

FY 2010-2019 Statewide Capital Investment Strategy



**... asset management, performance-based,
strategic direction**

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Governor Jon S. Corzine

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I. Executive Summary

The 10 Year Statewide Capital Investment Strategy (SCIS) provides transportation investment recommendations for transportation program categories based upon goals, objectives, and performance measures.

The SCIS is a requirement of the Transportation Trust Fund Authority Act of 2000; and is the product of a collaborative effort involving the New Jersey Department of Transportation (NJDOT), NJ TRANSIT, the New Jersey Turnpike Authority (NJTA), and the South Jersey Transportation Authority (SJTA).

In addition, the State's three Metropolitan Planning Organizations – the North Jersey Transportation Planning Authority, the Delaware Valley Regional Planning Commission, and the South Jersey Transportation Planning Organization – were partners in the process to develop the SCIS. A SCIS Task Force and subcommittees were formed to produce a report that:

- Clearly depicts the current and future condition of New Jersey's transportation system.
- Outlines recommended investment patterns, based on alternative funding scenarios that can be used to guide development of the NJDOT, NJ TRANSIT and Toll Road capital programs.
- Presents a needs analysis that documents the investments required to meet New Jersey's transportation needs over the next ten years.
- Makes clear policy and action recommendations.
- Represents a consensus of the SCIS Task Force and Subcommittees.

The goal of the SCIS is to develop an annual spending level that can achieve the performance objectives of the NJDOT, NJT, NJTA and SJTA. Scenarios were developed to determine performance levels based on different levels of funding. These alternative scenarios help to provide a context for New Jersey's overall transportation needs.

The SCIS, includes transportation investments in common categories across agencies, rather than separate strategies for each agency. This integrated approach provides a foundation for understanding the total state investment needed in roads, bridges, and public transit. It fosters a collaborative approach to making the best use of available transportation funding, which provides for the most efficient use of resources.

The SCIS also represents an "asset management" approach to addressing our transportation needs. Asset Management is a systematic, comprehensive approach and process for maintaining, upgrading and operating physical assets cost-effectively.

As part of the SCIS process, a total of nine investment categories were developed.

The following chart, shown in Figure 1, lists each of the categories and provides the annual investment target recommended by the SCIS, with an assumption of essentially flat transportation funding over the next ten years. It is important to note that these recommendations constitute the combined total investment of approximately \$4.3 billion annually for all four transportation agencies. The SCIS is necessarily constrained by the transportation funding resources available to New Jersey.

Figure 1

| Summary | | |
|-----------------------------------|---|---|
| Statewide Investment (millions) | | |
| Categories | Desired Investment Targets Statewide (without regard to funding limitations) | Recommended Constrained Investment Targets (considering reasonable revenue expectations) |
| Bridge Assets | \$1,024.6 | \$814.3 |
| Road Assets | \$512.5 | \$408.0 |
| Mass Transit Assets | \$1,145.6 | \$1,069.1 |
| Airport Assets | \$40.2 | \$40.2 |
| Transportation Support Facilities | \$219.1 | \$74.8 |
| Safety Management | \$335.2 | \$132.2 |
| Congestion Relief | \$3,111.8 | \$1,340.1 |
| Multimodal Support | \$96.5 | \$44.5 |
| Local System Support | \$705.5 | \$406.0 |
| Statewide Total | \$7,191.0 | \$4,329.1 |

- **Bridge Assets -- \$814.3 Million**

By investing \$814.3 million annually in bridges, the SCIS aims to slow the growth of bridges that are deemed structurally deficient. This amount includes investments in state highway and toll road authority bridges. Local bridge investment targets are included under the Local System Support section shown below. The need for bridge preservation in New Jersey is critical, and SCIS focuses on preventative maintenance, rehabilitation and selective replacements.

- **Road Assets -- \$408.0 Million**

This category seeks to improve pavement smoothness. It addresses the overwhelming need for pavement preservation focusing on implementing a life-cycle cost approach that completes life-extension treatments including preventive maintenance, rehabilitation and full reconstruction of the roadway.

- **Mass Transit Assets -- \$1069.1 Million**

There are several key objectives that this funding amount seeks to address and achieve a “state of good repair” for the mass transit network; reliability of service; and infrastructure rehabilitation. Replacement of bus and rail equipment is also targeted.

- **Airport Assets and Aviation Support -- \$40.2 Million**

This annual investment target achieves, preserves and ensures the continued viability of the core airport system in New Jersey.

- **Transportation Support Facilities Assets -- \$74.8 Million**

Although the current condition levels of some facilities are maintained, the backlog of substandard conditions at certain facilities will continue to increase.

- **Safety Management -- \$132.2 Million**

This investment amount seeks to maintain the current performance indicators to reduce fatality and injury severity rates, and promotes strategies and partnerships to continue to achieve that reduction. The investment also funds safety partnerships that advance Engineering, Education, Enforcement and Emergency Service Response.

- **Congestion Relief -- \$1340.1 Million**

This investment figure includes major widenings planned for the N.J. Turnpike and the Garden State Parkway. However, a reduced level of investment is expected for implementing major interchange and widening projects on the state highway system.

Investment for congestion relief will also be targeted toward strategies like better land-use planning and deployment of Intelligent Transportation Systems (ITS). These strategies can have positive effects on mobility and congestion-reduction.

- **Multimodal -- \$44.5 Million**

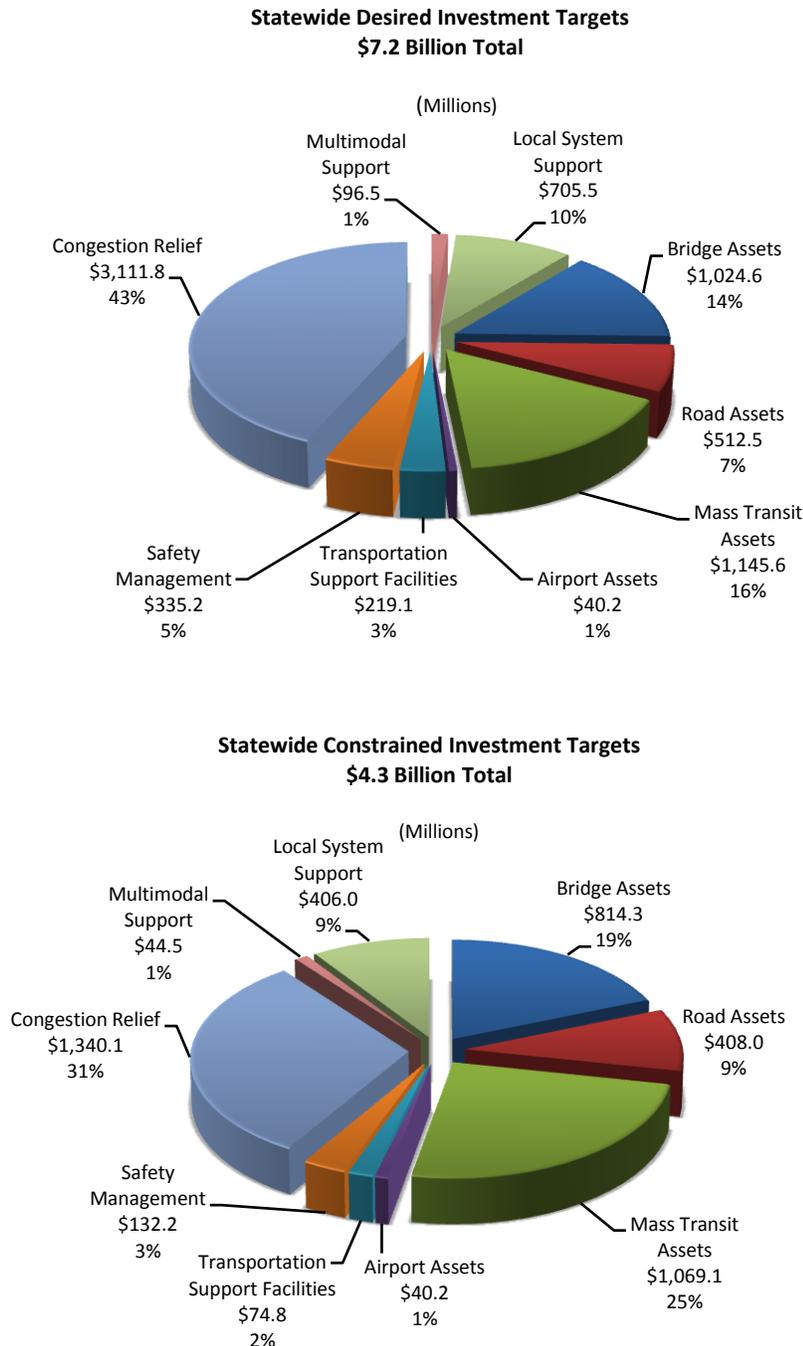
The Multimodal category is a varied category that is made up of programs that support the economy and promote a better quality of life. Examples of these programs include bicycle and pedestrian projects, goods movement improvements, and maritime programs. This category targets resources in these areas more efficiently, while allowing programs to continue with a goal of enhanced performance.

- **Local System Support -- \$406 Million**

This category invests in the county and municipal transportation network, where needs such as bridges, safety and congestion reduction are critical.

A comparison of the program category percentages of the Proposed Constrained and the Desired Investment Targets is presented in Figure 2:

Figure 2



As needs continue to grow and revenue is expected to remain limited, the ability to improve the performance of New Jersey's transportation system and achieve statewide transportation goals and objectives becomes a monumental challenge.

Promoting a safe, reliable, durable, and first-rate transportation system requires collaboration on common goals. The SCIS fulfills a statutory mandate of inclusive, thorough, and practical funding guidance for New Jersey's long-term transportation needs.

The following sections and appendices provide more detailed information about the creation of this document and the data used to identify needs and make funding recommendations.

II. Statewide Context

Forming a Partnership to Achieve Statewide Transportation Goals

With the intention of fulfilling the statutory mandate, as directed by the Governor and the Commissioner of Transportation, an enhanced collaborative effort is necessary to ensure that capital investments for New Jersey's transportation system are planned and implemented in a seamless manner. Their vision is to integrate the New Jersey Department of Transportation (NJDOT), NJ TRANSIT, New Jersey Turnpike Authority (NJTA) and South Jersey Transportation Authority (SJTA) transportation assets and supporting programs into a cohesive Statewide Capital Investment Strategy (SCIS).



As last year, an Executive Committee including all of these agencies, along with the state's three Metropolitan Planning Organizations (MPOs) (New Jersey Transportation Planning Authority, Delaware Valley Regional Planning Commission and South Jersey Transportation Planning Organization) and the Federal Highway Administration was convened to produce the FY 2010-2019 "Statewide" CIS.

The Executive Committee formed nine subcommittees to develop recommendations pertaining to each of the transportation asset categories (i.e. bridges, roads, mass transit, airports, and transportation support facilities) and the supporting programs (i.e. safety management, congestion relief, multimodal support and local support system).

The SCIS report sets out the overall strategy for investing capital transportation dollars over the next 10 years (FY 2010- 2019). This investment strategy will be used to develop an accompanying 10 year capital plan which will offer a more comprehensive blueprint of our transportation future. The plan extends to ten years in order provide the State Legislature and our taxpayers with a more stable and predictable outlook for anticipated statewide transportation improvements now and in the future.

New Jersey's Transportation System Ownership

The responsibility for constructing, maintaining and operating the highway system in New Jersey is shared by state, county and municipal governments and toll road authorities.

Combined, these agencies own and operate more than 38,000 centerline miles, as shown in Figure 3.

Figure 3

Statewide Road Mileage = 38,131 centerline miles

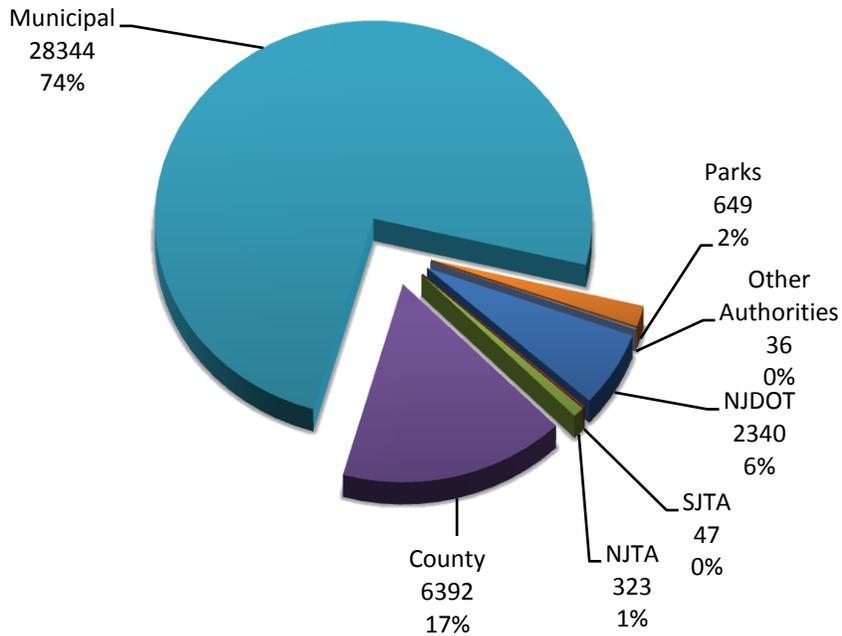
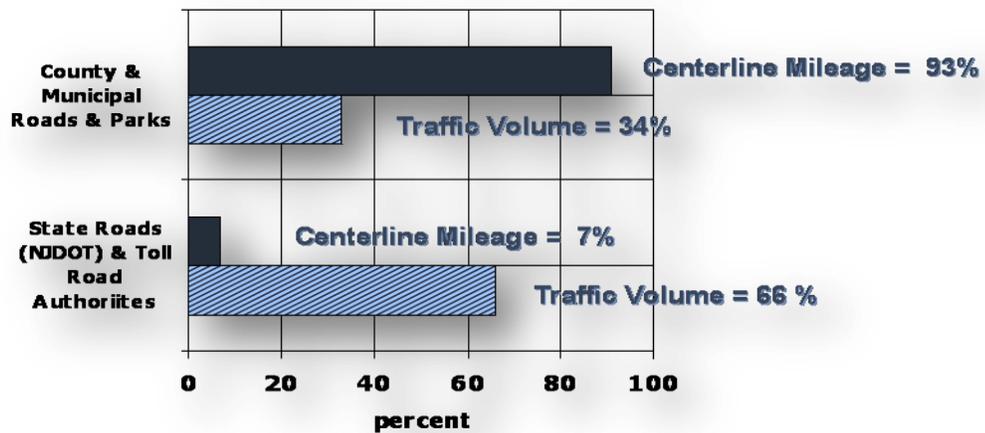


Figure 4

Statewide Highways Mileage vs Traffic Volume



The major roadways, including interstate highways, freeways, and major arterials, are mainly under the jurisdiction of NJDOT and to a lesser degree one of the toll road authorities. With some exceptions, most of the minor arterial and collector roads are under county jurisdiction. Local streets and roads are owned and operated by municipal governments. As shown in Figure 4, although NJDOT and toll road authority jurisdiction represents only about 7% of the total statewide mileage, approximately two-thirds of all traffic (66%), including high percentages of heavy trucks is carried on state-owned (41%) and toll roads (25%).

Despite the fact that the centerline mileage on the New Jersey Turnpike, Garden State Parkway and the Atlantic City Expressway is relatively small, these facilities handle very large volumes of statewide and regional commuter and recreational traffic on an individual basis. These major highway corridors are vital segments of our highway network.

The county roads account for approximately 17% of the total centerline miles statewide. They provide the critical links that connect the state and municipal roads. The roads under municipal jurisdiction comprise the significantly largest mileage (74%), but service the least amount of traffic volume. However, these local facilities play significant roles in providing access to the county and state transportation networks from urban, suburban and rural communities.

NJ TRANSIT, which is the nation's third largest mass transit provider, has construction, maintenance and operating responsibilities associated with providing extensive mass transportation services throughout the state. The bulk of all transit passengers in New Jersey depend on the operation of NJ TRANSIT rail and bus facilities on a daily basis.

At present, there are 6,447 highway carrying bridges over 20 feet long in New Jersey's bridge inventory. The State of New Jersey and the local governments (county and municipal) own the largest portion of this population, 2579 and 2557 bridges respectively. The remaining bridges are owned by toll authorities (1171), NJ TRANSIT (102), private entities (21), and special agencies (17). The average design life expectancy of a new bridge is 75 years. At present, 15 % of State, 31 % of County/Municipal, 59 % of NJ TRANSIT and 38 % of private bridges are older than 75 years. The average age of the bridges in New Jersey is 49 years.

New Jersey's 46 public use airports accommodate more than 2.5 million general aviation operations each year. This includes 43 general aviation airports and 3 air carrier commercial airports. Twenty nine (29) of the State's public-use airports are privately owned and 17 are publicly owned. The New Jersey Department of Transportation (NJDOT) has general oversight of all 45 public-use airports, and over 400 restricted-use aeronautical facilities, including airstrips, heliports and balloon ports. On the commercial side, the responsibilities are divided among agencies: the Port Authority of New York and New Jersey for Newark-Liberty and Teterboro; the South Jersey Transportation Authority for Atlantic City International Airport; and Mercer County for Mercer County Airport.

Asset Management

The State of New Jersey faces significant challenges with respect to determining what investments to make in its transportation system. New Jersey's transportation network is extensive and well-developed. It is critical that New Jersey is in a position to balance investments in different asset and investment categories to best preserve the state's transportation network, while also targeting improvements in mobility, safety and other areas.

In order to address this challenge, New Jersey is taking an asset management approach to preserving and improving the transportation system. Asset management offers an alternative to focusing solely on problem spots or worst conditions. The Federal Highway Administration and the American Association of State Highway and Transportation Officials define Asset Management as a "systematic process of maintaining, upgrading, and operating physical assets cost-effectively".

New Jersey will utilize an Asset Management approach to operate, preserve and improve NJDOT's infrastructure assets, focusing on roads, bridges and culverts, facilities and equipment, as well as investing in safety and congestion reduction.. This approach will ensure that available funding is spent effectively.

An essential part of Asset Management is the lifecycle management approach to reach or maintain desired or targeted performance levels while minimizing long-term costs. Lifecycle management also considers system expansion needs.

Given a block of funding to preserve, rehabilitate, replace or expand a particular asset class, a lifecycle management plan will outline a specific resource allocation level be dedicated to preventative maintenance activities, a portion dedicated to more repair and rehabilitation, and a portion dedicated to replacement. Lifecycle management plans may also prioritize based on functional classification -- for example, interstate highways versus arterial roads.

Through development of lifecycle management plans, we intend to outline the most effective allocation of funding for maintenance, rehabilitation and replacement in order to reach targeted levels of performance.

American Recovery and Reinvestment Act (ARRA)

The American Recovery and Reinvestment Act (ARRA) has provided over \$1 billion dollars to improve New Jersey's transportation infrastructure to stimulate the economy by creating thousands of transportation-related jobs and making needed improvements to our statewide transportation system.

New Jersey's Statewide Capital Investment Strategy (SCIS) will take advantage of this opportunity by investing ARRA funding in primarily road and bridge projects on the state highway system as well as local and county roads. However, investments in some congestion relief and safety projects are planned as well.

The ARRA investments are expected to improve the performance of our highway and bridge infrastructure by reducing the current rate of deterioration and therefore shrinking the accruing backlog of existing structural and safety deficiencies. As a result, this puts the state in a better position to manage our infrastructure assets to achieve the state's transportation goals and objectives more efficiently by reducing the current backlog earlier. In addition, from a budgeting perspective, other funding sources are now made available for reallocation to other asset categories in our 10-Year Capital Program for such things that include safety management, congestion relief, bicycle/pedestrian, freight and maritime improvements, as well as transportation support facilities and airport needs.

In conclusion, the ARRA funding stimulates our SCIS. It provides a needed boost towards restoring our infrastructure to a state of good repair. Management of our highway infrastructure assets is a key element in the development of the capital program.

III. Resource Allocation Analysis

Strategic Direction and Policy Framework

As previously mentioned, “Capital Investment Strategy” is the term used for a method of linking transportation investments with goals, objectives, and performance measures. The Capital Investment Strategy is a “performance-based” decision making tool that provides strategic direction to the development of the capital program. Within the resource allocation process, it provides investment options for major transportation asset categories and is used to ensure that plans drive programs. For example, by linking broad goals and policies to the specific investment choices, the SCIS recommends investment targets, shown above, that are guided by the following general principles:

- Clear goals that tell us where we want to be.
- Performance measures that tell us where we are and predict future outcomes.
- Measurable objectives we can work toward.
- Alternative investment scenarios that guide the consideration of “trade-offs” between different investment choices.
- Prioritization techniques used to evaluate individual projects.

Revenue Assumptions

An annual revenue estimate of approximately \$4.329 billion was developed for this analysis.

This includes average annual levels of Federal and State funding for NJDOT and NJ Transit, and Authority toll revenues for NJTA and SJTA. NJDOT revenue estimates do not consider Federal earmarks, Federal set asides and Demonstration funding, as well as capital program delivery and support costs. The NJTA and SJTA revenue estimates include toll revenue anticipated from a recent toll increase.

The investment targets identified in Figure 1 are:

- **Desired Investment Targets** are the annual investment levels required to meet the 10 year performance objectives outlined by each of the participating transportation agencies on the subcommittees. **The annual total does not assume any revenue constraints.**
- **Recommended Constrained Investment Targets** are the recommended annual investment levels that are subject to funding constraints based on estimated average annual revenue limitations over the next ten years. Federal earmarks, set-asides and demonstration funding are not included within these totals.

Based on a \$4.3 billion total revenue investment level, Figure 2 illustrates the proposed annual constrained investment target allocation percentages displayed by program category.

Performance-based Decision-making

A strategic resource allocation process was conducted that applies performance measures to guide the determination of program category investment targets required to achieve agency goals and objectives over the next ten years. It involves classifying all of the capital work done by each transportation agency into program categories and establishing goals, objectives and performance measures for each category.

Quantitative performance analyses were conducted when possible for highway and mass transit assets. Qualitative performance analyses were used when sound data was not available or could not be technically applied to gauge performance of a particular category. For example, data for state highway infrastructure was inventoried and life-cycle cost performance curves developed and analyzed using various management systems data for bridge and roadway assets including pavement and drainage condition information. Performance data was also applied from the congestion and safety management systems to conduct prioritization evaluations for alternative budget scenario evaluations as well. For mass transit assets, the expected service life of the component or facility was used to guide investments directed at reaching or maintaining a state of good repair.

The process to select the Recommended Constrained Investment Targets made every effort to optimize the overall performance of the budget. This approach tried to make certain that scarce financial resources are used as economically as possible to address our most important needs. Several investment target options were designed to achieve various performance levels for each program, as shown in Figure 5.

Figure 5

| | | |
|------------|-------------------------------------|---|
| Scenario A | Continued Funding Level | At a continued (current) funding level, what outcome (condition level, e.g., % deficient) is expected? Deficient deck area for bridges, % roughness for pavements, # of safety locations improved, # of airports preserved. |
| Scenario B | 25% Decrease in Funding level | At a 25% decreased funding level, what outcome (condition level) is expected? |
| Scenario C | 25% Increase in Funding Level | At a 25% increased funding level, what outcome (condition level) is expected? |
| Scenario D | Maintain Condition Level | Maintain a status quo overall condition level at the end of 10 yrs. |
| Scenario E | 50% Backlog Reduction | Reduce the backlog by 50% - of deficient bridge deck area (%), deficient pavement (%), # of safety projects improved or reducing injury severity rate, # of airports protected over 10 years, # of master plans completed, annual passenger increase, # of facilities improved; # of bike path lane miles built over 10 yrs etc. |
| Scenario F | 100% Backlog Reduction (Total Need) | Reduce the backlog by 100% - of deficient bridge deck area (%), deficient pavement (%), # of safety projects improved or reducing injury severity rate, # of airports protected over 10 years, # of master plans completed, annual passenger increase, # of facilities improved; # of bike path lane miles built over 10 yrs etc. |

The alternative investment scenarios included outcomes (in terms of system condition) and outputs (in terms of prospective project lists) for high, medium, and low investment levels. For example, a performance analysis was conducted which predicts bridge condition levels for painting needs, deck repairs and replacement/rehabilitation needs over the next ten years. This analysis is based on the bridge deterioration that can be improved by

implementing current and anticipated bridge improvement projects given specified funding level scenarios.

Examples of outcome-based performance analyses for various alternative bridge condition budget scenarios for state highway bridges are provided in Figures 6, 7 and 8. These graphs illustrate the predicted performance trends over the next ten years for bridge rehabilitation and replacement and bridge deck repair backlog. These “performance curves” depicts how that backlog increases or decreases with the various investment scenarios shown. It should be noted that the performance analyses shown in Figures 6, 7 and 8 are for state highway bridges only and do not include capital maintenance backlog.

Figure 6

| Scenario A Status Quo | Scenario B reduced investment | Scenario C increased investment | Scenario D Maintain condition | Scenario E 50% Backlog Reduction | Scenario F Eliminate | FY 0918 Capital Pgm |
|--------------------------|-------------------------------------|---------------------------------------|-------------------------------------|--|-------------------------|----------------------------|
| \$363M | \$270M | \$450M | \$500M | \$650M | \$800M | \$410 M avg over 10 yrs |

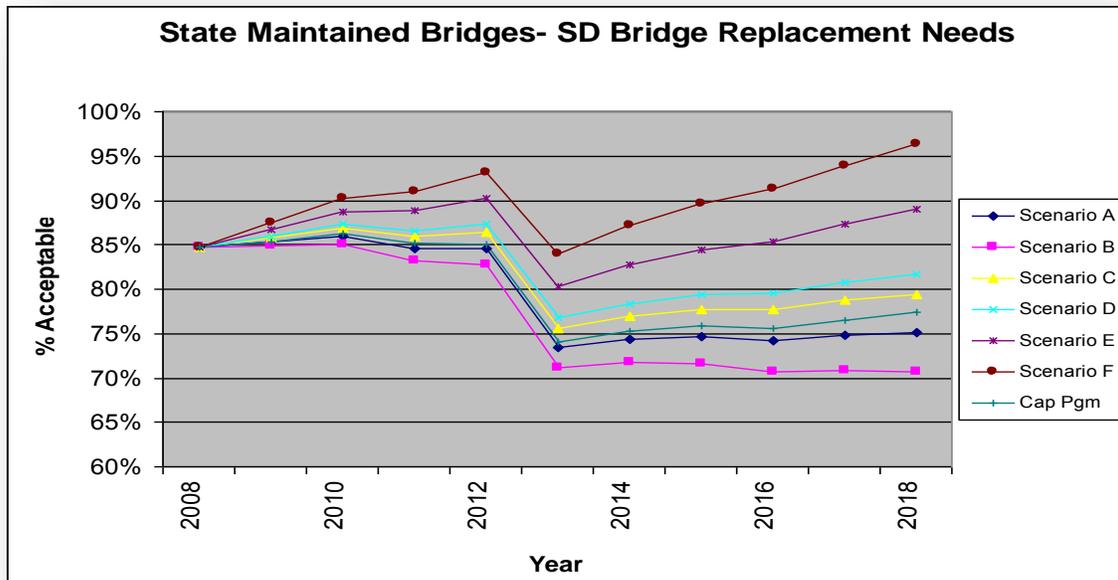


Figure 7

| | | | | | | |
|------------|------------|------------|------------|------------|------------|--------------------|
| Status quo | 25% less | 25% more | Maintain | TARGET | Eliminate | |
| Scenario A | Scenario B | Scenario C | Scenario D | Scenario E | Scenario F | Capital Program |
| \$55M | \$41M | \$69M | \$30M | \$50M | \$60M | \$54M 10 yr avg |

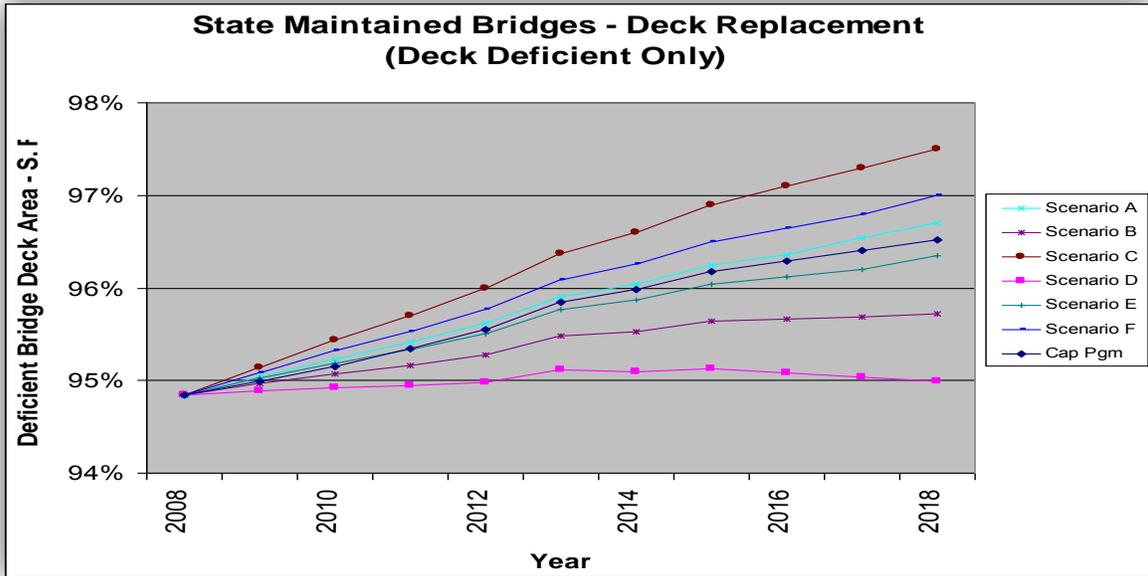
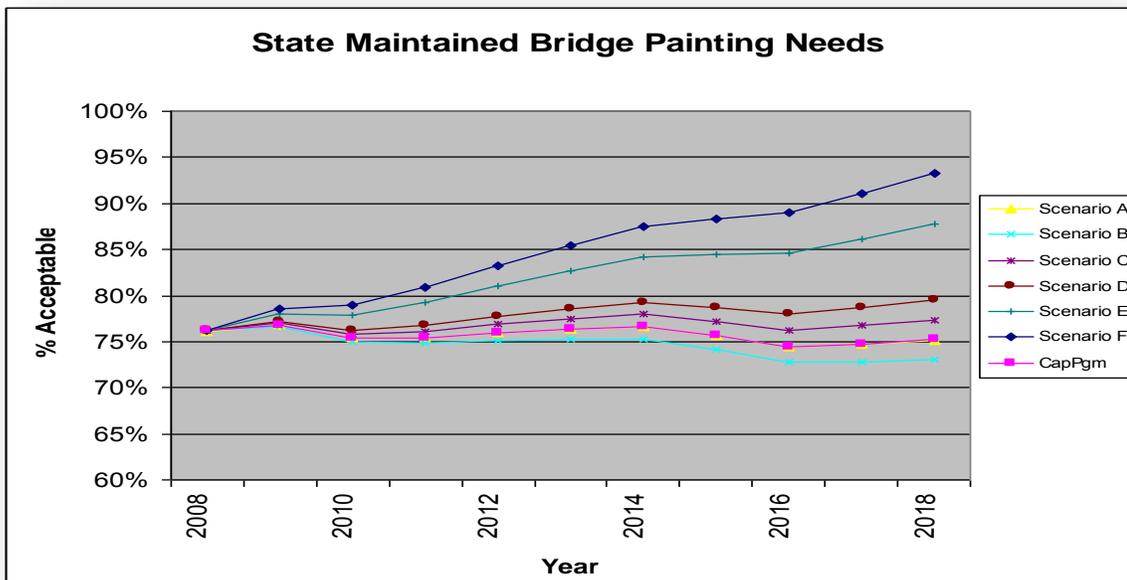


Figure 8

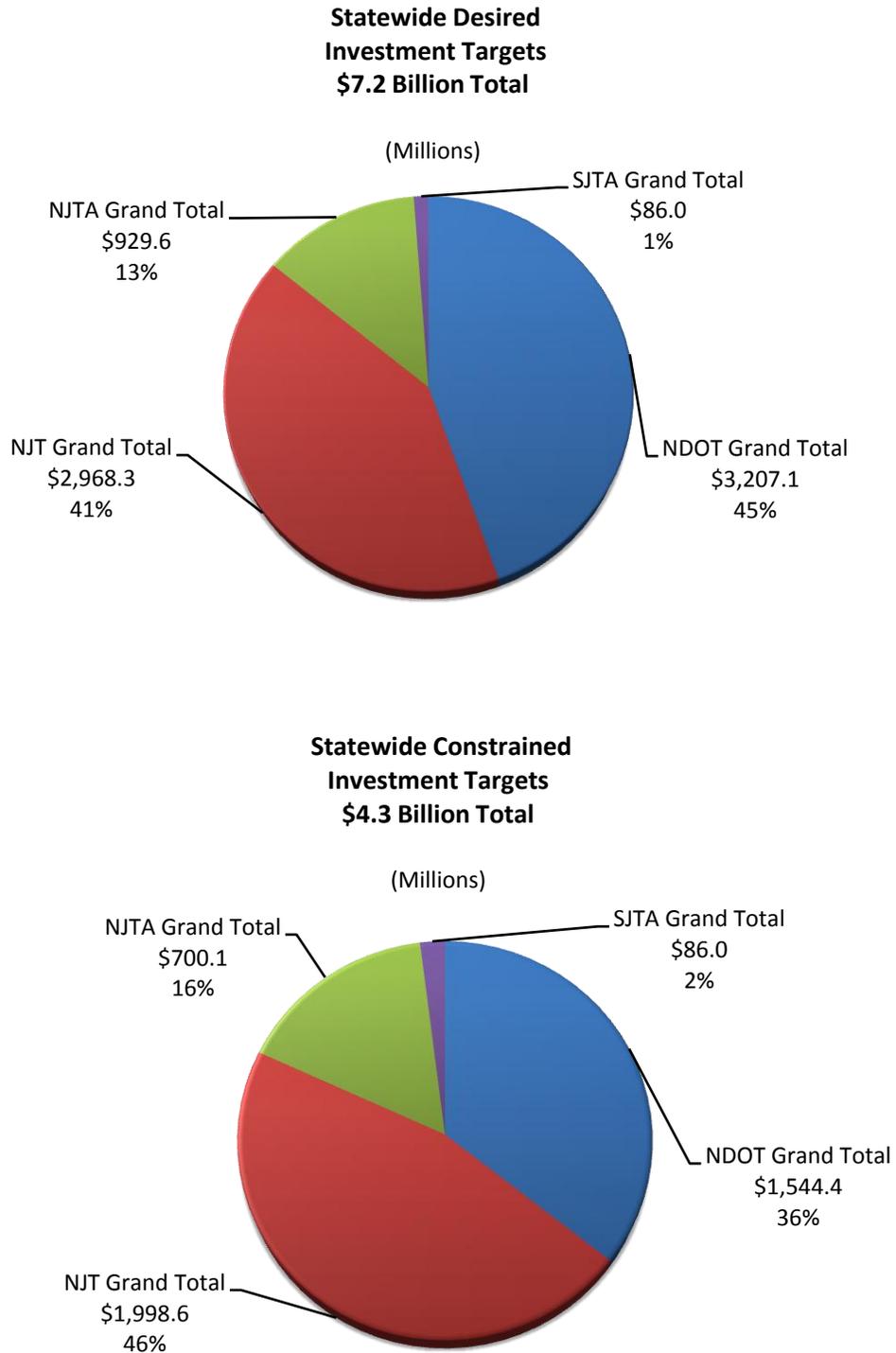
| | | | | | | |
|------------|------------|------------|------------|------------|------------|---------|
| Status quo | 25% less | 25% more | Maintain | TARGET | Eliminate | |
| Scenario A | Scenario B | Scenario C | Scenario D | Scenario E | Scenario F | Cap Pgm |
| \$17M | \$13M | \$21M | \$25M | \$40M | \$50M | \$17M |



Constraining the Investment Targets

The estimated total investment levels for the Desired and the Recommend Investment Targets by transportation agency are presented below in Figure 9:

Figure 9



When comparing the annual Desired and Recommended Constrained Investment Targets, in most cases, the percentages are similar for each agency. However, the Desired Investment Target amounts, which are connected to condition levels required to reach performance objectives, are significantly greater than the Recommended Constrained Investment benchmarks. Obviously, when investments are more restrictive, the performance of the transportation facilities is expected to be impacted.

The desired investment target to address statewide transportation needs is about \$7.2 Billion. However, within the context of fiscal realities, the primary focus of this investment strategy is the “Recommended Constrained Investment Targets”. Investment targets are fiscally constrained to reflect revenue projections which are estimated to remain relatively constant over the next ten year period. As a result, the “Recommended Constrained Investment Targets” totaling \$4.3 billion annually over the next ten years are reallocated to emphasize bridge, mass transit, safety and local system support as the top statewide transportation priorities. The anticipated revenue level needed to fund the Desired Investment Targets is approximately \$2.9 billion per year higher than the Constrained Investment Targets. There is certainly a need to address unfunded transportation improvements that are required in order to attain our transportation goals and objectives.

As a result of maintaining bridge assets as the highest priority, the annual investment levels for other categories such as Roadway Assets and Congestion Relief were not increased over the FY 2009-2018 target levels.

The goal of the SCIS was to apply effective performance measures to policy objectives with results based on the most technically sound data available.