

Florida and MAP-21 Performance Measures
Methodology and Data Sources

Final Report

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INTRODUCTION

The Moving Ahead for Progress in the 21st Century Act (MAP-21) and the Fixing America’s Surface Transportation Act (FAST Act) transformed the federal-aid highway and transit programs by establishing new performance-based planning requirements for state departments of transportation (DOT), metropolitan planning organizations (MPO), and providers of public transportation services. The performance management framework focuses on seven national goal areas articulated in MAP-21: safety, infrastructure condition, congestion reduction, system reliability, freight movement and economic vitality, environmental sustainability, and reduced project delivery delays.

Specific requirements for implementing the performance management provisions of MAP-21 and the FAST Act are codified in the Code of Federal Regulations. As of October 2018, the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) have published eight final rulemakings that have some relationship to performance management. These include:

- Statewide and Nonmetropolitan Transportation Planning; Metropolitan Transportation Planning Final Rule (commonly referred to as the “Planning Rule”);
- Highway Safety Improvement Program (HSIP) Final Rule;
- National Performance Management Measures for the Highway Safety Improvement Program Final Rule (“PM1” Rule);
- National Performance Management Measures for Assessing Pavement Condition and Bridge Condition for the National Highway Performance Program Final Rule (“PM2” Rule);
- Asset Management Plan Final Rule;
- National Performance Management Measures for Assessing Performance of the National Highway System, Freight Movement on the Interstate System, and Congestion Mitigation and Air Quality Improvement Program (CMAQ) Final Rule (“PM3” Rule);
- Transit Asset Management (TAM) Final Rule; and
- Public Transportation Agency Safety Plan Final Rule.

The Planning Rule provides overarching context for long-range and short-term planning, establishing requirements for coordination in data collection and management and target setting between state DOTs, MPOs, and providers of public transportation services as well as for integrating performance based planning and programming into the statewide and metropolitan planning processes. The Safety (PM1), Pavement and Bridge Condition (PM2), and System Performance (PM3) Final Rules establish standardized statewide performance measures intended to address the seven national performance goals. Each rule contains requirements for target setting, data collection and management, performance measurement, reporting, and significant progress determination. The HSIP and Asset Management Plan Final Rules do not establish performance measures, but describe procedures for developing related plans and data management procedures.

The Transit Asset Management (TAM) Final Rule establishes minimum federal requirements for transit asset management, requires public transportation providers to develop and implement transit asset management plans, and establishes state of good repair (SGR) standards and four SGR performance measures. The Public Transportation Agency Safety Plan rule require public transit agencies to develop and implement Public Transportation Agency Safety Plans based on a Safety Management System approach. This rule was finalized in August 2018 and is not discussed in this report.

Definitions

To ensure consistent definitions, following terms are defined as follows in 23 CFR 490.101.

- A “metric” is defined as a quantifiable indicator of performance or condition.
- A “measure” is defined as an expression based on a metric that is used to establish targets and to assess progress toward meeting the established targets.
- 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.
- 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 Global Positioning Station (GPS), navigation units, cell phones) that includes average travel times representative of all traffic on each mainline highway 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 15 minutes of every day of the year recorded and calculated for every travel time segment where probe data are available. The NPMRDS does not include any imputed travel time data.
- 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 FHWA.

The Safety (PM1), Pavement and Bridge Condition (PM2), and System Performance (PM3) Final Rules provide the performance metrics and measures that the Florida Department of Transportation (FDOT), MPOs, and transit providers must report. These are described in this report.

Purpose

This report focuses on the Safety (PM1), Pavement and Bridge Condition (PM2), System Performance (PM3), and Transit Asset Management Final Rules. It provides an overview of the performance measures, metrics, and the data sources used by FDOT to develop the performance metrics and measures. This report also specifies a schedule to be used by FDOT in sharing performance measures data with the MPOs, so they may develop and track progress towards targets. This report will be updated in the future with additional detail on the Public Transportation Safety measures.

SAFETY (PM1) FINAL RULE

The Safety (PM1) Final Rule establishes five performance measures that support the data-driven performance framework outlined in the Highway Safety Improvement Program (HSIP) Final Rule. The HSIP is a federal-aid funding program intended to reduce fatalities and serious injuries on the nation’s roadways. Under the Safety Rule, FDOT is responsible for establishing statewide targets, which must be reported, along with baseline performance and progress towards achieving targets, in the annual HSIP report due August 31 of each year. Targets are applicable to all public roads regardless of functional classification or ownership.

Performance Measures

- **Number of Fatalities:** The total number of persons suffering fatal injuries in a motor vehicle crash during a calendar year.
- **Rate of Fatalities per 100 Million VMT:** The ratio of total number of fatalities to the number of vehicle miles traveled (VMT, in 100 Million VMT) in a calendar year.
- **Number of Serious Injuries:** The total number of persons suffering at least one serious injury in a motor vehicle crash during a calendar year.
- **Rate of Serious Injuries per 100 Million VMT:** The ratio of total number of serious injuries to the number of VMT (in 100 Million VMT) in a calendar year.
- **Number of Non-motorized Fatalities and Non-motorized Serious Injuries:** The combined total number of non-motorized fatalities and non-motorized serious injuries involving a motor vehicle during a calendar year.

Data Sources

The Florida Department of Highway Safety and Motor Vehicles (DHSMV) is the official custodian of traffic crash reports. Therefore, the DHSMV database is the official crash records database for the State of Florida.¹ DHSMV produces official crash numbers every year with a closeout date that can vary from year to year. In the past five years, this closeout date has ranged from July to October of the following year.

- **Fatality Data:** Florida DHSMV is the source for fatality data.
- **Serious Injury Data:** Florida DHSMV is the source for serious injury data. Agencies must use the definition for “Suspected Serious Injury (A)” from the Model Minimum Uniform Crash Criteria (MMUCC), 4th edition by April 15, 2019. Prior to April 15, 2019 agencies may use injuries classified as “A” on the KABCO scale² through use of serious injury conversion tables. However, agencies are

¹ Florida Highway Safety Improvement Program 2017 Annual Report – page 32 of 115

² KABCO scale was developed by the National Safety Council (NSC) and is frequently used by law enforcement for classifying injuries: K – Fatal; A – Incapacitating injury; B – Non-incapacitating injury; C – Possible injury; and O – No injury.

encouraged to begin using the MMUCC, 4th edition definition and attributes at the beginning of 2019 for a complete and consistent data file for the calendar year.

- **Number of Non-motorized Fatalities and Non-motorized Serious Injuries:** Florida DHSMV is the source for non-motorized fatalities and serious injuries.
- **Volume Data:** The FDOT Transportation Data and Analytics Office provides the VMT data. VMT information is generated via the HPMS software by taking the product of Annual Average Daily Traffic (AADT) and length (in miles) for all sections, and summing the section-specific results to the desired HPMS aggregation level (e.g., functional system, urban area, etc.). VMT statistics are typically made available by June of the following year.
 - VMT for MPO planning areas, if applicable, is estimated by the MPO. Whereas states are expected to use HPMS data to furnish the VMT denominator for the safety rate metrics, using HPMS data at the MPO level is not directly possible. The VMT denominator must include travel on all public roadways within the Metropolitan Planning Area boundary. In HPMS, local roadway travel is reported in aggregate for the state and for large Census urbanized areas. However, urbanized areas do not necessarily coincide with Metropolitan Planning Area boundaries, as MPOs also must plan for areas that are reasonably expected to become urbanized in the next 20 years. In HPMS, travel on roadways with higher functional classification is reported for specific geo-located roadway segments and may be readily disaggregated to the geographic bounds of a Metropolitan Planning Area. However, because travel on local roadways is not geo-located, HPMS by itself does not provide sufficient information to compute full travel in an MPO study area.³

Table 1 summarizes the applicability, data needs, sources, and availability for the safety performance measures.

³ FHWA's guidance to identify reasonable technical methods for developing consistent VMT estimates on local roadways for a geographic area smaller than an entire State is available at:
https://www.fhwa.dot.gov/planning/processes/tools/technical_guidance/index.cfm

Table 1. Data Summary for Safety Performance Measures

Performance Measures	Applicability	Data Needs/ Performance Metrics	Data Source/Owner	Date Available
Number of Fatalities	All Public Roads	Annual fatalities for the five years preceding the performance period	Fatality data from Florida DHSMV	July-October of the following year
Rate of Fatalities per 100 million VMT	All Public Roads	Annual fatalities and VMT for the five years preceding the performance period	Fatality data from Florida DHSMV;	July-October of the following year;
			AADT and Roadway Section Length from HPMS	June of the following year
Number of Serious Injuries	All Public Roads	Annual serious injuries for the five years preceding the performance period	Serious injury data from Florida DHSMV	July-October of the following year/
Rate of Serious Injuries per 100 million VMT	All Public Roads	Annual serious injuries and VMT for the five years preceding the performance period	Serious injury data from Florida DHSMV;	July-October of the following year;
			AADT from HPMS	June of the following year
Number of Non-motorized Fatalities and Serious Injuries	All Public Roads	Annual non-motorized fatalities and serious injuries for the five years preceding the performance period	Florida DHSMV	November of the following year

Figure 3 in Appendix A summarizes how data are used to calculate the safety performance measures in a flow chart.

Safety performance management promotes a coordinated relationship for common performance measures, resulting in comprehensive transportation and safety planning.

- FDOT Safety Office established statewide targets for all the five safety measures in the August 31, 2017 HSIP Annual Report for calendar year 2018, and in the August 31, 2018 HSIP Annual Report for calendar year 2019, and will continue to do so annually thereafter.
- Additionally, the FDOT Safety Office established statewide targets for three performance measures in the July 1, 2017 and July 1, 2018 versions of the State Highway Safety Plan (HSP), and will continue to do so annually thereafter. In addition to the three performance measures required to be reported by the PM1 rule, the Florida HSP includes 15 measures to comprehensively quantify safety performance.

Targets

The HSIP annual report documents the statewide performance measures toward the zero deaths vision. For the 2018 HSIP annual report, FDOT established 2019 statewide safety performance targets at “0” for each safety performance measure to reflect the Department’s vision of zero deaths.

Justification for Targets

Florida envisions a fatality-free system and established safety as its highest priority at least 35 years ago. Florida’s Legislature enacted state law in 1984 placing top priority on safety, Section 334.046(2), Florida Statutes:

“(2) The mission of the Department of Transportation shall be to provide a safe statewide transportation system that ensures the mobility of people and goods, enhances economic prosperity, and preserves the quality of our environment and communities.”

Florida shares the national traffic safety vision, “Toward Zero Deaths,” and formally adopted its own version of the national vision, “Driving Down Fatalities,” in 2012.

This vision is well documented in FDOT’s mission and vision. Safety is the first goal of the Florida Transportation Plan (FTP) and the emphasis of the Strategic Highway Safety Plan (SHSP). The FTP, published in 2015, includes the number of transportation-related fatalities as an indicator to watch. The SHSP, published in 2012 and, most recently, in 2016, specifically embraces Vision Zero and identifies potential strategies to achieve zero traffic deaths. Both the FTP and SHSP highlight the state’s continuing commitment to advancing performance management and a vision of zero deaths. Both the FTP and the SHSP were developed in coordination with Florida’s 27 MPOs through Florida’s Metropolitan Planning Organization Advisory Council (MPOAC).

The Florida Highway Safety Improvement Program (HSIP) annual report documents the statewide performance targets toward that zero deaths vision. For the 2018 HSIP annual report, FDOT established FDOT’s 2019 safety targets, which set the target at “0” for each performance measure to reflect the Department’s vision of zero deaths. Florida’s Highway Safety Plan (HSP) also echo the goals of the SHSP. All three data-driven initiatives cite the goal of reducing traffic crashes, fatalities, and serious injuries, with an ultimate vision of zero deaths. The federal target for fiscal year 2019 is consistent with our prior state goal of zero.

Data Schedule

FDOT will make the safety data available to MPOs no later than the end of October of each year, subject to the availability of data.

PAVEMENT AND BRIDGE CONDITION (PM2) FINAL RULE

The Pavement and Bridge Condition (PM2) Final Rule establishes six performance measures (four for pavement and two for bridges) that FDOT must use to manage pavement and bridge performance on the National Highway System (NHS). The rule helps ensure that federal-aid highway funding under the National Highway Performance Program (NHPP) supports the achievement of performance targets established in a FDOT's Transportation Asset Management Plan.

Performance Measures

Pavement and bridge performance measures refer to the percentages of network lane-miles (for pavement) and percentages of deck area (for bridges), in Good or Poor condition, computed using the reported metrics. Good condition suggests no major investment is needed, while Poor condition suggests major reconstruction investment is needed. The pavement and bridge performance measures are:

- Pavement
 - Percentage of pavements of the Interstate System in Good condition
 - Percentage of pavements of the Interstate System in Poor condition
 - Percentage of pavements of the non-Interstate NHS in Good condition
 - Percentage of pavements of the non-Interstate NHS in Poor condition
- Bridges
 - Percentage of NHS bridges classified as in Good condition
 - Percentage of NHS bridges classified as in Poor condition

Methodology - Pavement

Step 1: Identify Pavement Surface Type

The PM2 rule requires the pavement types to be grouped into the following three categories: Asphalt, Jointed, and Continuously Reinforced Concrete Pavements (CRCP).

Step 2: Performance Metric Threshold

The PM2 rule identifies the following pavement performance metrics:

- **International Roughness Index (IRI)** – IRI is the road roughness index most commonly used worldwide for evaluating and managing road systems. Road roughness is the primary indicator of the utility of a highway network to road users. IRI is defined as a statistic used to estimate the amount of roughness in a measured longitudinal profile.
- **Rutting** – A rut is defined as longitudinal surface depressions in the asphalt pavement derived from measurements of a profile transverse to the path of travel on a highway lane.
- **Faulting** – Faulting is defined as a vertical misalignment of pavement joints in Portland Cement Concrete Pavements (Jointed Concrete Pavement).
- **Cracking percent** – Cracking is defined as a fissure or discontinuity of the pavement surface not necessarily extending through the entire thickness of the pavement. Cracking percent is defined as the percentage of pavement surface exhibiting cracking
- **Present Serviceability Rating (PSR)** – PSR is a rating used to describe the quality of pavement condition.

As stated in the PM2 rule, the following thresholds for each of the pavement performance metrics are applied.

Table 2. Thresholds for Pavement Performance Metrics

Metric Rating	Good	Fair	Poor
IRI (inches/mile)	< 95	95 – 170	> 170
Cracking Percent (%)	< 5	<ul style="list-style-type: none"> • CRCP: 5 – 10 • Jointed: 5 – 15 • Asphalt: 5 – 20 	<ul style="list-style-type: none"> • CRCP: > 10 • Jointed: > 15 • Asphalt: > 20
Rutting (inches) (for asphalt only)	< 0.20	0.20 – 0.40	> 0.40
Faulting (inches) (for jointed only)	< 0.10	0.10 – 0.15	> 0.15

Good condition suggests no major investment is needed, while Poor condition suggests major reconstruction investment is needed.

Step 3: Overall Section Condition

Overall conditions for the roadway sections is based on the pavement type and the criteria are described below:

Table 3. Overall Section Condition – Pavement Measures

	Good	Fair	Poor
Asphalt	Section exhibits good rating for all three conditions: - IRI - Cracking Percent - Rutting	Sections not categorized as Good or Poor	Section exhibits poor rating for two or more of the three conditions: - IRI - Cracking Percent - Rutting
Jointed	Section exhibits good rating for all three conditions: - IRI - Cracking Percent - Faulting	Sections not categorized as Good or Poor	Section exhibits poor rating for two or more of the three conditions: - IRI - Cracking Percent - Faulting
CRCP	Section exhibits good rating for both the following conditions: - IRI - Cracking Percent	Sections not categorized as Good or Poor	Section exhibits poor rating for both the following conditions: - IRI - Cracking Percent

Good condition suggests no major investment is needed, while Poor condition suggests major reconstruction investment is needed.

Step 4: Sections Excluded

As stated in the PM2 rule, the following sections are excluded prior to computing all pavement condition measures:

- Sections that are identified in HPMS as Bridge;
- Sections that have an unpaved surface type or an “other” surface type (such as cobblestone, planks, and bricks); and
- Sections with missing and invalid data.

Step 5: Pavement Condition Measures

As stated in the PM2 rule, the pavement condition measures are calculated as follows:

- **% of Interstate pavements in Good condition** shall be computed to the one tenth of a percent as the ratio of number of Interstate lane miles which are in Good condition to the number of total lane miles.
- **% of Interstate pavements in Poor condition** shall be computed to the one tenth of a percent as the ratio of number of Interstate lane miles which are in Poor condition to the number of total lane miles.

- **% of Non-Interstate NHS pavements in Good condition** shall be computed to the one tenth of a percent as the ratio of number of Non-Interstate NHS lane miles which are in Good condition to the number of total Non-Interstate NHS lane miles.
- **% of Non-Interstate NHS pavements in Poor condition** shall be computed to the one tenth of a percent as the ratio of number of Non-Interstate NHS lane miles which are in Poor condition to the number of total Non-Interstate NHS lane miles.

Methodology – Bridge

Step 1: Identify Performance Metrics

The PM2 rule identifies the following bridge performance metrics:

- **Condition rating value for Deck (Item 58)** – describes the overall condition rating of the deck
- **Condition rating value for Superstructure (Item 59)** – describes the physical condition of all structural members.
- **Condition rating value for Substructure (Item 60)** – describes the physical condition of piers, abutments, piles, fenders, footings, or other components.
- **Condition rating value for Culverts (Item 62)** – evaluates the alignment, settlement, joints, structural condition, scour, and other items associated with culverts.

Step 2: Performance Metric Threshold

As stated in the PM2 rule, the following thresholds for each of the bridge performance metrics are applied.

Table 4. Thresholds for Bridge Performance Metrics

Metric Rating	Good	Fair	Poor
Deck (Item 58)	≥ 7	5 or 6	≤ 4
Superstructure (Item 59)	≥ 7	5 or 6	≤ 4
Substructure (Item 60)	≥ 7	5 or 6	≤ 4
Culvert (Item 62)	≥ 7	5 or 6	≤ 4

Good condition suggests no major investment is needed, while Poor condition suggests major reconstruction investment is needed.

Step 3: Bridge Condition Measures

As stated in the PM2 rule, the bridge condition measures are calculated as follows:

- **% of Bridges in Good condition** shall be computed to the one tenth of a percent as the ratio of deck area of bridges in Good condition to the total bridge deck area.
- **% of Bridges in Poor condition** shall be computed to the one tenth of a percent as the ratio of deck area of bridges in Poor condition to the total bridge deck area.

Data Sources

- **Pavement Condition Measures:** The governing data source for computing all four pavement condition measures is Highway Performance Monitoring System (HPMS). While currently the FDOT reports pavement condition data by June 15, beginning in 2019 the reporting date changes to April 15 for the Interstate system. The following HPMS data items are used:
 - Cracking percent;
 - Faulting;
 - IRI;
 - PSR; and
 - Rutting.
- **Bridge Condition Measures:** The governing data source for computing bridge condition measures and determining the percent of the total deck area of highway bridges classified as Structurally Deficient is the National Bridge Inventory (NBI). NBI includes information on approximately 600,000 of the nation’s bridges located on public roads. Bridge data are uploaded to the NBI by March 15 of the following year. The following NBI data items are used:
 - NBI Data Item 58: Deck;
 - NBI Data Item 59: Superstructure;
 - NBI Data Item 60: Substructure; and
 - NBI Data Item 62: Culvert.
- **Bridge Deck Area Calculations:** for determining the deck area, the following NBI Data Items are used:
 - NBI Data Item 32: Approach Roadway Width;
 - NBI Data Item 49: Structure Length; and
 - NBI Data Item 52: Deck Width.

Table 5 summarizes the applicability, data needs and sources for the Pavement and Bridge condition performance measures.

Table 5. Data Summary for Pavement and Bridge Condition Performance Measures

Performance Measures	Extent	Data Needs/ Performance Metrics	Data Source/Owner	Date Available
Percent of Pavements on the Interstate in Good Condition	Interstate	IRI, Rutting, Faulting, Cracking Percent, PSR	Pavement Data from FDOT State Materials Office; LRS Network from FDOT TDA Office*	April 15 of the following year; Ongoing;
Percent of Pavements on the Interstate in Poor Condition	Interstate	IRI, Rutting, Faulting, Cracking Percent, PSR	Pavement Data from FDOT State Materials Office; LRS Network from FDOT TDA Office*	April 15 of the following year; Ongoing;
Percent of Pavements on the Non-Interstate NHS in Good Condition	Non-Interstate NHS	IRI, Rutting, Faulting, Cracking Percent, PSR	Pavement Data from FDOT State Materials Office; LRS Network from FDOT TDA Office*	April 15 of the following year; Ongoing;
Percent of Pavements on the Non-Interstate NHS in Poor Condition	Non-Interstate NHS	IRI, Rutting, Faulting, Cracking Percent, PSR	Pavement Data from FDOT State Materials Office; LRS Network from FDOT TDA Office*	April 15 of the following year; Ongoing;
Percent of Bridge Deck Area on the NHS in Good Condition	NHS	NBI Items: Deck, Superstructure, Substructure, Culverts, Approach Width, Structure Length, Deck Width	Bridge Data from FDOT Maintenance Office; LRS Network from FDOT TDA Office*	March 15 of the following year; Ongoing;
Percent of Bridge Deck Area on the NHS in Poor Condition	NHS	NBI Items: Deck, Superstructure, Substructure, Culverts, Approach Width, Structure Length, Deck Width	Bridge Data from FDOT Maintenance Office; LRS Network from FDOT TDA Office*	March 15 of the following year; Ongoing;

* The pavement and bridge data must be joined to the HPMS linear referencing system to determine which segments are on the Interstate and Non-Interstate NHS.

Figure 4 in **Appendix A** summarizes how data are used to calculate the pavement and bridge condition performance measures in a flow chart.

As described in the flow chart, using the data from HPMS and NBI, the pavement and bridge performance metrics and measures are calculated. Pavement and bridge performance targets will be determined from asset management analyses and procedures and reflect investment strategies that work toward achieving a state of

good repair over the life cycle of assets at minimum practicable cost. FDOT will document the target setting methodology and the targets in the Transportation Asset Management Plan (TAMP).

Targets

Pavement

Table 6. Targets for Pavement Condition Performance Measures

FHWA Performance Measure	2-year Target	4-year Target
% of Interstate pavements in Good condition	n/a	≥ 60%
% of Interstate pavements in Poor condition	n/a	≤ 5%
% of non-Interstate NHS pavements in Good condition	≥ 40%	≥ 40%
% of non-Interstate NHS pavements in Poor condition	≤ 5%	≤ 5%

Note: Per the federal rule, no more than 5 percent of the Interstate pavement can be in Poor condition.

Bridge

Table 7. Targets for Bridge Condition Performance Measures

FHWA Performance Measure	2-year Target	4-year Target
% of NHS bridges classified as in Good condition by deck area	≥ 50%	≥ 50%
% of NHS bridges classified as in Poor condition by deck area	≤ 10%	≤ 10%

Note: Per the federal rule, no more than 10 percent of the total deck area of NHS bridges can be classified as Structurally Deficient (Poor).

Justification for Targets

Pavement

The targets for the FHWA pavement condition performance measures were established after review and analysis of the last three years of the Department’s Interstate and non-Interstate NHS pavement condition survey data.

In the analyses of the pavement data, the federal regulation uses methodologies to measure rut depth and cracking that represent a significant departure from those currently used by the Department. Further, the FHWA pavement metrics are summarized in 0.1-mile intervals. All these three metrics (IRI, cracking percent and rutting/faulting) must be rated Good for the 0.1-mile segment to be considered Good. To be rated as Poor, two of the three metrics must be rated Poor.

In contrast, the Department performs a visual estimate of the extent of cracking and measures rutting using three points along the roadway width (i.e., both wheel paths and the center of the roadway). In addition, these pavement measurements are averaged along the entire length of the segment which can vary in length.

Pavement meeting the Department’s standards is defined as pavement for which each of the three rating factors (ride quality, crack severity and rutting) are scored 6.5 or above on a 10-point scale. The segment is considered Deficient if any one of the three ratings are deficient. The Department’s crack rating is a combination of lengths and severities as well as raveling and patching and is not comparable to the FHWA cracking percent, which is the percentage of the area of the surface section exhibiting visible cracking attributed to fatigue cracking only.

Figure 1 illustrates the differences between the Department and FHWA criteria for assessing pavement condition.

Figure 1: FDOT and FHWA Pavement Rating Criteria

	Non-Deficient	Deficient	
Ride Rating	≥ 6.5 (IRI ≤ 125 in/mile)	< 6.5 (IRI > 125)	FDOT
Crack Rating	≥ 6.5	< 6.5	
Rut Rating	≥ 6.5 (Rut < 3/8 in)	< 6.5 (Rut > 3/8 in)	

	Good	Fair	Poor	
IRI (in/mile)	< 95	95 - 170	> 170	FHWA
Cracking Percent	< 5	5 - 15 (JPCP) 5 - 20 (Asphalt)	> 15 (JPCP) > 20 (Asphalt)	
Rutting (in)	< 0.2	0.2 - 0.4	> 0.4	

Section 334.046 (4)(a), Florida Statutes, requires FDOT to ensure that 80 percent of the pavement on the State Highway System (SHS), which contains the majority of the NHS, meets Department standards. The Department will continue to use its long-standing, existing asset management processes to meet the Department standards. On the other hand, the federal performance measures focus on the Interstate highway system and NHS, rather than the full SHS. The NHS generally is a subset of the SHS, but also includes a small number of locally owned roads in MPO planning areas. About 6.5 percent of the center-line miles on Florida’s NHS are locally owned.

The Department will collect the data to satisfy the federal requirements based on the required approaches and technologies in the regulations. The Department has not previously collected pavement condition data using these new methodologies. Therefore, in consideration of the differences in data collection requirements used by the Department and those mandated by the rule, as well as other unknowns and unfamiliarity associated with the new required processes, conservative four-year targets for the Interstate and two- and four-year targets for the non-Interstate NHS pavement conditions were established.

- For the targets related to the percentage of pavement in Good condition, FDOT established targets for the federal performance measure slightly lower than current performance (initial four-year targets of ≥ 60.0 percent of Interstate pavements in Good condition and initial two- and four-year targets of

≥ 40.0 percent of non-Interstate NHS pavements in Good condition). The expectation is that FDOT will meet or exceed these targets

- For the targets related to the percentage of pavement in Poor condition, FDOT established a target for the federal performance measure equal to the maximum threshold established in federal rule for Interstate pavement (≤ 5.0 percent) and applied the same target to the federal performance measure for the non-Interstate NHS pavement. In both cases the expectation is that FDOT will meet or come in below these targets.

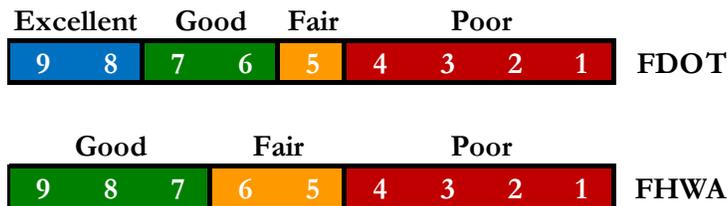
Bridge

The targets for the FHWA NHS bridge condition performance measures were established after review and analysis of the last five years of the Department’s bridge data collected through the annual bridge inventory process.

The federal regulation criteria consider bridges to be in Good condition if the NBI rating is 7, 8, or 9 and to be in Poor condition if the NBI rating is 4 or less. The percentage of bridges in Good and Poor condition will be reported to FHWA as a percentage of deck area for all bridges on the NHS. In contrast, the Department considers bridges to be in Excellent condition if the NBI rating is 9 or 8; Good condition if the NBI rating is 6 or 7; Fair condition if the NBI rating is 5; and Poor condition if the NBI rating is 4 or less. The Department’s internal process is to have no more than 10 percent of its bridges in Poor Condition. The Department does not program any significant bridge work for bridges with a NBI rating of 5, 6, 7, 8, or 9, but does actively perform routine maintenance and repairs.

Figure 2 shows the differences between the FDOT and FHWA criteria for assessing bridge condition.

Figure 2: FDOT and FHWA National Bridge Inventory (NBI) Rating Criteria



Section 334.046 (4)(a), Florida Statutes, requires FDOT to ensure that 90 percent of FDOT-maintained bridges meets Department standards. The Department will continue to use its long-standing, existing asset management processes to meet the Department standards. Both the FDOT and federal standards are based on NBI rating criteria on a 9-point scale, with three important differences:

- The FDOT standard covers all FDOT-maintained bridges on the SHS; the FHWA measure focuses on bridges on the NHS;
- The FDOT standard is calculated based on the total number of bridges; the FHWA measure is calculated based on deck area of bridges; and
- The FDOT standard defines meeting standards as 6 or higher on the NBI scale; the FHWA measure is calculated for both Good (7 or higher) or Poor (4 or lower).

An evaluation of historical bridge data over the last few years show the condition of bridges on the NHS is slowly moving from Good condition to Fair condition (NBI 5 or 6 per FHWA definition), which is to be expected as the Department's bridge inventory is slowly growing older. However, the Department programs bridges for repair or replacement work to begin within six years of reaching deficient status (NBI 4) or becoming posted.

Recently the Department has formed a Bridge Performance Group consisting of FDOT personnel and industry representatives to consider how data at the element level can be used to track bridge condition and the effectiveness of element level repairs over time. The goal is to determine when repairs are needed and which repairs are the most effective to extend the bridge service life. This will be an on-going effort to develop, monitor, and draw conclusions. It is anticipated that as data are collected, deterioration models will be refined, which should lead to long term cost savings and longer lasting bridges over time.

The Department identifies bridge maintenance needs during bridge inspections, and programs bridge maintenance and repair work to address these needs. The Department programs bridges for rehabilitation or replacement to begin within 6-years of being identified as being in Poor condition. The Department plans to continue with these internal processes, meet targets as established per FHWA criteria, and use the same targets for the two and four-year cycle. At some point in the future, the Department may adjust its targets if how the Department currently programs bridge work leads to consistent reporting results per FHWA criteria.

- For the targets related to the percentage of bridge deck area in Good condition, FDOT established targets for the federal performance measure lower than current performance (two- and four-year targets of ≥ 50.0 percent). The expectation is that FDOT will meet or exceed these targets.,
- For the targets related to the percentage of bridge deck area in Poor condition, FDOT established a target for the federal performance measure equal to the maximum threshold established in federal rule (two- and four-year targets ≤ 10.0 percent). In both cases the expectation is that FDOT will meet or come in below these targets.

Data Schedule

FDOT will provide a summary table and raw data for all the pavement and bridge performance measures to the MPOs by June 30 and the first week of April each year, respectively.

SYSTEM PERFORMANCE (PM3) FINAL RULE

The System Performance (PM3) Final Rule is intended to carry out the NHPP, National Highway Freight Program (NHFP), and Congestion Mitigation and Air Quality Improvement Program (CMAQ) through seven performance measures that address travel-time reliability, freight movement, greenhouse gas emissions, and delay on the Interstate and Non-Interstate NHS, and non-SOV travel and on-road mobile source emissions reductions. Because Florida does not have any air quality nonattainment or maintenance areas, three of the seven performance measures, related to the CMAQ program, are not currently required to be calculated by FDOT nor by Florida's MPOs. These three measures are not discussed in this document. In addition, the FHWA repealed a fourth measure related to Greenhouse Gas (GHG) in the Federal Register in May 2018. Thus, the GHG measure is not discussed in this document either.

The rule outlines key data items that should be used in the quantification of performance measures, such as travel time, average annual daily traffic (AADT), and vehicle occupancy factors. The rule also establishes mechanisms for reporting data and performance metrics to HPMS.

Performance Measures

- Percent of person-miles traveled on the Interstate that are reliable
- Percent of person-miles traveled on the non-Interstate National Highway System (NHS) that are reliable
 - The above two performance measures assess the percent of person-miles traveled on the Interstate or the non-Interstate NHS that are reliable. Each segment of roadway is assessed a Level of Travel Time Reliability (LOTTR), defined as the ratio of longer travel times (80th percentile) to a median travel time (50th percentile), over specific time periods on both weekdays and weekends. A segment with any LOTTR under 1.5 is considered reliable. These segments are weighted by traffic volume and expressed as the percent of person-miles traveled on the Interstate or non-Interstate NHS system that are reliable.
- Truck Travel Time Reliability (TTTR) Index
 - The TTTR performance measure assesses the reliability for trucks traveling on the Interstate. A TTTR ratio is generated for each segment of the Interstate system by dividing the 95th percentile travel time by a median travel time (50th percentile) over specific time periods throughout weekdays, overnight, and weekends. This is averaged across the length of all Interstate segments in the state or MPO planning area to determine the TTTR Index.

Methodology

Percent of Person Miles Traveled on the Interstate and Non-Interstate NHS that are Reliable

There are two federally required travel time reliability performance measures:

- Percent of Person Miles Traveled on the Interstate that are Reliable
- Percent of Person Miles Traveled on the non-Interstate NHS that are Reliable

These measures are calculated by determining the Level of Travel Time Reliability (LOTTR) for each reporting segment, rounded to the nearest hundredth. LOTTR is defined as the ratio of 80th percentile travel time to the 50th percentile travel time using travel time data in 15-minute intervals from the National Performance Monitoring Research Dataset (NPMRDS). The LOTTR metric is calculated for the following time periods:

- AM Peak – 6:00am – 10:00am on Monday – Friday
- Mid-day – 10:00am – 4:00pm on Monday – Friday
- PM Peak – 4:00pm – 8:00pm on Monday – Friday
- Weekends – 6:00am – 8:00pm on Saturday and Sunday

Segments with LOTTR ≥ 1.50 during any of the above time periods are considered unreliable. To obtain person miles traveled, vehicle miles traveled (VMT) for each segment are multiplied by the average vehicle occupancy for each type of vehicle on the roadway. FHWA published a national average occupancy of 1.7 for all roads and that is the number that was used for all the segments in Florida. To calculate the percent of person miles traveled that are reliable on the Interstate, sum the number of reliable person miles traveled and divide by the sum of total person miles traveled.

Truck Travel Time Reliability Index

Truck reliability is measured as the Truck Travel Time Reliability Index on the Interstate System. The Truck Travel Time Reliability Index is also calculated using travel time data in 15-minute intervals from the NPMRDS. Average travel times are ranked for each segment of the Interstate for each of the following five time periods:

- AM Peak – 6:00am – 10:00am on Monday – Friday
- Mid-day – 10:00am – 4:00pm on Monday – Friday
- PM Peak – 4:00pm – 8:00pm on Monday – Friday
- Weekend – 6:00am – 8:00pm on Saturday - Sunday
- Overnight – 8:00pm – 6:00am on all days of the week

Truck Travel Time Ratio (TTTR) is calculated by dividing the 95th percentile truck travel time by the 50th percentile truck travel time for each segment of the Interstate during each of the time periods. The highest TTTR for each segment is then weighted by segment length. The sum of the weighted values are divided by the total Interstate length to calculate the Travel Time Reliability Index.

Data Sources

The data sources for the three (3) performance measures in PM3 Rule are presented in the table below.

Table 8. Data Summary for System Performance Measures

Performance Measures	Extent	Data Needs/ Performance Metrics	Data Source/Owner	Date Available
Percent of Person-Miles Traveled on the Interstate that are Reliable	Interstate	Level of Travel Time Reliability – 80 th percentile travel time and 50 th percentile travel time for 15-minute intervals during four time periods	Travel time from NPMRDS	January of following year
			AADT from HPMS ⁴	January of following year
			Segment Length from NPMRDS	January of following year
			Occupancy Factor provided by FHWA	Ad hoc basis
Percent of Person-Miles Traveled on the Non-Interstate NHS that are Reliable	Non-Interstate NHS	Level of Travel Time Reliability – 80 th percentile travel time and 50 th percentile travel time for 15-minute intervals during four time periods	Travel time from NPMRDS	January of following year
			AADT from HPMS ⁵	January of following year
			Segment Length from NPMRDS	January of following year
			Occupancy Factor provided by FHWA	Ad hoc basis
Truck Travel-Time Reliability Index	Interstate	Truck Travel Time Reliability – 95 th percentile truck travel time and 50 th percentile truck travel time for 15-minute intervals during five time periods	Truck travel time from NPMRDS	January of following year

Note: NPMRDS – National Performance Management Research Data Set;

AADT – Average Annual Daily Traffic;

HPMS – Highway Performance Monitoring System

NPMRDS

NPMRDS is a national data set of average travel times on the National Highway System that was acquired by FHWA for use in its performance measures and management activities. This data set is also available to DOTs and MPOs to use for their performance management activities.

The first version (v1) of the NPMRDS data set was acquired by FHWA for 2014, 2015 and 2016 using travel time data from the private vendor HERE Technologies. The second version (v2) of the NPMRDS data set

⁴ It is important to note that, while the AADT data ultimately comes from HPMS, the rules requires that these data be conflated to the NPMRDS TMC segments. For that reason, most states, including Florida, are using the FHWA-provided AADTs that are associated to the NPMRDS. These AADTs may be two years behind the year of the travel times.

was acquired for 2017 onwards using travel time data from the private vendor INRIX, Inc. This change in vendors for acquiring the NPMRDS data set in 2017 directly impacts the results for performance measures.

In addition to the travel time data, the segment lengths for each roadway segment are also provided by NPMRDS.

Starting in 2017, FHWA includes the AADT reported in HPMS as part of the NPMRDS data sets. However, it should be noted that this causes a temporal mismatch as data submitted through HPMS in one year reflects data collected in the previous year (i.e. traffic counts submitted in 2016 are reflective of 2015 conditions).

Occupancy Factors

For computing Travel Time Reliability measures, the PM3 Rule requires that the Occupancy Factors needed to calculate the measures must come from the most recently available data tables published by FHWA, unless using other allowed data source(s). In April 2018, FHWA provided guidance that an Occupancy Factor of 1.7 be used for calculating the Travel Time Reliability measures.

Figure 5 in Appendix A summarizes how data are used to calculate the system performance measures in a flow chart.

Targets

Table 9. Targets for System Performance Measures

FHWA Performance Measure	2-year Target	4-year Target
Percent of the Person-Miles Traveled on the Interstate That Are Reliable	75.0%	70.0%
Percent of the Person-Miles Traveled on the Non-Interstate NHS That Are Reliable	n/a	50.0%
Truck Travel Time Reliability (TTTR) Index	1.75	2.00

Justification for Targets

FDOT undertook the following steps as a part of the target setting process:

- Reviewed the external factors (also called exogenous factors) that affect transportation system performance but are typically outside the control (at least operationally) of transportation agencies.
- Reviewed the internal factors and influences that affect transportation system performance and are under the control of transportation agencies.
- Conducted a trend line analysis for the performance measures using the baseline data.
- Conducted a sensitivity analysis to analyze the performance measures in detail.
- Set the targets.

The methodologies used to calculate the FHWA measures are similar to those used by FDOT to develop mobility performance measures in the past, but with some differences. As noted above, the NPMRDS data set changed significantly in 2017, making that year's data not directly comparable to prior year's information. FDOT applied the historic trend line in the system performance measures prior to 2017 as one approach for establishing targets. Because of these changes in methodology and data requirements, FDOT decided to be conservative in establishing initial targets in 2018, with the expectation that these targets could be refined over time when multiple years of baseline data are available. In most cases, the lower end of the range projected for each measure if current trends continue was selected for the target.

- For the percent of person-miles traveled on the Interstate that are reliable, baseline performance for Florida in 2017 was estimated at 82 percent, with a range from 79 percent to 85 percent on a monthly basis. FDOT established a two-year target of 75 percent and a four-year target of 70 percent for this measure.
- For the percent of person-miles traveled on the non-Interstate NHS that are reliable, baseline performance for Florida in 2017 was estimated at 84 percent, with a range from 82 percent to 87 percent on a monthly basis. FDOT established a four-year target of 50 percent for this measure.
- For the truck travel time reliability index, baseline performance for Florida in 2017 was estimated at 1.43 percent, with a range from 1.41 to 1.69. FDOT established a two-year target of 1.75 and a four-year target of 2.00 percent for this measure.

In each case, FDOT established a target that anticipates a decline from current performance, reflecting the likelihood that increasing population, improving economic conditions, and associated growth in travel demand could lead to a worsening of system performance in the future.

Data Schedule

FDOT will provide data for the three required measures to the MPOs by June 30 of each year.

TRANSIT ASSET MANAGEMENT PLAN FINAL RULE

The Federal Transit Administration (FTA) Transit Asset Management (TAM) Final Rule became effective on October 1, 2016. The purpose of the Final Rule is to help achieve and maintain a state of good repair (SGR) for the nation’s public transportation assets. Transit Asset Management is a business model that uses the condition of assets to guide the optimal prioritization of funding at transit properties and keep transit networks in a state of good repair.

SGR is the condition in which a capital asset is able to operate at a full level of performance. A capital asset is in a state of good repair when that asset:

- Is able to perform its designed function;
- Does not pose a known unacceptable safety risk; and
- Lifecycle investments have been met or recovered.

This rule applies to all recipients and subrecipients of FTA funding that own, operate, or manage public transportation capital assets. The rule introduces three key requirements:

- new SGR performance measures and targets;
- revised National Transit Database (NTD) reporting requirements; and
- new Transit Asset Management (TAM) Plan requirement.

The Final Rule groups transit providers into two categories: Tier I and Tier II.

- Tier I providers own, operate, or manage: rail, more than 100 vehicles across all fixed-route modes, or more than 100 vehicles in one non-fixed route mode.
- Tier II providers are sub-recipients of 5311 funds, or an Native American Tribe, or own, operate, or manage fewer than 100 vehicles across all fixed route modes, or fewer than 100 vehicles in one non-fixed route mode.

TAM Plan Elements

The TAM rule requires every transit provider that receives federal financial assistance under 49 U.S.C. 53 to develop a TAM Plan or be a part of a Group TAM Plan prepared by a sponsor. Table 10 shows the TAM Plan elements that are required by each category of provider. Since Tier II providers generally operate less complex systems, their TAM Plan requirements are not as extensive.

Table 10. TAM Plan Elements

TAM Plan Element	Transit Provider
1. Inventory of Capital Assets	Tier I and Tier II
2. Condition Assessment	
3. Decision Support Tools	
4. Investment Prioritization	
5. TAM and SGR Policy	Tier I only
6. Implementation Strategy	
7. List of Key Annual Activities	
8. Identification of Resources	
9. Evaluation Plan	

Group TAM Plan Participants

Because FDOT is the direct recipient of FTA funds for its subrecipients, FDOT’s Transit Office sponsored a Group TAM plan for those providers. A total of 28 transit providers participated in this Group TAM Plan. The participants in the FDOT Group TAM Plan are comprised of the Section 5311 Rural Program and open-door Section 5310 Enhanced Mobility of Seniors & Individuals with Disabilities FDOT subrecipients. The Group TAM Plan was adopted in October 2018 and covers fiscal years 2018-2019 through 2021-2022. Table 11 lists the Group TAM Plan participants.

Table 11. Group TAM Plan Participants

District	Participant
District 1	Good Wheels, Inc.
	CFRPC
	DeSoto County Transportation
District 2	Suwannee Valley Transit
	Big Bend Transit
	Baker County Council on Aging
	Nassau County Transit
	Clay Transit
	The Ride Solution
	Levy County Transit
Suwannee River Economic Council (SREC)	
District 3	Tri-County Community Council

District	Participant
	Big Bend Transit
	Santa Rosa Transit
	Gulf County ARC
	Calhoun Senior Citizen Center
	Liberty County Transit
	JTRANS
	Wakulla Transit
District 5	Sumter Transit
	Marion Transit
	Flagler County Public Transportation
District 6	Key West Transit
District 7	Neighborly Care Network
	Mid-Florida Community Service
	ARC Tampa Bay
	ARC Nature Coast
	PARC

All facilities, equipment, rolling stock, and infrastructure that an agency owns, operates, or manages must be included in the TAM Plan asset inventory. This includes (with the exception of equipment) assets that are owned by a third party or shared resources. The inventory must include all service vehicles, and any other owned equipment assets over \$50,000 in acquisition value. Agencies only need to include condition assessment for assets for which they have direct capital responsibility.

Performance Measures

Table 12 lists the required TAM performance measures. Asset performance is measured by asset class, which means a subgroup of capital assets within an asset category. The following table shows assets for which performance needs to be reported to the NTD and the measure which will be reported. Useful Life Benchmark (ULB) is defined as the expected lifecycle of a capital asset for a particular transit provider’s operating environment, or the acceptable period of use in service for a particular transit provider’s operating environment. ULB is not the same as an asset’s useful life. ULB considers a provider’s unique operating environment such as geography, service frequency, etc.

Table 12. TAM Asset Performance Measures

Asset Class	Performance Measure
<u>Equipment</u> : Non-revenue support-service and maintenance vehicles	Percentage of nonrevenue vehicles met or exceeded Useful Life Benchmark
<u>Rolling Stock</u> : Revenue vehicles by mode	Percentage of revenue vehicles met or exceeded Useful Life Benchmark
<u>Infrastructure</u> : Only rail fixed-guideway, track, signals and systems (Applicable to Tier I providers only)	Percentage of track segments with performance restrictions
<u>Facilities</u> : Maintenance and administrative facilities; and passenger stations (buildings) and parking facilities	Percentage of assets with condition rating below 3.0 on FTA TERM Scale

Data Sources

The principal data source is the detailed asset inventory per provider, which is summarized in the Group TAM Plan. This includes detailed information for total of 813 assets, including 752 revenue vehicles, 13 pieces of equipment (including support vehicles), and 48 facilities.

Figure 6 in **Appendix A** summarizes how data are used to calculate the transit asset management measures in a flow chart.

Targets

Targets are set by each transit provider or TAM plan sponsor for each applicable asset class for the coming year. Initial targets were set by January 1, 2017 and then must be set every fiscal year thereafter.

FDOT, as the Group TAM plan sponsor, is principally responsible for establishing performance targets applicable to all group plan participants. Table 13 lists the statewide targets for the Group TAM Plan participants:

Table 13. Statewide Targets for Transit Asset Management Performance Measures

Performance Measure	Asset Class	FY2019 Asset Condition	FY2020 Target
Revenue Vehicles			
% of revenue vehicles met or exceeded ULB	Automobile	55%	45%
	Bus	15%	13%
	Cutaway Bus	28%	28%
	Mini-Bus	31%	28%
	Van	13%	11%
	SUV	0%	0%
	Van	47%	34%
	Equipment		
% of equipment or non-revenue vehicles met or exceeded ULB	Non-revenue/service automobile	67%	67%
	Trucks and other rubber tire vehicles	50%	40%
	Maintenance equipment	50%	50%
	Route and scheduling software	100%	100%
Facilities			
% of assets with condition rating below 3.0 of FTA TERM scale	Administration	0%	9%
	Maintenance	6%	12%

Justification for Targets

The Group TAM Plan asset inventory found that approximately 27 percent of all inventoried assets have met or exceeded their ULB. The asset inventory includes a total of 752 revenue vehicles with an average age of 5.5 years, of which 271 (or 35 percent) have met or exceeded their ULB. Based on the investment prioritization, vehicles that are rated poor or marginal in the cutaway class and the van class will be prioritized for replacement. The targets reflect the investment prioritization in the Group TAM Plan and the expectation of changing conditions as specific assets are replaced or upgraded in the following fiscal year.

Timeframes/Reporting

TAM Plans

A TAM plan must be updated in its entirety at least every four years, and it must cover a horizon period of at least four years.

Performance Targets

FDOT will update the statewide performance targets for the participating agencies on an annual basis, and will notify the participating transit agencies and the MPOs in which they operate when the targets are updated.

NTD

Each entity developing a TAM Plan must report annually to FTA's National Transit Database (NTD). This submission should include: (1) projected targets for the next fiscal year; (2) condition assessments and performance results; and (3) a narrative report on changes in transit system conditions and the progress toward achieving previous performance targets.

APPENDIX A

Figure 3: Safety Data Flow Chart

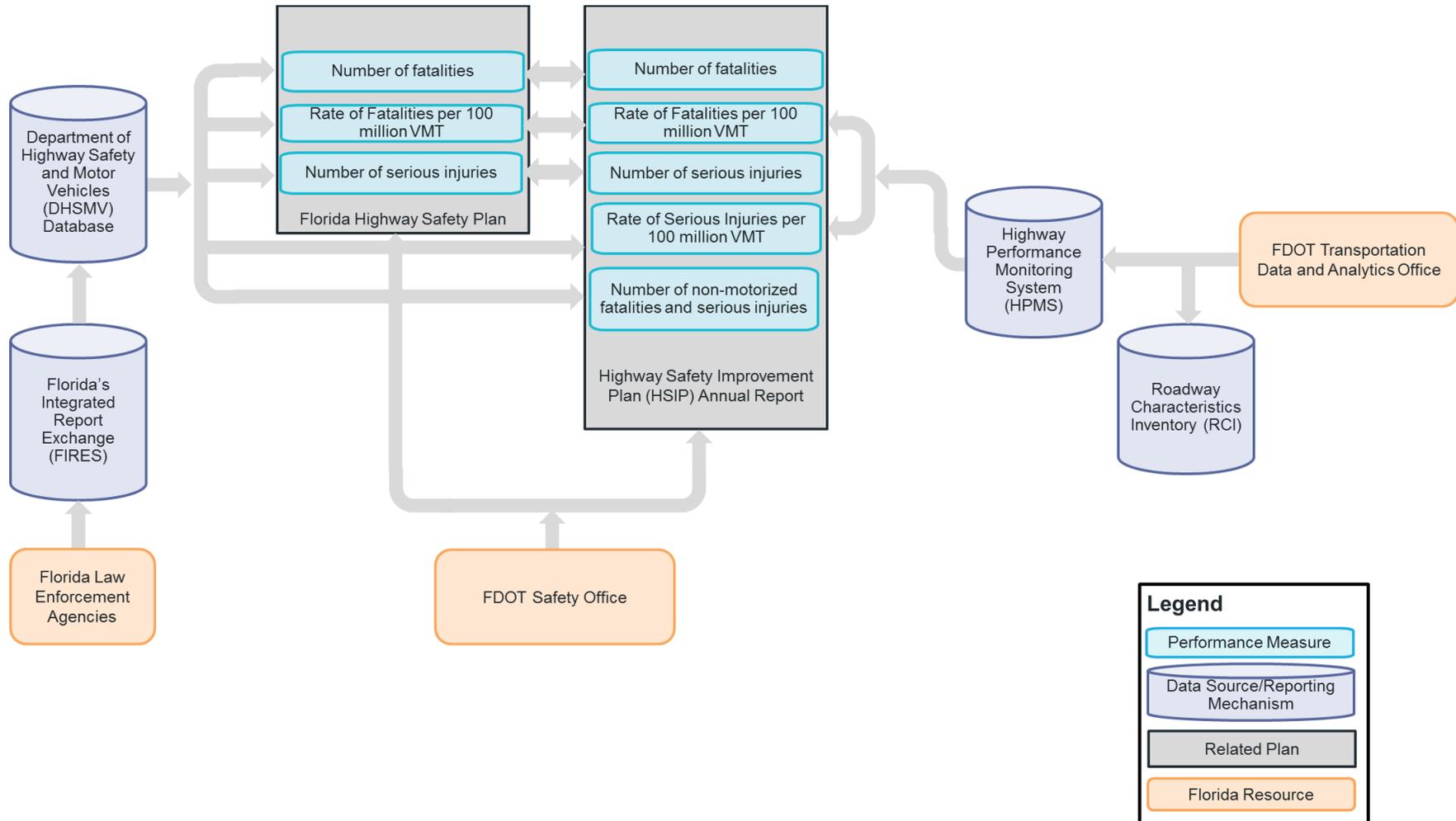


Figure 4: Pavement and Bridge Condition Data Flow Chart

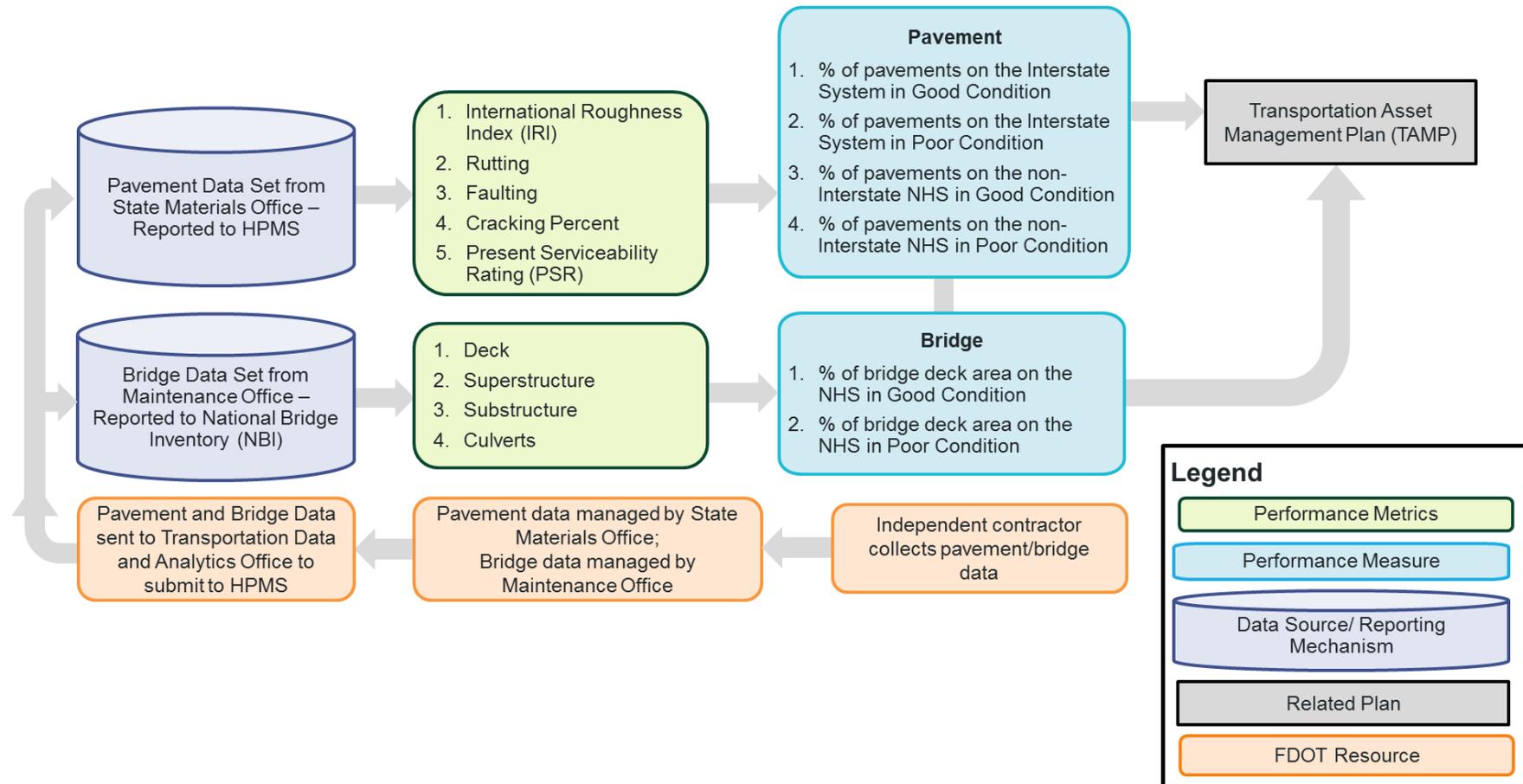


Figure 5: System Performance Data Flow Chart

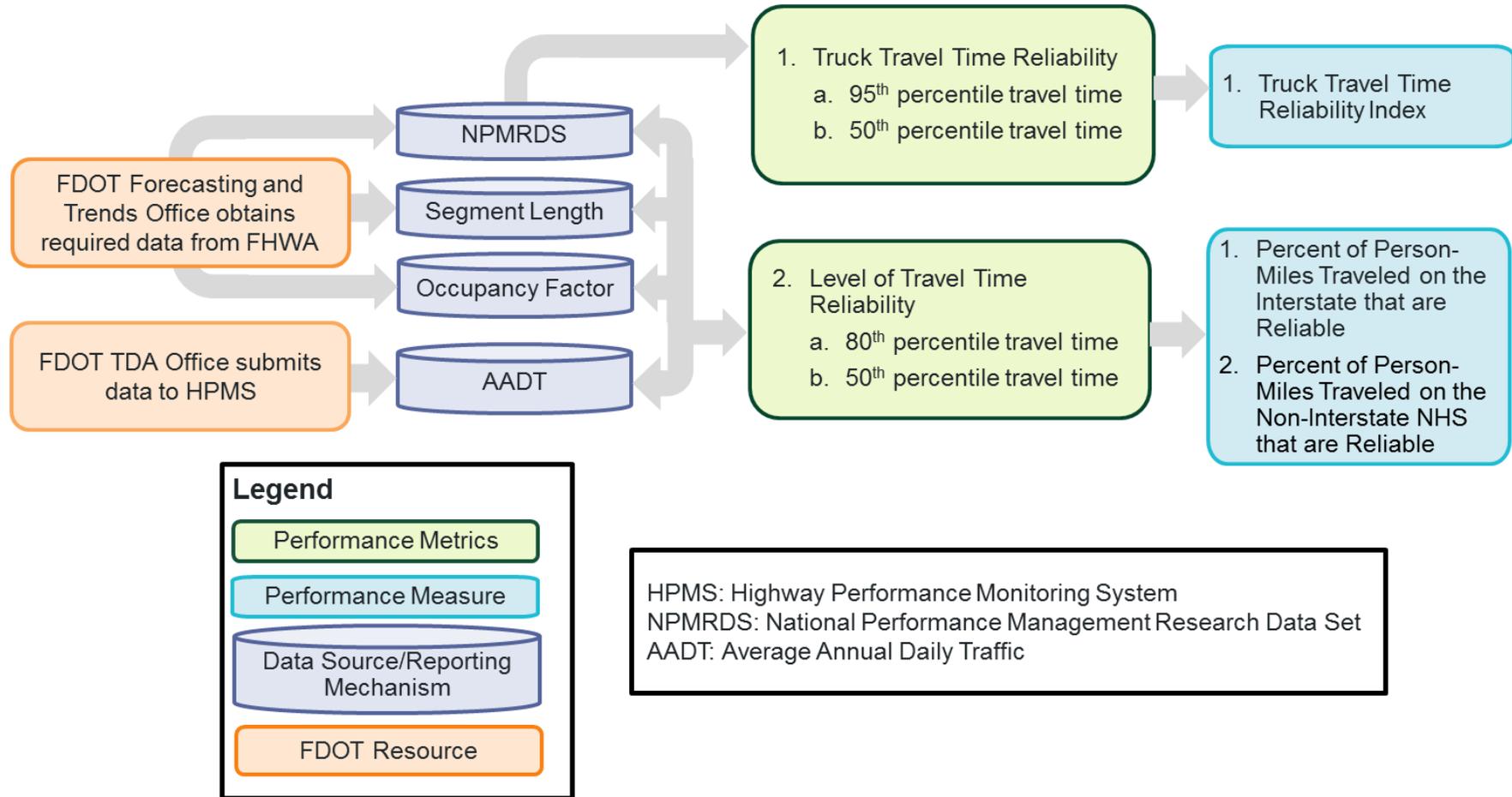


Figure 6: Transit Asset Management Data Flow Chart

