewpoints on System Performance and Traffic Congestion Measurement Approaches**

Stakeholders provided input to DOT on many different measure approaches for assessing either performance on the Interstate System and non-Interstate NHS for the purpose of carrying out the NHPP or assessing traffic congestion for the purpose of carrying out the CMAQ program. In general, stakeholders' suggested approaches fell within the following categories:

- Speed and Traffic Flow-based Approaches – Some stakeholders suggested continued use of traffic flow-based performance measures already widely in use by transportation agencies. They suggested several variations on traffic flow-based approaches including use of "Level of Service" classifications described in the Transportation Research Board's Highway Capacity Manual, volume to capacity ratios, or actual vehicle speeds relative to free-flow speeds. Some stakeholders noted that data to support these measure approaches is widely available.
- Spatial and Temporal Extent of Congestion-based Approaches – Some stakeholders suggested that the spatial or temporal extent of congestion should be used as the basis for measuring performance. Suggestions included measures of the portion of system segments exceeding acceptable travel times and measures of how traffic and freight in a corridor are balanced across parallel roads and other modes. For a temporal-based measure, stakeholders suggested that this information could be used to help plan strategies for moving traffic from more congested to less congested routes or find the best ways to increase corridor capacity.
- System Throughput Efficiency and Vehicle Occupancy–based Approaches – Some stakeholders suggested throughput or vehicle occupancy-based measures of performance. Variations of throughput and vehicle occupancy measures suggested by stakeholders included the quantity of vehicles, goods, or people per lane hour or vehicle occupancy rates. Stakeholders described "spillover" benefits from improving throughput efficiency or vehicle occupancy including fewer crashes, lower emissions, and lower demand for infrastructure. Some stakeholders, however, noted that access

to or availability of throughput or occupancy data for non-highway modes is a challenge.

- Travel Time-based Approaches – Many stakeholders suggested that travel time should be used as the basis for measuring performance. They offered many variations for characterizing travel time performance including "travel time per person," "travel time per vehicle," "travel delay per person," "travel delay per vehicle," and "percent of commutes less than 30 minutes," as well as use of these metrics to create planning time, travel time, travel slowness, or travel reliability indices. Some stakeholders also noted that travel time-based approaches might be adaptable for use in measuring transit, pedestrian, or bicycle system performance as data collection methods improve in the future. Many stakeholders who indicated support for travel time-based approaches stressed the importance of travel time reliability as a parameter that transportation users value highly. Some stakeholders who favored travel time-based approaches suggested that travel time measures are particularly relevant because travel time generally varies more than travel distance and it can be influenced by State DOTs' and MPOs' operations practices.
- Accessibility and Trip Generation-based Approaches – Many stakeholders indicated a preference for accessibility measures over travel time-based measures as a basis for measuring performance. Several stakeholders indicated a concern that travel time-based measures emphasize mobility and may encourage dispersed land use patterns; whereas accessibility measures would emphasize ease of access to transportation options and consideration of where trips are generated. Stakeholders suggested many

variations for characterizing accessibility or trip generation including "vehicle trip rate per household," "transportation efficiency based on distance," "miles traveled per employee," "vanpool passenger mileage," "number of employment locations reachable during rush hour within the travel time of the average commute," "average home to work commute time," "number of households able to reach businesses during off-peak hours within a reasonable time," or "time required to go from place to place." Some proponents of accessibility measures also suggested these measures may encourage greater consideration of non-auto travel modes like transit, carpooling, vanpooling, walking, and bicycling or options like telecommuting that tend to be more practical on systems with greater accessibility.

**b. Stakeholders' Viewpoints on Measurement Calculation Methods**

Stakeholders provided considerable input to DOT on detailed aspects of measure calculation methods. In general, stakeholders' suggestions fell within the following categories:

- Geographic Focus for Measures – Some stakeholders suggested performance measures should focus only on major corridors or in urbanized areas. They noted that current practice emphasizes corridor-level analysis and that the impact of heavily congested corridors may be masked by system-wide measures that include mostly uncongested system elements. Other stakeholders suggested that measures should focus on optimizing overall system performance rather than facility performance, with "system" being defined to include multimodal facilities as well as highways.

Some stakeholders, however, suggested measures should be geographically scalable so that they can be used either on individual facilities or at a system-wide level.

- Temporal Focus for Measures – Some stakeholders suggested that performance measures should place particular emphasis on peak period travel to maximize productivity of roads during peak periods by minimizing congestion, reducing growth in VMT, and using the most cost-effective methods to move people and goods. Other stakeholders suggested measures should generally be scalable on a temporal basis so they can be evaluated based on variable periods of time, such as individual hours, or grouped into peak periods.
- Travel Time Measurement Options – Stakeholders offered several suggestions for developing effective travel time-based measures:
    - Selection of Travel Time Percentiles for Travel Reliability Index – Some stakeholders suggested that when formulating a travel reliability index, the 85th or 90th percentile travel time should be used rather than the 95th percentile because the highest percentile travel times may be outliers that do not reflect the impacts of day-to-day operations strategies on the system.
    - Use of Travel "Slowness" as an Index – Some stakeholders suggested that reversing the widely used travel time index creates a more understandable metric by expressing congestion in terms of how slowly traffic is moving rather than in terms of how long trips take; they suggested, as an example, that describing a facility or system as operating at two-thirds of its desired

performance (66.6 percent) is more understandable than saying it has a travel time index of 1.50.

- Threshold Times for Travel Indices – Some stakeholders suggested that free flow speed is appropriate to use in calculating travel time-based indices. Other stakeholders indicated that free flow or posted speeds are unrealistic because State DOTs lack resources to achieve free flow conditions across their networks. "Maximum throughput" speed was suggested by some stakeholders as an alternative to free flow speed which they indicated is usually 70 to 85 percent of free flow but varies by facility.
- Travel Time Data Collection – Some stakeholders suggested collecting origin and destination travel time data via techniques such as license plate surveys for vehicles or for other modes by riding bicycle or transit corridors to collect data.

- Methods for Improving Accuracy of Vehicle Occupancy Counts – Some stakeholders who supported vehicle occupancy-based measures suggested use of a combination of technology-based data collection methods for improving the consistency of vehicle occupancy data, such as automated video image processing or in-vehicle technologies like seat belt detectors, and survey or counting techniques, such as manual field counts, home interviews, transit rider counts, census survey questions, or trip generation studies at employment centers. Stakeholders noted that occupancy data collection can be costly and may not need to be comprehensive to provide reasonable estimates.

- Use Census and American Community Survey Data – Some stakeholders suggested U.S. Census data could be used to examine performance, including information on commuting contained in the Census. Other stakeholders also suggested DOT could work with the Census to develop self-monitoring technologies, like Global Positioning Systems (GPS), or to build on the model of the American Community Survey and develop a continuous data collection resource for more detailed commuting information. Some stakeholders suggested developing standardized survey templates for communities to use for their own travel surveys.

**c. Stakeholders' Viewpoints on Measurement Principles**

Stakeholders provided DOT with input on general principles for selecting measures. In general, stakeholders' suggestions fell within the following categories:

- Measures Should be Simple to Understand – Many stakeholders suggested that measures should be simple for the general public to understand, with some further suggesting that travel time-based measures, particularly travel reliability, are well understood by the general public.
- Measures Should Rely on Readily Available Data – Some stakeholders suggested that measures should not include burdensome data collection requirements and that data collection and analysis requirements should be flexible and relevant to community needs. Some stakeholders noted that investment is needed in resources such as analysis tools and reporting mechanisms and guidance to make performance measures meaningful and useful.

- Measures Should Reflect MAP-21 National Goals – Some stakeholders suggested that DOT should select a set of measures that reflect MAP-21 national goals that benefit from reducing congestion while providing safer, more sustainable transportation systems that increase accessibility.
- States Should be Allowed to Select Measures/Avoid "One-Size-Fits-All" Measures – Some stakeholders suggested that selection of measures should be at the discretion of the State DOT or MPO, with Federal requirements focusing on monitoring and reporting of States' measures. It was also suggested that performance measures should not follow a "one-size-fits-all" approach and should allow for flexibility. Stakeholders noted that agencies have many options for improving traffic conditions, not only by adding capacity, but also by improving operations or reducing travel demand, and agencies' choices will depend on unique constraints determined by available funding, physical geography, and regional priorities. Stakeholders suggested that FHWA should allow agencies to tell their "story" via customized measures that reflect the unique strategies they use to manage congestion. Other stakeholders suggested that differences in data availability from place to place will preclude standardization and reasoned that FHWA should allow variation in measures because this will ensure agencies begin to assess performance.
- Ensure Standardization of Measures – Some stakeholders suggested that although allowing use of different measures is appealing because it gives flexibility to States, it will also make national-level analysis difficult. Based on this reasoning, these stakeholders concluded that measures should be standardized.

- Avoid Measures that Cause Policy Bias – Some stakeholders suggested that the choice of measures (e.g., per vehicle mile or per capita) will influence how communities prioritize projects. For example, these stakeholders explained that policy decisions may be different if the measure is based on per vehicle mile crashes or per capita crashes because reporting changes in crashes per vehicle mile fails to reflect reductions in total vehicle mileage.
- Measures Should Capture Wider Impacts – Some stakeholders suggested that performance metrics should capture the effects of transportation investments on economic growth, efficient land use, environment, and community quality of life, and should support development of wider choices for solving congestion.
- Measures for Individual Modes – Some stakeholders suggested metrics should measure performance across transportation modes as a way to encourage development of multimodal transportation solutions. Other stakeholders expressed interest in measures that allow direct comparison of the benefits and costs of all modes (e.g., transit, transportation demand management, road construction, system management). Stakeholders noted that if such metrics were pursued, they should consider the full extent of externalities in the calculation of costs. In particular, some stakeholders suggested that travel time-based measures should take into account all parts of a trip (walking, parking, driving, transit, etc.) to reflect overall transportation network performance.
- Measures Should Establish Minimum Acceptable Performance Levels – Some stakeholders suggested that performance measures should help transportation

agencies identify where corridors fall below minimum performance levels and help communities identify alternatives that allow them to reach that minimum performance level.

- Distinguish between Congestion and Reliability – Some stakeholders noted a distinction between recurrent congestion and travel time reliability, noting that agencies typically have limited control over recurrent congestion that is caused by physical capacity constraints. On the other hand, stakeholders explained that reliability can be influenced by efficient management of non-recurring incidents. A focus on reliability, according to these stakeholders, would give agencies credit for operational improvements that may improve travel time reliability but do not necessarily increase capacity.

**d. Stakeholders' Viewpoints on Measurement Challenges**

Stakeholders provided DOT with input on perceived measurement challenges. In general, stakeholders' suggestions fell within the following categories:

- Travel Time-based Measures do not Capture System Accessibility Benefits – Some stakeholders expressed concern that reliance on travel time-based measures alone may penalize densely developed communities that offer high levels of accessibility but not necessarily shorter travel times.
- Measures Should Recognize that Reducing Congestion is Impractical in Some Regions – Some stakeholders suggested that measures should acknowledge that, in fast growing areas, the rate of congestion growth can only be slowed down, not reversed.

- Some Measures May Favor Adding Road Capacity over Non-Auto Solutions to Congestion – Some stakeholders expressed concerns about measure approaches they think are more likely to encourage road capacity additions that generate sprawl and are expensive to maintain, versus alternative solutions such as transit, carpools, bicycling, telework, or shifting work hours. Measurement approaches for which this concern was raised included measures that emphasize travel time per mile or vehicle speeds. Other stakeholders suggested that land use is a stronger influence on decisions to add road capacity than travel time or vehicle speeds.
- Target Setting for Congestion is Premature – Some stakeholders suggested that system (congestion) performance measurement is one of the least mature and least robust measurement areas in transportation and that developing consistent data sets and understanding the patterns, causes, and trends in congestion is more important than establishing targets. Stakeholders suggested that a set of realistic performance targets should be determined locally (State and region) only after trend data and explanatory variables have been collected, analyzed, and made available for multiple years, thus creating a transition period or phased implementation of congestion related MAP-21 performance measurements.
- System-wide Measures do not Support Project-Level Decisionmaking – Some stakeholders expressed concern that national-level measures of performance are not sufficient to guide specific investments because they are not sensitive enough to capture the results of specific strategies and projects.

## 2. Summary of Viewpoints Received for Subpart F: National Performance Management Measures to Assess Freight Movement on the Interstate System

Freight movement is multidimensional and includes a variety of public and private stakeholders with unique perspectives. In addition to the public participation and stakeholder consultation described in Section III.A., of this NPRM, DOT held listening sessions with representatives of the freight stakeholder community from the private and public sectors. Outreach to stakeholders through these sessions provided valuable information for FHWA to consider in developing the proposed measures. The major themes collected from each session and relevant academic research are detailed below.

**Freight Roundtable**

The FHWA held a Freight Roundtable event that brought together membership of the Freight Policy Council, a group of the executive leadership in each operating administration at DOT, with multimodal industrial representatives and State and local leaders. Discussion was focused on freight planning and performance measurement. Panelists representing the freight community provided insights into both planning and measurement practices, issues, needs, and opportunities. Major themes of the subsequent discussion focused on multimodal measurements including reliability, trip time, access, safety, accident recovery, and economic measures. Predominant measure suggestions included reliability and travel time, which were described by a majority of attendees as the most valuable to the freight system user in the movement of goods.

**State-Level Stakeholders**

The FHWA held a listening session for State-level stakeholder organizations as these organizations have followed MAP-21's development and DOT's implementation activities and will have responsibility for reporting on the measures. These State-level stakeholders have advocated transportation-related policies and developed a significant amount of transportation research and findings that have contributed to the performance measure discussions surrounding MAP-21 implementation. Their suggestions included measures such as travel time, reliability, and bottleneck identification. Specifically, participants described travel time, reliability and speed as important to understand economic efficiency. Concern was expressed regarding data collection, cost, and burden to the States. Additionally, participants noted concern about external factors that are harder to measure or consider, as well as a lack of control over measures for safety or economics, where States do not want to be evaluated because they have little control in how to influence the measure. There was some discussion on targets and thresholds, noting that measuring speed and travel time against posted speed would be challenging due to regulators on trucks that limit speed, and variations in external factors would need to be considered by States in setting targets.

In addition to the listening session, the American Association of State Highway and Transportation Officials (AASHTO) performed a comprehensive analysis of the MAP-21 provisions and wrote a letter that contained recommendations approved by their membership for the MAP-21 Performance Measure Rulemaking. Other stakeholders and individuals provided recommendations as well. These letters are all posted on the docket

for review. For freight movement on the Interstate, these recommendations included the following:

- National level performance measures may not be the same performance measures State DOTs would use for planning and programming of transportation projects and funding.
- National level performance measures should be specific, measurable, attainable, realistic, timely, and simple.
- National level performance measures should focus on areas and assets where State DOTs have control.
- The initial set of national-level performance measures should build upon existing performance measures, management practices, data sets, and reporting processes.
- National level measures should be forward thinking to allow continued improvement over time.
- Messaging the impact and meaning of the national-level measures to the public and other audiences is vital to the success of this initiative.
- Flexibility in target setting to allow States to set their own thresholds and targets.

**Metropolitan Planning Organizations and Other Regional Organizations**

Like State-level stakeholders, MPO and regional organization freight representatives provided input in the MAP-21 outreach process for freight movement on the Interstate performance measures. In a listening session held with these representatives, key themes were consideration of hours of service for truck operators, economic efficiency, job creation measures, environmental measures, congestion, travel

speed, and reliability. These stakeholders also identified information from shippers as necessary for interpreting the user perspective. Representatives supported travel time and reliability as most critical for measurement and indicated that these measures were most important for businesses in their regions.

Additional regional organization stakeholders, representing both urban and rural areas, further called for consistency in the adoption of measures that could best describe the freight system while considering differences in mode, geography, locations of freight facilities, and practices. Additional concerns were related to how to adapt freight performance measures to current measures that may not provide the correct picture of freight movement even though they are good measures for passenger transport or some other function. Finally, representatives supported measures that identified reliability and the refinement and use of data for measuring reliability on freight corridors.

**Trucking Industry and Freight Business Stakeholders**

The FHWA held listening sessions with stakeholders representing a subset of the freight industry, primarily trucking, whose performance would be measured as part of this rule. These stakeholders represent various parts of the flow of goods from origin to destination and depend on the freight system for on-time deliveries of goods. More specifically, these stakeholders include professional truckers such as corporate drivers, owner-operators, and retired truckers, representatives of trucking companies, shippers, and related businesses.

The main comments received from these stakeholders related to truck parking, highway average speeds, bottlenecks, safety, oversize and overweight inconsistencies,

tolls, and delay. Average speed was important to stakeholders because it provided drivers and industrial planners with the information they needed to plan routes and delivery schedules. Stakeholders identified reliability as important because it provides the driver with the flexibility to plan routes and deliveries by knowing what to expect at what time. One participant noted that it is very difficult for a driver to say that average speed is more important than travel time or reliability - this depends on time of day or where the driver needs to go. The participant gave examples where he could drive in and out of a metropolitan area without issue at one time of day but have significant delays at other times. Time of day and other external factors were said to be important when measuring performance.

Some shipper and business owner comments, as well as those of their own drivers, suggested that performance measures for freight include safety, travel time, hours of service, trends of delay, speeds, and connections to other modes or access. They said time was critical because travel times are useful in planning deliveries. Further, measuring trends of delay could help identify better opportunities for route plans. These stakeholders noted that bottlenecks, speed, and travel time information were important to measure and further, identified speed as a useful measure for determining bottlenecks.

In April 2013, FHWA sought clarification from stakeholders on comments made during the listening sessions, specifically on measure thresholds and target setting. In subsequent outreach, the American Trucking Association, the Owner-Operator Independent Drivers Association, and AASHTO primarily reiterated previous comments that, in developing the measure, FHWA should balance the public and private perspective

by providing flexibility to States for assessing freight movement and developing a measure that would be useful to the freight industry.

### a. Stakeholders' Viewpoints on Measurement Approaches

Freight stakeholders provided diverse perspectives on approaches for assessing freight movement on the Interstate System including the use of measures based on accessibility, delay, speed, safety, parking availability, bottleneck identification, accident recovery, consistency in oversize/overweight vehicle practices, tolling practices, hours-of-service for truck operators, environmental impacts, and economic impacts. A common theme was the importance of speed, reliability, and travel time measures to freight system users because they can use this information to plan freight movements.

### b. Stakeholders' Viewpoints on Measurement Challenges

Stakeholders provided input to DOT on the following perceived measurement challenges:

- Avoid Additional Burden for Agencies – Stakeholders expressed concern regarding the cost and burden to the States of freight data collection.
- Lack of Control Over Performance Outcomes – Some stakeholders noted concern about measuring and influencing external factors, such as safety and economic impacts, where agencies have little control over measure results.
- Freight Measures are not the same as Broader System Performance Measures – Some stakeholders expressed concern that broad system-level measures of performance may not adequately represent freight conditions.

### c. Stakeholders' Viewpoints on Measurement Methods

Stakeholders provided input to DOT on detailed aspects of measure calculation methods. In general, stakeholders' suggestions fell within the following categories:

- Use of "Posted Speed" in Performance Measures – Some stakeholders noted that posted speed is not a satisfactory baseline for performance measures because of the use of embedded governors or speed control devices companies install on trucks that limit speed and variations in other external factors.
- Reliability Thresholds – Stakeholders supported the use of a reliability measure as it is universally used and understood among transportation agencies and freight representatives. Reliability is often measured in the form of an index such as a Planning Time Index or Buffer Index, which both express a ratio of the worst travel time compared to a free flow, normal day, or average travel time. Freight stakeholders supported the numerator of a measurement index to be defined as the $95^{th}$ percentile because it represents the higher degree of certainty for on-time arrival that freight stakeholders use in their route planning and deliveries. Understanding the gap between normal travel time and the $95^{th}$ percentile will help to work toward operational and capital strategies that will improve reliability. Improving freight reliability is critical for freight stakeholders as it lessens transportation costs associated with delay. Travel times above a $95^{th}$ percentile are usually attributed to unique and outlying circumstances, such as a major accident or event that significantly shuts down the roadway.
- Measure Definitions – Stakeholders mentioned research by the National Cooperation Highway Research Program (NCHRP), including NCHRP Report 20-24 (37)G

Technical Guidance for Deploying National Level Performance Measures, that defines "average speed" as the average speed of trucks over a 24-hour period and "Reliability" as the ratio of the 95th percentile travel time to mean segment travel time.

**d. Stakeholders' Viewpoints on Measurement Principles**

Stakeholders provided DOT with some general principles for selecting measures. In general, stakeholders' suggestions fell within the following categories:

- Flexibility in Measurement Approaches – Some stakeholders suggested that national requirements for performance measurement should be flexible enough to allow for variation in regional and State geographic characteristics and modal options.
- National Measures May Not Match State DOT's Measures – National-level performance measures may not be the same performance measures State DOTs would use for planning and programming of transportation projects and funding.
- Measures Should Address Issues that State DOTs Control – National-level performance measures should focus on areas and assets where State DOTs have control.
- Measures Should Build on Past Experience – Stakeholders emphasized that the initial set of national-level performance measures should build upon existing performance measures, management practices, data sets, and reporting processes.
- Measures Should Allow Improvement Over Time – Stakeholders suggested that national-level measures should be forward thinking to allow continued improvement over time.

- Measures Should be Accompanied by Communication – Stakeholders suggested that messaging the impact and meaning of the national-level measures to the public and other audiences is vital to the success of this initiative.
- Flexibility in Target Setting – Stakeholders suggested that there should be flexibility in target setting to allow States to establish their own thresholds and targets.
- Specificity, Simplicity, and other General Characteristics – Stakeholders advocated for specific, measurable, attainable, realistic, and timely national level performance measures. Additionally, stakeholders advocated for simplicity, arguing that measures should be simple and easy to understand.

**3. Summary of Viewpoints Received for Subpart H: National Performance Management Measures for the Congestion Mitigation and Air Quality Improvement Program – On-Road Mobile Source Emissions**

Stakeholders provided DOT with input on data collection and reporting related to on-road mobile source emissions. Suggestions generally fell in the following categories:

- Consistency with Current CMAQ Reporting Requirements and Practices – Some stakeholders suggested that on-road mobile source emissions measures should be consistent with current CMAQ program reporting requirements and practices because quantification of CMAQ project-related emissions reductions is already required under 23 U.S.C. 149. Stakeholders emphasized that any new performance data and reporting should be consistent with and build upon current practice.
- Avoid Imposing Burdens on Areas in Attainment – Some stakeholders suggested new measures should not burden those parts of the country with monitoring when none is

required by the Clean Air Act (CAA). It was noted that States without nonattainment areas are exempt from the burden of developing sophisticated emissions analysis tools and should not be required to do so going forward.

- Geographic Applicability of Reporting – Some stakeholders suggested that emissions reporting should be limited solely to large urbanized areas where air quality planning efforts are focused and most CMAQ funding is directed. Other stakeholders suggested reporting also should include small urban areas.
- Emissions Reporting Methods – Stakeholders suggested various analytic and empirical methods for performance measurement:
    - Consistency with EPA or California Emissions Models – Performance measures should be consistent with emissions modeling tools developed by EPA (Motor Vehicle Emission Simulator - MOVES)[6] and the California Air Resources Board (EMFAC).[7]
    - Applicability of EPA-recommended Sustainable Transportation Measures – The EPA's "Guide to Sustainable Transportation Performance Measures" is a helpful resource for developing on-road mobile source emission reporting approaches.



[6] Motor Vehicle Emission Simulator – MOVES: http://www.epa.gov/otaq/models/moves/index.htm
[7] California Air Resources Board (EMFAC): http://www.arb.ca.gov/msei/categories.htm#onroad_motor_vehicles

- Applicability of Envision Tomorrow ArcGIS Tool – Envision Tomorrow,[8] which is an extension for ArcGIS, could be a helpful tool for creating land-use scenarios and assessing their environmental and other impacts.
- Region-specific Fleet Information – MPOs may wish to consider using region specific fleet mix information when calculating emissions.

- Agency Emissions Data Capabilities – Some stakeholders cautioned that State DOTs and MPOs vary in their capabilities to collect, replicate, and report data on an annual basis.
- Emissions Reporting should Include Greenhouse Gases – It was suggested that greenhouse gas (GHG) emissions be tracked since GHGs are correlated with fuel use and air toxins.

**IV. Rulemaking authority and background**

The cornerstone of MAP-21's Federal-aid highway program transformation is the transition to a performance and outcome-based program. As part of this transformation, and for the first time, recipients of Federal-aid highway funds make transportation investments to achieve individual targets that collectively make progress toward national goals.

The MAP-21 provisions that focus on the achievement of performance outcomes are contained in a number of sections of the law that are administered by different DOT agencies. Consequently, these provisions require an implementation approach that includes a number of separate but related rulemakings, some from other modes within

[8]Envision Tomorrow: http://www.envisiontomorrow.org/about-envision-tomorrow/

DOT. A summary of the rulemakings related to this proposed rule is provided in this section and additional information regarding all related implementation actions is available on the FHWA Web site.[9]

**A. Summary of Related Rulemakings**

The DOT's proposal regarding MAP-21's performance requirements will be presented through several rulemakings. As a brief summary, these rulemaking actions are listed below and should be referenced for a complete picture of performance management implementation. The summary below describes the main provisions that DOT plans to propose for each rulemaking. The DOT has sought or plans to seek comment on each of these rulemakings.

1. First Federal-aid Highway Performance Measure Rule (FR Vol.81 No.50)[10], focused on highway safety
    a. Propose and define national measures for the HSIP
    b. State and MPO target establishment requirements for the Federal-aid highway program
    c. Determination of significant progress toward the achievement of targets
    d. Performance progress reporting requirements and timing
    e. Discuss how FHWA intends to implement MAP-21 performance-related provisions.

[9] http://www.fhwa.dot.gov/map21/qandas/qapm.cfm
[10] National Performance Management Measures; Highway Safety Improvement Program, 81 FR 13882(Published on March 15, 2016) (codified at 23 CFR Part 490).

2. Second Federal-aid Highway Performance Measure Rule (RIN: 2125-AF53)[11], focused on highway asset conditions.
    a. Propose and define national measures for the condition of NHS pavements and bridges
    b. State and MPO target establishment requirements for the Federal-aid highway program
    c. Determination of significant progress toward the achievement of targets for NHPP
    d. Performance progress reporting requirements and timing
    e. Minimum standards for Interstate System pavement conditions.
3. Third Federal-aid Highway Performance Measure Rule, focused on assessing performance of the NHS, freight movement on the Interstate System, and CMAQ (this NPRM)
    a. Propose and define national measures for the remaining areas under 23 U.S.C. 150(c) that require measures and are not discussed under the first and second measure rules, which includes the following: National Performance Measures for Performance of the Interstate System and non-Interstate National Highway System; CMAQ – Traffic Congestion; CMAQ – On-Road Mobile Source Emissions; and Freight Movement on the Interstate System

[11] National Performance Management Measures Assessing Pavement Condition for the National Highway Performance Program and Bridge Condition for the National Highway Performance Program, 80 FR 325 (proposed January 5, 2015) (to be codified at 23 CFR Part 490).

b. State and MPO target establishment requirements for the Federal-aid highway program

c. Performance progress reporting requirements and timing

d. Determination of significant progress toward the achievement of targets for NHFP as well as the NHPP

e. Provide a summary of all three performance measures rules (Table 2 below lists all proposed measures and the entire Part 490 is in the docket)

**Table 2 – Summary of Rulemakings to Implement the National Performance Management Measure Rules**

| Rulemaking | 23 CFR Part 490 Section | Proposed Performance Measure | Measure Applicability |
|---|---|---|---|
| **Safety PM Final Rule** | 490.207(a)(1) | Number of fatalities | All public roads |
| **Safety PM Final Rule** | 490.207(a)(2) | Rate of fatalities | All public roads |
| **Safety PM Final Rule** | 490.207(a)(3) | Number of serious injuries | All public roads |
| **Safety PM Final Rule** | 490.207(a)(4) | Rate of serious injuries | All public roads |
| **Safety PM Final Rule** | 490.207(a)(5) | Number of non-motorized fatalities and non-motorized serious injuries | All public roads |
| **Infrastructure PM NPRM** | 490.307(a) | Percentage of pavements of the Interstate System in Good condition | The Interstate System |
| **Infrastructure PM NPRM** | 490.307(a)(2) | Percentage of pavements of the Interstate System in in Poor condition | The Interstate System |
| **Infrastructure PM NPRM** | 490.307(a)(3) | Percentage of pavements of the non-Interstate NHS in Good condition | The non-Interstate NHS |

| Rulemaking | 23 CFR Part 490 Section | Proposed Performance Measure | Measure Applicability |
|---|---|---|---|
| **Infrastructure PM NPRM** | 490.307(a)(4) | Percentage of pavements of the non-Interstate NHS in Poor condition | The non-Interstate NHS |
| **Infrastructure PM NPRM** | 490.407(c)(1) | Percentage of NHS bridges classified as in Good condition | NHS |
| **Infrastructure PM NPRM** | 490.407(c)(2) | Percentage of NHS bridges classified as in Poor condition | NHS |
| **System Performance PM NPRM** | 490.507(a)(1) | Percent of the Interstate System providing for Reliable Travel | The Interstate System |
| **System Performance PM NPRM** | 490.507(a)(2) | Percent of the non-Interstate NHS providing for Reliable Travel | The non-Interstate NHS |
| **System Performance PM NPRM** | 490.507(b)(1) | Percent of the Interstate System where peak hour travel times meet expectations | The Interstate System in urbanized areas with a population over 1 million |
| **System Performance PM NPRM** | 490.507(b)(2) | Percent of the non-Interstate NHS where peak hour travel times meet expectations | The non-Interstate NHS in urbanized areas with a population over 1 million |
| **System Performance PM NPRM** | 490.607(a) | Percent of the Interstate System Mileage providing for Reliable Truck Travel Time | The Interstate System |
| **System Performance PM NPRM** | 490.607(b) | Percent of the Interstate System Mileage Uncongested | The Interstate System |
| **System Performance PM NPRM: CMAQ – traffic congestion** | 490.707 | Annual Hours of Excessive Delay Per Capita | The NHS in urbanized areas with a population over 1 million in nonattainment or maintenance for any of the criteria pollutants under the CMAQ program |

| Rulemaking | 23 CFR Part 490 Section | Proposed Performance Measure | Measure Applicability |
|---|---|---|---|
| **System Performance PM NPRM: CMAQ – On-road mobile source emissions** | 490.807 | Total tons of emissions reduced from CMAQ projects for applicable criteria pollutants and precursors | Projects financed with CMAQ funds in all nonattainment and maintenance areas for one or more of the criteria pollutants under the CMAQ program |

4. Update to the Metropolitan and Statewide Planning Regulations (RIN: 2125-AF52)[12]
    a. Supporting national goals in the scope of the planning process
    b. Coordination between States, MPOs, and public transportation providers in selecting FHWA and public transportation performance targets
    c. Integration of elements of other performance-based plans into the metropolitan and statewide planning process
    d. Discussion in Metropolitan and Statewide Transportation Improvement Programs section documenting how the programs are designed to achieve targets
    e. New performance reporting requirements in the Metropolitan transportation plan.
5. Updates to the Highway Safety Improvement Program Regulations (FR Vol.81 No.50)[13]

[12] Statewide and Nonmetropolitan Transportation Planning; Metropolitan Transportation Planning, 79 FR 31784 (proposed June 2, 2014) (to be codified at 23 CFR Part 450).

a. Integration of performance measures and targets into the HSIP

b. Strategic Highway Safety Plan (SHSP) updates

c. Establishment of Model Inventory of Roadway Element Fundamental Data Elements

d. HSIP reporting requirements.

6. Federal-aid Highway Asset Management Plan Rule (RIN: 2125-AF57)[14]

a. Contents of asset management plan

b. Certification of process to develop plan

c. Transition period to develop plan

d. Minimum standards for pavement and bridge management systems.

7. Transit State of Good Repair Rule (RIN: 2132-AB20)[15]

a. Define state of good repair and establish measures

b. Transit asset management plan content and reporting requirements

c. Target establishment requirements for public transportation agencies and MPOs.

8. Transit Safety Plan Rule (RIN: 2132-AB20)[16]

a. Define transit safety standards

b. Transit safety plan content and reporting requirements.

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[13] Highway Safety Improvement Program, 81 FR 13722 (published on March 15, 2016).
[14] Asset Management Plan, 80 FR 9231 (proposed on February, 20, 2015)(to be codified at 23 CFR Part 515).
[15] The FTA published their Advance Notice of Proposed Rulemaking (ANPRM) that incorporated items 7 and 8, on October 3, 2013. This ANPRM may be found at: http://www.gpo.gov/fdsys/pkg/FR-2013-10-03/pdf/2013-23921.pdf
[16] Ibid

9. Highway Safety Grant Programs Rule (National Highway Traffic Safety Administration (NHTSA) Interim Final Rule[17] (IFR), RIN: 2127-AL30, 2127-AL29)
    a. Highway Safety Plan (HSP) contents, including establishment of performance measures, targets, and reporting requirements
    b. Review and approval of HSPs.

## B. Organization of MAP-21 Performance-Related Provisions

The FHWA organized the many performance-related provisions within MAP-21 into six elements as defined below:

- **National Goals** – Goals or program purpose established in MAP-21 to focus the Federal-aid highway program on specific areas of performance.
- **Measures** – Establishment of measures by FHWA to assess performance and condition in order to carry out performance-based Federal-aid highway programs.
- **Targets** – Establishment of targets by recipients of Federal-aid highway funding for each of the measures to document expectations of future performance.
- **Plans** – Development of strategic and/or tactical plans by recipients of Federal-aid highway funding to identify strategies and investments that will address performance needs.

[17] 23 U.S.C. 402(k); Uniform Procedures for State Highway Grant Programs, Interim Final Rule, 78 FR 4986 (Jan. 23, 2013) (to be codified at 23 CFR Part 1200).

- **Reports** – Development of reports by recipients of Federal funding that would document progress toward the achievement of targets, including the effectiveness of Federal-aid highway investments.
- **Accountability** – Requirements developed by FHWA for recipients of Federal funding to use to achieve or make significant progress for targets established for performance.

The following provides a summary of MAP-21 provisions, as they relate to the six elements listed above, including a reference to other related rulemakings that should be considered for a more comprehensive view of MAP-21 performance management implementation.

**1. National Goals**

The MAP-21 sec. 1203 establishes national goals to focus the Federal-aid highway program. The following national goals are codified at 23 U.S.C. 150(b):

- Safety – To achieve a significant reduction in traffic fatalities and serious injuries on all public roads, including non-State owned public roads and roads on tribal lands.
- Infrastructure condition – To maintain the highway infrastructure asset system in a state of good repair.
- Congestion reduction – To achieve a significant reduction in congestion on the 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 practices.

These national goals will largely be supported through the metropolitan and statewide planning process, which is discussed under a separate rulemaking (RIN: 2125-AF52) to update the Metropolitan and Statewide Planning Regulations at 23 CFR part 450.

**2. Measures**

The MAP-21 requires the establishment of performance measures, in consultation with State DOTs, MPOs, and other stakeholders, that would do the following:

- carry out the NHPP and assess the condition of pavements on the Interstate System and the NHS (excluding the Interstate System), the condition of bridges on the NHS, and performance of the Interstate System and NHS (excluding the Interstate System);

- carry out the HSIP and assess serious injuries and fatalities per VMT and the number of serious injuries and fatalities;
- carry out the CMAQ program and assess traffic congestion and on-road mobile source emissions; and
- assess freight movement on the Interstate System.

The MAP-21 also requires the Secretary to establish the data elements necessary to collect and maintain standardized data to carry out a performance-based approach.[18]

The FHWA proposed to issue three rulemakings in sequence to implement the measures for the areas listed above. The first rulemaking, issued as a NPRM on March 11, 2014 and published as a final rule on March 15, 2016, focused on the performance measures, for the purpose of carrying out the HSIP, to assess the number of serious injuries and fatalities and serious injuries and fatalities per VMT. The second NPRM focused on the measures to assess the condition of pavements and bridges, and this third NPRM proposes measures for the remaining areas under 23 U.S.C. 150(c).

The FHWA had proposed in the prior performance management NPRMs to establish one common effective date for its three performance measure final rules. While FHWA recognizes that one common effective date could be easier for State DOTs and MPOs to implement, the process to develop and implement all of the Federal-aid highway performance measures required in MAP-21 has been lengthy. It is taking more than 3 years since the enactment of MAP-21 to issue all three performance measure

[18] 23 U.S.C. 150(c)(1)

NPRMs (the first performance management NPRM was published on March 11, 2014; the second NPRM was published on January 5, 2015). Rather than waiting for all three rules to be final before implementing the MAP-21 performance measure requirements, FHWA has decided to phase in the effective dates for the three final rules for these performance measures so that each of the three performance measures rules will have individual effective dates. This allows FHWA and State DOTs to begin implementing some of the performance requirements much sooner than waiting for the rulemaking process to be complete for all the rules. The FHWA believes that individual implementation dates will also help State DOTs transition to performance based planning.

On March 15, 2016, FHWA published a final rule (FR Vol.81 No.50) covering the safety-related elements of the Federal-aid Highway Performance Measures Rulemaking. With the staggered effective dates, the Rule will be implemented in its entirety before the other two rules are finalized.

Based on the timing of each individual rulemaking, FHWA would provide additional guidance to stakeholders on how to best integrate the new requirements into their existing processes. Under this approach, FHWA expects that even though the implementation for each rule would occur as each final rule is published, implementation for the second rule would ultimately be aligned with the third rule through a common performance period. In the second performance management measure NPRM, FHWA proposed that the first 4-year performance period would start on January 1, 2016. However, FHWA proposes in this NPRM that the first performance period would begin

on January 1, 2018. This would align the performance periods and reporting requirements for the proposed measures in the second and third performance management measure NPRMs. The FHWA has placed on the docket a timeline that illustrates how this transition could be implemented. However, FHWA seeks comment from the public on what an appropriate effective date(s) could be. Additional information on the approach to establish performance measures for the Federal-aid highway program can be found on FHWA's Transportation Performance Management Web site.[19]

The MAP-21 also requires FHWA to establish minimum levels for the condition of pavements for the Interstate System necessary to carry out the NHPP, which was proposed in the second rulemaking.[20] In addition, MAP-21 also requires FHWA to establish minimum standards for State DOTs to use in developing and operating bridge and pavement management systems, which FHWA proposed in a separate rulemaking to establish an Asset Management Plan (RIN 2125-AF57) for the NHS.[21]

Separate sections of MAP-21 require the establishment of additional measures to assess public transportation performance.[22] These measures, which would be used to monitor the state of good repair of transit facilities and to establish transit safety criteria, would be addressed in two separate rulemakings led by Federal Transit Administration (FTA).

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[19] http://www.fhwa.dot.gov/tpm/about/schedule.cfm
[20] 23 U.S.C. 150(c)(3)(A)(iii)
[21] 23 U.S.C. 150(c)(3)(A)(i)
[22] 49 U.S.C. 5326 and 49 U.S.C. 5329

In regard to the Federal Lands Transportation Program, FHWA anticipates working with eligible Federal entities to establish performance measures.

### 3. Targets

The MAP-21 requires State DOTs to establish performance targets reflecting measures established for the Federal-aid highway program[23] and requires MPOs to establish performance targets for these measures where applicable.[24] The first NPRM proposed the process for State DOTs and MPOs to follow in the establishment of safety performance targets, and was published as a final rule on March 15, 2016. The second NPRM and the third Federal-aid highway measure NPRM discusses similar target establishment requirements for State DOTs and MPOs as they relate to the measures discussed in the respective proposed rules. Additionally, State DOTs and MPOs are required to coordinate when selecting targets for the areas specified under 23 U.S.C. 150(c) in order to ensure consistency in the establishment of targets, to the maximum extent practical.[25] A separate rulemaking to update the Metropolitan and Statewide Planning Regulations (RIN 2125-AF52) at 23 CFR 450 discusses this coordination requirement.

Further, MAP-21 requires State Highway Safety Offices to establish targets for 11 core highway safety program outcome measures in the State HSP, which NHTSA has

[23] 23 U.S.C. 150(d)
[24] 23 U.S.C. 134(h)(2)(B)
[25] 23 U.S.C. 134(h)(2), 23 U.S.C. 135(d)(2), 49 U.S.C. 5303(h)(2), and 49 U.S.C. 5304(d)(2)

implemented through an Interim Final Rule,[26] and for recipients of public transportation Federal funding and MPOs to establish state of good repair and safety targets.[27] Discussions on these target establishment requirements are not included in this NPRM. Rather, DOT will discuss those target establishment requirements in the subsequent rulemakings to implement these respective provisions.

**4. Plans**

A number of provisions within MAP-21 require States and MPOs to develop plans that provide strategic direction for addressing performance needs. For the Federal-aid highway program these provisions require: State DOTs to develop an Asset Management Plan;[28] State DOTs to update their SHSP;[29] MPOs serving large TMAs in areas of nonattainment or maintenance to develop a CMAQ Performance Plan;[30] MPOs to include a System Performance Report in the Metropolitan Transportation Plan;[31] and State DOTs and MPOs to include a discussion, to the maximum extent practical, in their Transportation Improvement Program (TIP) as to how the program would achieve the performance targets they have established for the area.[32] In addition, State DOTs are encouraged to develop a State Freight Plan[33] to document planned activities and

[26] 23 U.S.C. 402(k); Uniform Procedures for State Highway Safety Grant Programs, Interim final rule, 78 FR 4986 (January 23, 2013) (to be codified at 23 CFR Part 1200). An eleventh core outcome measure for bicycle fatalities was added after the publication of the Interim Final Rule and is available at http://www.ghsa.org/html/resources/planning/index.html.
[27] 49 U.S.C. 5326(c) and 5329
[28] 23 U.S.C. 119(e)(2).
[29] 23 U.S.C. 148(d).
[30] 23 U.S.C. 149(l).
[31] 23 U.S.C. 134(i)(2)(C).
[32] 23 U.S.C. 134(j)(2)(D) and 23 U.S.C. 135(g)(4).
[33] MAP-21, sec. 1118.

investments with respect to freight. This rulemaking does not discuss any requirements to develop or how to use these plans, with the exception of some discussion of the CMAQ Performance Plan. Rather, a discussion on the development and use of these plans will be included in the respective rulemakings or guidance to implement these provisions. More information on the required plans and the actions to implement the statutory provisions related to plans can be found on FHWA's MAP-21 Web site.[34]

**5. Reports**

The MAP-21 sec. 1203 requires State DOTs to submit biennial reports to FHWA on the condition and performance of the NHS, the effectiveness of the investment strategy documented in a State DOT's asset management plan for the NHS, progress in achieving targets, and ways in which a State DOT is addressing congestion at freight bottlenecks.[35] The FHWA proposed in the first NPRM that safety progress be reported by State DOTs through the HSIP annual report and not in the biennial report required under 23 U.S.C. 150(e). This NPRM, under Subpart A, discusses the 23 U.S.C. 150(e) biennial reporting requirement. The 23 U.S.C. 150(e) biennial reporting requirement would apply to all of the non-safety measures for the Federal-aid highway program (i.e., the measures proposed in this NPRM and in the second Performance Measure NPRM).

Additional progress reporting is required under the CMAQ program, Metropolitan transportation planning, elements of the Public Transportation Act of 2012, and the Motor Vehicle and Highway Safety Improvement Act of 2012. Also, State DOTs should

[34] http://www.fhwa.dot.gov/map21/qandas/qapm.cfm .
[35] 23 U.S.C. 150(e)

include a system performance report in their statewide transportation plan. These reporting provisions are discussed in separate rulemakings and guidance and are not discussed in this rulemaking, with the exception of some reporting required by MPOs as part of the CMAQ program.

**6. Accountability**

Two provisions within MAP-21, specifically 23 U.S.C. 119(e)(7) under the NHPP and 23 U.S.C. 148(i) under the HSIP, and one provision within FAST Act (Section 1116 codified at 23 U.S.C. 167(j)) under NHFP require the State DOT to undertake actions if significant progress is not made toward the achievement of State DOT targets established for these respective programs. The FAST Act Section 1406 modified the NHPP significant progress language and added language for the NHFP. Accordingly, for NHPP and NHFP, if the State DOT has not achieved or made significant progress toward the achievement of applicable targets in a single FHWA biennial determination, then the State DOT must document in its next biennial report the actions it will take to achieve the targets.

Please note that FHWA proposes in section 490.109(e) that FHWA would consider a State DOT has made significant progress toward the achievement of an NHPP or NHFP target when either: (1) the actual condition/performance level is equal to or better than the State DOT established target; (2) or the actual condition/performance is better than the State DOT identified baseline of condition/performance. So the term "achieved or made significant progress" is synonymous with the term "made significant

progress" throughout this NPRM. This provision is discussed in the second performance measure NPRM and in this NPRM.

For the HSIP, if the State DOT does not achieve or make significant progress for its HSIP safety targets, then the State DOT must dedicate a specified amount of obligation limitation to safety projects and prepare an annual implementation plan.[36] The first performance measure NPRM discussed this provision, and it is codified in the final rule that covers the safety-related elements of the Federal-aid Highway Performance Measures Rulemaking published on March 15, 2016.

In addition, MAP-21 requires that each State DOT maintain a minimum condition level for Interstate System pavement and NHS bridge conditions. If a State DOT falls below either standard, then the State DOT must spend a specified portion of its funds for that purpose until the minimum standard is exceeded.[37] This provision was discussed in the second performance measure NPRM, which proposed pavement and bridge performance measures for the NHS.

The FHWA recognizes that there is a limit to the direct impact that State DOTs can have on performance outcomes within the State and that State DOTs need to consider this uncertainty in their establishment of targets. The FHWA encourages State DOTs to consult with relevant entities (e.g., MPOs, local transportation agencies, Federal Land Management Agencies, tribal governments) as State DOTs establish targets, so they can

[36] 23 U.S.C. 148(i).
[37] 23 U.S.C. 119(f).

better identify and consider factors outside of their direct control that could impact future condition/performance.

Further, MAP-21 includes special safety rules to require each State DOT to maintain or improve safety performance on high risk rural roads and for older drivers and pedestrians. [38] If the State DOT does not meet these special rules, which contain minimum performance standards, then it must dedicate a portion of HSIP funding (in the case of the high risk rural road special rule) or document in their SHSP actions it intends to take to improve performance (in the case of the older driver and pedestrian special rule). Guidance on how FHWA will administer these two special rules is provided on FHWA's MAP-21 Web site.[39]

**C. Implementation of MAP-21 Performance Requirements**

The FHWA will implement the performance requirements within section 1203 of MAP-21 in a manner that results in a transformation of the Federal-aid highway program so that the program focuses on national goals, provides for a greater level of accountability and transparency, and provides a means for the most efficient investment of Federal transportation funds. In this regard, FHWA plans to implement these new requirements in a manner that will provide Federal-aid highway fund recipients the greatest opportunity to fully embrace a performance-based approach to transportation investment decisionmaking that does not hinder performance improvement. In this

[38] 23 U.S.C. 148(g).
[39] http://www.fhwa.dot.gov/map21/guidance/guidehrrr.cfm and http://www.fhwa.dot.gov/map21/guidance/guideolder.cfm.

regard, FHWA carefully considered the following principles in the development of proposed regulations for national performance measures under 23 U.S.C. 150(c):

- **Provide for a National Focus** – focus the performance requirements on outcomes that can be reported at a national level.
- **Minimize the Number of Measures** – identify only the most necessary measures that will be required for target establishment and progress reporting. Limit the number of measures to one or no more than two per area specified under 23 U.S.C. 150(c).
- **Ensure for Consistency** – provide a sufficient level of consistency, nationally, in the establishment of measures, the process to establish targets and report expectations, and the approach to assess progress so that transportation performance can be presented in a credible manner at the national level.
- **Phase in Requirements** – allow for sufficient time to comply with new requirements and consider approaches to phase in new approaches to measuring, target establishment, and reporting performance.
- **Increase Accountability and Transparency** – consider an approach that would provide the public and decisionmakers a better understanding of Federal transportation investment returns and needs.
- **Consider Risk** – recognize that risks in the target establishment process are inherent and that many factors, outside the control of the entity required to establish the targets, can impact performance.

- **Understand that Priorities Differ** – recognize that targets need to be established across a wide range of performance areas and that performance trade-offs would need to be made to establish priorities, which would be influenced by local and regional needs.
- **Recognize Fiscal Constraints** – provide for an approach that encourages the optimal investment of Federal funds to maximize performance but recognize that, when operating with scarce resources, performance cannot always be improved.
- **Provide for Flexibility** – recognize that the MAP-21 requirements are the first steps that will transform the Federal-aid highway program to a performance-based program and that State DOTs, MPOs, and other stakeholders will be learning a great deal as implementation occurs.

The FHWA considered these principles in this and previous NPRMs and encourages comments on the extent to which the approach to performance measures set forth in this NPRM supports the principles discussed above.

*Federal Technical Assistance*

The FHWA is committed to providing stewardship to State DOTs and MPOs assisting them as they take steps to manage and improve the performance of the highway system. As a Federal agency, FHWA is in a unique position to utilize resources at a national level to capture and share strategies that can improve performance. The FHWA is prepared to dedicate resources at the national level to provide on-site assistance, technical tools and guidance to State DOTs and MPOs to assist them in making more effective investment decisions. It is FHWA's intent to be engaged at a local and national

level to provide resources and assistance from the onset to identify opportunities to improve performance and to increase the chances for full State DOT and MPO compliance of new performance related regulations. The FHWA technical assistance will include activities such as conducting national research studies, developing analytical modeling tools, identifying and promoting best practices, preparing guidance materials, and developing data quality assurance tools. The FHWA encourages comments on how it can help maximize opportunities for successful implementation.

**V. Performance Management Measure Analysis**

This section of the NPRM summarizes the process FHWA used to consider potential performance measures, including alternate data sources and potential measures. The FHWA's analysis was based on consideration of viewpoints from several sources including:

- Knowledge of technical experts within DOT and FHWA on the current state of practice for measuring system performance, freight movement, traffic congestion, and on-road mobile source emissions;
- Information provided by external stakeholders received directly or captured as part of organized stakeholder listening sessions;
- Information provided by external stakeholders received indirectly through informal contact such as telephone calls, email, or letters; and
- Measures that have been recommended and documented in nationally recognized reports such as the assessment of measurement readiness documented in the 2011

final report for NCHRP Project 20-24(37)G, "Technical Guidance for Deploying National Level Performance Measurements."

Compared with the two previous NPRMs in this series, the measurement areas covered by this NPRM are more varied from State to State; consequently, stakeholders' consensus about approaches for measuring performance is inconsistent. To aid its analysis of alternate measurement options for this NPRM specifically, FHWA relied on an expanded set of qualitative criteria (which supplement the assessment factors/criteria utilized in the other performance measure NPRMs) to ensure that a set of measures established through this rulemaking would allow for:

- A national performance story to be communicated in a credible and reliable manner;
- State DOTs and MPOs to consider their unique expectations of desirable performance;
- The potential for use across multiple surface transportation modes;
- One core set of data to be used to assess system performance, traffic congestion, and freight movement; and
- The potential utilization of new data as technology progresses.

Section V includes three sub-sections, which describe FHWA's assessment of measures using the expanded set of criteria as well as the assessment factors and criteria used in the two previous performance measure NPRMs:

- Sub-Section A – Analysis and assessment of potential data sources, measurement methodologies, and proposed measures for measuring system performance and traffic congestion;
- Sub-Section B – Analysis and assessment of potential data sources, measurement methodologies, and proposed measures for measuring freight movement, and
- Sub-Section C – Analysis and assessment of potential data sources, measurement methodologies, and proposed measures for measuring on-road mobile source emissions.

Also, each sub-section below describes FHWA's evaluation of the measures using a common methodology to identify gaps that could impact successful implementation of proposed performance measures.

**A. Selection of Measures for Subparts E and G – System Performance and Traffic Congestion**

This sub-section describes FHWA's analysis of data types, sources, and measurement methods to support potential measures. We also include a brief history of, and lessons learned from, FHWA's research on congestion and reliability performance measures. Lastly, this sub-section describes FHWA's assessment of proposed measures including: 1) percentage of system providing for reliable travel times; 2) percentage of system providing where peak hour travel times meet expectations; and 3) annual excessive delay per capita.

System Performance and Traffic Congestion Data Types and Sources Considered by FHWA

The FHWA considered several potential data sources for use in measuring system performance and traffic congestion including travel speed and time data, travel volume data, vehicle throughput data, and other trip information on data.

*Travel Speed or Travel Time Data* – Many State DOTs, MPOs, local agencies, and travel corridor partnerships make use of vehicle speed and travel time data sets to manage system operations or report performance. The FHWA recognizes that travel time or speed does not provide information on the purpose of trip, trip origin and destination, transportation mode, or occupancy rates. However, FHWA has been working to advance the quality of this data. One way FHWA has done this is by acquiring and making available to State and local governments a national travel time data set, the NPMRDS, to support national, State, and local system performance and congestion reporting, research and analysis needs. At this time, FHWA finds that the NPMRDS is the only national travel speed and travel time data source available to State DOTs and MPOs that could reliably support all the performance reporting needs of this rulemaking.

*Traffic Volume Data* – All State DOTs report annual average daily traffic (AADT) for all Federal-aid eligible roadways to FHWA's HPMS database. All State DOTs also voluntarily provide monthly counts of AADT to FHWA, which FHWA uses to produce monthly national traffic volume trend information.[40] The FHWA believes, however, that traffic volume data offers an incomplete picture of either system

[40] FHWA Traffic Volume Trends: https://www.fhwa.dot.gov/policyinformation/travel_monitoring/tvt.cfm

performance or traffic congestion because it lacks information about traffic volume by specific times of the day, and because volume counts are based on information collected at a limited number of locations. As these weaknesses do affect the accuracy or value of volume counts, FHWA concluded that volume data would be a poor choice as the sole data source for measuring system performance or traffic congestion.

*Traffic Throughput Data* – Some researchers and practitioners have used data on the total number of vehicles or persons passing through a specific location during a defined time period to measure system performance and/or traffic congestion. The FHWA believes that performance throughput data is not widely available at a national level nor is it routinely measured on a system-wide basis in States. However, we seek comment on the use and availability of performance throughput data.

To measure throughput on the NHS would require near constant vehicle count/volume data that does not exist today except for a very limited number of locations (usually those locations where HPMS requires reporting of volume). Person count data, which would be used for measuring person throughput, is typically based on vehicle occupancy which is typically reported as an average based on surveys (including the U.S. Census) or as a set multiplier to vehicles (e.g., 1.1 occupants per vehicle), although limited counts at single locations on roadways are often undertaken. Classification of vehicles data (for assigning person trips) is also available in a very limited number of locations and would be required for measuring the number of people in buses or vans, for example.

The FHWA concludes that an almost complete lack of data availability makes throughput data impractical as a measure of performance. The FHWA recognizes, however, that improvements in traffic data collection technologies could offer the potential to measure throughput on a system-wide basis in the future.

*Other /Trip Information* – The FHWA also considered various alternative data types related to trip characteristics that offer insights on system performance and traffic congestion such as typical travel times, trip purpose, and trip origin and destination information. This data is generally collected using surveys, such as the American Community Survey, or regional travel surveys produced by MPOs that sample a statistically representative portion of all travelers. Although surveys of this kind can provide valuable information to help plan and manage transportation demand, FHWA believes the information captured could not easily be used to support a national performance measure because these surveys are administered infrequently and are not referenced to specific locations.

A summary of FHWA's analysis of the viability of various data types to support national measures to assess system performance and traffic congestion is provided in Table 3 below:

**Table 3 – Summary Assessment of Data Types for use in Support of National Measures to Assess System Performance and Traffic Congestion**

| Information Source | National Data Source Available? | Update Frequency | Granularity | Considered for the proposed rule? |
|---|---|---|---|---|
| Speed or Travel Time | Yes | Monthly | Roadway segment | Yes |
| Traffic Volume | Yes | Annual | Roadway | Yes |

| | | | | |
|---|---|---|---|---|
| | | | segment | |
| Throughput | No | Varies | Specific Corridors | No |
| Trip Information | Yes | Annual | Regional | No |

Based on the discussion in this section, FHWA considered use of travel time, speed, or traffic volume data to support measures for system performance and traffic congestion.

Request for comments: FHWA recognizes limitations in the availability of data could be resolved in the future with technology advancement. The FHWA seeks comments on potential data sources and technologies related to system performance and traffic congestion measures, including:

1. Trip Information Data: The FHWA is seeking comments on approaches for gathering travel, trip origin and destination, transportation mode, or occupancy rates information on a routine and system-wide basis.
2. Throughput Data: The FHWA is seeking comment on approaches for gathering throughput data for traffic congestion that would capture the total number of travelers passing through segments that make up a full system on a regular basis.
3. Survey Data: The FHWA recognizes that survey data available today offers only limited application to the development of performance measures; technologies available to capture large volumes of data on the movement of people could provide the potential to capture trip-related information that could be useful in managing transportation performance. The FHWA is seeking comment on

approaches that can be used to capture trip-related information on a more routine and system-wide basis.

System Performance and Traffic Congestion Measures Considered by FHWA

The FHWA identified and considered a variety of approaches to express travel time, speed, or traffic volume data as measures of system performance or traffic congestion including travel delay, a travel time index, travel time, travel time reliability, or Level of Service. A summary of how these suggestions and approaches were considered by FHWA is provided below:

*Travel Delay-based Measure* – Delay is typically a corridor or system-level indicator of additional travel time or slower travel speed when compared to the desired time or the desired speed of travel; it is easily understood by transportation users and is meaningful, expressed in terms of lost time, for all modes of surface transportation. The FHWA finds that many operating agencies use delay metrics to report on and manage system performance; however, the definition of delay varies among agencies. The FHWA acknowledges that delay measures do not capture system performance attributes in terms of shorter trips or better access to destinations and modal options, which may occur at the expense of greater delay. For example, transportation priorities in a region may focus on land use decisionmaking that concentrates populations, resulting in reduced speeds but improving access to destinations and modal options. The FHWA considered these concerns in the design of measures based on delay.

*Travel Time Index Measure* – A travel time index compares actual travel time for a road segment (typically during the peak period) relative to a reference travel time. The

FHWA finds that travel time indices are widely used to report on and manage system performance and traffic congestion. As with delay metrics, FHWA acknowledges that travel time indices do not capture system attributes in terms of shorter trips or better access to destinations and mode options, which may occur at the expense of greater delay. Recognizing that a free-flow speed-based reference travel time may not support regional and local planning policies, FHWA believes it is appropriate for individual State DOTs and/or MPOs to establish reference travel times that support local priorities for certain types of measures. The FHWA believes that the use of an index provides an effective means to normalize travel times so that the performance can be evaluated across different roadway segments and used to calculate a national performance measure.

*Travel Time-based Measure* – A measure calculated using a travel time-based metric would report actual travel times for origin-destination pairs rather than comparing actual travel time to a reference travel time. The FHWA believes that use of travel time by itself as a metric or measure would be difficult for the public to understand without also knowing the associated origin-destination information. The FHWA believes that the use of an index that compares actual travel time to expected travel time is more meaningful to the public.

*Travel Time or Speed Reliability Measure* – This measure would compare the longest travel time or slowest speed that occurs during a specified time frame to a reference travel time or speed for a transportation facility. A reliability measure is an indication of the extra time a traveler must add to their trip in order to have a high degree of certainty that they will arrive at their destination on time. The FHWA finds that travel

time reliability measures are widely used to report on and manage system performance. The FHWA also notes two important refinements that strengthen travel time reliability measures: 1) Some agencies exclude the top 20 percent of longest travel times throughout the year because these travel times typically are due to extreme events that are beyond an agency's control and should not be considered in the assessment of overall system performance; and 2) The reference travel time used in a reliability measure often reflects travel time associated with typical or average travel speeds rather than the time associated with free flow travel speeds.

*Level of Service-based Measure* – Some transportation agencies assess the performance of their highways by comparing existing traffic volume to the capacity for which those highways are designed in a measure that is typically referred to as the Level of Service. This approach assumes that as traffic volume reaches the capacity of the system, performance is reduced. However, FHWA believes that an agency can often use operations strategies such as ramp metering or High Occupancy Vehicle lanes to avoid or reduce performance impacts as traffic volume approaches capacity. The FHWA also believes that data on traffic volume information is not sufficiently available on all segments of roadways at all times of the day to use as the only basis for the development of national performance measures.

*Impact-based Measures* – Some transportation agencies and planning organizations use measures to report the estimated impacts of increased travel times or reduced travel speeds such as wasted fuel, the value of lost time, or commuter stress levels. The FHWA finds, however, that the information to support such measures is not

directly measurable, thereby requiring the use of algorithms that would be difficult to develop in a reliable manner.

A summary of FHWA's analysis of the different approaches for expressing travel time, travel speed, and/or traffic volume considered as part of its efforts to develop measures to assess system performance and traffic congestion is provided in Table 4 below.

**Table 4 – Summary of Assessment of Approaches for Expressing Travel Time, Travel Speed, and Traffic Volume.**

| Approach | Level of Stakeholder Interest | Considered for the proposed rule? | Considerations |
|---|---|---|---|
| Delay | Mixed | Yes | |
| Travel Time as an Index | Low | Yes | Use of an agency defined threshold |
| Travel Time | Mixed | No | |
| Travel Time Speed Reliability | High | Yes | Consider non-recurring congestion tied to extreme events |
| Level of Service | Low | No | |
| Impacts | Very Low | No | |

FHWA Congestion and Reliability Performance Measure Research and Analysis

The FHWA has been researching performance measures for congestion, mobility, and reliability for over 10 years. The Urban Congestion Report[41] and Freight Performance Measurement (FPM)[42] have focused on producing performance measures from a variety of sources over the years. Initially, FHWA's research calculated travel

[41] http://ops.fhwa.dot.gov/perf_measurement/ucr/
[42] http://ops.fhwa.dot.gov/freight/freight_analysis/perform_meas/#fhwa

times from speed data derived from sensors in or along the roadway, including loop detectors, side-fired radar detectors, video detection, etc. The FHWA research then developed a variety of measures that could be used for trend analysis, such as the Planning Time Index (95th percentile travel time versus free flow travel time) that focuses on the variability (or reliability) of travel day to day, and hours of congestion (hours of day where travel on freeways is under 45 mph), among other measures. The measures were aggregated from roadway sections up to urbanized area-wide measure as well as national measures.

Two issues identified through this research are important to understanding the ultimate approach FHWA proposes for the MAP-21 performance measures related to congestion and system reliability. First, the advent of readily available vehicle-based probe travel time data in recent years has led to a transformation of traveler information and performance measure development. Vehicle-based probe travel time data is derived from in-vehicle, GPS-based probes, including track fleet management devices, navigation units, and cell phones that report location information and time. The travel times are either derived directly from speed data provided or calculated based on a probe's trip progress (deriving speeds from the amount of time taken to travel between two locations and the distance between the two locations). Because data on the entire NHS is available from actual measurements tied to a date, time, and location on specific roadway segments, congestion performance measurement can be much more accurate, widespread, and detailed. This data also provides the potential to undertake before/after evaluations of transportation projects and strategies.

Since the passage of MAP-21, the FHWA acquired vehicle-based probe travel time data from a private vendor for the entire NHS, and acquired the rights for State DOTs and MPOs to also use the data. The data set, the NPMRDS, delivers travel time data, averaged every 5 minutes of every day of the year every month. Travel times are reported for freight-only and for all traffic, which includes all probe data available (passenger, freight, fleet, taxis, etc.).

The second issue FHWA identified is that aggregating measures up to a national level provides important national trend information but has limited direct correlation to how money is being spent on road improvements that may actually affect changes in the measure. The FHWA has been advocating the use of performance measures at a local level as best practice in recent years. Operating and planning agencies can better understand how a project affects performance on a section of roadway or how a facility or corridor operates during peak periods or weather events using local performance measures, rather than aggregating measure up to a regional, State, or national level.

Applicability of Measures

The FHWA analysis of measures included applicability of measures to the transportation network or geographic area. Section 1203 of MAP-21 directed FHWA to establish measures for States to use to assess the performance of the Interstate System and the non-Interstate NHS. For assessing performance of the non-Interstate NHS, FHWA believes it is important that at least one of the selected measures relate to the entire NHS. Since system reliability is identified as one of the National Goals (23 U.S.C. 150(b)(4)), FHWA decided it was appropriate to establish a reliability-based measure for

the entire NHS. Accordingly, the NHPP Performance of the System reliability measure is calculated for the entire NHS.

Another important component of System Performance is congestion, and typically, but not exclusively, the worst congestion occurs on high-volume roads in urbanized areas. The FHWA thought it was important to capture this type of congestion in a measure so that urbanized areas would be able to monitor and address congestion issues. The Peak Hour Travel Time measure was developed to provide this information, limiting the reporting to the largest urbanized areas (over 1,000,000 in population). In selecting this measure, FHWA considered the national goal of congestion reduction, which asks to achieve a significant reduction in congestion on the NHS. 23 U.S.C. 150(b)(3). The FHWA believes the Peak Hour Travel Time measure is consistent with this national goal. The Peak Hour Travel Time measure also gives agencies in the affected urbanized areas the ability to relate their measure to their NHS roadway operational and investment policies by allowing them to set the "Desired Peak Period Travel Time" on their NHS roadways.

Consistent with the purpose of the CMAQ program to fund transportation projects and programs that will contribute to attainment or maintenance of the NAAQS in areas designated as nonattainment and maintenance, FHWA believes that the CMAQ Traffic Congestion measure should apply to nonattainment and maintenance areas and relate to the goals of the CMAQ Program (to improve air quality and relieve congestion). To reduce the burden on some States DOTs and MPOs and to focus on areas where typically the worst congestion occurs, like the System Performance congestion measure, FHWA

chose to limit this measure to urbanized areas over 1,000,000 in population as well, since those agencies typically have more capability and experience in assessing traffic congestion. In addition, these areas are the same areas where MPOs will need to report on the CMAQ measures as part of a performance plan under 23 U.S.C. 149(l). Similar to the System Performance congestion measure, FHWA also chose a measure that would be consistent with the national goal of congestion reduction.

Based on a thorough review of data, measure definitions, calculation methods, applicability, and national goals, FHWA identified three potential measures to assess system performance and traffic congestion that deserved further consideration including: percentage of system providing for reliable travel times; percentage of system where peak hour travel times meet expectations; and annual excessive delay per capita.

The FHWA analyzed these proposed measures for system performance and traffic congestion in tandem as part of this rulemaking so they would provide 1) a complete national picture of system reliability; 2) a focus on urbanized area peak hour congestion; and 3) a focus on the worst traffic delays in air quality nonattainment areas and maintenance areas. In addition, FHWA ensured that the proposed measures (and related metrics) were defined so that their methodologies could be applicable at the same segment, corridor, facility, or other level, resulting in fine grain performance information suitable for supporting the investment decisionmaking process at the statewide, metropolitan, and local levels. Finally, FHWA focused on using as much actual, observed data as is available to develop these measures. Together, these three measures provide a comprehensive picture of system performance, reliability and traffic congestion

nationwide, both on the entire NHS and with a focus on areas that typically have the worst congestion.

Assessment of Proposed Measures for Subparts E and G (System Performance and Traffic Congestion)

The FHWA used a common methodology of 12 criteria to assess the appropriateness of each measure for national use and the readiness to implement the performance measure accurately and reliably.

- A1) Is the measure focused on comprehensive performance outcomes?
- A2) Has the measure been developed in partnership with key stakeholders?
- A3) Can the measure accommodate changes in the future?
- A4) Can the measure be used to support investment decisions, policy making, and target establishment?
- A5) Can the measures be used to analyze performance trends?
- A6) Is collection, storage, and reporting of measure data feasible?
- B1) Timeliness
- B2) Consistency
- B3) Completeness
- B4) Accuracy
- B5) Accessibility
- B6) Data Integration

Each performance measure, as used in current practice, was assessed against the 12 criteria using the following three ratings for each criterion.

- Green Rating – Criterion is fully met for the candidate measure
- Yellow Rating – Criterion is partially met for the candidate measure and work is underway to fully meet it the criterion
- Red Rating – Criterion is not fully met or no work is underway or planned that would allow the criterion to be met.

The FHWA used the results of this assessment to identify gaps that FHWA could address through this rulemaking to improve the effectiveness of the measures in this NPRM. The rulemaking docket contains a description of the methodology used for this assessment. Table 5 below summarizes the results of the assessment for the proposed performance management measures for system performance and traffic congestion.

**Table 5 – Summary of Proposed Performance Management Measures for System Performance and Traffic Congestion**

| Assessment Factor | Percentage of System providing for Reliable Travel | Percentage of System where peak hour travel times meet expectations | Annual Hours of Excessive Delay Per Capita |
|---|---|---|---|
| A1) Is the measure focused on comprehensive performance outcomes? | G | G | Y |
| A2) Has the measure been developed in partnership with key stakeholders? | Y | Y | Y |
| A3) Is the measure maintainable to accommodate changes? | G | G | G |
| A4) Can the measure be used to support investment decisions, policy making and target establishment? | G | G | G |
| A5) Can the measures be used to analyze performance trends? | G | G | G |
| A6) Has the feasibility and practicality to collect, store, and report data in support of the measures been considered? | G | G | G |
| B1) Timeliness | G | G | G |
| B2) Consistency | G | G | G |
| B3) Completeness | Y | Y | Y |
| B4) Accuracy | G | G | G |
| B5) Accessibility | G | G | G |
| B6) Data Integration | G | G | G |

The factors that were assessed at a green level for the proposed measures were considered by FHWA in its choice of approach for system performance and traffic congestion measures. The FHWA also considered the factor assessed at yellow (B3 – completeness) for all three measures as probe data is available on most of the NHS, but there are still some times of day and locations where data is not consistently available via the NPMRDS data set that FHWA is requiring for use for these measures. The FHWA

believes that over time, as more probe data sources are added to the data set, that missing travel times will be minimized.

The FHWA proposal outlined in this NPRM attempts to address some of the gaps that exist today for the lower rated factors so that, when the new requirements are implemented, the measures result in an improved assessment rating, thereby better supporting national programs. In particular, FHWA factored the following considerations in its decision:

- Criterion A1 – recognize that the Traffic Congestion measure (Annual Hours of Excessive Delay Per Capita) should ideally reflect the movement of all travelers and the performance of all modes. As proposed, the measure may not capture modal options or better accessibility. The FHWA is seeking comment on methods that can be used reliably to achieve this outcome.
- Criterion A2 – recognize that a national measure is not in place for either system performance or traffic congestion and no national pilot studies have been conducted. However, FHWA and many State DOTs and MPOs have developed their own system performance/congestion measures and these were considered in developing the national measures.

The specifics of these proposals are described in the Section-by-Section portion of this proposed rule.

## B. Selection of Proposed Measures for Subpart F - Freight Movement on the Interstate System

This sub-section describes the FHWA's analysis of a range of data types and sources and measurement methods to support potential freight movement-related measures and describes FHWA's assessment of two proposed measures including: 1) percent of Interstate System mileage meeting the goal for reliability; and 2) percent of Interstate System mileage considered uncongested (by speed). The FHWA assessed both these proposed measures in terms of appropriateness as national measures and readiness for implementation.

The FHWA selected reliability and average speed measures because they offered the best understanding of freight performance at the national level and had the widest support from stakeholders. The FHWA seeks to refine the use of freight-related measures in the future and broaden measures and data sources that can better inform future policy, programming, and investment decisions and provide a multimodal consideration of freight flow.

Freight Movement Data Types and Sources Considered by FHWA

The FHWA recognizes that the efficient movement of freight is important to the Nation's economy. Efficiency is hindered by slow speeds and unreliable travel times caused by congested highways. For the freight industry, slow and unreliable travel results in diminished productivity by reducing the efficiency of operations, increasing costs of goods, increasing fuel costs, reducing drivers' available hours for service, and reducing equipment productivity. Reducing highway congestion could produce

important benefits for the freight industry and contribute to our Nation's growing economy. Solutions must address the long-term and short-term freight needs and depend on participation from both the public and private sectors to fully understand performance and develop strategic solutions.

Historically, congestion data collection efforts focused exclusively on commuting in urbanized areas. To improve availability of freight data, FHWA launched the FPM program in 2002. This program collects truck travel-time data on major freight-significant corridors, intercity pairs along those corridors, and major U.S. international land-border crossings. Data are collected from embedded probe technology in approximately 600,000 trucks and are used to provide a range of performance measures including but not limited to travel times, speeds, congestion points, incident analysis, and diversions. Although FPM itself is not a system improvement, it is a mechanism for collecting and analyzing data to assist national, State, regional, and local transportation agencies in better measuring and managing highway transportation system performance. The availability of FPM data has the potential to inform future investment decisions that produce benefits of regional and national significance.

The FPM program complements other efforts by FHWA to monitor and measure urban congestion. Combining FPM data with urban congestion data such as HPMS data, economic data from the Freight Analysis Framework, and other relevant data provides a more complete picture of surface transportation system performance and identifies areas where performance could be improved. To provide a comprehensive understanding of freight performance in concert with passenger and total traffic congestion and

performance, FHWA procured the NPMRDS in 2013, which provides travel times for all traffic, passenger, and freight with an archive of data beginning in October 2011. The FPM probe data is the freight data that is included in the NPMRDS travel time data. States and MPOs are currently using this data set to develop performance measures and support freight planning and other transportation plans. This data set allows a more comprehensive understanding of congestion for all types of traffic through the calculation of speed, reliability, and travel time on corridors with significant freight movement. As mentioned above, there is widespread support among stakeholders for these types of measures (e.g., speed, reliability, travel time). However, FHWA recognizes that a true picture of freight performance must reflect the multimultimodal nature of freight. In addition to efforts to implement the performance requirements of 23 U.S.C. 150, FHWA expects to continue work currently underway with other modes and public and private freight stakeholders to develop new data opportunities and create additional measures to provide a multimodal and economic assessment of freight. These efforts would further an understanding of freight performance that will support other freight-related provisions within MAP-21 such as freight planning. This work, in addition to FHWA's current efforts for the FPM program, will provide a clearer picture of the total supply chain and goods movement system so that improvements can be even more precisely targeted.

Freight Movement Measures Considered by FHWA

The FHWA focused its evaluation of measures for 23 U.S.C. 150 for freight movement on Interstate on its significant research and leadership in FPM development

through the FPM program, and stakeholder input. The FHWA recognizes that freight performance is best depicted by a series of measures to provide a comprehensive picture of freight movement. Stakeholders discussed multimodal measures and suites of measures to show performance in all aspects of freight movement. As the measures required for this rulemaking are only for freight movement on the Interstate System, FHWA is addressing stakeholder requests for multimodal and multiarea measures through other MAP-21 freight requirements such as freight planning and the development of a Freight Conditions and Performance Report (see MAP-21, Section 1115). An additional factor in FHWA's assessment was the varying practices for FPM among stakeholders, including State DOTs and MPOs, resulting in a lack of national consistency on data and measurement. After considering the ongoing research in this area and stakeholder support for FHWA's FPM efforts, FHWA believes that its proposed use of a nationally consistent data set is the most consistent, efficient, and reliable means of understanding Interstate freight movement at the local, State, and national levels.

Assessment of Proposed Measures for Subpart F (Freight Movement)

The FHWA identified two proposed measures: 1) percent of Interstate System mileage meeting the goal for reliability; and 2) percent of Interstate System mileage considered uncongested (by speed). The two measures proposed by FHWA were evaluated, based on existing state-of-practice, using the assessment process described in Section V.A of this section. Table 6 includes a summary of this assessment.

**Table 6 – Summary of Proposed Performance Management Measures Relating to Freight Movement**

| Assessment Factor | Percent of Interstate System Mileage Meeting Goal for Reliability | Percent of Interstate System Mileage Uncongested (by speed) |
|---|---|---|
| A1) Is the measure focused on comprehensive performance outcomes? | G | G |
| A2) Has the measure been developed in partnership with key stakeholders? | G | G |
| A3) Is the measure maintainable to accommodate changes? | G | G |
| A4) Can the measure is used to support investment decisions, policy making and target establishment? | G | G |
| A5) Can the measures be used to analyze performance trends? | G | G |
| A6) Has the feasibility and practicality to collect, store, and report data in support of the measures been considered? | G | G |
| B1) Timeliness | G | G |
| B2) Consistency | G | G |
| B3) Completeness | Y | Y |
| B4) Accuracy | G | G |
| B5) Accessibility | G | G |
| B6) Data Integration | G | G |

Legend: G=Green Y= Yellow R=Red

The measures proposed by FHWA were considered against the criteria presented in Table 6. For all of the assessment factors except completeness, FHWA ranked these measures as "green." The FHWA considered the measures against all of the criteria and weighed public and private stakeholder input along with FHWA's experience in applying the measures. These measures were determined to be the two measures that most appropriately met all of the assessment factors and provide a comprehensive assessment of performance for freight so that public and private decisionmakers can identify policy and operational improvements for goods movement. The FHWA considered the measures to be "yellow" for completeness only because they are proposed to rely on data from the NPMRDS, which has limited missing data that could impact the ability to conduct a complete assessment of freight movement on the Interstate. While a robust data set, the NPMRDS does exhibit limitations, especially with missing travel time data when no probe passes a location in a 5-minute period (referred to as 5-minute bins). For the freight data, the NPMRDS uses a sample of approximately 600,000 trucks. The probes that are used to derive travel times in the NPMRDS generally provide national coverage. However, there are some areas of the Nation where there are fewer trucks or no truck activity reported. When this occurs, these bins would not be reported in the NPMRDS, and are missing from the dataset. The FHWA's internal assessment has demonstrated that, even with the missing data, the measures could still be calculated because the measures are based on annual averages. There are not enough missing 5 minute bins to make calculating the measure impossible. The FHWA recognizes the need to improve the completeness of the data and continues to work to improve this data

set and include more trucks. It is expected that the truck sample will grow exponentially in coming years and over time the addition of more probe sources will reduce missing travel times.

### C. Selection of Proposed Measures for Subpart H – On-Road Mobile Source Emissions

The following section includes an overview of the factors FHWA considered in the selection of a proposed measure for the assessment of on-road mobile source emissions as required to administer the CMAQ program under 23 U.S.C. 149. (The previous section discusses proposed measures for Traffic Congestion to carry out the CMAQ program.) The FHWA wants the measure established through this rulemaking to:

- Meet CMAQ program performance requirements in 23 U.S.C. 149 and 150.
- Be mindful of existing emissions reduction reporting practices and data sets, thereby minimizing any additional burden on State DOTs and MPOs.
- Apply to CMAQ-funded projects instead of focusing on one project type (e.g., highways or transit).
- Apply to CMAQ-funded projects only in areas designated as nonattainment and maintenance for pollutants applicable to the CMAQ program (ozone ($O_3$), carbon monoxide (CO), and particulate matter (PM)) versus all areas.

The FHWA received viewpoints on suggested measures as discussed above in Section III, Discussion of Stakeholder Engagement and Outreach. In addition, FHWA considered measures in use today to report on-road mobile source emissions reduction

estimates. After consideration, FHWA identified four possible measures for preliminary consideration:

*1) Emission Reductions by Pollutant* – A measure of the estimated emissions reduced by CMAQ-funded projects within a nonattainment or maintenance area. The emissions reductions would be calculated by pollutant and their applicable precursors.

*2) Estimated Emission Reductions of CMAQ-funded Projects Relative to Total Emission Reductions of the nonattainment or maintenance area* – A measure that expresses the emissions reduced by CMAQ projects as a percentage of total emission reductions. Total emission reductions are calculated by taking the difference between the estimated emissions of all transportation projects and the total allowable emissions (i.e., emissions budget) within the nonattainment or maintenance area.

*3) Estimated Emissions Reduction of CMAQ-funded Projects Relative to Total Emissions of the nonattainment or maintenance area* – A measure that expresses the emissions reduced by CMAQ-funded projects as a percentage of total emissions in the nonattainment or maintenance area. Total emissions would be obtained from the regional emissions estimates prepared for the conformity determination for the nonattainment or maintenance area.

*4) Cost Effectiveness of CMAQ Projects* – A measure that compares the total amount of CMAQ funds spent in an area to estimated emissions reduced by those CMAQ projects.

Assessment of Potential Measures for Subpart H

The FHWA assessed the four potential on-road mobile source emission measures based on state-of-practice among States and MPOs and using the 12 criteria described in Section V.A. Table 7 below summarizes the results of this assessment.

**Table 7 – Summary of Proposed Performance Management Measures for On-Road Mobile Source Emissions.**

| Assessment Factor | Emission Reductions by Pollutant | Estimated Emission Reductions of CMAQ-Funded Projects Relative to Total Emission Reductions of the Area | Estimated Emission Reductions of CMAQ-funded Projects Relative to Total Emissions of Area | Cost Effectiveness of CMAQ Projects |
|---|---|---|---|---|
| A1) Is the measure focused on comprehensive performance outcomes? | G | G | G | G |
| A2) Has the measure been developed in partnership with key stakeholders? | G | R | R | R |
| A3) Is the measure maintainable to accommodate changes? | G | G | G | G |
| A4) Can the measure be used to support investment decisions, policy making and target establishment? | G | Y | Y | G |
| A5) Can the measures be used to analyze performance trends? | G | G | G | G |
| A6) Has the feasibility and practicality to collect, store, and report data in support of the measures been considered? | G | Y | Y | Y |
| B1) Timeliness | Y | Y | Y | Y |
| B2) Consistency | Y | Y | Y | R |
| B3) Completeness | Y | Y | Y | R |
| B4) Accuracy | G | Y | Y | R |
| B5) Accessibility | G | G | G | R |
| B6) Data Integration | Y | R | R | R |

Legend: G=Green Y= Yellow R=Red

Based on the assessment summarized above and the additional principles described in this section, FHWA concluded that the last three measures were not suitable because they did not provide useful information for establishing targets, were not developed with key stakeholders, or in the case of cost effectiveness, data was not readily available. The measure that best fits the criteria established by FHWA was emissions reduction by pollutant. With respect to this measure, FHWA considered the following:

- Criterion B1 – Measure recognizes that emissions are estimated, not measured, based on the expected benefit from building the project. Collecting emissions data on a project-by-project basis through vehicle probing or another means would be cost prohibitive and would take years to collect useable data.
- Criteria B2 and B3 – Measure recognizes that no consistent method is being used across the country to estimate CMAQ project emission reductions and that although quantitative emissions analyses of air quality impacts is expected for almost all project types, qualitative assessments are acceptable when it is not possible to accurately quantify emissions reductions (i.e., public education, marketing and other outreach efforts). The FHWA is conducting a number of research studies to develop tools to assist with consistency and completeness of emissions estimates, for those project types where it is possible to quantify emissions, but these tools will take time for FHWA to develop.
- Criterion B6 – While the CMAQ Public Access System does include estimated emissions reductions by pollutant by project for each MPO and State that receives CMAQ funds, this database is not integrated with performance-related

data such as a spatial component. Work is underway to improve and increase the functionalities of the database to support the performance planning activities.

The FHWA is proposing this approach to define the on-road mobile source emissions measure in a manner that is consistent with and reflects the various methods used today by State DOTs and MPOs to calculate on-road mobile source emissions and is consistent with the information received from stakeholders. The specifics of this proposal are described in the Section-by-Section portion of this proposed rule.

**D. Consideration of a Greenhouse Gas Emissions Measure**

The FHWA is seeking comment on whether and how to establish a CO2 emissions measure in the final rule. The FHWA received input through stakeholder listening sessions and various letters (available in the docket) suggesting that DOT add a GHG emissions measure because GHGs are correlated with fuel use and air toxins. One group of commenters specifically asked for a carbon emissions measure for mobile sources. However, it is clear that reducing CO2 emissions is critical and timely. On-road sources account for over 80 percent of U.S. transportation sector GHGs. In an historic accord in Paris, the U.S. and over 190 other countries agreed to reduce GHG emissions, with the goal of limiting global temperature rise to less than 2° C above pre-industrial levels by 2050.

According to the Intergovernmental Panel on Climate Change (IPCC), human activity is changing the earth's climate by causing the buildup of heat-trapping greenhouse gas emissions through the burning of fossil fuels and other human

processes[43]. Transportation sources globally have been a rapidly increasing source of GHGs. Since 1970, GHGs produced by the transportation sector have more than doubled, increasing at a faster rate than any other end-use sector. The GHGs from total global on-road sources have more than tripled, accounting these sources account for more than 80 percent of the increase in total global transportation GHG emissions[44]. In the U.S., GHG emissions from on-road sources represent approximately 23 percent of economy-wide GHGs, but have accounted for more than two-thirds of the net increase in total U.S. GHGs since 1990[45], during which time VMT also increased by more than 30 percent[46].

A well-established scientific record has linked increasing GHG concentrations with a range of climatic effects, including increased global temperatures that have the potential to result in dangerous and potentially irreversible changes in climate and weather. In December 2015, the Conference of Parties nations recognized the need for deep reductions in global emissions to hold the increase in global average temperature to well below 2° C above pre-industrial levels, and are pursuing efforts to limit temperature increases to 1.5° C. To that end, the accord calls on developed countries to take a

[43] The IPCC Document: IPCC, 2014: Summary for Policymakers. In: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. http://mitigation2014.org/report/summary-for-policy-makers

[44] Sims, et al. 2014: Transport: In Climate Change 2014, Mitigation of Climate Change. http://ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_full.pdf Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. p. 605. http://ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_chapter8.pdf

[45] This is the first year of official U.S. data.

[46] U.S. Environmental Protection Agency, 2015. Inventory of U.S. Greenhouse Gas Emissions and Sinks, 1990-2015. Washington, D.C. Tables 2-1 and 2-13. Federal Highway Administration, 2013 Status of the Nation's Highways, Bridges, and Transit: Conditions & Performance. Washington, D.C. Exhibit 1-3. https://www3.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2016-Main-Text.pdf

leadership role in identifying economy-wide absolute emissions reduction targets and implementing mitigation programs. Also, as part of a 2014 bilateral agreement with China, the U.S. pledged to reduce GHG emissions to 26-28 percent below 2005 levels by 2025, with this emissions reduction pathway intended to support economy-wide reductions of 80 percent or more by 2050.

The FHWA recognizes that achieving U.S. climate goals will likely require significant GHG reductions from on-road transportation sources. To support the consideration of GHG emissions in transportation planning and decisionmaking, FHWA has developed a variety of resources to quantify on-road GHG emissions, evaluate GHG reduction strategies, and integrate climate analysis into the transportation planning process. The FHWA already encourages transportation agencies to consider GHG emissions as part of their performance-based decisionmaking, and has developed a handbook to assist State DOTs and MPOs interested in addressing GHG emissions through performance-based planning and programming[47]. The FHWA has developed tools to help State and local transportation agencies address GHG emissions associated with their systems. These include the Energy and Emissions Reduction Policy Analysis Tool (EERPAT)[48], a model that evaluates the impacts of CO2 reduction policies for

[47] A Performance-Based Approach to Addressing Greenhouse Gas Emissions through Transportation Planning, available at http://www.fhwa.dot.gov/environment/climate_change/mitigation/publications_and_tools/ghg_planning/ghg_planning.pdf.

[48] The Energy and Emissions Reduction Policy Analysis Tool (EERPAT), available at https://www.planning.dot.gov/FHWA_tool/.

surface transportation, and the Infrastructure Carbon Estimator (ICE)[49], a tool that specifically evaluates CO2 associated with the construction and maintenance of transportation infrastructure. The FHWA is also currently conducting a number of pilots to analyze the potential GHG emission reductions associated with various transportation-related mitigation strategies[50]. Even with these efforts, FHWA recognizes that more will be needed to meet the U.S. climate goals.

The FHWA is considering how GHG emissions could be estimated and used to inform planning and programming decisions to reduce long term emissions. If FHWA were to establish a measure, we believe that, in the context of this rulemaking, GHG emissions would be best measured as the total annual tons of CO2 from all on-road mobile sources. The FHWA is seeking comment on the potential establishment and effectiveness of a measure as a planning, programming, and reporting tool, and how we could address the following considerations in the design of a measure:

- Should the measure address all on-road mobile sources or should it focus only on a particular vehicle type (e.g., light-duty vehicles)?
- Should the measure be normalized by changes in population, economic activity, or other factors (e.g., per capita or per unit of gross state product)?

[49] The Infrastructure Carbon Estimator (ICE), available at http://www.fhwa.dot.gov/environment/climate_change/mitigation/publications_and_tools/carbon_estimator/.

[50] FHWA's Greenhouse Gas / Energy Analysis Demonstration projects are described at http://www.fhwa.dot.gov/environment/climate_change/mitigation/ongoing_and_current_research/

- Should the measure be limited to emissions coming from the tailpipe, or should it consider emissions generated upstream in the life cycle of the vehicle operations (e.g., emissions from the extraction/refining of petroleum products and the emissions from power plants to provide power for electric vehicles)?
- Should the measure include non-road sources, such as construction and maintenance activities associated with Title 23 projects?
- Should CO2 emissions performance be estimated based on gasoline and diesel fuel sales, system use (vehicle miles traveled), or other surrogates?
- Due to the nature of CO2 emissions (e.g. geographic scope and cumulative effects) and their relationship to climate change effects across all parts of the country, should the measure apply to all States and MPOs? Is there any criteria that would limit the applicability to only a portion of the States or MPOs?
- Would a performance measure on CO2 emissions help to improve transparency and to realign incentives such that State DOTs and MPOs are better positioned to meet national climate change goals?
- The target establishment framework proposed in this rulemaking requires that States and MPOs would establish 2 and 4 year targets that lead to longer term performance expectations documented in longer range plans. Is this framework appropriate for a CO2 emissions measure? If not, what would be a more appropriate framework?

- Should short term targets be a reflection of improvements from a baseline (e.g., percent reduction in CO2 emissions) or an absolute value?
- What data sources and tools are readily available or are needed to track and report CO2 emissions from on-road sources?
- What tools are needed to help transportation agencies project future emissions and establish targets for a CO2 emission measure?
- How long would it take for transportation agencies to implement such a measure?
- Additionally, the FHWA requests data about the potential agency implementation costs and public benefits associated with establishing a CO2 emissions measure.

## VI. Section-by-Section Discussion of the General Information and Proposed Performance Measures Sections

This section discusses how the proposed regulations address MAP-21's charge to establish performance measures for State DOTs and MPOs to use to assess: the performance of the Interstate System and non-Interstate NHS for the purpose of carrying out the NHPP; freight movement on the Interstate System; and traffic congestion and on-road mobile source emissions for the purpose of carrying out the CMAQ program. Subpart A discusses common aspects of the proposed rulemaking related to definitions, reporting, significant progress determination, and target establishment. Discussion of the performance measures is organized into four subparts covering three performance areas, including: Subpart E, which discusses proposed measures to assess performance of the

NHS; Subpart F, which discusses the proposed measure to assess freight movement on the Interstate System; and Subparts G and H, which discuss the proposed CMAQ measures to assess traffic congestion and on-road mobile source emissions, respectively.

Subparts E, F, G, and H of the proposed regulations provide the requirements for the system performance, traffic congestion, freight movement, and on-road mobile source emissions measures, including any required methodologies for data collection, data requirements, and processes for calculating the measures. The Section-by-Section discussion also addresses procedural discrepancies in data collection and reporting, and attempts to align them using the latest research and state-of-the-practice experience to provide consistent national performance measures.

**A. Common Issues Across Subparts E, F, and G**

The FHWA established and followed certain standards in the development of the requirements proposed in Subparts E, F, and G. For example, for the proposed rules associated with assessing the performance of the NHS, freight movement on the Interstate, and traffic congestion, FHWA attempted to use a consistent framework and structure, to the extent possible, because the performance measures associated with these subparts are largely based on vehicle travel times and speeds. The following sub-sections summarize the overarching framework and guiding principles used across these subparts. Information related to the development of the requirements proposed in Subpart H is discussed separately

**Measures that Focus on Outcomes for Assessing the Performance of the NHS, Freight Movement on the Interstate, and Traffic Congestion**

Transportation performance outcomes can be impacted through the use of a wide range of strategies that support the transportation priorities and policies of local areas. In its decisionmaking to develop proposed measures, FHWA was careful to avoid any measures that would impact the ability of a State DOT or MPO to make decisions that work for the local area. For this reason, FHWA focused only on measures that track transportation performance where outcomes could tell a national story.

The proposed measures in Subparts E, F, and G of this rulemaking focus primarily on the consistency and efficiency of travel times on our Nation's highways. Improvements to this outcome could be the result of a wide range of strategies such as those that would improve the operations of highway facilities and those that would decrease the demand on highway facilities by providing alternative transportation choices. The FHWA believes that the selection of these strategies is a local decision and should not be influenced directly by the measure itself. For this reason, FHWA elected not to propose measures that would directly measure the implementation of strategies to improve system operations (i.e., percent modal use, or number of managed lanes).

**Measures that Use Travel Time Data for Assessing the Performance of the NHS, Freight Movement on the Interstate, and Traffic Congestion**

This rulemaking's proposals for subparts E, F, and G (performance of the NHS, freight movement on the Interstate, and traffic congestion-related measures) are based on travel times or travel speeds of highway users. Travel times and speeds are being

proposed as the basis for these measures as FHWA feels that this information accurately reflects highway operational performance and that the data can be captured across the full NHS in an accessible national data source in a timely and reliable manner. The FHWA is proposing the use of the new NPMRDS as the data source to calculate the metrics for the seven travel time/speed based measures to ensure consistency and coverage at a national level. This data set provides travel times representative of all traffic (freight and passenger vehicles) traveling on the NHS and captures this information every 5 minutes throughout every day of the year. The FHWA expects to continue to provide this data set to State DOTs and MPOs as long as there is a need at a national level for this information. The proposed regulations allow State DOTs to use alternative data sources provided the data set is considered at least equivalent in quality, coverage, and timeliness to the NPMRDS and is approved by FHWA. States DOTs and MPOs have the option to relate the travel time data provided in the NPMRDS to their relevant location referencing system (typically used for transportation planning).

As proposed in section 490.103, States and MPOs shall cooperatively develop and share information related to transportation systems performance data. The transportation systems performance data would include the travel time data set, the selected reporting segments, and the desired peak period travel time required for use under subparts E, F, and G.

When the State DOT selects the travel time data set, it must coordinate with the MPOs in the State that are subject to creating the metrics and measures in subparts E, F, and G. When the State selects the reporting segments and the Desired Peak Period Travel

Time for a particular reporting segment, State DOTs must coordinate with the applicable MPOs that contain the reporting segment within their metropolitan planning area boundary. States and MPOs must use the same data (the travel time data set, the reporting segments, and the desired peak period travel time for a reporting segment) for the purposes of calculating the metrics and measures.

**Dealing with Missing Data when Assessing the Performance of the NHS, Freight Movement on the Interstate, and Traffic Congestion**

Travel times and speeds of highway users may be captured from a variety of sources such as mobile phones, vehicle transponders, portable navigation devices, roadway sensors, and cameras. It is possible that during the day, during specific 5-minute intervals, travel time or speed data cannot be captured. Five-minute bins without data would not be reported in the NPMRDS, and would therefore be considered missing. This can occur due to one of the following reasons:

- Reason 1 – No users traveled on the roadway during the 5-minute interval, or
- Reason 2 – Travel occurred on the roadway but no sources of data were recognized (i.e., mobile phones, vehicle transponders, portable navigation devices), or
- Reason 3 – Equipment failure (e.g., sensor malfunction, communication system failure).

The FHWA believes that, although missing data is possible due to Reason 2 listed above, the likelihood of this condition occurring will decrease over time as data capture

technologies advance and as a greater percentage of highway users carry equipment that allows them to become viable travel time data sources. The FHWA also believes that it is valid to assume that travel occurring under the conditions that would result in missing data for Reason 1 would be consistent with free flow travel speeds. Lastly, for Reason 3, FHWA realizes that there are times when equipment used to capture data may fail because of usage, damage, or other causes. The FHWA believes this will be a more infrequent cause of missing information than Reason 1. For these reasons, FHWA is proposing in this rulemaking that missing travel time data be assumed to be occurring due to Reason 1 for purposes of the reliability measures (both freight and system performance) on the Interstate and, consequently, assumes travel times that are consistent with posted speed limits when data is missing.

The FHWA found, after analysis of missing data in the NPMRDS (a white-paper on missing data/outliers' impact on proposed measures is included in the docket), that there was currently sufficient data for the Interstate so States and MPOs could establish reasonable targets. However, the analysis also demonstrated that at the current time there is enough missing data for the non-Interstate NHS that it could impact the ability of States and MPOs to establish targets. Accordingly, FHWA is proposing that the non-Interstate reliability measures would be phased in, giving the States and MPOs an opportunity to understand the impact of missing data on target establishment and time for the NPMRDS to become more complete.

Regarding the peak hour travel time measures, which include both the Interstate and non-Interstate NHS, the measures rely on hourly average travel times. Missing data

does not have the same impact on target establishment for the peak hour travel time measures as it does for the reliability measures. So, FHWA proposes no replacement of missing data for either of the peak hour measures. However, in its analysis of the data, FHWA noted that outliers could have an effect on these measures, so FHWA is proposing that States and MPOs remove extreme outliers (i.e., those travel times at speeds less than 2 mph and over 100 mph) from the data set before calculating the peak hour measures. These outliers are further discussed in a white-paper on missing data/outliers' impact on proposed measures, which is included in the docket.

Missing data potentially could have an impact on target establishment for the traffic congestion measure (Annual Hours of Excessive Delay Per Capita). Because this is a delay measure that sums all the delay identified on segments, missing data could mean missing some delay in calculating the measure. This could make it difficult for States and MPOs to achieve targets due to more complete data may be available in the future. The FHWA is proposing that this measure would be phased in, to allow States and MPOs time to understand the impact of missing data on establishing targets, and for the NPMRDS to become more complete.

As mentioned, a white-paper on missing data/outliers' impact on proposed measures is included in the docket. This paper includes information on options such as applying a path-type processing that uses the actual observations of the vehicles on segments adjacent to those segments with missing data and that traversed the segment with missing data to fill in the missing travel times, and the impacts of trimming the data

at 2 and 100 mph. The FHWA is seeking comment on this process and other processes that FHWA should consider to improve missing data and outlier impacts.

**Phasing in Target Establishment Requirements for Less Mature Measures**

The FHWA is proposing a phased-in approach to the establishment of targets for both the non-Interstate NHS reliability measure and the traffic congestion (excessive delay) measure. The phased-in approach would provide 2 years for data coverage on non-Interstate NHS roadways to be more complete and for States and MPOs to understand the impacts of missing data on establishing targets. The completeness of travel time data in the NPMRDS is greater for the Interstate as compared to other NHS roadways. The FHWA believes that the completeness of data in the NPMRDS will improve over time as sources become more prevalent (missing data is discussed in a white paper provided on the docket). The FHWA also believes that State DOTs have more experience in collecting and reporting reliability and congestion performance on the Interstate as compared to other NHS roadways and, as a result, are more readily capable to establish targets for the Interstate System. However, missing data for the non-Interstate NHS may lead to uncertainty for State DOTs and MPOs as they establish targets. Giving time to State DOTs and MPOs to establish targets for the non-Interstate NHS may help them learn how to manage that uncertainty. For these reasons, FHWA believes that a phased approach to target establishment is appropriate for those measures that are derived from data on the non-Interstate NHS.

**Travel Time Reliability for Assessing the Performance of the NHS and Freight Movement on the Interstate**

The FHWA heard consistently from stakeholders that managing the travel time reliability of the highway network is important and should be considered as part of this rulemaking. For this reason, as part of this rulemaking FHWA is proposing the establishment of travel time reliability measures. In general, the proposed reliability measures address: 1) the reliability of the entire NHS for all travelers; and 2) the reliability of the Interstate System for longer haul freight movements. Reliability focuses on variability in travel times, and the travel time measures in this rulemaking focus on identifying portions of the NHS and Interstate (for freight) that have high levels of unreliable travel. An example of unreliable travel is a trip that takes 30 minutes on a typical day but could take over 45 minutes on a random day. This extra trip time might be due to a road or lane closure, a traffic accident, or bad weather. The FHWA intends that the measure for reliability of the NHS for all travelers would be used to identify the areas of the transportation network where there are the greatest impacts on travel when non-recurring incidents occur. Non-recurring incidents include temporary disruptions, such as incidents ranging from a flat tire to an overturned hazardous material truck, work zones, weather, and special events. In contrast, the proposed measure for freight travel time reliability is based only on freight travel and considers the longest travel times experienced as compared to travel times more likely during normal travel time conditions throughout all hours of the day. The index provided by this reliability measure is an important piece of information for shippers and suppliers so they can plan for a higher

likelihood of on-time arrivals of deliveries. These reliability measures are discussed in more detail in the section-by-section portion of this NPRM.

**Travel Time Delay for Assessing Freight Movement on the Interstate and Traffic Congestion**

The FHWA is proposing two measures to assess traffic congestion: 1) One measure to represent congestion impacting freight movement, which is proposed in Subpart F; and 2) One measure to represent overall traffic congestion, which is proposed in Subpart G. Although both proposed measures use delay as the basis for determining congestion, the two differ in design and intended purpose.

The first proposed congestion measure related to freight movement is focused on delay and is intended to be used to assess delay that could occur on the Interstate System. This proposed delay measure represents the percentage of the Interstate System that is uncongested as defined by a speed threshold of 50 mph. The FHWA aimed to understand the point of inflection to consider speeds and viewed 50 mph as appropriate for this measure. This is due in part because trucks often have speed governors installed on them so that they cannot travel much faster than 55 mph. Additionally, freight stakeholders commented that 50 mph or greater is where they would like to be in terms of average speed. The FHWA is seeking comment on this threshold.

The second proposed measure, related to traffic congestion and focused on Annual Hours of Excessive Delay Per Capita, is intended to be used to assess delays that FHWA believes would be considered excessive by users of the NHS roadways in large urbanized areas. This proposed delay measure is an indication of the additional time

spent by all users of the system (quantified by the total estimated vehicles using the system) when traveling at speeds considerably lower than typical speed limits. In addition, this measure is proposed to be only applicable to the largest urbanized areas in the country: the portion of those that exceed a population of 1 million.

**Reliable Performance for the NHS and Freight Movement on the Interstate**

Three of the eight measures proposed in this rulemaking focus on measuring reliable performance: 1) Section 490.507(a)(1) Percent of the Interstate System providing for reliable travel times, 2) Section 490.507(a)(2) Percent of the non-Interstate NHS providing for reliable travel times, and 3) Section 490.607(a) Percent of the Interstate System Mileage providing reliable truck travel times. The discussions provided in this section provide an explanation of how "reliable" performance is defined, understanding that the meaning of this term can be very subjective, especially when discussing outcomes that are derived from travel time and speed data. Each of the measures that focus on "reliable" performance includes a clearly defined calculation to remove any subjectivity in the meaning of the term. As discussed above, FHWA is proposing measures that, although they include similar methods of calculation, would be used to assess different aspects of highway performance. In general, reliable performance for the five proposed measures can be grouped as follows:

- Subpart E – Travel time reliability as being reliable for highway users;
- Subpart F – Truck travel time reliability as being reliable for shippers and suppliers.

Additional discussion is provided in each subpart to explain the method used to identify the percentage of the transportation network that would be considered "reliable" to these different users and stakeholders.

**Impact of Traffic Volumes on Travel Time Derived Measures**

The measures being proposed in this rulemaking that are derived from travel times reflect: system reliability, peak hour travel times, truck congestion, and excessive delay. With the exception of excessive delay, FHWA did not factor the volume of traffic in the calculations for these proposed measures. Consequently, these measures do not directly capture the weight of traffic volumes in the results. Rather, the measures are calculated based on the length of roadway segments. Table 8 below provides a very simple example to illustrate the impact of traffic volume on the measure calculation:

**Table 8 – An Example to illustrate the impact of traffic volume on the measure calculation**

| Road Segment Length (direction-miles) | Annual Traffic Volume (thousands of vehicles) | Reliable? | Length Reliable (direction-miles) | Vehicle Miles Reliable (thousands) | Vehicle Miles Traveled (thousands) |
|---|---|---|---|---|---|
| 5 | 2,700 | Yes | 5 | 13,500 | 13,500 |
| 1 | 73,000 | No | 0 | 0 | 73,000 |
| 3 | 5,000 | Yes | 3 | 15,000 | 15,000 |
| 6 | 1,700 | No | 0 | 0 | 10,200 |
| 2 | 50,000 | Yes | 2 | 100,000 | 0 |
| 2 | 18,000 | Yes | 2 | 36,000 | 36,000 |
| 1 | 75,000 | Yes | 1 | 75,000 | 75,000 |
| **Total = 20** | | | **Total = 13** | **Total = 239,500** | **Total = 322,700** |

In this simplified example using a mileage based approach 13 direction-miles, or 65.0 percent (13/20), of the network would be considered "reliable," and using a volume weighted approach 239,500 VMT, or 74.2 percent (239,500/322,700), of the VMT would have been "reliable." This example illustrates the differences in these two approaches.

Except for the excessive delay measure, FHWA elected to use a mileage based approach and not to weigh the measures by volume due to the absence of data regarding actual traffic volumes particularly for the level of roadway coverage and granularity needed (entire NHS and 5-minute temporal granularity). The system reliability, peak hour travel times, and truck congestion measures are intended to evaluate system performance. This objective can be achieved by analyzing performance on roadway segments and then indicating, via roadway segment length, whether or not a segment is performing to a satisfactory level (based on thresholds defined in this rule). If actual, observed volumes were available at these roadway segment levels every 5 minutes as well, an optional approach would be to identify the amount of VMT that met the measure thresholds, as demonstrated in Table 8. This would require actual volume counts every 5 minutes for every NHS road segment, data which do not currently exist. The FHWA believes it would be inappropriate to introduce estimated data for these measures, which are otherwise focused on actual data. As a result, FHWA is proposing the use of roadway segment length as the means for reporting the metrics and measures.

In addition, FHWA believes performance expressed as the percent of the system mileage is more easily understood by the public as compared to measures that would be

expressed as the percentage of vehicle miles traveled. The FHWA encourages State DOTs and MPOs to consider strategies that would provide the greatest impact to improving the performance of overall traffic volumes by focusing on roadway segments that carry higher volumes of traffic.

The Total Excessive Delay measure, on the other hand, needs to be weighted by something to be meaningful, as it is basically a sum of all the excessive travel times on the NHS in an urban area. If excessive delay during a 5 minute period (say 5 seconds) were simply totaled for every 5 minute period and roadway segment, then the excessive delay travel time on a roadway segment with one car would be equivalent to a roadway segment with 110 cars. Such an analysis would not capture the scope of the delay (how many vehicles are actually experiencing that 5 second excessive travel time). Hourly volumes (of vehicles) are a typical means of weighting delay measures. Therefore, for the Total Excessive Delay measure, FHWA requires development of hourly volumes based on actual vehicle counts or estimated from AADT (an estimated number from limited vehicle count data). State DOTs and MPOs can develop hourly volume estimates with AADT information provided to HPMS every year for their NHS roadways. In this case, using the best-available data, even if it is estimated, is preferable than not using such data, because DOTs and MPOs would have difficulty setting targets for this measure without weighting it by the number of vehicles experiencing the delay.

The FHWA is seeking comments on this approach and encourages comments suggesting alternative methods that may more effectively capture the impact of performance changes on differing levels of system use.

**Focus on Large Urbanized Areas for Assessing the Performance of the NHS and Traffic Congestion**

In addition to travel time reliability, FHWA is proposing travel time or speed based measures to assess and manage the worst areas of delay or congestion in large urbanized areas. The FHWA felt that this type of measure was most applicable to urbanized areas where populations are greater than 1 million, as these areas are where delay is most likely to occur, and where State DOTs and MPOs likely have a greater level of capability, experience, and need to manage the traffic operations. As proposed, three of the seven travel time or speed based measures are limited to these large urbanized areas. They are: 1) section 490.507(b)(1) Percent of the Interstate System where peak hour travel times meet expectations, 2) section 490.507(b)(2) Percent of the non-Interstate NHS where peak hour travel times meet expectations, and 3) section 490.707 Annual Hours of Excessive Delay Per Capita. The peak hour travel time measures capture congestion only during peak periods of use (commute-related congestion) and the annual hours of excessive delay per capita captures congestion throughout the day (overall delay).

The FHWA is proposing that only urbanized areas over 1 million in population would be subject to these measures because of the additional performance-reporting requirements that these areas, which are also nonattainment or maintenance areas, have to complete for the CMAQ-related measures (23 U.S.C. 149(l)) including Annual Hours of Excessive Delay per Capita. By requiring MPOs in these areas to do additional CMAQ performance reporting, Congress placed a special emphasis on these larger urbanized

areas. The FHWA considered this emphasis when it evaluated whether all areas or only a smaller subset of areas within a State should be subject to the traffic congestion measure.

In FHWA's experience, areas over 1 million in population are generally more complex from a transportation perspective. Those areas have more population, resulting in more trips. These areas also tend to have a variety of transportation options available, including highways, airports, commercial rail. In more concentrated urban environments, the areas may also be more constrained in terms of where any new facilities to accommodate demand can be located. There also may be higher costs for right-of-way acquisition. For all these reasons, FHWA's experience is that transportation planning in these larger urban areas is generally more complex than in areas less than 1 million in population, resulting in a greater need to manage the transportation system and, specifically, traffic operations. In addition, these larger areas do receive more Surface Transportation Program suballocated funding than smaller areas (see 23 U.S.C. 133(d)). For all these reasons, FHWA believe it is important that these areas look more closely peak hour travel times and excessive delay as they are managing traffic operations.

The FHWA also considered whether the measure should apply: to another subset of areas within the State, such as areas where MPOs serve a TMA[51] as these areas may have more experience with the congestion management process provided for in 23 U.S.C. 134(k); to all urbanized areas within the State; or to the entire State. Because of the

[51] A transportation management area (TMA) is defined in Federal statute (23 U.S.C. 134(k)) as an urbanized area having a population of over 200,000, or otherwise designated by the Governor and the MPO and officially designated by the FHWA and FTA Administrators.

additional burden involved in measuring peak hour and traffic congestion, FHWA is proposing that only urbanized areas where populations are greater than 1 million in population would be subject to these measures. The FHWA is requesting comment on: whether a population threshold should be used for determining the measure applicability; and if so then whether 1 million is the appropriate threshold, or whether another threshold (e.g., population over 200,000) would be more appropriate.

Within the United States there are 42 urbanized areas that have populations greater than 1 million based on the most recent U.S. Census (2010). These 42 areas are included within or intersect with 35 State and 67 metropolitan planning area boundaries. The FHWA is proposing that for these measures (traffic congestion measure and the peak hour travel time measures for system performance), one single target be established for the roadways within the urbanized area, including those areas that intersect with multiple State and metropolitan planning area boundaries. This single target would need to be agreed upon and shared by all of the entities in the urbanized area. For example, one target would be established for the Philadelphia urbanized area that would be shared by the four States and four MPOs that collectively make transportation investment decisions for the area. The FHWA recognizes that for these large areas, performance is not constrained by political boundaries and that strategies to address performance should be addressed regionally and across political boundaries. For these measures, strategies taken in one political jurisdiction can have direct and indirect impacts when measuring performance in another proximate political jurisdiction. The FHWA felt that this

approach would increase the potential for coordination across jurisdictions to manage the overall performance of the region.

**Starting with Highways and Expanding to other Surface Transportation Modes for Assessing Traffic Congestion**

The FHWA heard from many stakeholders that the traffic congestion measure should consider the mobility of travelers using all modes of surface transportation such as highways, commuter railways, bikeways, and walkways. The measure proposed in this rulemaking to assess traffic congestion does not fully address this as it is focused only on vehicle delays on NHS highways. The FHWA elected to propose a vehicle delay measure at this time due to the limited availability of reliable, accurate, comprehensive, and timely data for the other surface transportation modes. This type of data would be needed to calculate a more comprehensive delay measure that considers all travelers and all surface modes of transportation. However, FHWA would like to move to a measure in the future that would consider the mobility of travelers using all surface modes of transportation and is seeking comment on feasible approaches that can be taken to move toward the development of such as measure. The CMAQ traffic congestion delay measure proposed in this rulemaking does consider the travel times of vehicles and passengers to the extent they are captured as sources during data collection. In addition, the CMAQ traffic congestion delay measure is expressed as a rate by dividing the total vehicle delay in the area by the total population of the area, which would potentially reflect successful implementation of strategies to provide transportation choices other

than highway travel. This proposal is discussed in more detail in the Section-by-Section portion of this preamble for Subpart G.

**Improving the Operations of the Existing Transportation Network by Assessing Traffic Congestion**

The FHWA heard from many stakeholders that the traffic congestion measure should directly capture the impact of transportation network connectivity issues and land use decisionmaking to improve public accessibility to essential services. The FHWA believes that the delay measure proposed in this rulemaking to assess traffic congestion will reflect these types of strategies to the degree they minimize impacts on highway traffic operations. However, FHWA is not proposing a measure to directly assess transportation connectivity or accessibility. The focus of the proposed measure is to improve the operations of the existing network by reducing congestion, and does not assess if the network or use of land, as designed, is providing for the most efficient connections to adequately move people and goods from their origin to their destination. The FHWA believes that the scope of 23 U.S.C. 150(c) relates to establishing measures for State DOTs and MPOs to use to assess traffic congestion for the purpose of carrying out section 149, which is a component of the Federal-aid highway program. Improving overall network connectivity is a priority for DOT and FHWA. Outside of this rulemaking, FHWA, in cooperation with FTA, is actively working with transportation operating agencies and planning organizations on efforts to understand and advance best practices in assessing and managing transportation network connectivity to improve public accessibility to essential services.

## B. Issues Relating to Subpart H

In the development of the requirements in Subpart H, FHWA attempted to use a similar approach as in other subparts. Subpart H is focused on emissions reduced by CMAQ-funded projects in a nonattainment or maintenance area. A summary of the framework used is discussed below.

***Use of Existing/Available Dataset for Assessing On-Road Mobile Source Emissions***

This rulemaking proposes to use data included in the existing CMAQ Public Access System to calculate the metric for the on-road mobile source emissions measure. The CMAQ Public Access System is a database of CMAQ project information reported by each State DOT as part of the CMAQ annual reports to FHWA. The Public Access System contains all CMAQ-funded projects by Federal fiscal year and their estimated emissions reductions by pollutant and precursor applicable to the CMAQ program. For purposes of calculating the on-road mobile source emissions measure, use of this existing data set provides a national data source for emissions reductions estimates and will not require a new data collection process.

***Dealing with Missing Data when Assessing On-Road Mobile Source Emissions***

While quantitative emissions reductions are expected for most projects entered into the CMAQ Public Access System, it is not required nor has it been possible for some pollutants, especially PM emissions. Project sponsors have always had the option to provide a qualitative assessment based on a reasoned and logical evaluation of a project or programs emission benefits. Also, prior to December 20, 2012, EPA's emission model had significant limitations that made it unsatisfactory for use in microscale analyses of

PM2.5 and PM10 emissions. Once MOVES was released on December 20, 2010, areas had a 2 year grace period before the model was required to be used for CAA purposes and many areas also used that grace period to transition to using the model for estimating emissions for CMAQ projects. Therefore, the CMAQ Public Access System includes a mix of both quantitative and qualitative emissions estimates, and in some cases, incomplete emissions estimates for certain pollutants.[52]

In order to reflect the performance of the CMAQ program in reducing on-road mobile source emissions, FHWA is proposing to include only projects with quantitative emissions estimates in the proposed measure. The FHWA understands that State DOTs and/or MPOs may want to amend their project information with quantitative emissions estimates so the emissions reductions can be included in the performance measure. The FHWA is proposing that State DOTs and/or MPOs be allowed to amend their emissions information for projects in the CMAQ Public Access System to include a quantitative emissions estimate where a qualitative analysis may have been used in the past or, in the case of PM emissions, where an appropriate model was not available. State DOTs and/or MPOs would not be required to amend their project information, but we are also soliciting comments on other ways State DOTs and/or MPOs may update or amend their project information with quantitative emissions estimates for use in implementing this performance measure.

[52] FHWA is currently conducting a research effort in an attempt to understand the impact of missing data in the implementation of this measure.

***Focus on Nonattainment and Maintenance Areas when Assessing On-Road Mobile Source Emissions***

The FHWA heard from stakeholders that while all States receive some level of CMAQ funding, the CMAQ on-road mobile source emissions measure should only apply in nonattainment and maintenance areas. The main purpose of the CMAQ program is to fund transportation projects or programs that will contribute to attainment or maintenance of the NAAQS for $O_3$, CO, and PM (both $PM_{10}$ and $PM_{2.5}$). Therefore, FHWA determined that the performance measure should also focus on that same purpose. For this reason, the proposed measure in this rulemaking is only applicable to nonattainment and maintenance areas within a State. If a State does not have any nonattainment or maintenance areas, then FHWA is proposing this measure would not apply to them.

***Further Improvements to the Public Access System to Ease the Assessment On-Road Mobile Source Emissions***

While the CMAQ Public Access System has been available since summer 2011, and FHWA has been keeping a database of CMAQ projects and their estimated emissions since the beginning of the program, there are opportunities to improve the data. In addition to increasing the number of projects with quantitative emissions estimates, the quality of the data and methods used to calculate emissions can also be improved. The FHWA is developing a tool kit, that will be released in modules beginning late spring 2016, of best practices for estimating emissions by project type for project sponsors to improve the assumptions and calculations used in their quantitative estimates. The

FHWA developed cost effectiveness tables[53] to be used as a guide by State DOTs and MPOs during the project selection process and when developing performance plans under 23 U.S.C. 149(l). Finally, FHWA also improved the function and usability of the Public Access System in February 2016 to make it easier to develop reports needed for both this rulemaking and the CMAQ performance plan requirements under 23 U.S.C. 149(l) [54].

### *C. Detailed Discussion of the Proposed Subparts*

The elements discussed above were used by FHWA to develop the proposed regulations presented in this rulemaking. The next sections of this NPRM provide detailed discussions on each of the proposed measures and how they could be used by State DOTs and MPOs to establish and report on targets and by FHWA to assess progress made toward the achievement of targets.

#### 1. Subpart A: General Information, Target Establishment, Reporting, and NHPP and NHFP Significant Progress Determination

In this section, FHWA describes the proposed additions to Subpart A, which covers general information, target establishment, reporting, and NHPP and NHFP significant progress determination. This section builds on the proposal introduced in the second NPRM that covered measures to assess pavement and bridge condition on the NHS. For a complete picture, readers are directed to the docket which contains the regulatory text for Subpart A in its entirety. In addition, this section also incorporates the

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[53] http://www.fhwa.dot.gov/environment/air_quality/cmaq/reference/cost_effectiveness_tables/costeffectiveness.pdf

[54] https://fhwaapps.fhwa.dot.gov/cmaq_pub/

FAST Act changes to the NHPP significant progress determination, and the addition of a requirement for a NHFP significant progress determination. The discussions of the proposed requirements are organized as follows:

- Section 490.101 discusses proposed definitions;
- Section 490.103 describes the proposed data requirements;
- Section 490.105 presents the proposed requirements related to establishing performance targets;
- Section 490.107 discusses reporting on performance targets;
- Section 490.109 describes assessing significant progress toward achieving the performance targets for the NHPP and NHFP; and,
- Section 490.111 discusses the material FHWA would incorporate by reference into the proposed rule.

The proposed measures in this NPRM are summarized in Table 9 below. The proposed measures are grouped in 490.105(c) to better reference the proposed measures throughout Subpart A.

**Table 9– Summary of Proposed Measures in the 3rd NPRM**

| **Measure Groups in §490.105(c)** | **Proposed Performance Measures [23 CFR]** | **Measure Applicability [23 CFR]** | **Metric Data Source [23 CFR] & Collection Frequency** | **Metric Reporting** | **Metric** | **Measure Calculation** |
|---|---|---|---|---|---|---|
| NHS Travel time reliability measures [§490.105(c)(4)] | Percent of the Interstate System providing for Reliable Travel Times [§490.507(a)(1)] | Mainline of the Interstate System [§490.503] | NPMRDS or Equivalent [§490.103] – 5-minute cycle | Annual metric reporting to HPMS [§490.511(d)] | Level of Travel Time Reliability (LOTTR) [§490.511] | Percentage of the Interstate direction-miles of reporting segments with "LOTTR < |

| Measure Groups in §490.105(c) | Proposed Performance Measures [23 CFR] | Measure Applicability [23 CFR] | Metric Data Source [23 CFR] & Collection Frequency | Metric Reporting | Metric | Measure Calculation |
|---|---|---|---|---|---|---|
| | | | | | | 1.50" [§490.513] |
| | Percent of the non-Interstate NHS providing for Reliable Travel Times [§490.507(a)(2)] | Mainline of the non-Interstate NHS [§490.503] | NPMRDS or Equivalent [§490.103] – 5-minute cycle | Annual metric reporting to HPMS [§490.511(d)] | Level of Travel Time Reliability (LOTTR) [§490.511] | Percentage of the Interstate direction-miles of reporting segments with "LOTTR < 1.50" [§490.513] |
| Peak hour travel time measures [§490.105(c)(5)] | Percent of the Interstate System where peak hour travel times meet expectations [§490.507(b)(1)] | Mainline of the Interstate System in urbanized areas with a population over 1 million [§490.503] | NPMRDS or Equivalent [§490.103] – 5-minute cycle | Annual metric reporting to HPMS [§490.511(d)] | Peak Hour Travel Time Ratio (PHTTR) [§490.511] | Percentage of the non-Interstate NHS direction-miles of reporting segments with " PHTTR < 1.50" [§490.513] |
| | Percent of the non-Interstate NHS where peak hour travel times meet expectations [§490.507(b)(2)] | Mainline of the non-Interstate NHS in urbanized areas with a population over 1 million [§490.503] | NPMRDS or Equivalent [§490.103] – 5-minute cycle | Annual metric reporting to HPMS [§490.611(d)] | Peak Hour Travel Time Ratio (PHTTR) [§490.511] | Percentage of the non-Interstate NHS direction-miles of reporting segments with " PHTTR < 1.50" [§490.513] |
| Freight movement on the Interstate System measures [§490.105(c)(6)] | Percent of the Interstate System Mileage providing for Reliable Truck Travel Times [§490.607(a)] | Mainline of the Interstate System | NPMRDS or Equivalent [§490.103] – 5-minute cycle | Annual metric reporting to HPMS [§490.611(d)] | Truck Travel Time Reliability [§490.611] | Percentage of the Interstate direction-miles of reporting segments with "Truck Travel Time Reliability < 1.50". |
| | Percent of the Interstate System Mileage Uncongested [§490.607(b)] | Mainline of the Interstate System | NPMRDS or Equivalent [§490.103] – 5-minute cycle | Annual metric reporting to HPMS [§490.6 11(d)] | Average Truck Speed [§490.611] | Percentage of the Interstate direction-miles of reporting segments with "Average Truck Speed≥ 50 mph" |

| Measure Groups in §490.105(c) | Proposed Performance Measures [23 CFR] | Measure Applicability [23 CFR] | Metric Data Source [23 CFR] & Collection Frequency | Metric Reporting | Metric | Measure Calculation |
|---|---|---|---|---|---|---|
| | | | | | | [§490.613] |
| Traffic congestion measure [§490.105(c)(7)] | Annual Hours of Excessive Delay Per Capita [§490.707] | Mainline of NHS in urbanized areas with a population over 1 million in Nonattainment or Maintenance for any of the criteria pollutants under the CMAQ program | NPMRDS or Equivalent [§490.103] – 5-minute cycle. Traffic volume and population data in HPMS | Annual metric reporting to HPMS [§490.711(f)] | Total Excessive Delay [§490.711] | Annual Hours of Excessive Delay per Capita = (Total Excessive delay )/(total population of UZA ) [§490.713] |
| On-road mobile source emissions measure [§490.105(c)(8)] | Total Emission Reductions for applicable criteria pollutants [§490.807] | All Nonattainment and Maintenance areas for CMAQ criteria pollutants [§490.803] | CMAQ Public Access System | CMAQ Public Access System [§490.809] | Annual Project Emission Reductions [§490.811] | Cumulative emission reduction due to all projects for each of the criteria pollutant or precursor for which the area is in nonattainment or maintenance ($PM_{2.5}$, $PM_{10}$, CO, VOC and NOx). [§490.813] |

**Discussion of Section 490.101 General Definitions**

In this section, FHWA proposes to define and describe the proposed use of key terms that will be used throughout this NPRM. The first NPRM and the second NPRM included several definitions (full extent, HPMS, measure, metric, National Bridge Inventory (NBI), non-urbanized area, performance period, and target) that are repeated in this NPRM to clarify the proposed implementation of the performance measures. Please

see the docket for the entire listing of proposed definitions and for any additional information.

The FHWA proposes to define "criteria pollutant" in the same way as this term is defined in the general conformity rule at 40 CFR part 93, Subpart B (specifically, 40 CFR 93.152). As part of this definition, FHWA proposes to list the transportation-related criteria pollutants from the transportation conformity rule at 40 CFR 93.102(b)(1).

The FHWA proposes to include a definition for "freight bottleneck" for use in Part 490. A freight bottleneck is a segment of the Interstate System not meeting thresholds for freight reliability and congestion, as identified in section 490.613, and any other locations the State DOT wishes to identify as a bottleneck based on its own freight plans or related documents.

The FHWA proposes to include a definition for "Full Extent" to delineate data collection methods that utilize a sampling approach versus those that use a continuous form of data collection.

The FHWA proposes to include a definition for "Highway Performance Monitoring System (HPMS)" because it will be one of the data sources used in establishing a measure and establishing a target. The HPMS is an FHWA maintained, national level highway information system that includes State DOT-submitted data on the extent, condition, performance, use, and operating characteristics of the Nation's highways. The HPMS database was jointly developed and implemented by FHWA and State DOTs beginning in 1974 and it is a continuous data collection system serving as the primary source of information for the Federal Government about the Nation's highway

system. Additionally, the data in the HPMS is used for the analysis of highway system condition, performance, and investment needs that make up the biennial Condition and Performance Reports to Congress. These Reports are used by the Congress in establishing both authorization and appropriation legislation, activities that ultimately determine the scope and size of the Federal-aid highway program. Increasingly, State DOTs, as well as the MPOs, have utilized the HPMS as they have addressed a wide variety of concerns about their highway systems.[55] Numerous State DOTs and some MPOs use HPMS data and its analytical capabilities for supporting their condition/performance assessment, investment requirement analysis, strategic, and State planning efforts, etc.

The FHWA proposes to define "mainline highway" to limit the extent of the highway system to be included in the scope of the proposed pavement performance measures. The proposed definition for mainline highway includes the primary traveled portion of the roadway and excludes ramps, climbing lanes, turn lanes, auxiliary lanes, shoulders, and non-normally traveled pavement surfaces.

The FHWA proposes to include a definition for "measure" because establishing measures is a critical element of an overall performance management approach and it is important to have a common definition that FHWA can use throughout the Part. To have a consistent definition for "measure," FHWA proposes to make a distinction between "measure" and "metric." Hence, FHWA proposes to define "metric" as a quantifiable

[55] Highway Performance Monitoring System, FHWA Office of Policy Information. *http:// www.fhwa.dot.gov/policyinformation/hpms/nahpms.cfm*.

indicator of performance or condition and to define "measure" as an expression based on a metric that is used to establish targets and to assess progress toward achieving the established targets.

The FHWA proposes to include a definition of the "National Performance Management Research Data Set (NPMRDS)" because use of this FHWA-furnished data set by States and MPOs is proposed for calculating metrics to assess: performance of the Interstate System and non-Interstate NHS in Subpart E; freight movement on the Interstate System in Subpart F; and traffic congestion for the purpose of carrying out the CMAQ Program in Subpart G. The FHWA's proposed definition of the NPMRDS is a data set derived from vehicle-based probe data that includes average travel times representative of all segments of the NHS for all traffic and for freight traffic. It is important to note that for the purpose of this rulemaking, the freight measures require the use of the freight traffic travel times that are representative of freight trucks for those segments that are on the Interstate System only. The NPMRDS includes freight trucks for all segments of the NHS. Segments are defined by the Traffic Message Channel (TMC) location referencing system used by private sector probe data providers. Segment lengths are typically set as the distance between interchanges, intersections, etc., on roadways, and can be as small as $1/10^{th}$ of a mile or longer than 10 miles, depending on location. The data set contains records that include average travel times for every 5 minutes of every day (24 hours) of the year, recorded and calculated for every travel time segment where probe data is available. The NPMRDS does not include any imputed travel time data (i.e., data that is not from actual observations such as that derived from

historical data for similar days/times). The NPMRDS is used by FHWA to research and develop transportation system performance measures and information related to mobility, including travel time, speed, and reliability. Each travel time segment in the NPMRDS has a maximum of 105,408 5-minute average travel time data points annually.[56] Monthly updates to the NPMRDS are made available to State DOTs and MPOs by the middle of the month following collection (e.g., February 2015 data would be available around March 15, 2015). Each NPMRDS segment is identifiable via a unique geographic location reference called a TMC code. The TMC codes are used by most private sector mapping companies and data providers. Any State DOT or MPO using NPMRDS data has the option to use the TMC coding system to match the NPMRDS segment-level data to the State DOT or MPO's own NHS location referencing system. The FHWA believes use of a national travel time data set by States or MPOs will yield the best data consistency across the States and MPOs and provide for total coverage of the NHS.

The FHWA proposes to include a definition for "non-urbanized areas" to provide clarity in the implementation of the provision in 23 U.S.C. 150(d)(2) that allows the State DOTs the option of selecting different targets for "urbanized and rural areas." As written, the statute is silent regarding the small urban areas that fall between "rural" and "urbanized" areas. Instead of only giving the State DOTs the option of establishing targets for "rural" and "urbanized" areas, FHWA proposes to define "non-urbanized" area include a single geographic area that includes all "rural" areas and small urban areas

[56] Estimate based on 12 records per hour, 24 hours per day, and 366 days in the longest year that could occur.

that are larger than “rural” areas but do not meet the criteria of an “urbanized area” (as defined in 23 U.S.C. 101(a)(34)). This would then allow State DOTs to establish different targets throughout the entire State for urbanized areas and a target for a non-urbanized area. For target establishment purposes, FHWA believes that these small urban areas are best treated with the ‘‘rural’’ areas, as non-urbanized areas, because both of these areas do not have the same complexities that come with having the population and density of urbanized areas and are generally more rural in characteristic. In addition, neither of these areas are treated as MPOs in the transportation planning process or given the authority under MAP-21 to establish their own targets.

The FHWA proposes to include a definition for “Performance period” to establish a definitive period of time during which condition/performance would be measured, evaluated, and reported. The frequency of measurement and target establishment for the measures proposed to implement 23 U.S.C. 150 is not directly or indirectly defined in statute. The FHWA proposes a consistent time period of 4 years that would be used to assess non-safety condition/performance. This time period aligns with the timing of the biennial performance reporting requirements under 23 U.S.C. 150(e) and is consistent with a typical planning cycle for most State DOTs and MPOs (e.g., State and MPO transportation improvement programs are required to cover a 4-year period; metropolitan plans are also required to be updated every 4 or 5 years). The proposed calendar year basis is consistent with data reporting requirements currently in place to report pavement and bridge conditions, which are also done on a calendar year basis. For the measures in section 490.105(c)(1) through (c)(7) in Parts C through G, FHWA proposes a definition

for “Performance period” that would cover a 4-year period beginning on January 1 of the calendar year in which State DOT targets are due to FHWA, as discussed in section 490.105. For the on-road mobile source emission measure in section 490.105(c)(8) in Part H, FHWA proposes a definition for “Performance period” that would cover a 4-year period beginning on October 1st of the year prior in which State DOT targets are due to FHWA, as discussed in section 490.105. Please refer to section 490.105(e)(4) for more details. Within a performance period, condition/performance would be measured and evaluated to: (1) assess condition/performance with respect to baseline condition/performance; and (2) track progress toward the achievement of the target that represents the intended condition/performance level at the midpoint and at the end of that time period. The term “Performance period” applies to all proposed measures in Parts C though H. The proposed measures for the HSIP provided for in section 490.209 in Part B where FHWA proposed a 1 calendar year period as the basis for measurement, target establishment and reporting.

The FHWA proposes to include a definition of “Reporting Segment” because, with FHWA’s approval, State DOTs and MPOs may choose to combine individual Travel Time Segments (such as the TMC codes referenced in the prior paragraph) into longer, contiguous reporting segments. The FHWA’s proposed definition of “Reporting Segment” is the length of roadway that is comprised of one or more contiguous Travel Time Segments that the State DOT and MPOs coordinate to define for metric calculation and reporting.

The FHWA proposes to include a definition for "target" to indicate how measures will be used for target establishment by State DOTs and MPOs to assess performance or condition.

The FHWA proposes to include a definition of "Transportation Management Area (TMA)" consistent with the definition in 23 CFR 450.104.

The FHWA proposes to include a definition of "Travel Time Data Set" because in the event that either 1) NPMRDS data is unavailable, or 2) a State DOT requests, and FHWA approves the use of an equivalent data set, then the approved equivalent set of travel time data can be used to calculate metrics to assess performance of the Interstate System and non-Interstate NHS, freight movement on the Interstate System, and traffic congestion for the purpose of carrying out the CMAQ Program. The FHWA's proposed definition of "Travel Time Data Set" is either the NPMRDS or an FHWA-approved equivalent data set that is used to carry out the requirements in Subparts E, F, and G of Part 490.

The FHWA proposes to include a definition of "Travel Time Reliability" since this term is used to describe proposed measures for the performance of the Interstate System and non-Interstate NHS and for freight movement on the Interstate System. The FHWA's proposed definition for Travel Time Reliability is consistency or dependability of travel times from day to day or across different times of the day. The definition is based on one that FHWA has used in prior research and studies. The FHWA believes that Travel Time Reliability is important to many transportation system users, including vehicle drivers, public transit riders, and freight shippers. All of these users value Travel

Time Reliability, or consistent travel times, more than average travel time because it provides reliability and efficiency when planning for trip times.

The FHWA's proposed definition of "Travel Time Segment" is a set length, which is contiguous, of the NHS for which average travel time data are summarized in the Travel Time Data Set (in the NPMRDS, this would be the TMC codes).

The FHWA proposes to incorporate definitions for "attainment area," "maintenance area," "metropolitan planning organization (MPO)," "National Ambient Air Quality Standards (NAAQS)," "nonattainment area," and "Transportation Management Area (TMA)" as these terms are defined in the Statewide and Nonmetropolitan and Metropolitan Transportation Planning Regulations in 23 CFR 450.104.

**Discussion of Section 490.103 Data Requirements**

The FHWA is proposing in section 490.103 data requirements that apply to more than one subpart in Part 490. Additional proposed data requirements that are unique to each subpart are included and discussed in their respective subpart.

In this section, FHWA is proposing that State DOTs would submit urbanized area boundaries in accordance with the HPMS Field Manual. The boundaries of urbanized areas would be as identified through the most recent U.S. Decennial Census unless FHWA approves adjustments to the urbanized area, as submitted by State DOTs and allowed for under 23 U.S.C. 101(a)(34). These boundaries would be maintained in the HPMS and used to calculate measures that are applicable to specific urbanized areas or to assess State DOT progress toward the achievement of targets established for urbanized

and non-urbanized areas. These boundaries are to be reported to HPMS in the year the State DOT Baseline Performance Report is due (required in section 490.107(b)), and are applicable to the entire performance period (defined in section 490.101 and described in section 490.105(e)(4)), regardless of whether or not FHWA approved adjustments to the urbanized area boundary during the performance period. The FHWA proposes that the State DOT submitted boundary information would be the authoritative data source for the target scope for the additional targets for urbanized and non-urbanized areas (section 490.105(e)(3)), and progress reporting (section 490.107(b)) for the measures identified in section 490.105(c). As discussed in section 490.105(d)(3), any changes in urbanized area boundaries during a performance period would not be accounted for until the following performance period. The FHWA approved urbanized area data available in HPMS on June 15th (HPMS due date) prior to the due date of the Baseline Performance Report is to be used for this purpose. For example, State DOTs shall submit their first Baseline Performance Period Report to FHWA by October 1, 2018. The FHWA approved urbanized area data available in HPMS on June 16, 2018, is to be used.

In section 490.103(c), FHWA is proposing that the boundaries for the nonattainment and maintenance areas be identified for the entire performance period as they are designated and reported by the EPA under the NAAQS for any of the criteria pollutants applicable under the CMAQ program. The nonattainment and maintenance area would be based on the effective date of EPA designations as published in the Federal

Register at 40 CFR part 81. States may also want to review EPA's "Green Book"[57] Web site that provides an easy to search tool by pollutant of EPA designations and links to the associated Federal Register Notices. The EPA's "Green Book" is updated about twice per year, so States should also check with their local FHWA division office to ensure they have a complete list of all nonattainment and maintenance areas for the performance period. Any changes in the nonattainment or maintenance areas in a State during a performance period would not be accounted for until the following performance period.

In section 490.103(d), FHWA proposes that State DOTs would continue to submit NHS limit data in accordance with HPMS Field Manual. The FHWA proposed that the State DOT submitted NHS information would be the authoritative data source for determining measure applicability (section 490.105(c)), target scope (section 490.105(d)), progress reporting (section 490.107(b)), and determining significant progress (section 490.109(d)) for the measures identified in section 490.105(c)(1) through (c)(7). As discussed in section 490.105(e)(3)(i), the NHS limits dataset referenced in the Baseline Performance Report is to be applied to the entire performance period, regardless of changes to the NHS approved and submitted to HPMS during the performance period.

Depending on when the final rule for this proposal is effective, FHWA plans to determine and publish which State DOTs and MPOs are required to establish targets for each of the proposed measures in Subparts C through H 1 year prior to State DOT's reporting of the targets for the first performance period. The FHWA plans to make the determination based on the following information: population data from the latest

[57] See http://www.epa.gov/oar/oaqps/greenbk/index.html

Decennial Census from the U.S. Census Bureau, NHS data from HPMS, and the EPA designated nonattainment and maintenance area published in the Federal Register at 40 CFR part 81[58] at the time of determination. Based on this information, FHWA plans to publish a list on its Web site of State DOTs and MPOs meeting the target establishment requirements for Subparts C-H. Please refer to the discussions for sections 490.105(d), 490.105(e)(1), and 490.107(b)(1).

Beginning with the second performance period and continuing with each performance period thereafter, at the start of each performance period, FHWA will extract the population data from the latest Decennial Census from the U.S. Census Bureau, NHS data from HPMS, and the EPA designated nonattainment and maintenance areas published in the Federal Register at 40 CFR part 81, to determine which State DOTs and MPOs are required to establish targets for each of the proposed measures in Subparts C-H , for that performance period. Based on this information, and at the start of each performance period, FHWA plans to publish a list on its Web site of State DOTs and MPOs meeting the target establishment requirements for Subparts C-H.

In section 490.103(e), FHWA is proposing for State DOTs and MPOs to use the NPMRDS data to calculate the metrics defined in sections 490.511, 490.611, and 490.711 to ensure all data used by State DOTs to calculate travel time and speed related metrics are consistent and complete. If more detailed and accurate travel time data exists locally,

[58] States may also use EPA's "Green Book" (http://www.epa.gov/oar/oaqps/greenbk/index.html) as a reference to check the status of EPA designations and find links to the associated Federal Register Notices.

FHWA is proposing that this data could be used in place of, or in combination with the NPMRDS, provided it is first approved by FHWA.

The NPMRDS is a data set that includes travel times representative of all traffic using the highway system, including a breakdown of travel times of freight vehicles and passenger vehicles. Travel times are recorded on contiguous segments of roadway covering the entire mainline NHS. For the NPMRDS the sources of vehicle probes could include mobile phones, vehicle transponders, and portable navigation devices. Within this data set, the average travel time derived from all vehicle probes traversing each Travel Time Segment is recorded for every 5 minute period throughout every day of the year. This recorded average travel time is referenced as being stored in a "5 minute bin" in this rulemaking. Travel times are only included in the data set if during the 5 minute interval vehicle probes were present to measure travel speeds; consequently, there are no imputed (averaged from similar historical travel periods or estimated) travel times in the data set. The NHS data used in the NPMRDS dataset will be extracted from HPMS on August 15 each year. State DOTs are to provide the necessary NHS information to HPMS in accordance with the HPMS Field Manual. States should make every effort to submit NHS data to HPMS in a timely manner to ensure the NPMRDS dataset is as complete as possible. The NPMRDS is provided monthly and made available to State DOTs and MPOs for their use in managing the performance of the highway system. The FHWA expects to continue to provide for this data at a national level and to make it available to State DOTs and MPOs to ensure the data consistency and coverage needed to assess system performance at a national level.

The FHWA recognizes that some State DOTs and MPOs have developed robust programs to manage system operations, including collection of travel time data that may be more appropriate and effective to use as an alternative source to the NPMRDS. Considering this, FHWA is proposing that State DOTs and MPOs may utilize alternative data sources, referred to hereafter as "equivalent data source(s)," to calculate the travel time metrics proposed in this rulemaking provided the alternative data source is at least "equivalent" in the design and structure of the data as well as extent of coverage both spatially and temporally to the NPMRDS to ensure for consistency in performance assessment at a national level. The FHWA expects that the travel time data set could include a combination of equivalent data source data and NPMRDS data, as long as the combination covers the full NHS. The FHWA is also proposing that State DOTs request and receive approval from FHWA to use equivalent data source(s), to ensure data quality is maintained. The same travel time data for each travel time segment must be used by both State DOTs and MPOs in all measure calculation (in other words, the following must not happen: the State DOT uses NPMRDS and the MPO uses an equivalent data source for the same travel time segment). The FHWA expects that State DOTs and MPOs will work collaboratively to come to agreement on the data sources to use to meet the requirements proposed in this rulemaking.

The FHWA is proposing in section 490.103(e) that the use of equivalent data source(s) be requested by State DOTs and approved by FHWA before the beginning of a performance period. The FHWA anticipates that State DOTs could change their data source during a performance period, recognizing that over this period a State DOT may

elect to use an equivalent data source(s) or change back to the NPMRDS based on future data options, quality, and availability. The FHWA is proposing that State DOTs limit requests for the use of equivalent data sources to no more frequently than once per calendar year, and only include requests for data to be collected beginning on January 1 of the calendar year following the request. The request to use equivalent data source(s) would need to be submitted no later than October 1 prior to the beginning of the calendar year in which the data would be used to calculate metrics. The FHWA would need to approve the use of the equivalent data source(s) prior to implementation and use by a State DOT.

For example, a State DOT can elect to use the NPMRDS for the first performance period (anticipated to begin on January 1, 2018). If the State DOT acquires the resources to collect more accurate and complete data in 2019, the State DOT would need to submit a request for FHWA's approval of the equivalent data source(s), including the travel time segment(s) it is being used on, no later than October 1, 2019, and FHWA would have to approve its use. The State DOT could then use the FHWA approved equivalent data source(s) to calculate the travel time and speed metrics beginning on January 1, 2020.

The FHWA is proposing that for each performance year, the same data sources (i.e., NPMRDS or equivalent data is used for the same travel time segments for all referenced measures) be used to calculate the annual metrics proposed in subparts E, F, and G. The State DOT reporting of metrics to the HPMS proposed in subparts E, F, and G allow the State DOT to reference the reporting segments by either the NPMRDS TMC code or by HPMS location referencing. It is important to note that if a State DOT elects

to use an approved equivalent data source they would be required to submit metrics using HPMS location referencing as FHWA would only have the ability to conflate NPMRDS TMC codes to the HPMS roadway network and not TMC codes used in other travel time data sources.

The FHWA is proposing for State DOTs to establish, in coordination with applicable MPOs, and submit reporting segments as discussed in section 490.103 of this rulemaking. State DOTs and MPOs must use the same reporting segment for the purposes of calculating the metrics and measures proposed in subparts E, F, and G.

The State DOT and MPO must use the same reporting segments for all subparts. Several measures would use the information calculated from the reporting segments and convert segment length into mileage to calculate the actual measure, which is described in more detail for each specific measure.

Reporting segments would be distinct sections of roadway that could include one or more contiguous travel time segments. This requirement is being proposed as FHWA anticipates that State DOTs would prefer to join shorter travel time segments into more logical lengths of roadway for reporting purposes. To maintain the granularity needed to capture performance changes, FHWA is proposing that in urbanized areas, reporting segments would not exceed ½ mile in length unless a single travel time segment is longer in length, and in non-urbanized areas, would not exceed 10 miles in length unless a single travel time segment in the travel time data is longer in length. If a single travel time segment in the travel time data is longer than a ½ mile in length in urbanized areas or 10

miles in length in non-urbanized areas, the reporting segment would be the length of that single travel time segment.

In order to ensure that the reporting segments cover the complete NHS within a State, FHWA is proposing that the reporting segments be continuous and cover the full extent of the mainline highways of the NHS. The FHWA considered alternative approaches to defining reporting segments that would represent roadway key corridors to show travel time performance for the Interstate System and non-Interstate NHS. Although FHWA believes that corridor level evaluations are effective in managing system operations, we did not feel that a corridor based approach could be designed and implemented in manner that would provide for the consistency and reliability needed to report on performance at a State and national level. For this reason, FHWA is proposing that the reporting segments represent 100 percent of the mainline highways on the NHS applicable to the measures in subparts E, F, and G.

Although the State DOTs would be the entity required to submit reporting segments, MPOs would need to coordinate with State DOTs on defining these reporting lengths for those roadways that are within the portion of the metropolitan planning area included within the State boundary. In addition, it is recommended that States DOTs coordinate with any local transportation operating agencies that have influence over the management of traffic operations in making the final decision on reporting segment lengths.

In section 490.103(g), FHWA is proposing that the State DOT would submit its reporting segments to FHWA no later than November 1, prior to the beginning of the

calendar year in in which they will be used. These reporting segments would be used throughout the performance period. If the State DOT requests and FHWA approves an equivalent travel time data source during the performance period, the State DOT would need to submit a new set of reporting segments that would correspond to the new travel time data source segmentation. These reporting segments are to be submitted to FHWA by November 1 prior to the beginning of the calendar year in which they will be used. For the purposes of carrying out the requirements proposed in Subpart E, FHWA is proposing that the State DOT submit the travel times desired for each reporting segment that is fully included within urbanized areas with populations over 1 million during the peak period travel times (both morning and evening). The FHWA is proposing that State DOTs would submit reporting segments and the desired travel times to HPMS. The FHWA intends to issue additional guidance on how State DOTs could report these data to HPMS. Finally, the State DOT would be required to submit documentation to demonstrate the applicable MPOs' agreement on the travel time data set used, the defined reporting segments, and the desired travel times.

**Discussion of Section 490.105 Establishment of Performance Targets**

Performance target requirements specific to HSIP-related measures would be established in accordance with section 490.209 of the first performance management NPRM; and performance target requirements specific to pavement condition measures in sections 490.307(a) and bridge condition measures in sections 490.407(c) are included in the second performance management NPRM. The discussions specific to those measures

will not be repeated in this NPRM. For additional information, please see the docket for the proposed regulatory text for Part 490, in its entirety that covers both prior NRPMs.

The declared policy under 23 U.S.C. 150(a) transforms the Federal-aid highway program and encourages the most efficient investment of Federal transportation funds by refocusing on national transportation goals, increasing accountability and transparency in the Federal-aid highway program, and improving investment decisionmaking. To this end, FHWA encourages State DOTs and MPOs to establish targets that would support the national transportation goals while improving investment decisionmaking processes.

A number of considerations were raised during the performance management stakeholder outreach sessions regarding target establishment, such as: providing flexibility for State DOTs and MPOs, coordinating through the planning process, allowing for appropriate time for target achievement, and allowing State DOTs and MPOs to incorporate risks. Using these considerations, FHWA created a set of principles to develop an approach to implement the target establishment requirements in MAP-21. These principles aimed to develop an approach that:

- provides for a new focus for the Federal-aid program on the MAP-21 national goals under 23 U.S.C. 150(b);
- improves investment and strategy decisionmaking;
- considers the need for local performance trade-off decisionmaking;
- provides for flexibility in the establishment of targets;
- allows for an aggregated view of anticipated condition/performance; and
- considers budget constraints.

In section 490.105, FHWA proposes the minimum requirements for State DOTs and MPOs to follow in the establishment of targets for all measures identified in section 490.105(c), which include the proposed measures both in this performance management NPRM and the second performance management NPRM. This regulatory text, in its entirety, can be found in the docket. These requirements are being proposed to implement the 23 U.S.C. 150(d) and 23 U.S.C. 134(h)(2) target establishment provisions in a manner that provides for the consistency necessary to evaluate and report progress at a State, MPO, and national level, while also providing a degree of flexibility for State DOTs and MPOs.

The FHWA proposes in section 490.105(a) for State DOTs and MPOs to establish targets for each performance measure identified in section 490.105(c). In section 490.105(b), the performance targets for carrying out the HSIP would be established in accordance with section 490.209 of the first performance management NPRM.

In section 490.105(c), FHWA proposes that State DOTs and MPOs that include, within their respective geographic boundaries, any portion of the applicable transportation network or projects would establish performance targets for the performance measures identified in Subparts C through H. The transportation network or geographic areas applicable to each measure is specified in Subparts C through H under sections 490.303, 490.403, 490.503, 490.603, 490.703, and 490.803, respectively. It is possible that for some measures, the applicable transportation network or geographic area may not be contained within the State or metropolitan planning area geographic boundary. In these cases State DOTs and MPOs would not be required to establish

targets. The performance target requirements established by Congress in 23 U.S.C. 135(d)(2)(B)(i)(I) and 23 U.S.C. 134(h)(2)(B)(i)(I) require State DOTs and MPOs to establish targets for the measures described in 23 U.S.C. 150(c), where applicable. Consequently, State DOTs and MPOs are only required to establish targets where their respective geographic boundary contains portions of the transportation network or geographic area that are applicable to the measure. For example, the proposed measure Percent of the Interstate System providing for Reliable Travel Times specified in section 490.507(a)(1) is applicable, as proposed in section 490.503(a)(1), to "mainline highways on the Interstate System." In this example, if Interstate System mainline highways are not contained within the boundary of an MPO's metropolitan planning area the measure would not be applicable to that MPO. As a result, that MPO would not be required to establish a target for the proposed measure Percent of the Interstate System providing for Reliable Travel Times specified in section 490.507(a)(1).

The FHWA proposes in section 490.105(d)(1) that State DOTs establish statewide targets that represent performance outcomes of the transportation network or geographic area within their State boundary, and MPOs establish targets that represent performance outcomes of the transportation network or geographic area within their respective metropolitan planning area for the proposed NHS travel time reliability measures (section 490.507(a)), freight movement on the Interstate System measures (section 490.607), and on-road mobile source emissions measure (section 490.807). State DOTs and, if applicable, MPOs are encouraged to coordinate their target-establishment with neighboring States and MPOs to the extent practicable.

The FHWA proposes in section 490.105(d)(2) that State DOTs and MPOs would establish a single urbanized area target, as described in sections 490.105(e)(8) and 490.105(f)(4), respectively, that would represent the performance of the transportation network in each area applicable to the peak hour travel time measures (section 490.507(b)) and traffic congestion measure (section 490.707) as proposed in sections 490.503(a)(2) and 490.703, respectively. The applicable areas for the peak hour travel time measures are proposed to be urbanized areas with a population greater than 1 million. A subset of these areas would be applicable to the traffic congestion measure: those areas that also contain any part of an area designated as nonattainment or maintenance for any of the criteria pollutants applicable under the CMAQ program. Based on the 2010 U.S. Census,[59] the peak hour travel time measures would be applicable to the transportation network in 42 urbanized areas of which 33 of these areas (based on the effective date of EPA's most recent designations in 40 CFR part 81) would apply to the traffic congestion measure. The FHWA believes that this proposed approach of limiting the applicability of the peak hour travel time and traffic congestion measures is needed to focus performance measurement and reporting on only those areas in the United States where transportation demand can have a considerable impact on performance and where the planning and management of system operations are critical to the achievement of improved outcomes. The FHWA also believes that the State DOTs

[59] Urbanized Area Boundary Data: 2010 TIGER/LINE Shapefile published by the U.S. Census Bureau (Accessed on 8/7/2013): ftp://ftp2.census.gov/geo/tiger/TIGER2010/UA/2010/

and MPOs in these larger urbanized areas have the experience and capability needed to meet these performance requirements.

In section 490.105(d), FHWA recognizes that there is a limit to the direct impact the State DOT and the MPO can have on the performance outcomes within the State and the MPO, respectively, and recognizes that the State DOT and the MPO need to consider this uncertainty when establishing targets. For example, some Federal and tribal lands include roads and bridges on the NHS that State DOTs would need to consider (as appropriate) when establishing targets. The FHWA anticipates that State DOTs and MPOs would need to consult with relevant entities (e.g., relevant MPOs, State DOTs, local transportation agencies, Federal Land Management Agencies, tribal governments) as they establish targets to better identify and consider factors outside of their direct control that could impact future condition/performance.

The FHWA also recognizes that the limits of the NHS could change between the time of target establishment and the time of progress evaluation and reporting for the targets for measures specified in sections 490.105(c)(1) through (c)(7). State DOTs may request modifications to the NHS, which could result in additions, deletions, or relocations. Such changes may alter the measures reported, which could then impact how an established target relates to actual measured performance. For example, if NHS limits are changed after a State DOT establishes the target, actual measured performance of the transportation network within the changed NHS limits would represent a different set of highways as compared to what was originally used to establish the target. This difference could impact a State DOT's ability to make significant progress for targets. Thus, for

establishing targets for NHS, FHWA believes that it will be important for the State DOT to ensure that the data used to establish the targets is accessible, and the information about the data is properly documented. Consequently, FHWA proposes in section 490.105(d)(3) that State DOTs must declare and describe the extent of the NHS used for target establishment. The FHWA also proposes that State DOTs declare and describe their urbanized area boundaries. This information would be included, along with reporting targets, in the Baseline Performance Period Report described in section 490.107(b)(1). These NHS limits and urbanized area boundaries are to be reported to HPMS in the year the Baseline Performance Report is due, and are applicable to the entire performance period, regardless of whether or not FHWA approved adjustments to the NHS limits during the performance period. Any changes in NHS limits or urbanized area boundaries during a performance period would not be accounted for until the following performance period.

In section 490.105(e), FHWA proposes the State DOT requirements for the establishment of targets for all measures identified in section 490.105(c), with applicable transportation network for those targets (target scope) defined in section 490.105(d). As defined in section 490.101, a target is a numeric value that represents a quantifiable level of condition/performance in an expression defined by a measure. The FHWA proposes that a target would be a single numeric value representing the intended or anticipated condition/performance level at a specific point in time. For example, the proposed measure, Percent of the Interstate System providing for Reliable Travel Times (in section 490.507(a)(1)), would be a percentage of directional mainline highways on the Interstate

System providing for Reliable Travel Times (sections 490.503(a)(1) and 490.513(b)) expressed in one tenth of a percent. Thus, FHWA proposes that a target for this measure would be a percentage of directional mainline highways on the Interstate System providing for Reliable Travel Times expressed in one tenth of a percent. As a hypothetical example, a 2-year target and a 4-year target would be 39.5 percent and 38.5 percent, respectively for the proposed measure Percent of the Interstate System providing for Reliable Travel Times.

Pursuant to 23 U.S.C. 150(d)(1) and (e), FHWA proposes in section 490.105(e)(1) that State DOTs would establish targets within 1 year of the effective date of this rule, and for each performance period thereafter the State DOTs would establish and report the targets to FHWA by the due date provided in section 490.107(b)(1). The FHWA is proposing that this rule would have an individual effective date. Accordingly, FHWA anticipates the final rule for this proposal would be effective no later than October 1, 2017. This would provide for at least a 1-year period for States to establish targets so that they can be reported in the first State Biennial Performance Report which would be due to FHWA by October 1, 2018. The FHWA recognizes that if the final rule is effective after October 1, 2017, the due date to report State DOT targets for the first performance period may need to be adjusted. If it becomes clear that the final rule will not be effective until after October 1, 2017, FHWA will consider adjusting the due date in the final rule or issuing implementation guidance that would provide State DOTs a 1-year period to establish and report targets.

The proposed schedule would require the establishment and reporting of targets at the beginning of each performance period or every 4 years. With the exception of the allowance proposed in section 490.105(e)(6), FHWA is proposing that State DOTs will not have the ability to change targets reported for a performance period. Considering this proposed limitation, State DOTs would need to provide for sufficient time to fully evaluate their targets before they are due to be reported to FHWA.

Pursuant to 23 U.S.C. 135(d)(2)(B)(i)(II), FHWA proposes in section 490.105(e)(2) that State DOTs coordinate with relevant MPOs to establish consistent targets, to the maximum extent practicable. The coordination would be accomplished in accordance with 23 CFR 450. The FHWA recognizes the need for State DOTs and MPOs to have a shared vision on expectations for future condition/performance in order for there to be a jointly owned target establishment process. This coordination is particularly needed for the establishment of the targets for the peak hour travel time and traffic congestion measures since a single target will be established for each applicable[60] urbanized area that would need to be reported identically by each applicable State DOT and MPO. Please refer to sections 490.105(e)(8) and 490.105(f)(4) for discussion on the targets for the peak hour travel time and traffic congestion measures. The FHWA is seeking comment on examples of effective State DOT and MPO coordination. The FHWA is specifically requesting comment on the following questions related to State

[60] **Peak hour travel time measure**: Urbanized area with a population greater than 1 million; **Traffic congestion measure:** Urbanized area with a population greater than 1 million and also any part of the urbanized area is designated as nonattainment or maintenance for any of the criteria pollutants applicable under the CMAQ Program.

DOT and MPO coordination in light of the proposed performance management requirements in this rule: What obstacles do States and MPOs foresee to joint coordination in order to comply with the proposed requirements? What mechanisms currently exist or could be created to facilitate coordination? What role should FHWA play in assisting States and MPOs in complying with these proposed new requirements? What mechanisms exist or could be created to share data effectively between States and MPOs? Are there opportunities for States and MPOs to share analytical tools and processes? For those States and MPOs that already utilize some type of performance management framework, what are best practices that they can share?

The FHWA proposes in section 490.105(e)(3) to allow State DOTs to establish additional targets, beyond the required statewide target, for any of the proposed measures for the travel time reliability measures and freight movement on Interstate System measures described in sections 490.507(a) and 490.607, respectively. This is intended to give the State DOT flexibility when setting targets and to aid the State DOT in accounting for differences in urbanized areas and the non-urbanized area. The State DOT could establish additional targets for any number and combination of urbanized areas and could establish a target for the non-urbanized area for any or all of the proposed measures. For instance, a State DOT could choose to establish additional targets for a single urbanized area, a number of the urbanized areas, or all of the urbanized areas separately or collectively. For State DOTs that want to establish a non-urbanized target, it would be a single target that applies to the non-urbanized area statewide. If the State DOT elects to establish any additional targets, they need to be declared and described in

the State Biennial Performance Report just after the start date of a performance period (i.e., Baseline Performance Period Report). For each additional target established, State DOTs would evaluate whether they have made progress toward achieving each target and report on that progress in their biennial performance report in accordance with sections 490.107(b)(2)(ii)(B) and 490.107(b)(3)(ii)(B). The FHWA intends to issue guidance regarding the voluntary establishment of additional performance targets for urbanized areas and the non-urbanized area.

As proposed in section 490.105(e)(3)(v), for some measures State DOTs will not be able to establish additional targets. Since peak hour travel time measures and traffic congestion measures are proposed to apply only to certain urbanized areas[61] (please refer to section 490.105(e)(8) for target establishment discussion for these measures), it would not be appropriate to have additional targets. In addition, FHWA anticipates that State DOTs would focus on managing performance for on-road mobile source emissions for those areas designated as nonattainment and maintenance areas,[62] as discussed in section 490.803, regardless of whether those designated areas are located in urbanized area or in non-urbanized area. Thus, rather than the option for establishing additional targets for urbanized areas and the non-urbanized area, FHWA proposes that State DOTs could establish additional targets for any combination of nonattainment and maintenance areas

[61] Peak hour travel time measure: urbanized area with a population greater than 1 million; Traffic congestion measure: Urbanized area with a population greater than 1 million and also any part of the urbanized area is designated as nonattainment or maintenance for any of the criteria pollutants applicable under the CMAQ Program.

[62] Nonattainment or maintenance for any of the criteria pollutants applicable under the CMAQ Program.

for the on-road mobile source emissions measure. Please refer to section 490.105(e)(9) for target establishment discussion for on-road mobile source emissions measure.

If a State DOT chooses to establish additional performance targets, it would increase the number of performance targets that it reports. For example, at a minimum, State DOTs would be required to establish two statewide targets for NHS travel time reliability measures (separate target for each of the two measures identified in section 490.507(a)). If a State DOT chooses to establish additional targets for the two NHS travel time reliability measures for the single largest urbanized area in its State, the State DOT would increase the total number of NHS travel time reliability targets to four (2 required targets + 2 additional urbanized area targets = 4).

For each additional target established, State DOTs would evaluate whether they have made progress toward achieving each target and report on that progress in their biennial performance report in accordance with sections 490.107(b)(2)(ii)(B) and 490.107(b)(3)(ii)(B).

Any additional targets the State DOT chooses to establish would not be subject to the significant progress assessment in section 490.109. Because these additional targets are optional and subcomponents of targets established under section 490.105(d), including them in the significant progress assessment proposed in section 490.109 could result in "double counting" during that assessment. The FHWA believes that excluding these additional targets from the significant progress assessment in section 490.109 provides an opportunity for some flexibility with respect to establishing the targets and may encourage State DOTs to establish these additional targets.

Historically, the Census has defined urbanized areas every 10 years, and these boundaries can be adjusted (see 23 U.S.C. 101(a)(34)). The FHWA recognizes that the urbanized area boundaries and resulting non-urbanized area boundary have the potential to change on varying schedules. Changing a boundary during a performance period may lead to changes in the measures reported for the area, and could impact how an established target relates to actual measured performance. Thus, FHWA proposes that State DOTs would need to describe the urbanized area boundaries and the non-urbanized area boundary in place at the start of a performance period in the Baseline Performance Period Report, and use those same boundaries throughout a performance period. This will eliminate the potential for inconsistencies in the extent of the network used to establish targets and calculate measures in urbanized areas and the non-urbanized area, and provide consistency in reporting established targets for those areas.

The urbanized area boundaries are to be reported to HPMS in the year the Baseline Performance Report is due, and are applicable to the entire performance period, regardless of whether or not FHWA approved adjustments to an area boundary during the performance period for other reasons. Any changes in area boundaries during a performance period would not be accounted for until the following performance period.

The FHWA is seeking comments on this approach for establishing optional additional targets for urbanized areas and the non-urbanized area. The FHWA would also like comments on any other flexibility it could provide to or identify for State DOTs related to the voluntary establishment of additional targets. Some examples include:

- Providing options for establishing different additional targets throughout the State, particularly for the States' non-urbanized area; and
- Expanding the boundaries that can be used in establishing additional targets (e.g., metropolitan planning area boundaries, city limit boundaries).

As described in section 490.105(f), an MPO would have the option to establish a quantifiable target for their metropolitan planning area. As provided in 23 CFR 450.312, the boundaries of the metropolitan planning area include, at a minimum, the entire existing urbanized area (as defined by the Census Bureau) plus the contiguous area expected to become urbanized within a 20-year forecast period. The FHWA recognizes the challenges in coordinating targets between State DOTs and MPOs, especially in cases where urbanized and metropolitan planning areas cross multiple State boundaries. The FHWA intends for State DOTs and the MPOs to collectively consider boundary differences when establishing both State DOT and MPO targets. For reporting purposes, FHWA expects MPOs to report progress to the relevant State DOT for the entire metropolitan planning area. Multistate MPOs would also be expected to provide the data stratified by State. The FHWA seeks comments on target establishment options and coordination methods that could be used by MPOs and State DOTs in areas where the MPO metropolitan planning area crosses multiple States.

To illustrate the differences in boundaries and how they might be addressed for one of the travel time reliability measures, the following example is provided regarding the target establishment boundary differences that could exist in the State of Maryland today.

- **Urbanized Areas:** Based on the 2010 Decennial Census, the State of Maryland contains part or all of 11 urbanized areas. Of these urbanized areas, 5 are shared with neighboring States.
- **Metropolitan Planning Areas:** Currently, the State contains part or all of six metropolitan planning areas. Of these areas, four metropolitan planning areas are shared with neighboring States (A map of Metropolitan Planning Areas and Urbanized Areas of the State of Maryland is included in the docket).
- **Statewide Urbanized Area Target Extent:** An optional State target for the Percentage of Interstate System lane-miles in Good condition within the State's urbanized areas would represent those portions of the 11 urbanized areas within the geographic boundary of the State of Maryland, in aggregate.
- **Single Urbanized Area Target Extent:** An optional urbanized area target for a single urbanized area would represent the anticipated Percentage of Interstate System lane-mileage in Good condition within the identified urbanized area, based on the corresponding boundary described in the Baseline Performance Period Report. In the case of the Hagerstown urbanized area, the target would be established for the portion of the urbanized area in the State of Maryland.
- **MPO Target Extent:** Each of the six MPOs would establish individual targets for representing the anticipated percentage of the Interstate System

providing for Reliable Travel Times within their entire metropolitan planning area, regardless of State boundary. In the case of the Hagerstown – Eastern Panhandle MPO in Maryland/Pennsylvania/West Virginia, the MPO would establish target for the Interstate System providing for Reliable Travel Times within its metropolitan planning boundary that extends beyond Maryland State boundary and into Pennsylvania and West Virginia State boundaries, while the Maryland DOT would establish its target for the area only within its State boundary.

The FHWA is seeking comment on alternative approaches that could be considered to effectively implement 23 U.S.C. 134(h)(2)(B)(i)(I) and 23 U.S.C. 150(d)(2) considering the need for coordination required under 23 U.S.C. 134(h)(2)(B)(i)(II) and 23 U.S.C. 135(d)(2)(B)(i)(II). The FHWA is also requesting comment on whether the regulations should include more information or specificity about how the MPOs and States should coordinate on target establishment. For some measures proposed in this NPRM, MPOs could establish targets up to 180 days after the State DOT establishes its targets.

The FHWA proposes in section 490.105(e)(4) that State DOTs establish targets with a 2-year time horizon (i.e., 2-year target) and a 4-year time horizon (i.e., 4-year target) for each performance period. For the measures in section 490.105(c)(1) through (c)(7) of this section, each performance period, defined in section 490.101, would begin on the January 1 of the year in which the State DOT target is reported (i.e., State DOT Baseline Performance Period Report required in section 490.107(b)(1)) to FHWA and

would extend for a duration of 4 years. Additionally, the midpoint of a performance period would occur 2 calendar years after the beginning of a performance period. For the on-road mobile source emission measure identified in section 490.105(c)(8) of this section, each performance period would begin at the start of the Federal fiscal year, on October 1st of the year prior to which the State DOT target is reported in the State DOT Baseline Performance Period Report to FHWA and would extend for a duration of 4 Federal fiscal years. The midpoint of a performance period for the on-mobile source emission measure would occur 2 Federal fiscal years after the beginning of a performance period. For all measures in section 490.105(c)(1) through (c)(7), 2-year targets would represent the anticipated or intended condition/performance level at the midpoint of each respective performance period, and 4-year targets would represent the anticipated or intended condition/performance level at the end of each respective performance period. For the on-road mobile source emission measure in section 490.105(c)(8), 2-year targets would represent the anticipated cumulative emissions reduction for the first 2 years of a performance period, and 4-year targets would represent the anticipated cumulative emissions reduction for the entire performance period. Please refer to section 490.105(e)(9) for discussion on targets for on-road mobile source emission measure. It is important to emphasize that established targets (2-year and 4-year targets for all measures in paragraph (c) of this section) would need to be considered as interim conditions/performance levels that lead toward the accomplishment of longer-

term performance expectations in the State DOT's long-range statewide transportation plan[63] and NHS asset management plans.[64]

The FHWA is proposing this definitive performance period while recognizing that planning cycles and time-horizons for long-term performance expectations differ among State DOTs. The FHWA believes that although differences exist, it was necessary to utilize a 4-year performance period considering the following implementation expectations:

- Provide for a link between the interim, short-term targets (i.e., 2-year and 4-year time horizons) to individual State DOT's long-term performance expectations as part of performance-based planning and programming process;
- Ensure the time horizon is long enough to allow for condition/performance change to occur through the delivery of programmed projects;
- Align the schedule of reporting on targets and the evaluation of progress toward achieving the targets with the biennial performance reporting requirements under 23 U.S.C. 150(e); and
- Report targets using a consistent performance period as part of the evaluation of the State DOT's effectiveness of performance-based planning process to the Congress by October 1, 2017, as required by 23 U.S.C. 135(h).

[63] 23 U.S.C. 135(f).
[64] 23 U.S.C. 119(e).

The FHWA anticipates that the State DOTs would establish targets for the measures listed in section 490.105(c) and report the established targets to FHWA by the statutory deadline for the first biennial report of October 1, 2018.[65] If the final rule is published after September 1, 2016, FHWA will publish guidance to assist State DOTs in complying with Section 150(e) of MAP-21. The FHWA considered a number of alternatives for a consistent time horizon (i.e., performance period) across the State DOTs to ensure consistent reporting of targets and assessment of progress toward achieving those targets for carrying out the requirements in the statutory provisions.[66]

In addition, FHWA considered the data collection and reporting cycles associated with proposed measures. For example, the timeframe of collected data used for calculating a measure for the proposed measures in paragraphs (c)(1) through (c)(7) is on a calendar year basis, but the timeframe of reported data used for calculating a measure for the proposed on-road mobile source emissions measure in paragraph (c)(8) is on a Federal fiscal year basis. The FHWA also assessed the inherent time lag between data collection and target establishment due to necessary data processing, data quality management, data analysis, and other required business processes necessary for target establishment. The FHWA intends to minimize the time lag between the end of a performance period and the time of subsequent biennial performance reporting under 23 U.S.C. 150(e) to ensure a timely assessment of progress toward achieving the targets. Consequently, FHWA proposes two different performance periods—one for the measures

[65] 23 U.S.C. 150(e).
[66] 23 U.S.C. 150(e), 23 U.S.C. 135(h), and 23 U.S.C. 119(e)(7).

in paragraphs (c)(1) through (c)(7) and one for on-road mobile source emissions measure in paragraph (c)(8). The FHWA proposes that that the first 4-year performance period start on January 1, 2018, and end on December 31, 2021, and subsequent performance periods would follow thereafter, for the measures in paragraphs (c)(1) through (c)(7) and first 4-year performance period start on October 1, 2017, and end on September 30, 2021, and subsequent performance periods would follow thereafter, for the measures in paragraph (c)(8). As indicated previously, FHWA plans to align performance periods for the proposed measures in this NPRM (measures in paragraphs (c)(4) through (c)(7) and the measures proposed in the second performance management measure NPRM[67] (measures in paragraphs (c)(1) through (c)(3)). Diagrams for proposed performance periods for target establishment, condition/performance measure data collection and assessment, and biennial performance reporting are exhibited in Figures 1 and 2. Please see section 490.107(a)(4) for discussion on the Initial State Performance Report, which is due on October 1, 2016.



[67] Notice of Proposed Rulemaking for the National Performance Management Measures; Assessing Pavement Condition for the National Highway Performance Program and Bridge Condition for the National Highway Performance Program 80 FR 2014-30085 (published January 5, 2015) http://www.gpo.gov/fdsys/pkg/FR-2015-01-05/pdf/2014-30085.pdf

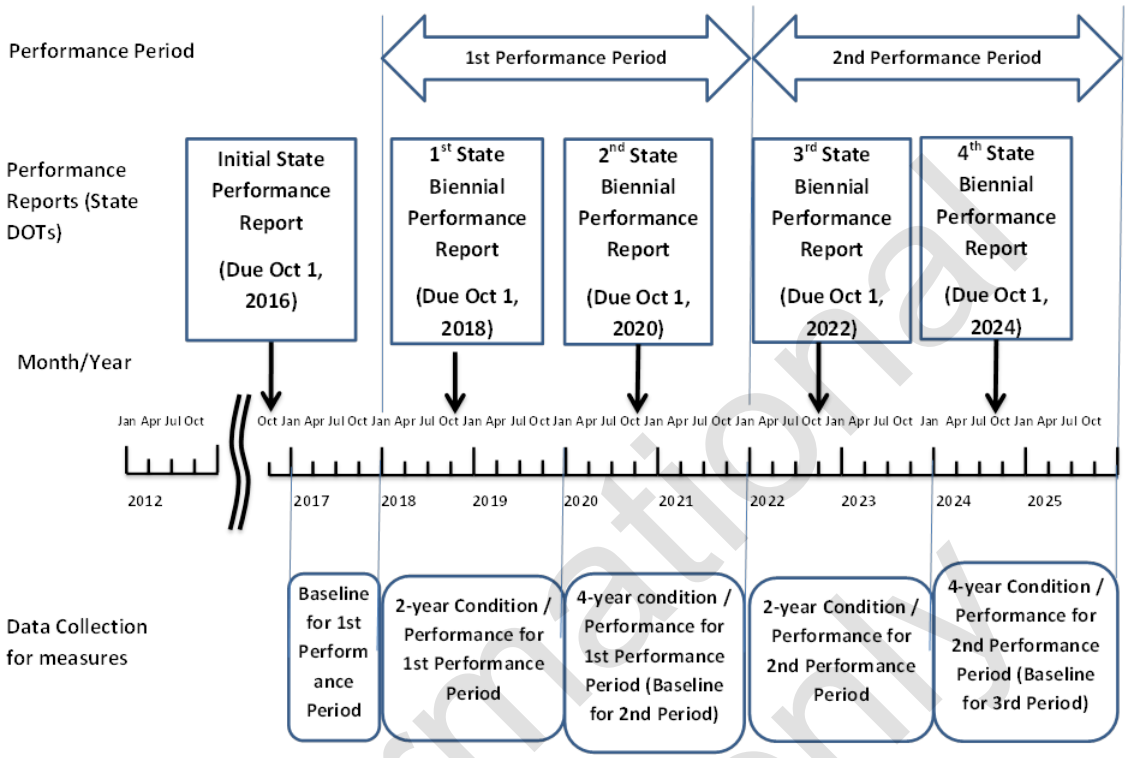


**Figure 1 – Timeline of Performance Periods for All measures Except On-Road Mobile Source Emissions Measure**

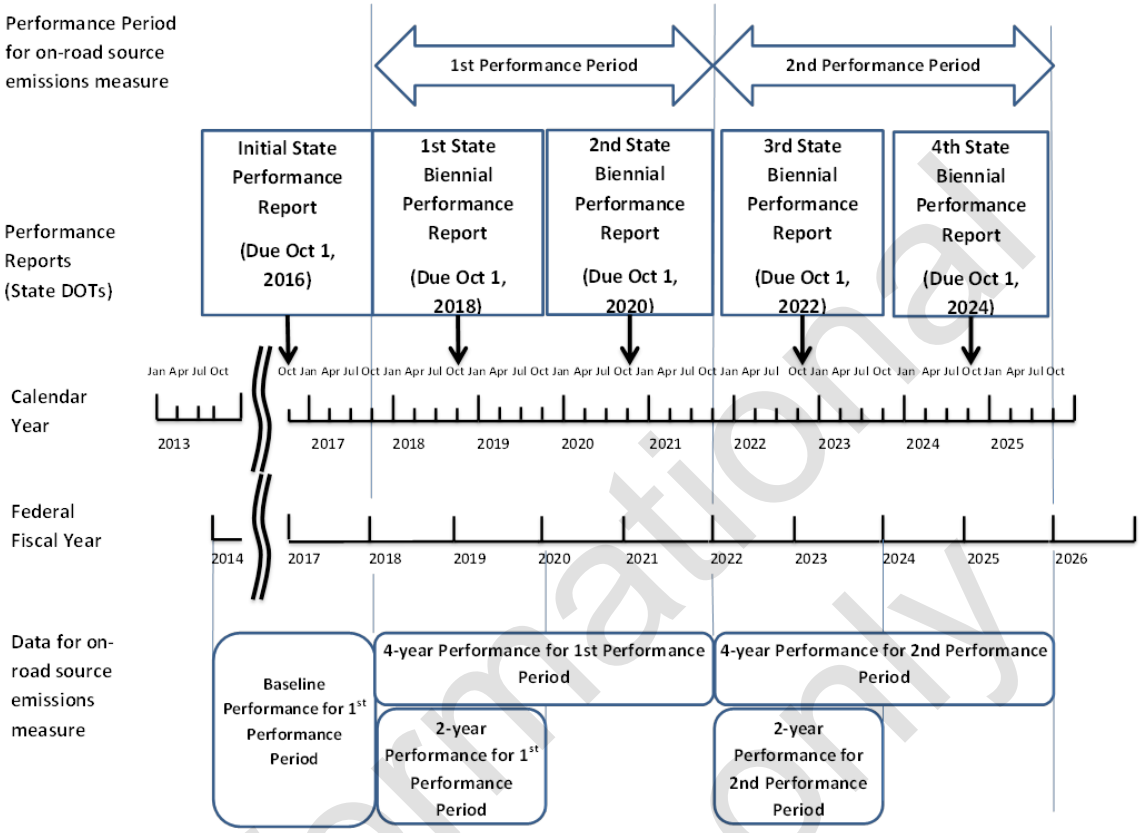


**Figure 2 – Timeline of Performance Periods for On-Road Mobile Source Emissions Measure**

As shown in Figure 1, for the first performance period for all measures except on-road mobile source emissions measure in paragraph (c)(8), the latest measured condition/performance data through December 31, 2017, is the baseline condition/performance. The State DOTs would establish 2-year targets as the condition/performance anticipated at a midpoint, which would be indicated by the latest measured condition/performance data through the midpoint of the performance period (December 31, 2019, for the first performance period). Similarly, the State DOTs would establish 4-year targets as the condition/performance anticipated at the end of a

performance period which would be indicated by the latest measured condition/performance data through the end of the performance period (December 31, 2021, for the first performance period). The FHWA recognizes that the previously programmed projects may have an impact on the target a State DOT establishes for the first performance period. State DOTs should consider the impact of previously programmed projects on future performance outcomes when establishing their targets.

As illustrated in Figure 2, the latest 4-year cumulative emissions reductions results from CMAQ projects from fiscal year 2014 through fiscal year 2017, is the baseline condition/performance. For the first performance period for the on-road mobile source emissions measure, State DOTs would establish 2-year targets which would reflect the anticipated cumulative emissions reductions resulting from CMAQ projects to be reported in the CMAQ Public Access System (described in section 490.809) for the Federal fiscal years 2018 and 2019. Thus, the 2-year target would be the anticipated sum of total emission reductions in the CMAQ Public Access System for the Federal fiscal years 2018 and 2019 for each criteria pollutant and applicable precursors for which the area is nonattainment or maintenance. Similarly, the State DOTs would establish 4-year targets as the anticipated cumulative emissions reductions resulting from CMAQ projects to be reported in the CMAQ Public Access System for the Federal fiscal years 2018 through 2021. Thus, the 4-year target would be the anticipated sum of total emission reductions in the CMAQ Public Access System for the Federal fiscal years 2018 through 2021 for each criteria pollutant and applicable precursors for which the area is nonattainment or maintenance. Similar to other measures, FHWA recognizes that the

previously programmed CMAQ projects may have an impact on target a State DOT establishes for the first performance period. State DOTs should consider the impact of previously programmed CMAQ projects on future performance outcomes when establishing their targets.

It is important to note that the timeframe of collected data used for calculating a measure depends on the individual measure. Data collection frequency requirements and the timeframe for when State DOTs and MPOs would collect data used for calculating a measure are proposed in the Data Requirement and Calculation of Performance Measure Sections for each measure in the relevant Subparts. This proposed timeline, depicted in Figures 1 and 2, is intended to: (1) satisfy the first State DOT biennial performance report due on October 1, 2018, as described in the discussion on section 490.107; (2) accommodate data collection cycles and the timeframe for when State DOTs and MPOs would collect data used for calculating a measure; and (3) minimize the time lag between the end/midpoint of a performance period and the following biennial performance reporting date, as described in the discussion sections in 490.107 and 490.109. Baseline condition and target establishment for subsequent performance periods would follow a similar timeline as the first performance period. The proposed 2-year and 4-year targets are timed so that the targets are on the same cycle as the biennial report under 23 U.S.C. 150(e), and are also necessary for FHWA to determine the significant progress for NHPP and NHFP targets as required under 23 U.S.C. 119(e)(7) and 23 U.S.C. 167(j). The FHWA must make this determination every 2 years, after a State DOT submits each biennial report.

The FHWA proposes in section 490.105(e)(5) that State DOTs report their established targets (2-year and 4-year) and progress toward achieving their targets in the biennial performance report required by 23 U.S.C. 150(e) as specified in section 490.107. As discussed in section 490.105(e)(2), State DOT coordination with relevant MPOs is required for selection of targets. Thus, FHWA proposes that the State DOTs would be able to provide relevant MPOs' targets to FHWA, upon request, each time the relevant MPOs establish or adjust MPO targets as described in section 490.105(f).

The FHWA recognizes that State DOTs would need to consider many factors in establishing targets that could impact progress such as uncertainties in funding, changing priorities, and external factors (see section 490.109(e)(5)) outside the control of the State DOTs.

Thus, FHWA proposes in section 490.105(e)(6) that State DOTs may adjust their established 4-year targets when they submit their State Biennial Performance Report just after the midpoint of the performance period (i.e., Mid Performance Period Progress Report, described in section 490.107(b)(2)). This target adjustment allowance would be limited to this specific report and not be allowed at any other time during the performance period. The FHWA feels that this frequency of adjustment allows a State DOT to address changes they could not have foreseen in the initial establishment of 4-year targets while still maintaining a sufficient level of control in the administrative procedure necessary to carry out these program requirements in an equitable manner. For example, the 4-year target established in 2018 (the 1st State Biennial Performance Report illustrated in Figures 1 and 2) may be adjusted in 2020 (2nd State Biennial Performance

Report illustrated in Figures 1 and 2). The State DOT would report and justify this adjusted target in the second State Biennial Performance Report due in October 2020 (i.e., Mid Performance Period Progress Report). As discussed in section 490.105(d)(2) of this section, FHWA proposes that State DOTs and MPOs would establish a single urbanized area[68] target, as described in section 490.105(e)(8), that would represent the performance of the transportation network in each area applicable to the peak hour travel time and traffic congestion measures. Thus, FHWA proposes that any adjustments made to 4-year targets established for the peak hour travel time and/or traffic congestion measures would be agreed upon and made collectively by all State DOTs and MPOs that include any portion of the NHS in the respective urbanized area applicable to the measure. The details of reporting requirements for adjusting a target are discussed in section 490.107(b)(2).

In section 490.105(e)(7), FHWA proposes a phase-in for the establishment of targets for the non-Interstate NHS travel time reliability measure, provided in section 490.507(a)(2). This phase-in would require only State DOTs to establish 4-year targets for the first performance period for this measure (reported in the 1st State Biennial Performance Report as illustrated in Figure 1) for non-Interstate NHS travel time reliability measure, provided in section 490.507(a)(2). The FHWA is proposing this phase-in to allow sufficient time for State DOTs and MPOs to become more proficient in

[68] Peak hour travel time measure: urbanized area with a population greater than 1 million; Traffic congestion measure: Urbanized area with a population greater than 1 million and also any part of the urbanized area is designated as nonattainment or maintenance for any of the criteria pollutants applicable under the CMAQ Program.

managing performance of non-Interstate roadways and for the coverage of the data, during peak periods, to become more complete in the NPMRDS. At the midpoint of the first performance period State DOTs would have the option to adjust the 4-year targets they established at the beginning of the performance period in their State Biennial Performance Report (report due in October 2020 as illustrated in Figure 1). This will allow State DOTs to consider more complete data in their decision on the 4-year targets for non-Interstate NHS travel time reliability. Although 2-year targets would not be established in the first performance period, FHWA is proposing that State DOTs still would report metrics annually, as required in section 490.511(d) ), for the non-Interstate NHS travel time reliability measure.

Similarly FHWA is proposing to phase-in the reporting of baseline travel time reliability performance for the non-Interstate NHS travel time reliability measure. The FHWA proposes that State DOTs would report baseline performance in the 2nd State Biennial Performance Report in 2020 (instead of the 1st report due in 2018) for non-Interstate NHS travel time reliability. This baseline would represent the performance through the end of 2019 (i.e., 2-year condition/performance). Also, as State DOTs would not be establishing 2-year targets for non-Interstate NHS travel time reliability, FHWA will not evaluate performance progress at the midpoint of the first performance period (discussed further in section 490.109(e)(3)) for this measure.

In section 490.105(e)(8), as discussed in sections 490.507(b) and 490.707, FHWA proposes that the peak hour travel time measure would apply to the roadway transportation network in urbanized areas with a population over 1 million and the traffic

congestion measure would include these same areas that also contain areas designated as nonattainment or maintenance areas for any of the criteria pollutants applicable under the CMAQ program. The FHWA proposes that State DOTs, with mainline highways on the Interstate System that cross any part of an urbanized area with a population more than 1 million within its geographic State boundary, would establish a target for peak-hour travel time for the Interstate System for that urbanized area. Similarly, FHWA proposes that State DOTs, with mainline highways on the non-Interstate NHS that cross any part of an urbanized area with a population more than 1 million within its geographic State boundary, would establish a target for peak-hour travel time for the non-Interstate NHS for that urbanized area. The FHWA proposes that if a State DOT is required to establish targets for either of the peak hour travel time measures for an urbanized area and that urbanized area contains any part of a nonattainment or maintenance area for any one of the criteria pollutants, as specified in section 490.703, then that State DOT would also be required establish targets for the traffic congestion measure. For instance, if a State is in attainment for the applicable criteria pollutants, but that State is part of a multistate urbanized area with more than 1 million in population and another part of that urbanized area contains an applicable nonattainment or maintenance area then the State that is in attainment would be required to work with the other States and establish a traffic congestion target.

In deciding to limit the applicability of these performance measures, FHWA considered a number of factors. In general, the boundary limits of large urbanized areas are representative of population size and density. The FHWA believes that the need to

plan for and manage transportation demand is greatest in areas of the country where populations are high and more densely located. The FHWA also believes that in these largest urbanized areas State DOTs and MPOs have the experience and capability needed to plan and manage high levels of transportation demand. For these reasons, FHWA is proposing, as discussed in Subparts E and G, an approach to limit the applicability of the peak hour travel time and traffic congestion measures to only those roadway networks that are contained in very large urbanized areas. The FHWA believes that the MAP-21 statewide and metropolitan target establishment provisions[69] only require State DOTs and MPOs to establish targets where the measure is applicable to them. Because some State DOTs and MPOs do not include these very large urbanized areas, it is highly likely that those State DOTs and MPOs would not be required to establish targets for the peak hour travel time and traffic congestion measures. Based on the 2010 Decennial U.S. Census[70] and a recent EPA designation[71] of nonattainment and maintenance areas, there are 42 urbanized areas in the country where the population is greater than 1 million and of these 33 are designated as nonattainment or maintenance areas. Using these boundaries, 35 State DOTs and 67 MPOs[72] would be required to establish targets for peak hour travel time measures and 33 State DOTs and 42 MPOs would be required to establish a target

[69] Target establishment provisions: Statewide 23 U.S.C.135(d)(2)(B)(i)(I); Metropolitan 23 U.S.C. 134(h)(2)(B)(i)(I)

[70] Urbanized Area Boundary Data: 2010 TIGER/LINE Shapefile published by the U.S. Census Bureau (Accessed on 8/7/2013): ftp://ftp2.census.gov/geo/tiger/TIGER2010/UA/2010/ Population Data for Urbanized Areas (Accessed on 8/7/2013): https://www.census.gov/geo/reference/ua/urban-rural-2010.html

[71] The status of the nonattainment/maintenance areas was verified on 5/1/2015 based on EPA's Green Book (updated on April 14, 2015): http://www.epa.gov/oaqps001/greenbk/gis_download.html

[72] Metropolitan Planning Area Data: FHWA HEPGIS (Accessed on 10/15/2015): http://hepgis.fhwa.dot.gov/hepgismaps11/ViewMap.aspx?map=MPO+Boundaries|MPO+Boundary#

for the traffic congestion measure. Based on the data available, FHWA has estimated the State DOTs and MPOs who might be affected by proposed peak hour travel time and traffic congestion measures. A list[73] of those State DOTs and MPOs is included in the docket.

The FHWA is proposing that the applicable areas would be determined at the beginning of a performance period and remain for the duration of the performance period regardless of changes that could result from U.S. Census or EPA designation changes during the performance period.

As population continues to grow there will be an increased potential for large urbanized areas to extend across State borders and/or metropolitan planning area boundaries necessitating an increased level of coordination of multiple entities to plan for and manage transportation demand. The FHWA believes that State DOTs and MPOs should collectively work together to support a common transportation performance vision for the area. The FHWA also believes that, through congestion management planning being done by MPOs serving a TMA as part of the planning process,[74] an increased level of coordination is occurring today, especially in the largest urbanized areas across the country. For this reason, FHWA is proposing in section 490.105(e)(8) that a single, unified target for each of the peak hour travel time measures and a single, unified target for the traffic congestion measure be established for each applicable urbanized area in the country. For each of these urbanized areas, the peak hour travel time and traffic

[73] Documents "Peak Hour Travel Time Measure States and MPOs.pdf" and "CMAQ Measure States and MPOs.pdf" in the docket.
[74] See 23 U.S.C. 134(k)(3).

congestion targets would be collectively established by all State DOTs and MPOs that have, within their respective boundaries, any portion of the applicable roadway network in the applicable urbanized area. Consequently, the 2-year and 4-year targets established for peak hour travel time and traffic congestion measures would be reported identically by each State DOT and MPO in the applicable area. Also, under the proposed approach, any adjustments to the 4-year target would be made for the entire applicable urbanized area; resulting in identical reporting of the adjustment by each State DOT and MPO in the applicable areas. For example, based on the most recent U.S. Census, four State DOTs and four MPOs have non-Interstate NHS mileage within their respective boundaries that are contained within or cross into the Philadelphia Urbanized Area. Although the share of the non-Interstate NHS network varies considerably among the eight entities, each would be required to report the same target that would be developed through a coordinated approach, for the Philadelphia Urbanized Area. In this area any adjustments to the target would also need to be made and agreed upon by all eight entities. The FHWA considered separate State DOT and MPO targets for their share of the transportation network within an urbanized area for the targets for the peak hour travel time and traffic congestion measures. However, FHWA believes that performances related to peak hour travel time and traffic congestion within each entity's geographic boundary within an urbanized area would heavily impact the performances of the surrounding entities in that urbanized area. To encourage an increased level of coordination for effectively managing transportation demand of an urbanized area for these measures, FHWA is proposing a single target for each applicable urbanized area.

State DOTs and MPOs would also be required to establish targets for peak hour travel time and traffic congestion measures for more than one urbanized area if their respective boundaries intersect or include multiple applicable urbanized areas. For example, based on the most recent U.S. Census, Maryland DOT would be required to establish targets for three applicable urbanized areas: Baltimore, Washington, D.C., and Philadelphia. As discussed above, the targets established for these three areas would be shared by the other applicable State DOTs and MPOs.

In section 490.105(e)(8)(vi), FHWA proposes a phase-in for the establishment of targets for the traffic congestion measure in section 490.707. As discussed previously for the non-Interstate NHS travel time reliability targets, this phase-in is being proposed to provide sufficient time for State DOTs and MPOs to become more proficient in managing traffic congestion performance and for the travel time data coverage to be more complete in the NPMRDS. The proposed traffic congestion measure requires complete data coverage to capture all excessive delay occurrences throughout the day at a 5-minute level of granularity. In addition, as indicated in section 490.711, the metric for the proposed traffic congestion measure requires the integration of travel time and traffic volume datasets. For these reasons, FHWA believes more time is needed before State DOTs and MPOs can reliably establish meaningful targets for traffic congestion.

The FHWA is aware that the NPMRDS will be lacking data on the non-Interstate NHS roadways in the short-term (missing data is discussed in a white paper provided on the docket). If 2-year targets were to be established in the first performance period, the NPMRDS will be lacking data on the non-Interstate NHS roadways. The FHWA

anticipates that enough data would be missing to make it difficult for States to establish reasonable targets. By the time the 2-year condition/performance are calculated, FHWA expects the NPMRDS data to have improved to an acceptable level for this measure. Also, States would have time to understand the impact of missing data on target establishment. Full compliance is required starting from the second performance period. Thus, FHWA proposes that for the first performance period, as with the non-Interstate travel time reliability measure, State DOTs would only be required to establish their 4-year targets for the traffic congestion measure in the beginning of the first performance period (i.e., the 1st State Biennial Performance Report in 2018 illustrated in Figure 1) for the traffic congestion measure. If necessary, State DOTs would adjust their established 4-year targets at the midpoint of the first performance period (i.e., the 2nd State Biennial Performance Report in 2020 illustrated in Figure 1) as described in section 490.105(e)(6). Although 2-year targets would not be established in the first performance period, FHWA is proposing that State DOTs still would report metrics annually, as required in section 490.711(f).

For the first performance period only, the baseline traffic congestion performance would be reported by the State DOT at the midpoint of the performance period in their 2nd State Biennial Performance Report in 2020 (illustrated in Figure 1). This baseline report would represent traffic congestion performance through 2019 (i.e., 2-year condition/performance).

The FHWA proposes in section 490.105(e)(9) the State DOT target establishment requirements for the proposed on-road mobile source emission measure, identified in

section 490.807. In paragraph (i) of this section, FHWA proposes that State DOTs would establish a statewide target for all areas within the State geographic boundaries designated as nonattainment or maintenance for the $O_3$, CO, or PM ($PM_{10}$ and $PM_{2.5}$) NAAQS.

In section 490.105(e)(9)(ii), FHWA proposes that State DOTs would establish separate statewide targets for each of the applicable criteria pollutant and precursor (PM2.5, PM10, CO, VOC and NOx) for which the State is designated as nonattainment or maintenance, as described in section 490.807.

As proposed in section 490.105(e)(4)(iii) and (e)(4)(iv), the 2-year targets for this measure would reflect the anticipated cumulative emissions reduction to be reported for the first 2 years of a performance period by (i.e., total emissions reduced for 2 fiscal years) pollutant and precursor. The 4-year target would reflect anticipated cumulative emissions reduction to be reported for the entire performance period (i.e., total emissions reduced for 4 fiscal years) by pollutant and precursor.

To implement the flexibility in 23 U.S.C. 150(d)(2) that provides State DOTs the option for establishing different targets for different areas of the State and in consideration of the measure that FHWA is proposing for on-road mobile source emissions, FHWA proposes in section 490.105(e)(9)(iv) that State DOTs would have the option of establishing additional targets, beyond the statewide targets, for any number and combination of nonattainment and maintenance areas by applicable criteria pollutant and precursors. For instance, a State DOT could choose to establish additional targets for a single nonattainment and maintenance area and a single applicable criteria pollutant or

precursor, a number of areas and applicable pollutants or precursors, or each of the areas and applicable pollutants or precursors separately. A State DOT that has multiple nonattainment and maintenance areas for multiple criteria pollutants could decide to establish a target for one of the areas and for only one of the applicable pollutants or precursors within that area. If a State DOT decides to establish these additional targets, the requirements for these targets are similar to those provided in section 490.105(e)(3). The additional targets would need to be described in the State Baseline Performance Period Report. For each additional target, State DOTs would evaluate whether they have made progress toward achieving the target and report on that progress in their biennial performance report in accordance with sections 490.107(b)(2)(ii)(B) and 490.107(b)(3)(ii)(B).

In sections 490.105(e)(9)(v) and (e)(9)(vi), FHWA proposes that the State DOT's requirement for establishing target(s) for on-road mobile source emission measure would be by the EPA's nonattainment and maintenance areas designations published in the Federal Register in 40 CFR part 81 at the time when the State DOT Baseline Performance Period Report is due to FHWA. States may also use EPA's "Green Book" Web site[75] to check the status of EPA designations. States should also check with their local FHWA division office to ensure they have a complete list of all nonattainment and maintenance areas for the performance period. These designations would be used for the duration of the performance period regardless of subsequent change in designation status during that performance period. In section 490.105(e)(9)(vii), FHWA proposes that if a

[75] See http://www.epa.gov/oar/oaqps/greenbk/index.html

State geographic boundary does not contain any part of areas designated by the EPA as nonattainment or maintenance for any of the criteria pollutants applicable to the CMAQ Program at the time when the State DOT Baseline Performance Period Report is due to FHWA, then that State DOT is not require to establish targets for on-road mobile source emissions measures for that performance period.

Although both traffic congestion and on-road mobile source emission measures are proposed to carry out the CMAQ Program, there are some differences in how the targets for the measures would be implemented. As discussed in section 490.105(e)(8), the targets for the traffic congestion measure would apply to the NHS roadway network in urbanized areas with a population over 1 million that also contain areas designated as nonattainment or maintenance for any of the criteria pollutants applicable under the CMAQ Program where as the targets for on-road mobile source emission measure would apply to all nonattainment or maintenance areas for any of the criteria pollutants applicable under the CMAQ Program as discussed in section 490.105(e)(9). The FHWA also proposes that a single, unified target for traffic congestion measure would be established for each applicable urbanized area in the country; whereas target(s) for the on-road mobile source emission measure would be bounded by State geographic boundaries and nonattainment or maintenance areas. Additionally, as discussed in section 490.105(e)(4), the performance period for the traffic congestion measure would be on a calendar year basis whereas the performance period for the on-road mobile source emission measure would be on a Federal fiscal year basis. Even though there are differences between these measures, FHWA believes both of these measures support two

goals of the CMAQ Program: to improve air quality and relieve congestion. Both of these measures also are consistent with the National Goals of environmental sustainability and congestion reduction (23 U.S.C. 150(a)(3) and (a)(6)). In section 490.105(f), FHWA proposes MPO requirements for the establishment of targets for all measures identified in section 490.105(c). These requirements are being proposed to implement the 23 U.S.C. 134(h)(2)(B) target establishment provisions in a manner that provides for a level of consistency necessary to evaluate and report progress at an MPO and national level while providing for a degree of flexibility to support metropolitan planning needs. The FHWA also attempted to develop these target establishment requirements so that they could be met by all MPOs, recognizing that MPOs currently vary in capability, resource availability, and ability to establish performance targets. Given these considerations, FHWA is proposing that MPOs would be required, depending on the measure, to establish both 2-year and 4-year targets or only 4-year targets.

As part of the MPO-State DOT coordination in establishing State DOT and MPO targets described in the discussion of sections 490.105(e)(2) and 490.105(f)(2), FHWA proposes in section 490.105(f)(1) that MPOs establish targets with a 4-year performance period identical to the State DOT's performance periods discussed in the Section-by-Section Discussion for 490.101 and 490.105(e)(4). It is important to emphasize that established MPO targets must be considered as interim conditions/performance levels that lead toward the accomplishment of longer-term performance expectations in the

MPO's Metropolitan Transportation Plan[76] and relevant State DOT NHS asset management plans.[77]

The FHWA proposes in section 490.105(f)(1)(i) that each MPO would establish 4-year targets for all applicable measures in section 490.105(c) no later than 180 days after the relevant State DOT establishes its targets, described in the discussion of section 490.105(e)(1).[78]

The FHWA proposes in section 490.105(f)(1)(ii) that the MPOs with any portion of the applicable roadway network in an urbanized area with a population greater than 1 million would establish both 2-year and 4-year targets for the peak hour travel time measures, as described in section 490.105(f)(4)(i). In addition, the MPOs that have any portion of the applicable roadway network in an urbanized area with a population greater than 1 million and contain areas designated as nonattainment or maintenance would establish both 2-year and 4-year targets for the traffic congestion measure, as described in section 490.105(f)(4)(ii). The FHWA is proposing this approach because, as discussed section 490.105(e)(8), 2-year and 4-year targets established for peak hour travel time and traffic congestion measures would represent the entire urbanized area, and State DOTs and MPOs would report identical targets for each of the applicable urbanized areas. In addition, for the traffic congestion measure, the requirement to have targets every 2 years

[76] 23 U.S.C. 134(i).
[77] 23 U.S.C. 119(e).
[78] 23 U.S.C.134(h)(2)(C) requires that an MPO establish targets 180 days after the relevant State DOT establishes its target, but does not require that the MPO establish the same number of targets as the State. For certain measures, even where a State DOT is establishing a 2-year and a 4-year target at the start of a performance period, FHWA is proposing that MPOs would only need to establish a 4-year target.

is consistent with the requirement for these MPOs to report on this target every 2 years under the performance plan requirements of 23 U.S.C. 149(l).

For the on-road mobile source emissions measure, whether an MPO must establish 2-year and 4-year targets or would only be required to establish a 4-year target depends on if the MPO is in an urbanized area with a population greater than 1 million and contains areas designated as nonattainment or maintenance for any of the criteria pollutants applicable to the CMAQ program. An MPO in one of these large urbanized areas would be required to establish both 2-year and 4-year targets for the on-road mobile source emissions measure, as provided in section 490.105(f)(5)(iii). An MPO outside of these large urbanized areas would only be required to establish a 4-year target for the on-road mobile source emissions measure, as required by section 490.105(f)(1)(i); it would not be required to establish a 2-year target as provided in section 490.105(f)(1)(ii). In proposing this approach, FHWA considered that the MPOs in a larger urbanized area would be required to do biennial reporting on these targets under 23 U.S.C. 149(l).

The FHWA recognizes the burden on MPOs, regardless of size, to establish targets. In addition, MPOs are not directly subject to the requirement to evaluate the progress toward achieving NHPP and NHFP targets under 23 U.S.C. 119(e)(7) and 23 U.S.C. 167(j). As a result, FHWA proposes in section 490.105(f)(1)(iii) that MPOs would not be required to establish 2-year targets for the NHS travel time reliability measures and freight movement on Interstate System measures.

In the case of the first performance period, FHWA anticipates that the State DOTs would establish targets for the measures listed in section 490.105(c) prior to the first State

DOT biennial performance report, and the MPOs would establish targets no later than 180 days thereafter. The timeline for target establishment for State DOTs is illustrated in Figures 1 and 2 in the discussion of section 490.105(e)(4). The FHWA recognizes that the previously programmed projects may have an impact on the target an MPO establishes for the first performance period. The MPOs should consider the impact of previously programmed projects on future performance outcomes when establishing their targets. As discussed in section 490.105(e)(4), FHWA recognizes that if the final rule is effective after September 30, 2017, the due date to report State DOT targets for the first performance period may need to be adjusted. If the rule is effective on or after September 30, 2017, MPOs may not have the opportunity to establish their own targets in time for State DOTs to consider those MPO targets when submitting the 1st Baseline Performance Period Report. If it becomes clear that the final rule will not be effective until after September 30, 2017, FHWA will consider adjusting the due date in the final rule or issuing implementation guidance that would provide State DOTs a 1-year period and MPOs 180 days thereafter to establish and report targets. The MPOs would be required to establish targets for all applicable measures.

Similar to the requirement for State DOTs, pursuant to 23 U.S.C. 134(h)(2)(B)(i)(II), FHWA proposes in section 490.105(f)(2) that MPOs coordinate with relevant State DOT(s) to establish consistent targets, to the maximum extent practicable. This would be done in accordance with 23 CFR 450.

The FHWA recognizes the burden on the MPOs to establish their own performance targets. Consequently, as proposed, the MPOs would have the flexibility to

establish their targets using one of the two options. The FHWA proposes in section 490.105(f)(3) that, for most of the measures, MPOs would establish targets, specific to the metropolitan planning area, by either: (1) agreeing to plan and program projects so that they contribute toward the accomplishment of the relevant State DOT target, or (2) committing to a quantifiable target for their metropolitan planning area. This proposal would give MPOs two options to establish targets. The MPOs could establish their own quantifiable targets. Alternatively, recognizing that the resource level and capability of some MPOs to reliably predict performance outcomes varies across the country, FHWA is proposing an approach that would allow MPOs that do not want to establish their own quantifiable target to establish targets by supporting the State DOT targets for performance. The MPOs would do this through their investment decisionmaking process. Regardless of which option MPOs use to establish targets, FHWA recognizes that the MPOs may need to work with relevant State DOTs to coordinate, plan, and program projects for their planning area.

However, these MPO target establishment options would not be available for MPOs subject to the peak hour travel time or the traffic congestion measures because FHWA has proposed that MPOs and the State DOTs subject to these measures establish identical targets. Also those MPO target establishment options would not be available for certain MPOs[79] for the on-road mobile source emissions measure as those MPOs are required to commit to their targets for the entire subject area under 23 U.S.C. 149(l).

[79] MPOs in an urbanized area with a population greater than 1 million that contain areas designated as nonattainment or maintenance for any of the criteria pollutants applicable to the CMAQ program.

As discussed previously, FHWA is proposing that MPOs establish targets for the peak hour travel time and traffic congestion measures for applicable urbanized areas. The FHWA proposes that MPOs, with mainline highways on the Interstate System that cross any part of an urbanized area with a population more than 1 million within its metropolitan planning area boundary, would establish a target for peak-hour travel time for the Interstate System for that urbanized area. Similarly, FHWA proposes that MPOs, with mainline highways on the non-Interstate NHS that cross any part of an urbanized area with a population more than 1 million within its metropolitan planning area boundary, would establish a target for peak-hour travel time for the non-Interstate NHS for that urbanized area.

The FHWA proposes an MPO would establish targets for the traffic congestion measure when mainline highways on the NHS within that MPO's metropolitan planning area boundary cross any part of an urbanized area with a population more than 1 million, and that portion of the metropolitan planning area boundary intersecting the urbanized area also includes a nonattainment or maintenance area for any one of the criteria pollutants, as specified in section 490.703. If an MPO's metropolitan planning area boundary overlaps with an urbanized area where a traffic congestion target is required but that MPO is not required to establish the traffic congestion target, then the MPO should coordinate with relevant State DOT(s) and MPO(s) in the target selection process for the traffic congestion measure. The FHWA is proposing in section 490.105(f)(4) that MPOs would be subject to the same requirements as State DOTs for the establishment of a single peak hour travel time target and a single traffic congestion target. This would

require MPOs to establish both 2-year and 4-year targets that would be identical to the targets reported by other State DOTs and MPOs that share in roadway network for the applicable urbanized area. The proposed language is similar to the proposal for State DOT targets for these measures in section 490.105(e)(8). It is possible that an MPO could be required to establish more than 1 peak hour travel time or traffic congestion target if the boundary of the respective metropolitan planning area includes applicable roadways that are in multiple, separate applicable urbanized areas. Based on the data available[80] at this time, FHWA has prepared a list[81] of the State DOTs and MPOs which might be affected by proposed peak hour travel time and traffic congestion measures and included this list in the docket.

In section 490.105(f)(4)(iv), FHWA proposes the same requirements be applied to MPOs for the traffic congestion target as required for State DOTs in sections 490.105(e)(8)(vi)(A) and (e)(8)(vi)(B), which would require only 4-year targets to be established for the first performance period. This will provide additional time needed for MPOs to become more proficient in the management of traffic congestion and for travel time data coverage to be more complete within the NPMRDS. Please see discussion for section 490.105(e)(8)(vi) for more details.

[80] Metropolitan Planning Area Data: FHWA HEPGIS (Accessed on 5/1/2015): http://hepgis.fhwa.dot.gov/hepgismaps11/ViewMap.aspx?map=MPO+Boundaries|MPO+Boundary# The nonattainment/maintenance status of the MPOs areas was verified on 5/1/2015 based on EPA's Green Book (updated on April 14, 2015): http://www.epa.gov/oaqps001/greenbk/gis_download.html Population Data for Urbanized Areas (Accessed on 8/7/2013): https://www.census.gov/geo/reference/ua/urban-rural-2010.html

[81] Documents "Peak Hour Travel Time Measure States and MPOs.pdf" and "CMAQ Measure States and MPOs.pdf" in the docket.

The FHWA proposes in section 490.105(f)(5) MPO target establishment requirements for the proposed on-road mobile source emission measure, identified in section 490.807. The proposed language is similar to the proposal for State DOT targets for these measures in 490.105(e)(9). In section 490.105(f)(5)(i), FHWA proposes that MPOs would establish targets for each applicable criteria pollutant (and precursor (PM2.5, PM10, CO, VOC and NOx) for which the area is designated as nonattainment or maintenance under the NAAQS.

As discussed in section 490.105(e)(9), the MPOs would adhere to the Federal fiscal year based performance periods for the on-road mobile source emissions targets. In paragraph (ii) of this section, FHWA proposes that the MPOs would establish targets as discussed in section 490.105(e)(9)(iii).

In section 490.105(f)(5)(iii), FHWA proposes that if any part of the nonattainment or maintenance area within a metropolitan planning area for any one of the applicable criteria pollutants is located within the boundary of an urbanized area with a population more than 1 million in population, then that MPO would establish both 2-year and 4-year targets for its metropolitan planning area.

In section 490.105(f)(5)(iv), FHWA proposes that a nonattainment or maintenance area within a metropolitan planning area for any one of the applicable criteria pollutants is not located within the boundary of an urbanized area with a population more than 1 million in population, then that MPO would not be required to establish a 2-year target and would only establish both 4-year targets for its metropolitan planning area as required in section 490.105(f)(3).

In section 490.105(f)(5)(v) and (f)(5)(vi), FHWA proposes the same requirements be applied to MPOs for the on-road mobile source emission target as required for State DOTs in sections 490.105(e)(9)(v) and (e)(9)(vi). In section 490.105(f)(5)(vii), FHWA proposes language for the MPOs that is similar to the State DOT provision in section 490.105(e)(9)(vii).

As discussed in section 490.105(e)(9), both traffic congestion and on-road mobile source emission measures are proposed to carry out the CMAQ Program, but there are some differences in how the targets for the measures are to be implemented. Please refer to the discussion for section 490.105(e)(9) for a summary of differences.

As stated in the section 490.105(e)(6) discussion, State DOTs may adjust their established 4-year targets when they submit their State Biennial Performance Report just after the midpoint of the performance period (i.e., Mid Performance Period Progress Report, described in section 490.107(b)(2)). The MPOs are required to establish targets 180 days after the date on which the relevant State DOT(s) establishes their targets, as specified in 23 U.S.C. 134(h)(2)(C). If a State DOT adjusts a target, as allowed under the proposed sections 490.105(e)(6) and 490.107(b)(2), any relevant MPOs would be required to also re-establish targets for the same measures within 180 days. However, FHWA is proposing that the MPO only be required to re-establish the target if the MPO had originally elected to establish a target supporting the State DOT target for that measure in section 490.105(f)(3). In that case, the adjusted State target could directly impact an MPO's investment decisionmaking. Specifically, FHWA proposes in section 490.105(f)(7) that if a State DOT adjusts its 4-year target in the State DOT's Mid

Performance Period Progress Report and the MPO established the relevant target by supporting the State DOT target as allowed under section 490.105(f)(3), then the MPO would be required, within 180 days, to report to the State DOT if they either: (1) agree to plan and program projects so that they contribute toward the accomplishment of State DOT adjusted target, or (2) commit to its own quantifiable 4-year target for the metropolitan planning area. Since a single, unified peak hour travel time target and a single, unified traffic congestion target would be established for each applicable urbanized area as discussed in section 490.105(e)(8), FHWA expects that if either of these 4-year targets need adjustment, all involved MPO(s) and State DOT(s) would collectively adjust target(s) in a manner that is documented and mutually agreed upon by all State DOTs and MPOs.

As with State DOTs, FHWA recognizes that MPOs would need to consider many factors in establishing targets, such as uncertainties in funding, changing priorities, and external factors outside the control of the MPO. Thus, FHWA proposes in section 490.105(f)(8) that MPOs may adjust their established 4-year target in a manner that is consistent with the process MPOs and State DOTs agreed upon. The FHWA recognizes that for many MPOs the establishment of targets, especially for the first performance period, would be new and challenging and that there may be a need to revisit targets during the 4-year performance period. The FHWA requires State DOTs and MPOs to coordinate with each other throughout the performance period with respect to any target adjustments so their targets are consistent to the maximum extent practicable.

In section 490.105(f), FHWA proposes that the method by which MPOs would report their established baseline condition/performance, targets, and progress toward achieving targets would be as specified in section 490.107(c). The FHWA further proposes in 490.105(f)(8) that the State would be able to provide MPO targets to FHWA on request after targets are established or adjusted by MPOs within the State. The FHWA believes that, through the coordination between a State DOT and relevant MPOs, the reporting on MPO progress can be shared between these two entities. However, FHWA expects to be able to request from a State DOT the MPO targets and reports on progress, as needed, to better understand performance expectations and outcomes in urbanized areas across the country. The State DOT and MPO would document the target establishment reporting process. The FHWA encourages State DOTs to work with multiple MPOs to mutually agree on a process for reporting that would provide a sufficient level of consistency to understand performance in urbanized areas collectively across the State.

**Discussion of Section 490.107 Reporting on Performance Targets**

Proposed reporting requirements for measures identified in section 490.207(a) are discussed in section 490.213 of the first performance management NPRM; and performance target reporting requirements specific to pavement condition measures in sections 490.307(a)(1) through (c)(4) and bridge condition measures in sections 490.407(c)(1) and (c)(2) are included in the second performance management NPRM. The discussions specific to those measures will not be repeated in this NPRM. Please see the docket for proposed Subpart A in its entirety for additional information.

Pursuant to 23 U.S.C. 150(e), State DOTs are required to submit reports on performance targets and progress in achieving established targets to FHWA not later than October 1, 2016, and every 2 years thereafter. The FHWA evaluated whether there were any existing reports that could be used to meet these 23 U.S.C. 150(e) reporting requirements. For the non-HSIP related measures, FHWA determined that none of the existing reporting requirements met the statutorily required timing. In addition, none of the existing reports currently provide the consistency needed to implement performance management nationally. For these reasons, FHWA proposes a new biennial report to meet the statutory requirements.

The FHWA proposes in section 490.107 for State DOT performance reporting to be used:

- in the determination of significant progress toward achieving NHPP and NHFP targets;
- to provide some of the information needed for FHWA to report to Congress on the performance-based planning process evaluation of each State DOT as required by 23 U.S.C. 135(h);
- to understand performance needs, expectations, and progress at a State, regional, and national level; and
- to provide for transparency by communicating the content of the report to the public on an externally facing Web site in a downloadable format.

In section 490.107, FHWA proposes the minimum requirements that State DOTs and MPOs would follow to report targets for all measures identified in section

490.105(c), which include the proposed measures in both this performance management NPRM and the second performance management NPRM. In section 490.107(a), FHWA proposes that all performance targets described in section 490.105 would be subject to biennial performance reporting in this section. However, reporting on performance targets for carrying out the HSIP would be in accordance with section 490.213. In the first performance measure rulemaking, published as a final rule on March 15, 2016, FHWA requires a 1 calendar year period as the basis for measurement, target establishment, and reporting. As discussed in section 490.101 of that Rule, a 1-year period is required to align the safety measures with the requirements for the common measures reported as a requirement of 23 U.S.C. 402. The FHWA also proposes that State DOTs use an electronic template to deliver the report proposed in section 490.107(a)(3). The FHWA intends to provide additional guidance regarding the template which will include fields to capture all of the information that would be required to be reported under this rulemaking.

The FHWA anticipates the final rule for the pavement and bridge condition performance measures (proposed in the second performance management NPRM) to be effective no later than October 1, 2016, and anticipates that the final rule for this proposal to be effective no later than October 1, 2017. However, 23 U.S.C. 150(e) requires State DOTs to submit reports on performance targets and progress in achieving established targets to FHWA not later than October 1, 2016. To meet the statutory deadlines for the first State DOT performance report due in 2016, FHWA proposes the minimum reporting requirements that would be followed by State DOTs in section 490.107(a)(4). The

FHWA proposes that State DOTs would submit an Initial State Performance Report to FHWA by October 1, 2016. In that report, the State DOTs shall include: (1) the condition/performance of the NHS in the State derived only from the available data in HPMS and NBI; (2) the effectiveness of the investment strategy document in the State asset management plan for the NHS; (3) progress toward targets the State DOT would be required to establish, which may only be a description of how State DOTs would coordinate with relevant MPOs and other agencies in target selection for the targets to be reported in the first State Biennial Performance Report in 2018; and (4) the ways in which the State is addressing congestion at freight bottlenecks.

Pursuant to 23 U.S.C. 150(d)(1), FHWA proposes in section 490.107(a)(5) that State DOTs would establish targets within 1 year of the effective date of applicable rule and the State DOTs would report the initial targets to FHWA. In this section, FHWA proposes that State DOTs submit their 2-year and 4-year targets for the first performance period to FHWA either within 30 days of target establishment by amending the Initial State Performance Report or on the due date of the first Baseline Performance Report, whichever comes first. The related NPRMs are being published on individual schedules. This creates the possibility that State DOTs will be required to establish targets for some performance measures, such as those published in the second performance management NPRM, well before the first Baseline Performance Report is due in October 2018. This proposal ensures timely reporting of targets, and allows FHWA to begin to develop a national story around targets sooner.

For consistent State DOT and FHWA reporting, FHWA proposes a 4-year performance period in section 490.105(e)(4). The FHWA recognizes the need for uniform data collection timing in order to ensure consistency in reporting and repeatable target establishment and progress evaluation processes. Thus, in subsequent sections, FHWA proposes the timing of data collection based on the specified performance periods, described in section 490.105(e)(4). The FHWA proposes that data collection requirements for the established measures support the reporting requirements in this section and be in accordance with the respective Data Requirements section for each measure (see section 490.103). To ensure consistency in reporting, FHWA proposes that the reported baseline condition/performance be derived from the latest data collected through the beginning date of a performance period, the reported actual 2-year condition/performance be derived from the latest data collected through the midpoint of a performance period, and the reported actual 4-year condition/performance be derived from the latest data collected through the end date of a performance period. This is illustrated in Figures 1 and 2 in the discussion for section 490.105(e)(4).

The FHWA proposes in section 490.107(b) that State DOTs submit to FHWA three types of Biennial Performance Reports: Baseline Performance Period Report, Mid Performance Period Progress Report and Full Performance Period Progress Report. The FHWA proposes to make a distinction between the three reports to emphasize the differences in content while aligning the reporting process to the proposed target establishment, progress evaluation, and other performance reporting requirements. Figures 3-5 illustrate the proposed reporting timelines for the three types of Biennial

Performance Reports. The proposed requirements identify three distinct biennial performance reports (baseline, mid, and full) and State DOTs will be expected to provide information for at least one of these reports every 2 years. Because these reports would be required for consecutive 4-year performance periods, the information provided in the Full Performance Period Report would be provided at the same time and may include some of the same information as the Baseline Performance Period Report for the next performance period. As discussed previously, FHWA is proposing to provide for an electronic template that State DOTs would use to capture the information required in each of the three reports discussed in section 490.107(b). It is envisioned that this electronic template would provide the State DOT all of the relevant fields for the information that would be due at the corresponding 2-year point. This approach would allow State DOTs to provide all of the required baseline and progress reporting information at one time. The proposed regulations identify three distinct reports to clarify the purpose and timing of information that would be required to be reported every 2 years.

## Discussion of Baseline Performance Period Reports

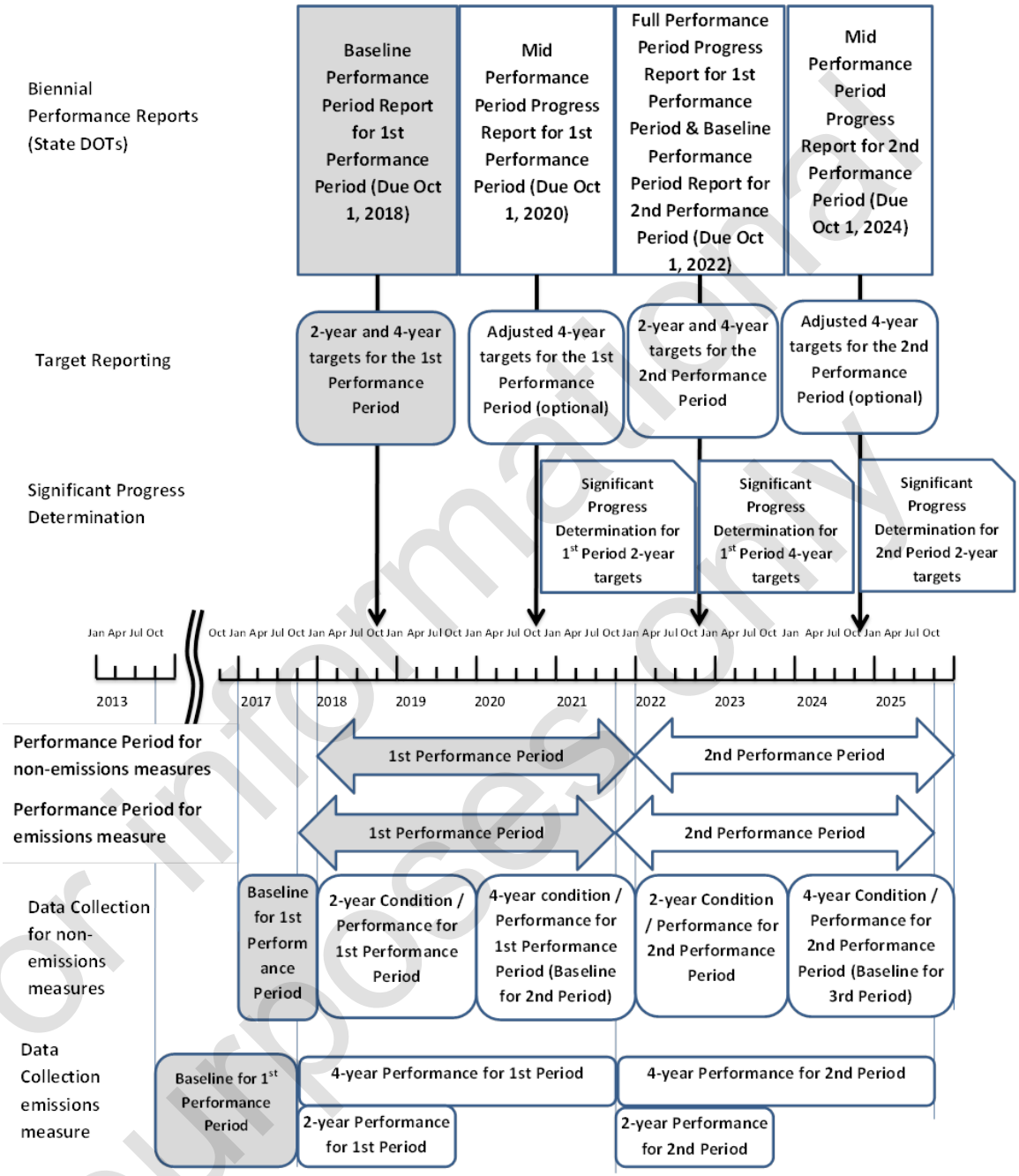


**Figure 3 – Biennial Performance Reports – The Baseline Performance Period Report**

The FHWA proposes the requirement for the Baseline Performance Period Report in section 490.107(b)(1), where the State DOTs would be required to submit a Baseline Performance Period Report no later than October 1st of the first year of a performance period. The FHWA is proposing that the first performance period would begin on January 1, 2018, for the measures identified in section 490.105(c)(1) through (c)(7) and would begin on October 1, 2017, for emission measure identified in section 490.105(c)(8). Although the performance periods may be different, the reporting for all the measures in 490.105(c) would follow the same schedule. State DOTs would submit their Initial State Performance Report no later than October 1, 2018. Subsequent Baseline Performance Period Reports would be due no later than October 1st every 4 years thereafter.

The required contents for the Baseline Performance Period Report are discussed in section 490.107(b)(1)(ii). The FHWA is proposing that the Baseline Performance Period Report would be the official source of the non-safety targets established by the State DOT. To document the established targets, FHWA proposes in section 490.107(b)(1)(ii)(A) that State DOTs would report both their established 2-year and 4-year targets for each measure listed in section 490.105(c) for the current performance period. Additionally, if a State DOT elects to establish additional targets as described in sections 490.105(e)(3) and 490.105(e)(9)(iv), the State DOT would be required to include these targets (both 2-year target and 4-year target) in the report.

Although FHWA would not approve the State DOT submitted targets, a discussion of the basis for each established target would be included in the Baseline

Performance Period Report. The FHWA believes that this discussion is needed to explain the State DOT's basis for the selection of a target. The FHWA intends to publish the State DOT established targets on a publicly available Web site along with the State DOT's discussion of the basis for each target selection. Although other MAP-21 required plans and reports may discuss and use targets, FHWA is proposing that only the targets reported in the Baseline Performance Period Report and the HSIP report would be used by FHWA in carrying out the requirements of 23 CFR 490, as they are the targets established by the State DOT to meet the requirements of 23 U.S.C. 150(d).

The FHWA proposes in section 490.107(b)(1)(ii)(B) that the State DOTs report baseline condition/performance associated with each target reported to represent the latest condition/performance data collected through the beginning date of a performance period. Because the first performance period for the measures in section 490.105(c)(1) through (c)(7) is proposed to begin on January 1, 2018, the baseline condition/performance for this performance period would be the most recent condition/performance that represents actual condition/performance through December 31, 2017. As the first performance period for the on-road mobile source emissions measure in section 490.105(c)(8) is proposed to begin on October 1, 2017, State DOTs would establish baseline performance of a 4-year cumulative emissions reduction resulting from CMAQ projects from fiscal year 2014 through fiscal year 2017 (ending September 30, 2017) in the CMAQ Public Access System, as described in section 490.809. The CMAQ Public Access System contains 20 years of past data. Since all past data in the CMAQ Public Access System may not have the necessary values for the

proposed measure, FHWA believes that State DOTs should revisit the data for CMAQ projects from fiscal year 2014 through fiscal year 2017 to improve baseline performance establishment which would ultimately help the State DOTs in their target establishment. Should a State DOT elect to establish additional targets, as described in sections 490.105(e)(3) and 490.105(e)(9)(iv), the State DOT would report baseline condition/performance that represent the applicable areas in addition to the statewide baseline condition/performance. As an example, for the Percent of the Interstate System providing for Reliable Travel Times measure (in section 490.507(a)(1)), would be a percentage of directional mainline highways on the Interstate System providing for Reliable Travel Times (sections 490.503(a)(1) and 490.513(b)) expressed in one tenth of a percent. Thus, FHWA proposes that a baseline condition/performance for this measure would be a percentage of directional mainline highways on the Interstate System providing for Reliable Travel Times expressed in one tenth of a percent. As a hypothetical example, a baseline condition/performance would be 37.7 percent for the proposed measure Percent of the Interstate System providing for Reliable Travel Times.

The FHWA proposes in section 490.107(b)(1)(ii)(C) that State DOTs would be required to also include a discussion in the Baseline Performance Period Report, of how the established 2-year and 4-year targets support longer term performance expectations in other performance-related plans, such as the State asset management plan and the long-range statewide transportation plan.

The FHWA proposes in section 490.107(b)(1)(ii)(D) that State DOTs would be required to report the geographic boundaries and Decennial Census population data used

to determine target scope and establish any additional targets for urbanized and non-urbanized areas. Similarly, in section 490.107(b)(1)(ii)(E), FHWA proposes that State DOTs would be required to report the NHS network limits used for target establishment. The State DOT would report both the urbanized area boundaries and NHS limits used for target establishment by identifying the corresponding data inventory year of the HPMS that includes this information. Additionally, State DOTs would be required to report the latest Decennial population data for all urbanized areas in accordance with HPMS Field Manual. The FHWA would use this information in determining measure applicability and making its progress determinations in future years. It is the State's responsibility to ensure that the data entered into HPMS reflects the information that is used for target establishment.

The FHWA proposes in section 490.107(b)(1)(ii)(F) that, in each Baseline Performance Period Report, State DOTs would include discussions on the ways in which State DOTs are addressing congestion at freight bottlenecks, including those identified in the National Freight Strategic Plan. This content is required as part of the report under 23 U.S.C. 150(e)(4). To meet this requirement for State DOTs to address congestion at freight bottlenecks within the State, FHWA proposes that State DOTs would describe their activities to improve freight bottlenecks. For the purpose of this report only, freight bottlenecks would be defined as the segments of the Interstate System not meeting thresholds for freight reliability and congestion (section 490.613) and any other locations the State wishes to identify as bottlenecks based on its own freight plans or related documents if applicable. Further, the State DOT should reference its activities in other

freight planning and programs that focus on improving freight bottlenecks, including: comprehensive freight improvement efforts of Statewide Freight Planning or MPO freight plans; the Statewide Transportation Improvement Program (STIP) and TIP; regional or corridor level efforts; other related planning efforts; and operational and capital activities targeted to improve freight movement on the Interstate. The FHWA understands the multifaceted and multimodal nature of a freight bottleneck and that many State DOTs will likely define bottlenecks beyond the definition for this Part. The FHWA believes that due to the diversity in characteristics of bottlenecks and a lack of a universal definition or approach to measurement, this reporting on freight bottlenecks should be focused at a minimum on the performance measures, as proposed in section 490.607 and how those measures and the State DOT's associated targets might be impacted by other freight efforts currently underway, such as planning or programming. The FHWA encourages State DOTs to consider multimodal freight performance in transportation planning and programming efforts taking place beyond this rule. Upon development of the National Strategic Freight Plan, a State DOT shall specifically include its activities for addressing freight bottlenecks as part of that Plan in this report. The FHWA is seeking comment on this approach.

The FHWA proposes in section 490.107(b)(1)(ii)(G) that State DOTs, where applicable, would be required to describe the boundaries of EPA's designation of nonattainment or maintenance areas under the NAAQS in 40 CFR part 81 at the time when the State DOT Baseline Performance Period Report is due to FHWA. Please refer to the discussion in section 490.103(c) for more information.

As discussed in section 490.107(c)(3), MPOs serving a TMA with a population over 1 million representing nonattainment and maintenance areas for $O_3$, CO or PM NAAQS are required to submit CMAQ Performance Plan, required under 23 U.S.C. 149(l), as a part in the State Biennial Performance Report. In section 490.107(b)(1)(ii)(H), the FHWA proposes that State DOTs would report relevant MPOs' CMAQ Performance Plan, where applicable.

## Discussion of Mid Performance Period Report

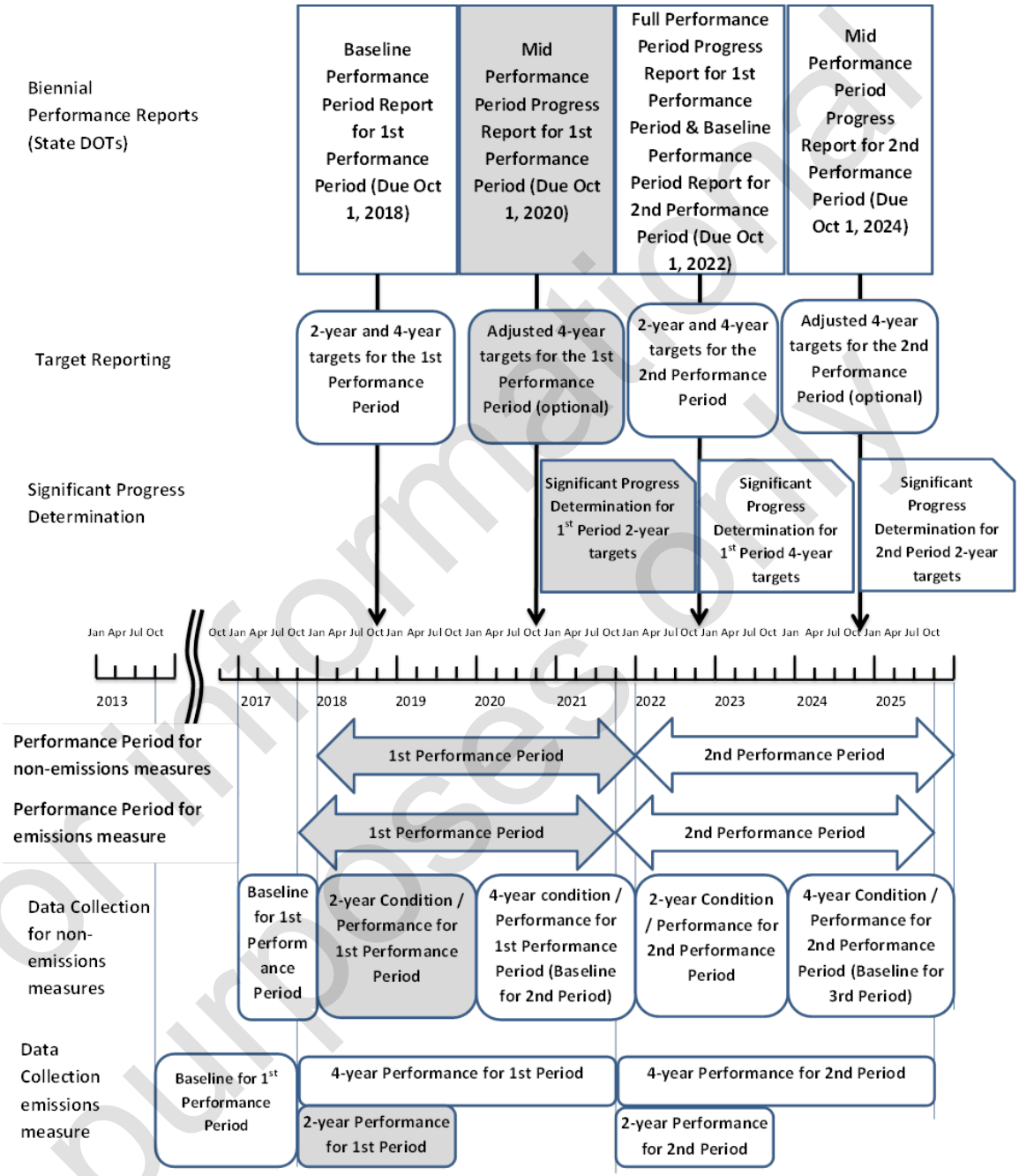


**Figure 4 – Biennial Performance Reports – The Mid Performance Period Report**

The FHWA proposes the requirement for the Mid Performance Period Progress Report in section 490.107(b)(2). In section 490.107(b)(2)(i), FHWA proposes that State DOTs would be required to submit a Mid Performance Period Progress Report no later than October 1st of the third year of a performance period. The FHWA is proposing that the first performance period would begin on January 1, 2018, for the measures identified in section 490.105(c)(1) through (c)(7) and would begin on October 1, 2017, for the emission measure identified in section 490.105(c)(8). Although the performance periods may be different, the reporting for all the measures in section 490.105(c) would follow the same schedule. State DOTs would submit their first Mid Performance Period Progress Report no later than October 1, 2020, and subsequent Mid Performance Period Progress Reports would be due no later than October 1st every 4 years thereafter.

In section 490.107(b)(2)(ii), FHWA proposes the required contents for the Mid Performance Period Progress Report. In section 490.107(b)(2)(ii)(A), FHWA proposes that State DOTs would be required to report 2-year condition/performance in each Mid Performance Period Progress Report. As exhibited in Figure 4, FHWA proposes that the 2-year condition/performance would be reported to represent the actual condition/performance derived from the latest measured condition/performance through the midpoint of a performance period. Considering the first performance period is proposed to begin on January 1, 2018, for the measures identified in section 490.105(c)(1) through(c)(7), 2-year condition/performance for this performance period would be the most recent conditions/performance that represents actual conditions/performance through December 31, 2019, (illustrated in Figure 4). As defined

in section 490.101, a target is a numeric value that represents a quantifiable level of condition/performance in an expression defined by a measure. The FHWA proposes that a target would be a single numeric value representing the intended or anticipated condition/performance level at a specific point in time. For example, the proposed measure, Percent of the Interstate System providing for Reliable Travel Times measure (in section 490.507(a)(1)), would be a percentage of directional mainline highways on the Interstate System providing for Reliable Travel Times (sections 490.503(a)(1) and 490.513(b)) expressed in one tenth of a percent. Thus, FHWA proposes that a target for this measure would be a percentage of directional mainline highways on the Interstate System providing for Reliable Travel Times expressed in one tenth of a percent. As a hypothetical example, a 2-year target for that measure would be 39.5 percent. The 2-year condition/performance would be 39.2 percent. For the on-road mobile emissions measure identified in section 490.105(c)(8), 2-year condition/performance for this performance period would be the estimated cumulative emissions reduction resulting from CMAQ projects from fiscal year 2018 through fiscal year 2019 in the CMAQ Public Access System, as described in section 490.809.

The FHWA proposes in section 490.107(b)(2)(ii)(B) that State DOTs would also include a discussion of progress made toward the achievement of 2-year targets established for the current performance period. In this discussion, State DOTs would present a comparison of 2-year condition/performance with the 2-year targets that were established for the performance period. For example, in the first Mid Performance Period Progress Report in 2020, a State would compare the actual condition/performance

through 2019 with the 2-year targets established for the first performance period and discuss why targets were or were not achieved. This discussion could describe accomplishments achieved, planned activities, circumstances that led to actual conditions/performance, or any other information that State DOT feel would adequately explain progress. Although this explanation would not be used to determine significant progress, as described in section 490.109, this information would be made available to the public to provide an opportunity for the State DOT to discuss actual outcomes achieved. As an example, for the Percent of the Interstate System providing for Reliable Travel Times measure (in section 490.507(a)(1)), a hypothetical 2-year target for this measure is 39.5 percent (in section 490.105(e)). If 2-year condition/performance for this measure is 39.2 percent as discussed above, the State DOT would discuss why this target was not achieved in its Mid Performance Period Progress Report.

The FHWA proposes in sections 490.107(b)(2)(ii)(C) and (D) that, in each Mid Performance Period Progress Report, State DOTs would include discussions on the effectiveness of the investment strategy documented in the State asset management plan for the NHS and the ways in which State DOTs are addressing congestion at freight bottlenecks, including those identified in the National Freight Strategic Plan, as described in section 490.107(b)(1)(ii)(F). This content is required as part of the report under 23 U.S.C. 150(e)(2) and (4). The FHWA recognizes that the Mid Performance Period Progress Report for the first performance period may be impacted by the timing of the implementation of the new NHS asset management plan requirement and the development of a final National Freight Strategic Plan. The FHWA intends to issue

further guidance if the timing of these two plans would impact a State DOT's ability to comply with the requirements proposed in sections 490.107(b)(2)(ii)(C) and (D).

As discussed in section 490.105(e)(6), FHWA recognizes the challenges that State DOTs may face in target establishment and proposes to allow State DOTs to adjust their 4-year targets. The FHWA is proposing in section 490.107(b)(2)(ii)(E) that State DOTs would report any adjustments to their 4-year targets in the Mid Performance Period Progress Report. The FHWA proposes that this target adjustment allowance would be limited to this specific report and not allowed prior to, or following, the submittal of the Mid Performance Period Progress Report. For example, if a State DOT elects to adjust a 4-year target established in its first Baseline Performance Period Report in 2018, the State DOT would only be able to adjust the 4-year target in its Mid Performance Period Progress Report in 2020. In addition to reporting the adjusted 4-year target, the State DOT would be required to include a discussion on the basis for the adjusted 4-year target(s) for the performance period and a discussion on how the adjusted targets support expectations documented in longer range plans, such as the State asset management plan and the long-range statewide transportation plan. The FHWA intends to publish the State DOT established targets on a publicly available Web site with the initial target basis discussion. Any targets adjusted at the mid-point will also be reflected on the site.

The FAST Act introduced 23 U.S.C. 167(j), which requires FHWA to determine if a State has met or made significant progress toward meeting the performance targets related to freight movement. This was not part of MAP-21. To meet the requirements of the FAST Act, FHWA has incorporated language throughout this NPRM requiring the

targets established for the measures in section 490.105(c)(6) to be included in the significant progress process. The FHWA has called these the NHFP targets. Section 490.107(b)(2)(ii)(F) is the first regulatory reference to the NHFP.

In section 490.107(b)(2)(ii)(F), FHWA proposes that the State DOTs would discuss the progress they have made toward the achievement of the 2-year targets reported in the current Baseline Performance Period Report that would had been established for the NHPP measures specified in sections 490.105(c)(1) through (c)(5) and the NHFP measures in section 490.105(c)(6). Additionally, State DOTs would provide information to discuss how the actual 2-year condition/performance levels compare to targets. Although this discussion would not be used to determine significant progress for the applicable measures, this information would be made available to the public to provide an opportunity for the State DOT to discuss actual outcomes related to the NHPP and NHFP. For example, the State DOT may use this discussion to explain how it effectively and efficiently delivered a program designed to achieve 2-year targets, how this may have resulted in actual condition/performance improvements for the NHPP and NHFP, and how the State DOT would deliver a program to make significant progress for 4-year targets for the NHPP and NHFP.

In section 490.107(b)(2)(ii)(G), FHWA is proposing that a State DOT would report any factors that it could not have foreseen and were outside of its control that impacted its ability to make significant progress for the 2-year targets for the NHPP or NHFP. The FHWA would use this discussion when considering extenuating circumstances discussed in section 490.109(e)(4).

In section 490.107(b)(2)(ii)(H), FHWA proposes that if FHWA determines that a State DOT has not made significant progress toward the achievement of any NHPP or NHFP targets in a biennial FHWA determination, then the State DOT would include a description of the actions it will undertake to achieve those targets as required, respectively, under 23 U.S.C. 119(e)(7) or 167(j).

For example, for the NHPP or the NHFP, if FHWA determines that a State DOT has not made significant progress (as provided in section 490.109(e)(2)) for either the 2-year or 4-year significant progress determination, then the State DOT would include a description of the actions it would undertake to achieve its conditions/performance with respect to all related measures (section 490.109(f)) in its next Biennial Progress Report. If FHWA determines that the State DOT has achieved the target or made significant progress, then the State DOT does not need to include such description in the next Biennial Progress Report.

For the NHPP targets, the FAST Act amended the language in MAP-21, and changed the determination period from being based on looking back over "two consecutive determinations" (a 4-year period) to a single biennial FHWA determination which looks back over a 2-year period. This is a change from the language presented in the second NPRM, but it is required to be consistent with the amended statute.

As discussed in section 490.107(c)(3), MPOs serving a TMA with a population over 1 million representing nonattainment and maintenance areas for $O_3$, CO, or PM NAAQS are required to submit CMAQ Performance Plan, required under 23 U.S.C. 149(l), as a part in the State Biennial Performance Report. In section 490.107(b)(2)(ii)(I),

FHWA proposes that State DOTs would report relevant MPOs' CMAQ Performance Plan, where applicable.

## Discussion of Full Performance Period Reports

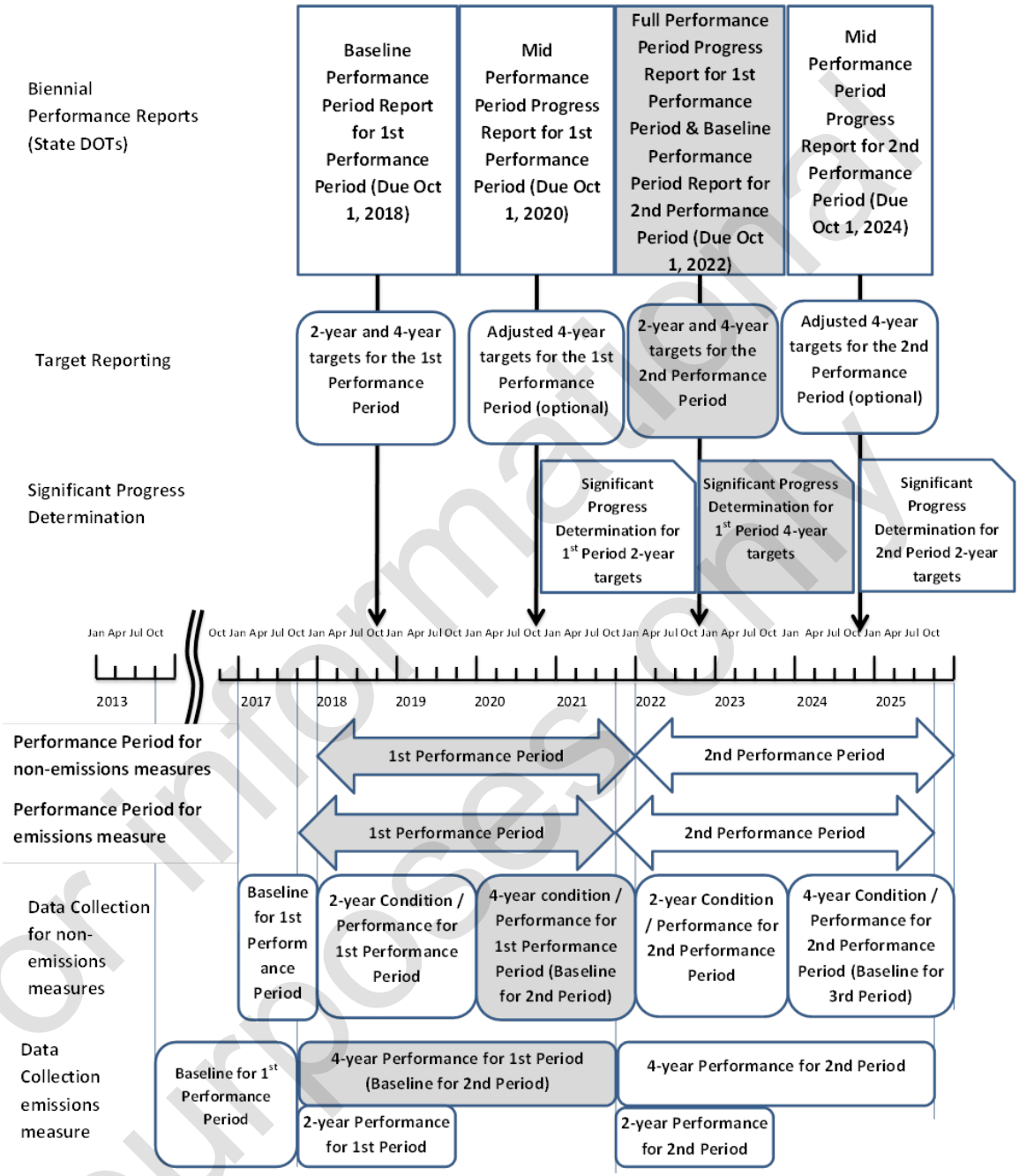


**Figure 5 –Biennial Performance Reports – The Full Performance Period Report**

The FHWA proposes the requirement for the Full Performance Period Progress Report in section 490.107(b)(3). In section 490.107(b)(3)(i), FHWA proposes that State DOTs be required to submit a Full Performance Period Progress Report no later than October 1st of the first year following the completion of a performance period. The FHWA is proposing that the first performance period would begin on January 1, 2018, for the measures identified in section 490.105(c)(1) through (c)(7) and would begin on October 1, 2017, for emission measure identified in section 490.105(c)(8). Although the performance periods may be different, the reporting for all the measures in section 490.105(c) would follow the same schedule. State DOTs would submit their first Full Performance Period Progress Report no later than October 1, 2022, and subsequent Full Performance Period Progress Reports would be due no later than October 1st every 4 years thereafter.

In section 490.107(b)(3)(ii), FHWA proposes the required contents for Full Performance Period Progress Report.

In section 490.107(b)(3)(ii)(A), FHWA proposes that State DOTs would be required to report 4-year condition/performance in each Full Performance Period Progress Report. As exhibited in Figure 5, FHWA proposes that the 4-year condition/performance be reported to represent the actual condition/performance derived from the latest measured condition/performance through the end of a performance period. Considering the first performance period is proposed to begin on January 1, 2018, for the measure identified in section 490.105(c)(1) through (c)(7) and on October 1, 2017, for the measure identified in section 490.105(c)(8), the 4-year condition/performance for this

performance period would be the most recent conditions/performance that represents actual conditions/performance through December 31, 2021 (illustrated in Figure 5). For the on-road mobile emissions measure identified in section 490.105(c)(8), 4-year condition/performance for this performance period would be the 4-year cumulative emissions reduction resulting from CMAQ projects from fiscal year 2018 through fiscal year 2021 in the CMAQ Public Access System, as described in section 490.809. As indicated in Figure 5, the reported 4-year condition/performance in a Full Performance Period Progress Report would be the baseline condition/performance for next performance period for all measures.

As an example, for the Percent of the Interstate System providing for Reliable Travel Times measure (in section 490.507(a)(1)), an hypothetical 4-year target for this measure is 38.5 percent (in section 490.105(e)). If 4-year condition/performance for this measure is 37.7 percent as discussed above, the State DOT would discuss why this target was not achieved in their Full Performance Period Progress Report.

The FHWA proposes in section 490.107(b)(3)(ii)(B) that the State DOTs would also include a discussion of progress made toward the achievement of 4-year targets established for the relevant performance period. In this discussion, State DOTs would present a comparison of 4-year condition/performance with the 4-year targets that were established for the performance period. For example, in the first Full Performance Period Progress Report in 2022, a State DOT would compare the actual condition/performance through the end of the performance period with the 4-year targets established for the first performance period and discuss why targets were or were not achieved. This discussion

could describe accomplishments achieved, planned activities, circumstances that led to actual conditions/performance or any other information that State DOT would feel would adequately explain progress. Although this explanation would not be used in the determination of significant progress, this information would be made available to the public to provide an opportunity for the State DOT to discuss actual outcomes achieved.

As discussed in sections 490.107(b)(2)(ii)(C) and (D) for the Mid Performance Period Progress Report, FHWA also proposes in sections 490.107(b)(3)(ii)(C) and (D) that in each Full Performance Period Progress Report, State DOTs would include discussions on the effectiveness of the investment strategy documented in their State asset management plans for the NHS and the ways in which State DOTs are addressing congestion at freight bottlenecks, including those identified in the National Freight Strategic Plan, as described in section 490.107(b)(1)(ii)(F). Please refer to the discussion of sections 490.107(b)(1)(ii)(F), 490.107(b)(2)(ii)(C) and (ii)(D) for more information.

In section 490.107(b)(3)(ii)(E), FHWA proposes that the State DOTs would discuss the progress they have made toward the achievement of the 4-year targets reported in the current Baseline Performance Period Report, or adjusted in the current Mid Performance Period Progress Report, that would have been established for the NHPP measures specified in sections 490.105(c)(1) through (c)(5) and the NHFP measures specified in section 490.105(c)(6). Additionally, State DOTs would provide information to discuss how the actual 4-year condition/performance levels compare with the applicable NHPP or NHFP targets. Although this discussion would not be used in the determination of significant progress for the applicable measures, this information would

be made available to the public to provide an opportunity for the State DOT to discuss actual outcomes related to the NHPP and NHFP. For example, the State DOT may use this discussion to explain how it effectively and efficiently delivered a program designed to achieve targets and how this may have resulted in actual condition/performance improvements for the NHPP and NHFP.

In section 490.107(b)(3)(ii)(F), FHWA is proposing that a State DOT would report any factors that it could not have foreseen and were outside of its control that impacted its ability to make significant progress for the NHPP or NHFP 4-year targets. This discussion would be used by FHWA to consider the application of the proposed consideration of extenuating circumstances discussed in section 490.109(e)(4).

In section 490.107(b)(3)(ii)(G), FHWA proposes that if FHWA determines that a State DOT has not made significant progress toward the achievement of any NHPP or NHFP targets, then the State DOT would include a description of the actions it would undertake to achieve conditions/performances with respect to all related NHPP or NHFP measures within the measure group, as described in section 490.109(f).

For example, for the NHPP or NHFP, if FHWA determines that a State DOT has not made significant progress at either the 2-year or 4-year significant progress determination, then the State DOT would include a description of the actions it would undertake to achieve its targets with respect to all related measures in the next Biennial Progress Report. If FHWA determines that the State DOT has achieved or made significant progress, then the State DOT does not need to include this description in the next Biennial Progress Report.

As discussed in section 490.107(c)(3), MPOs serving a TMA with a population over one million representing nonattainment and maintenance areas for $O_3$, CO, or PM NAAQS are required to submit CMAQ Performance Plan, required under 23 U.S.C. 149(l), as a part in the State Biennial Performance Report. In section 490.107(b)(3)(ii)(H), FHWA proposes that State DOTs would report relevant MPOs' CMAQ Performance Plan, where applicable.

The FHWA proposes, in section 490.107(c), that MPOs document the manner in which they report their established targets. The MPOs would report their established targets to the relevant State DOTs in a manner that is agreed upon by both parties and documented. The FHWA proposes in section 490.105(e)(5), that MPOs would report targets to the State DOT in a manner that would allow the State DOT to provide FHWA, upon request, all of the targets established by relevant MPOs. In section 490.107(c)(2), FHWA also proposes that MPOs would report baseline condition/performance, and progress toward the achievement of their targets, in the system performance report in the metropolitan transportation plan, in accordance with 23 CFR 450. In sections 490.105(e)(3) and 490.105(d)(3), FHWA discusses how an urbanized area boundary or NHS limit changes during a performance period may lead to changes in the measures reported for an area/network and could impact how an established target relates to actual measured performance. The FHWA anticipates that changes in the MPA boundary could also impact how an established target relates to actual measured performance. Thus, FHWA seeks comment on whether the description of the MPA in place when

establishing targets should be included in the system performance report and apply to the entire performance period.

As required in 23 U.S.C. 149(l), each MPO serving a TMA with a population over 1 million representing nonattainment and maintenance areas must develop a performance plan, updated biennially, to report baseline levels and the progress toward achievement of the targets for the CMAQ traffic congestion and on-road mobile source emissions measures. The FHWA proposes that the CMAQ performance plan is not required when the MPO does not serve a TMA with a population over 1 million; the MPO is attainment for $O_3$, CO and PM NAAQS; or the MPO's nonattainment or maintenance area for $O_3$, CO, or PM NAAQS is outside the urbanized area boundary of the TMA with a population over one million. Based on the data available,[82] FHWA has prepared a list[83] of the MPOs who might be subject to the CMAQ performance plan and included this list in the docket.

To encourage close coordination of the State DOT and MPOs in implementing the performance requirements and to streamline the reporting requirements, FHWA proposes in section 490.107(c)(3) that the MPOs meet the reporting requirements of the CMAQ performance plan in 23 U.S.C. 149(l) if the MPO's CMAQ performance plan is submitted as part of the State Biennial Performance Report as required under section

[82] Metropolitan Planning Area Data: FHWA HEPGIS (Accessed on 5/1/2015): http://hepgis.fhwa.dot.gov/hepgismaps11/ViewMap.aspx?map=MPO+Boundaries|MPO+Boundary# The nonattainment/maintenance status of the MPOs areas was verified on 5/1/2015 based on EPA's Green Book (updated on April 14, 2015): http://www.epa.gov/oaqps001/greenbk/gis_download.html Population Data for Urbanized Areas (Accessed on 8/7/2013): https://www.census.gov/geo/reference/ua/urban-rural-2010.html

[83] Document "CMAQ Measure States and MPOs.pdf" in the docket.

490.107(b). The CMAQ performance plan must be clearly documented in a separate section, as an attachment, of the State Biennial Performance Report. The FHWA is soliciting comments on other ways that will help further streamline the reporting requirements. Some options may include:

1. The MPOs could submit their CMAQ performance plans to FHWA separately from the State Biennial Performance Report as discussed in section 490.107(b). In this case, the State DOTs and the MPOs should coordinate to ensure that the MPOs' data are reflected in the State report in a consistent manner.

2. The MPOs could submit their performance information to the State DOTs to be included in the State Biennial Performance Report. In this case, the State DOTs would be responsible to ensure the CMAQ performance plan requirements are met.

The FHWA requests comments on other possible options that provide a streamlined approach to meet the performance requirements as discussed above.

The FHWA proposes that, similar to the State DOT Biennial Performance Reports, an MPO would have three distinct performance reports (Baseline Performance Period, Mid Performance Period Progress, and Full Performance Period Progress). These distinct reports would contain different content, but would align with target establishment and other State DOT performance reporting requirements.

As part of the CMAQ performance plan submitted with the State DOT's Baseline Performance Period Report, the MPO would include baseline condition/performance for each applicable measure. This could result in several different baseline condition/performances: one for each urbanized area's traffic congestion measure and up

to five[84] for the on-road mobile source emission measure. The FHWA intends that "baseline level," as used in 23 U.S.C. 149(l), has the same meaning as "baseline condition/performance" as used in this section. Interpreting these phrases as having the same meaning will help ensure that State DOTs and MPOs are reporting consistent baseline condition/performance information. For the traffic congestion measure, the baseline condition/performance would be the same as that reported by the State DOT(s) under section 490.107(b)(1)(ii)(B).

The report would also include the 2-year and 4-year targets for these measures for the performance period. The establishment of targets is required in section 490.105(f). An MPO would use the same geographic area for both reporting its baseline condition/performance and establishing targets. For the traffic congestion measure, as described in section 490.105(f)(5), 2-year and 4-year targets would be identical to the targets reported by the relevant State DOT(s) under section 490.107(b)(1)(ii)(A). As required by 23 U.S.C. 149(l)(1)(C), the report would describe projects identified for CMAQ funding and how such projects would contribute to achieving the performance targets for the traffic congestion and on-road mobile source emissions measures.

The FHWA proposes that the CMAQ performance plan submitted with the State DOT's Mid Performance Period Progress Report would include the actual 2-year condition/performance derived from the latest measured condition/performance through the midpoint of the performance period for an MPO-reported traffic congestion target and

[84] Measure for each of the applicable criteria pollutants and precursors (VOC, NOx, CO, PM2.5 and/or PM10)

the estimated cumulative emissions reduction resulting from CMAQ projects in the CMAQ Public Access System for each MPO-reported on-road mobile source emissions target. For the traffic congestion measure, the actual 2-year condition/performance would be identical to the 2-year condition/performance reported by the relevant State DOT(s) under section 490.107(b)(2)(ii)(A). For the on-road mobile source emissions measure, an MPO should use the same process the State DOT uses for determining the actual condition/performance, which is described in relation to section 490.107(b)(2)(ii). As required by 23 U.S.C. 149(l)(2), MPOs would assess the progress of the projects identified in the CMAQ performance plan submitted with the Baseline Performance Period Report toward achieving the 2-year targets for traffic congestion and on-road mobile source emissions measures. When doing this assessment, the MPO would compare the actual 2-year condition/performance with the 2-year target and document any reasons for differences between these two values.

If an MPO adjusts its 4-year target, the MPO would report that adjusted target, as provided in section 490.105(f)(7) and (f)(8). In addition, an MPO would update its description of projects identified for CMAQ funding and how those updates would contribute to achieving the performance targets for these measures. If an MPO has not adjusted its targets or does not have any changes to its description of projects, it may comply with this proposed requirement by making a statement to that effect.

The FHWA proposes the CMAQ performance plan submitted with the State DOT's Full Performance Period Progress Report would include the actual 4-year condition/performance derived from the latest measured condition/performance through

the end of the performance period for each MPO-reported traffic congestion and estimated cumulative emissions reductions resulting from CMAQ projects in the CMAQ Public Access System for each MPO reported on-road mobile source emissions target. For the traffic congestion measure, the actual 4-year condition/performance would be identical to the 4-year condition/performance reported by the relevant State DOT(s) under section 490.107(b)(3)(ii)(A). For the on-road mobile source emissions measure, an MPO should use the same process used by the State DOT for determining the actual 4-year condition/performance, which is described in relation to section 490.107(b)(3)(ii). As required by 23 U.S.C. 149(l)(2), MPOs would assess the progress of the projects identified in the CMAQ performance plan submitted with the Baseline Performance Period Report and any updates to that description identified in the CMAQ performance plan submitted with the Mid Performance Period Progress Report toward achieving the 4-year targets for these measures. When doing this assessment, the MPO would compare the actual 4-year condition/performance with the 4-year target and document any reasons for differences between these two values.

The FHWA has proposed that MPOs submit three distinct CMAQ performance plans with the State DOT's biennial performance reports (Baseline Performance Period, Mid Performance Period Progress, and Full Performance Period Progress). Because these plans would be required for consecutive 4-year performance periods, the information provided in the CMAQ performance plan submitted with the State DOT's Full Performance Period Report would be provided at the same time and may include some of the same information as the CMAQ performance plan submitted with the State

DOT's Baseline Performance Period Report for the next performance period. As FHWA expects that State DOTs would provide all of the required baseline and progress reporting information at one time, and the MPO CMAQ performance plan would be submitted in a similar fashion. The proposed regulations identify three distinct plans to clarify the purpose and timing of information that would be required to be reported every 2 years. The FHWA intends to issue guidance to assist MPOs in developing and submitting these biennial plans.

The FHWA also seeks comments on other issues or problems State DOTs and MPOs might anticipate in meeting the reporting requirements of 23 U.S.C. 149(l) and 150(e) for the performance measures related to the CMAQ program and ideas for resolving any anticipated issues or problems.

**Discussion of Section 490.109 Assessing Significant Progress toward Achieving the Performance Targets for the National Highway Performance Program and National Highway Freight Program.**

Significant progress determinations for measures identified in section 490.207(a) are discussed in section 490.211 of the first performance measure rulemaking, published as a final rule March 15, 2016; and significant progress determination specific to pavement condition measures in sections 490.307(a)(1) through (c)(4) and bridge condition measures in sections 490.407(c)(1) and (c)(2) are included in the second performance measure NPRM. The discussions specific to these measures will not be repeated in this NPRM. Please see the docket for Subpart A in its entirety for additional information.

In section 490.109, FHWA proposes the method by which FHWA would determine if a State DOT has achieved or is making significant progress toward its performance targets in the NHPP, as required by 23 U.S.C. 119(e)(7), and NHFP, as required 23 U.S.C. 167(j). This determination would involve the measures identified in section 490.105(c)(1) through (c)(5), which include the proposed measures in both this performance management NPRM and the second performance management NPRM, and section 490.105(c)(6). Although this determination could directly impact State DOTs, MPOs could also be indirectly impacted as a result of the link between metropolitan and statewide planning and programming decisionmaking. This rulemaking discusses the approach that would be taken by FHWA to assess State DOT performance progress, but does not include a discussion on the method that may be used by FHWA to assess the performance progress of MPOs. Interested persons should refer to the updates to the Statewide and Metropolitan Planning regulations (RIN 2125-AF52) for discussion on the review of MPO performance progress.

The FHWA recognizes that there may be factors outside of a State DOT's control that could impact its ability to achieve a target. The FHWA considered these factors in its evaluation of different approaches to implement this provision. A number of factors were raised as part of the performance management stakeholder outreach sessions regarding target establishment and progress assessment, including: the impact of funding availability on performance outcomes, the reliability of the current state-of-practice to predict outcomes resulting from investments at a system level, the impact of uncertain events or events outside the control of a State DOT on performance outcomes, the need to

consider multiple performance priorities in making investment trade-off decisions, and the challenges with balancing local and national objectives.

The FHWA recognizes that the State DOTs and MPOs have to consider multiple performance priorities in making investment trade-off decisions and that there are challenges with balancing local and national objectives. During outreach, stakeholders[85] raised a number of concerns regarding progress assessment, including:

- the desire to foster balanced and sound decisions rather than focusing on achieving one target at the expense of another;
- the desire to assess progress using quantitative and qualitative input; and
- the desire to avoid unachievable targets.

Thus, FHWA plans to implement an approach that balances the uncertainty facing State DOTs in predicting future performance with the need to provide for a fair and consistent process to determine compliance. The approach being proposed by FHWA is based on the following principles:

- focus the Federal-aid highway program on the MAP-21 national goals in 23 U.S.C. 150(b); and
- recognize that State DOTs need to consider fiscal constraints in their target establishment.

[85] AASHTO (2013), *SCOPM Task Force Findings on MAP-21 Performance Measure Target-Setting*. http://scopm.transportation.org/Documents/SCOPM%20Task%20Force%20Findings%20on%20Performance%20Measure%20Target-Setting%20FINAL%20v2%20(3-25-2013).pdf.

Because targets would be established for an entire system, FHWA acknowledges that State DOTs may make small incremental changes within that system that would not necessarily appear in a quantitative assessment. In some instances, even a modest increase in improvement when evaluating on a system-wide basis, would constitute significant progress. Accordingly, FHWA proposes that for each NHPP target (targets for the measures identified in section 490.105(c)(1) through (c)(5)) and each NHFP (targets for the measures identified in section 490.105(c)(6)), progress toward the achievement of the target would be considered "significant" when either of the following occur: the actual condition/performance level is equal to or better than the State DOT established target, or the actual condition/performance is better than the State DOT identified baseline of condition/performance. The FHWA believes that any improvement over the baseline, which represents a 0.1 percent improvement, should be viewed as significant progress considering the fiscal challenges and financial uncertainties many State DOTs are faced with today. Although a change of 0.1 percent may appear insignificant, this degree of improvement to a highway network is difficult to achieve. In many State DOTs this level of change would require improvements to hundreds, if not thousands, of lane-miles of highway network. The FHWA reviewed the extent to which State DOTs have been able to actually change system conditions/performance of their highway networks in recent years to validate this view of significant progress. This review supports FHWA's belief that any improvement should be considered significant, as many State DOTs have seen minimal or no improvements in the condition/performance of their highway networks in recent years. This is the case even

with the influx of funding State DOTs were able to utilize through the American Recovery and Reinvestment Act of 2009. For these reasons, FHWA believes that any improvement over the baseline should be viewed as significant progress.

The FHWA believes that State DOTs, through a transparent and public process, would want to establish or adjust targets that strive to improve the overall performance of the NHS and freight movement. For this reason, FHWA did not want to propose an approach to determine significant progress that would be difficult to meet, as it could discourage the establishment of "reach" targets due to the perceived uncertainties that would need to be assumed by State DOTs. The FHWA feels that the progress assessment approach proposed in this NPRM, which considers improvement from baseline conditions to be significant, would not discourage State DOTs from establishing targets to improve the overall condition/performance of the Interstate and non-Interstate System NHS, and freight movement.

The FHWA is proposing a three-step process to determine if a State DOT has made significant progress toward the achievement of its NHPP and NHFP targets. The FHWA would use this process to make a significant progress determination for the NHPP and NHFP each time the State DOT submits its Mid Performance Period Progress Report and its Full Performance Period Progress Report. This process is summarized below and discussed in more detail for each of the proposed regulations.

- Step 1: *Reporting Progress in the Biennial Performance Reports* – The State DOT would evaluate and report the progress it has made both toward the achievement of each individual target and for all related targets

collectively established for the NHPP and NHFP measures (measures identified in section 490.105(c)(1) through(c)(5) and 490.105(c)(6)). This evaluation would be documented in the discussion of progress achieved since the most recent report. The State DOT would document in its Biennial Performance Reports any extenuating circumstances outside its control that may have impacted its ability to achieve progress on any of the targets.

- Step 2: *Consideration of Extenuating Circumstances* – The FHWA would review the completeness of the content provided in their Biennial Performance Reports and would determine if any documented extenuating circumstances would be considered in the progress assessment. A State DOT would provide any additional information to FHWA, upon request, if the report is incomplete.
- Step 3: *Evaluation of Actual Condition/Performance* – The FHWA would determine if the State DOT has made significant progress for each target using the following sources:
    - Data contained within the HPMS for targets established for pavement condition measures, as specified in sections 490.105(c)(1) and (c)(2);
    - Data contained in the NBI for targets established for bridge condition measures, as specified in section 490.105(c)(3);

- Data contained within the HPMS for targets established for system performance measures, as specified in sections 490.105(c)(4) and (c)(5);
- Data contained within the HPMS for targets established for Freight performance measures, as specified in sections 490.105(c)(6);
- Data to define the urbanized area boundary and NHS limits as documented in the State DOT Baseline Performance Period Report; and
- Population data, as defined by the most recent U.S. Decennial Census that was available when targets were first reported by the State DOT in their Baseline Performance Period Report.

The FHWA would use these biennial determinations to assess if the State DOT is in compliance with the NHPP[86] and NHFP[87] performance achievement provisions. For the NHPP and NHFP, the State DOTs are required to achieve or make significant progress toward their targets every biennial reporting period (every 2 years), and are to take additional reporting actions if FHWA determines significant progress is not made. The FHWA plans to issue guidance, following the publication of the Final Rule, establishing when the determination notification to the State DOTs will be made.

For the NHPP, the requirement for State DOTs to take the additional reporting actions would be based on each FHWA biennial determination. This is a change from the

[86] 23 U.S.C 119(e)(7)
[87] 23 U.S.C. 167(j)

second NPRM, which proposed that the requirement for a State DOT to take the additional reporting actions would be based on two consecutive FHWA biennial determinations. As discussed in previous sections, the enactment of FAST Act introduced the significant progress determination requirements for the NHFP and removed the requirement that two consecutive reports (4 year period) be used in determining if a State DOT would be required to take additional reporting actions when the State DOT has made significant progress toward its NHPP targets. Thus, in this NPRM, the language has been changed to reflect the statutory language in FAST Act. The FHWA proposes, in this NPRM, that FHWA would determine whether or not a State DOT has achieved or make significant progress toward its NHPP and NHFP targets every biennial reporting period, and the determination on whether or not a State DOT would take additional reporting actions based on each of FHWA biennial determination.

In section 490.109(a), FHWA proposes that it would determine whether a State DOT has achieved or has made significant progress toward achieving each of the State DOT's targets for each of the NHPP and NHFP measures separately.

The FHWA proposes in section 490.109(b) that FHWA would determine whether a State DOT has or has not made significant progress for NHPP and NHFP targets at the midpoint and the end of each performance period.

In section 490.109(c), FHWA proposes that FHWA would determine significant progress toward the achievement of a State DOT's NHPP and NHFP targets after the State DOT submittal of the Mid Performance Period Progress Report and after the State DOT submittal of the Full Performance Period Progress Report. This process, which is

described in the discussion of section 490.107(b), would follow the proposed schedule illustrated in Figures 4 and 5. Following this proposed frequency, the FHWA would make a significant progress determination for the NHPP and NHFP and assess compliance with the NHPP and NHFP performance achievement provisions every 2 years.

The FAST Act introduced 23 U.S.C. 167(j), which says "If the Administrator determines that a State has not met or made significant progress toward meeting the performance targets related to freight movement of the State established under section 150(d) by the date that is 2 years after the date of the establishment of the performance targets, the State shall include in the next report submitted under section 150(e) a description of the actions the State will undertake to achieve the targets, including…" The FHWA interprets the 2-year period referenced in 23 U.S.C. 167(j) as 2 years after the start of the performance period, which is consistent with 150(e) reporting requirements and the reporting regulations of this NPRM. This 2 year period is the period of time the State DOT has to establish targets, collect data, and provide information to FHWA. This interpretation allows FHWA to determine if a State DOT has made significant progress on its 2-year targets following the submittal of its Mid Performance Period Progress Report, and on its 4-year targets following the submittal of its Full Performance Period Progress Report.

The FHWA would notify all State DOTs within a reasonable time of the final determination and would advise on any subsequent need to address progress achievement in their next biennial reports (see 450.109(f)). The data reported to FHWA by the States

would be available to the public and would be used to communicate a national performance story. The FHWA is developing a public Web site to share performance related information. This information would provide for greater transparency for FHWA programs.

The FHWA also expects that during a performance period, State DOTs would routinely monitor leading indicators, such as program delivery status, to assess if they are on track to make significant progress toward achievement of their NHPP and NHFP targets. If a State DOT anticipates it may not make significant progress, it is encouraged to work with FHWA and seek technical assistance during the performance period to identify the actions that can be taken to improve progress toward making significant progress. The FHWA also seeks comment on whether it should require State DOTs to more frequently (e.g., annually) evaluate and report the progress they have made.

The FHWA desires to use national datasets in a consistent manner as a basis for making its NHPP and NHFP significant progress determinations. Thus, in section 490.109(d), FHWA proposes to use specific data sources that could be accessed by State DOTs and others if they chose to replicate FHWA's determinations. The data in these sources, specifically the HPMS, would be provided by State DOTs as proposed in Subparts E-F. To ensure a repeatable process, in section 490.109(d), FHWA is proposing to establish a specific date (August 15) to extract data from the HPMS for the measures proposed in this NPRM, as the HPMS is often updated. This "extraction" date is considered the earliest time data can be available in a national data source. This proposed "extraction" date considers the time State DOTs typically need to submit the data to

HPMS, to process raw data, and to address missing or incorrect data that may be identified as a result of quality assessments conducted by the State DOT and/or FHWA. The proposed "extraction" date is necessary for FHWA to make significant progress determinations in a timely manner. The FHWA is proposing to extract metric data from the HPMS on August 15 to determine the actual performance of Interstate System and non-Interstate NHS for the Reliability and Peak Hour Travel Time measures, and Freight measures, as specified in sections 490.105(c)(4), (c)(5) ), and (c)(6). This date is needed to provide FHWA with sufficient time to make a determination of significant progress for NHPP and NHFP targets.

In section 490.109(e), FHWA proposes a process for the significant progress determination for each individual NHPP and NHFP target. In paragraph (e)(1), FHWA proposes that FHWA would assess how the target established by the State DOT compares to the actual condition/performance using the data/information sources described in section 490.109(d). This process is generally outlined in Step 3 of the 3-step process described earlier. The FHWA proposes, in section 490.109(e)(2), that FHWA would determine that a State DOT has made significant progress for each 2-year or 4-year target if either: 1) the actual condition/performance level is better than the baseline condition/performance reported in the State DOT Baseline Performance Period Report; or 2) the actual condition/performance level is equal to or better than the established target.

For illustrative purposes, 2-year and 4-year evaluations where improving targets were established for the first performance period are shown in Figure 6.

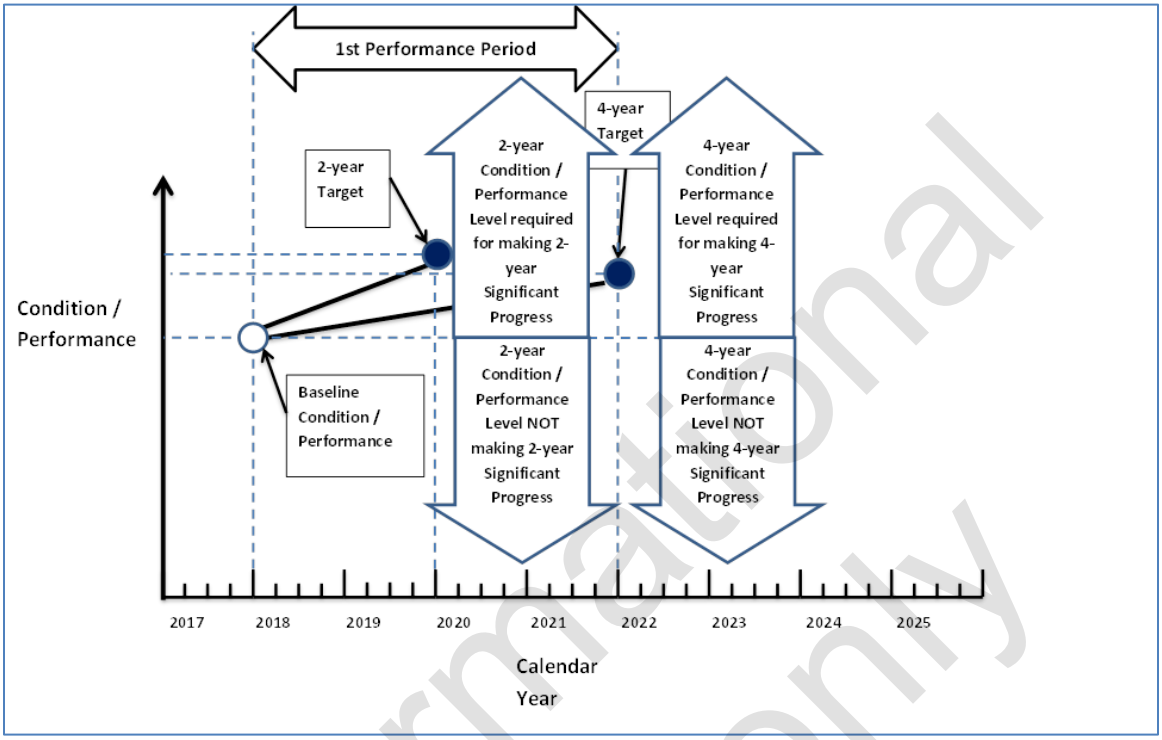


**Figure 6 – First Performance Period: 2- and 4-year Significant Progress Determination for a 2-and 4-year Target (anticipated improving scenario)**

The FHWA recognizes that State DOTs have to consider their fiscal situation in target establishment and acknowledges that, in some cases, anticipated condition/performance could be projected to decline from (or sustain) the baseline condition/performance due to lack of funding, changing priorities, etc. In these cases, State DOTs should document why they project a decline in condition in their Biennial Performance Reports as discussed in paragraph 490.107(b)(1)(ii)(A). The FHWA proposes that significant progress could still be made in cases where the established target indicates a decline from (or sustain) the baseline condition/performance. For the decline/sustain condition/performance scenario, FHWA proposes that significant progress

is made for a target when actual condition/performance level is equal to or exceeds the target. For illustrative purposes, 2-year and 4-year evaluations where declining targets were established for the first performance period are shown in Figure 7.

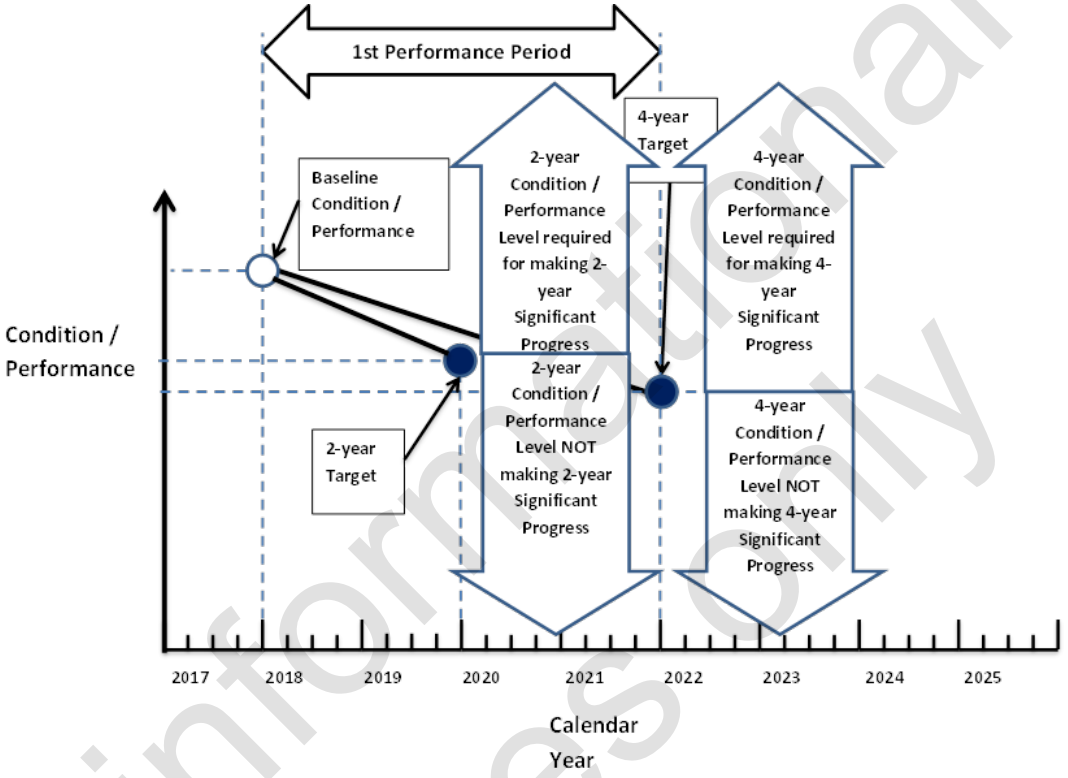


**Figure 7 - First Performance Period: 2-and 4-year Significant Progress Determination for a 2-and 4-year Target (anticipated decline/sustain scenario)**

As discussed in section 490.105(e)(7), FHWA recognizes the data limitation issues associated with the non-Interstate NHS travel time reliability measure (in section 490.507(a)(2)) prior to the start of the first performance period. Considering this limitation, FHWA proposes in section 490.105(e)(7) that for the first performance period, the State DOTs would not be required to report their 2-year targets and their baseline condition for the non-Interstate NHS travel time reliability measure at the beginning of

the first performance period. Consequently, FHWA proposes in section 490.109(e)(3) that for the first performance period only, progress toward the achievement of 2-year targets for non-Interstate NHS travel time reliability measure would not be subject to FHWA determination under section 490.109(e)(2).

The FHWA proposes to accomplish this by categorizing the 2-year targets for the non-Interstate NHS travel time reliability measure as "progress not determined," which would exclude these targets from the FHWA determination under section 490.109(e)(2). The FHWA expects that some State DOTs would adjust their established 4-year targets at the midpoint of the first performance period because they may have had limited baseline data available to them when they first establish the 4-year target. For the first performance period, FHWA would determine significant progress toward the achievement of a State DOT's non-Interstate NHS travel time reliability measure targets based on HPMS data extracted on August15 of the year in which the Full Performance Period Progress Report is due. The FHWA recognizes that some State DOTs would be able to establish and report baseline condition and 2-year targets for the proposed non-Interstate NHS travel time reliability measure in their first Baseline Performance Period Report. However, FHWA proposes that the process established in this section apply to all State DOTs in order to ensure uniformity in the progress determination process.

In section 490.109(e)(4), FHWA proposes that if a State DOT does not provide sufficient data and/or information for FHWA to make a significant progress determination for NHPP or NHFP target(s), then that State DOT would be deemed to not have made significant progress for those individual target(s).

In section 490.109(e)(5), if a State DOT encounters extenuating circumstances beyond its control, the State DOT would document the explanation of the extenuating circumstances in the biennial performance report. This explanation would address factors that the State DOT could not have foreseen and were outside of its control when it established targets at the beginning of the performance period. If the explanation is accepted by FHWA, then the associated NHPP or NHFP target(s) would be classified as "progress not determined" and would not be subject to the requirement under section 490.109(f). If the explanation is not accepted by FHWA, then the State DOT would be deemed to not have made significant progress for the target. Proposed extenuating circumstances are listed in 490.109(e)(5). The list includes:

- natural or man-made disasters causing delay in NHPP or NHFP project delivery, extenuating delay in data collection, and/or damage/loss of data system;
- sudden discontinuation of Federal Government furnished data due to natural and man-made disasters or lack of funding; and/or
- new law and/or regulation directing State DOTs to change metric and/or measure calculation.

In section 490.109(f), pursuant to 23 U.S.C. 119(e)(7) and 23 U.S.C. 167(j), FHWA has proposed that if that if FHWA determines that a State DOT has not made significant progress for any NHPP or NHFP targets in a biennial determination, then the State DOT would include in its next Biennial Performance Report a description of the actions the State DOT will undertake to improve conditions/performances with respect to

all related measures within the measure group. The FHWA proposed the related measures be grouped as follows:

- Interstate System pavement condition – both proposed measures Percentage of pavements of the Interstate System in Good condition in section 490.307(a)(1) and Percentage of pavements of the Interstate System in Poor condition in section 490.307(a)(2);
- Non-Interstate NHS pavement condition – both proposed measures Percentage of pavements of the non-Interstate NHS in Poor condition in section 490.307(a)(3) and Percentage of pavements of the non-Interstate NHS in Good condition in section 490.307(a)(4);
- NHS bridge condition – both measures Percentage of NHS bridges in Good condition in section 490.407(c)(1) and Percentage of NHS bridges in Poor condition in section in 490.407(c)(2);
- NHS travel time reliability – both measures Percent of the Interstate System providing for Reliable Travel Times in section 490.507(a)(1) and Percent of the non-Interstate NHS providing for Reliable Travel Times in section 490.507(a)(2); and
- Peak Hour Travel Time for an Urbanized Area – both measures Percent of the Interstate System where peak hour travel times meet expectations in section 490.507(b)(1) and Percent of the non-Interstate NHS where peak hour travel times meet expectations in section 490.507(b)(2). Please note the grouping for these measures is for each urbanized area separately.

- Freight movement on the Interstate System – both measures Percent of the Interstate System Mileage providing for Reliable Truck Travel Times in section 490.607(a), and Percent of the Interstate System Mileage Uncongested in section 490.607(b).

As a general example of this proposed approach, when a State DOT has not made significant progress for any one of the targets for NHS travel time reliability measures (Interstate or non-Interstate NHS), then that State DOT would, at a minimum, include in its next Biennial Performance Report a description of the actions the State DOT will undertake to improve conditions for NHS travel time reliability measures (Interstate or non-Interstate NHS). As for the peak hour travel time measures, if significant progress is not made for either urbanized area specific target (Interstate or non-Interstate NHS), as described in section 490.105(e)(8), for an urbanized area, then the State DOT would document the actions it will take to improve both the Interstate and non-Interstate NHS peak hour travel times such that both targets for the peak hour travel time measures will be achieved for that urbanized area.

States must provide description of the actions they will undertake in the next Biennial Performance Report. The FHWA strongly encourages States to add a description of their planned actions to their most recent Biennial Report within 6 months of the FHWA significant progress determination to ensure actions to achieve targets are taken in a timely manner, and to improve progress toward making significant progress for the applicable targets.

Tables 10 and 11 illustrate this proposed determination method for both the NHPP and NHFP measures. Table 10 includes the significant progress determination results in 2021 for the midpoint of the 1st performance period and the significant progress determination in 2023 for the end of the 1st performance period.

**Table 10 – Example of NHPP and NHFP Significant Progress Determinations in 2021 and 2023**

| Measure | Baseline Condition / Performance for the 1st Performance Period | Significant Progress Determination in 2021 for the midpoint of the 1st Performance Period | | | Significant Progress Determination in 2023 for the end of the 1st Performance Period | | | Measure Group |
|---|---|---|---|---|---|---|---|---|
| | | 2-year target | 2-year Condition / Performance | Significant progress made at the midpoint? | 4-year target | 4-year Condition / Performance | Period-end Significant progress made at the end of period? | |
| *The Percentage of pavements in Good Condition on Interstate System* – **statewide** | **40.0%** | *N/A* | 40.0% | **Progress not determined** [88] | *38.5%* | 37.7% | **No** | Interstate System pavement condition |
| *The Percentage of pavements in Poor Condition on Interstate System*– **statewide** | **7.0%** | *N/A* | 7.0% | **Progress not determined** [89] | *5.2%* | 6.0% | **Yes** by actual being better than the baseline | |
| *Percentage of pavements in Good Condition on non-Interstate NHS* – **statewide** | **35.0%** | *34.4%* | 34.4% | **Yes** by achieving the 2-year target | *33.3%* | 33.4% | **Yes** by achieving the 4-year target | Non-Interstate NHS pavement condition |

[88] The FHWA proposes to categorizing the 2-year targets for the Interstate pavement condition measure as "progress not determined" for the first performance period. Please see sections 490.105(e)(7) and 490.109(e)(3) in the Second Performance Measure NPRM.
[89] Ibid

| Measure | Baseline Condition / Performance for the 1st Performance Period | Significant Progress Determination in 2021 for the midpoint of the 1st Performance Period | | | Significant Progress Determination in 2023 for the end of the 1st Performance Period | | | Measure Group |
|---|---|---|---|---|---|---|---|---|
| | | 2-year target | 2-year Condition / Performance | Significant progress made at the midpoint? | 4-year target | 4-year Condition / Performance | Period-end Significant progress made at the end of period? | |
| *Percentage of pavements in Poor Condition on non-Interstate NHS –* **statewide** | **3.8%** | *2.9%* | 2.9% | **Yes** by achieving the 2-year target | *2.3%* | 2.2% | **Yes** by achieving the 4-year target | |
| *Percentage of NHS bridges in Good Condition –* **statewide** | **35.0%** | *34.5%* | 34.9% | **Yes** by achieving the 2-year target | *34.0%* | 33.4% | **No** | NHS Bridge condition |
| *Percentage of NHS bridges in Poor Condition –* **statewide** | **10.0%** | *9.3%* | 8.9% | **Yes** by achieving the 2-year target | *7.5%* | 8.5% | **Yes** by actual being better than the baseline | |
| *Percent of the Interstate System providing for Reliable Travel Times–* **statewide** | **80.0%** | *81.0%* | 79.8% | **No** | *80.0%* | 80.2% | **Yes** by achieving the 4-year target | NHS Reliable Travel Times |
| *Percent of the non-Interstate NHS providing for Reliable Travel Times–* **statewide** | **87.5%** | *N/A* | 87.5% | **Progress not determined** [90] | *88.8%* | 89.5% | **Yes** by achieving the 4-year target | |
| *Percent of the Interstate System where peak hour travel times meet expectations –* **Urbanized Area A** | **75.0%** | *76.3%* | 75.1% | **Yes** by actual better than the baseline | *77.5%* | 75.5% | **Yes** by actual being better than the baseline | Peak Hour Travel Times for Urbanized Area A |

[90] The FHWA proposes to categorizing the 2-year targets for the non-Interstate NHS travel time reliability measure as "progress not determined" for the first performance period. Please see sections 490.105(e)(10) and 490.109(e)(3).

| Measure | Baseline Condition / Performance for the 1st Performance Period | Significant Progress Determination in 2021 for the midpoint of the 1st Performance Period | | | Significant Progress Determination in 2023 for the end of the 1st Performance Period | | | Measure Group |
|---|---|---|---|---|---|---|---|---|
| | | 2-year target | 2-year Condition / Performance | Significant progress made at the midpoint? | 4-year target | 4-year Condition / Performance | Period-end Significant progress made at the end of period? | |
| *Percent of the non-Interstate NHS where peak hour travel times meet expectations* – **Urbanized Area A** | **62.5%** | *64.4%* | 62.9% | **Yes** by actual better than the baseline | *65.0%* | 60.0% | **No** | |
| *Percent of the Interstate System where peak hour travel times meet expectations* – **Urbanized Area B** | **55.0%** | *55.3%* | 56.1% | **Yes** by achieving the 2-year target | *55.5%* | 57.5% | **Yes** by achieving the 4-year target | Peak Hour Travel Times for Urbanized Area B |
| *Percent of the non-Interstate NHS where peak hour travel times meet expectations* – **Urbanized Area B** | **62.5%** | *63.1%* | 62.9% | **Yes** by actual better than the baseline | *63.8%* | 61.3% | **No** | |
| *The Percent of the Interstate System Mileage providing for Reliable Truck Travel Times* – **statewide** | **40.0%** | *40.0%* | 40.0% | **Yes** by achieving the 2-year target | *38.5%* | 37.7% | **No** | Freight Movement on the Interstate System |
| *The Percent of the Interstate System Mileage Uncongested* – **statewide** | **70.0%** | *70.5%* | 70.5% | **Yes** by achieving the 2-year target | *72.0%* | 71.3% | **Yes** by actual being better than the baseline | |

In Table 10 above, the statewide target for the measure Percent of the Interstate System providing for Reliable Travel Times did not make significant progress for the 2-

year target in FHWA's biennial determination in 2021. In this example, the State DOT would include, at a minimum, in its next Biennial Performance Report (i.e. Full Performance Period Progress Report in 2022) a description of the actions the State DOT will undertake to achieve its targets with respect to both Percent of the Interstate System providing for Reliable Travel Times and the Percent of the non-Interstate NHS providing for Reliable Travel Times measures. The FHWA strongly encourages State DOTs to add a description of their planned actions to their most recent Biennial Reports (i.e. 2020 Mid Performance Period Progress Reports) within 6 months of the FHWA significant progress determination to ensure that State DOTs take actions to achieve targets in a timely manner and to improve progress toward making significant progress for the applicable targets.

Also in Table 10, for the hypothetical "Urbanized Area A," the urbanized area target for the measure Percent of the non-Interstate NHS where peak hour travel times meet expectations did not make significant progress for the 4-year target in FHWA's biennial determination in 2023. In this example, the State DOT would include in its next Biennial Performance Report (i.e., Mid Performance Period Progress Report in 2024) a description of the actions the State DOT will undertake to improve its performance with respect to both "Urbanized Area A's relevant measures: Percent of the non-Interstate NHS where peak hour travel times meet expectations and the Percent of the Interstate System where peak hour travel times meet expectations measures. In addition, this hypothetical State DOT did not make significant progress for the statewide target for the measure The Percent of the Interstate System Mileage providing for Reliable Truck

Travel Times for the 4-year target in FHWA's determination in 2023. So the State DOT would, at a minimum, include in its next Biennial Performance Report (i.e. Mid Performance Period Progress Report in 2024) a description of the actions the State DOT will undertake to achieve targets with respect to both the Percent of the Interstate System Mileage providing for Reliable Truck Travel Times and the Percent of the Interstate System Mileage Uncongested measures. The FHWA strongly encourages State DOTs to add a description of their planned actions to their most recent Biennial Reports (i.e. 2022 Full Performance Period Progress Reports) within 6 months of the FHWA significant progress determination to ensure that State DOTs take actions to achieve targets in a timely manner and to improve progress toward making significant progress for the applicable targets.

The FHWA believes that any one of the targets would impact other targets in the same measure group and that the State DOT's descriptions of the actions for all targets in a same measure group would be more logical and sensible in managing performance of relevant network rather than isolated description on a subset of the network. So, FHWA proposes that a State DOT would provide a description of the actions the State DOT will undertake to achieve all targets in the same measure group.

As indicated in the previous discussion in section 490.109, FHWA would make the significant progress determination each time the State DOT submits its Mid Performance Period Progress Report and its Full Performance Period Progress Report (every 2 years). In section 490.109(f)(2), FHWA proposes the consequences for not making significant progress for the NHFP measures in 490.105(c)(6). Pursuant to 23

U.S.C. 167(j), if a State DOT has not made significant progress toward the achievement of NHFP targets in a single FHWA biennial determination, then the State DOT must take the required actions in section 490.109(f)(2).

When a State DOT does not make significant progress toward the achievement of NHFP targets, it must include a description of the actions the State DOT will undertake to achieve the targets in its next Biennial Performance Report. This discussion must include:

- a description of the actions the State DOT will undertake to achieve targets including an identification of significant freight system trends, needs and issues within the State;
- a description of the freight policies and strategies that will guide the freight-related transportation investments of the State;
- an inventory of freight bottlenecks with the State and a description of the ways in which the State DOT is allocating national highway freight program funds to improve those bottlenecks; and
- a description of the actions the State DOT will undertake to meet the performance targets of the State.

For the purpose of the requirements in section 490.109(f)(2), the State DOT may reference the Statewide Freight Plan elements that identify freight system trends, needs and issues, as well as the freight policies and strategies in the Plan to guide investment. Under Section 150(e), State DOTs are already responsible for reporting on ways in which the State DOT is addressing freight bottlenecks, which are defined as those segments of

the Interstates not meeting the threshold levels for congestion and average speed, as well as any other bottlenecks the State DOT wishes to include and anything that is identified in the National Freight Strategic Plan. The State DOT will provide an inventory of those segments as defined for section 150(e) and any other locations the State DOT wishes to reference as a bottleneck, as well as any bottleneck referenced in the National Freight Strategic Plan. Additionally, the State DOT will describe how funding is or will be allocated to improve freight fluidity through bottlenecks, as well as other actions to meet performance targets of the Interstates in the State.

In section 490.109(f)(3), FHWA proposes that State DOTs who fail to make significant progress for either the NHPP or NHFP should amend their Biennial Performance Reports within 6 months of FHWA's determination to include the actions they will take to achieve their targets. State DOTs are required to include description of the actions the State DOT will undertake to achieve targets in its next Biennial Performance Reports to meet the requirement in 23 U.S.C. 119(e)(7), as described in paragraph (f) of this section. State DOTs are encouraged to amend their most recent Biennial Performance Reports to include this information. As discussed in sections 490.107(b)(2)(ii)(F) and 490.107(b)(3)(ii)(E), all State DOTs are required to discuss the progress they have made toward the achievement of targets established for the NHPP and NHFP measures in each of their Biennial Performance Reports. The FHWA expects State DOTs would routinely monitor leading indicators, such as program delivery status and measured data, to assess if they are on track to make significant progress for their NHPP and NHFP targets and expects State DOTs to be aware of their progress prior to

the time of each Biennial Performance Report. As described in the discussion of section 490.109(c), if a State DOT anticipates it may not make significant progress, it is encouraged to work with FHWA and seek technical assistance during the performance period to identify the actions that can be taken in a timely manner to improve progress toward making significant progress for the targets reported in subsequent Biennial Performance Reports. Thus, in section 490.109(f)(3), FHWA proposes that the State DOT should, within 6 months of the significant progress determination, amend its Biennial Performance Report to document the information specified in this section to ensure actions are being taken to achieve targets.

**Discussion of Section 490.111 Incorporation by Reference**

In the second performance measure NPRM, FHWA had proposed to incorporate the proposed HPMS Field Manual to codify the data requirements for measures and to be consistent with HPMS reporting requirements. In this NPRM, FHWA proposes to extend that incorporation to subparts E though G. This would codify the data requirements for these measures and ensure consistency with HPMS reporting requirements. The proposed HPMS Field Manual includes detailed information on technical procedures to be used as reference by those collecting and reporting data for the proposed measures. The proposed HPMS Field Manual is included in the docket.

2. **Subpart E: National Performance Management Measures to Assess Performance of the National Highway System**

In this section, FHWA describes the proposed provisions in Subpart E, which would establish performance measures to assess the performance of the NHS. The discussions of the proposed requirements are organized as follows

- Section 490.501 discusses the purpose of the subpart;
- Section 490.503 describes the applicability of the subpart;
- Section 490.505 presents the definitions;
- Section 490.507 discusses the performance measures;
- Section 490.509 describes the data requirements;
- Section 490.511 identifies how to calculate performance metrics; and,
- Section 490.513 presents how to calculate performance measures.

**Relationship between Data Requirements, Calculation of Metrics, and Calculation of Measures**

The following provides a general discussion of the relationship between data requirements, metrics, and measures. This relationship exists in this Subpart as well as Subparts F – H. The proposed approach to determining individual measures includes data requirements, methods to calculate metrics, and methods to calculate measures. These are presented in sections 409.509, 490.511, and 409.513, respectively, and in similar sections in Subparts F – H. This proposed approach is presented as follows:

- Data Requirements – Outlines the data necessary to determine the required set of metrics that would be used to calculate the relevant measures. The type of data to be collected, the methods of data collection, and the extent and frequency of collection are described below and in the appropriate sections.
- Metrics – Describes the values that would be calculated from the data collected to support measure development and how to report the individual metrics.
- Measures – Provides the method to calculate the measures using reported metrics. State DOTs would use the calculated measures to report baseline condition or performance, establish targets, and report on progress.

Discussion of Section 490.501 Purpose

The FHWA is required, under 23 U.S.C. 150(c), to establish performance measures for State DOTs to use to assess the performance of the Interstate System and of the non-Interstate NHS. In this Subpart, FHWA proposes to establish two measures (1) a travel time reliability measure and (2) a peak hour travel time measure.

Discussion of Section 490.503 Applicability

The FHWA is proposing to establish a travel time reliability measure to apply to the entire NHS, including Interstate System and non-Interstate NHS elements. This measure would compare the longest travel time or slowest speed that occurs during a specified time frame to a reference travel time or speed for a transportation facility. A

reliability measure is an indication of the extra time travelers must add to their trips in order to have a high degree of certainty that they will arrive at their destination on time. The FHWA has defined travel time reliability as the variability of travel times. Reliability, in the eyes of transportation system users, reflects how consistent a travel time is on portions of the NHS they are traveling on. The larger the variability of travel times is from day-to-day or hour-to-hour, the more the user has to plan for unexpectedly long travel times when planning a trip. For instance, to make sure a traveler arrives at the airport in time for a flight, the traveler may allot extra travel time to ensure that he/she arrives in time in case of traffic incident, bad weather, or road construction along the way.

In more mathematical terms, reliability looks at the longer (all travelers) or longest (freight) travel times faced by users on portions of the NHS and compares these times to what is typically experienced by the system user (normal travel time). The larger the difference in these travel times, the worse the reliability is. In order to improve reliability, State DOTs and MPOs can implement operational and other strategies that are specifically designed make the system more reliable and efficient.

The reliability measure proposed in this NPRM would be reported as a Percent of the Interstate System providing reliable travel times and as the Percent of the Non-Interstate NHS providing reliable travel times. What that really means is that the number of miles on the Interstate or Non-Interstate NHS that performed in a reliable manner will be those miles where the travel time during any time period of the "daylight" hours (6 a.m. to 8 p.m.), 7 days a week, did not surpass the normal travel time by more 50 percent.

The time periods during "daylight" hours include: 6 a.m. to 10 a.m. weekdays, 10 a.m. to 4 p.m. weekdays, 4 p.m. to 8 p.m. weekdays, and weekend days 6 a.m. to 8 p.m. If the longer travel times exceed the normal travel time by 50 percent or more in any of these time periods, then that section of road is considered unreliable. The FHWA experience and analysis led to the proposed threshold of 1.5, which reflects 50 percent longer travel times. The FHWA seeks comments on whether the 1.5 threshold is appropriate.

The calculations (or metrics) used to report this measure report the travel time reliability for every road segment on the NHS, so it will be readily apparent to State DOTs, MPOs, and the general public where the NHS road segments are that have a reliability problem.

The FHWA also notes two important refinements that strengthen travel time reliability measures: 1) Some operating agencies currently exclude the top 20 percent of longest travel times throughout the year when developing reliability-related measures because these travel times typically are due to extreme events that are beyond an agency's control and should not be considered in the assessment of overall system performance; and 2) the reference travel time used in a reliability measure often reflects travel time associated with typical or average travel speeds rather than the time associated with free flow travel speeds.

By establishing targets for, and reporting on this measure, State DOTs and MPOs can better identify and manage portions of the NHS where users experience unreliable travel. Note that FHWA is proposing a phase-in for the establishment of targets for the

non-Interstate NHS reliability measure which is outlined in more detail under the discussion for section 490.105(e)(7).

The FHWA is proposing to establish a peak hour travel time measure to apply to the NHS, including Interstate System and non-Interstate NHS, within urbanized areas with a population over 1 million. By establishing targets for, and reporting on this measure, State DOTs and MPOs can better identify and manage portions of the NHS in major urbanized areas regardless of roadway ownership. As proposed, FHWA expects State DOTs and MPOs to use this measure to report one outcome for each of the applicable urbanized areas, even in cases where the boundary of the urbanized area intersects multiple States and metropolitan planning areas.

Discussion of Section 490.505 Definitions

The FHWA is proposing to define *Desired Peak Period Travel Time* as the travel time during 3 morning peak hours and the 3 evening peak hours, for each reporting segment in urbanized areas with a population over 1 million. State DOTs shall coordinate with MPOs when establishing the Desired Peak Period Travel Time. A State DOT and MPO(s) must use the same Desired Peak Period Travel Time for a particular reporting segment for the purposes of calculating the metrics and measures. The Desired Peak Period Travel Time should represent a travel time that is consistent with the intended plan and design of the roadway as part of a complete transportation system. The Desired Peak Period Travel Time should be developed in consultation with operating agencies as well. An operating agency is the agency or agencies that actually operate the NHS roadways at the most local level—this could be a State DOT, MPO, or a local (city,

town, county) transportation agency. Operating means applying operational strategies in the day to day management of the NHS roadways; strategies such as posting travel times, sending out freeway service patrols, altering signal timing, and other items that could improve the efficiency and reliability of the NHS. The Desired Peak Period Travel Time will be used to calculate the Peak Hour measure which assesses peak hour travel and should represent a travel time that is consistent with the intended plan and design of the roadway as a part of a complete transportation system.

The FHWA is proposing to define *Level of Travel Time Reliability* (LOTTR) as a comparison, expressed as a ratio, of the 80$^{th}$ percentile travel time of a reporting segment to the "normal" (50$^{th}$ percentile) travel time of a reporting segment occurring throughout a full calendar year. The 80$^{th}$ percentile travel time reflects the longer travel times to make a trip. The FHWA chose the 80$^{th}$ percentile travel time because it reflects the travel time where operational strategies can make the most impact on improving reliability. The closer the 80$^{th}$ percentile travel time is to the normal (50th percentile) travel time, the better the reliability. The FHWA seeks comments on this methodology.

The FHWA is proposing to define *Normal Travel Time* as the time expected of Interstate System and non-Interstate NHS roadway users to travel when the system is predominantly in use. This time is proposed to be defined as the 50$^{th}$ percentile travel time occurring during this defined time period. The 50$^{th}$ percentile relates to the travel time that occurs in the middle of a distribution of all travel times for that travel time segment during that time period over a 1-year reporting period. The FHWA selected the 50$^{th}$ percentile as "normal travel" because it represents the "normal" experiences of

travelers, rather than free flow travel (which would typically be a lower percentile, such as the 20th).

The FHWA is proposing to define *Peak Hour Travel Time* as the hour that contains the longest annual average travel time during the peak period of each non-holiday weekday. The peak period is made up of the hours of the day where the most people typically commute, or the hours with the highest amount of travel and include: morning (6:00 a.m. to 7:00 a.m.; 7:00 a.m. to 8:00 a.m.; and 8:00 a.m. to 9:00 a.m.) and afternoon (4:00 p.m. to 5:00 p.m.; 5:00 p.m. to 6:00 p.m.; and 6:00 p.m. to 7:00 p.m.). This definition is needed as the peak period would be used as the time frame to develop the Peak Hour Travel Time Ratio metric.

The FHWA is proposing to define *Peak Hour Travel Time Ratio* as the ratio between the longest peak hour travel time and the Desired Peak Period Travel Time. The closer the ratio is to 1.0, the more the actual peak hour travel time reflects the desired peak period travel time.

A *Travel Time Cumulative Probability Distribution* is the approach State DOTs and MPOs would use to determine percentiles needed for the travel time reliability measure. A travel time cumulative probability distribution is a representation of all the travel times for a road segment during a defined reporting period (such as annually) presented in a percentile ranked order (see Table 11 below for an example). In a graphic representation, as shown in the lower graph in Figure 8, the x-axis is the span of travel times (from shortest to longest) and the y-axis is the probability that a travel time will occur at or slower than the travel time on the x-axis. The upper graph in Figure 8 shows

the travel time distribution, with travel time on the x-axis and the number of occurrences over a year on the y-axis. In a graphic representation of a cumulative probability distribution, the variability in travel time is indicated by the difference between the upper and lower bounds of travel times on a given travel time segment. For purposes of this subpart, FHWA is proposing that the upper and lower bounds be identified as the $80^{th}$ and $50^{th}$ percentile travel times respectively, as illustrated in the lower graph in Figure 8. Travel time variability will reduce as the difference between the upper and lower bounds decreases or as the slope of the cumulative probability distribution curve increases.

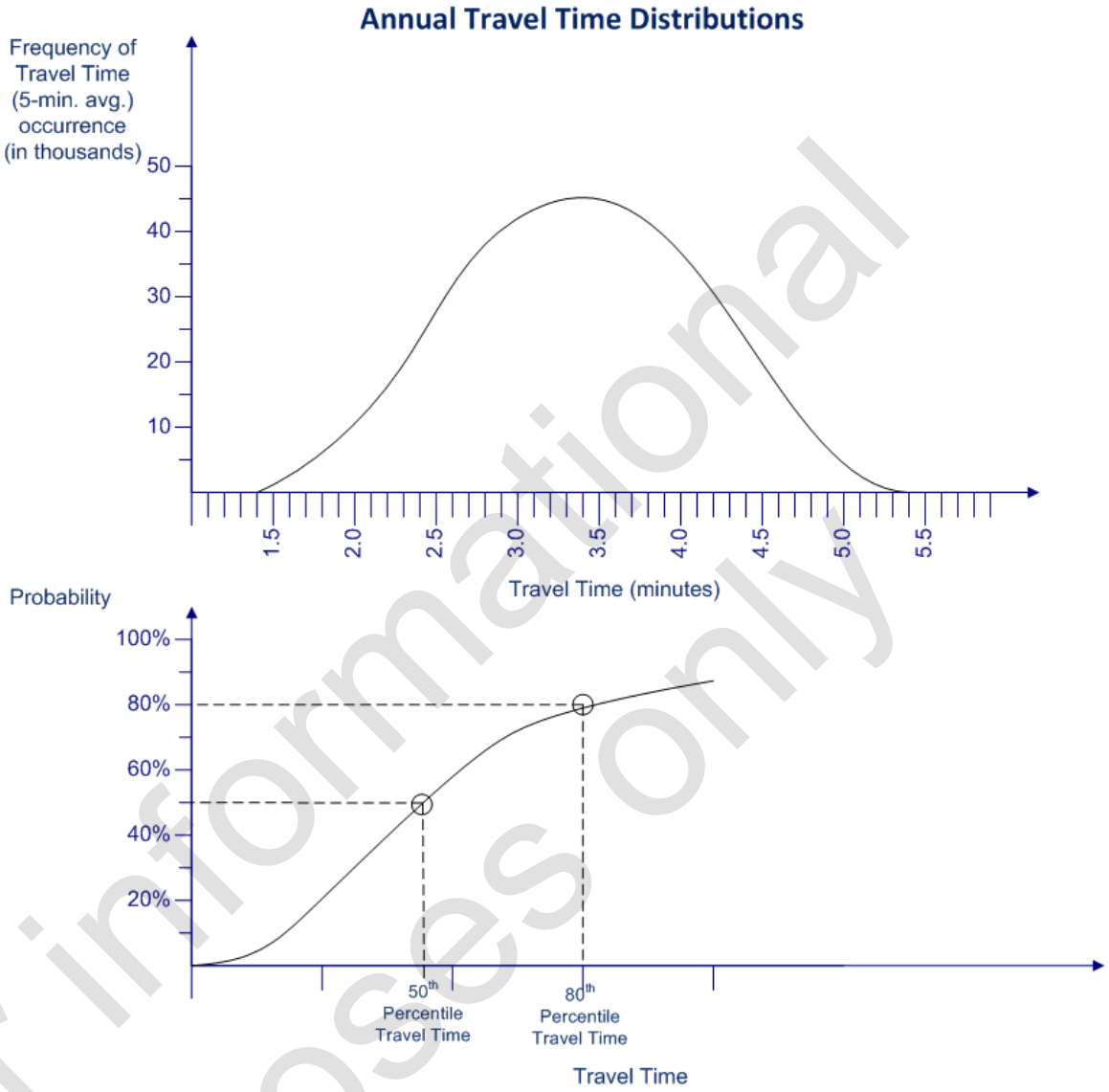


**Figure 8 – An Example of Annual Travel Time Distributions: Frequency of Travel Times vs. Cumulative Probability of Each Travel Time for a Segment**

**Table 11- Example Travel Time Distribution Showing Percentiles.**

| Example Travel Time Distrubtion | | |
|---|---|---|
| Rank (Shortest to Longest) | Travel Time on Road Segment (seconds) | Percentiles |
| 1 | 20 | |
| 2 | 20 | |
| 3 | 20 | |
| 4 | 21 | |
| 5 | 21 | |
| 6 | 22 | |
| 7 | 22 | |
| 8 | 22 | |
| 9 | 22 | |
| 10 | 23 | 50th perecntile |
| 11 | 24 | |
| 12 | 24 | |
| 13 | 24 | |
| 14 | 25 | |
| 15 | 27 | |
| 16 | 27 | 80th percentile |
| 17 | 29 | |
| 18 | 33 | |
| 19 | 40 | |
| 20 | 44 | |

Please note that Table 11 is a simple illustration of obtaining 50th and 80th percentile values in a hypothetical dataset with 20 travel time entries. Within Table 11, the 50th percentile is calculated by multiplying the total number of travel time entries (20) by 0.5 resulting in "10." So the tenth entry in the table would be the 50th percentile travel time (23 seconds). The same approach would be used with the 80th percentile calculation: 20 travel time entries x 0.8 = 16 so the 16th entry is the 80th percentile

travel time (27 seconds). Please see section 490.511 for the specifics on the proposed metrics for Travel Time Reliability and Peak Hour Travel Time measures.

Discussion of Section 490.507 National Performance Management Measures to Assess Performance of the NHS

The FHWA is proposing in section 490.507 the establishment of four measures to be used to assess the performance of the Interstate System and non-Interstate NHS. The first two measures, which are focused on travel time reliability, are applicable to all NHS roadways in the State. The next two measures, focused on peak hour travel time, are applicable to all NHS roadways within urbanized areas with a population greater than 1 million. A total of four measures are proposed:

Travel Time Reliability:

- Percent of the Interstate System providing for Reliable travel times
- Percent of the non-Interstate NHS providing for Reliable travel times

Peak Hour Travel Time:

- Percent of the Interstate System in large urbanized areas over 1 million in population where peak hour travel times meet expectations
- Percent of the non-Interstate NHS in large urbanized areas over 1 million in population where peak hour travel times meet expectations

State DOTs and MPOs would need to establish targets for each of these measures in accordance with section 490.105. These measures would be calculated using the metrics proposed in section 490.511 following the methods proposed in section 490.513. The data to support the measures are proposed in section 490.509. The proposed travel

time reliability measures are designed to be used by State DOTs and MPOs to better understand the scope of reliability problems on their highway systems and to aid in identifying and implementing strategies to improve system performance. These measures are intended to quantify the variability in travel times experienced by users of the highway system during hours of the day when the predominant travel occurs on the system. In general, the variability captured by the proposed measures would be a comparison of some of the longer travel times experienced by users compared to the amount of time users typically expect their travel to take. This comparison is an indication of how reliable the highway system is, in terms of how close actual travel times are to what is expected by users.

Based on research the FHWA has been doing for the past several years, it believes that measuring the reliability of travel times is a key to operating the system more efficiently and reliably.[91] The FHWA also heard from a wide range of stakeholders that travel time reliability is important and should be considered in this rulemaking. In addition, many stakeholders expressed a desire for a reliability measure to capture longer than normal travel times that would occur as a result of non-recurring congestion, such as

[91]Urban Congestion Report Program (http://www.ops.fhwa.dot.gov/perf_measurement/ucr/index.htm)
Urban Congestion Trend and "Traffic Congestion and Reliability" reports (http://www.ops.fhwa.dot.gov/perf_measurement/reliability_reports.htm)
Travel Time Reliability Overview Brochure and Guidance Document (http://www.ops.fhwa.dot.gov/perf_measurement/reliability_measures/index.htm)
SHRP 2 Reliability Program (esp. L03)
Lessons Learned: Monitoring Highway Congestion and Reliability Using Archived Traffic Detector Data (http://www.ops.fhwa.dot.gov/publications/lessons_learned/index.htm)
Monitoring Urban Freeways in 2003 (http://d2dtl5nnlpfr0r.cloudfront.net/tti.tamu.edu/documents/FHWA-HOP-05-018.pdf)

traffic incidents, work zones, and special events, which can be managed by operating agencies through improved traffic flow.

The proposed peak hour travel time measures are designed to be used by State DOTs and MPOs in urbanized areas over 1 million in population to better understand the scope of undesirable congestion problems in these large urbanized areas and to identify and implement strategies to improve system performance in these areas. The measures are designed to compare the longest average time of travel experienced by users during peak hours of the day to the travel time desired for the system. The FHWA is proposing in section 490.511(c)(1) that the State DOT, in coordination with MPOs, establish a desired time of travel for sections of their highway system that would be consistent with its intended use and design. The proposed measure would represent the percentage of the applicable highway network where actual travel times experienced during peak hours meets the expectations of the State DOT and MPOs. The FHWA is proposing that peak hour travel times that meet expectations would be those conditions where actual travel times are less than 50 percent greater than what is desired for the highway.

The FHWA heard concerns from many stakeholders regarding the effectiveness of the establishment of measures that would utilize an absolute speed or travel time as a reference to assess NHS performance. Many felt that some portions of the new expanded NHS highway network may be functioning as intended even when traffic is not flowing freely. Considering this, FHWA is proposing an approach where State DOTs, in coordination with MPOs, would establish Desired Peak Period Travel Times (as times that are desired for the reporting segment) to be used as the basis for the peak hour

measures. The Desired Peak Hour Period Travel Time would reflect the policies and management approach for the urbanized areas. In addition, as discussed in section 490.105(e)(8), FHWA is proposing that the peak hour travel time measures would only be applicable to NHS highways in urbanized areas where populations are greater than 1 million. For these measures, one single target would be established and reported for each applicable urbanized area, where collectively all State DOTs and MPOs in these areas would need to agree on the single target even where the urbanized area intersects with multiple jurisdictional boundaries. In total, based on the 2010 U.S. Census, 42 targets would be established nationwide using this measure—one for each urbanized area where populations are greater than 1 million. This approach is being proposed so that State DOTs and MPOs can work collectively to address highway performance problems that cross geographic boundaries and impact the ability to improve system performance throughout the urbanized area.

Discussion of Section 490.509 Data Requirements

The FHWA is proposing for State DOTs and MPOs to use a travel time data set that would meet the requirements discussed in section 490.103 of this rulemaking to calculate the metrics defined in section 490.511. State DOTs and MPOs would use the same travel time data set to assess the performance of the directional mainline highways of the NHS.

The FHWA is proposing State DOTs, in coordination with MPOs, establish and submit reporting segments as discussed in section 490.103 of this rulemaking. These reporting segments would be used as the basis for calculating and reporting metrics to the

FHWA and for State DOTs and MPOs to calculate the measures proposed in this subpart to assess Interstate System and non-Interstate NHS performance. Reporting segments, as defined in 490.101, include one or more travel time segments and must be contiguous so that they cover the full extent of the mainline highways of the NHS in the State. The section 490.103 discussion included in this rulemaking provides more information on the proposal for State DOTs to define and submit reporting segments.

The FHWA is proposing in this section that State DOTs would use the posted speed limits of roadways to estimate travel times for calculating the Reliability metrics when the data is missing or represented as a time of "0" or null in the Travel Time Data Set. The proposed use of the posted speed data is discussed in section 490.511. The FHWA is not proposing that posted speed limit data be reported as part of this rulemaking.

The areas that would be applicable to the Peak Hour Travel Time measure would be identified when the State DOT Baseline Performance Period Report is due to FHWA, based on the urbanized area boundaries at that time. These areas would continue to be applicable to the measure (or conversely "not applicable") for the duration of the performance period regardless of population changes that may occur during the performance period. The FHWA is proposing that the applicability of the area be determined using the most recent U.S. Decennial Census reports on area populations. At the time of this rulemaking, the Peak Hour Travel Time measure would be applicable to 42 urbanized areas in the United States.

**Discussion of Section 490.511 Calculation of System Performance Metrics**

The FHWA is proposing that two metrics need to be calculated to develop the Travel Time Reliability and Peak Hour Travel Time measures proposed in this rulemaking. They are the LOTTR metric and the Peak Hour Travel Time Ratio (PHTTR) metric. State DOTs would be required to calculate these metrics for all applicable roadway segments for the applicable time periods and report them to FHWA annually. The proposed approach to calculate and report these metrics is discussed in this section.

As proposed in section 490.511(b), the LOTTR metric would be calculated annually by the State DOT for all reporting segments on the NHS in the State and used by FHWA, State DOTs, and MPOs to assess the performance of the system. The source of data would be the Travel Time Data Set. The FHWA is proposing that 5 minute travel time bins that do not have data reported, or are reported as null, or "0" in the Travel Time Data Set would be replaced with a calculation of the travel time needed to fully traverse the travel time segment while traveling at the posted speed limit. This will ensure that a complete set of travel times for the time periods throughout the day needed to calculate the LOTTR metric are utilized. The FHWA believes that, in order to calculate an accurate assessment of reliability, travel times throughout the day are necessary to capture the variability of travel times on the system. The FHWA is proposing that in cases where travel times are not recorded, typically due to a lack of probe sources, it is assumed that vehicles are travelling at the posted speed limit. The FHWA believes that this assumption is valid since a lack of vehicles present during a 5 minute interval on a roadway segment generally indicates uncongested conditions. The FHWA believes that

as technologies improve and the percentage of vehicles containing equipment capable of communicating with vehicle probes increases, the potential for missing data will decrease over time. Considering the possibility for travel times to be missing during different time intervals of the day and the need for a complete data set to accurately calculate the reliability metric, FHWA encourages comments from the public on this proposed approach and/or alternative approaches that could be used reliably as part of a national performance program.

The FHWA is proposing that the LOTTR metric is based on the variability of travel times over a full year during following time periods: weekdays 6:00 a.m. to 10:00 a.m.; 10:00 a.m. to 4:00 p.m.; 4:00 to 8:00 p.m.; and weekend days 6:00 a.m. to 8:00 p.m. The FHWA selected these time periods to cover peak hours and other times of day the system may be used the most. It is FHWA's desire to have the Travel Time Reliability metric reflect the level of consistency in travel times during hours of the day when the majority of highway use occurs. In addition, by using these smaller time periods, State DOTs and MPOs may better understand reliability issues during varying travel periods throughout the week (i.e., peak periods, weekday mid-day, and weekends) and implement effective operational strategies. Evaluating the defined time periods would remove the times of day when travel is typically uncongested due to the lack of vehicle use. The proposed time periods for the LOTTR metric covers 14 hours of each day resulting in 168 average travel time values for each reporting segment (stored in each 5 minute bin), either directly measured from probes or using the calculated travel time at posted speed limit as discussed above. The FHWA is proposing that the LOTTR metric be based on a

full calendar year of data which would require the analysis of up to 61,488 travel time values for each reporting segment.[92] Analyzing this volume of data for each reporting segment will be simpler for the State DOTs and MPOs if they use an automated spreadsheet or other software product that features a "percentile" function. This function can be used to generate the 50th percentile or "normal time" (a shorter travel time) and the 80th percentile travel time (a longer travel time) that are being proposed to calculate the metric. The FHWA is proposing the use of the 80th percentile travel time because it is generally accepted as the upper bound of travel times that transportation agencies can plausibly manage using available resources; travel times beyond this point are acknowledged to occur during unique traffic incidents that are outside the control of a transportation agency.[93] The FHWA is proposing the use of the 50th percentile travel time to represent the "normal" or expected time of travel during hours of the day when the highway is predominantly used.

The FHWA reviewed other options for the denominator in the LOTTR metric and determined that the 50th percentile, more so than either the 20th percentile or average travel time, more accurately reflected the expected time. Use of the 50th percentile, along with the 80th percentile, travel time, shows the variability in travel times that operational strategies can positively affect in helping to improve travel time reliability.

In general, the proposed calculation is made by ranking, from the shortest travel time to the longest, all the travel time values in each reporting segment for each time

[92] Estimate based on multiplying 168 travel time values per day by 366 days in the longest year that could occur.
[93] SHRP 2 Project L03: http://onlinepubs.trb.org/onlinepubs/shrp2/SHRP2_S2-L03-RR-1.pdf

period (weekdays 6 a.m. to 10 a.m.; 10 a.m. to 4 p.m.; and 4 p.m. to 8 p.m. and weekends 6 a.m.to 8 p.m.) every day from January 1st through December 31st and identifying the 50th and 80th percentile travel times in this series for each time period. An example is contained in Table 11. The FHWA is proposing that the LOTTR metric would be calculated by developing a ratio that compares the 80th percentile travel time to the normal (50th percentile) travel time as shown in the following equation.

$$\text{LOTTR} = \frac{\text{80th percentile travel time}}{\text{50th percentile "normal travel time"}}$$

The resulting LOTTR metrics (one for each time period) would be rounded to the nearest hundredth decimal place and calculated for every NHS reporting segment within the State. The LOTTR values for each of the four time periods would be reported for the relevant reporting segment. The FHWA believes that the comparison of the 80th and 50th percentiles of the travel times occurring during the time periods identified, the most typical travel times, will reflect the reliability of the system as perceived by most highway users. The FHWA encourages comments from the public on the use of time periods to develop the LOTTR metric, as well as the number and length of the time periods proposed.

In section 490.511(c), FHWA is proposing that the PHTTR metric would be calculated by State DOTs for all NHS mileage within urbanized areas with a population over 1 million using average peak hour travel times derived from the Travel Time Data Set. The proposed metric is a comparison of the longest average hourly travel time, referred to in this rulemaking as the "peak hour travel time," to the travel time desired by

the State DOT and MPO for the reporting segment. The FHWA is not proposing to address missing data for this metric as:

- the metric is focused on travel occurring during only peak hours of the day when it may not be correct to assume free flowing conditions when data are missing; and
- the metric is computed using hourly average travel times that can be determined even if there are missing 5 minute travel time bins within the one hour time period.

The FHWA also proposes that, for this metric, any 5 minute bin travel times that represent travel speeds below 2 mph or above 100 mph be excluded from the metric calculation to remove outliers that may negatively affect the metric. The FHWA encourages comments on these approaches and invites suggestions on alternatives that could be considered that may be more effective.

In this rulemaking, FHWA is proposing that the peak period of travel will occur between 6:00 a.m. and 9:00 a.m. or between 4:00 p.m. and 7:00 p.m. on non-holiday weekdays. The six 1-hour time blocks within these periods are referred to as the "peak period" in this rulemaking. The FHWA proposes a 2-step process of determining the peak hour of travel time for calculating the PHTTR metric for a reporting segment. As the first step, the annual average travel time for each of the six hourly blocks in the peak period (6:00 a.m. to 7:00 a.m.; 7:00 a.m. to 8:00 a.m.; 8:00 a.m. to 9:00 a.m.; 4:00 p.m. to 5:00 p.m.; 5:00 p.m. to 6:00 p.m.; and 6:00 p.m. to 7:00 p.m.) would be calculated separately for a reporting segment. For calculating those six annual averages, measured

travel times on non-holiday weekdays over a full calendar year would be used. As the second step, the highest numeric value, or longest time, of the annual average travel time among the hours in the peak period would be selected as the peak hour travel time for calculating the PHTTR metric for the reporting segment and that hour would be referred to as the "peak hour" for metric and measure development purposes. For example, if annual average peak hour travel times across a reporting segment were as follows: 6:00 a.m. to 7:00 a.m.: 125 seconds; 7:00 a.m. to 8:00 a.m.: 196 seconds; 8:00 a.m. to 9:00 a.m.: 120 seconds; 4:00 p.m. to 5:00 p.m.: 105 seconds; 5:00 p.m. to 6:00 p.m.: 105 seconds; 6:00 p.m. to 7:00 p.m.: 108 seconds, then the 7:00 a.m. to 8:00 a.m. period with an average annual hourly travel time of 196 seconds would be selected as the peak hour and used to calculate the PHTTR.

This proposed process is illustrated in the equation below:

$$Peak\ Hour\ Travel\ Time = Max_{i=1}^{i=6}\left\{\left(\frac{\sum_{j=1}^{T}\sum_{k=1}^{12} Travel\ Time_{k,j,i}}{T \times 12}\right)\right\}$$

Where:

- Max = longest average travel time of the six peak hours
- i = "peak hours" (each hour between 6:00 a.m. to 9:00 a.m. and 4:00 p.m. to 7:00 p.m.)
- j = day of the year
- T = total number of days in the year
- k = 5 minute bin

- $Travel\ Time_{k,j,i}$ = vehicle travel time, to the nearest second, for the reporting segment recorded or estimated during 5 minute bin "k," on day "j," during the peak hour "i"
- Peak Hour Travel Time = the highest recorded annual average travel time, to the nearest second, occurring throughout the year during the "peak hours."

The FHWA is proposing that State DOTs, in coordination with MPOs, establish Desired Peak Period Travel Times for each reporting segment, based on their operational policies for NHS roadways. The FHWA recommends that these Desired Peak Period Travel Times also be developed in consultation with operating agencies. For each reporting segment, State DOTs would need to report a single "Desired Peak Period Travel Time" for the morning hours in the peak period and a single "Desired Peak Period Travel Time" for the afternoon hours in the peak period when reporting segments are submitted to FHWA as proposed in section 490.103(f). As proposed, State DOTs would only be allowed to modify the Desired Peak Period Travel Time if the reporting segment lengths change during a performance period. The FHWA anticipates that State DOTs will work with MPOs, in consultation with applicable operating agencies, to develop polices (i.e., desired travel at posted speed limits) that would determine how the desired level would be established. Under this proposed approach, FHWA does not plan to approve or judge the Desired Peak Period Travel time levels or the policies that will lead to the establishment of these levels.

The FHWA is proposing that the PHTTR ratio is a comparison of the Peak Hour Travel Time to the Desired Peak Period Travel Time for each reporting segment and calculated as illustrated in the following equation:

$$\text{PHTTR} = \frac{\text{Peak Hour Travel Time}}{\text{Desired Peak Period Travel Time}}$$

Where:

- Peak Hour Travel Time = the longest recorded average annual travel time, to the nearest second, occurring throughout the year during the "peak hour;"
- Desired Peak Period Travel Time = the desired travel time, to the nearest second, in the peak period, either morning or afternoon, that corresponds to the hour in which the Peak Hour Travel Time occurred;
- PHTTR = Peak Hour Travel Time Ratio for the reporting segment to the nearest hundredth.

In section 490.511(d), FHWA is proposing for State DOTs to report annually the LOTTR and PHTTR metrics for each applicable reporting segment on the NHS. State DOTs would report these metrics in HPMS no later than June 15$^{th}$ of the following year (i.e., metrics for calendar year 2017 would be reported no later than June 15, 2018). Specifically, FHWA is proposing that State DOTs would report annually the following to the HPMS for each reporting segment:

- NPMRDS TMC codes (or related reporting segments made up of multiple Travel Time Segments) or standard HPMS location referencing;

- LOTTR metrics for each of the four time periods, to the nearest hundredth;
- 80th percentile, travel times for each of the four time periods to the nearest second;
- 50th percentile, travel times for each of the four time periods to the nearest second;
- PHTTR metric, to the nearest hundredth;
- Peak Hour Travel Time, to the nearest second; and
- the Hour (6 a.m., 7 a.m., 8 a.m., 4 p.m., 5 p.m., or 6 p.m.)

The FHWA intends to issue additional guidance on how State DOTs could report these data to HPMS. The FHWA recognizes the burden associated with the efforts needed to conflate (or relate) travel time reporting segments (NPMRDS data locations) to locations on a defined roadway network (State GIS-based locations). For this reason, FHWA is not proposing a requirement for State DOTs to conflate the travel time reporting segments to the HPMS roadway network. The FHWA intends to conduct this conflation.

**Discussion of Section 490.513 Calculation of System Performance Measures**

The FHWA is proposing section 490.513 to establish a method that can be used by State DOTs, MPOs, and FHWA to calculate the performance measures proposed in section 490.507. These system performance measures are based on the performance metrics proposed in section 490.511 Calculation of System Performance Metric(s). The FHWA expects that State DOTs and MPOs will use the methods proposed in this section

to assess and report on the performance of the system. The FHWA proposes to use this calculation method to report on performance at a national level and to carry out its evaluation of the progress made by State DOTs to achieve their NHPP targets.

The proposed calculation method would be used to determine the percentage of the system, by length, operating at a specified level of performance. The general format for this calculation is illustrated in the equation below:

$$Measure = 100 \times \frac{\sum_{i=1}^{R} SL_i}{\sum_{i=1}^{T} SL_i}$$

where:

- i = reporting segment
- R = total number of reporting segments operating at a specified performance level, as defined through a threshold proposed for each metric
- T = total number of reporting segments in the system and area applicable to the measure
- $SL_i$ = length of the reporting segment, to the nearest thousandth of a mile
- Measure = the percentage of the system operating at a specified performance level (operating below the metric threshold).

The FHWA is proposing the level that represents reliable travel to highway users is a LOTTR of 1.50. This LOTTR level represents an operating level where 80 percent of the travel times observed on a roadway segment is less than 50 percent more than what is observed normally (defined as the 50$^{th}$ percentile travel time for this rulemaking). The

LOTTR is a ratio, so a 1.0 would mean that the 80th and 50th percentile travel times were the same. A 1.50 or above LOTTR means that the 80th percentile travel time is 50 percent longer than the 50th percentile travel time and represents less than acceptable travel time reliability. In general, this operating level of reliability represents conditions where the amount of time to travel on an NHS highway is up to 50 percent longer than what users would have expected. The FHWA also considered a threshold of 2.0, or twice the normal travel time, but determined that these travel times would be longer than most system users would consider reliable. The FHWA ultimately chose the 1.5 threshold understanding that there will be some variability in travel time that may be beyond the ability of operating agencies to affect. While any LOTTR above 1.00 would indicate some variability in travel time, it is the variability that is 50 percent more than the normal time that is being addressed with this measure and that has the ability to be addressed through operational and other strategy implementation. The FHWA encourages comments from the public on the proposed LOTTR threshold level of 1.50 and if it is at the appropriate level to indicate unreliable performance.

The FHWA is proposing that a PHTTR threshold level of 1.50 represents peak hour travel times that meet expectations of State DOTs, MPOs, and local operating agencies. This PHTTR level represents a condition where observed (or estimated) travel times in large urbanized areas are no more than 50 percent higher than what would be desired for the roadway, as identified by the State DOT and MPO. The PHTTR is a ratio where 1.0 would mean that that the actual peak hour travel time would equal to the Desired Peak Period Travel Time. So a PHTTR of 1.5 represents an actual peak hour

travel time that is 50 percent higher than the Desired Peak Period Travel Time. The FHWA feels that a PHTTR level of 1.50 or higher indicates a roadway is no longer meeting its intended purpose, as desired by local needs, to move traffic through the system. The FHWA encourages comments from the public on the proposed PHTTR threshold level of 1.50 and if it is at the appropriate level to indicate that peak hour travel time performance meets expectations.

Both of these measures use the same threshold—1.50. The FHWA believes that highway users and operating agencies begin to consider the system to not meet expectations when trips take 50 percent longer than what they would normally expect. For example, highway users would become frustrated with the system when a trip that is expected to take 30 minutes ends up taking 45 minutes or longer.

For the reliability measure, FHWA evaluated the impact of different threshold values ranging from 1.2 to 2.0 on reliability of the Interstate System in five States that varied in size and population. This evaluation showed minimal sensitivity to changes in reliability when the reliability threshold was above 1.6 and a sharp drop off in reliability when the threshold was below 1.3. The FHWA's proposed threshold value of 1.50 resulted in reliability levels that appeared to be reasonable as a level that could be used to manage performance.

A summary of the criteria described previously for the proposed performance measures, including the measure, the metric, and transportation network or geographic area the measure would apply to, is provided in Table 12 below:

**Table 12 – Summary of Proposed Performance Measure Criteria**

| Measure | Metric & Threshold | Applicable Transportation Network / Geographic Area |
|---|---|---|
| 490.507(a)(1)<br>Percent of the Interstate System providing for reliable travel times (calculation proposed in 490.513(b)) | LOTTR < 1.50 | • Interstate System |
| 490.507(a)(2)<br>Percent of the non-Interstate NHS providing for reliable travel times (calculation proposed in 490.513(c)) | LOTTR < 1.50 | • Non-Interstate NHS |
| 490.507(b)(1)<br>Percent of the Interstate System where peak hour travel times meet expectations (calculation proposed in 490.513(d)) | PHTTR < 1.50 | • Interstate System in each urbanized area† with a population > 1 M |
| 490.507(b)(2)<br>Percent of the non-Interstate NHS where peak hour travel times meet expectations (calculation proposed in 490.513(e)) | PHTTR < 1.50 | • Non-Interstate NHS in each urbanized area† with a population > 1 M |

†One measure would be calculated for each urbanized area, including those urbanized areas that intersect with multiple State and metropolitan planning area boundaries.

### 3. Subpart F: National Performance Management Measures to Assess Freight Movement on the Interstate System

In this sub-section, FHWA describes the proposed requirements in Subpart F, which would establish performance measures to assess freight movement on the

Interstate System. The discussions of the proposed requirements are organized as follows:

- Section 490.601 discusses the purpose of the subpart;
- Section 490.603 describes the applicability of the subpart;
- Section 490.605 presents the definitions;
- Section 490.607 discusses the performance measures;
- Section 490.609 describes the data requirements;
- Section 490.611 identifies how to calculate performance metrics; and,
- Section 490.613 presents how to calculate performance measures.

Discussion of Section 490.601 Purpose

The FHWA is required, under 23 U.S.C. 150(c), to establish performance measures for State DOTs to use to assess the performance of freight movement on the Interstate System. The FHWA proposes to establish in this subpart a travel time reliability measure and a congestion measure for State DOTs and MPOs to use to assess freight movement on the Interstate System.

Discussion of Section 490.603 Applicability

As required by 23 U.S.C. 150(c)(6), FHWA proposes that the freight performance measures will apply to freight movement on the Interstate System.

Discussion of Section 490.605 Definitions

The FHWA proposes to define *Normal Travel Time* for freight performance in the same manner as defined for system performance in section 490.603 as the time expected of Interstate System roadway users to travel when the system is predominantly in use.

This time is proposed to be defined as the 50th percentile travel time occurring during this period of use. The 50th percentile relates to the travel time that occurs in the middle of a distribution of all travel times for that travel time segment over a 1-year reporting period. The FHWA selected the 50th percentile as "normal travel" because it is the mid-point of all reported travel time and is more likely to provide an accurate estimate of the typical travel time that best serves as the travel time, or denominator, by which to compare the highest travel times. The 50th percentile was chosen to represent the *Normal Travel Time* because it has been used in previous FHWA performance measure research and analysis to represent a speed at which a vehicle is traveling without impediments or congestion. This previous FHWA research and analyses confirmed that this is an appropriate threshold. The FHWA considered other options, including the 20th percentile and average speed. After analysis of these options, the 50th percentile compared to the 95th percentile appeared to provide the most meaningful representation of delay for the purpose of this rule.

Discussion of Section 490.607 National Performance Management Measures to Assess Freight Movement on the Interstate System

Slow or unreliable truck travel times are a cause of diminished productivity for drivers and equipment; they reduce the efficiency of operations, increase the cost of goods, increase fuel costs, and reduce drivers' available hours for service. Considering these potential impacts and the input received from public and private sector freight stakeholders, FHWA is proposing measures in this subpart that would focus on both the speed of truck travel and the time reliability for truck travel. The FHWA identifies these

measures as complimentary in illustrating congestion and performance of the Interstate System. The FHWA believes that State DOTs and MPOs, by using both of these measures, can assess and evaluate areas where freight-movement problems are occurring on the Interstate System by looking at the entire Interstate System within their boundaries, as well as specific isolated areas where delays typically occur. The two measures proposed are: 1) Percent of the Interstate System providing for Reliable Truck Travel Times; and 2) Percent of the Interstate System Uncongested.

The first proposed measure (Percent of the Interstate System providing for Reliable Truck Travel Times) is based on the concept of using a metric that is an index to assess the "extra budgeted time" needed to assure an on-time arrival. This concept, used by many transportation operating agencies today to assess and manage system operations, considers the variability in operating travel times as an indicator of trip time planning needs. In general, highways that are operating with higher travel time variability would require extra time to be budgeted to assure an on-time arrival of trips. This metric can be used as a management tool to identify the strategies that, when implemented effectively, would minimize the need for travelers to have to budget "extra time" into their trip planning.

The efficient use of resources to move goods across the country is particularly critical for freight operations on the Interstate System. For this reason, the reliability measure proposed in this subpart is designed to support freight trip planning needs where a high level of certainty is needed to assure on time arrivals for trips occurring at all hours throughout the year. Shippers, carriers, and receivers desire on-time or just-in-time

delivery of goods and plan their trips by building in enough time to be on time. To do this, they consider the longest travel times of a route by looking at the distribution of travel times, which equates to the 95$^{th}$ percentile or higher. They typically budget their trip time at the 95$^{th}$ percentile travel time level. This assures their customers that aside from an extreme traffic event, they will be on time. However, the freight industry will consider the reliability ratio of the worst travel times to normal travel times in route planning and desire for there to be a low ratio meaning that there is little difference between the normal travel time and the worst travel times. They will reroute or consider other shipping options for routes with extreme congestion or high reliability rations. To be consistent with the industry measures of reliability, FHWA proposes to use the 95th percentile travel time in comparison to the 50$^{th}$ percentile travel time as the normal travel time. As a threshold, FHWA proposes that the reliability ratio be below 1.5. This means that the trips take no more than 50 percent longer than normal. The FHWA believes that the freight industry would not find trips that are longer than 50 percent above normal reliable. The FHWA seeks comments on this assumption.

The FHWA selected this ratio based on information it has received from stakeholders as well as its own research. As discussed with relation to section 490.513 (the performance of the NHS measures), FHWA believes that shippers and suppliers begin to consider the system to not meet expectations when trips take 50 percent longer than what they would normally expect.

The truck travel time reliability measure proposed in this subpart differs from the travel time reliability measure proposed in Subpart E (for performance of the Interstate

and non-Interstate NHS) of this rulemaking in that the truck travel time reliability is focused on the variability in travel times experienced by trucks during all hours of the day and throughout the year. In contrast, the travel time reliability measure proposed in Subpart E is focused on the variability in travel times experienced by all vehicles that typically occur due to non-recurring events during the times of the day when the highway facility is in predominant use. The second proposed measure (Percent of the Interstate System Mileage Uncongested) uses average truck speeds to determine the percentage of Interstate System mileage that is considered uncongested. This measure is being proposed to assess where delays are occurring on the Interstate System so that strategies to address these locations can be implemented to improve the efficiency of freight movement. This measure differs from the reliability measure in that it is focused on shortening travel times where the reliability measure is focused on improving the consistency of travel times.

The congestion measure proposed in this subpart differs from the traffic congestion measure proposed in Subpart G (Annual Hours of Excessive Delay per Capita) of this rulemaking in that the speed threshold to identify the presence of congestion for freight movement is higher than the threshold used to define traffic congestion. In addition, the freight congestion measure broadly applies to all Interstate System roadways across the country where the traffic congestion measure is focused only on NHS roadways in the largest urbanized areas in the country. Both sets of measures are based on speed. The freight measures use speed to identify congested segments,

while the traffic congestion measure uses speed to calculate the additional travel time caused by "excessive" delay.

The criteria used to establish the two proposed measures in this subpart are derived from research and testing of data by FHWA using the FPM. The FHWA produced two reports illustrating the use of Travel Time Reliability and Average Truck Speed measures to validate the proposed thresholds.[94] These reports provided insight into how well the measures described the travel conditions on the Interstate System confirming that the thresholds are appropriate for the measures.

Discussion of Section 490.609 Data Requirements

The FHWA is proposing that State DOTs use a travel time data set that would meet the requirements discussed in section 490.103 of this rulemaking to calculate the metrics defined in section 490.611. State DOTs and MPOs would use the same travel time data set to assess freight movement on the Interstate System.

The FHWA is proposing that State DOTs establish and submit reporting segments as discussed in section 490.103 of this rulemaking. These reporting segments would be used as the basis for calculating and reporting metrics to FHWA, and for their use and MPO use to calculate measures proposed in this subpart to assess freight movement. Reporting segments, as defined in section 490.101, include one or more travel time segments and must be contiguous so that they cover the full extent of the mainline

[94] FHWA 2006, Travel Time Reliability: Making It There On Time, All the Time. http://ops.fhwa.dot.gov/publications/tt_reliability/; FHWA 2006, Freight Performance Measure: Travel Time in Freight-Significant Corridors. http://ops.fhwa.dot.gov/freight/freight_analysis/perform_meas/fpmtraveltime/traveltimebrochure.pdf.

highways of the Interstate System in the State. The section 490.103 discussion included in this rulemaking provides more information on the proposal for State DOTs to define and submit reporting segments.

The FHWA is proposing in this section that in cases where the travel time required to calculate a metric is missing or represented as a time of "0" or null in the Travel Time Data Set, State DOTs would be required to use an observed travel time that represents all traffic on the roadway during the same 5 minute interval (referred to as "all vehicles" in the NPMRDS) provided this travel time is representative of travel speeds less than the posted speed. In all other cases, FHWA is proposing that State DOTs use a travel time that would have occurred while traveling at the posted speed limit to replace missing travel times or those that are represented as a time of "0" or null in the Travel Time Data Set. The proposed use of the "all traffic" and posted speed data is discussed in section 490.611. As discussed previously, FHWA is not proposing that posted speed limit data be reported as part of this rulemaking.

**Discussion of Section 490.611 Calculation of Freight Movement Metrics**

In section 490.611, FHWA proposes the methodologies for calculating Truck Travel Time Reliability and Average Truck Speed metrics. The FHWA is proposing the same method to calculate the truck travel time reliability metric as discussed for the LOTTR metric discussed in Subpart E of this rulemaking with the exception of the days/times and the travel time percentile used in the calculation. As discussed previously in Subpart E, this method would require State DOTs to assemble and organize a complete year of travel time data for each reporting segment to calculate the metric. The FHWA is

proposing in section 490.611(b), that the assembled data would include, for each reporting segment, average truck travel times, to the nearest second, for 5 minute periods of the day, or 5-minute bins. The information in those 5-minute bins would be collected throughout the day, for every hour of every day from January 1st through December 31st of the same year. In cases where the 5-minute bins for travel time segments are:

- missing from the dataset or include truck travel times reported as "0" or null; and
- do not include all traffic travel times representative of speeds less than the posted speed limit; then
- a truck travel time would be used that represents travel at the posted speed limit (TTT@PSL)

$$TTT@PSL(seconds) = \frac{Segment\ Length\ (miles)}{Posted\ Speed\ Limit\ (miles\ per\ hour)} x60x60$$

In section 490.611(b), to calculate the Truck Travel Time Reliability the FHWA is proposing that State DOTs would determine from the assembled data set described above the 95$^{th}$ percentile travel time and the 50$^{th}$ percentile travel time. The basis for the 95$^{th}$ percentile travel time is that it represents more certainty of on-time arrival for freight stakeholders. The 50$^{th}$ percentile was chosen, as previously described, based on an analysis of reliability measurement and how it compares to using the 20$^{th}$ percentile or average. The FHWA analyzed travel times for several regions in the Nation with different population characteristics and found that the 50$^{th}$ percentile provided the most accurate picture of reliability.

The metric would be determined by dividing the 95th percentile travel time by the 50th percentile travel time for each reporting segment. The FHWA believes that the 95th percentile travel time will represent the longest trip, excluding extreme outliers, that likely occurred on the reporting segment throughout the year and the 50th percentile travel time will typically represent the normal time experienced during the year. Therefore, the proposed metric will be an indication of the variability considering nearly all travel times that had occurred throughout the year. The FHWA is proposing this approach so that the Truck Travel Time Reliability metric would be an indicator of the planning time needed to assure a high level of confidence in on-time arrival of freight movements that could occur all hours of the day throughout the year. The FHWA is seeking comment specifically on the appropriateness of the proposed percentiles used in this metric calculation to assess reliability of truck travel times on the Interstate System.

In section 490.611(c), to calculate the Average Truck Speed metric for each reporting segment, truck travel speeds would be derived from the data in the travel time data set. Within that data set, for any 5-minute bins that are missing from the dataset, are missing data, or where data is reported as "0" or null, those bins would be replaced with the "all traffic" travel time value where the travel time correlates with speeds that are less than posted speed limit. In all other cases, it would be replaced with a travel time (TTT@PSL) that would represent the time to traverse the travel time segment at the posted speed limit.

Because the data set provides average travel times by Travel Time Segment and in 5-minute bins (or 5-minute periods), Average Truck Speed for a reporting segment

would need to be calculated for the entire calendar year. Average truck travel time would be calculated by dividing the Travel Time Segment length by the truck travel time for each reporting segment for each 5-minute bin throughout the calendar year. Then, the result of this calculation for each of the 5-minute bins would be added together. This sum would be divided by the total number of 5-minute bins in a calendar year. This calculation would be done for each of the reporting segments.

In section 490.611(d), FHWA is proposing for State DOTs to report, on an annual frequency, the Truck Travel Time Reliability and Average Truck Speed metrics for each reporting segment on the Interstate System. State DOTs would report the annual outcomes to the HPMS by June 15$^{th}$ of the following year (i.e., metrics for calendar year 2017 would be reported no later than June 15, 2018). Specifically, FHWA is proposing that State DOTs would report annually the following to the HPMS for each reporting segment:

- Reference NPMRDS TMC codes (or related reporting segments made up of multiple TMC codes) or standard HPMS location referencing;
- Truck Travel Time Reliability metric, to the nearest hundredth;
- 95$^{th}$ percentile travel time to the nearest second;
- 50$^{th}$ percentile travel time to the nearest second; and
- Average Truck Speed metric, to the nearest hundredth mile per hour.

The FHWA intends to issue additional guidance on how State DOTs could report these data to HPMS. The FHWA recognizes the level of effort needed to conflate travel time reporting segments to align them with a referenced highway network for the system

performance and freight measures. For this reason, FHWA is not proposing a requirement for State DOTs to conflate the travel time reporting segments to the HPMS roadway network. The FHWA intends to conduct this conflation, if needed, if State DOTs choose to report the metrics by Travel Time Segment codes.

**Discussion of Section 490.613 Calculation of Freight Movement Measures**

In sections 490.613(a) and (b), FHWA proposes the method to calculate the measures to assess freight movement on the Interstate System proposed in section 490.607. This method would be used by State DOTs and MPOs to assess freight performance when reporting and establishing targets. The FHWA would also use this to report on freight performance at a national level. The two measures would be calculated using the annual metrics reported for reporting segments.

The proposed calculation method would be used to determine the percentage of the system, by length, operating at a specified level of performance for each of the two measures. The general format for this calculation is illustrated in the equation below:

$$Measure = 100 \times \frac{\sum_{i=1}^{R} SL_i}{\sum_{i=1}^{T} SL_i}$$

where:

- i = reporting segment
- R = total number of reporting segments operating at a specified performance level, as defined through a threshold proposed for each metric

- T = total number of reporting segments on the Interstate System in the State
- $SL_i$ = length of the reporting segment, to the nearest thousandth of a mile
- Measure = the percentage of the system operating at a specified performance level (operating above the metric threshold).

The specific criteria proposed to calculate each of the measures following the format discussed above is proposed as follows:

- Truck Travel Time Reliability metric threshold < 1.50
- Average Truck Speed $\geq$ 50.00 mph.

The truck travel time reliability threshold of 1.50 is proposed to be the level at which truck travel times become unreliable. This level represents a condition where travel time could be no more than 50 percent longer than what would be expected during normal travel time conditions. Reliability levels greater than 1.50 are considered in this rulemaking to be unreliable due to the impact of the additional time that freight operators would need to consider and provide for during trip planning to assure on-time arrival. Reliability levels greater than 1.50 generally mean a trip could take twice as long as it would at the $50^{th}$ percentile or normal travel time. This would not occur on every trip, but on the worst days. The FHWA also considered a threshold of 2.0, or twice the normal travel time, but determined that these travel times would be longer than most users would consider reliable. The FHWA ultimately chose the 1.5 threshold understanding that there will be some variability in travel time that may be beyond the ability of operating agencies to affect.

The average truck speed of 50.00 mph is proposed to be the level at which delay would exist on Interstate System highways when speeds are below this value as posted speed limits on Interstate System highways are typically 55 mph or greater. The FHWA is considering any travel speeds occurring below 50.00 mph to be representative of "congested" conditions for freight flow. The FHWA is seeking comment on the appropriateness of this speed threshold to indicate congested conditions.

4. **Subpart G: National Performance Management Measures to Assess the Congestion Mitigation and Air Quality Improvement Program – Traffic Congestion**

In this section, FHWA describes the proposed changes to Subpart G, which would establish a performance measure for assessing traffic congestion. The discussions of the proposed requirements are organized as follows:

- Section 490.701 discusses the purpose of the subpart;
- Section 490.703 describes the applicability of the subpart;
- Section 490.705 presents the definitions;
- Section 490.707 discusses the performance measure;
- Section 490.709 describes the data requirements;
- Section 490.711 identifies how to calculate performance metric; and,
- Section 490.713 presents how to calculate performance measure.

**Discussion of Section 490.701 Purpose**

The FHWA is required, under 23 U.S.C. 150(c), to establish performance measures for State DOTs to use to assess traffic congestion for the purpose of carrying

out the CMAQ program. The FHWA proposes to establish in this subpart an excessive delay measure for State DOTs and MPOs to use to assess traffic congestion.

**Discussion of Section 490.703 Applicability**

The FHWA proposes that the measure apply only to those portions of the NHS in urbanized areas with a population over 1 million that contain areas designated as nonattainment or maintenance areas for the $O_3$, CO, or PM ($PM_{10}$ and $PM_{2.5}$) NAAQS under the CAA Amendments of 1990.

The FHWA felt that the CMAQ Traffic Congestion measure should apply to nonattainment/maintenance areas and should relate to how the CMAQ program currently operates. Given the burden of developing multiple measures, FHWA chose to limit this measure to urbanized areas over 1 million in population, as agencies in these areas typically have more capability and experience in developing this type of measure than agencies outside of these areas. In addition, MPOs in these areas are expected to be the same MPOs that are required to report on this measure as part of the CMAQ performance plan requirements in 23 U.S.C. 149(l).

Many traffic congestion reduction projects that seek CMAQ funding use a form of a delay measure to show the benefits of traffic reduction (as well as emission reductions). This, in part, led FHWA to focus on a delay measure for the CMAQ Traffic Congestion measure, so that existing and future projects would use similar measures for analysis as the proposed national measure.

By establishing where and when the worst delay occurs on the NHS facilities in large urbanized areas where air quality is a concern, State DOTs and MPOs can better plan investments that address excessive delays and emissions reduction.

**Discussion of Section 490.705 Definitions**

The FHWA proposes to define "Excessive Delay" as the traffic speed that causes delays that would be perceived by users as being excessive (i.e., delay that is significantly greater than normal and, therefore, an indication of the most congested conditions). The FHWA is proposing that "excessive delay" occurs on Interstates, freeways,[95] or expressways[95] when traffic slows to below 35 mph, and on other principal arterials[95] and all other roads included on the NHS when traffic slows to below 15 mph. These speed thresholds were chosen to represent "excessive" delay.

**Discussion of Section 490.707 National Performance Management Measures for CMAQ Program – Traffic Congestion**

In section 490.707, FHWA proposes the measure of Annual Hours of Excessive Delay Per Capita, which would be used by State DOTs, MPOs, and FHWA to assess traffic congestion performance of large urbanized areas that contain nonattainment or maintenance areas for any of the criteria pollutants under the CMAQ program. The FHWA is proposing that this measure be used to establish a single target and report on traffic congestion performance for each applicable urbanized area, including those that

[95] *Highway Functional Classification Concepts, Criteria and Procedures (2013 Edition)*: http://www.fhwa.dot.gov/planning/processes/statewide/related/highway_functional_classifications/fcauab.pdf

intersect with multiple State and metropolitan planning area boundaries. This measure is being proposed because it addresses the impact of transportation projects funded under the CMAQ program, which are often designed to create both emissions and congestion benefits. Incidentally, the proposed measure would also capture the impacts of transportation projects funded via other sources that aid in reducing congestion in areas applicable to this measure. Use of an excessive delay measure relates to the widespread use of delay-related metrics to justify congestion-related CMAQ projects, an important consideration when looking at what projects will help meet targets established under 23 U.S.C. 150(d) and 23 U.S.C. 134(h)(2).

In order to capture the total delay over a full year, FHWA is proposing in this subpart to use vehicle counts as a method to expand the sampling of highway average travel times to all traffic using the system. The FHWA elected to propose the use of vehicle counts as this is the most accurate and widely available information on nationwide use of the system. Including vehicle counts in the measure helps ensure the measure reflects, as closely as possible from available data, the actual amount of vehicles delayed. If FHWA proposed a measure that did not include vehicle counts, the same length of delay on a high volume road would count the same as the same length of delay on a low volume road.

As discussed in the Performance Measure Analysis section of this rulemaking, DOT considered alternatives to a highway based traffic congestion measure that would reflect the delays experienced by all travelers using all modes of surface transportation but, for the reasons discussed in this rulemaking, elected to propose only a highway based

measure as a first step. After careful consideration, FHWA determined that it would be too burdensome at this time to propose requirements for State DOTs and MPOs to gather and process the data necessary to calculate measures that would be representative of travelers using all surface transportation modes. Although technologies are improving and information on system use is more available, FHWA believes that the current state of practice is not yet mature enough to propose requirements to measure, in a reliable and consistent manner, more than highway delay. Considering the current state, FHWA is proposing a measurement approach that would focus on excessive delay experienced by motor vehicles on the highway system. The FHWA is proposing that this measure is expressed as a ratio of the total excessive highway delay experienced by all traffic to the population of the applicable area. This will provide a more meaningful measure as delay is related to a typical person's experience in traveling in the urbanized area. The FHWA recognizes that other options for making the Annual Vehicle Hours of Excessive Delay understandable to the public besides dividing by urban area population may exist. The FHWA encourages comments on using "per capita" or other options.

The FHWA and DOT would like to move to a measure in the future that could be used to assess traffic congestion in a manner that reflects the experience of all travelers using the various modes of surface transportation that are available in an urbanized area. For the purpose of this rulemaking, FHWA considers any expansion of the proposed approach to be a "future" measure of traffic congestion where such a measure could additionally capture the congestion as experienced by travelers that are using other modes such as: transit, commuter railways, walkways, and bikeways. The DOT is taking steps

now to work with State DOTs, MPOs, and other surface transportation stakeholders to study and advance the technologies that could be used to move the current state of practice to capture the necessary data to support a "future" measure.

The FHWA encourages public comment on the following issues related to the measure approach and methods that can be used to realize a "future" measure of traffic congestion.

- Are there existing methods that can be used reliably to weigh the highway delay metric by "total vehicle occupants" rather than "total number of vehicles"? Are there technologies or methods that could be advanced in the next 3-5 years to capture vehicle occupancy data?
- Which surface modes of transportation, other than highways, have readily available data that could be used to support a measure to assess traffic congestion? To what extent is this information available in the urbanized areas applicable to the measure proposed in this subpart?
- What would be the appropriate surface transportation network to use to measure traffic congestion in the future? Is data available off the NHS that can be used to assess traffic congestion that can be made available to all State DOTs and MPOs?

**Discussion of Section 490.709 Data requirements**

The FHWA is proposing for State DOTs and MPOs to use a travel time data set that would meet the requirements discussed in section 490.103 of this rulemaking to calculate the metrics defined in section 490.711. State DOTs and MPOs would use the

same travel time data set to assess traffic congestion for all applicable directional mainline highways on the NHS.

In section 490.709(b), FHWA is proposing for State DOTs to establish and submit reporting segments, in coordination with MPOs on the segments within metropolitan planning areas, as discussed in section 490.103 of this rulemaking. These reporting segments would be used as the basis for calculating and reporting metrics to FHWA and for calculating measures proposed in this subpart to assess traffic congestion. Reporting segments, as defined in 490.101, include one or more travel time segments, and would be contiguous so they cover the full extent of the mainline highways of the NHS in the State. The section 490.103 discussion included in this rulemaking provides more information on the proposal for State DOTs to define and submit reporting segments.

To calculate the measure, State DOTs also would need to provide estimates of hourly traffic volume that can be applied to some or all portions of the NHS in areas applicable to this measure. Traffic volumes would be needed to estimate the accumulated delay experienced by all users of the highway system. The FHWA is proposing in section 490.709(c) that State DOTs could use one of the two methods proposed in section 490.709(c)(1) to count or estimate hourly traffic volumes for each reporting segment. Examples of standard approaches to estimate hourly traffic include using AADT with k-factors or traffic profiles. The hourly traffic volumes do not have to be submitted to FHWA, but State DOTs would need to report to FHWA the method they used to estimate traffic volumes. State DOTs would need to report the method they use to FHWA no later than 60 days prior to the submittal of the first Baseline Performance Period Report. The

FHWA recognizes State DOTs subsequently may change the method they used to estimate traffic volumes. Thus, FHWA proposes in section 490.709(c)(4) that if a State DOT elects to change the submitted methodology, then the State DOT would submit the changed methodology no later than 60 days prior to the submittal of next State Biennial Performance Report required in section 490.107(b).

The population of the applicable area is needed to calculate the proposed traffic congestion measure. The FHWA is proposing in section 490.709(d) that the most recently available U.S. Decennial Census population data available at the time when the State DOT Baseline Performance Period Report is due to FHWA would be used for the entire performance period. Census-defined urbanized areas could change between the Decennial Census and could be adjusted on varying schedules. Consequently, the population in those changed or adjusted urbanized areas may change as well. The FHWA recognizes that if an urbanized area boundary is changed after the target is established by the State DOT for urbanized areas, then actual measured performance within the changed urbanized area boundary would represent a different transportation network and population as compared to what was used to establish the target. This difference could impact a State DOT's ability to make significant progress for targets. Thus, for calculating the traffic congestion measure, FHWA proposes that State DOTs and MPOs would use the latest Decennial Census population of urbanized areas available at the time when the State DOT Baseline Performance Period Reports are due to FHWA, regardless of subsequent boundary adjustment or natural population changes. This means

that the population numbers used in the calculation of the traffic congestion measure would remain constant for the duration of a performance period.

Similarly, urbanized areas that contain nonattainment or maintenance areas would be based on the designation status at the time the State DOT Baseline Performance Period Report is due to FHWA, and that designation status would be used for the entire performance period.

The geographic areas that would be applicable to this measure would be identified in the State DOT Baseline Performance Period Report submitted to FHWA. These areas would continue to be applicable to the measure (or conversely remain "not applicable") for the duration of the performance period regardless of changes to designation, urbanized areas, or populations that may occur during the performance period. The FHWA is proposing that the applicability of the area be determined using the most recent U.S. Decennial Census reports on area populations; the urbanized areas approved by FHWA and submitted in HPMS at the start of a performance period; and the EPA nonattainment or maintenance designations for the $O_3$, CO, and PM NAAQS. At the time of this rulemaking, 36 urbanized areas in the U.S. would be applicable to this measure.

**Discussion of Section 490.711 Calculation of Congestion Metric**

The FHWA is proposing in this section for State DOTs to calculate the Total Excessive Delay for each reporting segment and report these metrics to FHWA annually.

Section 490.711(b) contains the specific data that is required to calculate the metric and is described in more detail in the discussion of section 490.709(b). The use of the data is explained in the proposed calculation methodology.

The FHWA is proposing in section 490.711(c) through (e) the method to calculate the Total Excessive Delay as discussed below.

*Excessive Delay Threshold Travel Time* – The FHWA is proposing in section 490.711(c) the establishment of two threshold travel speeds that would be used to indicate when operating conditions have deteriorated to the point that excessive travel time delays would occur. Any measured travel speeds below the threshold would represent the operating condition level that would result in excessive delays. These thresholds are proposed to be:

- 35 mph for Interstates, freeways, or expressways, and
- 15 mph for all other NHS roadways.

The FHWA defines congestion on the agency Traffic Congestion Reliability reporting Web site[96] as *"an excess of vehicles on a roadway at a particular time resulting in speeds that are slower - sometimes much slower - than normal or free flow speeds. (Congestion is) stop-and-go traffic."* The Urban Congestion Report, a quarterly publication produced for FHWA, uses a speed threshold of 45 mph to define congested travel on Interstates and other highways, in a number of urban areas across the country. Operating speeds that are below a "free flow" speed will generate some level of delay

[96] Traffic Congestion Reliability, http://www.ops.fhwa.dot.gov/perf_measurement/index.htm.

and therefore could be seen by travelers as a congested condition. The FHWA decided when establishing the proposed traffic congestion measure to assess when delays are excessively impacting travel, so that the worst congestion would be accounted for and, hopefully, addressed. By accounting for the worst congestion, FHWA believes that the proposed approach could help reduce overall traffic congestion. For this reason, FHWA selected proposed thresholds of 35 mph on Interstate and other highways to express excessive (rather than just congested conditions at 45 mph), and 15 mph on principle arterials and all other roadways on the NHS to identify excessive delay when speed limits can be as low as 25 mph on these roads. The threshold for Interstates and other highways is below the threshold FHWA uses to define congested travel in the Urban Congestion Report. However, FHWA believes that the proposed thresholds represent operating speeds that would excessively impact travel times. The FHWA encourages public comment on these proposed thresholds and invites alternative approaches to define the threshold at which excessive delay would occur.

The Excessive Delay Threshold Travel Time would be determined by the State DOT for each travel time segment to represent the time that it could take for a vehicle to traverse the reporting segment before excessive delay would occur. This time threshold would be determined by dividing the travel time segment length by the excessive delay threshold speed corresponding to the roadway functional level (35 mph or 15 mph) and converting the quotient to a time unit of seconds. For example, if a travel time segment on an Interstate is ½ mile in length, then the Excessive Delay Threshold Travel Time for that segment would be the travel time at 35 mph. The calculation would be Segment

length (.5 mile) divided by threshold speed (35 mph) which equals .0142 hours, or 51.4 seconds.

*Excessive Delay* – The FHWA is proposing in section 490.711(d) the method to determine the amount of excessive delay occurring during each 5-minute interval for a Travel Time Segment within the travel time data set for which travel times were recorded. The excessive delay would be determined by comparing the recorded average travel time[97] from the 5-minute bin to the Excessive Delay Threshold Travel Time for the corresponding Travel Time Segment discussed in the previous paragraph. The excessive delay would need to be determined for every 5-minute interval for every hour and every day during a calendar year. The methodology proposed in the regulation identifies an arithmetic difference between the measured and an Excessive Delay Threshold Travel Time for each 5-minute bin for individual reporting segment as the travel time segment delay or the reporting segment delay (RSD).

The RSD, as calculated above, would result in a positive or negative amount of time. Any positive RSD values would be considered the additional amount of time, during the corresponding 5-minute time interval, each user of the roadway would have needed to traverse the Travel Time Segment as compared to traveling at the threshold speed. Any negative RSD times would represent 5-minute times in which travel is not excessively delayed. These negative RSD values would change to "0" seconds. Any positive RSD values that are calculated to be above 5 minutes would be capped at 5

[97] The NMPRDS provides a recorded average travel time (in seconds) from the 5-minute bin for Travel Time Segment that is an average travel time of all the probes that traveled through that Travel Time Segment during a 5-minute interval.

minutes to prevent excessive delay from being counted twice. The excessive delay for the travel time segment would be determined by converting the RSD values (0 or greater than 0) to a unit of "hours," by dividing the RSD by 3,600 seconds/hour.

*Total Excessive Delay* – The FHWA is proposing in section 490.711(e) the method State DOTs would use to calculate the excessive delay metric for each reporting segment where this value represents the accumulated amount of additional time, in hours, that were experienced by all traffic throughout a full calendar year as a result of being excessively delayed. The metric would be calculated by first multiplying (1) the Excessive Delay values for a particular 5-minute bin by (2) the estimated traffic volume for a recorded 5-minute interval (which would be based on the hourly volume for the hour that corresponds to the 5-minute interval). That calculation would be done for every 5-minute bin of every day for the entire calendar year. Then, the product of those calculations would be added up for a reporting segment to produce the metric—Total Excessive Delay (in vehicle hours), an annual metric. This proposed calculation method would be based only on recorded travel times in the travel time data set as FHWA is assuming in this rulemaking that any missing or null travel time values would be occurring when travel times are consistent with free flow speeds. The FHWA believes that this assumption is valid as missing or null values would likely occur when very few or no vehicles are using the roadway.

The FHWA is proposing for State DOTs to use estimated hourly traffic volumes to expand the travel times, determined by probing a sample of highway users, to represent

the total excessive delay experienced by roadway users. An example of this proposed method is provided in Figure 9 below:

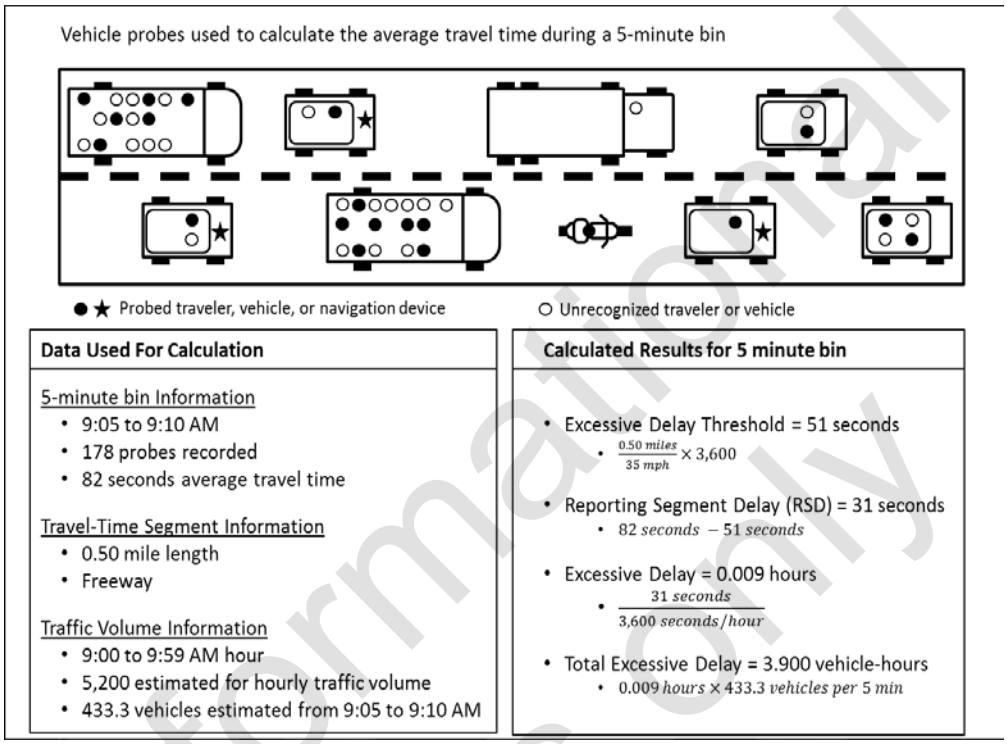


**Figure 9: Example-Total Excessive Delay**

In this example, 178 highway probes were recorded (from mobile phones, vehicles, or portable navigation devices) during a 5-minute period of time which, on average, took 82 seconds to traverse a 0.50 mile long roadway segment located on a freeway. These highway users were experiencing excessive delay as the threshold time for this roadway segment is 51 seconds. For this example, the additional time experienced by each highway user as a result of being excessively delayed is estimated to be 0.009 hours. This delay per highway user is expanded to represent all traffic by multiplying the delay per user, 0.009 hours, by the estimated traffic volume during the 5

minute interval, 433.3 vehicles. The product of 3.900 vehicle-hours is the Total Excessive Delay for the 5 minute interval. The final metric for this example would then carry out this same process for every 5 minute interval through a full calendar year and for each travel time segment within the reporting segment.

The FHWA recognizes that the proposed method would apply a delay per highway user to total vehicles to identify the total excessive delay of vehicles. The FHWA elected to use this approach as it is believed that traffic volume data are the most accurate and complete data available on the use of the highways. As previously discussed, the FHWA desires to move to a future measure that would account for all travelers and encourages public comment as to how and when this can be accomplished in a reliable and accurate manner at a national level.

The FHWA is proposing section 490.711(f) that would require State DOTs to report annually on the Total Excessive Delay (as measured in vehicle-hours) metric for each applicable reporting segment on the NHS. State DOTs would report the annual outcomes to the HPMS by June 15th of the following year (i.e., metrics for calendar year 2017 would be reported no later than June 15, 2018). Specifically, FHWA is proposing that State DOTs would report annually the following to the HPMS for each reporting segment:

- NPMRDS TMC codes or standard HPMS location referencing; and
- Total Excessive Delay metric, to the nearest one hundredth hours.

The FHWA intends to issue additional guidance on how State DOTs could report these data to HPMS. As discussed previously with respect to proposed sections 490.511

and 490.611, FHWA recognizes the level of effort to conflate travel time reporting segments to align with a referenced highway network. For this reason, FHWA is not proposing a requirement for State DOTs to conflate the travel time reporting segments to the HPMS roadway network. The FHWA intends to conduct this conflation, if needed, if State DOTs choose to report the metric by Travel Time Segment reference codes.

**Discussion of Section 490.713 Calculation of Congestion Measure**

The FHWA is proposing the method to be used by State DOTs and MPOs to calculate the traffic congestion measure, Annual Hours of Excessive Delay Per Capita, proposed in section 490.707. The FHWA, State DOTs, and MPOs would all use this method to assess performance, establish targets, and/or report on performance. The measure would be calculated by summing the Total Excessive Delay, calculated as proposed in section 490.711, of all reporting segments in the applicable area and then dividing this total by the population for the applicable area. As discussed in section 490.703, this measure is calculated for each urbanized area with a population over 1 million that contain nonattainment or maintenance areas for any of the criteria pollutants covered under the CMAQ program. A single measure would be determined for urbanized areas that intersect with multiple State and metropolitan planning area boundaries and for each applicable area within a State boundary. For example, in the State of Maryland, based on the 2010 U.S. Decennial Census and areas designated nonattainment or maintenance at the time of this rulemaking for $O_3$, CO, and/or PM; there are three TMAs that are applicable to this measure including Philadelphia, Baltimore, and Washington DC In this case, for Maryland, the State DOTs and MPOs

with NHS mainline highways in these TMAs would need to calculate three identical measures for the entire area, and report associated targets: one for the Baltimore area, and one each for the Philadelphia area and the Washington DC area.

5. **Subpart H: National Performance Management Measures for the Congestion Mitigation and Air Quality Improvement Program – On-Road Mobile Source Emissions**

In this section, FHWA describes the proposed changes to Subpart H, which would establish a performance measure for assessing on-road mobile source emissions. The discussion of the proposed requirements is as follows:

- Section 490.801 discusses the purpose of the subpart;
- Section 490.803 describes the applicability of the subpart;
- Section 490.805 presents the definitions;
- Section 490.807 discusses the performance measure;
- Section 490.809 describes the data requirements;
- Section 490.811 identifies how to calculate performance metric;
- Section 490.813 presents how to calculate performance measure.

**Discussion of Section 490.801 Purpose**

The FHWA is required, under 23 U.S.C. 150(c), to establish performance measures for State DOTs to assess on-road mobile source emissions for the purpose of carrying out the CMAQ program. The FHWA proposes to establish in this subpart a measure for State DOTs and MPOs to use to assess the reduction of the criteria pollutants

and applicable precursors under the CMAQ program through the programming of projects.

**Discussion of Section 490.803 Applicability**

In section 490.803(a), FHWA proposes that the on-road mobile source emissions performance measure would be applicable to State DOTs and MPOs that received funding from the CMAQ program that contain areas designated as nonattainment or maintenance for the $O_3$, CO, or PM ($PM_{10}$ and $PM_{2.5}$) NAAQS under the Clean Air Act Amendments of 1990.

Similar to the traffic congestion measure, for this measure MPOs serving urbanized areas over 1 million in population with nonattainment and maintenance areas have additional performance reporting requirements (See 23 U.S.C. 149(l)). Because of the special emphasis for these areas, FHWA proposes that these areas would be subject to the full set of performance requirements. The FHWA anticipates that MPOs serving in these areas over 1 million in population with nonattainment or maintenance areas could calculate and use the proposed performance measure to assess on-road mobile source emissions in their applicable planning area as these organizations have more experience and capability to manage their air quality program through the transportation conformity process and the implementation of the CMAQ program, including estimating emissions reductions and reporting to the CMAQ Public Access System.[98] Accordingly, FHWA's proposal includes some additional requirements for the MPOs serving larger urbanized areas that are described in more detail throughout this NPRM. For nonattainment and

[98] CMAQ Performance Plan as required by 23 U.S.C. 149(l)

maintenance areas defined in section 490.803(a) with a population below this threshold, even though they are not subject to the additional CMAQ performance plan reporting requirements, FHWA proposes that the measure would apply in these areas, but with more flexibility. The FHWA believes that since all $O_3$, CO, or PM nonattainment and maintenance areas, regardless of size, are eligible to receive CMAQ funds and all CMAQ-funded projects must demonstrate an emissions reduction, then the measure should apply to all areas. The FHWA believes that planning organizations serving smaller urbanized areas, including "donut areas" (as defined in 40 CFR 93.101) could either calculate and use the performance measure or support the State DOT and rely on it to calculate and use the performance measure to assess on-road mobile source emissions. State DOTs would also calculate and use the measure in "isolated rural nonattainment and maintenance areas," as defined in 40 CFR 93.101.

In section 490.803(b), FHWA proposes that State DOTs and MPOs that do not contain any $O_3$, CO, $PM_{10}$, and $PM_{2.5}$ nonattainment or maintenance areas would not be required to calculate and report on on-road mobile source emission performance as these State DOTs and MPOs are allowed for flexibility in spending their CMAQ funds whereby projects are not required to adhere to specific CMAQ eligibility requirements can be funded by CMAQ.

**Discussion of Section 490.805 Definitions**

The FHWA proposes definitions associated with the on-road mobile source emissions performance measures that are used in the proposed regulation. It includes

definitions for Donut Areas, Isolated Rural Nonattainment and Maintenance Areas, and On-Road Mobile Source.

The FHWA proposes to utilize the same definition for donut area and isolated rural nonattainment and maintenance areas, as found in the transportation conformity rule at 40 CFR 93.101. The FHWA proposes to define on-road mobile sources as emissions from vehicles that you would typically expect to find on our roadways, such as cars, trucks, and buses.[99]

**Discussion of Section 490.807 National Performance Management Measures for CMAQ Program: On-Road Mobile Source Emissions**

In section 490.807, FHWA proposes the measure of "Total Emissions Reduction" to assess on-road mobile source emissions. The measure will be the 2-year and 4-year cumulative reported emissions reduction resulting from CMAQ projects, by applicable criteria pollutants ($O_3$, CO, $PM_{10}$, and $PM_{2.5}$) and applicable precursors (e.g., VOC and NOx are precursors for $O_3$ and PM) for which the area is in nonattainment or maintenance. For example, in the case of $O_3$, a measure will need to be established for each of $O_3$'s precursors, NOx and VOC. The FHWA would like, through this rulemaking, to establish a measure that would rely on the existing processes State DOTs are using to manage, track, and report projects as part of the CMAQ program. For this reason, FHWA elected to base the proposed measure on the estimated emission reductions reported by State DOTs for CMAQ-funded projects through the CMAQ

[99] "What is Transportation Conformity?" training slides https://connectdot.connectsolutions.com/whatisconformity/

Public Access System. As discussed in the Measure Analysis section of the rulemaking, FHWA believes that this approach provides the best opportunity to effectively implement the MAP-21 performance requirements for on-road mobile source emissions. The data and tools to support the performance measure are readily available at a national level and are already in use today. The FHWA believes that collecting emissions data on a project-by-project basis through vehicle probing or another means would be cost prohibitive and would delay implementation because enough pre and post project completion data would not be available to accurately measure the actual reductions. The FHWA is proposing in this rulemaking to establish a measure that expresses the total emissions reduced per fiscal year, for all CMAQ-funded projects by pollutant and applicable precursors for which the area has been designated as nonattainment or maintenance. The emissions reductions would be summed for each fiscal year and cumulated by applicable pollutant and precursor to represent total reductions estimated after 2 fiscal years and after 4 fiscal years.

**Discussion of Section 490.809 Data Requirements**

The FHWA proposes to use the CMAQ Public Access System[100] as the data source for the measure, based on data available as of July 1 of the calendar year in which a CMAQ performance plan required in 23 U.S.C. 149(l) or State Biennial Performance Reports, required in section 490.107, is due. The CMAQ Public Access System is

[100] The Public Access System is available at: https://fhwaapps.fhwa.dot.gov/cmaq_pub/HomePage/

populated from the State DOT CMAQ annual report[101] which includes project information submitted through the CMAQ project tracking system.[102] The FHWA uses these yearly submissions through the CMAQ Public Access System to maintain a database of CMAQ investments as required by 23 U.S.C. 149(i)(1). Drawing from the information in the database, the CMAQ Public Access System provides an opportunity for the general public and project sponsors to have access to information submitted through the annual reporting process.

State DOTs report estimated emissions reductions of CMAQ projects for the first year that a project is obligated and only the first time a project is entered into the system, not each time the project receives CMAQ funds, to avoid double counting of benefits. The quantitative emissions reduction estimates are reported for each CMAQ-funded project in kilograms (kg) per day for applicable criteria pollutants (and their precursors) for which the area is nonattainment or maintenance. These five pollutants or precursors include CO, $PM_{2.5}$, $PM_{10}$, nitrogen oxides (NOx), and volatile organic compound (VOC). Both NOx and VOC are potential precursors to $O_3$, $PM_{10}$ and $PM_{2.5}$. While no single method is specified in the CMAQ Guidance for estimating emissions, every effort should be taken to ensure that the estimates are credible and based on a reproducible and logical analytical procedure. The FHWA is working to develop a tool kit of best practices to improve the assumptions and calculations used to quantitatively estimate emissions.

[101] Guidance on CMAQ annual reporting can be found in section IX. C. of the CMAQ Interim Program Guidance under MAP-21, November 12, 2013.
[102] Information on the CMAQ project tracking system can be found at http://www.fhwa.dot.gov/environment/air_quality/cmaq/reporting/

For the purpose of establishing targets in section 490.105, FHWA proposes the annual reports shall include for each project, the applicable nonattainment or maintenance area and MPO for which the project is located, and quantified emissions reductions for all applicable criteria pollutants (and their precursors) for which the area is nonattainment or maintenance. For those projects that do not include a quantified emissions reduction (i.e., public education and marketing), the CMAQ guidance allows for a qualitative assessment. This option is still allowed, but those projects will not be considered for the purposes of implementing the on-road mobile source emissions measure.

In 490.809(b), FHWA is proposing a period of approximately 120 days for FHWA to review and approve the data for publication in the CMAQ Public Access System. Considering this time allowance, FHWA is proposing that specific dates be established for when FHWA approves the State DOT's annual reports and when data are available for extraction from the CMAQ Public Access System for the purpose of implementing the on-road mobile source emissions measure. These dates are necessary in order to report the measures and establish targets in a timely manner. The FHWA is proposing the following dates:

- March 1 – The FHWA is proposing that State DOTs enter their project information for a given fiscal year by March 1st of the following fiscal year; and
- July 1 – The FHWA is proposing that it will make available the data necessary to calculate the on-road mobile source emissions measure will be in the CMAQ Public Access System by July 1st for project obligations in the prior fiscal year.

In 490.809(c), FHWA is proposing to identify nonattainment or maintenance areas based on the most recent effective designations made by the EPA when the State DOT Baseline Performance Period Report is due to FHWA. The areas designated at this time will remain as the areas applicable to this subpart for the duration of the performance period. For example, for a performance period that begins on October 1, 2017, and ends on September 30, 2021, FHWA would consider the designated areas as of October 1, 2018, to be those subject to this subpart even if the effective nonattainment and maintenance area designations change during the performance period after this date.

**Discussion of Section 490.811 Calculation of Emissions Metric**

The FHWA proposes in section 490.811 the method that would be used by State DOTs and MPOs to calculate the annual emission reductions for projects reported to the CMAQ Public Access System in a Federal fiscal year. The metric would be calculated for each CMAQ-funded project and for each applicable criteria pollutant and precursor. The proposed method would convert the emissions reductions reported in the CMAQ Public Access System from units of kg per day to short tons per year: one kg per day is equal to 0.4026 short tons per year. The emissions reductions would then be summed for all projects within the applicable reporting area, by criteria pollutant or precursor, for a Federal fiscal year. The annual emissions reductions (in tons/year) would be used to calculate the performance measure proposed in section 490.813.

**Discussion of Section 490.813 Calculation of Emissions Measure**

The FHWA proposes in section 490.813 that State DOTs and MPOs should calculate on-road mobile source emissions reductions by summing the annual tons of

emissions reduced by CMAQ projects, using the 2 and 4 years of available data from the Public Access System as proposed in section 490.809 by criteria pollutant or precursor. For example, for the first proposed performance period that would begin on October 1, 2017, and end on September 30, 2021. So the 2-year total emissions reductions by criteria pollutant or applicable precursor for the performance period would reflect project data from Federal fiscal years from 2018 through 2019, and the 4-year total emissions reductions by criteria pollutant or applicable precursor for the performance period would reflect project data from Federal fiscal years from 2018 through 2021.

## VII. Rulemaking Analyses and Notices

All comments received before the close of business on the comment closing date indicated above will be considered and available for examination in the docket at the above address. Comments received after the comment closing date will be filed in the docket and considered to the extent practicable. In addition to late comments, FHWA will also continue to file relevant information in the docket as it becomes available after the comment period closing date, and interested persons should continue to examine the docket for new material. A final rule may be published at any time after close of the comment period and after FHWA has had the opportunity to review the comments submitted.

## A. Executive Order 12866 (Regulatory Planning and Review), Executive Order 13563 (Improving Regulation and Regulatory Review), and DOT Regulatory Policies and Procedures.

The FHWA has determined that this proposed rule constitutes a significant regulatory action within the meaning of Executive Order 12866 and is significant within the meaning of DOT regulatory policies and procedures. This action complies with Executive Orders 12866 and 13563 to improve regulation. This action is considered significant because of widespread public interest in the transformation of the Federal-aid highway program to be performance-based, although it is not economically significant within the meaning of Executive Order 12866. The FHWA is presenting a Regulatory Impact Analysis (regulatory analysis or RIA) in support of this NPRM on National Performance Measures to Assess Performance of the National Highway System, Freight Movement on the Interstate System, and Congestion Mitigation and Air Quality Improvement Program. The regulatory analysis estimates the economic impact, in terms of costs and benefits, on Federal, State, and local governments, as well as private entities regulated under this action, as required by Executive Order 12866 and Executive Order 13563. The economic impacts are measured on an incremental basis, relative to current practices.

This section of the NPRM identifies the estimated costs and benefits resulting from the proposed rule in order to inform policy makers and the public of the relative value of the current proposal. The complete RIA may be accessed from the rulemaking's docket (FHWA-2013-0054).

The cornerstone of MAP-21's highway program transformation is the transition to a performance-based program. In accordance with the law, State DOTs would invest resources in projects to achieve performance targets that make progress toward national goal areas. The MAP-21 establishes national performance goals for system reliability, freight movement and economic vitality, and environmental sustainability. The FHWA must promulgate a rule to establish performance measures to assess performance of the Interstate System and non-Interstate NHS; assess freight movement on the Interstate System, and to carry out the CMAQ program and assess traffic congestion and on-road mobile source emissions. As required by MAP-21, this NPRM identifies the following performance measures for which State DOTs and MPOs must collect and report data, establish targets for performance, and make progress toward achievement of targets:

1. Percent of the Interstate System providing for Reliable Travel Times;
2. Percent of the non-Interstate NHS providing for Reliable Travel Times;
3. Percent of the Interstate System where peak hour travel times meet expectations;
4. Percent of the non-Interstate NHS where peak hour travel times meet expectations;
5. Percent of the Interstate System Mileage providing for Reliable Truck Travel Times;
6. Percent of the Interstate System Mileage Uncongested;
7. Annual Hours of Excessive Delay Per Capita; and
8. Cumulative emissions reduction resulting from CMAQ projects by criteria pollutant for which the area is in nonattainment or maintenance.

Estimated Cost of the Proposed Rule

To estimate costs for the proposed rule, FHWA assessed the level of effort, expressed in labor hours and the labor categories, and capital needed to comply with each component of the proposed rule. Level of effort by labor category is monetized with loaded wage rates to estimate total costs.

Because there is some uncertainty regarding the availability of NPMRDS data for use by State DOTs and MPOs, FHWA estimated the cost of the proposed rule according to two scenarios. Under Scenario 1, FHWA assumes that it will provide State DOTs and MPOs with the required data from NPMRDS. Table 13 displays the total cost of the proposed rule for the 11-year study period (2016–2026).[103] Total costs over 11 years are estimated to be $165.3 million undiscounted, $117.4 million discounted at 7 percent, and $141.6 million discounted at 3 percent.

**Table 13 – Total Cost of the Proposed Rule Under Scenario 1**

| Cost Components | 11-Year Total Cost | | |
|---|---|---|---|
| | Undiscounted | 7% | 3% |
| **Section 490.103 - Data Requirements** | **$21,241,714** | **$15,226,570** | **$18,275,559** |
| **Intake and Process DOT Travel Time Data** | **$15,918,501** | **$11,180,489** | **$13,578,804** |

[103] In FHWA's first two performance measure NPRMs, it assessed costs over a 10-year study period. Because FHWA is now proposing individual effective dates for each of its performance measure rules rather than a common effective date, the timing of the full implementation of the measures has shifted. Using an 11-year study period ensures that the cost assessment includes the first 2 performance periods following the effective date of the rulemaking, which is comparable to what the 10-year study period assessed in the first two NPRMs. An 11-year study period captures the first year costs related to preparing and submitting the Initial Performance Report and a complete cycle of the incremental costs that would be incurred by State DOTs and MPOs for assembling and reporting all required measures as a result of the proposed rule. FHWA anticipates that the recurring costs beyond this timeframe would be comparable to those estimated in the 10-year period of analysis.

| | | | |
|---|---|---|---|
| **NPMRDS Data Acquisition** | **$4,000,000** | **$2,809,433** | **$3,412,081** |
| **NPRMDS Data Training** | **$489,800** | **$457,757** | **$475,534** |
| **NPMRDS Data Reconciliation** | **$833,414** | **$778,891** | **$809,139** |
| **Section 490.105 - 490.109 - Reporting Requirements** | **$90,529,176** | **$63,693,723** | **$77,239,133** |
| **Document and Submit Description of Coordination Between State DOTs and MPOs** | **$2,134,912** | **$2,134,912** | **$2,134,912** |
| **Establish and Update Performance Targets** | **$40,763,607** | **$29,114,925** | **$35,021,902** |
| **Prepare and Submit Initial Performance Report** | **$919,236** | **$919,236** | **$919,236** |
| **Reporting on Performance Targets Progress** | **$31,269,138** | **$21,219,453** | **$26,279,023** |
| **Prepare CMAQ Performance Plan** | **$13,465,179** | **$9,137,563** | **$11,316,326** |
| **Assess Significant Progress Toward Achieving Performance Targets** | **$1,933,462** | **$1,132,171** | **$1,528,071** |
| **Adjust HPMS to Handle Data in TMC Format and Design Post-Submission Reports** | **$24,804** | **$23,181** | **$24,082** |
| **HPMS Data Processing (e.g., Data Verification)** | **$18,838** | **$12,282** | **$15,581** |
| **Section 490.511 - Calculation of Performance Metrics for NHS Performance** | **$5,478,984** | **$3,897,015** | **$4,698,453** |
| **Calculate LOTTR** | **$2,828,595** | **$1,961,095** | **$2,399,861** |
| **Estimate Desired Level of PHTTR for All Roads** | **$787,736** | **$654,465** | **$723,310** |
| **Calculate PHTTR** | **$1,862,653** | **$1,281,455** | **$1,575,282** |
| **Section 490.513 - Calculation of Performance Measure for NHS Performance** | **$4,285,750** | **$3,111,923** | **$3,709,859** |
| **Develop Reliability Performance Measures** | **$3,084,798** | **$2,239,901** | **$2,670,283** |
| **Develop Travel Time Performance Measures** | **$1,200,952** | **$872,023** | **$1,039,576** |
| **Section 490.611 - Calculation of Performance Metrics for Freight Mobility** | **$3,306,150** | **$2,407,408** | **$2,863,507** |

| | | | |
|---|---|---|---|
| **Calculate Average Truck Travel Speed: Establish Process** | **$183,675** | **$171,659** | **$178,325** |
| **Calculate Average Truck Travel Speed: Update Average** | **$1,469,400** | **$1,032,045** | **$1,253,428** |
| **Calculate Truck Reliability: Establish Process** | **$183,675** | **$171,659** | **$178,325** |
| **Calculate Truck Reliability: Update Metric** | **$1,469,400** | **$1,032,045** | **$1,253,428** |
| **Section 490.613 - Calculation of Performance Measures for Freight Reliability** | **$14,807,031** | **$10,751,525** | **$12,817,359** |
| **Develop Freight Travel Time Performance Measures** | **$7,403,516** | **$5,375,762** | **$6,408,679** |
| **Develop Freight Reliability Performance Measures** | **$7,403,516** | **$5,375,762** | **$6,408,679** |
| **Section 490.711 - Calculation of Performance Metric for CMAQ Congestion** | **$5,128,771** | **$3,710,508** | **$4,429,895** |
| **Calculate Excessive Delay Threshold Travel Time** | **$1,282,193** | **$927,627** | **$1,107,474** |
| **Identify all 5-minute Bins with Travel Times above the Threshold Speed and Calculate Excessive Delay** | **$1,165,630** | **$818,690** | **$994,306** |
| **Develop Hourly Traffic Volumes in Order to Weight Segments** | **$1,515,319** | **$1,145,502** | **$1,333,810** |
| **Finalize Weighted Metrics for Reporting** | **$1,165,630** | **$818,690** | **$994,306** |
| **Section 490.713 - Calculation of Congestion Measure** | **$6,612,300** | **$4,801,253** | **$5,723,782** |
| **Develop Congestion Performance Measure** | **$6,612,300** | **$4,801,253** | **$5,723,782** |
| **Section 490.811 - Calculation of Emissions Metric** | **$13,285,826** | **$9,331,408** | **$11,333,079** |
| **Develop Emission Performance Metric for Some CMAQ Projects** | **$13,285,826** | **$9,331,408** | **$11,333,079** |
| **Section 490.813 - Calculation of Emissions Measure** | **$593,412** | **$430,882** | **$513,673** |
| **Develop Emission Performance Measure** | **$593,412** | **$430,882** | **$513,673** |

| | | | |
|---|---|---|---|
| **Total Cost of Proposed Rule** | **$165,269,115** | **$117,362,215** | **$141,604,299** |

* Totals may not sum due to rounding

Under Scenario 2, which represents "worst case" conditions, State DOTs would choose to independently acquire the necessary data. Table 14 displays the total cost of the proposed rule for the 11-year study period (2016–2026). Total costs over 11 years are estimated to be $224.5 million undiscounted, $158.9 million discounted at 7 percent, and $192.1 million discounted at 3 percent.

**Table 14 – Total Cost of the Proposed Rule Under Scenario 2**

| Cost Components | 11-Year Total Cost | | |
|---|---|---|---|
| | Undiscounted | 7% | 3% |
| **Section 490.103 - Data Requirements** | **$80,425,414** | **$56,794,724** | **$68,760,455** |
| Acquire Freight and General Traffic Data | $51,000,000 | $35,820,266 | $43,504,034 |
| Adjust Contract for Freight-only Data | $9,000,000 | $6,321,223 | $7,677,183 |
| Remove Estimated Data Values from Database | $3,183,700 | $2,236,098 | $2,715,761 |
| Intake and Process | $15,918,501 | $11,180,489 | $13,578,804 |
| Data Training | $489,800 | $457,757 | $475,534 |
| Data Reconciliation | $833,414 | $778,891 | $809,139 |
| **Section 490.105 - 490.109 - Reporting Requirements** | **$90,529,176** | **$63,693,723** | **$77,239,133** |
| Document and Submit Description of Coordination Between State DOTs and MPOs | $2,134,912 | $2,134,912 | $2,134,912 |
| Establish and Update Performance Targets | $40,763,607 | $29,114,925 | $35,021,902 |
| Prepare and Submit Initial Performance Report | $919,236 | $919,236 | $919,236 |
| Reporting on Performance Targets Progress | $31,269,138 | $21,219,453 | $26,279,023 |
| Prepare CMAQ Performance Plan | $13,465,179 | $9,137,563 | $11,316,326 |
| Assess Significant Progress Toward Achieving Performance Targets | $1,933,462 | $1,132,171 | $1,528,071 |

| | | | |
|---|---|---|---|
| **Adjust HPMS to Handle Data in TMC Format and Design Post-submission Reports** | **$24,804** | **$23,181** | **$24,082** |
| **Data Processing (e.g., Data Verification)** | **$18,838** | **$12,282** | **$15,581** |
| **Section 490.511 - Calculation of Performance Metrics for NHS Performance** | **$5,478,984** | **$3,897,015** | **$4,698,453** |
| **Calculate LOTTR** | **$2,828,595** | **$1,961,095** | **$2,399,861** |
| **Estimate Desired Level of PHTTR for All Roads** | **$787,736** | **$654,465** | **$723,310** |
| **Calculate PHTTR** | **$1,862,653** | **$1,281,455** | **$1,575,282** |
| **Section 490.513 - Calculation of Performance Measure for NHS Performance** | **$4,285,750** | **$3,111,923** | **$3,709,859** |
| **Develop Reliability Performance Measures** | **$3,084,798** | **$2,239,901** | **$2,670,283** |
| **Develop Travel Time Performance Measures** | **$1,200,952** | **$872,023** | **$1,039,576** |
| **Section 490.611 - Calculation of Performance Metrics for Freight Mobility** | **$3,306,150** | **$2,407,408** | **$2,863,507** |
| **Calculate Average Truck Travel Speed: Establish Process** | **$183,675** | **$171,659** | **$178,325** |
| **Calculate Average Truck Travel Speed: Update Average** | **$1,469,400** | **$1,032,045** | **$1,253,428** |
| **Calculate Truck Reliability: Establish Process** | **$183,675** | **$171,659** | **$178,325** |
| **Calculate Truck Reliability: Update Metric** | **$1,469,400** | **$1,032,045** | **$1,253,428** |
| **Section 490.613 - Calculation of Performance Measures for Freight Reliability** | **$14,807,031** | **$10,751,525** | **$12,817,359** |
| **Develop Freight Travel Time Performance Measures** | **$7,403,516** | **$5,375,762** | **$6,408,679** |
| **Develop Freight Reliability Performance Measures** | **$7,403,516** | **$5,375,762** | **$6,408,679** |
| **Section 490.711 - Calculation of Performance Metric for CMAQ Congestion** | **$5,128,771** | **$3,710,508** | **$4,429,895** |
| **Calculate Excessive Delay Threshold Travel Time** | **$1,282,193** | **$927,627** | **$1,107,474** |
| **Identify All 5-minute Bins with Travel Times Above the Threshold Speed and Calculate Excessive Delay** | **$1,165,630** | **$818,690** | **$994,306** |
| **Develop Hourly Traffic Volumes in Order to Weight Segments** | **$1,515,319** | **$1,145,502** | **$1,333,810** |
| **Finalize Weighted Metrics for Reporting** | **$1,165,630** | **$818,690** | **$994,306** |

| | | | |
|---|---|---|---|
| **Section 490.713 - Calculation of Congestion Measure** | **$6,612,300** | **$4,801,253** | **$5,723,782** |
| **Develop Congestion Performance Measure** | **$6,612,300** | **$4,801,253** | **$5,723,782** |
| **Section 490.811 - Calculation of Emissions Metric** | **$13,285,826** | **$9,331,408** | **$11,333,079** |
| **Develop Emission Performance Metric for Some CMAQ Projects** | **$13,285,826** | **$9,331,408** | **$11,333,079** |
| **Section 490.813 - Calculation of Emissions Measure** | **$593,412** | **$430,882** | **$513,673** |
| **Develop Emission Performance Measure** | **$593,412** | **$430,882** | **$513,673** |
| **Total Cost of Proposed Rule** | **$224,452,815** | **$158,930,370** | **$192,089,196** |

* Totals may not sum due to rounding

The costs in Tables 14 and 15 assume a portion of MPOs will establish their own targets and a portion will adopt State DOT targets. For the performance measures that apply to all State DOTs and MPOs (i.e., Travel Time Reliability and Freight Movement), it is assumed that State DOTs and MPOs serving TMAs[104] would use staff to establish performance targets and all other MPOs would adopt State DOT targets rather than establish their own targets and would therefore not incur any incremental costs. The FHWA made this assumption because larger MPOs may have more resources available to develop performance targets. The FHWA believes that this is a conservative estimate as larger MPOs may elect not to establish their own targets for any variety of reasons, including resource availability.

Break-Even Analysis

Currently, State DOTs differ from State to State in the way they evaluate the performance of the NHS, congestion, on-road mobile source emissions, and freight

[104] A Transportation Management Area (TMA) is an urbanized area having a population of over 200,000, or otherwise requested by the Governor and the MPO and officially designated by FHWA and FTA. 23 U.S.C. 134(k).

movement. These differences hinder accurate analysis at the national level. The proposed rulemaking would not only establish uniform performance measures, but also would establish processes that (1) State DOTs and MPOs use to report measures and establish performance targets and (2) FHWA uses to assess progress that State DOTs have made toward achieving targets.

Upon implementation, FHWA expects that the proposed rule would result in some significant benefits that are not easily monetized, but nonetheless deserve mention in this analysis. Specifically, the proposed rule would allow for more informed decisionmaking on congestion-, freight-, and air-quality-related project, program, and policy choices. The proposed rule also would yield greater accountability because the MAP-21-mandated reporting would increase visibility and transparency. In addition, the proposed rule would help focus the Federal-aid highway program on achieving balanced performance outcomes.

The expected benefits discussed above (i.e., more informed decisionmaking, greater accountability, and the focus on making progress toward the national goal for infrastructure condition) would lead to an enhanced performance of the NHS due to reduced congestion, improved freight movement, and reduced emissions. The benefits, while real and substantial, are difficult to forecast and monetize. Therefore, FHWA addresses this issue by using the break-even analysis method suggested by OMB Circular A-4. Break-even analyses calculate the threshold a specific variable must achieve in order for benefits to equal costs while holding every other variable in the analysis constant. The FHWA performed three separate break-even analyses based on the

estimated costs associated with: (1) enhancing performance of the Interstate System and non-Interstate NHS by relieving congestion; (2) reducing emissions; and, (3) improving freight movement.

For the break-even analyses associated with enhancing the performance of the Interstate System and non-Interstate NHS, the costs associated with the following proposed rule sections are summed together to estimate the total cost of provisions aimed at reducing congestion:

- Section 490.103. Sixty percent of the cost[105] of obtaining data requirements;
- Section 490.105. Approximately 63 percent of the cost[106] of establishing performance targets;
- Section 490.107. Approximately 63 percent of the cost[107] of documenting and submitting a description of coordination between State DOTs and MPOs;
- Section 490.107. Approximately 63 percent of the cost[108] of preparing and submitting Initial Performance Reports;
- Section 490.107. Approximately 63 percent of the cost[109] of reporting performance targets;

[105] Sixty percent is assumed because three of the five metrics (LOTTR, PHTTR, and Total Excessive Delay) are calculated from NPMRDS and are aimed at improving system performance and reducing congestion.
[106] Approximately 63 percent is assumed because five of the eight performance measures (Reliability on the Interstate System, Reliability on the non-Interstate NHS, Peak Hour Travel Time on the Interstate System, Peak Hour Travel Time on the non-Interstate NHS, and Annual Hours of Excessive Delay Per Capita) are aimed at improving system performance and reducing congestion.
[107] Ibid.
[108] Ibid.
[109] Ibid.

- Section 490.107. Half the cost[110] of preparing CMAQ performance plan;
- Section 490.107. Sixty percent of the cost[111] of adjusting HPMS and processing data;
- Section 490.109. Cost of assessing significant progress for NHPP measures;
- Section 490.511. Cost of calculating system performance metrics;
- Section 490.513. Cost of calculating system performance measures;
- Section 490.711. Cost of calculating congestion metric; and
- Section 490.713. Cost of calculating congestion measure.

Table 15 presents the results from the break-even analysis associated with enhancing performance of the Interstate System and non-Interstate NHS under Scenario 1 (i.e., FHWA provides NPMRDS data to State DOTs).

The results represent the passenger car travel time (in hours) that would need to be saved in order to justify the costs. The analysis shows that the proposed rule would need to result in approximately 354,000 hours of passenger car travel time saved per year, or 3.9 million hours over 11 years. To provide context, private commuters in 498 urban areas across the United States experience 5.5 billion hours of travel delay per year. As a result, the reduction represents a less than 0.01 percent decrease in the amount of travel delay per year for major U.S. urban areas.[112]

[110] Fifty percent is assumed because one of the two CMAQ performance measures (Annual Hours of Excessive Delay Per Capita) is aimed at improving system performance and reducing congestion.
[111] Sixty percent is assumed because three of the five metrics (LOTTR, PHTTR, and Total Excessive Delay) are aimed at improving system performance and reducing congestion.
[112] Texas Transportation Institute's (TTI) "2012 Annual Urban Mobility Report," 2013.

**Table 15 – Break-Even Analysis of Interstate System and non-Interstate NHS Performance (Reliability, Peak Hour Travel Time, and Congestion) under Scenario 1**

| Undiscounted 11-Year Costs<br>a | Average Commuter Value of Time ($ per hour)<br>b | Number of Hours of Travel that Need to be Reduced<br>c = a ÷ b | Average Annual Number of Hours of Travel that Need to be Reduced<br>d = c ÷ 11 |
|---|---|---|---|
| $88,387,756 | $22.72 | 3,891,103 | 353,737 |

*Variance in the calculation is due to rounding.

**Please refer to the RIA in the docket for details on the methodology used in the analysis.

Table 16 presents the results from the break-even analysis associated with enhancing performance of the Interstate System and non-Interstate NHS under Scenario 2 (i.e., State DOTs independently acquire the necessary data). The results represent the passenger car travel time (in hours) that would need to be saved in order to justify the costs. The analysis shows that the proposed rule would need to result in approximately 496,000 hours of passenger car travel time saved per year, or 5.5 million hours over 11 years. To provide context, private commuters in 498 urban areas across the United States experience 5.5 billion hours of travel delay per year. This reduction represents a 0.01 percent decrease in the amount of travel delay per year for major U.S. urban areas.[113]

**Table 16 – Break-Even Analysis of Interstate System and non-Interstate NHS Performance (Reliability, Peak Hour Travel Time, and Congestion) under Scenario 2**

| Undiscounted 11-Year Costs | Average Commuter Value of Time ($ per hour) | Number of Hours of Travel that Need to be Reduced | Average Annual Number of Hours of Travel that Need to be Reduced |
|---|---|---|---|

[113] TTI's "2012 Annual Urban Mobility Report," 2013.

| a | b | c = a ÷ b | d = c ÷ 11 |
|---|---|---|---|
| $123,897,977 | $22.72 | 5,454,373 | 495,852 |

*Variance in the calculation is due to rounding.

**Please refer to the RIA in the docket for details on the methodology used in the analysis.

Table 187 presents the results from the break-even analysis associated with the Freight Movement on the Interstate System measures under Scenario 1 (i.e., FHWA provides NPMRDS data to State DOTs and MPOs). The costs associated with the following proposed rule sections are summed together to estimate the total cost of provisions aimed at reducing freight congestion:

- Section 490.103. Forty percent of the cost[114] of the data requirements;
- Section 490.105. Twenty-five percent of the cost[115] of establishing performance targets;
- Section 490.107. Twenty-five percent of the cost[116] of documenting and submitting a description of coordination between State DOTs and MPOs;
- Section 490.107. Twenty-five percent of the cost[117] of preparing and submitting Initial Performance Reports;

[114] Forty percent is assumed because two of the five metrics (Truck Travel Time Reliability and Average Truck Speed) calculated from NPMRDS are aimed at freight movement.
[115] Twenty-five percent is assumed because two of the eight performance measures (Freight Movement Reliability and Average Truck Speed) are aimed at reducing truck congestion.
[116] Ibid.
[117] Ibid.

- Section 490.107. Twenty-five percent of the cost[118] of reporting performance targets;
- Section 490.107. Forty percent of the cost[119] of adjusting HPMS and processing data;
- Section 490.109. Cost of assessing significant progress for NHFP measures;
- Section 490.611. Cost of calculating freight movement metrics; and
- Section 490.613. Cost of calculating freight movement measures.

The results represent the amount of truck travel time (in hours) which would need to be saved in order to justify the costs associated with the Freight Movement on the Interstate System measures. The analysis shows that the proposed rule would need to result in approximately 168,000 hours of freight travel time saved per year, or 1.8 million hours over 11 years. This reduction represents a less than 0.1 percent decrease in the amount of freight travel delay per year for major U.S. urban areas.[120]

**Table 17 – Break-Even Analysis of Freight Performance (Freight Reliability, Average Truck Speed) under Scenario 1**

| **Undiscounted 11-Year Costs**<br>**a** | **Average Truck Value of Time ($ per hour)**<br>**b** | **Number of Hours of Travel that Need to be Reduced**<br>**c = a ÷ b** | **Average Annual Number of Hours of Travel that Need to be Reduced**<br>**d = c ÷ 11** |
|---|---|---|---|
| $46,883,670 | $25.36 | 1,848,481 | 168,044 |

*Variance in the calculation is due to rounding.

[118] Ibid.
[119] Forty percent is assumed because two of the five metrics (Truck Travel Time Reliability and Average Truck Speed) calculated from NPMRDS are aimed at freight movement.
[120] Trucks in 498 urban areas across the U.S. experience 353.1 million hours of travel delay per year, according to the TTI's "2012 Annual Urban Mobility Report," 2013.

**Please refer to the RIA in the docket for details on the methodology used in the analysis.

Table 198 presents the results from the break-even analysis associated with the Freight Movement on the Interstate System measures under Scenario 2 (i.e., State DOTs independently acquire the necessary data). The results represent the amount of truck travel time (in hours) which would need to be saved in order to justify the costs associated with the Freight Movement on the Interstate System measures. The analysis shows that the proposed rule would need to result in approximately 253,000 hours of freight travel time saved per year, or 2.8 million hours over 11 years. This reduction represents a 0.1 percent decrease in the amount of freight travel delay per year for major U.S. urban areas.[121]



**Table 18 – Break-Even Analysis of Freight Performance (Freight Reliability, Average Truck Speed) under Scenario 2**

| Undiscounted 11-Year Costs<br>a | Average Truck Value of Time ($ per hour)<br>b | Number of Hours of Travel that Need to be Reduced<br>c = a ÷ b | Average Annual Number of Hours of Travel that Need to be Reduced<br>d = c ÷ 11 |
|---|---|---|---|
| $70,557,150 | $25.36 | 2,781,855 | 252,896 |

*Variance in the calculation is due to rounding.

[121] Trucks in 498 urban areas across the U.S. experience 353.1 million hours of travel delay per year, according to the TTI's "2012 Annual Urban Mobility Report," 2013.

**Please refer to the RIA in the docket for details on the methodology used in the analysis.

Table 19 presents the results from the break-even analysis to estimate the reduction in pollutant tons[122] needed to be achieved in order to justify the costs associated with the Emissions performance measures. The costs associated with the following proposed rule sections are summed together to estimate the total cost of provisions aimed at reducing emissions:

- Section 490.105. Approximately 13 percent of the cost[123] of establishing performance targets;
- Section 490.107. Approximately 13 percent of the cost[124] of documenting and submitting a description of coordination between State DOTs and MPOs;
- Section 490.107. Approximately 13 percent of the cost[125] of preparing and submitting Initial Performance Reports;
- Section 490.107. Approximately 13 percent of the cost[126] of reporting performance targets;
- Section 490.107. Half the cost[127] of preparing CMAQ performance plan;
- Section 490.811. Cost of calculating emissions metric; and

[122] Includes VOCs, NOx, $PM_{2.5}$, and CO.
[123] Approximately 13 percent is assumed because one of the eight performance measures (Total Emissions Reduction) is aimed at reducing emissions.
[124] Ibid.
[125] Ibid.
[126] Ibid.
[127] Fifty percent is assumed because one of the two CMAQ performance measures (Total Emissions Reduction) is aimed at reducing emissions.

- Section 490.813. Cost of calculating emissions measure.

The costs associated with the Emissions performance measure are identical under Scenario 1 and Scenario 2 because State DOTs would not need data from NPMRDS. Therefore, FHWA presents one set of results.

With the undiscounted cost of the on-road mobile source emissions requirements, the analysis estimates the savings in emission tons from automobiles that the proposed rule would need to save in order for the proposed rule to be cost-beneficial. The break-even analysis estimates that a total of 49,000 emission tons would need to be reduced throughout the 10-year study period, or approximately 4,000 tons annually. On a pollutant-specific basis, this is approximately equivalent to 410 tons of VOCs, 275 tons of NOx, two tons of $PM_{2.5}$, and 3,730 tons of CO. These reductions represent less than 0.01 percent of the average annual pollutant emission amounts.[128]

**Table 19 – Break-Even Analysis of Emissions (Reduced Pollutants) using Emission Ton Metric**

| Undiscounted 11-Year Costs<br>a | Average Emission Ton Cost ($ per long ton)<br>b | Number of Emissions Tons Needed to be Reduced<br>c = a ÷ b | Average Annual Number of Emissions Tons Needed to be Reduced<br>d = c ÷ 11 |
|---|---|---|---|
| $29,997,688 | $617.38 | 48,589 | 4,417 |

*Variance in the calculation is due to rounding.

[128] In 2011, emissions by highway vehicles totaled 3 million tons VOCs, 4.1 million tons NOx, 183,000 tons $PM_{2.5}$, and 34.2 million tons CO. Source: EPA Office of Air Quality Planning and Standards, summary data, included in EPA Greenhouse Gas Inventory for 2012 (https://www3.epa.gov/climatechange/ghgemissions/usinventoryreport/archive.html), and EPA, "National Emissions Inventory: Air Pollutant Emissions Trends Data," 2012, document posted to the Docket. Because these estimates are updated over time, there are variations in these data year-to-year. The FHWA will update the data at the Final Rule stage.

**Please refer to the RIA in the docket for details on the methodology used in the analysis.

**B. Regulatory Flexibility Act**

In compliance with the Regulatory Flexibility Act (Pub. L.96-354, 5 U.S.C. 601-612), FHWA has evaluated the effects of this action on small entities and has determined that the action would not have a significant economic impact on a substantial number of small entities. The proposed amendment addresses the obligation of Federal funds to State DOTs for Federal-aid highway projects. The proposed rule affects two types of entities: State governments and MPOs. State governments do not meet the definition of a small entity under 5 U.S.C 601, which have a population of less than 50,000.

The MPOs are considered governmental jurisdictions, and to qualify as a small entity they would need to serve less than 50,000 people. The MPOs serve urbanized areas with populations of 50,000 or more. As discussed in the RIA, the proposed rule is expected to impose costs on MPOs that serve populations exceeding 200,000. Therefore, the MPOs that incur economic impacts under this proposed rule do not meet the definition of a small entity.

I hereby certify that this regulatory action would not have a significant impact on a substantial number of small entities.

**C. Unfunded Mandates Reform Act of 1995**

The FHWA has determined that this NPRM does not impose unfunded mandates as defined by the Unfunded Mandates Reform Act of 1995 (Pub. L. 104–4, March 22, 1995, 109 Stat. 48). This rule does not include a Federal mandate that may result in

expenditures of $143.1 million or more in any one year (when adjusted for inflation) in 2012 dollars for either State, local, and tribal governments in the aggregate, or by the private sector. The FHWA will publish a final analysis, including its response to public comments, when it publishes a final rule. Additionally, the definition of "Federal mandate" in the Unfunded Mandates Reform Act excludes financial assistance of the type in which State, local, or tribal governments have authority to adjust their participation in the program in accordance with changes made in the program by the Federal Government. The Federal-aid highway program permits this type of flexibility.

**D. Executive Order 13132 (Federalism Assessment)**

The FHWA has analyzed this NPRM in accordance with the principles and criteria contained in Executive Order 13132. The FHWA has determined that this action does not have sufficient federalism implications to warrant the preparation of a federalism assessment. The FHWA has also determined that this action does not preempt any State law or State regulation or affect the States' ability to discharge traditional State governmental functions.

**E. Executive Order 12372 (Intergovernmental Review)**

The regulations implementing Executive Order 12372 regarding intergovernmental consultation on Federal programs and activities apply to this program. Local entities should refer to the Catalog of Federal Domestic Assistance Program Number 20.205, Highway Planning and Construction, for further information.

## F. Paperwork Reduction Act

Under the Paperwork Reduction Act of 1995 (PRA) (44 U.S.C. 3501, et seq.), Federal agencies must obtain approval from the OMB for each collection of information they conduct, sponsor, or require through regulations. The DOT has analyzed this proposed rule under the PRA and has determined that this proposal contains collection of information requirements for the purposes of the PRA.

This proposed rule provides definitions and outlines processes for performance elements of this NPRM. Some burdens in this proposed rule would be realized in other reporting areas as described below. The PRA activities that are already covered by existing OMB Clearances have reference numbers for those clearances as follows: HPMS information collection, OMB No. 2125-0028 with an expiration of May 2015 and CMAQ Program OMB 2125-0614 with an expiration date of (INSERT DATE) -. Any increase in PRA burdens caused by MAP-21 in these areas will be addressed in PRA approval requests associated with those rulemakings.

This rulemaking requires the submittal of performance reports. The DOT has analyzed this proposed rule under the PRA and has determined the following:

*Respondents:* Approximately 262 applicants consisting of State DOTs and MPOs.

*Frequency:* Biennially.

*Estimated Average Burden per Response:* Approximately 416 hours to complete and submit the report.

*Estimated Total Annual Burden Hours:* Approximately 65,312 hours annually.

The FHWA invites interested persons to submit comments on any aspect of the information collection. Comments submitted on the information collection proposed in this NPRM will be summarized or included, or both, in the request for OMB approval of this information collection.

**G. National Environmental Policy Act**

The FHWA has analyzed this action for the purpose of the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 et seq.), and has determined that this action would not have any effect on the quality of the environment and meets the criteria for the categorical exclusion at 23 CFR 771.117(c)(20).

**H. Executive Order 12630 (Taking of Private Property)**

The FHWA has analyzed this proposed rule under Executive Order 12630, Governmental Actions and Interference with Constitutionally Protected Property Rights. The FHWA does not anticipate that this proposed action would affect a taking of private property or otherwise have taking implications under Executive Order 12630.

**I. Executive Order 12988 (Civil Justice Reform)**

This action meets applicable standards in §§ 3(a) and 3(b)(2) of Executive Order 12988, Civil Justice Reform, to minimize litigation, eliminate ambiguity, and reduce burden.

**J. Executive Order 13045 (Protection of Children)**

We have analyzed this rule under Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks. The FHWA certifies that this action

would not cause an environmental risk to health or safety that might disproportionately affect children.

**K. Executive Order 13175 (Tribal Consultation)**

The FHWA has analyzed this action under Executive Order 13175, dated November 6, 2000, and believes that the proposed action would not have substantial direct effects on one or more Indian tribes; would not impose substantial direct compliance costs on Indian tribal governments; and would not preempt tribal laws. The proposed rulemaking addresses obligations of Federal funds to State DOTs for Federal-aid highway projects and would not impose any direct compliance requirements on Indian tribal governments. Therefore, a tribal summary impact statement is not required.

**L. Executive Order 13211 (Energy Effects)**

The FHWA has analyzed this action under Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use. The FHWA has determined that this is not a significant energy action under that order and is not likely to have a significant adverse effect on the supply, distribution, or use of energy. Therefore, a Statement of Energy Effects is not required.

**M. Executive Order 12898 (Environmental Justice)**

The E.O. 12898 requires that each Federal agency make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minorities and low-income populations. The FHWA has determined that this proposed rule does not raise any environmental justice issues.

## N. Privacy Impact Assessment

The FHWA continues to assess the privacy impacts of this proposed rule as required by section 522(a)(5) of the FY 2005 Omnibus Appropriations Act, Pub. L. 108-447, 118 Stat. 3268 (December 8, 2004) [set out as a note to 5 U.S.C. 552a].

The FHWA is proposing the use of the new NPMRDS as the data source to calculate the metrics for the seven travel time/speed based measures to ensure consistency and coverage at a national level. This private sector data set provides average travel times derived from vehicle/passenger probe data traveling on the NHS. The FHWA recognizes that probe data is an evolving field and we will continue to evaluate the privacy risks associated with its use.

## O. Regulation Identifier Number

An RIN is assigned to each regulatory action listed in the Unified Agenda of Federal Regulations. The Regulatory Information Service Center publishes the Unified Agenda in April and October of each year. The RIN number contained in the heading of this document can be used to cross-reference this action with the Unified Agenda.

**List of Subjects in 23 CFR Part 490**

Bridges, Highway safety, Highways and roads, Incorporation by reference, Reporting and record keeping requirements.

Issued in Washington D.C. on April 1, 2016, under authority delegated in 49 CFR 1.85:

**Gregory G. Nadeau,**

Federal Highway Administrator.

In consideration of the foregoing, FHWA proposes to amend 23 CFR part 490 as follows:

**PART 490 – National Performance Management Measures**

1. The authority citation for part 490 continues to read as follows:

Authority: 23 U.S.C. 134, 135, 148(i), and 150; 49 CFR 1.85.

2. Revise Subpart A to read as follows:

**Subpart A—General Information**

**Sec.**



**§ 490.101 Definitions.**

Unless otherwise specified, the following definitions apply to the entire Part 490:

Attainment area as used in this Part is defined in § 450.104 of this title, Transportation Planning and Programming Definitions.

Criteria pollutant means any pollutant for which there is established a NAAQS at 40 CFR part 50. The transportation related criteria pollutants per 40 CFR 93.102(b)(1) are carbon monoxide, nitrogen dioxide, ozone, and particulate matter ($PM_{10}$ and $PM_{2.5}$).

Freight bottleneck, as used in Part 490, is defined as a segment of the Interstate System not meeting thresholds for freight reliability and congestion, as identified in § 490.613 and any other locations the State DOT wishes to identify as a bottleneck based on its own freight plans or related documents, if applicable.

Full extent means continuous collection and evaluation of pavement condition data over the entire length of the roadway.

Highway Performance Monitoring System (HPMS) is a national level highway information system that includes data on the extent, condition, performance, use, and operating characteristics of the Nation's highways.

Mainline highways means the through travel lanes of any highway. Mainline highways specifically exclude ramps, shoulders, turn lanes, crossovers, rest areas, and other pavement surfaces that are not part of the roadway normally traveled by through traffic.

Maintenance area as used in this Part is defined in § 450.104 of this title, Transportation Planning and Programming Definitions.

Measure means an expression based on a metric that is used to establish targets and to assess progress toward achieving the established targets (e.g., a measure for flight

on-time performance is percent of flights that arrive on time, and a corresponding metric is an arithmetic difference between scheduled and actual arrival time for each flight).

Metric means a quantifiable indicator of performance or condition.

Metropolitan Planning Organization (MPO) as used in this Part is defined in § 450.104 of this title, Transportation Planning and Programming Definitions.

National Ambient Air Quality Standards (NAAQS) as used in this Part is defined in § 450.104 of this title, Transportation Planning and Programming Definitions.

National Bridge Inventory (NBI) is an FHWA database containing bridge information and inspection data for all highway bridges on public roads, on and off Federal-aid highways, including Tribally owned and federally owned bridges, that are subject to the National Bridge Inspection Standards (NBIS).

National Performance Management Research Data Set (NPMRDS) means a data set derived from vehicle/passenger probe data (sourced from GPS, navigation units, cell phones) that includes average travel times representative of all traffic on each segment of the National Highway System (NHS), and additional travel times representative of freight trucks for those segments that are on the Interstate System. The data set includes records that contain average travel times for every 5 minutes of every day (24 hours) of the year recorded and calculated for every travel time segment where probe data is available. The NPMRDS does not include any imputed travel time data.

Nonattainment area as used in this Part is defined in § 450.104 of this title, Transportation Planning and Programming Definitions.

Non-urbanized area means a single geographic area that comprises all of the areas in the State that are not "urbanized areas" under 23 U.S.C. 101(a)(34).

Performance period means a determined time period during which condition/performance is measured and evaluated to: assess condition/performance with respect to baseline condition/performance; and track progress toward the achievement of the targets that represent the intended condition/performance level at the midpoint and at the end of that time period. The term "performance period" applies to all proposed measures in this Part, except the measures proposed for the Highway Safety Improvement Program (HSIP) in Subpart B. Each performance period covers a 4-year duration beginning on a specified date (provided in § 490.105).

Reporting segment means the length of roadway that the State DOT and MPOs define for metric calculation and reporting and is comprised of one or more Travel Time Segments.

Target means a quantifiable level of performance or condition, expressed as a value for the measure, to be achieved within a time period required by the Federal Highway Administration (FHWA).

Transportation Management Area (TMA) as used in this Part is defined in § 450.104 of this title, Transportation Planning and Programming Definitions.

Travel time data set means either the NPMRDS or an equivalent data set that is used by State DOTs and MPOs as approved by FHWA, to carry out the requirements in Subparts E, F, and G of Part 490.

Travel time reliability means the consistency or dependability of travel times from day to day or across different times of the day.

Travel time segment means a contiguous stretch of the NHS for which average travel time data are summarized in the travel time data set.

**§ 490.103 Data requirements.**

(a) *In General.* – Unless otherwise noted below, the data requirements in this section applies to the measures identified in Subparts C through H of this part. Additional data requirements for specific performance management measures are identified in 23 CFR sections –

(1) 490.309 for the condition of pavements on the Interstate System;

(2) 490.309 for the condition of pavements on the non-Interstate NHS;

(3) 490.409 for the condition of bridges on the NHS;

(4) 490.509 for the performance of the Interstate System;

(5) 490.509 for the performance of the non-Interstate NHS;

(6) 490.609 for the freight movement on the Interstate System

(7) 490.709 for traffic congestion; and

(8) 490.809 for on-road mobile source emissions.

(b) *Urbanized area data* – The State DOTs shall submit urbanized area data, including boundaries of urbanized areas, in accordance with the HPMS Field Manual for the purpose of the additional targets for urbanized and non-urbanized areas in § 490.105(e) and IRI rating determination in § 490.313(b)(1), and establishment and reporting on targets for the Peak Hour Travel Time measures in § 490.507(b) and the

traffic congestion measure in § 490.707. The boundaries of urbanized areas shall be identified based on the most recent U.S. Decennial Census, unless FHWA approves adjustments to the urbanized area as provided by 23 U.S.C. 101(a)(34) and these adjustments are submitted to HPMS, available at the time when the State DOT Baseline Performance Period Report is due to FHWA.

(c) *Nonattainment and Maintenance areas data* – The State DOTs shall use the nonattainment and maintenance areas boundaries based on the effective date of U.S. EPA designations in 40 CFR part 81 at the time when the State DOT Baseline Performance Period Report is due to FHWA.

(d) *National Highway System data.* – The State DOTs shall document and submit the extent of the NHS in accordance with the HPMS Field Manual.

(e) *Travel Time Data Set.* – Travel time data needed to calculate the measures in Subparts E, F, and G of this part will come from the NPMRDS, unless the State DOT requests, and FHWA approves, the use of an equivalent data source(s) that meets the requirements of this section. In accordance with 490.103(g), the State DOT shall establish, in coordination with applicable MPOs, a single travel time data set (i.e., NPMRDS or equivalent data set) that will be used to calculate the annual metrics proposed in Subparts E, F, and G. The same data source shall be used for each year in a performance period. A State DOT and MPO(s) must use the same travel time data set for each reporting segment for the purposes of calculating the metrics and measures. The use of equivalent data source(s) shall comply with the following:

(1) State DOTs and MPOs shall use the same equivalent data source(s) for a calendar year; and

(2) The State DOT shall request FHWA approve the use of equivalent data source(s) no later than October 1st prior to the beginning of the calendar year in which the data source would be used to calculate metrics and FHWA would need to approve the use of that data source prior to a State DOT and MPO(s)'s implementation and use of that data source; and

(3) The State DOT shall make the equivalent data source(s) available to FHWA, on request; and

(4) The State DOT shall maintain and use a documented data quality plan to routinely check the quality and accuracy of data contained within the equivalent data source(s); and

(5) The equivalent data source(s) shall:

(i) Be used by both the State DOT and all MPOs within the State for all applicable travel time segments;

(ii) In combination with or in place of NPMRDS data, include:

(A) Contiguous segments that cover the full NHS, as defined in 23 U.S.C. 103, within the State and MPO boundary;

(B) Average travel times for at least the same number of 5 minute intervals and the same locations that would be available in the NPMRDS

(iii) Be populated with actual measured vehicle travel times and shall not be populated with travel times derived from imputed (historic travel times or other estimates) methods;

(iv) Include, for each segment at 5 minute intervals throughout a full day (24 hours) for each day of the year, the average travel time, recorded to the nearest second, representative of at least one of the following:

(A) All traffic on each segment of the NHS;

(B) Freight vehicle traffic on each segment of the Interstate System;

(v) Include, for each segment, a recording of the time and date of each 5 minute travel time record;

(vi) Include the location (route, direction, State), length and begin and end points of each segment; and

(vii) Be available within 60 days of measurement.

(f) State DOTs, in coordination with MPOs, shall define a single set of reporting segments of the Interstate System and non-Interstate NHS for the purpose of calculating the measures specified in § 490.507, § 490.607, and § 490.707 in accordance with the following:

(1) Reporting segments shall be comprised of one or more contiguous Travel Time Segments of same travel direction;

(2) Reporting segments shall not exceed ½ mile in length in urbanized areas unless an individual Travel Time Segment is longer, and 10 miles in length in non-urbanized areas unless an individual Travel Time Segment is longer; and

(3) All reporting segments collectively shall be contiguous and cover the full extent of the directional mainline highways of the Interstate System and non-Interstate NHS required for reporting the measure.

(g) State DOTs shall submit their defined reporting segments to FHWA no later than November 1st prior to the beginning of a calendar year. If a State DOT is using an approved equivalent travel time data source during the performance period, the State DOT shall resubmit a new set of defined reporting segments that corresponds to the equivalent travel time data source. The State DOT shall submit the following to FHWA in HPMS:

(1) The Travel Time segment/s that make up each reporting segment; and

(2) The route and length (to the nearest thousandth of a mile) of each reporting segment; and

(3) The Desired Peak Period Travel Times (both morning and evening) that will be used to calculate the Peak Hour Travel Time measures identified in § 490.507(b) for each reporting segment that is fully included within urbanized areas with populations over one million.

(4) Documentation of the State DOT and applicable MPOs coordination and agreement on the travel time data set, the defined reporting segments, and the desired travel times submitted.

(5) If the defined reporting segments contain segments using equivalent data set, in part or in whole, all reporting segment shall be referenced by HPMS location referencing standards.

**§ 490.105 Establishment of performance targets.**

(a) *In general.* – State Departments of Transportation (State DOTs) shall establish performance targets for all measures specified in paragraph (c) of this section for the respective target scope identified in paragraph (d) with the requirements specified in paragraph (e), and the Metropolitan Planning Organizations (MPOs) shall establish performance targets for all measures specified in paragraph (c) for respective target scope identified in paragraph (d) with the requirements specified in paragraph (f).

(b) *Highway Safety Improvement Program measures.* – State DOTs and MPOs shall establish performance targets for the Highway Safety Improvement Program (HSIP) measures in accordance with § 490.209.

(c) *Applicable measures.* - State DOTs and MPOs that include, within their respective geographic boundaries, any portion of the applicable transportation network or area shall establish performance targets for the performance measures identified in 23 CFR sections–

(1) 490.307(a)(1) and 490.307(a)(2) for the condition of pavements on the Interstate System;

(2) 490.307(a)(3) and 490.307(a)(4) for the condition of pavements on the National Highway System (NHS) (excluding the Interstate);

(3) 490.407(c)(1) and 490.407(c)(2) for the condition of bridges on the NHS;

(4) 490.507(a)(1) and 490.507(a)(2) for the NHS travel time reliability;

(5) 490.507(b)(1) and 490.507(b)(2) for the peak hour travel time;

(6) 490.607(a) and 490.607(b) for the freight movement on the Interstate System;

(7) 490.707 for traffic congestion; and

(8) 490.807 for on-road mobile source emissions.

(d) *Target scope.* – Targets established by the State DOT and MPO shall, regardless of ownership, represent the transportation network or geographic area, including bridges that cross State borders, that are applicable to the measures as specified in paragraphs (d)(1) and (2) of this section.

(1) State DOTs and MPOs shall establish Statewide and metropolitan planning area wide targets, respectively, that represent the condition/performance of the transportation network or geographic area that are applicable to the measures, as specified in 23 CFR sections-

(i) 490.303 for the condition of pavements on the Interstate System measures specified in § 490.307(a)(1) and § 490.307(a)(2);

(ii) 490.303 for the condition of pavements on the National Highway System (NHS) (excluding the Interstate) measures specified in § 490.307(a)(3) and § 490.307(a)(4);

(iii) 490.403 for the condition of bridges on the NHS measures specified in § 490.407(c)(1) and § 490.407(c)(2);

(iv) 490.503(a)(1) for NHS travel time reliability measures specified in § 490.507(a)(1) and § 490.507(a)(2);

(v) 490.603 for the freight movement on the Interstate System measures specified in § 490.607(a) and § 490.607(b); and

(vi) 490.803 for the on-road mobile source emissions measure identified in § 490.807.

(2) State DOTs and MPOs shall establish a single urbanized area target that represents the performance of the transportation network in each area applicable to the measures, as specified in 23 CFR sections-

(i) 490.503(a)(2) for the peak hour travel time measures identified in § 490.507(b)(1) and § 490.507(b)(2); and

(ii) 490.703 for the traffic congestion measure identified in § 490.707.

(3) For the purpose of target establishment in this section, reporting targets and progress evaluation in § 490.107 and significant progress determination in § 490.109, State DOTs shall declare and describe the NHS limits and urbanized area boundaries within the State boundary in the Baseline Performance Period Report required by § 490.107(b)(1). Any changes in NHS limits or urbanized area boundaries during a performance period would not be accounted for until the following performance period.

(e) State DOTs shall establish targets for each of the performance measures identified in paragraph (c) of this section for respective target scope identified in paragraph (d) of this section as follows:

(1) *Schedule*. – State DOTs shall establish targets not later than 1 year of the effective date of this rule and for each performance period thereafter, in a manner that allows for the time needed to meet the requirements specified in this section and

so that the final targets are submitted to FHWA by the due date provided in § 490.107(b).

(2) *Coordination.* – State DOTs shall coordinate with relevant MPOs on the selection of targets in accordance with 23 U.S.C. 135(d)(2)(B)(i)(II) to ensure consistency, to the maximum extent practicable.

(3) *Additional targets for urbanized and non-urbanized areas.* – In addition to statewide targets, described in paragraph (d)(1) of this section, State DOTs may, as appropriate, for each statewide target establish additional targets for portions of the State.

(i) A State DOT shall declare and describe in the Baseline Performance Period Report required by § 490.107(b)(1) the boundaries used to establish each additional target. Any changes in boundaries during a performance period would not be accounted for until the following performance period.

(ii) State DOTs may select any number and combination of urbanized area boundaries and may also select a non-urbanized area boundary for the establishment of additional targets.

(iii) The boundaries used by the State DOT for additional targets shall be contained within the geographic boundary of the State.

(iv) State DOTs shall evaluate separately the progress of each additional target and report that progress as required under § 490.107(b)(2)(ii)(B) and § 490.107(b)(3)(ii)(B).

(v) Additional targets for urbanized areas and the non-urbanized area are not applicable to the peak hour travel time measures, traffic congestion measures, and on-road mobile source emissions measures in paragraphs (c)(5), (c)(7), and (c)(8) of this section, respectively.

(4) *Time horizon for targets.* – State DOTs shall establish targets for a performance period as follows:

(i) The performance period will begin on:

(A) January 1st of the year in which the Baseline Performance Period Report is due to FHWA and will extend for a duration of 4 years for the measures in paragraphs (c)(1) through (c)(7) of this section; and

(B) October 1st of the year prior to which the Baseline Performance Report is due to FHWA and will extend for a duration of 4 years for the measure in paragraph (c)(8) of this section.

(ii) The midpoint of a performance period will occur 2 years after the beginning of a performance period described in paragraph (e)(4)(i) of this section.

(iii) Except as provided in paragraphs (e)(7) and (e)(8)(vi) of this section, State DOTs shall establish 2-year targets that reflect the anticipated condition/performance level at the midpoint of each performance period for the measures in paragraphs (c)(1) through (c)(7) of this section, and the anticipated cumulative emissions reduction to be reported for the first 2 years of a performance period by applicable criteria pollutant and precursor for the measure in paragraph (c)(8) of this section.

(iv) State DOTs shall establish 4-year targets that reflect the anticipated condition/performance level at the end of each performance period for the measures in paragraphs (c)(1) through (c)(7) of this section, and the anticipated cumulative emissions reduction to be reported for the entire performance period by applicable criteria pollutant and precursor for the measure in paragraph (c)(8) of this section.

(5) *Reporting.* – State DOTs shall report 2-year targets, 4-year targets, the basis for each established target, progress made toward the achievement of targets, and other requirements to FHWA in accordance with § 490.107, and the State DOTs shall provide relevant MPO(s) targets to FHWA, upon request, each time the relevant MPOs establish or adjust MPO targets, as described in paragraph (f) of this section.

(6) *Target adjustment.* – State DOTs may adjust an established 4-year target in the Mid Performance Period Progress Report, as described in § 490.107(b)(2). Any adjustments made to 4-year targets established for the peak hour travel time measure specified in paragraph (c)(5) or traffic congestion measure in paragraph (c)(7) of this section shall be agreed upon and made collectively by all State DOTs and MPOs that include any portion of the NHS in the respective urbanized area applicable to the measure.

(7) *Phase-in of new requirements for Interstate System pavement condition measures and the non-Interstate NHS travel time reliability measures.* – The following

requirements apply only to the first performance period and to the measures in §§ 490.307(a)(1) and (2) and § 490.507(a)(2):

(i) State DOTs shall establish their 4-year targets, required under paragraph (4)(iv), and report these targets in their Baseline Performance Period Report, required under § § 490.107(b)(1);

(ii) State DOTs shall not report 2-year targets, described in paragraph (e)(4)(iii) of this section, and baseline condition/performance in their Baseline Performance Period Report; and

(iii) State DOTs shall use the 2-year condition/performance in their Mid Performance Period Progress Report, described in § 490.107(b)(2)(ii)(A) as the baseline condition/performance. State DOTs may also adjust their 4-year targets, as appropriate.

(iv) State DOTs shall annually report metrics for all mainline highways on the NHS throughout the performance period, as required in § 490.511(d).

(8) *Urbanized area specific targets.* – The following requirements apply to establishing targets for the peak hour travel time measures specified in paragraph (c)(5) and traffic congestion measure in paragraph (c)(7) of this section, as their target scope provided in paragraph (d)(2) of this section:

(i) State DOTs, with mainline highways on the Interstate System that cross any part of an urbanized area with a population more than 1 million within its geographic State boundary, shall establish target for the measure specified in § 490.507(b)(1) for the urbanized area. State DOTs, with mainline highways

on the non-Interstate NHS that cross any part of an urbanized area with a population more than 1 million within its geographic State boundary, shall establish target for the measure specified in § 490.507(b)(2) for the urbanized area.

(ii) If any part of the urbanized area for either of the peak hour travel time measures, provided for in paragraph (i) of this section, contains any part of a nonattainment or maintenance area for any one of the criteria pollutants, as specified in § 490.703, then that State DOT shall establish targets for the measure specified in § 490.707.

(iii)If required to establish a target for a peak-hour travel time measure, as described in paragraph (e)(8)(i) of this section and/or a target for a traffic congestion measure , as described in paragraph (e)(8)(ii), State DOTs shall comply with the following:

(A) For each urbanized area, only one 2-year target and one 4-year target for the entire urbanized area shall be established regardless of roadway ownership.

(B) For each urbanized area, all State DOTs and MPOs that contain, within their respective boundaries, any portion of the NHS network in that urbanized area shall agree on one 2-year and one 4-year target for that urbanized area. The targets reported, in accordance with § 490.105(e)(5) and § 490.105(f)(7), by the State DOTs and MPOs for that urbanized area shall be identical.

(C) State DOTs shall meet all reporting requirements in § 490.107 for the entire performance period even if there is a change of population, NHS designation, or nonattainment/maintenance area designation during that performance period.

(D) The 1 million population threshold, in paragraph (e)(8)(i) of this section, shall be determined based on the most recent U.S. Decennial Census available at the time when the State DOT Baseline Performance Period Report is due to FHWA.

(E) NHS designations, in paragraphs (e)(8)(i) and (ii) of this section, shall be determined from the State DOT Baseline Performance Period Report required in § 490.107(b)(1)(ii)(E).

(F) The designation of nonattainment or maintenance areas, in paragraph of (ii) of this section, shall be determined based on the effective date of U.S. Environmental Protection Agency's designation under the NAAQS in 40 CFR part 81 at the time when the State DOT Baseline Performance Period Report is due to FHWA.

(iv) If a State DOT does not meet the criteria specified in paragraph (e)(8)(i) of this section for both peak-hour travel time measures at the time when the State DOT Baseline Performance Period Report is due to FHWA, then that State DOT is not required to establish targets for traffic congestion measure for that performance period.

(v) If a State DOT does not meet the criteria specified in paragraph (ii) at the time when the State DOT Baseline Performance Period Report is due to FHWA, then that State DOT is not required to establish targets for the traffic congestion measure for that performance period.

(vi) The following requirements apply only to the first performance period and the traffic congestion measure in § 490.707:

(A) State DOTs shall establish their 4-year targets, required under paragraph § 490.105(e)(4)(iv), and report these targets in their Baseline Performance Period Report, required under § 490.107(b)(1);

(B) State DOTs shall not report 2-year targets, described in § 490.105(e)(4)(ii) of this section, and baseline condition/performance in their Baseline Performance Period Report; and

(C) State DOTs shall use the 2-year condition/performance in their Mid Performance Period Progress Report, described in § 490.107(b)(2)(ii)(A) as the baseline condition/performance. The established baseline condition/performance shall be collectively developed and agreed upon with relevant MPOs.

(D) State DOTs may, as appropriate, adjust their 4-year target(s) in their Mid Performance Period Progress Report, described in § 490.107(b)(2)(ii)(A). Adjusted 4-year target(s) shall be developed and collectively agreed upon with relevant MPO(s), as described in paragraph (e)(6) of this section.

(E) State DOTs shall annually report metrics for all mainline highways on the NHS for all applicable urbanized area(s) throughout the performance period, as required in § 490.711(f).

(9) *Targets for on-road mobile source emissions measure.* – The following requirements apply to establishing targets for the measures specified in paragraph (c)(8) of this section :

(i) The State DOTs shall establish statewide targets for the on-road mobile source emissions measure for all nonattainment and maintenance areas for all applicable criteria pollutants and precursors specified in § 490.803.

(ii) For all nonattainment and maintenance areas within the State geographic boundary, the State DOT shall establish separate statewide targets for each of the applicable criteria pollutants and precursors.

(iii) The established targets, as specified in paragraph (e)(4) of this section, shall reflect the anticipated cumulative emissions reduction to be reported in the CMAQ Public Access System required in § 490.809(a).

(iv) In addition to the statewide targets in paragraph (e)(9)(i) of this section, State DOTs may, as appropriate, establish additional targets for any number and combination of nonattainment and maintenance areas by applicable criteria pollutant within the geographic boundary of the State. If a State DOT establishes additional targets for nonattainment and maintenance areas, it shall report the targets in the Baseline Performance Period Report required by § 490.107(b)(1). State DOTs shall evaluate separately the progress of each of

these additional targets and report that progress as required under § 490.107(b)(2)(ii)(B) and § 490.107(b)(3)(ii)(B).

(v) The designation of nonattainment or maintenance areas shall be determined based on the effective date of U.S. Environmental Protection Agency's designation under the NAAQS in 40 CFR part 81 at the time when the State DOT Baseline Performance Period Report is due to FHWA.

(vi) The State DOT shall meet all reporting requirements in § 490.107 for the entire performance period even if there is a change of nonattainment or maintenance area designation status during that performance period.

(vii) If a State geographic boundary does not contain any part of nonattainment or maintenance areas for applicable criteria pollutants and precursors at the time when the State DOT Baseline Performance Period Report is due to FHWA, then that State DOT is not required to establish targets for on-road mobile source emissions measures for that performance period.

(f) The MPOs shall establish targets for each of the performance measures identified in paragraph (c) of this section for the respective target scope identified in paragraph (d) of this section as follows:

(1) *Schedule.* – The MPOs shall establish targets no later than 180 days after the respective State DOT(s) establishes their targets, as provided in paragraph (e)(1) of this section.

(i) The MPOs shall establish 4-year targets, described in paragraph (e)(4)(iv) of this section, for all applicable measures, described in paragraphs (c) and (d) of this section.

(ii) Except as provided in paragraph (f(4)(vi) of this section, the MPOs shall establish 2-year targets, described in paragraph (e)(4)(iii) of this section for the peak hour travel time, traffic congestion and on-road source emissions measures, described in paragraphs (c) and (d) of this section as their applicability criteria described in paragraphs (f)(4)(i), (f)(4)(ii), and (f)(5)(iii) of this section, respectively.

(iii) If an MPO does not meet the criteria described in paragraphs (f)(4)(i), (f)(4)(ii), or (f)(5)(iii) of this section, the MPO is not required to establish 2-year target(s) for the corresponding measure(s).

(2) *Coordination.* – The MPOs shall coordinate with relevant State DOT(s) on the selection of targets in accordance with 23 U.S.C. 134(h)(2)(B)(i)(II) to ensure consistency, to the maximum extent practicable.

(3) *Target establishment options.* – For each performance measure identified in paragraph (c) of this section, except the peak hour travel time measures, the traffic congestion measure, and MPOs meeting the criteria under paragraph (5)(iii) for on-road mobile source emission measure, the MPOs shall establish a target by either:

(i) Agreeing to plan and program projects so that they contribute toward the accomplishment of the relevant State DOT target for that performance measure; or

(ii) Committing to a quantifiable target for that performance measure for their metropolitan planning area.

(4) *Urbanized area specific targets.* –The following requirements apply to establishing targets for the peak hour travel time measures specified in paragraph (c)(5) and traffic congestion measure in paragraph (c)(7) of this section, as their target scope provided in paragraph (d)(2) of this section:

(i) MPOs shall establish targets for the measure specified in § 490.507(b)(1) when mainline highways on the Interstate System within their metropolitan planning area boundary cross any part of an urbanized area with a population more than 1 million. MPOs shall establish targets for the measure specified in § 490.507(b)(2) when mainline highways on the non-Interstate NHS within their metropolitan planning area boundary cross any part of an urbanized area with a population more than 1 million .

(ii) MPOs shall establish targets for the measure specified in § 490.707 when mainline highways on the NHS within their metropolitan planning area boundary cross any part of an urbanized area with a population more than 1 million, and that portion of their metropolitan planning area boundary also contains any portion of a nonattainment or maintenance area for any one of the criteria pollutants, as specified in § 490.703. If an MPO is not required to

establish a target for the measure specified in § 490.707, but any part of the urbanized area for either of the peak hour travel time measures, provided for in paragraph (i) of this section, contains any part of a nonattainment or maintenance area for any one of the criteria pollutant, as specified in § 490.703, then that MPO should coordinate with relevant State DOT(s) and MPO(s) in the target establishment process for the measure specified in § 490.707.

(iii) If required to establish a target for a peak-hour travel time measure, as described in paragraph (f)(4)(i) of this section and/or traffic congestion measure, as described in paragraph (f)(4)(ii), MPOs shall comply with the following:

(A) For each urbanized area, only one 2-year target and one 4-year target for the entire urbanized area shall be established regardless of roadway ownership.

(B) For each urbanized area, all State DOTs and MPOs that contain, within their respective boundaries, any portion of the NHS network in that urbanized area shall agree on one 2-year and one 4-year target for that urbanized area. The targets reported, in accordance with § 490.105(e)(5) and § 490.105(f)(7), by the State DOTs and MPOs for that urbanized area shall be identical.

(C) MPOs shall meet all reporting requirements in § 490.107(c) for the entire performance period even if there is a change of population, NHS

designation, or nonattainment/maintenance area designation status during that performance period.

(D) The 1 million population threshold, in paragraph (f)(4)(i) of this section, shall be determined based on the most recent U.S. Decennial Census available at the time when the State DOT Baseline Performance Period Report is due to FHWA.

(E) NHS designations, in paragraphs (f)(4)(i) and (ii) of this section, shall be determined from the State DOT Baseline Performance Period Report required in § 490.107(b)(1)(ii)(E).

(F) The designation of nonattainment or maintenance areas, in paragraph (f)(4)(ii) of this section, shall be determined based on the effective date of U.S. Environmental Protection Agency's designation under the NAAQS in 40 CFR part 81 at the time when the State DOT Baseline Performance Period Report is due to FHWA.

(iv) If an MPO does not meet the criteria specified in paragraph (f)(4)(i) of this section at the time when the State DOT Baseline Performance Period Report is due to FHWA, then that MPO is not required to establish targets for the peak hour travel time measure for that performance period.

(v) If an MPO does not meet the criteria specified in paragraph (f)(4)(ii) of this section at the time when the State DOT Baseline Performance Period Report is due to FHWA, then that MPO is not required to establish targets for the traffic congestion measure for that performance period.

(vi) The following requirements apply only to the first performance period and the traffic congestion measure in § 490.707:

(A) The MPOs shall not report 2-year targets, described in paragraph (f)(4)(iii)(A) of this section,

(B) The MPOs shall use the 2-year condition/performance in State DOT Mid Performance Period Progress Report, described in § 490.107(b)(2)(ii)(A) as baseline condition/performance. The established baseline condition/performance shall be agreed upon and made collectively with relevant State DOTs.

(C) The MPOs may, as appropriate, adjust their 4-year target(s). Adjusted 4-year target(s) shall be collectively developed and agreed upon with all relevant State DOT(s), as described in paragraph (f)(7) of this section.

(5) *Targets for on-road mobile source emissions measures.* – The following requirements apply to establishing targets for the measure in paragraph (c)(8) of this section:

(i) The MPO shall establish targets for each of the applicable criteria pollutants and precursors, specified in § 490.803, for which it is in nonattainment or maintenance, within its metropolitan planning area boundary.

(ii) The established targets, as specified in paragraph (e)(4) of this section, shall reflect the anticipated cumulative emissions reduction to be reported in the CMAQ Public Access System required in § 490.809(a).

(iii) If any part of a designated nonattainment and maintenance area within the metropolitan planning area overlaps the boundary of an urbanized area with a population more than 1 million in population, then that MPO shall establish both 2-year and 4-year targets for their metropolitan planning area.

(iv) For the nonattainment and maintenance areas within the metropolitan planning area that do not meet the criteria in paragraph (f)(5)(iii) of this section, MPOs shall establish 4-year targets for their metropolitan planning area, as described in paragraph (f)(3) of this section.

(v) The designation of nonattainment or maintenance areas shall be determined based on the effective date of U.S. Environmental Protection Agency's designation under the NAAQS in 40 CFR part 81 at the time when the State DOT Baseline Performance Period Report is due to FHWA.

(vi) The MPO shall meet all reporting requirements in § 490.107(c) for the entire performance period even if there is a change of nonattainment or maintenance area designation status or population during that performance period.

(vii) If a metropolitan planning area boundary does not contain any part of nonattainment or maintenance areas for applicable criteria pollutants and precursors at the time when the State DOT Baseline Performance Period Report is due to FHWA, then that MPO is not require to establish targets for on-road mobile source emissions measures for that performance period.

(6) *MPO response to State DOT target adjustment.* – For the established targets in paragraph (f)(3) of this section, if the State DOT adjusts a 4-year target in the

State DOT's Mid Performance Period Progress Report and if, for that respective target, the MPO established a target by supporting the State DOT target as allowed under paragraph (f)(3)(i) of this section, then the MPO shall, within 180 days, report to the State DOT whether they will either:

(i) Agree to plan a program of projects so that they contribute to the adjusted State DOT target for that performance measure; or

(ii) Commit to a new quantifiable target for that performance measure for its metropolitan planning area.

(7) *Target adjustment*. – If the MPO establishes its target by committing to a quantifiable target, described in paragraph (f)(3)(ii) of this section or establishes target(s) for on-road source emissions measure required in paragraph (f)(5)(iii) of this section, then the MPOs may adjust its target(s) in a manner that is collectively developed, documented, and mutually agreed upon by the State DOT and MPO. Any adjustments made to 4-year targets, established for the peak hour travel time measure or traffic congestion measure in paragraph (f)(4)(i) or (ii) of this section, shall be collectively developed and agreed upon by all State DOTs and MPOs that include any portion of the NHS in the respective urbanized area applicable to the measure.

(8) *Reporting.* – The MPOs shall report targets and progress toward the achievement of their targets as specified in § 490.107(c). After the MPOs establish or adjust their targets, the relevant State DOT(s) must be able to provide these targets to FHWA upon request.

**§ 490.107 Reporting on performance targets.**

(a) *In general.* – All State DOTs and MPOs shall report the information specified in this section for the targets required in § 490.105.

(1) All State DOTs and MPOs shall report in accordance with the schedule and content requirements under paragraphs (b) and (c) of this section, respectively.

(2) For the measures identified in § 490.207(a), all State DOTs and MPO shall report on performance in accordance with § 490.213.

(3) State DOTs shall report using an electronic template provided by FHWA.

(4) *Initial State Performance Report.* – State DOTs shall submit an Initial Performance Report to FHWA by October 1, 2016, that includes the following information:

(i) The condition/performance of the NHS in the State for measures where the State DOT is required to establish targets and where data is available;

(ii) The effectiveness of the investment strategy document in the State asset management plan for the National Highway System;

(iii) Progress toward targets the State DOT are to establish, which may only be a description of how State DOTs are coordinating with relevant MPOs and other agencies in target selection for the targets to be reported in the first State Biennial Performance Report in 2018; and

(iv) The ways in which the State is addressing congestion at freight bottlenecks, including those identified in the National Freight Strategic Plan, within the State.

(5) State DOTs shall report initial 2-year and 4-year targets, as described in § 490.105(e)(4), to FHWA within 30 days of target establishment by either amending the Initial State Performance Report due in October 2016, or through the Baseline Performance Report for the first performance period, as described in § 490.107(b)(1)(i), whichever comes first.

(b) *State Biennial Performance Report.* – State DOTs shall report to FHWA baseline condition/performance at the beginning of a performance period and progress achievement at both the midpoint and end of a performance period. State DOTs shall report at an ongoing 2-year frequency as specified in paragraphs (b)(1), (b)(2), and (b)(3) of this section.

(1) *Baseline Performance Period Report.*

(i) *Schedule*. – State DOTs shall submit a Baseline Performance Period Report to FHWA by October 1 of the first year in a performance period. State DOTs shall submit their first Baseline Performance Period Report to FHWA by October 1, 2018, and subsequent Baseline Performance Period Reports to FHWA by October 1 every 4 years thereafter.

(ii) *Content*. – The State DOT shall report the following information in each Baseline Performance Period Report:

(A) *Targets.* – 2-year and 4-year targets for the performance period, as required in § 490.105(e), and a discussion, to the maximum extent practicable, of the basis for each established target;

(B) *Baseline condition/performance*. – Baseline condition/performance derived from the latest data collected through the beginning date of the performance period specified in § 490.105(e)(4)(i) for each target, required under paragraph (b)(1)(ii)(A) of this section;

(C) *Relationship with other performance expectations.* – A discussion, to the maximum extent practicable, on how the established targets in paragraph (b)(1)(ii)(A) of this section support expectations documented in longer range plans, such as the State asset management plan required by 23 U.S.C. 119(e) and the long-range statewide transportation plan provided in part 450 of this chapter;

(D) *Urbanized area boundaries and population data for targets*. – For the purpose of determining target scope in § 490.105(d), determining IRI rating in § § 490.313(b)(1), and establishing additional targets for urbanized and non-urbanized areas in § 490.105(e)(3), State DOTs shall document the boundary extent for all applicable urbanized areas and the latest Decennial Census population data, based on information in HPMS;

(E) *NHS limits for targets.* – - For the purpose of determining target scope in § § 490.105(d), State DOTs shall document the extent of the NHS, based on information in HPMS;

(F) *Congestion at freight bottlenecks.* – Discussion on the ways in which the State DOT is addressing congestion at freight bottlenecks within the State, including those identified in the National Freight Strategic Plan, and any additional locations that the State DOT wishes to include as identified through comprehensive freight improvement efforts of Statewide Freight Planning or MPO freight plans; the Statewide Transportation Improvement Program and Transportation Improvement Program; regional or corridor level efforts; other related planning efforts; and operational and capital activities targeted to improve freight movement on the Interstate System;

(G) *Nonattainment and maintenance area for targets.* – Where applicable, for the purpose of determining target scope in § 490.105(d) and any additional targets under § 490.105(e)(9)(iv), State DOTs shall describe the boundaries of the U.S. Environmental Protection Agency's designated nonattainment and maintenance areas, as described in § 490.103(c) and § 490.105(e)(9)(v):

(H) *MPO CMAQ Performance Plan.* – Where applicable, State DOTs shall include as an attachment the MPO CMAQ Performance Plan, described in paragraph (c)(3) of this section.

(2) *Mid Performance Period Progress Report*.

(i) *Schedule*. – State DOTs shall submit a Mid Performance Period Progress Report to FHWA by October 1 of the third year in a performance period. State DOTs shall submit their first Mid Performance Period Progress Report to FHWA by October 1, 2020, and subsequent Mid Performance Period Progress Reports to FHWA by October 1 every 4 years thereafter.

(ii) *Content*. – The State DOT shall report the following information in each Mid Performance Period Progress Report:

(A) *2-year condition/performance.* – the actual condition/performance derived from the latest data collected through the midpoint of the performance period, specified in § 490.105(e)(4), for each State DOT reported target required in paragraph (b)(1)(ii)(A) of this section;

(B) *2-year progress in achieving performance targets*. – A discussion of the State DOT's progress toward achieving each established 2-year target in paragraph (b)(1)(ii)(A) of this section. The State DOT shall compare the actual 2-year condition/performance in paragraph (b)(2)(ii)(A) of this section, within the boundaries and limits documented in paragraphs (b)(1)(ii)(D) and (b)(1)(ii)(E) of this section,

with the respective 2-year target and document in the discussion any reasons for differences in the actual and target values;

(C) *Investment strategy discussion.* – A discussion on the effectiveness of the investment strategies developed and documented in the State asset management plan for the NHS required under 23 U.S.C. 119(e);

(D) *Congestion at freight bottlenecks.* – Discussion on progress of the State DOT's efforts in addressing congestion at freight bottlenecks within the State, as described in paragraph (b)(1)(ii)(F) of this section;

(E) *Target adjustment discussion.* – When applicable, a State DOT may submit an adjusted 4-year target to replace an established 4-year target in paragraph (b)(1)(ii)(A) of this section. If the State DOT adjusts its target, it shall include a discussion on the basis for the adjustment and how the adjusted target supports expectations documented in longer range plans, such as the State asset management plan and the long-range statewide transportation plan. The State DOT may only adjust a 4-year target at the midpoint and by reporting the change in the Mid Performance Period Progress Report;

(F) *2-year significant progress discussion for the National Highway Performance Program (NHPP) targets and the National Highway Freight Program (NHFP) targets.* – State DOTs shall discuss the progress they have made toward the achievement of all 2-year targets established for the NHPP measures in § 490.105(c)(1) through (c)(5)

and NHFP measures in 490.105(c)(6). This discussion should document a summary of prior accomplishments and planned activities that will be conducted during the remainder of the Performance Period to make significant progress toward that achievement of 4-year targets for applicable measures;

(G) *Extenuating Circumstances discussion on 2-year Targets.* – When applicable, for 2-year targets for the NHPP or NHFP, a State DOT may include a discussion on the extenuating circumstance(s), described in § 490.109(e)(5), beyond the State DOT's control that prevented the State DOT from making 2-year significant progress toward achieving NHPP or NHFP target(s) in paragraph (b)(2)(ii)(F) of this section;

(H) *Applicable Target Achievement Discussion*. – If FHWA determines that a State DOT has not made significant progress toward the achievement of any NHPP or NHFP targets in a biennial FHWA determination, then the State DOT shall include a description of the actions they will undertake to achieve those targets as required under § 490.109(f). If FHWA determines under § 490.109(e) that the State DOT has made significant progress for NHPP or NHFP targets, then the State DOT does not need to include this description for those targets; and

(I) *MPO CMAQ Performance Plan.* – Where applicable, State DOTs shall include as an attachment the MPO CMAQ Performance Plan, described in paragraph (c)(3) of this section.

(3) *Full Performance Period Progress Report*.

(i) *Schedule*. – State DOTs shall submit a progress report on the full performance period to FHWA by October 1 of the first year following the reference performance period. State DOTs shall submit their first Full Performance Period Progress Report to FHWA by October 1, 2022, and subsequent Full Performance Period Progress Reports to FHWA by October 1 every 4 years thereafter.

(ii) *Content*. – The State DOT shall report the following information for each Full Performance Period Progress Report:

(A) *4-year* condition/performance. – The actual condition/performance derived from the latest data collected through the end of the Performance Period, specified in § 490.105(e)(4), for each State DOT reported target required in paragraph (b)(1)(ii)(A) of this section;

(B) *4-year progress in achieving performance targets*. – A discussion of the State DOT's progress made toward achieving each established 4-year target in paragraph (b)(1)(ii)(A) or in paragraph (b)(2)(ii)(E) of this section, when applicable. The State DOT shall compare the actual 4-year condition/performance in paragraph (b)(3)(ii)(A) of this section, within the boundaries and limits documented in paragraphs (b)(1)(ii)(D)

and (b)(1)(ii)(E) of this section, with the respective 4-year target and document in the discussion any reasons for differences in the actual and target values;

(C) *Investment strategy discussion.* – A discussion on the effectiveness of the investment strategies developed and documented in the State asset management plan for the NHS required under 23 U.S.C. 119(e);

(D) *Congestion at freight bottlenecks.* – Discussion on progress of the State DOT's efforts in addressing congestion at freight bottlenecks within the State, as described in paragraph (1)(ii)(F) of this section;

(E) *4-year significant progress evaluation for applicable targets.* – State DOTs shall discuss the progress they have made toward the achievement of all 4-year targets established for the NHPP measures in § 490.105(c)(1) through (c)(5) and NHFP measures in § 490.105(c)(6). This discussion shall include a summary of accomplishments achieved during the Performance Period to demonstrate whether the State DOT has made significant progress toward achievement of 4-year targets for those measures;

(F) *Extenuating circumstances discussion on applicable targets.* – When applicable, a State DOT may include discussion on the extenuating circumstance(s), described in § 490.109(e)(5), beyond the State DOT's control that prevented the State DOT from making a 4-year

significant progress toward achieving NHPP or NHFP targets, described in paragraph (b)(3)(ii)(E) of this section;

(G) *Applicable Target Achievement Discussion*. – If FHWA determines that a State DOT has not made significant progress toward the achievement of any NHPP or NHFP targets in a biennial FHWA determinations, then the State DOT shall include a description of the actions they will undertake to achieve those targets as required under § 490.109(f). If FHWA determines in § 490.109(e) that the State DOT has made significant progress for NHPP or NHFP targets, then the State DOT does not need to include this description for those targets; and

(H) *MPO CMAQ Performance Plan.* – Where applicable, State DOTs shall include as an attachment the MPO CMAQ Performance Plan, described in paragraph (c)(3) of this section.

(c) *MPO Report.* - The MPOs shall establish targets in accordance with § 490.105 and report targets and progress toward the achievement of their targets in a manner that is consistent with the following:

(1) The MPOs shall report their established targets to their respective State DOT in a manner that is documented and mutually agreed upon by both parties.

(2) The MPOs shall report baseline condition/performance and progress toward the achievement of their targets in the system performance report in the metropolitan transportation plan in accordance with Part 450 of this chapter.

(3) MPOs serving a TMA with a population over one million representing nonattainment and maintenance areas for ozone, CO, or PM NAAQS shall develop a CMAQ performance plan as required by 23 U.S.C. 149(l). The CMAQ performance plan is not required when the MPO does not serve a TMA with a population over one million; the MPO is attainment for ozone, CO, and PM NAAQS; or the MPO's nonattainment or maintenance area for ozone, CO, or PM NAAQS is outside the urbanized area boundary of the TMA with a population over one million.

(i) The CMAQ performance plan shall be submitted as a separate section attached to the State Biennial Performance Reports, as required under § 490.107(b), and be updated biennially on the same schedule as the State Biennial Performance Reports.

(ii) For traffic congestion and on-road mobile source emissions measures in Subparts G and H, the CMAQ performance plan submitted with the State DOT's Baseline Performance Period Report shall include:

(A) The 2-year and 4-year targets for the traffic congestion measure, identical to the relevant State DOT(s) reported target under paragraph (b)(1)(ii)(A) of this section, for each applicable urbanized area;

(B) The 2-year and 4-year targets for the on-road mobile source emissions measure for the performance period;

(C) Baseline condition/performance for each MPO reported traffic congestion target, identical to the relevant State DOT(s) reported

baseline condition/performance under paragraph (b)(1)(ii)(B) of this section;

(D) Baseline condition/performance derived from the latest estimated cumulative emissions reductions from CMAQ projects for each MPO reported on-road mobile source emissions target; and

(E) A description of projects identified for CMAQ funding and how such projects will contribute to achieving the performance targets for these measures.

(iii) For traffic congestion and on-road mobile source emissions measures in Subparts G and H, the CMAQ performance plan submitted with the State DOT's Mid Performance Period Progress Report shall include:

(A) 2-year condition/performance for the traffic congestion measure, identical to the relevant State DOT(s) reported condition/performance under paragraph (b)(2)(ii)(A) of this section, for each applicable urbanized area;

(B) 2-year condition/performance derived from the latest estimated cumulative emissions reductions from CMAQ projects for each MPO reported on-road mobile source emissions target;

(C) An assessment of the progress of the projects identified in the CMAQ performance plan submitted with the Baseline Performance Period Report toward achieving the 2-year targets for these measures;

(D) When applicable, an adjusted 4-year target to replace an established 4-year target; and

(E) An update to the description of projects identified for CMAQ funding and how those updates will contribute to achieving the 4-year performance targets for these measures.

(iv) For traffic congestion and on-road mobile source emissions measures in Subparts G and H, the CMAQ performance plan submitted with the State DOT's Full Performance Period Progress Report shall include:

(A) 4-year condition/performance for the traffic congestion measure, identical to the relevant State DOT(s) reported condition/performance reported under paragraph (b)(3)(ii)(A) of this section, for each applicable urbanized area;

(B) 4-year condition/performance derived from the latest estimated cumulative emissions reductions from CMAQ projects for each MPO reported on-road mobile source emissions target; and

(C) An assessment of the progress of the projects identified in both paragraphs (c)(3)(ii)(C) and (c)(3)(iii)(D) of this section toward achieving the 4-year targets for these measures.

**§ 490.109 Assessing significant progress toward achieving the performance targets for the National Highway Performance Program and the National Highway Freight Program.**

(a) *In general.* – The FHWA will assess each of the State DOT targets separately for the measures specified in § 490.105(c)(1)through (c)(5) and the NHFP measures specified in § 490.105(c)(6) to determine the significant progress made toward the achievement of those targets.

(b) *Frequency.* – The FHWA will determine whether a State DOT has or has not made significant progress toward the achievement of applicable targets as described in paragraph (e) of this section at the midpoint and the end of each performance period.

(c) *Schedule.* – The FHWA will determine significant progress toward the achievement of a State DOT's NHPP and NHFP targets after the State DOT submits the Mid Performance Period Progress Report for progress toward the achievement of 2-year targets, and again after the State DOT submits the Full Performance Period Progress Report for progress toward the achievement of 4-year targets. The FHWA will notify State DOTs of the outcome of the determination of the State DOT's ability to make significant progress toward the achievement of its NHPP and NHFP targets.

(d) *Source of data/information.* –

(1) The FHWA will use the following sources of information to assess NHPP condition and performance progress:

(i) Data contained within the HPMS on June 15 of the year in which the significant progress determination is made that represents conditions from the prior year for targets established for Interstate System pavement condition measures, as specified in § 490.105(c)(1);

(ii) Data contained within the HPMS on August 15 of the year in which the significant progress determination is made that represents conditions from the prior year for targets established for non-Interstate NHS pavement condition measures, as specified in § 490.105(c)(2);

(iii) The most recently available data contained within the NBI as of June 15 of the year in which the significant progress determination is made for targets established for NHS bridge condition measures, as specified in § 490.105(c)(3);

(iv) The urbanized area boundary and NHS limit data in the HPMS as documented in the Baseline Performance Period Report specified in § § 490.107(b)(1)(ii)(D) and (E);

(v) Data contained within the HPMS on August 15 of the year in which the significant progress determination is made that represents performance from the prior year for targets established for the Interstate System and non-Interstate NHS performance measures, as specified in § 490.105(c)(4) and (5); and

(vi) Population data as defined by the most recent U.S. Decennial Census for urbanized areas available at the time when the State DOT Baseline Performance Period Report is due to FHWA.

(2) The FHWA will use the data contained within the HPMS on August 15 of the year in which the significant progress determination is made that represents performance from the prior year for targets established for NHFP measures, as specified in § 490.105(c)(6), to assess NHFP targets and performance progress.

(e) *Significant progress determination for individual NHPP and NHFP targets.*

(1) *In general.* – The FHWA will biennially assess whether the State DOT has achieved or made significant progress toward each target established by the State DOT for the NHPP measures described in § 490.105(c)(1) through (c)(5) and NHFP measures described in § 490.105(c)(6). The FHWA will assess the significant progress of each statewide target separately using the condition/performance data/information sources described in paragraph (d) of this section. The FHWA will not assess the progress achieved for any additional targets a State DOT may establish under § 490.105(e)(3).

(2) *Significant progress toward individual NHPP and NHFP targets*. – The FHWA will determine that a State DOT has made significant progress toward the achievement of each 2-year or 4-year applicable target if either:

(i) The actual condition/performance level is better than the baseline condition/performance reported in the State DOT Baseline Performance Period Report; or

(ii) The actual condition/performance level is equal to or better than the established target.

(3) *Phase-in of new requirements.* – The following requirements shall only apply to the first performance period and only to the Interstate System pavement condition targets and non-Interstate NHS travel time reliability targets, described in § 490.105(e)(7):

(i) At the midpoint of the first performance period, FHWA will not make a determination of significant progress toward the achievement of 2-year targets for Interstate System pavement condition measures.

(ii) The FHWA will classify the assessment of progress toward the achievement of targets in paragraph (e)(3)(i) of this section as "progress not determined" so that they will be excluded from the requirement under paragraph (e)(2) of this section.

(iii)FHWA will not make a determination of significant progress toward the achievement of 2-year targets for non-Interstate NHS travel time reliability measure.

(4) *Insufficient data and/or information.* – If a State DOT does not provide sufficient data and/or information, required under paragraph (d) of this section and § 490.107, necessary for FHWA to make significant progress determination for an NHPP or NHFP target, FHWA will determine that the State DOT has not made significant progress toward the achievement of the applicable target(s).

(5) *Extenuating circumstances.* – The FHWA will consider extenuating circumstances documented by the State DOT in the assessment of progress toward the achievement of NHPP and NHFP targets in the relevant State Biennial Performance Report, provided in § 490.107.

(i) The FHWA will classify the assessment of progress toward the achievement of an individual 2-year or 4-year target as "progress not determined" if the State DOT has provided an explanation of the extenuating circumstances beyond the control of the State DOT that prevented it from making significant progress toward the achievement of a 2-year or 4-year target and the State DOT has quantified the impacts on the condition/performance that resulted from the circumstances, which are:

(A) Natural or man-made disasters that caused delay in NHPP or NHFP project delivery, extenuating delay in data collection, and/or damage/loss of data system;

(B) Sudden discontinuation of Federal government furnished data due to natural and man-made disasters or lack of funding; and/or

(C) New law and/or regulation directing State DOTs to change metric and/or measure calculation.

(ii) If the State DOT's explanation, described in paragraph (e)(5)(i) of this section, is accepted by FHWA, FHWA will classify the progress toward achieving the relevant target(s) as "progress not determined," and those

targets will be excluded from the requirement in paragraph (e)(2) of this section.

(f) *Performance achievement.* –

(1) If FHWA determines that a State DOT has not made significant progress toward the achieving of NHPP targets, then the State DOT shall include as part of the next performance target report under section 150(e) [the Biennial Performance Report] a description of the actions the State DOT will undertake to achieve the targets related to the measure in which significant progress was not achieved as follows:

(i) If significant progress is not made for either target established for the Interstate System pavement condition measures, § 490.307(a)(1) and § 490.307(a)(2), then the State DOT shall document the actions they will take to improve Interstate Pavement conditions;

(ii) If significant progress is not made for either target established for the Non-Interstate System pavement condition measures, § 490.307(a)(3) and § 490.307(a)(4), then the State DOT shall document the actions they will take to improve Non-Interstate Pavement conditions;

(iii) If significant progress is not made for either target established for the NHS bridge condition measures, § 490.407(c)(1) and § 490.407(c)(2), then the State DOT shall document the actions they will take to improve the NHS bridge conditions;

(iv) If significant progress is not made for either target established for the NHS travel time reliability measures, § 490.507(a)(1) and § 490.407(a)(2), then the State DOT shall document the actions they will take to achieve the NHS travel time targets;

(v) If significant progress is not made for either urbanized area specific target, described in § 490.105(e)(8), established for the peak hour travel measures, § 490.507(b)(1) and § 490.407(b)(2) for an urbanized area, then the State DOT shall document the actions they will take to achieve both the Interstate and non-Interstate NHS peak hour travel time targets that urbanized area;

(2) If FHWA determines that a State DOT has not made significant progress toward achieving the NHFP targets established for either of the NHFP measures in § 490.607(a) or § 490.607(b), then the State DOT shall include as part of the next performance target report under section 150(e) [the Biennial Performance Report], a description of the action the State will undertake to achieve the targets, including –

(i) An identification of significant freight system trends, needs, and issues within the State;

(ii) A description of the freight policies and strategies that will guide the freight-related transportation investments of the State;

(iii) An inventory of freight bottlenecks within the State and a description of the ways in which the State DOT is allocating national highway freight program funds to improve those bottlenecks; and

(iv) A description of the actions the State DOT will undertake to achieve the targets established for the Freight measures in § 490.607(a) and § 490.607(b).

(3) The State DOT should, within 6 months of the significant progress determination, amend its Biennial Performance Report to document the information specified in this paragraph to ensure actions are being taken to achieve targets.

**§ 490.111 Incorporation by reference.**

(a) Certain material is incorporated by reference into this subpart with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. To enforce any edition other than that specified in this section, FHWA must publish a document in the Federal Register and the material must be available to the public. All approved material is available for inspection at the Federal Highway Administration, Office of Highway Policy Information (202-366-4631) and is available from the sources listed below. It is also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, call 202-741-6030 or go to http://www.archives.gov/federal_register/code_of_federal_regulations/ibr_locations.html.

(b) The Federal Highway Administration, 1200 New Jersey Avenue, SE, Washington, DC 20590, www.fhwa.dot.gov.

(1) Highway Performance Monitoring System (HPMS) Field Manual, IBR approved for Subparts A through C, and E through G.

(2) Recording and Coding Guide for the Structure Inventory and Appraisal of the Nation's Bridges, Report No. FHWA-PD-96-001, December 1995 and errata, IBR approved for Subpart D.

(c) The American Association of State Highway and Transportation Officials, 444 North Capitol Street NW., Suite 249, Washington, D.C. 20001, (202) 624-5800, www.transportation.org.

(1) AASHTO Standard M328-14, Standard Specification for Transportation Materials and Methods of Sampling and Testing, Standard Equipment Specification for Inertial Profiler, 2014, 34th/2014 Edition, AASHTO, 1-56051-606-4, IBR approved for Subpart C.

(2) AASHTO Standard R57-14, Standard Specification for Transportation Materials and Methods of Sampling and Testing, Standard Practice for Operating Inertial Profiling Systems, 2014, 34th/2014 Edition, AASHTO, 1-56051-606-4, IBR approved for Subpart C.

(3) AASHTO Standard R55-10 (2013), Standard Specification for Transportation Materials and Methods of Sampling and Testing, Standard Practice for

Quantifying Cracks in Asphalt Pavement Surface, 2014, 34th/2014 Edition, AASHTO, 1-56051-606-4, IBR approved for Subpart C.

(4) AASHTO Standard PP67-14, Standard Specification for Transportation Materials and Methods of Sampling and Testing, Standard Practice for Quantifying Cracks in Asphalt Pavement Surfaces from Collected Images Utilizing Automated Methods, 2014, 34th/2014 Edition, AASHTO, 1-56051-606-4, IBR approved for Subpart C.

(5) AASHTO Standard PP68-14, Standard Specification for Collecting Images of Pavement Surfaces for Distress Detection, 2014, 34th/2014 Edition, AASHTO, 1-56051-606-4, IBR approved for Subpart C.

(6) AASHTO Standard R48-10 (2003), Standard Specification for Transportation Materials and Methods of Sampling and Testing, Standard Practice for Determining Rut Depth in Pavements, 2014, 34th/2014 Edition, AASHTO, 1-56051-606-4, IBR approved for Subpart C.

(7) AASHTO Standard PP69-14, Standard Specification for Transportation Materials and Methods of Sampling and Testing, Standard Practice for Determining Pavement Deformation Parameters and Cross Slope from Collected Transverse Profiles, 2013, 2014, 34th/2014 Edition, AASHTO, 1-56051-606-4, IBR approved for Subpart C.

(8) AASHTO Standard PP70-14, Standard Specification for Transportation Materials and Methods of Sampling and Testing, Standard Practice for Collection the Transverse Pavement Profile, 2014, 34th/2014 Edition, AASHTO, 1-56051-606-4, IBR approved for Subpart C.

(9) AASHTO Standard R36-13, Standard Specification for Transportation Materials and Methods of Sampling and Testing, Standard Practice for Evaluating Faulting of Concrete Pavements, 2014, 34th/2014 Edition, AASHTO, 1-56051-606-4, IBR approved for Subpart C.

(10) AASHTO Standard R43-13, Standard Specification for Transportation Materials and Methods of Sampling and Testing, Standard Practice for Quantifying Roughness of Pavement, 2014, 34th/2014 Edition, AASHTO, 1-56051-606-4, IBR approved for Subpart C.

3. Add a new Subpart E to read as follows:

**Subpart E - National Performance Management Measures to Assess Performance of the National Highway System**

Sec.
490.501 Purpose.
490.503 Applicability.
490.505 Definitions.
490.507 National performance management measures for system performance.
490.509 Data requirements.
490.511 Calculation of system performance metrics.
490.513 Calculation of system performance management measures.

**§ 490.501 Purpose.**

The purpose of this subpart is to implement the requirements of 23 U.S.C. 150(c)(3)(A)(ii)(IV) and (c)(3)(A)(ii)(V) to establish performance measures for State Departments of Transportation (State DOTs) and Metropolitan Planning Organizations (MPOs) to use to assess:

(a) Performance of the Interstate System; and

(b) Performance of the non-Interstate National Highway System (NHS).

**§ 490.503 Applicability.**

(a) The performance measures are applicable to those portions of the mainline highways on the NHS as provided below (and in more detail in § 490.507):

(1) The Reliability measures in § 490.507(a) are applicable to all directional mainline highways on the Interstate System and non-Interstate NHS.

(2) The Peak Hour Travel Time measures in § 490.507(b) are applicable to all directional mainline highways on the Interstate System and non-Interstate NHS that are within the boundary of urbanized areas with a population over one million.

**§ 490.505 Definitions.**

All definitions in § 490.101 apply to this subpart. Unless otherwise specified in this subpart, the following definitions apply:

Desired Peak Period Travel Time is the desired travel time on a specific reporting segment during the peak period that is defined in coordination between the State DOT and MPO.

Level of Travel Time Reliability is a comparison, expressed as a ratio, of the 80th percentile travel time of a reporting segment to the "normal" (50th percentile) travel time of a reporting segment occurring throughout a full calendar year.

Normal Travel Time (or 50th percentile travel time) is the time of travel to traverse the full extent of a reporting segment which is greater than the time for 50 percent of the travel in a calendar year to traverse the same reporting segment.

Peak Hour Travel Time is defined as the longest average annual travel time on a segment of roadway during the peak period.

The Peak Period is defined as non-holiday weekdays from 6:00to 7:00 a.m., 7:00 to 8:00 a.m., 8:00 to 9:00 a.m., 4:00 to 5:00 p.m., 5:00 to 6:00 p.m. and 6:00 to 7:00 p.m.

Peak Hour Travel Time Ratio is defined as the ratio between the Peak Hour Travel Time and the Desired Peak Period Travel Time for a segment of roadway.

Travel Time Cumulative Probability Distribution means a representation of all the travel times for a road segment during a defined reporting period (such as annually) presented in a percentile ranked order as provided in the Travel Time Data Set. The normal (50th percentile) and 80th percentile travel times used to compute the Travel Time Reliability measure may be identified by the travel time cumulative probability distribution.

**§ 490.507 National Performance Management Measures for System Performance.**

There are four performance measures to assess the performance of the Interstate System and the performance of the non-Interstate NHS for the purpose of carrying out the National Highway Performance Program.

(a) Two measures are used to assess Reliability. They are:

(1) Percent of the Interstate System providing for Reliable Travel Times; and

(2) Percent of the non-Interstate NHS providing for Reliable Travel Times.

(b) Two measures are used to assess Peak Hour Travel Time in urbanized areas over 1,000,000 in population. They are:

(1) Percent of the Interstate System where Peak Hour Travel Times meet expectations; and

(2) Percent of the non-Interstate NHS where Peak Hour Travel Times meet expectations.

**§ 490.509 Data requirements.**

(a) Travel time data needed to calculate the measures in § 490.507 shall come from the Travel Time Data Set, as specified in § 490.103(e).

(1) State DOTs, in coordination with MPOs, shall define reporting segments in accordance with § 490.103(f) and submit the reporting segments in accordance with § 490.103(g). Reporting segments must be contiguous so that they cover the full extent of the mainline highways of the NHS in the State.

(2) ]Reserved]

(b) State DOTs shall use posted speed limit data to calculate travel times when data is not available in the Travel Time Data Set (data not reported, or reported as "0" or null) as specified in § 490.511(b)(1)(v).

(c) Populations of urbanized areas shall be as identified based on the most recent U.S. Decennial Census available at the time when the State DOT Baseline Performance

Period Report is due to FHWA. State DOTs and MPOs shall use this population to identify areas that are applicable to the Peak Hour Travel Time measure as specified in § 490.503.

**§ 490.511 Calculation of system performance metrics.**

(a) Two performance metrics are required for the measures specified in § 490.507. These are:

(1) Level of Travel Time Reliability (LOTTR)

(2) Peak Hour Travel Time Ratio (PHTTR)

(b) The State DOT shall calculate the LOTTR metrics for each NHS reporting segment in accordance with the following:

(1) Data sets shall be created from the Travel Time Data Set to be used to calculate the LOTTR metrics. This data set shall include, for each reporting segment, a ranked list of average travel times for all traffic ("all vehicles" in NPMRDS nomenclature), to the nearest second, for 5 minute periods of a population that:

(i) Includes travel times occurring between the hours of 6:00 a.m. and 10:00 a.m. for every weekday (Monday –Friday) from January 1st through December 31st of the same year;

(ii) Includes travel times occurring between the hours of 10:00 a.m. and 4:00 p.m. for every weekday (Monday-Friday) from January 1st through December 31st of the same year;

(iii) Includes travel times occurring between the hours of 4:00 p.m. and 8:00 p.m. for every weekday (Monday-Friday) from January 1st through December 31st of the same year;

(iv) Includes travel times occurring between the hours of 6:00 a.m. and 8:00 p.m. for every weekend day (Saturday-Sunday) from January 1st through December 31st of the same year; and

(v) Any travel time for Travel Time segments contained within a reporting segment that are not reported, or reported as "0" or null shall be replaced with the calculated travel time for that segment, based on the segment length and posted speed limit ( TT@PSL), rounded to the nearest second.

$$\text{TT@PSL(seconds)} = \frac{\text{Segment Length (miles)}}{\text{Posted Speed Limit (miles per hour)}} \text{x60x60}$$

(2) The Normal Travel Time (50th percentile) shall be determined from each data set defined under paragraph (b)(1) of this section as the time in which 50 percent of the times in the data set are shorter in duration and 50 percent are longer in duration. The 80th percentile travel time shall be determined from the each data set defined under paragraph (b)(1) of this section as the time in which 80 percent of the times in the data set are shorter in duration and 20 percent are longer in duration. Both the Normal and 80th percentile travel times can be determined by plotting the data on a Travel Time Cumulative Probability Distribution graph or using the percentile functions available in spreadsheet and other analytical tools.

(3) Four LOTTR metrics shall be calculated for each reporting segment; one for each data set defined under paragraph (b)(1) of this section as the 80th percentile travel time divided by the 50$^{th}$ percentile travel time and rounded to the nearest hundredth.

(c) The State DOT shall calculate the PHTTR metric for each reporting segment that is included within an urbanized area with a population over 1,000,000 in accordance with the following:

(1) The State DOT, in coordination with the relevant MPOs, shall assign a "Desired Peak Period Travel Time," based on their operational policies for their NHS roadways, for each reporting segment for the peak period, one each for the three morning hours and three evening hours and report these to FHWA in accordance with § 490.103(g)(3).

(2) All travel times equating to speeds less than 2 mph or greater than 100 mph shall be removed from the calculation described in paragraph (c)(3) of this section.

(3) An average annual peak hour travel time for each reporting segment shall be computed for each peak hour on non-Federal holiday weekdays that includes travel times recorded from January 1$^{st}$ through December 31$^{st}$ of a calendar year. Morning peak hours for this metric shall include 6:00 to 7:00 a.m., 7:00 to 8:00 a.m., and 8:00 to 9:00 a.m. and afternoon peak hours for this measure shall include 4:00 to 5:00 p.m., 5:00 to 6:00 p.m., and 6:00 to 7:00 p.m. The average travel time for each peak hour shall be calculated for each reporting segment to the nearest whole second as the sum of the 5-minute bin segment average travel

times for all traffic ("all vehicles" in NPMRDS nomenclature) occurring in the peak hour on non-Federal holiday weekdays throughout the year divided by the total count of 5-minute intervals where travel times were reported in the peak hour.

(4) The longest average annual peak hour travel time out of the 6 calculated in paragraph (c)(2) of this section shall be used to calculate the PHTTR metric for the reporting segment.

(5) The PHTTR metric shall be calculated for each reporting segment by using the longest average annual peak hour travel time as described in paragraph (c)(3) of this section divided by either the desired morning or afternoon peak hour travel time defined in paragraph (c)(1) of this section corresponding to the hour when the longest average annual peak hour travel time occurred, and rounded to the nearest hundredth.

(d) Starting in 2018 and annually thereafter, State DOTs shall report the metrics, as defined in this section, in accordance with HPMS Field Manual by June 15$^{th}$ of each year for the previous year's measures. Specifically, the following metrics shall be reported for each reporting segment:

(1) All reporting segments of the NPMRDS shall be referenced by NPMRDS TMC. If a State DOT elects to use, in part or in whole, the equivalent data set, all reporting segment shall be referenced by HPMS location referencing standards:

(2) The Level of Travel Time Reliability (LOTTR) metric (to the nearest hundredths) for each of the four time periods identified in paragraphs (b)(1)(i) through (iv) of

this section; the corresponding80th percentile travel times (to the nearest second); and the corresponding normal (50th percentile) travel times (to the nearest second);

(3) Peak Hour Travel Time Ratio (PHTTR) (to the nearest hundredth); peak hour travel time (to the nearest second); and the hour (6 a.m., 7 a.m., 8 a.m., 4 p.m., 5 p.m., or 6 p.m.) where the peak travel time occurred.

**§ 490.513 Calculation of system performance measures.**

(a) The performance measures in § 490.507 shall be calculated in accordance with this section and used by State DOTs and MPOs to carry out the Interstate System and non-Interstate NHS performance-related requirements of part 490, and by FHWA to make the significant progress determinations specified in § 490.109.

(b) The performance measure for Interstate System Travel Time Reliability specified in § 490.507(a)(1) shall be computed to the nearest tenth of a percent as follows:

$$100 \times \frac{\sum_{i=1}^{R} SL_i}{\sum_{i=1}^{T} SL_i}$$

Where,

R: total number of Interstate System reporting segments that are exhibiting an LOTTR below 1.50 during all of the time periods identified in 490.511(b)(1)(i) through (iv);

i: Interstate System reporting segment;

$SL_i$: length, to the nearest thousandth of a mile, of Interstate System reporting segment "i;"

T: total number of Interstate System reporting segments

(c) The performance measure for non-Interstate NHS Travel Time Reliability specified in § 490.507(a)(2) shall be computed to the nearest tenth of a percent as follows:

$$100 \times \frac{\sum_{i=1}^{R} SL_i}{\sum_{i=1}^{T} SL_i}$$

Where,

R: total number of non-Interstate NHS reporting segments that are exhibiting an LOTTR below 1.50 during all of the time periods identified in § 490.511(b)(1)(i) through (iv);

i: non-Interstate NHS reporting segment;

$SL_i$: length, to the nearest thousandth of a mile, of non-Interstate NHS reporting segment "i;"

T: total number of non-Interstate NHS reporting segments

(d) The performance measure for Interstate System Peak Hour Travel Time specified in § 490.507(b)(1) shall be computed to the nearest tenth of a percent as follows:

$$100 \times \frac{\sum_{i=1}^{R} SL_i}{\sum_{i=1}^{T} SL_i}$$

Where,

R: total number of Interstate System reporting segments that are exhibiting a PHTTR below 1.50;

i: Interstate System reporting segment in an urbanized area with a population over one million;

$SL_i$: length, to the nearest thousandth of a mile, of Interstate System reporting segment "i";

T: total number of Interstate System reporting segments in an urbanized area with a population over one million.

(e) The performance measure for non-Interstate NHS Peak Hour Travel Time specified in § 490.507(b)(2) shall be computed to the nearest tenth of a percent as follows:

$$100 \times \frac{\sum_{i=1}^{R} SL_i}{\sum_{i=1}^{T} SL_i}$$

Where,

R: total number of non-Interstate NHS reporting segments that are exhibiting a PHTTR below 1.50;

i: non-Interstate NHS reporting segment in an urbanized area with a population over one million;

$SL_i$: length, to the nearest thousandth of a mile, of non-Interstate NHS reporting segment "i";

T: total number of non-Interstate NHS reporting segments in an urbanized area with a population over one million.

4. Add Subpart F to read as follows:

**Subpart F - National Performance Management Measures to Assess Freight Movement on the Interstate System**

Sec.
490.601 Purpose.
490.603 Applicability.
490.605 Definitions.

**§ 490.601 Purpose.**

The purpose of this subpart is to implement the requirements of 23 U.S.C. 150(c)(6) to establish performance measures for State Departments of Transportation (State DOTs) and the Metropolitan Planning Organizations (MPOs) to use to assess the national freight movement on the Interstate System.

**§ 490.603 Applicability.**

The performance measures to assess the national freight movement are applicable to the Interstate System.

**§ 490.605 Definitions.**

The definitions in § 490.101 apply to this subpart.

**§ 490.607 National performance management measures to assess freight movement on the Interstate System.**

There are two performance measures to assess freight movement on the Interstate System. They are:

(a) Percent of the Interstate System Mileage providing for Reliable Truck Travel Times; and

(b) Percent of the Interstate System Mileage Uncongested.

**§ 490.609 Data requirements.**

(a) Travel time data needed to calculate the measures in § 490.607 shall come from the Travel Time Data Set, as specified in § 490.103(e).

(b) State DOTs, in agreement with MPOs, shall define reporting segments in accordance with § 490.103(f) and submit the reporting segments in accordance with § 490.103(g). Reporting segments must be contiguous so that they cover the full extent of the directional mainline highways of the Interstate in the State.

(c) When truck travel times are not available in the Travel Time Data Set (data not reported, or reported as "0" or null) as specified in § 490.611(b)(1)(ii) for a given 5 minute interval State DOTs shall replace the missing travel time as follows:

(1) Replace the missing value with an observed travel time that represents all traffic on the roadway during the same 5 minute interval ("all vehicles" in NPMRDS nomenclature) provided this travel time is associated with travel speeds that are less than the posted speed limit; or

(2) Replace the missing value with the travel time that would have occurred while traveling at the posted speed limit.

**§ 490.611 Calculation of freight movement metrics.**

(a) Two performance metrics are required for the measures specified in § 490.607. These are:

(1) Truck Travel Time Reliability.

(2) Average Truck Speed.

(b) The State DOT shall calculate the Truck Travel Time Reliability metric for each Interstate System reporting segment in accordance with the following:

(1) A truck travel time data set shall be created from the Travel Time Data Set to be used to calculate the Truck Travel Time Reliability metric. This data set shall include, for each reporting segment, a ranked list of average truck travel times, to the nearest second, for 5 minute periods of a 24 hour period for an entire calendar year that:

(i) Includes truck travel times occurring for all hours of every day and for every 24-hour period from January 1st through December 31st of the same year; and

(ii) Any truck travel times for Travel Time Segments contained within a reporting segment that are not reported, or reported as "0" or null shall be replaced with an observed travel time that represents all traffic on the roadway during the same 5 minute interval ("all vehicles" in NPMRDS nomenclature) provided this travel time is associated with travel speeds that are less than the posted speed limit. In all other cases the truck travel time shall be replaced with a calculated truck travel time for that segment, based on the segment length and posted speed limit (TTT@PSL), rounded to the nearest second.

$$TTT@PSL(seconds) = \frac{Segment\ Length\ (miles)}{Posted\ Speed\ Limit\ (miles\ per\ hour)} x60x60$$

(2) The Normal Truck Travel Time (50th percentile) shall be determined from the truck travel time data set defined under paragraph (b)(1) of this section as the time in which 50 percent of the times in the data set are shorter in duration and 50

percent are longer in duration. The 95th percentile truck travel time shall be determined from the truck travel time data set defined under paragraph (b)(1) of this section as the time in which 95 percent of the times in the data set are shorter in duration. Both the Normal and 95th percentile truck travel times can be determined by plotting the data on a Travel Time Cumulative Probability Distribution graph or using the percentile functions available in spreadsheet and other analytical tools.

(3) The Truck Travel Time Reliability metric shall be calculated for each Interstate System reporting segment as the $95^{th}$ percentile truck travel time divided by the Normal Truck Travel Time ($50^{th}$ percentile truck travel time), rounded to the nearest hundredth.

(c) The State DOT shall calculate the Average Truck Speed metric for each Interstate System reporting segment, in accordance with the following:

(1) Any truck travel times for the travel time segments contained within a reporting segment that are not reported, or reported as "0" or null shall be replaced with an observed travel time that represents all traffic on the roadway during the same 5 minute interval ("all vehicles" in NPMRDS nomenclature) provided this travel time is associated with travel speeds that are less than the posted speed limit. In all other cases the truck travel time shall be with the truck travel time, to the nearest second, at posted speed limit (TTT@PSL) for that segment.

$$TTT@PSL(seconds) = \frac{Segment\ Length\ (miles)}{Posted\ Speed\ Limit\ (miles\ per\ hour)} x60x60$$

(2) The Average Truck Speed shall be calculated for each reporting segment as follows:

$$Average\ Truck\ Speed\ (s) = \frac{\left[\sum_{b=1}^{T} \frac{Segment\ Length\ (s)}{Truck\ Travel\ Time_b}\right]}{T} \times 60 \times 60$$

Where,

$b$ = a 5-minute time interval of a travel time reporting segment "$s$;"

$s$ = a travel time reporting segment;

T = total number of time intervals in everyday in a full calendar year;

$Segment\ Length\ (s)$ = length of reporting segment "$s$," to the nearest one thousandth of a mile;

$Truck\ Travel\ Time_b$ = travel time of trucks, for time interval "$b$" in the Travel Time Data Set or TTL@PSL for the reporting segment *s* described in paragraph (1), to the nearest second;

$Average\ Truck\ Speed\ (s)$ = average annual speed of trucks travelling through the reporting segment "$s$," to the nearest hundredth mile per hour.

(d) Starting in 2018 and annually thereafter, State DOTs shall report the metrics, as defined in this section, in accordance with HPMS Field Manual by June 15th of each year for the previous year's measures. Specifically, the following metrics shall be reported for each reporting segment:

(1) All reporting segments of the NPMRDS shall be referenced by NPMRDS TMC. If a State DOT elects to use, in part or in whole, the equivalent data set, all reporting segment shall be referenced by HPMS location referencing standards:

(2) Truck Travel Time Reliability metric (to the nearest hundredth), including the 95th percentile truck travel time (to the nearest second) and normal (50th percentile) truck travel time (to the nearest second);

(3) Average Truck Speed metric (to the nearest hundredth mile per hour).

**§ 490.613 Calculation of freight movement measures.**

(a) The performance measures in § 490.607 shall be calculated in accordance with this section and used by State DOTs and MPOs to carry out the Freight Movement on the Interstate System related requirements of part 490, and by FHWA to report on performance of the Interstate System.

(b) The performance measure for the Percent of the Interstate System Mileage providing for Reliable Truck Travel Times specified in § 490.607(a) shall be computed to the nearest tenth of a percent as follows:

$$100 \times \frac{\sum_{a=1}^{R} SL_a}{\sum_{i=1}^{T} SL_i}$$

Where,

$a$: An Interstate System reporting segment exhibiting Reliable Truck Travel Times. Reliable Truck Travel Times for a reporting segment is where calculated value of metric for the reporting segment, in § 490.611(b)(3), is below 1.50;

$SL_a$: Segment length, to the nearest thousandth of a mile, of Interstate System reporting segment "a;"

R: A total number of Interstate System reporting segments that are exhibiting Reliable Truck Travel Times ($R \in T$);

$i$: An Interstate System reporting segment;

$SL_i$: Segment length, to the nearest thousandth of a mile, of Interstate System reporting segment "i;" and

T: A total number of Interstate System reporting segments.

(c) The performance measure for the Percent of the Interstate System Mileage Uncongested as specified in § 490.607(b) shall be computed to the nearest tenth of a percent as follows:

$$100 \times \frac{\sum_{g=1}^{U} SL_g}{\sum_{i=1}^{T} SL_i}$$

Where,

$g$: An uncongested Interstate System reporting segment. An uncongested reporting segment is where calculated Average Truck Speed for the reporting segment, in § 490.611(c)(2), is greater than 50.00 mph;

$SL_g$: Segment length, to the nearest thousandth of a mile, of Interstate System reporting segment "$g$;"

U: A total number of uncongested Interstate System reporting segments ($U \in T$);

i: An Interstate System reporting segment;

$SL_i$: length, to the nearest thousandth of a mile, of Interstate System reporting segment "i;" and

T: total number of Interstate System reporting segments.

5. Add Subpart G to read as follows:

**Subpart G – National Performance Management Measure for Assessing the Congestion Mitigation and Air Quality Improvement Program – Traffic Congestion**

Sec.


**§ 490.701 Purpose.**

The purpose of this subpart is to implement the requirements of 23 U.S.C. 150(c)(5)(A) to establish performance measures for State Departments of Transportation (State DOTs) and the Metropolitan Planning Organizations (MPOs) to use in assessing traffic congestion.

**§ 490.703 Applicability.**

The performance measure is applicable to all of the National Highway System in urbanized areas with a population over one million that are, in all or part, designated as nonattainment or maintenance areas for ozone ($O_3$), carbon monoxide (CO), or particulate matter ($PM_{10}$ and $PM_{2.5}$) National Ambient Air Quality Standards (NAAQS).

**§ 490.705 Definitions.**

All definitions in § 490.101 apply to this subpart. Unless otherwise specified, the following definitions apply in this subpart:

Excessive delay means the extra amount of time spent in congested conditions defined by speed thresholds that are lower than a normal delay threshold. For the purposes of this rule, the speed threshold is 35 miles per hour (mph) on Interstates (Functional Class 1) and other freeways and expressways (Functional Class 2) and 15 mph on other principal arterials (Functional Class 3) and other roads with lower functional classifications that are included in the NHS, as defined by FHWA: HPMS Functional Classifications.[1]

**§ 490.707 National performance management measure for traffic congestion.**

The performance measure to assess traffic congestion for the purpose of carrying out the CMAQ program, is Annual Hours of Excessive Delay Per Capita.

**§ 490.709 Data requirements.**

(a) Travel time data needed to calculate the measure in § 490.707 shall come from the Travel Time Data Set, as specified in § 490.103(e).

(b) State DOTs, in coordination with MPOs, shall define reporting segments in accordance with § 490.103(f) and submit the reporting segments in accordance with § 490.103(g). Reporting segments must be contiguous so that they cover the full extent of the directional mainline highways of the NHS in the urbanized area(s).

[1] *Highway Functional Classification Concepts, Criteria and Procedures*: http://www.fhwa.dot.gov/planning/processes/statewide/related/highway_functional_classifications/fcauab.pdf

(c) State DOTs shall develop hourly traffic volume data for each reporting segment as follows:

(1) State DOTs shall measure or estimate hourly traffic volumes for each day of the reporting year by using either paragraph (c)(1)(i) or (ii) of this section.

(i) State DOTs may use hourly traffic volume counts collected by continuous count stations and apply them to multiple reporting segments, or

(ii) State DOTs may use Annual Average Daily Traffic (AADT) reported to the HPMS to estimate hourly traffic volumes when no hourly volume counts exist. In these cases the AADT data used should be the most recently available, but no more than two years older than the reporting period (i.e., if reporting for calendar year 2018, AADT should be from 2016 or 2017) and should be split to represent the appropriate direction of travel of the reporting segment.

(2) State DOTs shall assign hourly traffic volumes to each reporting segment by hour (e.g., between 8:00 a.m. and 8:59 a.m.; between 9:00 a.m. and 9:59, a.m.).

(3) State DOTs shall report the methodology they use to develop hourly traffic volume estimates to FHWA no later than 60 days prior to the submittal of the first Baseline Performance Period Report.

(4) If a State DOT elects to change the methodology it reported under paragraph (c)(3) of this section, then the State DOT shall submit the changed methodology no later than 60 days prior to the submittal of next State Biennial Performance Report required in § 490.107(b).

(d) Populations of urbanized areas shall be as identified based on the most recent U.S. Decennial Census available at the time when the State DOT Baseline Performance Period Report is due to FHWA. This population shall be used for the duration of the performance period to calculate the performance measure as specified in § 490.713.

(e) Nonattainment and maintenance areas shall be identified based on the U.S. Environmental Protection Agency's designation of the area under the NAAQS at the time when the State DOT Baseline Performance Period Report is due to FHWA. These designations shall be used for the duration of the performance period.

**§ 490.711 Calculation of congestion metric.**

(a) The performance metric required to calculate the measure specified in § 490.707 is Total Excessive Delay (vehicle-hours). The following paragraphs explain how to calculate this metric.

(b) State DOTs shall use the following data to calculate the Total Excessive Delay (vehicle-hours) metric:

(1) Travel times of all traffic ("all vehicles" in NPMRDS nomenclature) during each five minute interval for all applicable reporting segments in the Travel Time Data Set occurring for all hours of every day and for every 24-hour period from January 1st through December 31st of the same year;

(2) The length of each applicable reporting segment, reported as required under § 490.709(b); and

(3) Hourly volume estimation for all days and for all reporting segments where excessive delay is measured, as specified in § 490.709(c).

(c) The State DOT shall calculate the "excessive delay threshold travel time" for all applicable travel time segments as follows:

$$Excessive\ Delay\ Threshold\ Travel\ Time\ (s) = \left(\frac{Travel\ Time\ Segment\ Length\ (s)}{Threshold\ Speed\ (s)}\right) \times 3{,}600$$

Where:

$Excessive\ Delay\ Treshold\ Travel\ Time(s)$ = The time of travel, to the nearest whole second, to traverse the Travel Time Segment at which any longer measured travel times would result in excessive delay for the travel time segment "$s$;"

$Travel\ Time\ Segment\ Length\ (s)$ = Total length of travel time segment to the nearest thousandth of a mile for travel time reporting segment "$s$;" and

$Threshold\ Speed\ (s)$ = The speed of travel at which any slower measured speeds would result in excessive delay for travel time reporting segment "$s$."

$$Threshold\ Speed\ (s) = \begin{cases} 35 \text{ mph for Interstates/freeways/expressways} \\ 15 \text{ mph for principal arterials and all other NHS roads} \end{cases}$$

(d) State DOTs shall determine the "excessive delay" for each five minute bin of each reporting segment for every hour and every day in a calendar year as follows:

(1) The travel time segment delay (RSD) shall be calculated to the nearest whole second as follow:

$$RSD(s)_b = Travel\ time(s)_b - Excessive\ Delay\ Treshold\ Travel\ Time(s)$$

and

$$RSD(s)_b \leq 300\ seconds$$

Where:

$RSD(s)_b$ = travel time segment delay, calculated to the nearest whole second, for a five minute bin "$b$" of travel time reporting segment "$s$" for in a day in a calendar year. $RSD(s)_b$ not to exceed 300 seconds;

$Travel\ time(s)_b$ = a measured travel time, to the nearest second, for 5-minute time bin "$b$" recorded for travel time reporting segment "$s$;"

$Excessive\ Delay\ Threshold\ Travel\ Time(s)$ = The maximum amount of time, to the nearest second, for a vehicle to traverse through travel time segment "s" before excessive delay would occur, as specified in § 490.711(c);

$b$ = a five minute bin of a travel time reporting segment "$s$;" and

$s$ = a travel time reporting segment.

(2) Excessive delay, the additional amount of time to traverse a travel time segment in a five minute bin as compared to the time needed to traverse the travel time segment when traveling at the excessive delay travel speed threshold, shall be calculated to the nearest thousandths of an hour as follows:

$$Excessive\ Delay(s)_b = \begin{cases} \frac{RSD(s)_b}{3{,}600}\ when\ RDS(s)_b \geq 0 \\ or \\ 0\ when\ RDS(s)_b < 0 \end{cases}$$

Where:

Excessive Delay$(s)_b$ = Excessive delay, calculated to the nearest thousandths of an hour, for five minute bin "$b$" of travel time reporting segment "$s$;"

$RSD(s)_b$ = the calculated travel time reporting segment delay for five minute bin "$b$" of a travel time reporting segment "$s$," as described in paragraph (1) of this section;

$b$ = a five minute bin of a travel time reporting segment "$s$;" and

$s$ = a travel time reporting segment.

(e) State DOTs shall use the hourly traffic volumes as described in § 490.709(c) to calculate the Total Excessive Delay (vehicles-hours) metric for each reporting segment as follows:

$$Total\ Excessive\ Delay(s) = \sum_{d=1}^{TD}\left\{\sum_{h=1}^{TH}\left[\sum_{b=1}^{TB}\left([Excessive\ Delay(s)_{b,h,d} \times \left(\frac{hourly\ volume(s)}{12}\right)_{h,d}\right)_b\right]_h\right\}_d$$

Where:

*Total Excessive Delay (in vehicle-hours)* = the sum of the excessive delay, to the nearest thousandths, for all traffic traveling through single travel time reporting segment $s$ on NHS within an urbanized area, specified in § 490.703, accumulated over the full reporting year;

$s$ = a travel time reporting segment;

$d$ = a day of the reporting year;

*TD*= total number of days in the reporting year;

$h$ = single hour interval of the day where the first hour interval is 12:00 a.m. to 12:59 a.m.;

$TH$ = total number of hour intervals in day "h;"

$b$ = 5-minute bin for hour interval "h;"

$TB$ = total number of 5-minute bins where travel times are recorded in the travel time data set for hour interval "h;"

$Excessive\ Delay(s)_{b,h,d}$ = calculated excessive travel time, in hundredths of an hour, for 5 minute bin ($b$), hour interval (h), day (d), and travel time segment (s), as described in paragraph d(2) of this section; and

$\left(\frac{\text{hourly volume(s)}}{12}\right)_{\text{h,d,s}}$ = hourly traffic volume, to the nearest tenth, for hour interval "h" and day "d" that corresponds to 5-minute bin "$b$" and travel time reporting segment "s" divided by 12. For example, the 9:05 a.m. to 9:10 a.m. minute bin would be assigned one twelfth of the hourly traffic volume for the 9:00 a.m. to 9:59 a.m. hour on the roadway in which travel time segment is included.

(f) Starting in 2018 and annually thereafter, State DOTs shall report Total Excessive Delay (vehicle-hours) metric (to the nearest one hundredth hour) in accordance with HPMS Field Manual by June 15th of each year for the previous year's measures. The Total Excessive Delay (vehicle-hours) metric shall be reported for each reporting segment. All reporting segments of the NPMRDS shall be referenced by NPMRDS

TMC. If a State DOT elects to use, in part or in whole, the equivalent data set, all reporting segment shall be referenced by HPMS location referencing standards.

**§ 490.713 Calculation of congestion measure.**

(a) The performance measure in § 490.707 shall be computed in accordance with this section and shall be used by State DOTs and MPOs to carry out CMAQ Traffic Congestion performance-related requirements of part 490.

(b) The performance measure for CMAQ Traffic Congestion specified in § 490.707, Annual Hours of Excessive Delay Per Capita, shall be computed to the nearest hundredth, and by summing the "Total Excessive Delay (vehicle-hours)" metrics of all reporting segments in each of the urbanized area, specified in § 490.703, and dividing it by the population of the urbanized area to produce the measure. The equation for calculating the measure is as follows:

$$Annual\ Hours\ of\ Excessive\ Delay\ per\ Capita = \frac{\sum_{s=1}^{T} Total\ Excessive\ Delay(s)}{Total\ Population}$$

Where:

*Annual Hours of Excessive Delay per Capita* = the cumulative hours of excessive delay, to the nearest tenth, experienced by all traffic traveling through all reporting segments in the applicable urbanized area for the full reporting calendar year.

$s$ = travel time reporting segment within an urbanized area, specified in § 490.703;

$T$ = total number of travel time reporting segments in the applicable urbanized area;

$Total\ Excessive\ Delay(s)$ = total hours of excessive delay in § 490.711(e) for all traffic traveling through travel time reporting segment "$s$" during the reporting year (as defined in § 490.711(f));

Total Population = the total population in the applicable urbanized area as reported by the most recent U.S. Decennial Census.

(c) Calculation for the measure, described in this section, and target establishment for the measure shall be phased-in under the requirements in §§ 490.105(e)(8)(vi) and 490.105(f)(4)(vi).

8. Add Subpart H to read as follows:

**Subpart H- National Performance Management Measures to Assess the Congestion Mitigation and Air Quality Improvement Program – On-Road Mobile Source Emissions**

Sec.

**§ 490.801 Purpose.**

The purpose of this subpart is to implement the requirements of 23 U.S.C. 150(c)(5)(B) to establish performance measures for State Departments of Transportation (State DOTs) and the Metropolitan Planning Organizations (MPOs) to use in assessing on-road mobile source emissions.

**§ 490.803 Applicability.**

(a) The on-road mobile source emissions performance measure is applicable to all projects financed with funds from the 23 U.S.C. 149 CMAQ program apportioned to State DOTs in areas designated as nonattainment or maintenance for ozone ($O_3$), carbon monoxide (CO), or particulate matter ($PM_{10}$ and $PM_{2.5}$) National Ambient Air Quality Standards (NAAQS).

(b) This performance measure does not apply to States and MPOs that do not contain any portions of nonattainment or maintenance areas for the criteria pollutants identified in paragraph (a) of this section.

**§ 490.805 Definitions.**

All definitions in § 490.101 apply to this subpart. Unless otherwise specified in this part, the following definitions apply in this part:

Donut areas mean geographic areas outside a metropolitan planning area boundary, but inside the boundary of a nonattainment or maintenance area that contains a part of any metropolitan area(s). These areas are not isolated rural nonattainment and maintenance areas.

Isolated rural nonattainment and maintenance areas mean areas that do not contain or are not part of any metropolitan planning area as designated under the transportation planning regulations. Isolated rural areas do not have federally required metropolitan transportation plans or Transportation Improvement Plans (TIPs) and do not have projects that are part of the emissions analysis of any MPO's metropolitan transportation plan or TIP. Projects in such areas are instead included in statewide transportation improvement programs. These areas are not donut areas.

On-road mobile source means, within this rulemaking, emissions created by all projects and sources financed with funds from the 23 U.S.C. 149 CMAQ program.

**§ 490.807 National performance management measure for assessing on-road mobile source emissions for the purposes of the Congestion Mitigation and Air Quality Improvement Program.**

The performance measure for the purpose of carrying out the CMAQ Program and for State DOTs to use to assess on-road mobile source emissions is, "Total Emissions Reduction", which is the 2-year and 4-year cumulative reported emission reductions, for all projects funded by CMAQ funds, of each criteria pollutant and applicable precursors ($PM_{2.5}$, $PM_{10}$, CO, VOC, and NOx) under the CMAQ program for which the area is designated nonattainment or maintenance.

**§ 490.809 Data requirements.**

(a) The data needed to calculate the Total Emission Reduction measure shall come from the CMAQ Public Access System and includes:

(1) The applicable nonattainment or maintenance area;

(2) The applicable MPO; and

(3) The emissions reduction estimated for each CMAQ funded project for each of the applicable criteria pollutants and their precursors for which the area is nonattainment or maintenance.

(b) The State DOT shall:

(1) Enter project information into the CMAQ project tracking system for each CMAQ project funded in the previous fiscal year by March 1st of the following fiscal year; and

(2) Extract the data necessary to calculate the on-road mobile source emissions measures as it appears in the CMAQ Public Access System on July 1st for projects obligated in the prior fiscal year.

(c) Nonattainment and maintenance areas shall be identified based on the effective date of U.S. Environmental Protection Agency's designations under the NAAQS in 40 CFR part 81 at the time when the State DOT Baseline Performance Period Report is due to FHWA. These designations shall be used for the duration of the performance period.

**§ 490.811 Calculation of emissions metric.**

(a) The metric to calculate the Total Emission Reductions measure is the conversion of Emission Reductions from kg/day to short tons per year.

(b) The Annual Tons of Emission Reductions that are predicted for each applicable project reported to the CMAQ Public Access System for each criteria pollutant or precursor for one year shall be defined as follows:

$$Annual\ Tons\ of\ Emission\ Reductions(p)_i = Reductions(p)_i \times 0.4026$$

Where:

$p$ = criteria pollutant or precursor: $PM_{2.5}$, $PM_{10}$, , CO, VOC, or NOx;

$i$ = a project that is obligated for CMAQ funding for the first time;

$Reductions_p$ = estimated daily emissions reductions for a criteria pollutant or a precursor in a Federal fiscal year for which the project is obligated for CMAQ funding for the first time. This is reported in kg/day, in the first year the project is operational, to the nearest one thousandths; and

$Annual\ Tons\ of\ Emission\ Reductions(p)_i$

= total annual short tons, to the nearest one thousandths, of reduced emissions for a criteria pollutant or an applicable precursor "p" in the in the first year the project is obligated.

**§ 490.813 Calculation of emissions measure.**

(a) The Total Emission Reductions performance measure specified in § 490.807 shall be calculated in accordance with this section and used by State DOTs and MPOs to carry out CMAQ On-Road Mobile Source Emissions performance-related requirements of part 490.

(b) The Total Emission Reductions for each of the criteria pollutant or applicable precursor for all projects reported to the CMAQ Public Access System shall be calculated to the nearest one thousandths, as follows:

$$Total\ Emission\ Reduction(p) = \sum_{i=1}^{T} Annual\ Tons\ of\ Emission\ Reductions(p)_i$$

Where:

i = applicable projects reported in the CMAQ Public Access System for the first 2 Federal fiscal years of a performance period and for the entire performance period, as described in in § 490.105(e)(4)(i)(B);

p = criteria pollutant or applicable precursor: $PM_{2.5}$, $PM_{10}$, CO, VOC, or NOx;

$Annual\ Tons\ of\ Emission\ Reductions(p)_i$ = specified metric in § 490.811(b);

$T$ = total number of applicable projects reported to the CMAQ Public Access System for the first 2 Federal fiscal years of a performance period and for the entire performance period, as described in § 490.105(e)(4)(i)(B); and

$Total\ Emission\ Reduction(p)$ = cumulative reductions in emissions over 2 and 4 Federal fiscal years, total annual short tons, to the nearest one thousandths, of reduced emissions for criteria pollutant or precursor "p".