

Appendix M:

Performance Measures

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Performance Measures Overview

The Moving Ahead for Progress in the 21st Century Act (MAP-21) required State DOTs and MPOs to conduct performance-based planning and programming (PBPP) by tracking performance measures, setting data-driven targets for each measure, and selecting projects to help meet those targets. These PBPP requirements were continued and strengthened in the Fixing America’s Surface Transportation (FAST) Act. PBPP ensures the most efficient investment of federal transportation funds by increasing accountability and transparency and providing for better investment decisions that focus on key outcomes related to seven national goals:

- Safety
- Infrastructure preservation
- Congestion reduction
- System reliability
- Freight movement and economic vitality
- Environmental sustainability
- Reduced project delivery delays

The performance measures are grouped based on funding program and performance area.

Funding Program	Performance Area
Highway Safety Improvement Program (HSIP)	Roadway Safety
National Highway Performance Program (NHPP)	National Highway System (NHS) Asset (Pavement and Bridge) Management
	NHS Travel Time Reliability
National Highway Freight Program (NHFP)	Freight
Congestion Mitigation and Air Quality (CMAQ)	CMAQ Traffic Congestion
	CMAQ Emissions Reduction
Transit Asset Management (49 U.S. Code § 5326)	Transit Asset Management
Transit Safety & Oversight (49 U.S. Code § 5329)	Transit Safety

Requirements for each performance area are being phased in over time. This appendix describes how the NJTPA addresses all performance areas as currently required (all those noted above other than Transit Safety¹), including how this TIP is anticipated to help meet established state, regional and urbanized area performance measure targets. The latest targets can be found on the NJTPA website at <http://www.njtpa.org/Planning/Plans-Guidance/Performance-Measures.aspx>.

¹ Transit safety targets are to be set by transit operators in their Public Transportation Agency Safety Plans (PTASP), due to FTA by July 20, 2020. MPOs have an additional 180 days (by January 16, 2021) to either set specific MPO targets or support the transit agency targets. The TIP needs to be updated to discuss efforts to help meet transit safety targets by July 19, 2021 (two years after the transit safety final rule’s effective date of July 19, 2019).

Roadway Safety Performance Measures

Background

Safety is the first national goal identified in the FAST Act. In March 2016, the Highway Safety Improvement Program and Safety Performance Management Measures Rule (Safety PM Rule) was finalized and published in the Federal Register. The rule requires State DOTs and MPOs to set targets for five safety-related performance measures on an annual basis, beginning with targets for calendar year (CY) 2018. State DOTs report baseline values, targets, and progress toward meeting the targets to the Federal Highway Administration (FHWA) in an annual safety report. MPOs may either establish quantitative targets for their metropolitan planning area or agree to plan and program projects that contribute toward the accomplishment of the statewide targets. MPOs must report their safety targets to the State DOT, and include a discussion of progress toward meeting them in any TIPs or Long Range Plans amended after May 27, 2018.

The federal roadway safety performance measures are five-year rolling averages (including crashes on all public roads) of:

- **Number of fatalities**
- **Rate of fatalities per 100 million vehicle miles traveled (MVMT)**
- **Number of serious injuries**
- **Rate of Serious Injuries per 100M VMT**
- **Number of non-motorized fatalities and serious injuries (combined)**

NJDOT Statewide Targets and Goals

NJDOT's annual safety report includes statewide targets for the following calendar year's performance. These reports can be found on the FHWA website at <https://safety.fhwa.dot.gov/hsip/reports/>.

NJDOT prepared a [New Jersey Strategic Highway Safety Plan](#) (SHSP) in August 2015. This document adopts the national vision for highway safety – *Toward Zero Deaths: A National Strategy on Highway Safety*, which sets a national goal of reducing the number of traffic fatalities by half by the year 2030. The New Jersey SHSP also sets a statewide goal to reduce serious injuries and fatalities by 2.5 percent annually. The SHSP was prepared in collaboration with the New Jersey Division of Highway Traffic Safety (NJDHTS) and all three New Jersey MPOs. The statewide targets referenced above were developed to align with and help further the SHSP goals.

The NJTPA Board approved resolutions supporting the NJDOT's statewide roadway safety targets on an annual basis since the CY 2018 targets were set in 2017.

Progress Toward Targets

The investment priorities of the NJTPA are reflected in the NJTPA's long-range plan, [Plan 2045: Connecting North Jersey](#), which was adopted in November 2017. These investment priorities are implemented through projects and programs in the TIP. A major emphasis of the NJTPA TIP is on safety

initiatives, and the TIP was developed to focus on safety issues where possible. These priorities are closely aligned with addressing the established New Jersey safety performance targets referenced above.

Additionally, revised Project Prioritization criteria were adopted in May 2018 for the NJTPA region, emphasizing *Plan 2045's* new goal category of safety and incorporating the latest crash data, pedestrian safety, and the SHSP. Safety receives 251 points of the 1,000 maximum points.

The NJTPA SHSP 5-year action plan for 2017-2021 includes 46 projects totaling over \$98 million (an average of more than \$20 million per year) utilizing federal Highway Safety Improvement Program (HSIP) funds. The focus of the NJTPA's roadway safety investments include hotspot and corridor-wide intersection, pedestrian, and lane departure safety improvement projects, through the annual Local Safety Program (LSP) and High Risk Rural Roads Program (HRRRP).

Examples of roadway safety projects targeting the intersection, pedestrian, and lane departure focus areas in the 5-year action plan include:

- Systemic roundabout program:
 - Five roundabouts in the [FY 2016-2017 LSP](#) and currently under design
 - Three roundabout locations in the [FY 2017-2018 LSP](#) approved by the NJTPA Board, and will begin design in 2019.
 - Continued outreach with all subregions to identify potential locations for systemic treatments
- Road diet program (at least one project per year):
 - [Somerset](#) - Manville – Main Street in the FY 2016-2017 LSP and currently under design
 - [Passaic](#) – Clifton - Allwood Road and Clifton Avenue in the FY 2017-18 LSP approved by the NJTPA Board and will begin design in 2019.
- Continue to work with subregions to:
 - Conduct Road Safety Audits
 - Develop robust applications for the LSP and HRRRP solicitations
 - Incorporate curb extensions and/or pedestrian refuge islands in safety projects whenever feasible
 - Implement FHWA proven safety countermeasures where feasible
 - Share experiences with what systemic and pedestrian safety improvements have been implemented

Other roadway [safety strategies](#) being advanced by the NJTPA include:

- Support for and promotion of [StreetSmart NJ](#), the NJTPA's pedestrian safety education and enforcement campaign
- Participation with the Governor's Highway Traffic Safety Policy Advisory Council (HITSPAC)
- Identification of suitable locations for [road safety audits](#) (RSAs)

- Support for New Jersey’s eight [Transportation Management Associations](#) (TMAs) to promote pedestrian and bicycle safety, senior driver safety, and related safety efforts.

The local safety projects are in addition to many HSIP-funded TIP projects being developed on state highways, such as:

- Route 7, Mill Street to Park Avenue in Essex County (Project ID: [12408B](#))
- Route 46, Pequannock Street to CR 513 in Morris County (Project ID: [16318](#))
- Route 82, Caldwell Avenue to Lehigh Avenue in Union County (Project ID: [11404](#))
- Route 66, Jumping Brook Road to Bowne Road/Wayside Road in Monmouth County (Project ID: [14357](#))

Overall, these and the other programs and projects within this TIP are anticipated to significantly contribute to addressing the established New Jersey roadway safety performance targets.

NHS Asset (Pavement and Bridge) Management Performance Measures

Background

In October 2016, the FHWA Transportation Asset Management Plan Rule (TAMP Rule) was finalized and published in the Federal Register (effective October 2, 2017). In January 2017, the FHWA Bridge and Pavement Condition Performance Measures Rule was finalized and published (effective February 17, 2017). The TAMP Rule sets forth requirements for State DOTs in their preparation of TAMPs and bridge/pavement management systems, while the Bridge and Pavement Condition Performance Measures Rule describes the performance measures required to assess performance of the NHS assets.

The Bridge and Pavement Condition Performance Measures Rule requires State DOTs and MPOs to set 2- and 4-year targets for six pavement and bridge condition performance measures (listed below) every four years (with the option to modify the 4-year targets midway through the four-year performance period). State DOTs report baseline values, targets, and progress toward meeting the targets to the Federal Highway Administration (FHWA) in a biennial performance report. MPOs may either establish quantitative targets for their metropolitan planning area or agree to plan and program projects that contribute toward the accomplishment of the statewide targets. MPOs must report their pavement and bridge condition targets to the State DOT, and include a discussion of progress toward meeting them in any TIP or Long Range Plan amendments after May 20, 2019.

The federal asset (pavement and bridge) management measures are:

- **Percent Interstate pavement lane-miles in Good condition**
- **Percent Interstate pavement lane-miles in Poor condition**
- **Percent non-Interstate NHS pavement lane-miles in Good condition**
- **Percent non-Interstate NHS pavement lane-miles in Poor condition**
- **Percent NHS bridge deck area in Good condition**
- **Percent NHS bridge deck area in Poor condition**

NJDOT measures the condition of pavement on the NHS for each tenth-mile segment, using a defined set of metrics. These metrics, which differ based on the type of pavement, include ride quality (using the International Roughness Index), rutting, cracking, and faulting. The metrics are used to classify each segment's pavement condition as either Good, Fair, or Poor, using criteria established by FHWA.

NJDOT also collects bridge inspection data for all NHS bridges covered by the National Bridge Inspection Standards (NBIS). The bridge inspection data includes ratings for each bridge component (bridge deck, superstructure, substructure, and culvert (where applicable)). These ratings are used to classify each bridge as either Good, Fair, or Poor, using criteria established by FHWA.

NJDOT Statewide Targets and Goals

The first goal of *Transportation Choices 2030*, the current New Jersey Long Range Transportation Plan, is to "Maintain and Renew Transportation Infrastructure." This goal intends to bring the state's

transportation physical assets (including pavement and bridges) into a state of good repair, and to maintain the state of good repair.

The New Jersey Transportation Asset Management Plan (TAMP) defines the overall policy, state of good repair (SOGR) objectives and plans for infrastructure preservation. New Jersey's initial TAMP (which included the TAMP processes and other elements as prescribed by the TAMP Rule) was certified by FHWA on July 25, 2018. The final TAMP (submitted to FHWA in June 2019, and currently under review by FHWA) includes federal performance measures, state performance measures and indicators, and analytical processes for establishing and monitoring the SOGR and targets to predict the performance of National Highway System and New Jersey State Highway System assets. New Jersey's TAMP also includes the established federal 2- and 4-year targets for NHS pavement and bridges. Additionally, the final TAMP provides the analytical basis for meeting performance objectives over a 10-year horizon synonymous with that of the 10-year Financial Plan. The longer 10-year investment strategies identified in the TAMP will shape the setting of future 2- and 4-year targets, and be used in evaluating the need to adjust the 4-year targets at the midpoint of the performance period.

The objective stated in the New Jersey TAMP is to reach 80 percent State of Good Repair on all NHS pavements (using NJDOT's "condition status" metric) by 2021. New Jersey's TAMP Team (which includes NJDOT asset management experts along with other NHS owners and stakeholders) used this long-term statewide objective to develop short-term (2- and 4-year) targets for the national pavement performance measures. One factor that they considered was that regulations require that the percentage of Interstate lane-miles in Poor condition cannot exceed 5 percent. Another factor was that the NHS in New Jersey is owned and maintained by several different agencies. As of collection year 2017, NJDOT only owns approximately three-fifths of New Jersey's NHS pavement (by lane-miles). The remaining is owned by counties (approximately 15 percent), municipalities (less than 2 percent), and other transportation agencies and authorities (approximately one quarter of the NHS lane-miles).

Similarly for bridges, NJDOT owns only approximately half of the NHS bridges (by bridge deck area). The remaining bridges are owned by the New Jersey Turnpike Authority (approximately one-third), other toll authorities (approximately one-sixth), and others (approximately 2 percent).

The New Jersey TAMP Team took all of these factors into account, along with existing pavement and bridge conditions, and projected conditions after planned projects/improvements are implemented, to identify realistic 2- and 4-year targets for the pavement and bridge condition measures. NJDOT's analysis showed gradually declining trends at the current funding level, as would be expected due to the state's aging infrastructure. Thus, the short-term targets allow for a slight worsening of asset conditions. However, NJDOT remains committed to a long-term goal of increasing asset conditions, achieving a sustainable "state of good repair." These short-term targets will serve as useful benchmarks toward achieving that long-term goal. As NJDOT and the other NHS asset owners in New Jersey gain more experience with these measures, and perspective regarding target setting, they will make adjustments where needed.

The NJTPA Board approved a resolution supporting the NJDOT's statewide pavement and bridge condition targets in September 2018.

Progress Toward Targets

The investment priorities of the NJTPA are described in the NJTPA long-range plan, *Plan 2045: Connecting North Jersey*, which was adopted in November 2017, and are implemented through projects and programs in the Transportation Improvement Program (TIP). The TIP places a major emphasis on projects that maintain and rehabilitate the region's pavement and bridges. Pavement and bridge state-of-good repair criteria are significant elements of the NJTPA's project prioritization process, aligned with supporting the pavement and bridge condition performance targets. More than 45 percent of the funding over the five years of the TIP is dedicated to maintaining bridges and preserving and enhancing roadways in the NJTPA region. This is in keeping with the 40 percent allocated to these categories in the NJTPA Regional Capital Investment Strategy (RCIS).

Examples of NHS asset (pavement and bridge) projects and programs in the Transportation Improvement Program include:

Pavement projects and programs

- Route 4, River Drive to Tunbridge Road Pavement in Bergen County (Project ID: [12431A](#))
- Route 9, Jones Road to Longboat Avenue Pavement in Ocean County (Project ID: [11330](#))
- Route 31, Route 78/22 to Graysrock Road in Hunterdon County (Project ID: [11342A](#))
- Route 34, CR 537 to Washington Avenue, Pavement in Monmouth County (Project ID: [11307](#))
- Route 18 East Brunswick, Drainage and Pavement Rehabilitation in Middlesex County (Project ID: [10354](#))
- Pavement Preservation Program (Project ID: [X51B](#))
- Restriping Program & Line Reflectivity Management System (Project ID: [X03A](#))
- Statewide Resurfacing Programs (Project IDs: [99327A](#) and [X03E](#))

Bridge projects and programs

- Route 4 Bridges in Bergen County (Project IDs: [02346](#), [065C](#), [08410](#), [93134](#), and [94064](#))
- Route 22 Bridge over NJ TRANSIT Raritan Valley Line in Hunterdon County (Project ID: [14425](#))
- Monmouth County Bridges, W7, W8, W9 over Glimmer Glass and Debbie's Creek (Project ID: [NS9306](#))
- Route 31 Bridge over Furnace Brook in Warren County (Project ID: [09325](#))
- Route 166, Bridges over Branch of Toms River in Ocean County (Project ID: [14324](#))
- PANY&NJ-NJDOT Project Program (aka Lincoln Tunnel Access Program), addressing Route 7 Wittpenn Bridge and Route 1&9 Pulaski Skyway, in Hudson and Essex Counties (Project ID: [11407](#))
- Statewide Bridge Deck/Superstructure Replacement Program (Project ID: [03304](#))
- Statewide Bridge Emergency Repair Program (Project ID: [98315](#))
- Statewide Bridge Inspection Program (Project ID: [X07A](#))
- Statewide Bridge Maintenance and Repair Program, Movable Bridges (Project ID: [14404](#))

- Statewide Bridge Preventive Maintenance Program (Project ID: [13323](#))
- Statewide Bridge Replacement Program, Future Projects (Project ID: [08381](#))

Overall, these and other programs and projects in this TIP will significantly contribute to addressing the established New Jersey pavement and bridge performance targets for the NHS.

NHS Travel Time Reliability Performance Measures

Background

Traffic congestion is common in the NJTPA region, and many drivers are accustomed to congestion. They expect and plan for some delay, particularly during peak driving times. These drivers often adjust their schedules or budget extra time to allow for “usual” traffic delays. But what happens when traffic delays are much worse than expected? Most travelers are less tolerant of unexpected delays because they cause them to be late for work or important meetings, miss appointments, or incur extra childcare fees. Shippers that face unexpected delay may lose money and experience disruption of just-in-time delivery and manufacturing processes. Travel time reliability measures the extent of such unexpected delay. A formal definition for travel time reliability is: the consistency or dependability in travel times, as measured from day-to-day and/or across different times of the day.

The national travel time reliability performance measures are:

- **Percent of person-miles traveled (PMT) on the Interstate system with reliable travel times**
- **Percent of PMT on the non-Interstate NHS roadways with reliable travel times**

“Reliable” travel times are based on how longer travel times (but that still occur frequently)² compare to expected travel times³. If the longer travel time for a segment is less than one and a half times as long as the median travel time, then that road segment is considered to have reliable travel times.

These performance measures are calculated using archived real-time vehicle probe data contained in the National Performance Management Research Data Set (NPMRDS). The NPMRDS is a dataset used to monitor system performance, procured and sponsored by FHWA. The NPMRDS is a network of roadway segments, called Traffic Message Channels (TMCs). The calculations in New Jersey are done by the NPMRDS Analytics Suite, created and maintained by the University of Maryland Center for Advanced Transportation Technology Laboratory (CATT Lab), following FHWA guidance.

FHWA requires states and MPOs to establish 2- and 4-year travel time reliability targets every four years (with the option to modify the 4-year targets midway through the four-year performance period).

NJDOT Statewide Targets and Goals

One of the goals of NJDOT’s current Long Range Transportation Plan, *Transportation Choices 2030*, is to “improve mobility, accessibility, and reliability.” This goal intends to counter traffic congestion with a multifaceted approach, including strategies such as spot congestion improvement, improved public transit, transportation demand management, and improved facilities for bicycling and walking. Another goal is to “operate efficiently,” which focuses on using transportation systems management and

² The “longer” travel time is defined as the 80th percentile travel time, which is the time such that 80% of travel times are shorter.

³ The “expected” travel time is defined as the 50th percentile (or median) travel time, which is the time such that 50% of travel times are shorter and 50% are longer.

operations (TSMO) strategies to use existing capacity most efficiently. Both of these goals point toward improving reliability on New Jersey’s roadways.

In setting statewide targets for the travel time reliability measures, New Jersey subject matter experts considered a number of factors, including:

- The long-term goal for all stakeholders is to have dependable, consistent travel times
- Stakeholders have limited experience with measuring travel time reliability, and techniques to forecast future reliability are evolving
- There are constraints on available funding, particularly considering other priorities such as improving infrastructure condition and improving safety
- The travel time reliability impact of new technologies, including connected and autonomous vehicles and transportation network companies (e.g., Uber and Lyft), is unknown

NJDOT and the New Jersey MPOs collaboratively developed 2-year and 4-year travel time reliability targets, deciding to keep the future the same as the existing (2017) values, and examine available data in 2020, potentially adjusting the 4-year targets at that time. NJDOT established the required reliability targets for New Jersey in May 2018, and submitted them to FHWA in October 2018.

The NJTPA Board approved a resolution supporting the NJDOT’s statewide travel time reliability targets in September 2018.

Progress Toward Targets

The investment priorities of the NJTPA are reflected in the NJTPA long-range plan, *Plan 2045: Connecting North Jersey*, which was adopted in November 2017. These investment priorities are implemented through projects and programs in the Transportation Improvement Program (TIP). One of the goals of *Plan 2045* is to “maintain a safe, secure and reliable transportation system in a state of good repair.” *Plan 2045* includes a map of unreliable road segments, and the updated RCIS includes guidelines to:

- use the NJTPA congestion management process and context-sensitive criteria to target roadway investments that improve travel time reliability and address bottlenecks and hotspots
- invest in technologies that deliver environmental benefits, improve reliability, manage congestion, and streamline traffic flow

One of the criteria in the NJTPA project prioritization process addresses travel time reliability, giving additional priority to projects that help to improve travel time reliability by either reducing non-recurring incident delays or by providing alternative transportation modes or routes.

NJDOT TSMO strategies are employed to support travel time reliability on interstate and non-interstate NHS roadways. Such TSMO strategies focus on safety and mobility, congestion relief and air quality mitigation along arterial corridors, addressing recurring and non-recurring congestion, and providing real-time traveler information. Examples of TIP program and project investments include:

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- Operational improvements on NJ Route 10 between NJ Route 53 and Johnson Road in Parsippany-Troy Hills, Morris County, which will make several operational improvements to alleviate the congestion problem during the morning peak hour, especially in the eastbound lanes (Project ID: [98338C](#))
- Operational improvements to the intersection of US Route 202 and First Avenue in Raritan Borough, Somerset County, to address chronic congestion problems (Project ID: [02372B](#))
- Operational improvements on Route 46, between Main Street/Woodstone Road (CR 644) and Route 80 in Morris County (Project ID: [06366D](#))
- New Jersey Statewide Traffic Operations and Support program comprised of Safety Service Patrols (SSP), two Traffic Operations Centers, New Jersey’s Traffic Incident Management (TIM) Program to detect, respond to, and remove traffic incidents and restore traffic capacity as safety and quickly as possible ([NJTIM.org](#)), and 511 real-time traveler information system (Project ID: [13308](#))
- New Jersey Mobility and Systems Engineering (MSE) program focused on arterial management with intelligent traffic signal systems (Project ID: [13306](#))
- “Smart Moves” – New Jersey’s Intelligent Transportation Systems (ITS), a centrally managed system of CCTV’s, electronic message signs, sensors, and fiber optic communications network (Project ID: [02379](#))
- New Jersey ITS Resource Center focused on research and delivery of TSMO strategies in association with NJ academic institutions (Project ID: [13304](#))
- Active Transportation Management System (ATMS) program employs technology for automatic operation and handling of traffic (Project ID: [13303](#))

These and other programs and projects in this TIP should significantly contribute to addressing the established New Jersey reliability performance targets. As the NJTPA and transportation planning and programming partners improve understanding of this measure (particularly how various types of projects impact travel time reliability), the agencies will continue to strive to program projects that help to improve travel time reliability for the traveling public.

Freight Performance Measures

Background

Freight is critical to North Jersey's economy, with about a third of the region's 3 million jobs highly dependent on goods movement. The freight sector's strength is based on the region's location in the center of a major consumer market; its extensive marine, rail and highway infrastructure; and its extensive warehouse and distribution facilities—over 800 million square feet in the region.

Nearly all goods moved in the region travel by truck for at least part of their journey, especially short haul and time-sensitive deliveries. In all, more than 80 percent of domestic freight traveling to, from or within North Jersey moves by truck. Congestion over key highways and at ports and terminals hampers timely freight movements. The industry also faces driver shortages and a lack of parking.

The national freight performance measure is:

- **Truck Travel Time Reliability (TTTR) Index on the Interstate System**

The TTTR metric for a segment is the ratio between a rare “very long” truck travel time for a segment (where 95 percent of travel times are shorter) and an “expected” truck travel time for that segment (where 50 percent of travel times are shorter and 50 percent are longer). The TTTR Index is computed by averaging the TTTR metric on all Interstate segments in the state, weighted by the segment distance. Note that higher values for this measure indicate lower travel time reliability.

FHWA requires states and MPOs to establish 2-year and 4-year freight targets every four years (with the option to modify the 4-year targets midway through the four-year performance period).

NJDOT Statewide Targets and Goals

NJDOT's Statewide Long Range Transportation Plan, *Transportation Choices 2030*, includes a goal to optimize freight movement. It also recommends continued investment in facilities to move more freight by rail, and policies that support moving freight during non-rush hours. Additionally, FHWA approved NJDOT's Statewide Freight Plan in 2017. Among other goals and objectives, the plan seeks to improve the efficiency and reliability of goods movement across and between all modes. The plan also identifies existing freight bottlenecks throughout the state, along with priority projects to address many of these bottlenecks.

When setting targets for the TTTR Index, NJDOT and its partners considered several factors, including:

- Overall VMT is increasing, which puts additional stress on the Interstate highways for all users, including trucks
- Port activity and e-commerce are also increasing, leading to increased truck activity
- Road capacity is not expanding

These factors indicate that congestion and reliability will worsen in the near future, and therefore targets were identified that moderate the amount of increase in the TTTR Index measure. NJDOT established the required freight targets for New Jersey in May 2018, and submitted them to FHWA in October 2018.

The NJTPA Board approved a resolution supporting the NJDOT's statewide freight targets in September 2018.

Progress Toward Targets

The investment priorities of the NJTPA are reflected in the NJTPA long-range plan, *Plan 2045: Connecting North Jersey*, which was adopted in November 2017. These investment priorities are implemented through projects and programs in the TIP. Freight planning activities at the NJTPA are guided by the Freight Initiatives Committee, which serves as a forum for discussion of regional freight issues. One of the criteria in the NJTPA project prioritization process specifically focuses on projects that enhance the movement of freight.

The [Statewide Freight Plan](#) identifies several projects that are being advanced in priority freight locations in the NJTPA region (in particular, see [Table 53: STIP Projects along Freight Project Areas](#), NJTPA). In addition to these priority projects in the Statewide Freight Plan, the NJDOT and the NJTPA spearhead numerous initiatives with the specific intent of improving infrastructure conditions for safe, efficient multimodal goods movement in New Jersey.

Examples of freight projects and programs in the Transportation Improvement Program include:

- Delancy Street, Avenue I to Avenue P in Essex County (Project ID: [NS0504](#))
- Portway, Fish House Road/Pennsylvania Avenue, CR 659 in Hudson County (Project ID: [97005B](#))
- Local Freight Impact Fund Program (Project ID: [17390](#))
- Maritime Transportation System (Project ID: [01309](#))
- New Jersey Rail Freight Assistance Program (Project ID: [X34](#))

These and other programs and projects in this TIP are expected to contribute to addressing the established New Jersey truck travel time reliability targets.

CMAQ Traffic Congestion Performance Measures

Background

FHWA's Congestion Mitigation and Air Quality Improvement (CMAQ) program provides states and MPOs with funds for transportation investments that contribute to air quality improvements and provide congestion relief. Examples of CMAQ-funded projects include roadway and intersection improvements that address congestion chokepoints and help reduce vehicle idling, and bicycle and pedestrian paths that enhance travel for non-motorized modes. FHWA has divided the performance measures related to the CMAQ program into two portions: traffic congestion (addressed in this section), and emissions reduction (addressed in the next section).

States and MPOs are responsible for participating in target setting for the traffic congestion measures if: 1) they have mainline highways on the National Highway System (NHS) that cross part of an urbanized area (UZA) with a population of more than one million⁴; and 2) that UZA contains part of a nonattainment or maintenance area for relevant criteria pollutants. Similarly, MPOs must participate in target setting for the traffic congestion measures if 1) they have mainline highways on the NHS that cross part of an UZA with a population of more than one million; and 2) the part of the MPO area that overlaps the UZA contains part of a nonattainment or maintenance area for relevant criteria pollutants.

State departments of transportation (DOTs) and MPOs that meet the aforementioned applicability criteria for traffic congestion measures must coordinate with one another to set single, unified targets for the entire UZA—as opposed to targets for areas covered by individual states and MPOs—and they must report those single, unified targets consistently to FHWA. Because it meets all relevant criteria, the NJTPA is required to participate in target-setting for two UZAs during the initial performance period: the New York-Newark, NY-NJ-CT UZA, and the Philadelphia, PA-NJ-DE-MD UZA.

Traffic congestion is complex to address. While widening roadways at a bottleneck may help manage or reduce localized congestion, widening long stretches of roadways may add a level of additional capacity that can lead to overall increased vehicle volumes, and even more traffic congestion and air pollution over time. Also, many vibrant commercial districts, urbanized areas and important major roadway arteries experience daily recurring “routine” traffic congestion that cannot realistically be eliminated due to potential costs, limited land availability and/or potential quality of life impacts to communities.

Many of the region's roadways are subject to high levels of recurring congestion. Daily, large numbers of travelers face recurring morning and afternoon/evening peak congestion due to capacity issues on major corridors, particularly those leading to bridge and tunnel crossings into New York City. Most of these high capacity routes traverse the region's most densely populated areas, where increasing capacity may be neither locally desirable nor cost-effective. Although routine congestion on these

⁴ During the initial performance period (2018-2021), the requirement only applies to urbanized areas with populations above 1 million. For subsequent performance periods (i.e., starting in 2022), the requirement expands to UZAs with populations above 200,000.

routes presents challenges to the reliability of travel, it is largely an expected occurrence that businesses and individuals attempt to factor into their travel and location decisions.

Congestion is most problematic when it hinders accessibility, a key contributor to the region's economic and community well-being. Transportation works well when it puts travelers' desired destinations (jobs, shopping, schools, parks, etc.), within reach, making them accessible. It works well when the transportation system is reliable and trips are therefore predictable, with reasonable expected travel times and actual travel times matching those expectations. Overall, the northern New Jersey transportation system provides enormous accessibility to the region, but addressing the challenges of a growing and changing region requires understanding congestion in these broader contexts. The NJTPA's Congestion Management Process (CMP) contributes to this understanding.

The CMP addresses not only the roadway system, but also rail and bus transit, ridesharing, walking and bicycling, and freight transportation. The CMP points to mobility strategies that complement roadway investments to minimize the need for capacity expansions, realize greater system efficiency and protect the environment.

The federal traffic congestion performance measures (reported for entire large multi-state urbanized areas) are:

- **Annual person-hours of peak hour excessive delay (PHED) per capita**
- **Percent non-SOV (single-occupancy vehicle) travel**

Elements of the PHED per capita measure (including only the National Highway System) include the following (more detail, including a video with an example on how the PHED measure is calculated, can be found on the NJTPA website, at <https://www.njtpa.org/planning/performance-analysis>):

- Annual – delay accumulated over the entire calendar year
- Person-hours – delay experienced by people not vehicles
- Peak hour – 6–10 am and 3–7 pm weekdays (any “excessive” delay outside these periods is not included)
- Excessive delay – time traveling below 60 percent of posted speed limit (or 20 mph, whichever is greater)⁵. For example, if the speed limit is:
 - 65 mph, the extra time spent by traveling slower than 39 mph
 - 40 mph, the extra time spent traveling slower than 24 mph
 - 30 mph (or lower), the extra time spent traveling slower than 20 mph

As an illustration, consider a two-mile segment with a speed limit of 60 mph. Traveling along this segment at the speed limit takes 2 minutes. However, the “excessive delay” threshold for this segment is 36 mph (60 percent of 60 mph). At this speed, it takes 3.33 minutes. So, any time

⁵ Only the “extra” time is counted toward excessive delay, not the entire travel time.

above 3.33 minutes on that segment counts toward “excessive” delay. If travel on this segment on a particular day takes 5 minutes, then 1.67 minutes (5 minus 3.33) counts as excessive delay.

- Per capita – divides by entire population, not just drivers. Thus, areas that have more transit/carpool use get “credit” for those people who are not contributing to congestion⁶.

Targets and Goals

The NJTPA has a goal to manage congestion, considering the competing priorities of asset management (“fix it first”), safety (“toward zero deaths”), and economic growth (with associated increasing travel). The NJTPA RCIS states that the NJTPA congestion management process and context-sensitive criteria should be used to target roadway investments that improve travel time reliability and address bottlenecks and hotspots. The RCIS also encourages investment in technologies that help to manage congestion (along with delivering environmental benefits, improving reliability, and streamlining traffic flow).

The NJTPA’s congestion management process (CMP) provides a systematic investigation of the region’s complex travel patterns and advances suitable approaches to improve transportation system performance. This performance-based process is federally required as an integral part of the planning process. The CMP provides information and strategies to decision-makers regarding accessibility, mobility, reliability and congestion as they relate to the movements of persons and goods in northern New Jersey. The CMP considers the extent to which strategies such as travel demand management, trip reduction, and support for alternate modes, can address roadway-related needs. This approach avoids the addition of single-occupant-vehicle (SOV) capacity where possible. If new SOV capacity is warranted, other complementary strategies are identified to manage demand into the future.

NJDOT’s long-range plan includes a goal to counter traffic congestion with a multifaceted approach, including strategies such as spot congestion improvements, improved public transit, transportation demand management, and improved facilities for bicycling and walking.

The state departments of transportation and MPOs in the New York-Newark and Philadelphia Urbanized Areas set traffic congestion targets as required in May 2018, and reported them to FHWA in October 2018. This included, in July 2018, the NJTPA Board approval of a resolution establishing the urbanized area traffic congestion targets for both the New York-Newark and Philadelphia Urbanized Areas. The NJTPA also prepared the required CMAQ Performance Plan to accompany NJDOT’s 2018 baseline performance report (submitted to FHWA on October 1, 2018).

For the New York-Newark urbanized area, partner agencies agreed that the effects of expected economic growth, especially in New York City, would exceed the impacts of investments to reduce traffic congestion. Continued increase in non-SOV travel is expected to mitigate the growth in traffic delay to some extent. However, the ability of the existing public transit systems to accommodate

⁶ In the New York-Newark urbanized area, the Census American Community Survey reports that for every four residents, there is approximately one vehicle used for commuting to work. The other residents either do not commute to work (e.g., work at home, children, unemployed or not in work force) or commute in carpools, buses, trains, subway, ferry, walk, or bike.

increased ridership is limited over the time frame for these targets (i.e., the next four years). Additionally, only data for 2017 is currently available, and there is no historical trend data. However, related measures of congestion and delay have shown recent increases, and a long-term forecast of similar measures suggest modest increases over time. Thus, the 2-year target for the non-SOV measure is to maintain the current percentage, and the 4-year target represents a slight increase in the percentage of non-SOV travel. For the PHED measure, the 4-year target is set to represent an increase of 2 percent per year in excessive delay per capita.

For the Philadelphia urbanized area, the partner agencies observed the vehicle miles of travel (VMT) forecasts for the DVRPC region for 2015–2020, based on the travel demand model, a growth of 0.7 percent per year. On that basis, they set a 4-year target to reflect an increase in the PHED measure of 0.6 percent per year. For the non-SOV measure, the partners agreed that the 2-year target would be a slight increase, and the 4-year target would be an additional slight increase in the percentage of non-SOV travel within the urbanized area.

Progress Toward Targets

The investment priorities of the NJTPA are described in the NJTPA long-range plan, *Plan 2045: Connecting North Jersey*, which was adopted in November 2017 and implemented through projects and programs in the Transportation Improvement Program (TIP).

As indicated in previous sections, transportation investment resources in the NJTPA region (and through the urbanized areas) are largely directed toward preserving the existing system. Thus, the plans and programs for the various agencies are anticipated to have relatively small impact on NHS traffic congestion overall. There is an understanding that expanding or adding new roads is a limited option due to high costs, environmental impacts, and the likelihood that capacity expansion may provide only temporary congestion relief, and is likely to induce even more traffic over the long term.

However, there are still ways to reduce traffic congestion and increase non-SOV travel. There are specific criteria in the NJTPA project prioritization process that emphasize projects that address traffic congestion. Considerable resources, including as guided by the RCIS, are devoted to maintaining and enhancing the region's public transit system. Transportation system management and operations (TSMO) are anticipated to moderate some of the expected increase in roadway delay. Transportation demand management (TDM) programs can help to change travel behaviors in ways that meet travel needs while minimizing the impacts to delay. Changes in pricing (e.g., congestion pricing, fuel costs, transit fares) could also have impacts on excessive delay and non-SOV travel. Land use (e.g., transit oriented development, or TOD) will continue to affect trip making and the traffic on NHS roads. The impacts of transportation network companies (TNCs, e.g., Uber and Lyft) and emerging advanced transportation technology are still being understood. These may lead to increases or decreases in these measures. Finally, while there is little expectation that public transit opportunities will be significantly expanded in the near term (as noted above), there are plans and proposals for expansions for the longer term.

Examples of projects and programs in the Transportation Improvement Program that address traffic congestion (peak hour excessive delay and non-SOV travel) include:

- Traffic signal optimizations in Hackensack TOD area, along McCarter Highway (Route 21) in Essex County, and three Passaic County corridors (Implemented through the NJTPA [Transportation Clean Air Measures](#) program, Project ID: [X065](#))
- Reconfiguration of four Hackettstown intersections (Routes 57/182/46) in Warren County, re-phasing traffic signals and upgrading ADA facilities (Project ID: [9237](#))
- NJ TRANSIT Hudson-Bergen and Newark LRT System rolling stock improvements and Route 440 extension (Project ID: [T87](#))
- NJ TRANSIT Small/Special Services Program, promoting transit solutions to reduce congestion, management transportation demand, and improve air quality through services such as shuttles and facilitating bike/transit use (Project ID: [T120](#))
- Improvements on Route 1 (Alexander Road to Mapleton Road) to relieve congestion by increasing travel lanes from 3 to 4 per direction, reconfiguring the Route 1 Washington Road traffic circle and re-phasing traffic signals (Project ID: [17419](#))
- Bicycle and pedestrian facilities and accommodations, implementing elements of the Statewide Bicycle and Pedestrian Master Plan (Project ID: [X185](#))
- Development of an active traffic management system (ATMS) (Project ID: [13303](#))
- Support for transportation demand management (TDM) programs, including the Park and Ride System management and the RidePro ride matching program (Project ID: [X28B](#))
- NJTPA [local mobility \(shuttle\) initiatives](#), to be solicited for FY 2021 (Project ID: [X065](#))
- Additional NJTPA [Transportation Clean Air Measures](#) (TCAMs), to be solicited for FY 2021 (Project ID: [X065](#))
- Bus enhancements on Route 9, including transit signal priority to reduce congestion and bus travel times (Project ID: [07350](#))

These and other programs and projects in this TIP are expected to contribute to addressing the established urbanized area traffic congestion (peak hour excessive delay and non-SOV travel) targets.

CMAQ Emissions Reduction Performance Measures

Background

As discussed in the previous section, FHWA’s CMAQ program provides funding for transportation investments that contribute to air quality improvements and provide congestion relief. While that section discussed performance measures relating to traffic congestion, this section discusses the emissions reduction performance measures. The CMAQ emissions reduction performance measure focuses specifically on the impacts of CMAQ investments in areas that do not meet air quality standards (nonattainment areas) or that have not met them in the past (maintenance areas). This measure examines the total daily kilograms of emissions reduction of mobile source pollutants or precursors—including carbon monoxide (CO), nitrogen oxides (NO_x), volatile organic compounds (VOCs), and fine particulate matter (PM_{2.5})—for CMAQ-funded projects in nonattainment and maintenance areas.

States and MPOs are responsible for setting targets for the emissions reduction measures if they contain or overlap nonattainment or maintenance areas. State DOTs and MPOs are required to set two- and four-year emissions reduction targets that represent estimated daily emissions reduction for anticipated CMAQ-funded transportation projects in nonattainment or maintenance areas. These targets focus on the pollutants or precursors for which designated areas are in nonattainment or maintenance status.

The federal emissions reduction performance measures are:

- **Total emissions reduction for the following pollutants and precursors for CMAQ-funded projects within the corresponding nonattainment and maintenance areas:**
 - **Fine particulate matter (PM_{2.5})**
 - **Carbon monoxide (CO)**
 - **Ozone precursors:**
 - **Volatile organic compounds (VOC)**
 - **Nitrogen oxides (NO_x)**

Targets and Goals

NJDOT’s *Transportation Choices 2030* includes several goals which support the reduction of on-road mobile source emissions, including: 1) integrating transportation and land use planning; 2) improving mobility, accessibility, and reliability; 3) operating efficiently; and 4) respecting the environment.

The NJTPA’s goal to protect and improve natural ecosystems, the built environment and quality of life is supported by the [Transportation Clean Air Measures](#) (TCAM) program, which funds innovative projects to reduce transportation-related emissions. Supported by CMAQ funds, with guidance from the NJTPA Board and a Technical Advisory Committee, and working closely with regional and local partners, the NJTPA has advanced many priority TCAMs, including:

- **Local Traffic Signal Optimization/Adaptive Project** – By more efficiently managing traffic, the systems—as implemented in Ocean County and slated for Newark and Hackensack—have realized significant reductions in congestion, travel time and emissions.
- **North Jersey Regional Truck Replacement Program** – Identified in the PANYNJ’s Clean Air Strategy, this program replaces older, polluting drayage trucks (service from an ocean port to a rail ramp, warehouse, or other destination) that serve marine terminals with newer cleaner models. All old trucks are scrapped.
- **Fleet Modernization & Replacement Program for Cargo Handling Equipment** – Identified in the PANYNJ’s Clean Air Strategy, this program is replacing about 100 yard tractors and similar pieces of cargo handling equipment at the Port Authority’s Marine Terminals with cleaner equipment versions, including alternative powered equipment.
- **Marine Vessel Repower Program** – This program replaces older marine diesel engines with new cleaner versions. Currently this New Jersey Department of Environmental Protection program includes two high-speed catamaran ferries, one excursion vessel, and three commercial fishing vessels.

In addition to the TCAM program, the NJTPA’s *Plan 2045: Connecting North Jersey* calls for many strategies that can reduce regional emissions, particularly by cutting the number, length, and duration of vehicle trips. They include: encouraging the use of public transit and ridesharing; addressing congestion with upgraded road designs, adaptive traffic signals and other improvements; encouraging development that accommodates walking and biking; and many others. In addition, new technologies can improve air quality, including encouraging use of alternative fuel vehicles and systems to achieve more efficient freight distribution.

Emissions reduction targets were developed to harmonize the NJDOT and MPO approaches and goals for air quality, with the NJDOT engaging MPO partners throughout the process. Because New Jersey is completely covered by MPO planning areas, targets for each MPO’s planning area were identified, and then added together to arrive at statewide targets. All three MPOs in New Jersey agreed on the data and the process to arrive at the targets. NJDOT established the New Jersey statewide targets in May 2018, and reported to FHWA in October 2018. The NJTPA Board approved a resolution establishing the emissions reduction targets in September 2018.

As a baseline, the partners examined emissions reductions from CMAQ projects authorized during the previous four fiscal years (FY 2014 – FY 2017). The baseline used required data from the FHWA CMAQ Public Access System (PAS) with corrections including eliminating duplicate projects and adding projects not counted in the system.

For target setting, the group took into account the baseline and the partner agencies’ commitment to sustaining the level of effort with CMAQ program pollutant reductions. Looking at the entire four-year baseline period was appropriate because of variations in specific projects from year to year. (The four-year sum also helps to address an accounting complexity for this measure—emission reductions are assigned to the first year that projects are authorized, even if the benefits are spread over longer

periods.) The target setting also considered that vehicles are becoming cleaner (less polluting) over time, making it more challenging to achieve pollutant reductions by reducing vehicle miles traveled.

Progress Toward Targets

The investment priorities of the NJTPA are described in the NJTPA long-range plan, *Plan 2045: Connecting North Jersey*, which was adopted in November 2017 and implemented through projects and programs in the Transportation Improvement Program (TIP).

Targets for the emissions reduction measures specifically reflect the anticipated impacts of CMAQ-funded projects that are currently funded in the TIP. The NJTPA, working with its partner agencies, will continue to identify and develop CMAQ projects based on a performance-driven planning and programming process, and will assess data and progress reports for the midpoint and final performance period milestones in 2020 and 2022. As appropriate at those times, adjustments may be made to performance targets. More importantly, those progress reports will also inform decision makers overseeing the planning process, offering opportunities to reassess and re-align investment priorities. These can be incorporated into updates of the NJTPA's Transportation Improvement Program and the NJTPA's long-range Regional Transportation Plan.

Examples of CMAQ projects and programs in the Transportation Improvement Program that contribute to meeting the established emissions reduction targets (in addition to the CMAQ projects listed in the traffic congestion section above, all of which have emissions reduction benefits) include the following. Note that these projects are all implemented through the NJTPA [TCAM](#) program (funded through Project ID: [X065](#)):

- NJDEP electric vehicle charging program (It Pay\$ to Plug In)
- NJDEP idle reduction program, including technology for transport refrigeration units at food distribution centers
- NJDEP Marine Repower Program, replacing older, higher-emission marine diesel engines with EPA compliant engines on NJ/NY passenger ferries and commercial fishing fleets
- Port Authority diesel retrofits of cargo handling equipment with anti-idling technology
- Port Authority onshore exhaust capture and control system to capture and treat engine exhaust, removing air contaminants at Port Newark as ships load and unload
- North Jersey Regional Truck Replacement Program, replacing and scrapping pre-2007 drayage trucks that service the port area regularly with EPA-compliant trucks

Transit Asset Management Performance Measures

Background

Critical to the safety and performance of a public transportation system is the condition of its capital assets—most notably, its equipment, rolling stock, infrastructure, and facilities. When transit assets are not in a state of good repair, the consequences include increased safety risks, decreased system reliability, higher maintenance costs, and lower system performance.

Transit asset management (TAM) is the strategic and systematic practice of procuring, operating, inspecting, maintaining, rehabilitating, and replacing transit capital assets to manage their performance, risks, and costs over their life cycles to provide safe, cost-effective, and reliable public transportation. TAM uses transit asset condition to guide how to manage capital assets and prioritize funding to improve or maintain a state of good repair. Based on the mandate in MAP-21 (and continued in the FAST Act), FTA developed a rule establishing a strategic and systematic process of operating, maintaining, and improving public capital assets effectively through their entire life cycle. The TAM Final Rule 49 USC 625 became effective Oct. 1, 2016. The TAM rule develops a framework for transit agencies to monitor and manage public transportation assets, improve safety, increase reliability and performance, and establish performance measures. Transit agencies are required to develop TAM plans and submit their performance measures and targets to the National Transit Database. TAM plans must be updated at least every four years. MPOs are required to either set specific MPO targets or support the transit agency targets.

The TAM rule established the following national transit asset management performance measures (49 CFR Part 625 Subpart D):

- *Rolling stock*: The percentage of revenue vehicles (by type) that meet or exceed the useful life benchmark (ULB)
- *Equipment*: The percentage of non-revenue service vehicles (by type) that meet or exceed the ULB
- *Facilities*: The percentage of facilities (by group) that are rated less than 3.0 on the Transit Economic Requirements Model (TERM) scale
- *Infrastructure*: The percentage of track segments (by mode) that have performance restrictions

Useful life benchmark (ULB) is the yardstick that agencies will use to track the performance of revenue vehicles (rolling stock) and service vehicles (equipment) to set their performance measure targets. Each vehicle type's ULB estimates how many years that vehicle can be in service and still be in a state of good repair. The ULB considers how long it is cost effective to operate an asset before ongoing maintenance costs outweigh replacement costs.

Under the TERM scale, an asset in need of immediate repair or replacement is scored as one (1), whereas a new asset with no visible defects is scored as five (5).

Within the NJTPA planning area, there are two Tier 1 transit agencies providing public transit service, and subject to the FTA TAM performance management rules. These agencies are: the New Jersey Transit

Corporation (NJ TRANSIT) and the Port Authority of New York and New Jersey (PANYNJ) Port Authority Trans-Hudson (PATH). In addition, there are several Tier 2 transit providers. NJ TRANSIT is sponsoring a Tier 2 Group TAM Plan for these providers.

NJ TRANSIT Asset Management Targets and Goals

NJ TRANSIT maintains a large fleet of buses, railroad cars, locomotives, and light rail vehicles. The fleet is in a state of good repair and meets FTA guidelines for useful equipment life. To continue in this pattern, NJ TRANSIT has budgeted funds to permit regular ongoing replacement of equipment as it approaches the end of its useful life. This approach also permits NJ TRANSIT to procure newer propulsion and fuel systems for vehicles and railroad equipment as they are proven to be feasible, reliable and cost effective. This maintenance strategy creates a sustainable financial replacement program and is expected to continue into the future.

NJ TRANSIT prepared an Enterprise Asset Management Program Transit Asset Management (TAM) Plan, dated October 1, 2018. In this plan, NJ TRANSIT sets forth its blueprint to identify, describe, and improve asset management practices, with the vision to maintain the agency's assets in a state of good repair. The plan presents a summary inventory of assets, describes the current condition of the assets, sets near-term targets for the required performance measures, and explains how NJ TRANSIT managers develop and present requests for operating/maintenance budgets and capital asset replacements. The plan also identifies NJ TRANSIT programs and projects aimed at helping to achieve its TAM targets.

Plan 2045 calls for continuing strategic investment to make transit a viable alternative for an increasing share of residents. The current funding priorities are maintaining the system in a state of good repair and operating it in a safe and secure manner. This includes replacing buses, railcars and locomotives as they age, as well as attending to more than 600 rail bridges, 500-plus miles of track, signal systems, stations, and other infrastructure.

NJ TRANSIT has committed to improving the resiliency of its systems to prevent future damage and to prepare for possible future extreme weather events and security threats. This includes significant new investments in a series of hardening projects such as new rail vehicle storage, upgraded power systems, maintenance facilities, emergency control centers, security improvements and signal and communications systems resilience upgrades.

NJ TRANSIT established TAM targets in 2018 and submitted them to FTA. The NJTPA Board approved a resolution supporting NJ TRANSIT targets in May 2019.

PATH Asset Management Targets and Goals

PATH is an interstate heavy rail rapid transit system that serves as the primary transit link between Manhattan and the neighboring New Jersey urban communities, as well as suburban commuter railroads. The PATH system connects terminals in Newark, Jersey City, and Hoboken in New Jersey to lower and mid-town Manhattan in New York City, using two pairs of tunnels beneath the Hudson River. The system has four service lines: Newark to World Trade Center (WTC), Journal Square to 33rd Street, Hoboken to WTC, and Hoboken to 33rd Street.

The PATH system includes:

- Approximately 45 miles of revenue and storage/yard tracks

- 350 revenue vehicles
- 13 passenger stations
- Service buildings, and numerous other equipment and systems, including fare collection, elevators and escalators, power substations, signals, communications, and electrical.

Similarly to NJ TRANSIT, PATH prepared a TAM Plan, dated October 2018. In addition to providing a summary inventory of assets and their current condition, the PATH TAM Plan examines the current TAMP practices at PANYNJ and PATH, and recommends a set of action plans that will help ensure that the PATH system continues to provide a safe, reliable, and high-quality service.

In its TAM Plan, PATH committed to implementing a strategic process to maintaining its assets in a state of good repair through transparent financial stewardship and reinvestment, by focusing on high quality asset condition and performance information with a risk-based approach as the basis for decision-making. PATH’s asset management program is designed to support and lead to the timely implementation of projects and programs which maintain PATH’s infrastructure, systems, equipment, and facilities in a state of good repair.

PATH also committed to improving the resiliency of its system to prepare for possible future extreme weather events. This includes investments in several systems, including substations, maintenance facilities, and rail rolling stock.

PATH established TAM targets in 2018. The NJTPA Board approved a resolution supporting PATH targets in May 2019.

Progress Toward Targets

The investment priorities of the NJTPA are described in the NJTPA long-range plan, *Plan 2045: Connecting North Jersey*, which was adopted in November 2017, and implemented through projects and programs in the Transportation Improvement Program (TIP). The NJTPA Regional Capital Investment Strategy targets the largest portion of funding, more than 35 percent, to transit maintenance and preservation.

The NJTPA FY 2020-2023 TIP dedicates approximately \$4.5 billion over the four-year period toward NJ TRANSIT preservation projects and programs. This represents nearly 40 percent of the total four-year program. An additional \$6.7 billion has been assigned to these projects for the “unconstrained” period of FY 2024 – FY 2029.

Some of the transit preservation projects and programs allocated the most resources in the 4-year TIP include the following:

- Nearly \$1 billion is programmed for the rail preventive maintenance program, which is used for overhaul of rail cars and locomotives, and other preventive maintenance costs. Additionally, more than \$300 million is allocated toward preventive maintenance of the bus system.
- More than \$1 billion is allocated toward replacing or overhauling rail cars and locomotives that have reached the end of their useful life, and \$430 million for replacing buses.
- Approximately \$500 million is dedicated to maintaining the Northeast Corridor, including projects like the Midline Loop in North Brunswick and various yard improvements.

- Projects to modernize and improve the signal and communication systems receive nearly \$200 million over the four years.

NJ TRANSIT's \$1.4 billion Fiscal Year 2020 Capital Program calls for continued investment in the State's transit infrastructure to maintain a state of good repair and provide reliable transit service. An emphasis on better preparing NJ TRANSIT to withstand, and recover from, future extreme weather events through building a more resilient system remains a key focus of the Capital Program, which invests in railroad bridge rehabilitation, track replacement, signal upgrades, repairs to overhead power lines and electric substations, improvements to rail stations, and bus shelter upgrades.

In addition, the NJ TRANSIT 2018 Annual Report highlights several items relating to transit asset management, including

- Final design on the Portal Bridge was completed in FY 2018, and early action work is being advanced through a USDOT TIGER grant. The remainder of work on the project is being prepared for advertisement for construction. Portal Bridge plays a critical role in the operation of the Northeast Corridor. As part of the Gateway Program, the Portal Bridge Project would replace Amtrak's existing, century-old swing-span bridge with a fixed-span bridge over the Hackensack River. When the replacement bridge is finished, bridge openings for boating traffic will no longer be necessary, greatly improving service reliability and speed on the Northeast Corridor between Newark and New York.
- A request for proposals was advertised in FY 2018 for 113 state-of-the-art Multilevel III Vehicles (MLV III), which will replace aging Arrow III railcars. The MLV III fleet will consist of self-propelled railcars and coaches that can operate in trainsets without the need for locomotives. Arrival of the MLV III railcars will greatly reduce the average age of the NJ TRANSIT rail fleet.
- A design-build contract was awarded in FY 2018 to replace the existing Elizabeth Station on the Northeast Corridor with a new station. The project includes reconstructing and extending existing high-level platforms, installing new elevators, replacing existing elevators, constructing new and expanded station buildings and waiting areas, installation of a state-of-the-art communications system and other customer amenities.
- Construction began in FY 2018 on a project at the New Brunswick station on the Northeast Corridor. Planned improvements include rehabilitation of waiting room windows, optimization of lighting, heating and air conditioning systems, exterior façade work, downspout and gutter repairs, and exterior painting. Other upcoming projects include replacement of two elevators, rehabilitation of the escalator and an inbound platform extension project.
- Final repairs were completed in FY 2018 on the existing Raritan River Bridge on the North Jersey Coast Line, which spans the Raritan River between Perth Amboy and South Amboy. The bridge was extensively damaged during Superstorm Sandy. A long-term plan to replace the 110-year-old bridge is underway. The existing swing-span bridge will be replaced by a new lift bridge constructed with more durable materials and built at a higher elevation than the existing bridge. Final design of the bridge advanced in FY 2018 to 60 percent, with 100 percent design scheduled to be completed in FY 2019. Construction is anticipated to begin in FY 2020.
- Construction work was completed on platform improvements at Cranford Station on the Raritan Valley Line (RVL) in FY 2018. Plans for improvements at Roselle Park Station (also on the RVL) advanced, which will include replacement of deteriorated sections of existing platforms,

installing new tactile-edge protections, construction of a new elevator to comply with the Americans with Disabilities Act (ADA) and other repairs.

- Extensive state-of-good-repair work was completed across the rail system in FY 2018. The work included the installation of more than 46,500 wood railroad ties on the Montclair-Boonton, Main, Morristown, North Jersey Coast and Port Jervis lines and 5,800 composite cross ties on the North Jersey Coast, Main, and Morristown lines. More than 9,500 feet of continuous welded rail was installed on the Main and Port Jervis lines, and 166 miles of track was resurfaced on the Atlantic City, Gladstone, Main/Bergen County, Montclair-Boonton, Morristown, North Jersey Coast, Princeton, Pascack Valley, Raritan Valley, Meadowlands, and Port Jervis lines. Several new switches and turnouts were installed at Hoboken Terminal and on the Port Jervis Line to improve service reliability. Additionally, 12 grade crossing renewal projects were completed on the North Jersey Coast, Main, and Pascack Valley lines.

Most of PATH's funding for TAM projects comes from PANYNJ funding sources, and are thus not in the NJTPA's TIP. As such, the NJTPA will rely on PANYNJ to provide information on projects and programs that will help meet PATH's TAM targets.

These projects and programs, along with others in the TIP and other programs will assist in addressing the established NJ TRANSIT and PATH transit asset management targets.