

NEW JERSEY TRANSPORTATION ASSET MANAGEMENT PLAN



OVERVIEW



What is Transportation Asset Management?

New Jersey's roadways are made up of assets such as bridges and pavements, many of which last for 50 or more years. Asset management is the process through which assets are managed across their lifecycle. It applies engineering science to ensure that the right work is done at the right time to minimize the costs of ownership, providing safe and reliable roads.

Why an Asset Management Plan?

The TAMP provides accountability for the performance of the National Highway System (NHS) and addresses federal reporting requirements regarding NHS pavement and bridge conditions.

TAMP Policy Goals

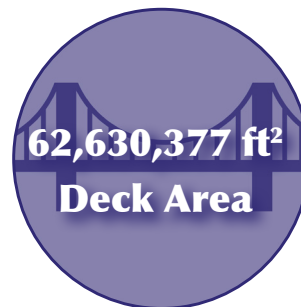
- Provide a safe, reliable roadway system.
- Achieve and maintain a state of good repair for transportation infrastructure assets.
- Manage the roadway system to reduce life cycle costs.
- Increase resilience of the system to the impacts of extreme weather events.
- Establish a data-driven TAM program linking performance targets to outcomes through the New Jersey Transportation Capital Program and the 10-year Statewide Transportation Improvement Plan development processes.

Scope of the TAMP

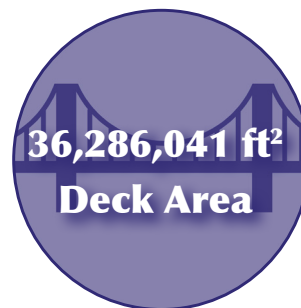
BRIDGES
National Bridge Inspection Standard (NBIS) bridges on either of the:

PAVEMENTS
Interstate and non-interstate pavements on either of the:

National Highway System (NHS)



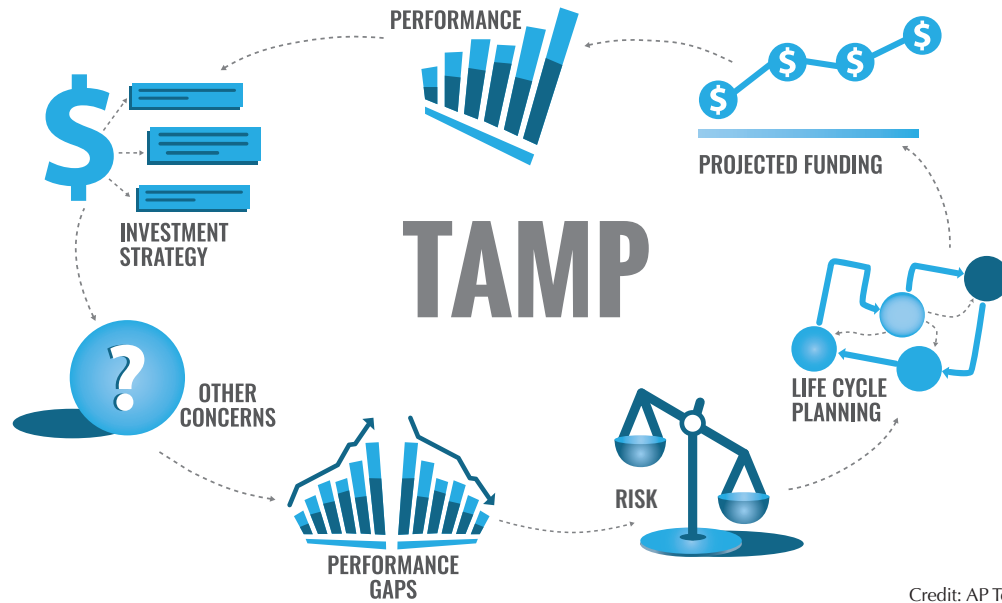
State Highway System (SHS)



Note: Data Collected in 2021
ft² = Square Feet

How Does Transportation Asset Management (TAM)Work?

The TAMP documents a data-driven, risk-based framework that guides the ongoing management of roadway assets in New Jersey. Using data on the current conditions of assets, TAM uses sophisticated planning tools and processes to estimate investment needs and project types to preserve the operability of New Jersey’s pavements and bridges.



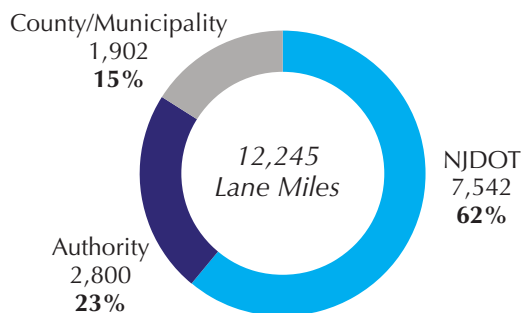
Credit: AP Tech

Who Manages the National Highway System (NHS) and State Highway System (SHS)?

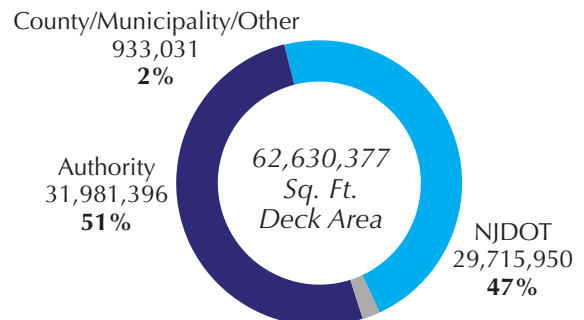
The TAMP includes transportation assets that are on the National and/or State Highway Systems (NHS and SHS). The New Jersey Department of Transportation (NJDOT) manages portions of the NHS and all SHS assets; however, authorities and commissions, counties, and municipalities also manage NHS assets in addition to their other non-NHS assets.

Additionally, NJDOT has exceeded the minimum federal requirements that a TAMP include all NHS pavement and NBIS bridge assets and has included SHS pavement and NBIS bridge assets that are not on the NHS.

NHS Pavements by Lane Miles



NHS NBIS Bridges by Deck Area (ft²)



Note: Data Collected in 2021

NEW JERSEY TRANSPORTATION ASSET MANAGEMENT PLAN



2022 NJDOT SHS PAVEMENT FACT SHEET

NJDOT-Maintained Inventory

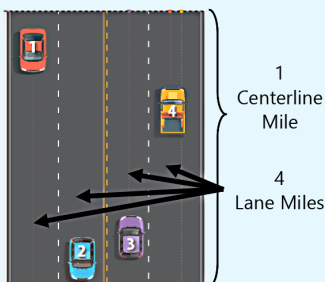
8,560 State Highway System (SHS)
Lane Miles

Performance

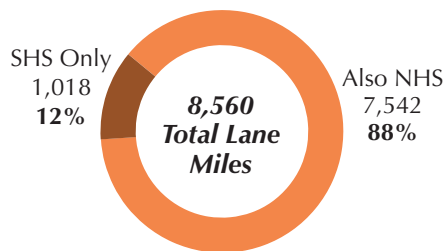
State of Good Repair Objective:
80.0% of SHS lane miles in a state
of good repair or “Acceptable”
condition (*Good* or *Fair*) by NJDOT
measures

Definitions

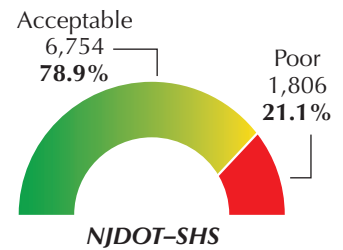
While highways are commonly
described in terms of their length
and the distance travelled by drivers
(e.g., a 1-mile drive can be thought
of as 1 centerline mile), highway
pavements are typically managed in
terms of lane miles. Below, a 1-mile
highway segment with 2 lanes in each
direction equates to 4 lanes miles.



NJDOT-SHS Pavements



Baseline Condition



Note: Data Collected in 2021. Units = Lane Miles. Measures = NJDOT Measures.

Performance Measures

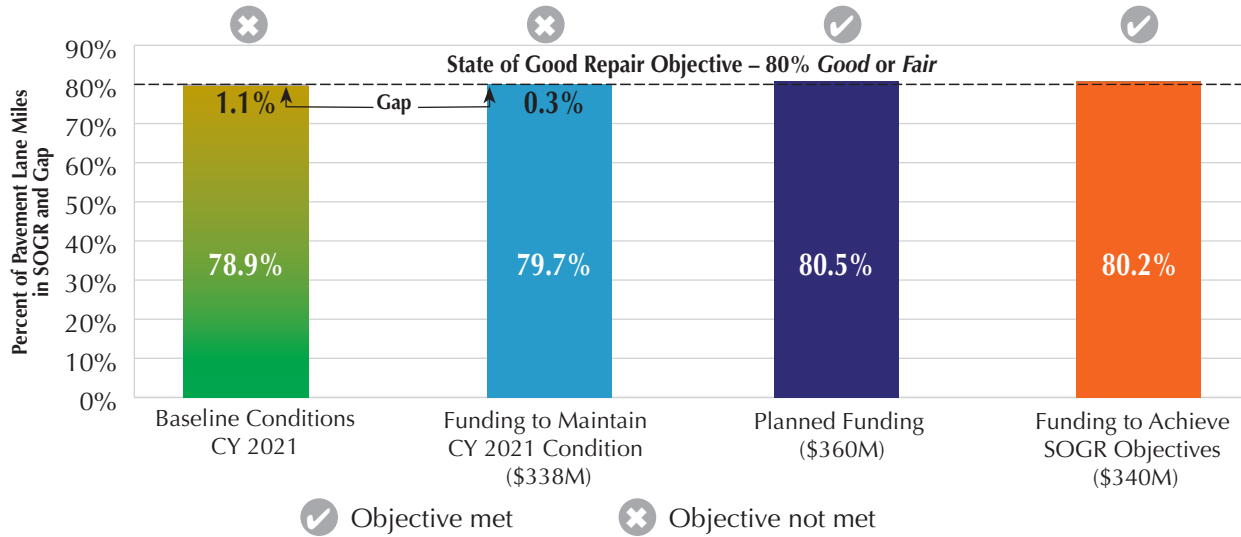
NJDOT has been collecting data to manage its State Highway System (SHS) network since the early 2000s and has developed and refined its performance metrics to best support a cost effective pavement management strategy considering pavement type, traffic loading, distresses types, failure modes and treatment options.

NJDOT uses two metrics to assess pavement condition which are ride smoothness and a Surface Distress Index which includes cracking in the travel lane, rutting, faulting, patching, shoulder drop-off, and other indications of pavement deterioration. These metrics differ from the metrics that Federal Highway Administration (FHWA) established in 2017 to measure and report condition on the National Highway System (NHS) which are described on the NHS Pavement Fact Sheet. Pavement condition is measured for each 1/10-mile segment and assigned into *Good*, *Fair*, and *Poor* categories as described below. Sometimes the term “Acceptable” is used to describe pavements in *Good* or *Fair* condition.

- Good** Pavement in good condition has minimal deterioration. Road users experience a smooth ride without cracks/ruts/faults. Preserving the road optimizes performance.
- Fair** Some deterioration, such as minor cracking, rutting, or faulting. Road users experience an acceptable ride. Preserving or repairing the road minimizes costs.
- Poor** Advanced deterioration and poor ride that can damage vehicles. Requires significant reactive repairs until more costly road treatments can be programmed.

Projected SHS Pavement Conditions by Scenario — NJDOT Measures

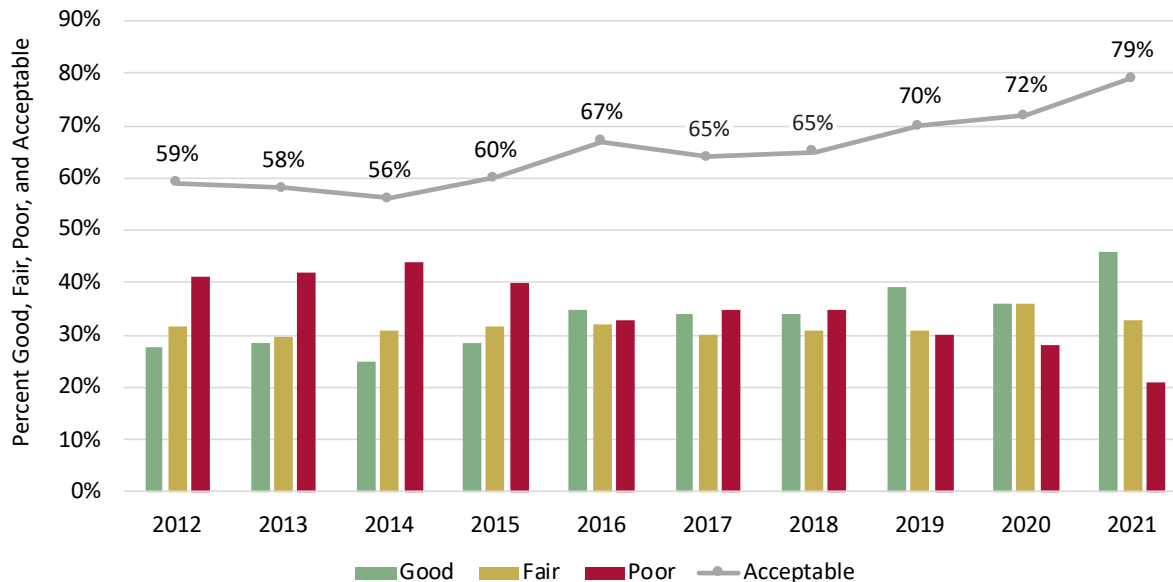
Baseline CY 2021 and Projected CY 2032 Conditions and Gaps by Investment Scenario (Annual Average \$)



At planned funding levels (\$360M/year average), the TAMP projects that SHS pavement conditions will meet NJDOT’s state of good repair objective by 2032. In fact, all three funding scenarios achieve similar performance by the end of the TAMP analysis period.

Historical SHS Pavement Conditions — NJDOT Measures

CY 2012 to CY 2021 Pavement Conditions



During the past decade, NJDOT’s pavement management practices have resulted in substantial improvements to the portion of SHS pavements in *Good*, as well as those considered *Acceptable* (*Good* or *Fair*) while also reducing SHS pavements in *Poor* condition.

NEW JERSEY TRANSPORTATION ASSET MANAGEMENT PLAN



2022 NJDOT NHS PAVEMENT FACT SHEET

Inventory

12,245 National Highway System (NHS) Lane Miles

Performance

National Highway

Performance Program

(NHPP) Two- and

Four-Year NHS Targets

Interstates

- Two-Year Target: 75.7% *Good* | 0.1% *Poor*

- Four-Year Target: 77.0% *Good* | 0.1% *Poor*

Non-Interstates

- Two-Year Target: 41.6% *Good* | 4.8% *Poor*

- Four-Year Target: 43.0% *Good* | 4.0% *Poor*

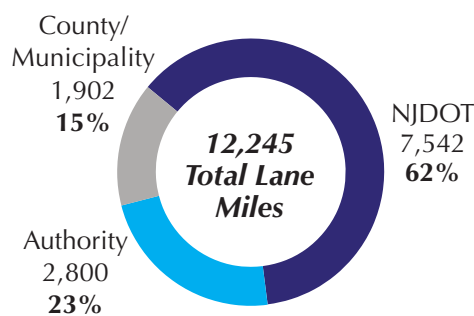
Note: By NHPP measures

Federal Thresholds

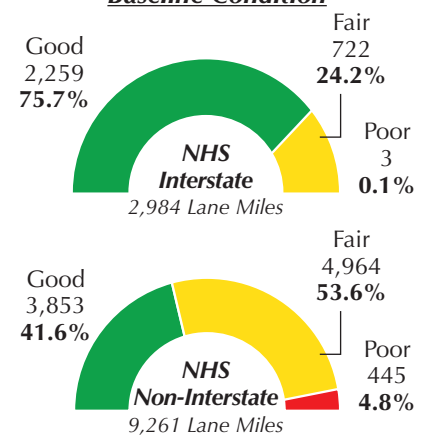
for NHS

- 5.0% or less rated as *Poor* for NHS Interstates by NHPP Measures

NHS Ownership



Baseline Condition



Note: Data Collected in 2021. Units = Lane Miles. Measures = NJDOT Measures.

Performance Measures

In 2017 the Federal Highway Administration (FHWA) established performance measures and metrics through the National Highway Performance Program (NHPP) to measure and report the condition on the National Highway System (NHS). The three categories of pavement condition metrics for NHS pavements are ride smoothness, cracking in the wheel paths, and rutting for asphalt pavements or faulting for concrete pavements. All three metrics must be good for a pavement to be rated *Good*. Two or more must be poor to be rated *Poor*. This methodology is very forgiving and results in all but the very worst pavements being rated as *Good* or *Fair* with very little ability to distinguish variations of condition within each category. This methodology was developed as a reporting tool but is insufficient for states to use as an effective pavement management tool. Pavement condition is measured for each 1/10-mile segment and assigned into *Good*, *Fair*, and *Poor* categories as described below:

Good Pavement displays minor or no deterioration in any of the three federal metric categories. These pavements may be good candidates for cost effective preservation treatments.

Fair Pavement displays significant deterioration in one of the three federal metric categories. These pavements are no longer candidates for cost effective preservation treatments and require more costly repairs such as resurfacing, major rehabilitation or replacement.

Poor Pavement displays significant deterioration in two or more of the three federal metric categories. These pavements are not candidates for cost effective preservation treatments and require more costly repairs such as resurfacing, major rehabilitation or replacement.

Pavement Conditions Examples



Roughness



Rutting



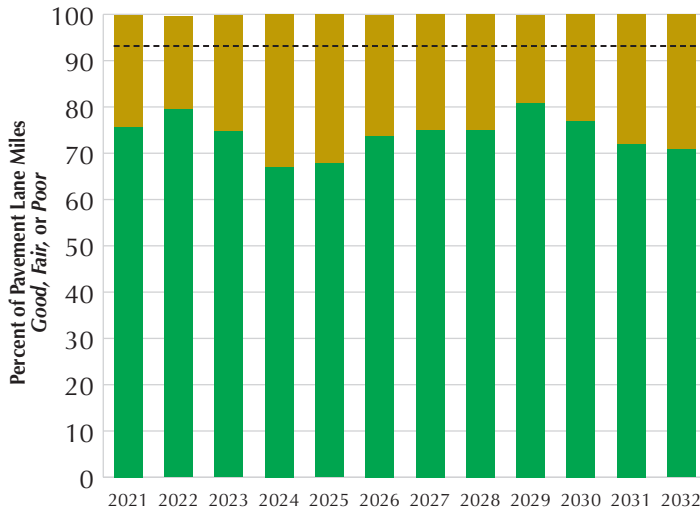
Cracking



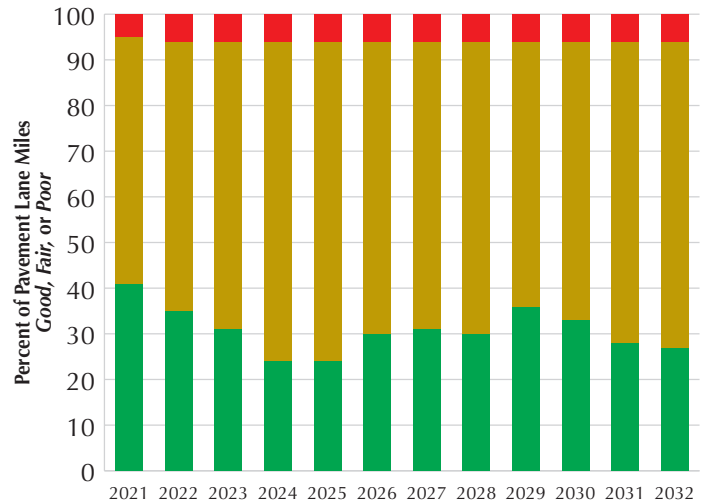
Faulting

Projected NHS Pavement Conditions — NHPP Measures

CY 2021 to CY 2032 Interstate Projections



CY 2021 to CY 2032 Non-Interstate Projections



Interstate		
	Prior Targets (2019 & 2021)	Current Targets (2023 & 2025)
Two-Year (CY 2023)	50.0% Good 2.5% Poor	75.7% Good 0.1% Poor
Four-Year (CY 2025)	50.0% Good 2.5% Poor	77.0% Good 0.1% Poor

Non-Interstate		
	Prior Targets (2019 & 2021)	Current Targets (2023 & 2025)
Two-Year (CY 2023)	25.0% Good 2.5% Poor	46.1% Good 4.8% Poor
Four-Year (CY 2025)	25.0% Good 15.0% Poor	43.0% Good 4.0% Poor

■ Good
 ■ Fair
 ■ Poor
 - - - - - 5% Poor Federal Threshold

Projections Based on Planned Funding Levels

NEW JERSEY TRANSPORTATION ASSET MANAGEMENT PLAN



2022 BRIDGES FACT SHEET



Inventory

62,630,377 ft² National Highway System (NHS) NBIS Bridges
36,286,041 ft² State Highway System (SHS) NBIS Bridges

Performance

State of Good Repair Objectives

- 95.0% of NHS NBIS Bridges in a State of Good Repair (*Good* or *Fair*) by deck area
- 94.0% of SHS NBIS Bridges in a State of Good Repair (*Good* or *Fair*) by deck area

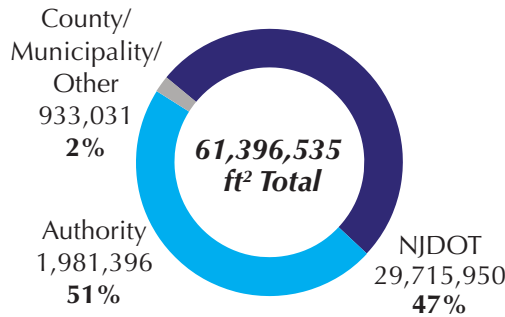
National Highway Performance Program (NHPP) Two- and Four-Year NHS Targets

- Two-Year Target: 21.3% *Good* | 6.6% *Poor*
- Four-Year Target: 23.0% *Good* | 6.0% *Poor*

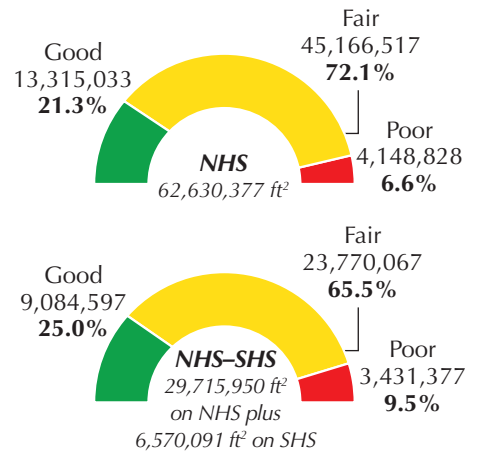
Federal Thresholds for NHS

- 10.0% or less rated as *Poor* for NHS NBIS bridges

NHS Ownership



Baseline Condition

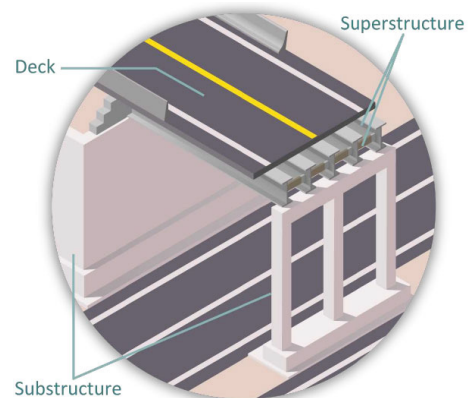


Note: Data Collected in 2021. Units: Deck Area (ft² = Square Feet).

Performance Measures

Both the Federal Highway Administration (FHWA) and NJDOT use bridge condition measures developed by the National Bridge Inventory to monitor the performance of NBIS bridges on the NHS and SHS.

Bridges are inspected at least once every two years, and the final score that the entire bridge receives is the lowest score received by any of the bridge elements. Conditions are recorded and assigned into *Good*, *Fair*, and *Poor* categories, as described below. In the TAMP, the term state of good repair (SOGR) is used to describe bridges in *Good* or *Fair* condition.



Good Bridges in good condition range from those with no problems to those having some minor deterioration of deck or structural elements.



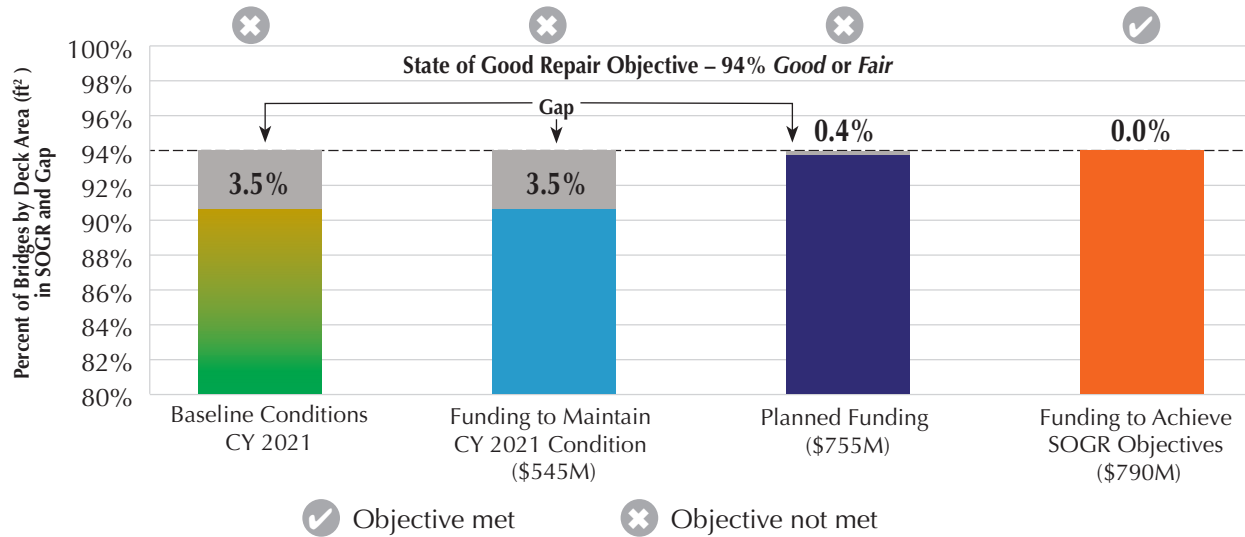
Fair Primary structural elements are sound; may have minor deterioration. This is the most cost-effective time to rehabilitate.



Poor Advanced deterioration or seriously affected structural components. Bridges are still safe to travel but require greater rehabilitation.

Projected SHS NBIS Bridge Conditions by Scenario

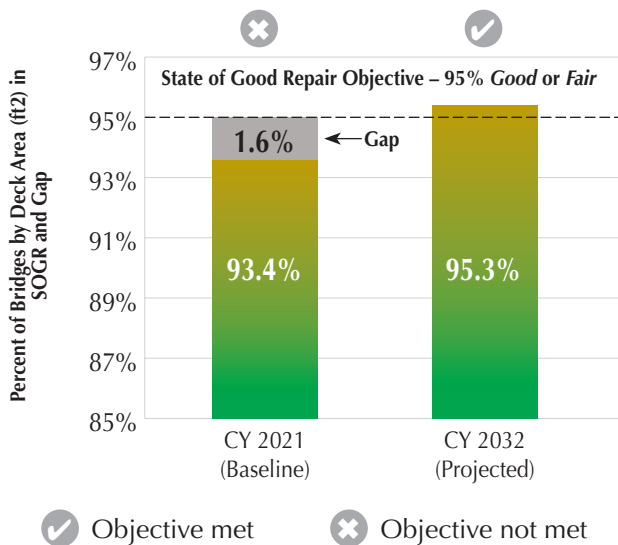
Baseline CY 2021 and Projected CY 2032 Conditions and Gaps by Investment Scenario (Annual Average \$)



At planned funding levels (\$755M/year average), the TAMP projects that SHS bridge conditions will not meet NJDOT’s State of Good Repair Objective by 2032. However, substantial progress will have been made by the end of the TAMP analysis period.

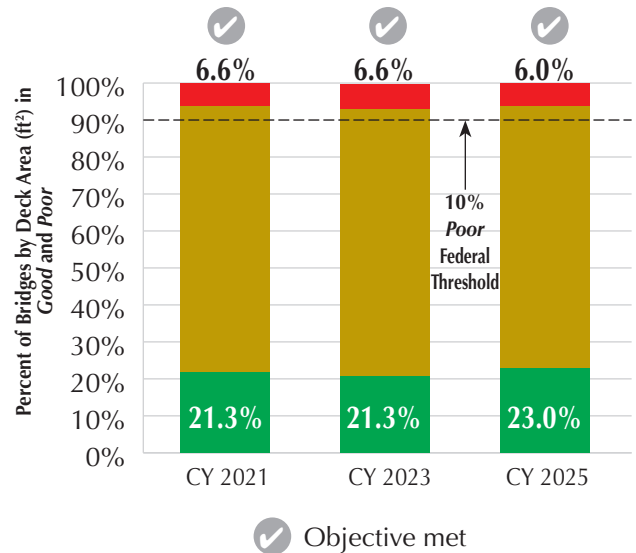
Projected NHS NBIS Bridge Conditions

Baseline CY 2021 and Projected CY 2032 Conditions and Gaps



The TAMP estimates that NHS NBIS bridge conditions will meet NJDOT’s State of Good Repair Objective by 2032. Despite NJDOT not managing the entire NHS, condition and expenditure data collected on behalf of other owners support this projection.

Baseline CY 2021 Conditions and Two- and Four-Year NHPP Targets/Projected Conditions



The TAMP estimates that NHS NBIS bridge conditions will meet the two- and four-year NHPP targets for deck areas in *Good* or *Poor* condition in FY 2023 and FY 2025. Additionally, the maximum threshold for deck areas in *Poor* condition will not be exceeded.

NEW JERSEY TRANSPORTATION ASSET MANAGEMENT PLAN



2022 RISK FACT SHEET



Managing Risks to Asset Management Policy and Performance Objectives

The TAMP builds on established risk management practices at NJDOT by identifying, categorizing, and evaluating risks with respect to asset management. The result is a risk register that can be used to monitor and manage high impact risks. The three top-rated risks are summarized here.

Impacts of Extreme Weather Events

The impacts of extreme weather events on highway infrastructure are projected to increase. The frequency and severity of extreme weather and other climate change stressors will continue to present challenges to maintaining a state of good repair for transportation assets.

Funding Levels and Project Cost Increases

The ability to achieve the state of good repair objectives is contingent on certainty of federal funding levels and predictable project costs. Federal and state funding levels are reasonably predictable through 2026, but become very uncertain beyond that year. The potential for rising project costs to reduce the purchasing power of the funding levels exists from the earliest years and increases over the TAMP planning horizon.

Strengthening Asset Management Practices

Proper asset management requires sound processes and data to support decision-making. NJDOT will need to ensure it continues to refine and institutionalize its practices.

Performance

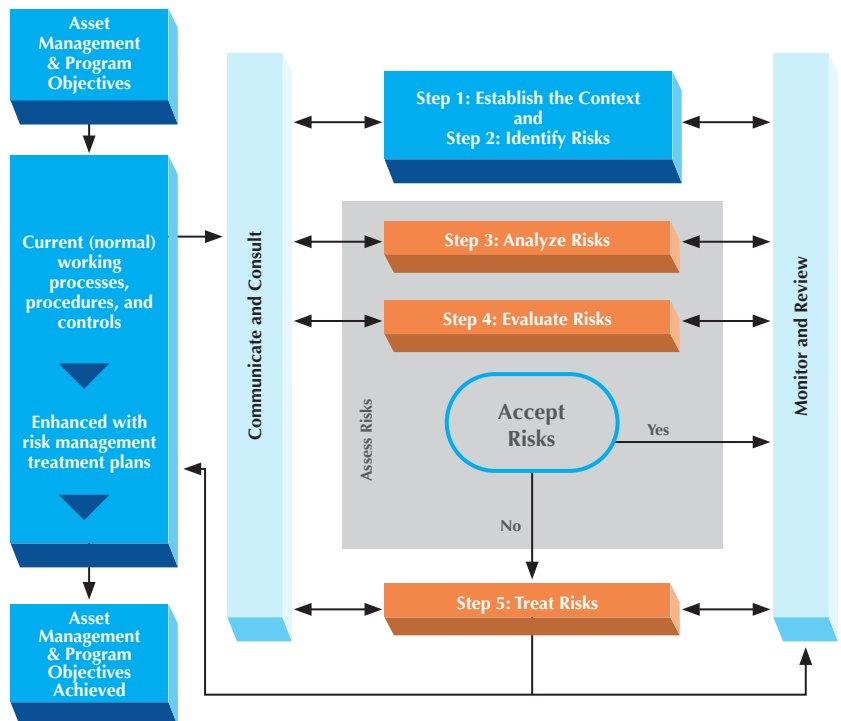
The role of risk management is to develop a systematic approach to anticipating adverse and unexpected situations and responding effectively to these situations in the event they arise.

The role of risk management in the TAMP is outlined by these activities:

- Provide information to stakeholders
- Reduce risks to performance through mitigation
- Set priorities for TAMP enhancements
- Prioritize capital investments
- Improve resilience

NJDOT ISO-Based Risk Management Framework

ISO 31000 defines risk as the "effect of uncertainty on objectives"



NEW JERSEY TRANSPORTATION ASSET MANAGEMENT PLAN



2022 RESILIENCE FACT SHEET

Improving Resilience in Response to Extreme Weather and Climate Change

Risk and resilience are related concepts with resilience defined as the capacity to prevent, withstand, respond to, and recover from a disruption. The TAMP risk management process identified the impacts of extreme weather events as a top risk. NJDOT is currently undertaking multiple initiatives to enhance the resilience of its infrastructure requiring the collaboration of multiple business units, several of which inform the TAMP and support its established objectives.



Climate Hazards Visualization Tool

NJDOT has developed a visualization tool to help personnel visually identify future climate hazards ranging from coastal flooding to heat impacts. The tool will allow the incorporation of resilience considerations as part of NJDOT's capital planning, project design, operations, maintenance, and project delivery processes.



Pavement and Bridge Deterioration & Performance Tracking

NJDOT performs routine inspections of its pavement and bridges and is working on tracking the deterioration of assets based on the fluctuations in temperature, increased precipitation, and other stressors associated with climate change. In the future, this data will be incorporated into the Climate Hazards Visualization Tool to identify areas more susceptible to climate hazards.



Incorporation of Climate Change Into the Life Cycle Planning of Pavements and Bridges

In 2021, NJDOT sponsored the "Life-cycle assessment of roadway pavements for the adaptation and mitigation of climate change impacts" study to investigate ways in which climate change affects these assets. Reports and expert interviews uncover the impact of heat and other climate stressors on pavement life cycles. NJDOT continues to consider how those stressors are changing along with the climate, as well as hopes to evaluate impacts on the life cycle of bridges.



Criticality Tool

NJDOT is finalizing a tool to help analyze data pertaining to infrastructure assets to identify the most essential assets or segments of the transportation system. The criticality tool will be used in combination with the GIS Climate Hazards Visualization Tool to help identify critical and vulnerable areas to support the decision-making process for project prioritization and resilience improvement strategies.

Future Improvements

Additionally, NJDOT will continue to work toward a more resilient future by enhancing existing practices to better consider the impacts of extreme weather and climate change in the following areas:

- Data Gathering, Collection, and Management
- Inspections and Maintenance
- Project Design and Delivery Processes
- Identification of Funding for Resilience Initiatives
- Project Prioritization and Planning
- Policy Development