

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 supports effective and 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.

<i>Funding Program</i>	<i>Performance Area</i>
Highway Safety Improvement Program (HSIP)	Roadway Safety
Transit Safety & Oversight (49 U.S. Code § 5329)	Transit Safety
Transit Asset Management (49 U.S. Code § 5326)	Transit Asset Management
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

Performance measure requirements are addressed by state departments of transportation, public transit providers, and MPOs in a cooperative process. For the NJTPA region, this involves the NJTPA working among a host of agencies, including the NJDOT, NJ TRANSIT, PANYNJ, neighboring MPOs, and neighboring state transportation departments. This appendix describes how this TIP is anticipated to help meet established state, regional and urbanized area performance measure targets. Each of the sections, arrayed below by performance area, describes background on the priority and definition of the national measures; the most recent and current targets applicable to the NJTPA region; and how this TIP will help to meet those targets.

In terms of setting targets, MPOs may either establish quantitative targets for their metropolitan planning area or agree to plan and program projects that contribute toward meeting the statewide

targets. MPOs must report their targets to the state DOT and include a discussion of progress toward meeting the targets in their long-range transportation plans and transportation improvement programs.

The investment priorities of the NJTPA are reflected in the NJTPA's long-range plan, [*Plan 2050: Transportation, People, Opportunity*](#), which was adopted in September 2021. These investment priorities are implemented through projects and programs in this TIP.

The latest targets can be found on the NJTPA website at <https://www.njtpa.org/PerformanceMeasures.aspx>.

Roadway Safety

Background

Safety is the first national goal identified in MAP-21 and continued to be so under the FAST Act and IIJA. In 2020, the National Road Safety Strategy became the guidance document for safety programs. It is based on the Safe System Approach, which addresses safety by building and reinforcing multiple layers of protection to both prevent crashes from happening in the first place and minimize the harm caused to those involved when crashes do occur. This is a shift from a conventional safety approach because it focuses on both human mistakes AND human vulnerability and designs a system with many redundancies in place to protect everyone. With the safe system approach, safety programs are focused on infrastructure, human behavior, responsible oversight of the vehicle and transportation industry, and emergency response.

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 Federal Highway Administration (FHWA) established national performance measures for the purpose of carrying out the Highway Safety Improvement Program (HSIP) and for state departments of transportation (DOTs) and metropolitan planning organizations (MPOs) to use in assessing serious injuries and fatalities. Since 2017, DOTs and MPOs must annually collect and report performance data on safety targets for these measures as required by federal safety performance management rules. The safety measures are assessed as five-year averages, so, for example, the targets for 2023 reflected data collected during calendar years 2019 through 2023. FHWA assesses whether state DOTs have met or are making significant progress toward their targets.

State DOTs report baseline values, targets, and progress toward meeting the targets to the Federal Highway Administration (FHWA) in an annual safety report (e.g., the 2022 ASR set targets for CY 2024). MPOs must report their safety targets (either separate quantitative targets or support for the statewide targets, as discussed above) to the State DOT, and include a discussion of progress toward meeting them in their TIP.

The federal roadway safety performance measures are five-year rolling averages 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)**

NJTPA Regional Targets and Goals

In January 2023, the NJTPA Board adopted the [first set of regional roadway safety targets for calendar year 2023](#), reflecting a data-driven timeline for reaching the goal of zero fatalities and serious injuries by 2050¹. NJDOT's annual safety report (ASR) includes statewide targets for the following calendar year's performance (e.g., the 2022 ASR set targets for CY 2024).

¹ In prior years, 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.

Despite gradual reductions in serious injuries and fatalities between 2007 and 2017, significant increases were seen over the next five years (2018 through 2022) and are projected to increase further for 2023. Reaching the goal of eliminating severe crashes by 2050 will rely on increased investment in creating a safety culture through a holistic [Safe System Approach](#).

NJDOT updated the [New Jersey Strategic Highway Safety Plan](#) (SHSP) in August 2020. 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 fatalities, serious injuries, and total injuries each by 3 percent annually. The SHSP was prepared in collaboration with the New Jersey Division of Highway Traffic Safety (NJDOTS) and all three New Jersey MPOs, New Jersey’s county engineers, planners, and safety advocates. The statewide targets referenced above were developed to help further the SHSP goals. (Targets developed prior to the August 2020 SHSP were based on the previous SHSP’s goal to reduce combined fatalities and serious injuries by 2.5 percent annually.)

Progress Toward Targets

The NJTPA conducts planning consistent with the Safe System Approach to integrate safety into all phases of transportation improvement planning and development. 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 NJTPA and 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 then 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 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 \(HRRRP\)](#). For FY 2022, there are a total of 22 projects in these programs totaling \$188 million, a doubling of funding for the programs since the last round of projects in FY 2020. Since FY 2004, there have been [145 LSP projects \(\\$403 million\) and 26 HRRR projects \(\\$73 million\)](#).

Examples of current roadway safety projects being [advanced by the NJTPA through the LSP and HRRRP](#) include:

- Local Safety Program:
 - \$46.5655 million for traffic and pedestrian signal upgrades, high-visibility crosswalks, accessible curb ramps, and leading pedestrian intervals at 52 intersections in Essex County. These upgrades will occur along Bloomfield Avenue (CR 506) from Highland Avenue to Broadway; Ridgewood Avenue (CR 653) from Bloomfield Avenue to Bay Avenue; Grove Street (CR 509) from Nye Avenue to Hoffman Boulevard; and Irvington Avenue/Clinton Avenue (CR 655) from Riggs Place to New Street. The intersections are in Belleville, Bloomfield, Glen Ridge, Newark, East Orange, Irvington, Maplewood, and South Orange.
 - \$8.142 million to improve safety and overall operations at 33 intersections along approximately 1.5 miles of Summit Avenue between Route 139 and Secaucus Road in Jersey City (Hudson County). Improvements include conversion of Summit Avenue to one-way south-bound, installation of a protected bicycle lane, signal upgrades, pedestrian signal

- upgrades, high-visibility crosswalks, curb extensions, and leading pedestrian intervals. New traffic signals will be installed at 19 intersections.
- \$33.214 million for traffic and pedestrian signal upgrades, high-visibility crosswalks, curb extensions, and leading pedestrian intervals at 26 intersections in Hudson County. These upgrades will occur in Jersey City along JFK (Kennedy) Boulevard from Pavonia Avenue to St. Paul's Avenue, and from Route 139 to Secaucus Road.
 - \$12.024 million for safety improvements at seven intersections in the Hudson County municipalities of Hoboken, Jersey City, North Bergen and Union City. Improvements to JFK (Kennedy) Boulevard East, from Main Drive to Palisades Triangle Plaza, will include pedestrian signal upgrades, high-visibility crosswalks, curb extensions and a roundabout. Improvements to Paterson Plank Road, from Harrison Street to South Wing Viaduct, will include signal upgrades, pedestrian signal upgrades, high-visibility crosswalks, curb extensions, lead pedestrian intervals, and a raised median barrier. New traffic signals will be installed at five intersections.
 - \$10.408 million for traffic and pedestrian signal upgrades, high-visibility crosswalks, curb extensions, and leading pedestrian intervals at 23 intersections along Smith Street in Perth Amboy (Middlesex County), from Convery Boulevard to Front Street. New traffic signals will be installed at six intersections.
 - \$7.761 million for bicycle lanes, signal upgrades, pedestrian signal upgrades, high-visibility crosswalks, a multi-use path, rectangular rapid flashing beacons and pedestrian railroad crossings at 18 intersections along Stelton Road in the Piscataway (Middlesex County). New traffic signals will be installed at two intersections.
 - \$4.7 million for buffered bicycle lanes, signal upgrades, pedestrian signal upgrades, dedicated left-turn lanes, high-visibility crosswalks, and pedestrian railroad crossings at 15 intersections along Cedar Avenue in the Long Branch (Monmouth County). New traffic signals will be installed at two intersections.
 - \$2.958 million for a roundabout, upgraded guiderails, dedicated left-turn lanes, accessible curb ramps, high-visibility crosswalks, upgraded signs and pavement markings at four intersections on the border between Jackson and Millstone Townships (Monmouth County).
 - \$1.885 million for a roundabout, streetlighting upgrades, pedestrian signal upgrades, accessible curb ramps, and high-visibility crosswalks at three intersections on East Main Street/Mendham Road from Tempe Wick Road to Cold Hill Road in Mendham Boro and Mendham Township (Morris County). A new traffic signal will be installed at the intersection of East Main Street (CR 510) and Tempe Wick Road (CR 646).
 - \$1.175 million to improve safety and overall operations at three intersections on South Morris Street from Millbrook Avenue/ Munson Avenue to Byram Avenue in Dover (Morris County). Improvements will include streetlighting upgrades, accessible curb ramps and high-visibility crosswalks. Two new traffic signals with 12-inch signal heads and pedestrian countdown heads will be installed. An improved school crossing with curb extensions and a rectangular rapid flashing beacon will be installed at South Morris Street and Byram Avenue. Road geometry will be reconfigured at the intersection of South Morris Street and Millbrook Avenue/Munson Avenue.
 - \$5.879 million for bicycle lanes, signal upgrades, high-visibility crosswalks, and curb extensions at 15 intersections along Lakeview Avenue from Crooks Avenue to Clifton Avenue in Clifton (Passaic County). New traffic signals will be installed at three intersections.
 - \$15.042 million for new sidewalks, bicycle lanes, traffic signal and pedestrian signal upgrades at 30 intersections along Valley Road from French Hill Road to Hamburg Turnpike in Wayne (Passaic County). New traffic signals will be installed at six intersections.

- \$7.699 million for signal upgrades, pedestrian signal upgrades, sidewalk replacement, high-visibility crosswalks, pedestrian refuge islands, rectangular-rapid flashing beacons, accessible curb ramps, and curb extensions at 19 intersections on County Routes 533 and 527 from Tea Street to the Bound Brook border, in Bound Brook (Somerset County). New traffic signals will be installed at three intersections.
- \$10.709 million for dedicated left turn lanes, accessible curb ramps, high-visibility crosswalks, and NJDEP compliant storm water management upgrades at 14 intersections throughout the municipalities of Berkeley Heights, Linden, New Providence, Roselle, and Summit (Union County). New traffic signals will be installed at 10 intersections.
- High Risk Rural Roads Program:
 - \$9.449 million to improve safety and overall operations on approximately six miles of roadway throughout Upper Freehold (Monmouth County). Improvements on Allentown-Davis Station Road/Forked River Road from the Allentown border to Arneytown-Hornestown Road will include: a single-lane roundabout at the intersection of CR 539 and CR 27, centerline rumble strips, edgeline rumble strips, safety edge, high friction surface treatment and super-elevation along curves, upgraded signs, pavement markings and improved lighting at intersections.
 - \$4.785 million for centerline rumble strips, edgeline rumble strips, safety edge, high friction surface treatment and super-elevation along curves, upgraded signs, pavement markings and improved lighting at intersections on Iron Ore Road/High Bridge Road (CR 527A) from Indian Path to Woodruff Court in Manalapan (Monmouth County).
 - \$5.969 million for centerline rumble strips, edgeline rumble strips, safety edge, high friction surface treatment and super-elevation along curves, upgraded signs, pavement markings and improved lighting at intersections on Trenton-Lakewood Road (CR 526) from Sharon Station Road to I-195 in Millstone and Upper Freehold (Monmouth County).

The local safety projects are in addition to several TIP projects being developed by NJDOT, such as:

- Route 46, Pequannock Street to CR 513 in Morris County, which will provide improvements to signalized intersections following the proposed road diet design (Project ID: [16318](#))
- Route 66, Jumping Brook Road to Bowne Road/Wayside Road in Monmouth County (Project ID: [14357](#))
- Route 10, Chelsea Drive to Kelly Drive in Essex County, which will provide installation of sidewalks (with ADA curb ramps) on the westbound side of Route 10 in this section (Project ID: [15439](#))
- Route 173, CR 513 (Pittstown Rd) to Beaver Avenue (CR 626) in Hunterdon County, which will improve pedestrian safety with the construction of sidewalks, ADA ramps, and upgraded traffic signals (Project ID: [16362](#))
- Systemic installation of backplates and snow scoops at various intersections in South Brunswick, Middlesex County (Project ID: [22326](#))

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. StreetSmart NJ partners with NJTPA subregions; local, county and state agencies; the state's Transportation Management Associations (TMAs); safety and public health organizations; academic institutions; and other entities.
- Partnership with the Vorhees Transportation Center at Rutgers University and Sustainable New Jersey on the [Complete Streets Technical Assistance program](#), a competitive program that

provides expert assistance to municipalities seeking to implement complete streets. This program has assisted 24 municipalities in nine counties over the past six years.

- Identification of suitable locations for [Road Safety Audits](#) (RSAs), an FHWA proven safety countermeasure. This involves local officials, engineers, planners, and staff from various agencies conducting physical inspections and jointly assessing data. The NJTPA assists NJDOT in working with city/county members to select high ranking corridors for RSAs. The intent is to use the RSA recommendations as an important first step in the project development pipeline, including gaining funding from the NJTPA's LSP and HRRR programs. To date, 50 RSAs have been conducted in the NJTPA region, with 74 percent advancing to construction projects. Five of the new projects funded by the NJTPA in the current round grew out of RSAs.
- Oversight of New Jersey's eight [Transportation Management Associations](#) (TMAs), which promote pedestrian and bicycle safety, conduct speed studies, support the implementation of complete streets, and other related safety efforts.
- Consideration of safety in goods movement including studying hazards involving truck parking and rail grade crossings.
- Continued work with subregions (where feasible) to incorporate curb extensions and/or pedestrian refuge islands in safety projects; implement FHWA proven safety countermeasures; and share experiences with what systemic improvements have been implemented.
- In keeping with the IIJA Safe Streets and Roads for All requirements, the NJTPA is supporting its counties in developing Local Safety Action Plans. Four counties (Essex, Hudson, Monmouth, and Union) received grants to create plans, and the NJTPA is engaging consultant services to work with remaining counties to develop these plans. Local Safety Action Plans are required to apply for implementation funding under the Safe Streets and Roads for All program.

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.

Public Transit Safety

Background

As noted above, safety is the first national goal set forth in the FAST Act. The Federal Transit Authority's Public Transportation Agency Safety Plan (PTASP) regulation requires that a public transit agency's PTASP must include performance targets based on the safety performance measures established under the National Public Transportation Safety Plan. USDOT's statewide and nonmetropolitan and metropolitan transportation rule further requires that MPOs develop targets for the PTASP performance measures, coordinating with the transit agencies.

The PTASP performance measures are organized in six sets:

- Fatalities
 - **The total number of fatalities reported to the National Transit Database (NTD), by mode.**
 - **The rate of fatalities, per revenue vehicle mile (RVM), by mode.**
- Injuries
 - **The total number of injuries reported to the NTD, by mode.**
 - **The rate of injuries, per RVM, by mode.**
- Collision Events
 - **The total number of collision events reported to the NTD, by mode.**
 - **The rate of collision events, per RVM, by mode.**
- Employee Injuries
 - **The total number of employee injuries reported to the NTD, by mode.**
 - **The rate of employee injuries, either per RVM (for the light rail systems), or per 200,000 hours (for the bus operations), by mode.**
- Fire Events
 - **The total number of fire events reported to the NTD, by mode.**
 - **The rate of fire events, per RVM, by mode.**
- System Reliability
 - **The mean distance between major service failures, by mode.**

The first five sets of performance measures (fatalities, injuries, collisions, employee injuries, and fires) relate to "reportable events" as defined by FTA (in the NTD Safety and Security Reporting Manual). These include any events (either planned or unplanned) occurring on a transit right-of-way, in a transit revenue facility, in a transit maintenance facility, or involving a transit revenue vehicle that meets NTD reporting thresholds provided below. (Occupational safety events occurring in administrative buildings are excluded from NTD reportable events.)

- Fatalities involving passengers, others (people waiting or leaving), transit vehicle operators, bicyclists, pedestrians, and occupants of other vehicles.
- Injuries requiring transportation away from the scene for medical attention.
- Substantial property damage.
- Towaways of any motor vehicle.
- Smoke, fire evacuations for life safety reasons, fire (suppression).

The "rates" for the first five sets of performance measures are per vehicle revenue mile, except for the rate of employee injuries for the NJ TRANSIT bus system, which is reported per 200,000 hours worked

(an OSHA standard representing the number of hours that 100 employees working 40 hours a week for 50 weeks would accumulate).

The last performance measure (system reliability) is the average distance between major mechanical failures, particularly those failures that inhibit vehicle movement or prevent the start or completion of a scheduled revenue trip due to safety concerns. Examples of factors and/or components impacting system reliability include tires, brakes, doors, engine/transmission, cooling systems, steering, axles, and suspension.

NJ TRANSIT has oversight of four PTASPs—one for the NJ TRANSIT bus operations (systemwide), and one for each of the three NJ TRANSIT light rail operations: Newark Light Rail, Hudson Bergen Light Rail, and River Line. The PTASPs contain targets for each of the performance measures described above. Targets pertinent to the NJTPA region apply to the following three systems (the River Line is outside the NJTPA region):

Non-Rail Mode

- 1) Systemwide bus operations

Rail Modes

- 2) Newark Light Rail
- 3) Hudson Bergen Light Rail

PTASPs are not required for the NJ TRANSIT commuter rail system and the Port Authority of New York & New Jersey’s Port Authority Trans Hudson (PATH) rail system. Those systems are regulated by the Federal Railroad Administration (FRA) and not by FTA. FRA requires different safety planning and monitoring procedures, and USDOT regulations do not require MPOs to be involved in that planning.

NJ TRANSIT Targets and Goals

NJ TRANSIT’s 10-year strategic plan, [NJT 2030](#), states that NJ TRANSIT’s mission is to “move New Jersey and the region by providing safe, reliable and affordable public transportation that connects people to their everyday lives, one trip at a time,” and the first of its five goals is to “ensure the reliability and continued safety of our transit system.” One of the ways that the plan sets forth to measure success for this goal, is to “strive for zero preventable injuries and fatalities across all modes by 2025, with an annual decrease of 20 percent.”

NJ TRANSIT’s initial set of targets were developed as part of the PTASPs approved by NJ TRANSIT in 2020. These are short-term targets; NJ TRANSIT’s long-term goal is to reduce all these performance measures to zero. The NJTPA Board approved a resolution supporting NJ TRANSIT targets in January 2021. These targets may be updated annually in the various PTASPs that NJ TRANSIT oversees, but the NJTPA is not required to formally support the new targets. Targets provided by NJ TRANSIT will, however, continue to be monitored and considered in the NJTPA planning and programming process (and incorporated on the NJTPA website table of current targets).

Progress Toward Targets

NJ TRANSIT takes every precaution to ensure both passenger and public safety on their bus, rail and light rail systems. NJ TRANSIT operates a risk-based safety management system (SMS), a data-driven process to proactively manage public transportation system risks. The SMS is intended to change the safety

culture to reduce safety-related events by making safety everyone's responsibility, empowering employees to play a role in safety, and encouraging employees and contractors to report safety concerns to senior management.

A major safety initiative underway at NJ TRANSIT is the successful implementation of positive train control (PTC), which uses Global Positioning System (GPS) technology, Wi-Fi, and high-frequency radio transmission to automatically control train speeds. PTC can automatically controlling train speeds and movements, thereby reducing the risk of accidents due to human error. PTC will make train accidents, already rare, even less likely. Implementation of PTC enhances the safety of NJ TRANSIT rail customers and employees and is required by federal law. NJ TRANSIT's PTC system was certified by the FRA as meeting the December 31, 2020 deadline for implementation. Details of NJ TRANSIT's PTC program can be found at <https://www.njtransit.com/ptc>.

Other major NJ TRANSIT safety initiatives include:

- Established in May 2014, the Office of System Safety (OSS) consolidated all agency safety functions, across all transit modes and in the workplace. OSS focuses on promoting the health and safety of the agency's customers and employees and preventing accidents and injuries. The OSS also coordinates and manages incident prevention efforts and develops a more rigorous safety culture. The OSS is an important organizational structure that complements already existing operational protocols and technologies.
- The Rail Operations Center (ROC) in Kearny controls train movements, signals and switches and monitors the location and status of every locomotive throughout the system.
- NJ TRANSIT trains employ operator safety devices including "alerters" and the so-called "dead man's switch." Both tools require the train engineer to stay engaged and alert. Any failure to respond automatically triggers the brake, resulting in a complete vehicle stop.
- Starting with the FRA's initial roll-out in 2009, NJ TRANSIT has participated in the Confidential Close Call Reporting System (C3RS). Under the program, employees can confidentially report unsafe events or conditions to federal authorities.
- To maintain a State of Good Repair for the rail system, a specialized track geometry inspection vehicle examines every inch of NJ TRANSIT's tracks once per month—a schedule that exceeds the quarterly federal requirements. NJ TRANSIT also conducts manual track inspections once per week.
- Safety sensitive employees with positive Obstructive Sleep Apnea (OSA) screening are removed from service until a full sleep study can be conducted and they obtain the appropriate documentation attesting to the satisfactory results of treatment or the condition is not present.
- Rail Operations implemented a new initiative which requires the conductor to ride in the front cab of trains, along with the engineer, when entering terminals in Hoboken, Penn Station New York, Atlantic City, Princeton, Gladstone and the Meadowlands Rail Station.
- Speed limits entering Hoboken, Atlantic City, Princeton and the Meadowlands Rail Station have been reduced from 10 mph to 5 mph as a proactive measure.
- Inward & outward facing cameras are installed on 100% of locomotives and cab cars.
- Following a thorough analysis, NJ TRANSIT will be replacing all the existing bumper blocks with sliding friction bumper blocks at Hoboken Terminal, the Atlantic City Rail Terminal and the Meadowlands Rail Station—all stub-end stations.
- For the bus network, NJ TRANSIT continues working to prevent pedestrian and other collisions. They are installing more cameras on buses to reduce blind spots and assessing route

modifications to reduce the number of left turns. Together, these initiatives will provide bus operators with information they need to drive safely to avoid future collisions.

- Realizing that using public transportation does not end at the bus stop or train station, NJ TRANSIT partners with municipalities to design safer routes for customers to walk or ride bicycles to and from public transportation stops (e.g., through the Transportation Trust Fund supported Safe Routes to Transit program).
- The School Safety Education Program (SAFETY RULES!) created its first ever virtual program for railroad safety in FY 2020 due to COVID-19 and was presented in FY 2021. This program covers important topics, such as no trespassing, staying alert, obeying signs and signals, crossing at designated areas and standing behind the safety line on station platforms. All programs are age appropriate to fit the curriculum from Pre-K through high school.

In the NJTPA TIP, transit safety projects and programs are funded through the NJ TRANSIT Safety Improvement Program (Project ID: [T509](#)). This program provides funding for safety improvement initiatives system wide addressing bus, rail, light rail, Access Link and other identified safety needs. Funding includes investment in equipment, passenger and maintenance facilities, right of way improvements, and other initiatives that improve the safe provision of transportation services. Funding supports planning, engineering, design, construction, acquisitions and other associated costs.

Overall, these and other programs and projects within this TIP and funded separately by NJ TRANSIT are anticipated to significantly contribute to addressing the established NJ TRANSIT safety performance targets.

Public Transit Assets

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)²**
- ***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) scale³**
- ***Infrastructure:* The percentage of track segments (by mode) that have performance restrictions**

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.

² Useful life benchmark (ULB) is the yardstick that agencies 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.

³ 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).

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 in the future.

NJ TRANSIT updated its Enterprise Asset Management Program Transit Asset Management (TAM) Plan in September 2022. 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 the NJ TRANSIT Enterprise Asset Management Team, in collaboration with NJ TRANSIT managers, develops and presents 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 2050 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 safely and securely. This includes replacing buses, railcars, and locomotives as they age and attending to over 600 rail bridges, 950 track miles, 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. NJ TRANSIT updates TAM targets annually and provides them to NJTPA when they have been finalized and approved by FTA. Based on regulations, the NJTPA Board is not required to support the updated targets, but NJTPA does post the latest targets on its web page, which is referenced in any TIP or LRTP update.

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.

Similar 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 is 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. PATH updates TAM targets annually and provides them to NJTPA when they have been finalized and approved by FTA. Based on regulations, the NJTPA Board is not required to support the updated targets, but NJTPA does post the latest targets on its web page, which is referenced in any TIP or LRTP update.

Progress Toward Targets

The NJTPA Regional Capital Investment Strategy targets the largest portion of funding, more than 35 percent, to transit maintenance and preservation. The NJTPA FY 2024-2027 TIP dedicates more than \$5 billion over the four-year period toward NJ TRANSIT preservation projects and programs. This represents approximately 45 percent of the total four-year program. An additional \$7.6 billion has been assigned to these projects for the “unconstrained” period of FY 2028 – FY 2033.

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

- More than \$1 billion is allocated toward replacing rail cars and locomotives that have reached the end of their useful life (Project ID: [T112](#)), and nearly \$500 million for replacing buses (Project ID: [T111](#)).
- Over \$1.1 billion is programmed for the rail preventive maintenance program (Project ID: [T39](#)), which is used for overhaul of rail cars and locomotives, and other preventive maintenance costs. An additional \$420 million is allocated toward preventive maintenance of the bus system (Project ID: [T135](#)).
- More than \$500 million is dedicated to maintaining the Northeast Corridor, including projects like the Midline Loop in North Brunswick and various yard improvements (Project ID: [T44](#)).
- Projects to modernize and improve the signal and communication systems receive more than \$85 million over the four years (Project ID: [T50](#)).

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 relies 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.

NHS Asset (Pavement and Bridge) Condition

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 (aka PM2) describes the performance measures required to assess performance of the NHS assets.

PM2 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, or IRI), 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

NJDOT establishes 2- and 4- year targets for the NHS pavement and bridge condition national performance measures within the New Jersey Transportation Asset Management Plan (TAMP). The TAMP addresses the first goal, "Maintain and Renew Transportation Infrastructure," of *Transportation Choices 2030*, the current New Jersey Long Range Transportation Plan. This goal calls for bringing the state's transportation physical assets (including pavement and bridges) into a state of good repair and maintaining the state of good repair.

Development of the TAMP included NJDOT asset management experts along with other NHS owners and stakeholders. All three New Jersey MPOs and NHS-owning local governments and authorities were engaged in the process.

The TAMP's 10-year investment strategy was integral to setting performance targets, along with existing pavement and bridge conditions and projected conditions after planned projects/improvements. The TAMP pavement and bridge targets are intended to be realistic, considering the overall goal to maintain assets in a state of good repair, historical trends and projected impacts of upcoming projects, uncertainties about the data and project completion, and uncertainty related to the multiple agencies owning and maintaining the NHS pavement and bridges in the state⁴

NJDOT pavement and bridge subject matter experts analyzed current (2021) and historical conditions using the performance measures. Forecasts from the NJDOT pavement and bridge management systems were also examined, taking into account projects anticipated in the near term (assuming increased spending from the Infrastructure Investment and Jobs Act (IIJA)). Additional risk factors were also identified including inflation, supply chain issues, and labor markets, each of which could negatively impact the delivery of planned infrastructure programs.

The targets for the 2022-2025 performance period demonstrate New Jersey's commitment to sustain the improvements that have been made, continuing to maintain its infrastructure in a state of good repair.

The 2-year pavement targets were set based on a steady state projection from the 2021 baseline. The reduced number of planned projects on the Interstate network in the next fiscal year indicated a potential dip in the percentage of lane miles in the good category for the 2-year performance report, and the analysis on the non-Interstate NHS pavement condition also indicated a slight dip in the near-term. However, it is anticipated that increased funding from the IIJA will allow the NJDOT to develop additional pavement projects and maintain both the Interstate and non-Interstate pavement at its current baseline level for the mid performance period.

NJDOT has observed a slow downward trend in the deck area of state-maintained bridges classified as good due to aging bridges. Despite an enhanced commitment to bridge preservation, NJDOT does not expect the preservation program to outpace deterioration on bridges classified as good during the 2-year timeframe. However, due to completion of major projects statewide, there will be an increase in the percentage of good bridges from the baseline in the fourth year. In addition, based on information collected by NJDOT, for NHS bridges not maintained by NJDOT, some increase in the deck area classified as good is expected over the full performance period. On net, NJDOT projects an increase in deck area from baseline on NHS bridges in good condition.

NJDOT projects the net percent poor condition of bridges to decrease, even though aging infrastructure results in more bridges being classified as poor. NJDOT steadily rehabilitates bridges in poor condition and future improvements should slowly offset deterioration of bridges from fair to poor. For the non-NJDOT owners, the NHS percent poor is expected to decrease over the next four years. Accordingly,

⁴ NJDOT only owns about three-fifths of New Jersey's NHS pavement lane-miles, with 15 percent owned by counties, two percent by municipalities, and about a quarter by other transportation agencies and authorities.) NJDOT owns only half of the state's NHS bridges (by bridge deck area). The remaining bridges are owned by the New Jersey Turnpike Authority (about a one-third), other toll authorities (about one-sixth), and others (about 2 percent).

NJDOT set a 2-year target for percent poor at the baseline level, but a 4-year target as decreasing (reflective of improved condition).

The 4-year targets are aspirational and represent NJDOT's goal for the condition of the NHS at the end of the 4-year performance period. NJDOT will work to allocate the funding necessary to achieve these targets.

Progress Toward Targets

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. Approximately 35 percent of the funding over the four years of the TIP is dedicated to maintaining bridges and preserving roadways in the NJTPA region. This is in keeping with the 37 percent allocated to these two categories in the NJTPA Regional Capital Investment Strategy (RCIS).

During the first four-year performance period (2018-2021), the condition of the NHS pavements (both Interstate and non-Interstate) improved throughout New Jersey. From 2019 to 2021, the percentage of the Interstate system pavement in good condition increased from 62.1% to 75.7%, while the percentage in poor condition decreased from 1.8% to 0.1%. For the non-Interstate NHS pavement, the percentage in good condition increased from 33.0% to 41.6%, while the percentage in poor condition decreased from 10.7% to 4.8%. Also during this period, the condition of the NHS bridges fluctuated throughout New Jersey. The percentage of bridges in good condition decreased slightly from 22.1% in 2019 to 21.3% in 2021, and the percentage in poor condition also decreased slightly from 6.8% to 6.6% over the same period.

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

Pavement projects and programs

- Interstate 287, from Route 202 to the Ramapo River in Bergen, Morris and Passaic Counties (Project ID: [14359](#))
- Route 35, from Route 9 to Colonia Boulevard in Middlesex and Union counties (Project ID: [15392](#))
- Route 34, CR 537 to Washington Avenue, Pavement in Monmouth County (Project ID: [11307](#))
- Route 29, Alexauken Creek Road to Washington Street in Hunterdon County (Project ID: [11413C](#))
- Route 94, Pleasant Valley Drive to Maple Grange Road in Sussex County (Project ID: [15391](#))
- Statewide & NJTPA Pavement Preservation Programs (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 80 WB, McBride Avenue to Polify Road in Bergen and Passaic Counties (Project ID: [11415](#))
- Route 4 Bridges in Bergen County (Project IDs: [02346](#), [065C](#), [08410](#), and [93134](#))
- 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](#))
- Statewide Bridge Deck/Superstructure Replacement Program (Project ID: [03304](#))
- Statewide Bridge Emergency Repair Program (Project ID: [98315](#))
- Statewide Bridge Inspection Programs (Project IDs: [X07A](#) and [17341](#))
- 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 and Freight Reliability

Background

Traffic congestion is common in the NJTPA region, and many drivers are accustomed to it. They expect and plan for some delay, particularly during peak driving times. In addition, the NJTPA region experiences unexpected travel delay which can be even more burdensome. 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*. Importantly, unexpected delays impact all roadway users, including those in automobiles, buses, trucks, and other vehicles.

Freight is critical to North Jersey’s economy, with about a third of the region’s three 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. This warrants particular attention to the reliability of truck travel times.

The national travel time and freight 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**
- **Truck Travel Time Reliability (TTTR) Index on the Interstate System**

“Reliable” travel times are based on how “longer” travel times (but that still occur as frequently as one out of five days)⁵ compare to expected (median) travel times. 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 (for general traffic). For truck travel time reliability (TTTR) on Interstate highways, a more stringent standard of what is acceptable is used (travel times that occur as frequently as one out of 20 days). The TTTR metric for a segment is the ratio between rare “very long” truck travel times for a segment⁶ and the median truck travel time for that segment. 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 the TTTR index indicate lower travel time reliability.)

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

⁵ The “longer” travel time is defined as the 80th percentile travel time, which is the time such that 80% of travel times are shorter.

⁶ The “very long” travel time is defined as the 95th percentile travel time, which is the time such that 95% of travel times are shorter.

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 and freight targets every four years (with the option to modify the 4-year targets midway through the 4-year performance period).

NJDOT Statewide Targets and Goals

NJDOT's current Long Range Transportation Plan, *Transportation Choices 2030* includes goals to "improve mobility, accessibility, and reliability," and to optimize freight movement. These goals intend 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. The NJDOT Plan also recommends continued investment in facilities to move more freight by rail, and policies that support moving freight during non-rush hours. Another goal is to "operate efficiently," which focuses on using transportation systems management and operations (TSMO) strategies to use existing capacity most efficiently. All these goals point toward improving reliability on New Jersey's roadways for the movement of people and goods.

In setting statewide targets for the travel time reliability measures, members of the NJDOT Complete Team (consisting of planning and operations staff from NJDOT, the three New Jersey MPOs, NJ TRANSIT, PANYNJ, NJ Turnpike Authority, and FHWA-NJ) considered a number of factors, including:

- Dependable, consistent travel time long-term goal for all stakeholders
- Limited stakeholder experience with measuring travel time reliability, and techniques to forecast future reliability are evolving.
- Available funding constraints, particularly considering other priorities such as improving infrastructure condition and improving safety.
- Travel time reliability impact of new technologies, including connected and autonomous vehicles and transportation network companies (e.g., Uber and Lyft), is unknown.
- Increased VMT, which puts additional stress on the Interstate highways for all users, including trucks.
- Increased port activity and e-commerce, leading to increased truck activity.
- Limited road capacity.

NJDOT and the New Jersey MPOs collaboratively developed 2-year and 4-year travel time reliability targets for 2023 and 2025. Factors considered by the Complete Team in setting these targets included: the trends of VMT change from the past years; projects in the STIP that may improve reliability; major STIP projects that will be in construction phase during the next 4 years, which may worsen reliability; uncertainties such as future changes in data; and possible future impacts of COVID-19 on travel patterns. NJDOT, in coordination with Complete Team members, will revisit the 4-year targets in two years as allowed by FHWA.

The NJTPA Board approved a resolution supporting the NJDOT's statewide travel time and freight reliability targets in May 2023.

Progress Toward Targets

One of the goals of *Plan 2050* is to “maintain a safe, secure and reliable transportation system in a state of good repair.” *Plan 2050* includes a map of unreliable road segments. The updated RCIS includes using the following guidelines:

- 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.

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 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. Another project prioritization criterion focuses on projects that enhance the movement of freight.

During the first four-year performance period (2018-2021), travel time reliability on the NHS and track travel time reliability on the Interstate improved drastically. From 2019 to 2021, the percentage of person-miles with reliable travel times on the Interstate increased from 80.6% to 94.0%, and from 86.2% to 92.2% on the non-Interstate NHS. The average TTTR decreased from 1.89 in 2019 to 1.56 in 2021.

However, traffic patterns in calendar years 2020 and 2021 were significantly affected by the COVID-19 pandemic. The reliability numbers became unusually high because fewer people were on the road. While setting the targets for future years, more emphasis was given to the trends based on pre-pandemic performance while keeping in mind the possible effects of lasting changes on traffic trends and patterns.

NJDOT Transportation Systems Management and Operations (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:

- New Jersey’s Traffic Incident Management (TIM) Program to detect, respond to, and remove traffic incidents and restore traffic capacity as safely and quickly as possible (NJTIM.org)
- New Jersey Statewide Traffic Operations and Support program comprised of Safety Service Patrols (SSP), two Traffic Operations Centers, 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](#))
- 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](#))
- Improvements to the interchange between I-80 and NJ 15 in Morris County by adding the missing ramp and making other operational improvements to increase travel time reliability (Project ID: [93139](#))

The [2023 New Jersey Statewide Freight Plan](#) identifies several projects that are being advanced in priority freight locations in the NJTPA region (in particular, see [Table 113](#) on page 454 showing NJTPA Freight Projects). In addition to the 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. A [FY 2021 funded consultant activity](#) completed two concept development studies for the [Berkshire Valley Road Truck Circulation Project](#) in Roxbury, Morris County; and the [Port Reading Secondary South Main Street Grade Crossing Elimination Project](#) in Bound Brook, Somerset County. PANYNJ received a \$44 million discretionary INFRA (Infrastructure for Building America) grant from the Nationally Significant Multimodal Freight and Highway Projects program towards the \$176 million Port Street project, a modernization of road improvements at Port Newark, one of the six marine terminals that make up the largest port complex on the East Coast.

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

- Port Street Corridor Improvement Project (Project ID: [PA2201](#))
- Delancy Street, Avenue I to Avenue P in Essex County (Project ID: [NS0504](#))
- Kapkowski Road – North Avenue East Improvement Project in Union County (Project ID: [17339](#))
- 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 should significantly contribute to addressing the established New Jersey reliability performance targets (for both people and goods). 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.

CMAQ Traffic Congestion

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).

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 routes presents challenges to the reliability of travel, it is 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 traffic congestion performance measures are applicable to all urbanized areas (UZAs) that include National Highway System (NHS) mileage and with a population over 200,000⁷ with designated air quality nonattainment or maintenance areas for ozone (O₃), carbon monoxide (CO), or particulate matter (PM₁₀ and PM_{2.5}). The NJTPA Planning Area overlaps three such UZAs: the New York—Newark, NY—NJ—CT

⁷ During the initial performance period (2018-2021), the requirement only applied 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.

(“New York-Newark”), the Philadelphia, PA—NJ—DE—MD (“Philadelphia”), and the Allentown—Bethlehem—Easton, PA—NJ (“Allentown”) UZAs.

For each UZA, all state departments of transportation and MPOs with jurisdiction within them must coordinate with one another to set single, unified targets for the entire area—as opposed to targets for portions covered by individual states and MPOs—and they must report those single, unified targets consistently to FHWA.

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 measure⁸ (assessed only for National Highway System facilities) include the following:

- 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)⁹. 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 mphAs 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 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 – divided by the entire population, not just drivers. Thus, areas that have more transit/carpool use get “credit” for those people who are not contributing to congestion¹⁰.

This percent non-SOV travel performance measure recognizes the role that single-occupant vehicles play in contributing to traffic congestion and pollutant emissions. The measure is calculated using U.S. Census American Community Survey (ACS) data about journey-to-work trips. Non-SOV includes carpool, train, bus, walk, bike, taxi, rideshare, working at home, etc.—anything other than driving alone.

⁸ More detail on this measure, including a video with an example on how PHED is calculated, can be found on the NJTPA website, at <https://njtpa.org/PerformanceMeasures.aspx>.

⁹ Only the “extra” time is counted toward excessive delay, not the entire travel time.

¹⁰ 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.

Urbanized Area Targets and Goals

Established NJTPA goals point to user-responsive, affordable, accessible, and dynamic transportation systems; environmental protection; system coordination; efficiency; and connectivity. All these goals relate to managing congestion and improving air quality. The NJTPA's congestion management process includes targeting congestion bottlenecks and hotspots and specifically aims to minimize single-occupant vehicle travel through multimodal, travel demand, and operational strategies.

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

Percent non-SOV travel

According to the 2016-2020 5-year ACS, over half (52.4%) of the residents within the New York-Newark urbanized area used a non-SOV mode as their primary commute mode. There were slightly less than one-third (30.6%) non-SOV commuters in the Philadelphia UZA, and slightly less than one-fifth (19.7%) in the Allentown UZA. Within the New York-Newark and Philadelphia UZAs, there has been a modest increase in recent years prior to the pandemic. In all three UZAs, the 2016-2020 percentage was somewhat higher than pre-pandemic conditions¹¹.

For target setting, the New York-Newark UZA discussions highlighted several considerations, including: historic trends in non-SOV commuting along with population, employment and ridesharing; consistency with policy goals; long-range forecasts; public transit capacity constraints; the limited short-term impact of transportation projects and programs; the potential impacts of New York City congestion pricing; and the uncertainty from numerous external factors, including transportation impacts from the COVID-19 pandemic, and recent increases in inflation (particularly gas prices).

The group noted that while some workers are returning to offices after working from home during the height of the pandemic, it is likely that at least in the near term, telecommuting will be greater than it was pre-pandemic. Because telecommuting counts as a non-SOV mode, this would lead to an increase in the percent of non-SOV commuters. Counter to that, some commuters that previously took transit may shift to driving alone for health reasons, which would lower the percentage of non-SOV commuters. Thus, the group anticipated that the sharp rise in non-SOV commuting seen during the height of the pandemic would likely not be sustained.

However, it was recognized that the performance measure's data source—surveys collected over a 5-year timeframe—may limit the responsiveness of the measure to changing conditions. That is, surveys collected in 2020 and 2021 will continue to be included throughout this performance period. Thus, even to the extent that the pandemic impacts are transitory, any decreases in measured non-SOV travel would be diluted in the measurements until the next performance period.

Based on these considerations, the New York-Newark UZA MPOs and state DOTs agreed that an appropriate 2-year target (corresponding to the 2018-2022 5-year ACS period) is to maintain the percent

¹¹ It is important to note that the 5-year ACS reports on surveys collected over the course of five calendar years. Thus, somewhat less than one-fifth of the samples reported on in the 2016-2020 ACS reflect conditions during the onset of the pandemic.

non-SOV travel at 52.4%; and that an appropriate 4-year target (corresponding to the 2020-2024 5-year ACS period) would be a slight increase to 52.5%.

Discussions around non-SOV target-setting for the Philadelphia UZA highlighted similar considerations and uncertainties as discussed in the New York-Newark UZA. The Philadelphia UZA MPOs and state DOTs agreed that both the 2-year and 4-year targets would represent a slight decrease in the percent non-SOV travel, to 30.0%. The Allentown UZA MPOs and state DOTs agreed to set both the 2-year and 4-year targets to that pre-pandemic average value of 18.6%, which is slightly below the 2016-2020 reported value.

Peak Hour Excessive Delay

Based on data collected during 2021, residents in the New York-Newark UZA experienced an average of 20.9 person-hours of peak hour excessive delay. Similarly, residents in the Philadelphia UZA experienced an average of 13.1 person-hours of excessive delay, and residents in the Allentown UZA experienced an average of 7.1 person-hours of excessive delay. In all three UZAs, the PHED in 2020 was dramatically lower than in 2019 due to pandemic-influenced travel behaviors. However, 2021 appeared to be only slightly lower than pre-pandemic conditions.

Target discussions included similar considerations as for the percent non-SOV measure. The UZA groups noted that traffic has returned to near pre-pandemic conditions, and that construction projects (which are anticipated to increase due to funding from the Infrastructure Investment and Jobs Act) would likely contribute to temporary increases in excessive delay.

For the New York-Newark UZA, the group agreed that an appropriate 2-year target (for 2023) would be a slight increase to 22.0 person-hours per person (which was the 4-year target from the previous performance period). A 4-year target (for 2025) reflects a subsequent slight decrease in excessive delay to 21.0 person-hours per person.

For the Philadelphia UZA, the consensus 2-year target represents a slight increase to 15.2 person-hours per person, and the 4-year target represents a subsequent very slight decrease to 15.1 person-hours per person.

For the Allentown UZA, both the 2-year and 4-year targets to the pre-pandemic average value of 8.4 person-hours per person, which is slightly above the 2021 reported value.

In September 2022, the NJTPA Board approved a resolution establishing the urbanized area traffic congestion targets for all three urbanized areas. The NJTPA also prepared the required CMAQ Performance Plan to accompany NJDOT's Full Performance Period Report on the first four-year performance period (2018-2021) and the Baseline Performance Period Report for the second four-year performance period (2022-2025).

Progress Toward Targets

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:

- Interstate 78 interchange 15 (CR 513/Pittstown Road) improvements in Hunterdon County (Project ID: [NS0309](#))
- NJDOT's Carbon Reduction Program (Project ID: [22352](#)) and the NJTPA Carbon Reduction Program (Project ID: [N2309](#))
- Smart Move Program (congestion relief via low-cost, quick-turnaround intelligent transportation system (ITS) improvements, Project ID [02379](#))
- Intelligent Traffic Signal Systems program (Project ID: [15343](#))
- NJ TRANSIT Light Rail Infrastructure Improvements (Project ID: [T95](#))
- 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](#))
- Bicycle and pedestrian facilities and accommodations, implementing elements of the Statewide Bicycle and Pedestrian Master Plan (Project ID: [X185](#))
- 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](#) (Project ID: [X065](#))
- Additional NJTPA [Transportation Clean Air Measures](#) (TCAMs) (Project ID: [X065](#))

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

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 measures focus 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). These measures examine the total daily kilograms of emissions reduction of mobile source pollutants or precursors—including carbon monoxide (CO), nitrogen oxides (NOx), volatile organic compounds (VOCs), and fine particulate matter (PM2.5)—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 2- and 4-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 (PM2.5)**
 - **Carbon monoxide (CO)**
 - Ozone precursors:
 - **Volatile organic compounds (VOC)**
 - **Nitrogen oxides (NOx)**

NJTPA Air Quality Areas 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.

Targets for emissions reduction by CMAQ projects were developed to combine 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 reported the New Jersey statewide targets to FHWA in December 2022. The NJTPA Board approved a resolution establishing the emissions reduction targets for the NJTPA region in September 2022.

As a baseline, the partners examined emissions reductions from CMAQ projects authorized during the prior four federal fiscal years (FFY 2018 – FFY 2021). 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 considered the baseline and the partner agencies' commitment to sustaining the level of effort with CMAQ program pollutant reductions. Looking at the entire 4-year baseline period was appropriate because of variations in specific projects from year to year. (The 4-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

Targets for the emissions reduction measures specifically reflect the anticipated impacts of CMAQ-funded projects that are currently funded in the Transportation Improvement Program (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 final performance period milestones in 2022. This progress report will also inform decision makers overseeing the planning process, offering opportunities to reassess and re-align investment priorities.

Examples of CMAQ projects and programs in the TIP 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 (Project ID: [X065](#)):

- Electric Monmouth, Monmouth County. Electric charging stations on publicly accessible county properties.
- Emergency Vehicle Idle Reduction Project, NJDEP. Installation of auxiliary power units in emergency vehicles to reduce idling.
- EZ Electric- Meadowlink Electric Shuttles program, EZ Ride.
- Highlands Rail Trail (Phase II), Passaic County. Extension of the Highlands Rail Trail for bicycle and pedestrian traffic.
- It Pay\$ to Plug In, NJDEP. Electric vehicle charging station installation program.
- JFK Boulevard– Armstrong Avenue to Clinton Avenue Traffic Signal Optimization, Hudson County.
- Paterson Traffic Circulation and Signal Optimization Project, City of Paterson.
- Patriots' Path-Morristown/Hanover Shared-Use Path, Morris County.
- Traffic Signal Optimization / Adaptive Traffic Signals along Central Avenue, Essex County.
- Union City and Weehawken Traffic Signal Optimization, Township of Weehawken and City of Union City.

Afterword

The projects and programs identified in Appendix M, along with others in the NJTPA TIP and other agency programs, will help address the established asset management targets. Appendix M will be periodically updated to reflect changed targets and new measures identified through federal legislation, in order to help ensure an efficient investment of federal funds through better investment decisions and outcomes.