

# 5

## SCENARIO PLANNING

As discussed earlier (Chapter 3, Context & Trends), Plan 2035 predicts significant regional population and job increases between 2009 and 2035. The current economic downturn has slowed growth for now, but over the next 25 years, the region can expect to experience substantial growth. By 2035, the region will be home to:

- About 7.8 million people (an increase of nearly 1.1 million or 16 percent)
- About 3.7 million jobs (an increase of more than 500,000 or 17 percent)
- About 3 million households (an increase of more than 500,000 or 21 percent)

More people and more jobs mean more travel. The region's existing transportation network already is struggling to meet travel demand during peak periods, with drivers in many areas facing significant congestion-related delays. These delays have substantial



*The future scenarios examined for Plan 2035 all forecast a significant increase in transit ridership. Light rail station, downtown Jersey City.*

negative consequences, including worsening air quality, higher emissions, greater energy consumption and lost productivity. The region's public transportation system, particularly crossing the Hudson, is handling record-high ridership. The additional demand created by growth will severely challenge the transportation system to provide acceptable service to travelers.

To explore and understand appropriate responses and strategies to meet the demands of such growth, Plan 2035 identifies and evaluates three different future scenarios—a Baseline Scenario, the Plan 2035 Scenario and an Aspirational Scenario. These scenarios were developed using demographic and travel data as well as input from the visioning workshops discussed in Chapter 2. The scenarios were examined using a regional travel demand model that can gauge the effects of different land use and transportation choices guiding investments over the next 25 years.

The goal of this scenario planning process was to evaluate the effectiveness of a set of transportation and land development strategies to determine how well the transportation system would function in the future, given regional growth expected under all three scenarios. The future will of course not follow any of these scenarios precisely—elements of each may materialize or unforeseen events may occur. However, this exploration provides important insight into a realistic range of possibilities for the future.

The NJTPA region faces a future in which transportation investment needs (for both the existing system and new highway and transit services) far exceed projected funding from current sources. This means that significant policy decisions will be required at both the state and regional level to close the gap, whether through increased revenues, reductions in planned investments, changes in demand due to different land development patterns, or a combination of all three.

Plan 2035's three scenarios each offer a different possible path for the region as it attempts to align its goals with its resources. A common element of all three scenarios is the completion of the \$8.7 billion MTT tunnel in 2017, which results in substantial increases in transit ridership. Also assumed for all is the region's desired and anticipated overall growth—growth which in actuality could fail to materialize if the transportation

system does not continue to maintain the region's competitiveness. This chapter describes the scenarios and the results of modeling and includes a discussion of the outlook for bridge and pavement maintenance under each scenario. Details on the financial aspects of the scenarios can be found in Chapter 8 (Financing).

## Baseline Scenario

The Baseline Scenario reflects a level of investment in transportation through 2035 commensurate with current trends in the region. These trends include:

- *Funding*—As described in Chapter 8 (Financing), transportation funding in New Jersey is currently on a negative trajectory, and the Baseline Scenario models the continuation of current funding trends. For both highways and transit, this funding level is below the level needed to simply maintain the condition of the existing networks, so performance will worsen and the backlog will grow (e.g., the percentage of deficient highway pavement will increase).
- *Demographics and Land Use*—The Baseline Scenario assumes current demographic trends, with no new changes in land use policy to encourage more population and job growth near transit stations and in other “centers.”
- *Service and Capacity*—The Baseline Scenario includes only committed transit investments and highway improvements in the region.

In terms of highway capacity, the Baseline Scenario assumes that continued deterioration of the road network over time, combined with the increased demand created by a larger population, will reduce effective capacity by 5 percent. This reduction of capacity would stem from a failure to make necessary repairs to bridges and pavement, as well as an inability to make minimal capital expenditures to address the most critical highway congestion needs.

For more details on these projects, see Chapter 6 (Implementation) and Appendix D (Transit Investment Analysis).

## Baseline Scenario Results

Key results from this scenario, projected for 2035 (and compared to 2009 conditions) include the following:

*Impacts to Trip Making and Mode Choice:*

- A roughly 17 percent increase in the number of trips made, driven largely by population and employment growth in the region.
- An increase of nearly 18 percent in the number of automobile trips made.
- A 48 percent increase in transit trips\*
- The combined share of trips made by transit, walking and bicycling is expected to rise to 16 percent of all trips (as compared to 14 percent of trips in 2009).



*Plan 2035's scenarios looked at different potential growth patterns for the region's cities, suburbs and rural areas. Newark.*

*Impacts to Highway Network Performance:*

- Given increased activity with the large growth in population and employment anticipated for the region, roadway delays due to traffic congestion will go up—in this scenario to 7.8 minutes for the average trip as compared to 5.1 minutes in 2009.
- A 15 percent increase in regional Vehicle Miles Traveled (VMT).
- A more than 50 percent increase in VMT on roads experiencing extreme congestion (Level-of-Service “F”).
- A 29 percent increase in the regional Vehicle Hours Traveled (VHT). This means overall network speeds will decrease by 2035, as hours traveled will increase significantly faster than miles traveled. Average highway speeds would be reduced by about 10 percent.

*Implications of Baseline Scenario Results:*

- Significantly greater automobile congestion (and associated delay) would occur by 2035 on an already stressed highway network.
- This increased highway congestion would mean significant corresponding negative impacts to the region,

*\* This dramatic rise in transit trip-making would, in large part, stem from the completion of the committed, major capital investments for the transit system, especially the MTT project with its associated increase in service and convenience offered by one-seat rides into Manhattan. However such an anticipated increase also reflects travelers avoiding the highway network which would suffer a degradation due to increased congestion and deteriorated highway pavement and bridge conditions under this scenario.*

with higher greenhouse gas emissions, continued loss of productivity, and higher energy usage.

- A consequence of allowing highway conditions to degrade (along with the significant investment in new transit capacity brought about by the MTT and continued strong growth in the region's urban core—particularly Jersey City and New York City) might be a lower rate of growth in automobile usage than otherwise would be anticipated, with significant growth in transit ridership.
- The region would fail to address its backlog of maintenance needs on bridges and pavement.

**Plan 2035 Scenario**

This scenario represents the cornerstone of Plan 2035. The Plan 2035 Scenario assumes that additional new funding will become available, allowing the region to maintain its existing infrastructure while also adding a few critical new links to improve capacity and system performance. The Plan 2035 Scenario serves as the foundation of the financially constrained plan required by federal regulations. It also reflects the recurring themes that emerged in the visioning workshops held throughout the region to help develop Plan 2035—that the region needs to grow smarter by focusing development and redevelopment around transit and in mixed-use centers; invest in maintaining the existing transportation system that is in place today; and make investments that focus on “last mile” transit services (shuttles

to and from train or BRT stations to employment locations and/or concentrated residential locations).

Of note, the assessment of land development in this and the Aspirational Scenario implicitly takes into account transportation efficiencies that arise with smart growth, especially with respect to maximizing the number of people that can take advantage of investments in public transit service. (As discussed in Chapter 7, smart growth in general aims for efficiencies in land use, cost-effectiveness of infrastructure investments and environmental benefits.)

- *Funding*—As described in Chapter 8 (Financing), transportation funding for the existing network in this scenario allows the region to maintain and slightly improve existing system performance.
- *Demographics and Land Use*—Under this scenario, county-level demographics were held constant, but forecasts assumed improved land use that helps to focus more growth in development and redevelopment around existing or planned transit stations and stops and within mixed-use centers. Eight criteria were used to identify locations that would have potential for such development or redevelopment:
  - Participation in the Urban Tax Credit program
  - State Plan Center designation within the Plan Endorsement process
  - Transit Village designation
  - Urban Enterprise Zone community



*The connection between transportation and land use was an important aspect of the scenarios examined in developing Plan 2035. Phillipsburg, Warren County*

- Highlands Planning Area designation and Highlands Plan Conformance
  - Other plans (such as local transit-oriented development plans)
  - Input from visioning workshops conducted for Plan 2035
  - Redevelopment zones
- *Service & Capacity*—The Plan 2035 Scenario includes a modest (5 percent) increase in bus service in the region (representing such investments as new shuttles or connectors, increased frequency on bus routes or the implementation of bus priority treatments or BRT on critical corridors). However, the rail system used in this scenario (which includes the completion of the MTT and associated system upgrades) is identical to that of the 2035 Baseline Scenario. As discussed in Chapter 6 (Implementation), a number of other future rail projects in the region are now undergoing planning and environmental analysis and may be candidates for federal funding. It is expected that at least the initial operating segments, if found justified and feasible through detailed study, could be accomplished under the level of funding assumed for the Plan 2035 Scenario. However, since the exact mode, power source, alignment and other factors of these potential services are not determined at this point, the travel demand modeling for this scenario did not include these possible rail investments. Under this scenario, modest congestion mitigation efforts will occur on the highway network, allowing the region to maintain its current highway capacity. The Plan 2035 scenario assumes that bridges and pavement will be kept at least at current acceptable conditions, avoiding the degradation to highway capacity in the Baseline Scenario.

### *Plan 2035 Scenario Results*

Key results from this scenario include:

#### *Impacts to Trip Making and Mode Choice:*

- Trip making and mode choice under the Plan 2035 Scenario are anticipated to be similar to the Baseline: an increase in total trips, with transit and non-motorized trips making up a

greater share of all trips in the region overall as compared to 2009.

- Transit trips produced in the region are projected to grow substantially, totaling about 42 percent more than in 2009.\*

#### *Impacts to Highway Network Performance:*

- With the region's projected increases in population and employment, delays experienced due to roadway congestion will increase from 5.1 minutes for the average trip in 2009 to 7.5 minutes under the Plan 2035 Scenario. This represents a somewhat smaller increase in such delay compared to the Baseline Scenario, amounting to about a 4 percent less.
- Under the Plan 2035 Scenario, the region would see 1 percent more VMT than under the Baseline. However, there would be a slight (3 percent) reduction in VMT on highways with extreme congestion (Level-of-Service "F"). Both of these changes would be due to the effective maintenance of pavement and bridges as opposed to the continued degradation of these assets assumed in the Baseline Scenario.
- Regional Vehicle Hours Traveled under the Plan 2035 Scenario would be the same as in the Baseline Scenario. With slightly more road travel occurring (VMT), this means overall highway speeds would be slightly higher under the Plan 2035 Scenario as compared to the Baseline Scenario. However, speeds are expected to be lower than 2009 in both the Baseline and the Plan 2035 Scenarios due to higher traffic volumes.

#### *Implications of the Plan 2035 Scenario Results—Similar to Baseline Scenario*

- Compared to 2009 conditions, the region's significant

*\*The 42 percent increase identified here likely underestimates the actual transit ridership in the 2035 Scenario compared to the Baseline Scenario due to limitations of the analysis. In particular, the planned transit system expansion for which the Plan 2035 Scenario includes financial capacity could not be fully modeled. This includes several proposed rail expansions that are not yet fully specified (in terms of alignments and other details).*



*Under the Plan 2035 scenario, biking and walking trips in the region would grow significantly. Oldwick, Hunterdon County.*

anticipated growth will mean that even under the Plan 2035 Scenario, the region's already stressed highway network will see more automobile congestion by 2035. The level of congestion would be similar but slightly lower than that of the Baseline Scenario.

- Maintaining pavement and bridges in a state-of-good repair, as assumed in the Plan 2035 Scenario, is critical to ensure that the highway network's ability to handle traffic does not degrade further. This results in slightly higher speeds and slightly lower levels of delay in Plan 2035 as compared to the Baseline.
- As was found in the Baseline, increased congestion levels compared to 2009 means significant corresponding negative impacts to the region with higher greenhouse gas emissions, continued loss of productivity, and higher energy usage. However, this will occur at a somewhat lower level than at the Baseline.
- Similar to the Baseline, the significant growth in transit system ridership is driven by increased highway congestion levels, the capacity provided by transit network expansion and continued strong growth in the region's Urban Core (particularly in Jersey City and New York City).

#### **Aspirational Scenario**

The Aspirational Scenario assumes that significant new funding sources will be identified to make additional transportation investments in the region as compared to



Mixed-use centers are a key aspect of land use considered in Plan 2035. Newton, Sussex County.

the Baseline Scenario and the Plan 2035 Scenario.

As described above for the Plan 2035 Scenario, this Scenario also reflects the recurring themes that emerged in the visioning workshops, especially the need to grow smarter and invest in system maintenance while expanding the transit system. Details about the Aspirational Scenario include:

- *Funding*—As described in Chapter 8 (Financing), funding in this scenario significantly increases, allowing the region to virtually eliminate the backlog of deficient highway pavement and bridges and make significant improvements to address highway congestion at critical locations such as bottlenecks and improve transit service by increasing service frequency and expanding the transit system to serve new locations.
- *Demographics and Land Use*—This scenario assumes an even greater concentration of development and redevelopment into mixed-use centers by channeling more of the growth forecasted for the region into urban core areas, additional centers along transit lines, and additional mixed-use centers in the smaller cities and towns. The reallocation of regional growth for this scenario did not hold constant county-level demographic projections.
- *Service and Capacity*—The Aspirational Scenario includes a variety of system improvements such as:
  - *Expanded Bus Services*—All non-New York City bus routes experience 25 percent additional service (more frequent service).

- *Improved Transit Network Coverage*—Includes enhanced accessibility to transit to reflect likely future extensions and expansions and the concentration of a greater share of regional growth in mixed use centers near transit stations which are more conducive environments to walking and bicycling to transit.
- *Rail Service Expansion*—Provides for more frequent train service in the peak-period to Hoboken Terminal and increases the frequency of off-peak train service on all existing passenger rail lines.
- *PATH Service Expansion*—Provides additional off-peak service frequency.

This scenario also assumes increased driving costs and parking fees, helping to make transit the mode of choice for more travelers in the region and to support the expanded transit services that would be operating in the region. These increased costs, depending how they are structured, might focus principally on auto trips in certain congested corridors; specific locations such as downtowns, concentrated employment centers and entertainment destinations; and/or peak periods. However, they might also include region-wide measures such as an increased gas tax.

Additionally, this scenario assumes that a greater share of anticipated demographic growth would happen in locations where parking charges are in effect, including urban core areas, denser towns and cities in the region and around mixed-use transit centers. The assumed increased costs of auto use would be matched by more extensive and convenient transit services for many trips now made by auto. It is also possible that the increased costs could come about because of market conditions creating significantly increased gasoline prices (as occurred in 2008).

It should be noted that the assumptions for increased costs of driving and increased parking fees were included in the scenario to allow assessment of the impacts of substantially increased transit demand in the region. In reality, implementation of such increased costs or fees would have to be balanced against the need to support auto mobility where transit is not a viable travel alternative. In addition, it will be desirable for many downtown business districts to pursue creative, innovative parking strategies to attract

patrons and businesses. The assumptions about driving cost and parking fees were as follows:

- Automobile operating costs 50 percent more than in 2009—This could involve toll increases, congestion pricing policies, increased fuel prices, higher registration fees, VMT taxes, etc. Or it could involve dramatically higher gasoline prices.
- Increased Parking Fees—Includes parking fees 20 percent higher than 2009 for areas of the NJTPA region that have a transit score of medium or above. (NJ Transit calculates a “transit score” for areas based on population density, employment density and zero-car household density to anticipate the success of various transit investments.)

### **Aspirational Scenario Results**

#### *Impacts to Trip Making and Mode Choice:*

- Under the Aspirational Scenario, the total number of auto trips would be slightly less than under the Plan 2035 Scenario. Non-motorized trips (those made by bicycling or walking) would grow—an increase of 100,000 trips per day when compared to the Baseline and Plan 2035 Scenarios. This is a result of further concentrating forecasted regional growth in centers, where non-motorized modes can be used effectively.
- Transit trips in the region would also grow by more than 100,000 (approximately 7 percent) versus the Baseline and Plan 2035 Scenarios (60 percent as compared to 2009 conditions). This is due to the significant investment in transit and is related to the increase in non-motorized travel, both facilitated by capturing more growth in center-oriented development, as described above.

#### *Impacts to Highway Network Performance:*

- Delays experienced due to roadway congestion will increase to “only” 7.1 minutes for the average trip under the Aspirational Scenario. This represents a somewhat smaller increase compared to the Baseline Scenario and is slightly smaller than under the Plan 2035 Scenario.
- Slightly lower regional VMT is anticipated under the Aspirational Scenario as compared to the Baseline Scenario, with 5 percent less VMT occurring on facilities with extreme congestion (Level-of-Service “F”). This is due to the effective maintenance of pavement and

bridges as opposed to the continued degradation of these assets considered in the Baseline Scenario.

- Three percent lower regional VHT is anticipated under the Aspirational Scenario than estimated for the Baseline.

#### *Implications of the Aspirational Scenario Results—as Compared to Baseline and Plan 2035*

- While growth in congestion over current conditions is anticipated regardless of scenario, the congestion delay experienced during an average trip is expected to be 8 percent lower in the Aspirational Scenario than in the Baseline Scenario. This represents avoiding about a quarter of the projected growth in the delay anticipated for the Baseline Scenario.
- Substantial increases in travel by bicycling and walking.
- Significantly higher utilization of the public transit system.
- Improved highway network performance that results in lower congestion levels, higher speeds, and lower pollutant emissions. With not as much time spent in travel, average travel speeds would be correspondingly faster for the Aspirational Scenario than under the Baseline. Thus, the highway system would move vehicles more efficiently than under the Baseline Scenario.
- Bridges and pavement maintained in a state of good repair.

Table 5-1 summarizes the key indicators under each of the scenarios discussed in this chapter. (Some of the small differences noted above may not be evident in the table due to rounding.)

### **Implications for Highway and Pavement Maintenance**

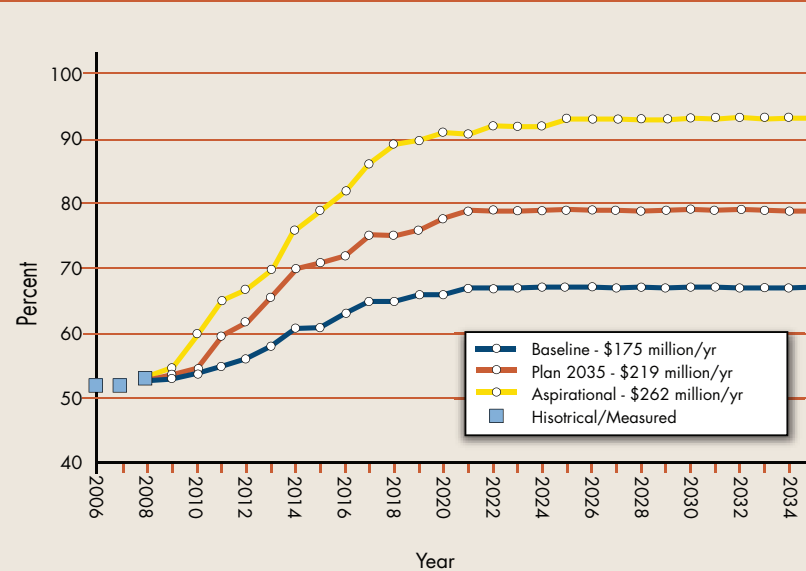
The charts below show the projected impact of the three plan scenarios on meeting the need for addressing pavement and bridge maintenance, as discussed in Chapter 4 (Needs and Strategies). As Figure 5-1 demonstrates, pavement condition in North Jersey is actually projected to continue to improve even under current funding trends. However, this would still leave a significant fraction of the roadway network in an unacceptable condition, and thus the Plan 2035 Scenario anticipates an increase of roughly 25 percent in pavement funding, while the Aspirational Scenario posits a 50 percent in-

**Table 5-1**  
Average Weekday Indicators for Scenarios

Indicator (NJTPA region, average weekday)	2009	Baseline	2035	
			Plan	Aspirational
Auto Trips (million)	17.2	19.8	19.8	19.6
Transit Trips (million)	1.0	1.5	1.5	1.6
Non-motorized trips (million)	1.8	2.2	2.2	2.3
Average Delay (minutes per trip)	5.1	7.8	7.5	7.2
Vehicle-Miles Traveled (million)	144	165	167	164
Vehicle-Miles Traveled at Level of Service "F" (million)	25	38	37	36
Vehicle-Hours Traveled (million)	4.9	6.3	6.3	6.1

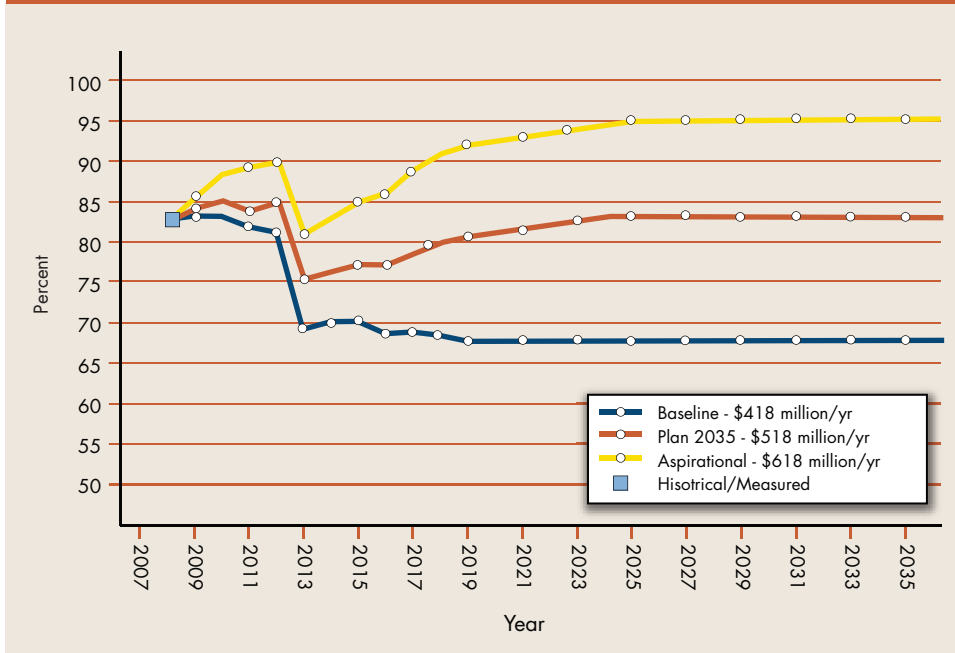
*Numbers are rounded*

**Figure 5-1**  
NJTPA Region Highway Pavement Acceptability  
Three Plan Scenarios





**Figure 5-2**  
**NJTPA Region State-Maintained Bridge Acceptability (% not Structurally Deficient): Three Plan Scenarios**



crease in funding in order to truly meet the region’s pavement needs.

Figure 5-2 demonstrates the more precarious conditions of the region’s bridges. As the region’s bridges continue to undergo wear from heavy traffic volumes, an increasing share are projected to become deficient in the next five years. The region’s overall bridge acceptability rating will fall significantly. At current funding levels, the region will never recover from this drop and will be forced to play “catch-up,” potentially even facing the restriction of traffic on certain deficient bridges. A 25 percent increase in bridge funding, as in the Plan 2035 Scenario, will at least allow the region to make a long-term recovery back to currently acceptable conditions, while a 50 percent increase would allow for more rapid near-term bridge improvements and a path toward a very high long-term level of acceptability. As noted in Chapter 4 (Needs and Strategies) adequate levels of funding can allow the region to move beyond addressing the backlog of needs to conducting the kind of preventative maintenance that avoids more costly future repairs and slows the accrual of needs.

### Direction for the Future

Plan 2035 predicts strong northern New Jersey growth in the coming decades, but this growth both relies on and impacts the transportation system. The scenario analysis illuminates how choices made now can foster not only population and employment growth, but can also help ensure such growth is sustainable, that the environment is protected, that infrastructure remains safe, dependable and flexible, that the region’s economic competitiveness is strengthened and that the region’s communities are shaped in ways that enhance quality of life.

The Plan 2035 Scenario and the knowledge gained from considering Baseline and Aspirational Scenarios demonstrates that the funding levels for transportation must be increased and investments must be made that specifically support the goals of this plan. This means targeting improvements to support public transit, walking and biking trips, making the roadway system work better, supporting more efficient goods movement, and providing a smarter, more interconnected system for a better informed traveling public. The measures that will be taken to accomplish these goals are presented in the next chapter, focusing on how Plan 2035 will be implemented.

