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# Scenarios & Inves

Little Falls, Passaic County

An aerial photograph of a highway interchange. A multi-lane highway curves through the scene. To the left, there is a gas station with a red roof and a building with a yellow sign. The background is filled with green trees. The text is overlaid on the right side of the image.

**T**he assessment of trends described in the previous chapter sets the stage for how the NJTPA faces decisions that can shape the region's future. This plan anticipates substantial growth in population and employment over the coming decades, but also recognizes that unknown opportunities and challenges will arise along the way. In response, this chapter presents policy guidance for transportation investments in the form of an updated Regional Capital Investment Strategy (RCIS), a statement of principles and guidelines, along with desired spending allocations for different types of transportation projects. ● The RCIS

# Investment Priorities

is performance-based, meaning that it considers desired outcomes for the region's future. Regional outcomes will depend on many factors, including funding levels and how funding is allocated for investments. To update the RCIS, the NJTPA formulated scenarios and assessed their ramifications. This drew upon the results of technical analysis and modeling and consultations with NJTPA Board members, subregional staff, planners, engineers, stakeholders, researchers and others at various forums and workshops. The updated RCIS also reflects input gathered through the extensive public outreach (chapter 2) and draws upon NJTPA's work with partners in preparing and implementing the Together North Jersey plan. Ultimately, the RCIS reflects the NJTPA Board of Trustees' policy directions and choices for transportation investment.



#### Guttenberg, Hudson County

The RCIS consists of 12 principles (right) and associated guidelines (plan addendum) which set the overall direction for NJTPA investments over the long term. The principles are translated into more specific strategies and actions, as presented in Chapter 5, for addressing transportation needs on various modes and facilities in the region. The RCIS desired outcomes and associated performance measures inform planning. Related criteria are used to prioritize funding for proposed projects (through the NJTPA Project Prioritization process). These uses of the RCIS ensure a consistent performance based and asset management approach to transportation investments.

The RCIS provides the foundation for charting the region's future amid the "game-changers" discussed in Chapter 3 as well as fiscal uncertainties. Four exploratory scenarios were identified and analyzed for outcomes tied to the *Plan 2045* vision of a **Competitive, Efficient, Livable and Resilient** region. While funding issues are dealt with in detail in Chapter 6, three funding scenarios are also discussed in this chapter—Plan 2045 (reasonably anticipated), limited, and aspirational—showing how different funding levels would meet regional needs, in keeping with the RCIS

principles. This chapter also addresses performance measures, which are used to assess impacts of investments and will be used to set targets for how well the transportation system functions and is maintained.

#### Scenarios and Updating the RCIS

The RCIS was first created in 2005 and is modified as part of updates to the NJTPA Regional Transportation Plan every four years. The key elements of the RCIS have remained largely unchanged. In particular, the *Fix it First* principle continues to drive most NJTPA investments and receives the largest share of funding—73 percent—which is devoted to maintenance and preservation categories. As discussed later in this chapter, this and other allocations have been adjusted based on current and historical investment levels. Despite the general continuity of most elements of the RCIS, modifications must be made to meet changing conditions and needs.

In preparing an updated RCIS for *Plan 2045*, it was important to consider not only underlying population and demographic trends, but also uncertainties and possible developments that could affect the region (as discussed in Chapter 3). Based on the themes and topics repeatedly raised in outreach events, forums, and workshops conducted for *Plan 2045*,

## Regional Capital Investment Strategy (RCIS) Principles

**E**ach principle is further refined with guidelines (listed in addendum).

**Help Northern New Jersey Grow Wisely** Transportation investments should encourage economic growth while protecting the environment and minimizing sprawl in accordance with the State Development and Redevelopment Plan, Energy Master Plan, and Greenhouse Gas Plan.

**Make Travel Safer** Improving safety and security should be explicitly incorporated in the planning, design and implementation of all investments.

**Fix it First** The existing transportation system requires large expenditures for maintenance, preservation, and repair, and its stewardship should be the region's highest priority.

**Expand Public Transit** Investment to improve the region's extensive transit network should be a high priority, including strategic expansions to increase capacity and to serve new markets.

**Improve Roads but Add Few** Road investments should focus on making the existing system work better, and road expansion should be very limited without compromising the tremendous accessibility provided by the existing highway system.

**Move Freight More Efficiently** Investments should be made to improve the efficiency of goods movement because of its importance to the region's economy and quality of life.

### **Manage Incidents and Apply Transportation**

**Technology** Investments should be made to transportation systems management and operations to improve information flow, operational coordination, energy use, and other technological advances that can make the transportation system work smarter and more efficiently.

**Support Walking and Bicycling** All transportation projects should promote walking and bicycling wherever possible.

**Increase Regional Resiliency** Investments should be made to mitigate risks associated with sea level rise, extreme weather, homeland security, and other potential threats. Investments should consider criticality of infrastructure, vulnerability, and level of risk.



four exploratory scenarios were assessed: Regional Challenges (including resiliency), Communities Focus (including community design, development patterns, walking, biking and transit access), High Technology (including automation, energy and information technology) and Economic Opportunities (including those identified in the NJTPA's North Jersey Comprehensive Economic Development Strategy and investments in public transit capacity and roadway reliability). Each was the subject of computer modeling and qualitative analysis to assess possible impacts of different possible futures. The following summarizes updates to the RCIS based on consideration of these scenarios:

## REGIONAL CHALLENGES

Heeding the lessons of Superstorm Sandy, Hurricane Irene and the 9/11 tragedy before it—as well as national examples of hurricanes Katrina and Harvey—the NJTPA must bolster efforts to help the region prepare for unforeseen and potentially catastrophic events. During outreach for this plan, people in the region repeatedly expressed concern that their communities needed to do more to prepare for a repeat of Sandy or similar threats. Above all, public agencies including the NJTPA must help preserve and maintain the functioning of the transportation system and the well-being of the region's residents. Challenges may arise from increased extreme weather due to climate change, rising sea levels, or malicious physical or cyber-attacks.

In response—and following direction of the NJTPA Board of Trustees—a new investment principle has been added to the RCIS, *Increase Regional Resiliency* (see page 51).

A number of guidelines were added relating to this principle including calling for improving system redundancy and incorporating vulnerability and risk assessments into project development. This applies to system preservation as well as system upgrades and expansion. Also in keeping with this principle, *Plan 2045* advances strategies for mitigating the impacts of extreme weather and improving the environment through clean air programs and alternate fuel technologies, as discussed in Chapter 5.

Investments in resiliency, in addition to upgrading infrastructure in preparation for extreme events, should improve day-to-day travel reliability by

offering more route and mode options. Cleaner air and alternate fuels should be associated with health, quality-of-life and energy efficiency benefits.

Even with increased resiliency investments, coastal storm surge with sea level rise could seriously threaten population and infrastructure. Agencies at all levels of government will continue to grapple with investments in places highly vulnerable to potential coastal or riverine flooding. Individuals and businesses will consider these challenges in deciding where to locate or develop properties. Both the public and private sector must engage in asset-based planning to manage these future challenges. For some communities in vulnerable locations, issues of equity and environment justice must be considered.

## COMMUNITIES FOCUS

The changing demographic trends described in Chapter 3 include shifts in preferences and needs of different segments of the population, which favor the urban core and more densely populated centers around the region, where walking, biking and transit are viable travel options. This includes millennials seeking out walkable neighborhoods with less need for driving; an aging population with seniors in need of improved access to essential services; and employers looking for creative, collaborative environments and to attract the new generation of workers.

The NJTPA and its partners support the growth and development of places that meet these needs, including through Transit Supportive Development focused on the region's many older downtowns already served by bus and rail and towns planning new development that could support future transit services. Based on outreach for this plan, much of the public are enthusiastic about this type of development in their communities. This support is reflected in the RCIS principles of *Help the Region Grow Wisely*, *Support Walking and Biking*, and *Expand Transit*. It also fits with key objectives of the Together North Jersey plan, in particular its livability theme. To reference recent initiatives in this area, language was added to the RCIS guidelines on the importance of Complete Streets, recreation, open space and the arts in community development.

Benefits of these types of investments should include reduced driving, along with associated



reductions in transportation-related fatalities, injuries and air pollution. Positive health outcomes should also emerge from more physical activity, walking and biking.

### **TECHNOLOGY**

The march of technology advancement is unrelenting. NJTPA planning programs and studies continue to explore technology’s potential not only to produce a more efficient transportation system but also to support broader regional goals in innovative ways. Future technology may include any or all of the developments noted in Chapter 3—autonomous cars, 3-D printing, responsive signal systems—or, as likely, features that are yet to be imagined.

Scenario analysis of a “high tech” future pointed to the potential of technology for maximizing the use of existing infrastructure, creating a more reliable system across travel modes. Public input to this plan was broadly supportive of such technologies that can reduce congestion, provide users (roadway, transit and freight) with more real-time information, lessen capital outlays on projects and reduce reliance on cars. But many people were wary of costs and negative impacts, particularly of autonomous vehicles, with some people questioning their safety and whether they would make

### **Roxbury, Morris County**

congestion and air quality worse by putting more cars on the road. Transportation experts cautioned that technology developments must be carefully managed to ensure they serve the public and stressed the need for cooperation among government agencies and the private sector. Resiliency of new technology infrastructure will also be an issue as its operation will need to be preserved and maintained.

To address these and related issues, a number of modifications and additions were made to the *Manage Incidents and Apply Transportation Technology* RCIS principle and associated guidelines. This includes language emphasizing the need for cooperative planning and coordination, the need to assess and avoid unwanted impacts and ensuring support for public transit and the environment.

### **ECONOMIC OPPORTUNITIES**

As discussed in Chapter 3, the region’s economy and prosperity are closely tied to the effective functioning of the transportation system. The capacity of the system to support growth and economic activity is critical. To this end, NJTPA planning activities, particularly as part of Together North Jersey, support



#### Weehawken, Hudson County

better coordinating transportation investments and economic development throughout the region. One notable effort, touching on all RCIS principles, was the development of the North Jersey Comprehensive Economic Development Strategy (CEDS) in cooperation with local governments (see p. 14). The importance of implementing CEDS recommendations was added to the RCIS, noting the need for “special attention to facilitating access to jobs for all residents and communities.”

At the regional level, investments guided by the RCIS principles should result in continued economic progress. The project index includes a host of major highway, bridge and transit improvements. Language was added to the RCIS calling for streamlining of project delivery to ensure these projects are delivered in a timely manner and make cost effective use of available funding.

Public transit capacity is a crucial element of supporting the region’s economic attractiveness. While comments from the public generally favored communities with more travel options, many residents outside of the urban core expressed frustration with the lack of transit (especially rail) options and the difficulty of

accessing the transit system. Creating new rail services, however, will depend on addressing the bottleneck in rail capacity crossing the Hudson River. The RCIS supports the Hudson Tunnel Project, which will maintain capacity while repairs are made to the old tunnels. Language was also added calling for “new capacity for expanded service,” which is part of the larger Gateway program (see page 58). (Note, however, that funding for these large transit projects will need to be identified outside of NJ’s typical funding sources, and therefore is not reflected in the allocation objectives contained in the RCIS.)

The RCIS was also updated to acknowledge the role of region’s Transportation Management Associations whose coordination of programs such as shuttle buses and employer subsidized travel services can facilitate access to transit and provide travel alternatives, including carpooling, particularly in the suburbs.

Also of importance for the regional economy is attending to needs on the road network, both for people and goods. *Under the Improve Roads but Add Few* principle, a guideline was modified to call for using “the NJTPA congestion management process and context-sensitive criteria to target roadway investments that improve travel time reliability and address

bottlenecks and hotspots.” To implement this guideline, Chapter 5 includes numerous proposed strategies for the road network including Complete Streets. Additional references were added to the RCIS regarding the importance of improving the region’s freight system including connectivity of roadway, freight rail and waterborne facilities—critical supports for the regional economy.

The range of factors discussed for other scenarios should support the region’s economic prosperity, with benefits throughout the region’s communities. Increased resiliency, stronger communities, and smart application of technology should all serve to make northern New Jersey more competitive.

### RCIS Allocation Objectives

The long-term RCIS allocation objectives (Table 4.1) describe as a percentage how funding should be allotted to the various categories of transportation projects over time. The process of formulating and assigning new allocation objectives took into account specific NJTPA Board of Trustees preferences, historical programming expenditures in the transportation improvement programs (TIPs), currently programmed expenditures, and the scenario analysis discussed above. Transportation investment according to the RCIS should help the region achieve its favored outcomes.

The allocation objectives are not intended to dictate year-to-year spending, but to provide a general guide over the life of Plan 2045. The objectives largely mirror current spending patterns (with some adjustments for emerging priorities), thus looking forward while also reinforcing past NJTPA investment decisions. The allocation objectives exclude special large-scale investments such as the Gateway Program (including the Hudson Tunnel Project and Portal Bridge North) for which dedicated funding should be sought.

As noted, the RCIS provides for the majority of funding to be allocated toward maintaining, preserving, and hardening the existing transportation network, but the investment strategy also builds upon the region’s commitment to expanding transit, improving safety, enhancing transportation efficiency, optimizing the system, improving freight facilities, augmenting bicycle and pedestrian travel, increasing regional

resiliency, and encouraging sustainable growth and prosperity. Below is a summary of the allocations by category. It is important to recognize that the investment strategy allocations described are long-term objectives.

- *Maintenance and preservation for roads, bridges, and public transit facilities*—73 percent of total investment. The intention is to invest more in the near term in order to bring the system to a sustainable state of good repair, allowing for relatively lower future needs.
- *Investment in enhancing and expanding public transit*—8 percent. This level recognizes the limited opportunities for significant expansions to the existing robust transit network; it does not include additional dedicated funding as noted above.
- *Investment in road enhancements*—3 percent. This includes physical upgrades, such as adding turning lanes or renovating intersections. Technology, incident management, safety and pedestrian/bicycle investments will improve road operations as well.

**Table 4.1:**  
**Plan 2045 RCIS Allocation Objectives**

Category of Investment	Objective
Bridges	20%
Road Preservation	17%
Road Enhancement	3%
Road Expansion	1%
<b>Subtotal: Roads &amp; Bridges</b>	<b>41%</b>
Transit Preservation	36%
Transit Enhancement	4%
Transit Expansion	4%
<b>Subtotal: Transit</b>	<b>44%</b>
Dedicated Freight	3%
Direct ITS	4%
TDM	2%
Direct Safety	4%
Direct Bike/Ped	2%
<b>Subtotal: Other</b>	<b>15%</b>
<b>TOTAL</b>	<b>100%</b>
<b>Other Subtotals</b>	
Preservation <sup>†</sup>	73%
Direct ITS, Safety, Bike/Ped	10%

<sup>†</sup>Bridges, Road Preservation, and Transit Preservation

- *Investment in roadway expansion*—1 percent. This recognizes that more cost-effective benefits are to be found from other types of improvements.
- *Investment in direct safety improvements*—4 percent. In addition to this direct investment, safety is a priority to incorporate in all investments.
- *Investment in dedicated freight facilities*—3 percent. This focuses on improving connections for serving critical markets and optimizing the system. Other roadway investments will benefit freight movement as well.
- *Investment in intelligent transportation systems (transportation technology) and incident management projects*—4 percent. This supports the potential for major advances in technology while also including these elements appropriately in other types of projects.
- *Investment in bicycle and pedestrian facilities*—2 percent. In addition to these investments, non-motorized elements will be incorporated in other types of projects.
- *Investment in reducing motor vehicle trips with Transportation Demand Management*—2 percent. This includes funding for programs supporting efforts to reduce vehicle trips, such as through NJ’s transportation management agencies (TMAs).

Lakewood, Ocean County



## Funding Scenarios

The recommended mix of investments in the RCIS is intended to provide a host of regional benefits: support for the economy; stronger community centers; better health through increased walking and biking; increased traveler satisfaction through transportation choices and better information flow; greater resilience to natural and human-caused challenges; and a cleaner environment. But much will depend on the level of funding available.

To assess potential outcomes and provide the foundation for the financing element of *Plan 2045*, three distinct funding scenarios were analyzed:

- Plan 2045 (Reasonably Anticipated Funding) Scenario
- Limited Funding Scenario
- Aspirational Funding Scenario

How these funding levels were arrived at and their relation to meeting the federal requirement for fiscal constraint is addressed in Chapter 6. Briefly, the Plan 2045 scenario will provide a sound fiscal basis for planning future investments over the next 28 years; the Limited Funding Scenario would provide a smaller amount, making it more challenging to maintain current system performance and meet increasing travel demands; and the Aspirational Scenario would provide for additional investments such as expansion of rail capacity with the Gateway program of trans-Hudson transit expansion (and the intrastate transit options that the Gateway program enables) that would provide vital support for regional progress.

The Plan 2045 scenario would likely lead to a continued high level of accessibility for the region’s travelers and goods movement, although without an increase in trans-Hudson capacity, congestion and crowding on the transit and roadway systems are to be expected. It is anticipated that the focus on investing in preservation will allow the existing infrastructure to be brought to a state of good repair, reducing future costs. Qualitatively, expected outcomes in the different scenarios track with funding levels, affirming the value of transportation investments in fostering desired outcomes.



### **Performance Measures and Performance-Based Planning**

The NJTPA has long practiced performance based planning in which the performance of the transportation system is monitored and assessed to see how well policies, projects and programs are accomplishing what they are intended to. Performance measures offer information on the region’s challenges and opportunities to decision-makers, planning partners, and the public. Performance measures such as travel time, transit ridership and vehicle miles traveled are cited throughout Plan 2045 and are used in a variety of contexts in the NJTPA planning process. Studies sponsored and conducted by the NJTPA provide assessments of current conditions using measures and indicators. The region’s Congestion Management Process (see Appendix) applies measures to identify transportation needs and to recommend improvements for various modes. In scenario planning for the RCIS and other forward-looking analyses, performance outcomes are estimated through study and computer simulations. In prioritizing projects to be programmed for funding, performance measures serve as criteria to score and compare project benefits.

Performance-based planning is a growing federal emphasis area. New federal regulations are beginning

### **Asbury Park, Monmouth County**

to require states and MPOs to use established national measures. The measures concern transportation safety (on roadways and public transit); state-of-good-repair of infrastructure (roads, bridges, public transit); and system performance (including reliability, freight movement, traffic congestion, and air pollution). The NJTPA is engaged in setting regional targets and supporting state targets in these areas.

Given constrained resources, these and other performance-based planning efforts are critical for helping decision-makers weigh competing priorities and giving the public assurances that funds are being spent cost-effectively to meet regional needs. They will be important tools for implementing Plan 2045.



# Trans-Hudson Travel



The Hudson River rail tunnels are in desperate need of repair. Built more than a century ago, the tunnels sustained damage during Superstorm Sandy and are reaching the end of their life expectancy.

Shutting down one tube for repairs would reduce passenger rail capacity by as much as 75 percent. At the same time, demand is expected to grow. Transportation agencies throughout the region recognize the need to upgrade existing transit systems and add trans-Hudson capacity to meet demands. The NJTPA is committed to working with partner agencies to address this critical need and has made trans-Hudson improvements a top long-term priority, referenced in the RCIS.

Several planning initiatives are underway to increase rail access across the Hudson River. The Hudson Tunnel Project, a partnership among NJ TRANSIT, Amtrak and the Port Authority, would add a new rail tunnel and rehabilitate the existing North River Tunnel. The tunnel project is undergoing an environmental review process, which is being led by NJ TRANSIT, Amtrak and the Federal Railroad Administration, that is expected to be completed in 2018. Funding sources to complete the project have not yet been identified.

AMTRAK



The new tunnel supports the larger Gateway Program being led by Amtrak, a long-term plan to improve rail service along the Northeast Corridor. In addition to the tunnel, Gateway calls for expanding New York Penn Station for passengers and trains, new rail storage capacity in New Jersey, replacing the Portal Bridge over the Hackensack River and installation of the Bergen Loop, additional track that would allow for one-seat rides to Manhattan on NJ TRANSIT's Pascack Valley and Main-Bergen lines.

The Federal Railroad Administration is overseeing a companion effort, NEC Future (see sidebar).

The Port Authority has several infrastructure efforts underway, including planning and environmental review to replace the Port Authority Bus Terminal, which is approaching the end of its useful life by 2030. The Authority's Board of Commissioners allocated \$3.5 billion toward the project in its 10-year capital plan approved in 2017. The capital plan also included extending PATH service to the Rail Link Station at Newark Liberty International Airport, connecting to the World Trade Center hub in lower Manhattan and augmenting transit options for commuters and local residents.

The agency is also exploring emerging technologies including connected and automated vehicles to increase the capacity of the exclusive bus lane at the Lincoln Tunnel, the busiest bus lane in the country. A recent Port Authority study also suggests coping with growing trans-Hudson demand by exploring expanded bus service at other crossings, targeted expansion of commuter ferries and investments in PATH capacity.

It is anticipated that as these initiatives progress, an effort to form a workable partnership of the right stakeholders will be initiated to fund and advance the implementation of one or more of these projects over the coming years.



## Rail Investment Plan for the Northeast Corridor

**PLANS ARE UNDERWAY** to make improvements to the Northeast Corridor, from Washington, D.C. to Boston, MA, that would keep the rail corridor in a state of good repair and support growth in intercity and commuter rail service.

The Federal Railroad Administration (FRA) released a Record of Decision in July 2017, choosing a selected alternative for the NEC Future investment program. The decision does not approve construction, but provides a framework, allowing individual environmental and engineering project studies to move forward. The timing of these projects will depend on a number of factors, including decisions by the railroads that operate along the corridor and Northeast states, the availability of funding, market conditions, and practical operating constraints.

The selected alternative offers a vision for the corridor, which includes increased capacity and service to support the economic vitality of the Northeast, with expanded access to jobs, better connections between urban centers, and a more resilient rail network.

This plan modernizes infrastructure corridor-wide, increasing reliability. It also expands rail capacity with additional infrastructure between Washington, D.C., and New Haven, CT, and between Providence, RI, and Boston, MA, as needed to achieve the plan's service and performance objectives, including investments that increase speeds and eliminate chokepoints.

