Appendix E – Technical Memoranda 1-4

Technical Memorandum 1: Outreach & Coordination

November 2011

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1. Outreach and Coordination

1.1 Introduction

Making Connections is a community-based planning process to prepare a circulation plan that is truly reflective of Somerset County's diverse community of stakeholders. The County and project team met with, and sought input from, a broad range of residents; the business community; trucking and freight transportation providers; the real estate community; advocates and special interest groups; and numerous local, county, regional, and state agencies and representatives.

This sort of comprehensive outreach process is necessary to identify the many varied and often competing issues, interests, needs, and concerns of those who live, work, govern, and do business in Somerset County.

The outreach and coordination process included the following:

- A steering committee was formed and convened to guide the study, review, and provide comment on study findings and work products.
- Seven focus groups sessions were held to discuss issues that included freight and goods movement, public transit, mobility and safety, economic issues, and critical infrastructure and climate change. Participants were drawn from a broad spectrum of interests.
- A meeting was held with Planning Board Chairs from each of Somerset's 21 municipalities. A survey was distributed among the group to gather input on issues of particular concern to the individual municipalities.
- Two public meetings were held to publicize the Plan, inform the public on the study purpose, present the findings, and gather comments and feedback to shape the final plan.
- An on-line survey was distributed using an extensive email list and posting on the RideWise website to gather feedback on the nine goals and policies of the Making Connections Plan.
- Finally, the Plan was presented to the Somerset County Planning Board, first for final review and comment, and then for adoption as the Circulation Element for Somerset County.

1.2 Project Outreach

1.2.1 Steering Advisory Committee

A key driving force in the development of the Making Connections Plan for Somerset County was the locally and regionally represented Steering Advisory Committee (SAC). The SAC provided invaluable input and guidance to the project team to ensure that the needs and goals of Somerset County were properly channeled into the final document. Each meeting followed a pre-planned theme, but also allowed for open discussions about on-going project efforts and provided ample opportunities for SAC members to voice their opinions about the Making Connections Plan. Four meetings, as noted below, were held during the study and minutes for each are provided in Appendix A.

- SAC Meeting #1 – Kickoff – January 27, 2010

- SAC Meeting #2 – Scenario Modeling, Crash Data, Survey – March 26, 2010
- SAC Meeting #3 – Focus Groups, Scenario Modeling Results/Consensus – February 16, 2011
- SAC Meeting #4 – Review Draft Plan – June 9, 2011

SAC members were chosen by the Somerset County Planning Department, in collaboration with the project team, to represent numerous disciplines relevant to the Making Connections Plan. SAC members included representatives of:

- Somerset County Planning
- Somerset County Engineering
- Somerset County Public Works
- Somerset County Transportation
- New Jersey Transportation Planning Authority
- New Jersey Office of Planning Advocacy
- New Jersey Department of Transportation
- New Jersey Transit
- RideWise of Raritan Valley
- NJ Future
- Somerset County United Way
- Somerset County Business Partnership
- Franklin Township Planning
- Bernards Township Engineering

1.2.2 Focus and Stakeholder Groups

In order to obtain targeted information on specific topics that were important to the key goals for Somerset County, seven focus group sessions with experts on each of those topics were held in the early stages of the Making Connections Plan. These sessions included a formal question and answer period in which the project team asked for specific responses from the topical experts, as well as an open discussion period in which those experts and the project team could provide further valuable information for the final Making Connections Plan. A list of the seven focus group sessions is below, while minutes of each are included in Appendix A.

- Freight and Goods Movement
  - May 5, 2010 – Passenger and freight rail providers
  - June 3, 2010 – Commercial real estate
  - June 7, 2010 – Commercial trucking
- Passenger Transit – May 13, 2010
- Mobility and Safety – May 13, 2010
- Economic Issues – May 14, 2010
- GHG and Vulnerable Infrastructure– August 18, 2010

1.2.3 Planning Board Chair Outreach

As part of the outreach effort for the study, Somerset County surveyed municipal planning board chairs via a detailed questionnaire. The questionnaire was delivered to attendees of a briefing held on April 5, 2010, with a requested response date of April 30, 2010. The responses were incorporated into the development of the Making Connections Plan.

1.2.4 Public Meetings

Public meetings are an equally important element in ensuring that the residents who will be impacted by the Making Connections Plan are able to provide input into the plan elements and ultimately the final vision for Somerset County. As the study progressed, four public meetings were held to keep Somerset County residents in touch with the project team, as well as providing them a forum for public comment and questions. A list of the four meetings is below, and documentation of each public meeting is provided in Appendix A.

- Public Meeting #1: Kickoff/Introduction – February 25, 2010
- Public Meeting #2: Scenario Planning Results –March 30, 2011
- Planning Board: Plan Review – June 21, 2011
- Planning Board: Plan Adoption – November 15, 2011

1.2.5 Public Survey

A key part of the public outreach strategy in updating Somerset County's Circulation Element was the development and deployment of a survey aimed at gauging the community's priorities for future transportation improvements and investments. The survey was developed in conjunction with Somerset County Planning staff and was deployed on the RideWise website. The survey included nine major categories, with several subcategories included within each category. For each subcategory, residents were asked to define how important they believed that element was in prioritizing future investments, with a "1" classifying it as "Not Important," and a "5" classifying it as "Very Important." A final, open-ended question was included to allow residents to provide specific feedback regarding future transportation improvements in Somerset County. Basic demographic information was requested as well. The survey was posted in February and closed to responses on April 9, 2010. A summary of survey responses is included in Section 2.19, while raw survey data is provided in Appendix B.

Technical Memorandum 2: Transportation System

November 2011

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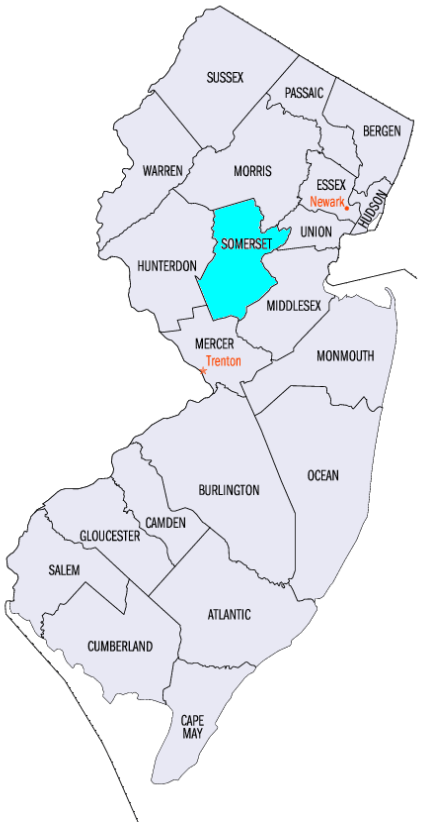
2. Transportation System

2.1. Background

Access and mobility issues have shaped the development of Somerset County throughout its long history. First settled during the latter part of the seventeenth century, Somerset is one of America's oldest counties. Proximity to water was an early strategic advantage and the first settlements took place along the banks of the Bound Brook Stream in present-day Bound Brook. By the mid-eighteenth century, additional development had begun to occur in what is now modern-day Somerville.

Throughout much of its history, Somerset County was predominantly rural, and farming was at the center of its economy. Overland distances were long, and many early settlers relied on agriculture for their subsistence. Like the surrounding county, Somerville was a largely rural, and sparsely populated, farming community. New transportation facilities, including the mid-nineteenth century arrival of the railroad, and, to a lesser extent, the Delaware and Raritan Canal began to change the character of the region. The resulting improvements increased Somerville's strategic importance, and industry and population followed.

The development of the Interstate System ushered in yet another wave of change and growth. This was evident during the first half of the twentieth century with the development of Route 22, which is one of the original federal highways, and later with the construction of Interstates 287 and 78 in the latter half of the century. They made the county readily accessible and within easy reach of opportunities on a regional- and national-level.



These changes, gradual over Somerset's first 300 years, and then occurring more rapidly over the last half century, are reflected in Somerset's demographics. The county's population, which first topped 100,000 in the early 1950s after nearly 300 years of settlement, as per the 2010 US Census, currently stands at 323,444. Improved access and mobility have translated not only into significant population growth, but have changed the breadth and nature of commercial activity as well, as the region has transitioned from its early farm-based origins, to becoming a focal point first for industry and goods movement, and more recently as the home to many leading telecommunications and pharmaceutical firms. Yet while many parts of Somerset County have became more suburban than rural in character, it is still largely a collection of bedroom communities and small urban centers connected by arterial highways and railroads.

Despite its long history and many assets and advantages, Somerset County faces numerous challenges: peak hour traffic congestion, conflicts among regional and local traffic, the limitations of many local and county roadways, and the need to support economic development without further burdening the county's finite roadway capacity. Long sought out for its quality of life and high standard of living, Somerset County must recapture the advantages it once held.

To meet these challenges, the County's circulation system must play a critical role. An examination of this system is provided below.

2.2. Circulation System Overview

Somerset County's modern circulation system is comprehensive and comprises several classes of roadways, freight and passenger railways, truck routes, airports, public and private bus lines, shuttles, greenways, bikeways, sidewalks, park-and ride lots, and other integral components, including bridges and signalized at-grade rail crossings. The circulation system provides access to various community features, including major traffic generators such as major employers, shopping areas, schools, hospitals, airports and transit stations. Figure 2.2 depicts the community features, and Sections 2.3 through 2.17, provide complete details of the existing character and condition of the County's circulation system.

2.3. Rail Service

Somerset County is served by two passenger rail lines of New Jersey Transit. These include the Gladstone Branch of the Morris and Essex Line, and the Raritan Valley Line.

On both lines, the majority of traffic is between Somerset County and Newark's Broad Street Station, Newark's Pennsylvania Station, Hoboken Terminal, or New York City's Pennsylvania Station. Intra-County traffic on both lines is limited.

2.3.1. Gladstone Branch

The Gladstone Branch of the Morris and Essex Line serves six stations within Somerset County: Lyons and Basking Ridge stations in Bernards Township; Bernardsville Station in the Borough of Bernardsville; Far Hills Station in the Borough of Far Hills; and, Peapack and Gladstone stations in the Borough of Peapack and Gladstone. This line terminates at Gladstone Station. Figure 2.3 shows the location of each station within Somerset County.

The Gladstone Branch service terminates at Summit on weekends, with connecting service to Newark Broad Street and New York Penn Station. The service focuses on providing this connection. Several trains each way serve NYC directly on the Gladstone branch, Monday through Friday. Bus and rail connections to many points in the NY/NJ metro area are only possible for Gladstone passengers from New York Penn Station on the weekends, and this requires a transfer to the Morristown line at Summit.

As of May 2010, a total of 19 eastbound trains were scheduled to depart Gladstone Station every weekday between 4:26AM and 11:41PM, and a total of 24 westbound trains were scheduled to arrive between 9:12AM and 2:16AM. All but three (3) eastbound departures from Gladstone occur before 4:39PM, and trains run at the greatest frequency between 4:43AM and 7:58AM when the average headway is 27 minutes. Westbound departures to Gladstone occur regularly throughout the day, but have increased frequency between 5:55PM and 8:26PM when the average headway is 24 minutes. Overall, the average headway in both directions is approximately 45 minutes; however off-peak weekday travel is limited with headways as great as 284 minutes eastbound and 60 minutes westbound.

On weekends and holidays, a total of 19 eastbound departures from Gladstone Station were scheduled between 6:01AM and 12:10AM, and 20 westbound trains were scheduled to arrive between 8:12AM and 3:05AM. Both eastbound departures from Gladstone and westbound departures to Gladstone occur regularly throughout the day. The average headway in both directions is approximately 60 minutes.

The approximate travel times to Hoboken and New York City were 75 minutes and 90 minutes, respectively.

Figure 2.3 shows the path of the Gladstone Branch of the Morris and Essex Line.

2.3.2. Raritan Valley Line

The Raritan Valley Line serves five stations within Somerset County: Bound Brook Station; Bridgewater Station; Somerville Station; Raritan Station; and, North Branch Station in Branchburg Township. This line offers limited weekday service west of Raritan Station to High Bridge Station. Figure 2.3 shows the location of each station within Somerset County.

The Raritan Valley Line provides service to Newark's Pennsylvania Station, where bus and rail connections are provided to most points in the New York/New Jersey metropolitan area, including New York City, Hoboken, and Jersey City. National connections via Amtrak are also possible.

As of May 2010, a total of 26 eastbound trains were scheduled to depart Raritan Station every weekday between 4:46AM and 11:40PM, and a total of 26 westbound trains were scheduled to arrive between 7:00AM and 2:32AM. Eastbound trains run at the greatest frequency between 4:46AM and 7:39AM, when the average headway is 19 minutes. Westbound departures to Raritan occur regularly throughout the day, but have increased frequency between 5:44PM and 8:17PM, when the average headway is 20 minutes. Overall, the headway in both directions is approximately 45 minutes.

On weekends, 18 eastbound trains were scheduled between 6:18AM and 11:40PM, and 18 westbound trains were scheduled to arrive between 8:42AM and 2:32AM. These trains run at regular intervals of approximately 60 minutes.

Service to points west of Raritan Station is limited to seven eastbound and ten westbound trains on weekdays, and not provided on weekends.

The approximate travel time between Raritan Station and Newark's Pennsylvania Station is one hour.

Figure 2.3 shows the path of the Raritan Valley Line.

2.4. Bus Service

2.4.1. New Jersey Transit Bus Services

As of May 2011, a total of seven New Jersey Transit bus routes serve Somerset County. These routes are detailed in Table 2.4.1 below.

Table 2.4.1: New Jersey Transit Bus Routes

Route	Somerset County Destinations	Terminus	Days Operating
114	Bridgewater, Somerville, Bound Brook, North Plainfield, Watchung	New York City	Monday – Sunday
117	Somerville, Bound Brook, North Plainfield	New York City	Monday – Friday
65	Bridgewater, Somerville, Bound Brook, North Plainfield	Newark	Monday – Saturday
66	North Plainfield (One Stop Daily)	Newark	Monday – Friday
822	North Plainfield	Plainfield	Monday – Saturday
605	Montgomery	Lawrence via Princeton	Monday – Sunday
986	North Plainfield, Watchung	Plainfield	Monday – Friday

Source: New Jersey Transit

Figure 2.3 shows the routing and key destinations of each of the New Jersey Transit bus routes that serve Somerset County.

2.4.2. Private Carriers

2.4.2.1. Lakeland Bus Lines

On weekdays, Lakeland Bus Lines operates bus service between Somerset County and New York City. Lakeland Bus Route 78 serves commuters destined to New York City with eastbound departures in the morning, and westbound departures in the afternoon. Route 78 serves the Somerset County municipalities of Bedminster, Far Hills, Bernardsville, and Bernards, and includes stops at park-and-ride lots located at the Far Hills, Bernardsville, and Lyons rail stations. From Bedminster, the approximate travel time to New York City is 75 minutes. Figure 2.3 depicts the trajectory of Route 78 through the County.

2.4.2.2. Trans-Bridge Lines

Trans-Bridge Lines offers daily service between Bethlehem, Pennsylvania, Newark's Liberty International Airport, and the Port Authority Bus Terminal in New York City. After a pause at the PABT, this service also continues to John F. Kennedy International Airport. This service serves Somerset County with stops in Bridgewater and Branchburg. Travel time from Branchburg to New York City via Liberty International Airport is approximately 75 minutes. Figure 2.3 depicts Trans-Bridge Line's service in Somerset County.

2.4.2.3. Suburban Transit

Suburban Transit operates bus service between Princeton and New York City. Suburban Transit Route 100 travels along New Jersey Route 27 and makes stops in Franklin Township at Kingston and Franklin Park. Travel time from Kingston to New York City is approximately 90 minutes, and the journey from Franklin Park is approximately 75 minutes. Service is also provided to key intermediate points along Route 27, and the City of New Brunswick. Figure 2.3 shows Suburban Transit's service in Somerset County.

2.4.2.4. Susquehanna Trailways

Susquehanna Trailways operates daily bus services between Sunbury and Lock Haven, Pennsylvania and New York City. These services offer service to Somerville, though eastbound buses originating in Sunbury only discharge passengers in Somerville as they travel to New York. Westbound buses provide access to several Pennsylvania destinations, including Easton, Jim Thorpe, Hazelton, and Williamsport. Each of the two routes operated by Susquehanna Trailways makes two stops per day in Somerville. Figure 2.3 shows Susquehanna Trailways' service in Somerset County.

2.4.3. Shuttles

2.4.3.1. Davidson Avenue Shuttle

The Davidson Avenue Shuttle (DASH) is operated as a public service by Somerset County. The service operates on weekdays, and follows a fixed route within Bridgewater, Bound Brook, Franklin Township, Somerset, New Brunswick, and North Brunswick. Figure 2.3 shows the DASH route.

2.4.3.2. SCOOT

Somerset County Transportation Services also operate the SCOOT bus network. The service operates on weekdays and follows two separate routes, known as SCOOT and SCOOT Regional. SCOOT Regional serves Bound Brook, Bridgewater, Hillsborough, Manville, and Somerville. SCOOT serves Hillsborough, Manville, Bridgewater, Somerville, Bedminster, and Far Hills. Figure 2.3 shows the SCOOT routes.

2.4.3.3. Community Access Transit

Community Access Transit (CAT) is operated from Monday through Friday by Somerset County Transportation Services. The service has five (5) different routes, one for each day of the week. These routes are detailed in Table 2.4.3.3 below.

Table 2.4.3.3: Community Access Transit

Route	Municipalities Served
Monday	Bridgewater, Somerville, Bound Brook, South Bound Brook, Franklin
Tuesday	Bridgewater, Bound Brook, Somerville, Greenbrook, North Plainfield, Watchung
Wednesday	Franklin, Montgomery, Rocky Hill, Hillsborough, Manville, Somerville
Thursday	Bridgewater, Branchburg, Raritan, Somerville, Manville
Friday	Bernards, Warren, Bridgewater, Somerville, Bound Brook

Source: Somerset County

Figure 2.3 depicts each of the CAT routes.

2.5. Park-and-Ride Lots

The availability of park-and-ride lots plays an important role in promoting the use of public transportation and reducing the number of single-occupancy vehicles on County roadways. Somerset County has a total of 13 official park-and-ride lots.

A total of eleven park-and-ride lots are associated with the New Jersey Transit railway stations along the Raritan Valley Line and the Gladstone Branch of the Morris and Essex Line. These stations provide commuters with a combined total of approximately 2,500 parking spaces, and are distributed as shown in Table 2.5-1 below.

Table 2.5-1: Park-and-Ride Lots

Station	Municipality	Spaces
Lyons	Bernards Township	331
Basking Ridge	Bernards Township	89
Bernardsville	Bernardsville Borough	143
Far Hills	Far Hills Borough	170
Peapack	Peapack and Gladstone Borough	54
Gladstone	Peapack and Gladstone Borough	186
Bound Brook	Bound Brook Borough	275
Bridgewater	Bridgewater Township	467
Somerville	Somerville Borough	416
Raritan	Raritan Borough	288
North Branch	Branchburg Township	40
Source: New Jersey Transit		

In addition to the park-and-ride lots associated with the New Jersey Transit railway stations, the New Jersey Department of Transportation recognizes two additional park-and-ride lots in Somerset County, detailed in Table 2.5-2.

Table 2.5-2: Park-and-Ride Lots

Name of Lot	Municipality	Spaces
Hillsborough Park-and-Ride	Route 206, Hillsborough Township	85
Branchburg Park-and-Ride	Route 202, Branchburg Township	113
Source: New Jersey Department of Transportation		

Somerset County's official park-and-ride lots are mapped in Figure 2.3.

Aside from the official park-and-ride lots, additional informal park-and-ride lots exist throughout the County in locations such as underutilized parking lots of shopping centers or malls, and along residential streets.

2.6. Airports

Somerset County is the location of three general aviation airports: Somerset Airport in Bedminster Township; Central Jersey Regional Airport in Hillsborough Township, and Princeton Airport in Montgomery Township. The specific location of each airport is depicted in Figure 2.3.

These airports, all of which are privately owned, play a vital role in the region's circulation system. They serve corporate and recreational users, and provide access to pilot training facilities. As reliever airports, they also provide an alternative to larger, scheduled-service airports such as Newark's Liberty International Airport. This helps to reduce delays and congestion at the region's larger, scheduled-service airports.

2.7. Trails and Greenways

Greenways are an integral part of County's open space network. They are linear corridors of undeveloped land that connect the County's parks and other community features with one another. In addition to land preservation, they also protect environmental resources, provide for recreation, and present opportunities to expand bicycle and pedestrian mobility by offering a viable alternative to congested roadways for non-motorized travelers.

There are currently six (6) County greenways within Somerset County. These greenways, which are in various stages of completion, are described below:

- **South Branch Greenway:** Located along the South Branch River corridor, the South Branch Greenway contains about 957 acres of the Somerset County Park Commission's planned total of 1,845 acres. When complete, this greenway will provide a regional connection into Hunterdon County.

- **North Branch Greenway:** Located to the north of Route 22, the North Branch Greenway contains about 222 acres of the Somerset County Park Commission's planned total of 650 acres.

- **Second Watchung Greenway:** Located along the ridge of the Second Watchung Mountain, this greenway contains slightly more than 566 acres of the Somerset County Park Commission's planned total of 700 acres.

- **Raritan River Greenway:** This greenway follows the Raritan River and contains about 460 acres of the Somerset County Park Commission's planned total of 1,400 acres.

- **Passaic River Greenway:** Located along the Passaic River, this greenway contains about 65 acres of the Somerset County Park Commission's planned total of 600 acres.

- **Lamington River Greenway:** This greenway follows the Lamington River and contains about 297 acres of the Somerset County Park Commission's planned total of 400 acres.

Somerset County also contains several regionally-significant greenways. These include the Delaware and Raritan Canal State Park, and Peters Brook Greenway, both of which are described below:

- **Delaware and Raritan (D&R) Canal State Park:** This state park follows the Delaware and Raritan Canal, and connects New Brunswick and Milford with Trenton. A total of about 22 miles of the section located between Trenton and New Brunswick traverses Somerset County. This greenway provides Somerset County residents with regional mobility in addition to a wealth of recreational opportunities.

  The Delaware and Raritan Canal State Park Towpath is also a part of the larger East Coast Greenway, a trail system whose goal is to ultimately stretch along the eastern seaboard and connects Key West, Florida with the Canadian border at Calais, Maine.

- **Peters Brook Greenway:** Peters Brook Greenway has been planned by the Regional Center Partnership of Somerset County. Different segments of this multiyear project are coming to fruition. Most recently, in July 2010, construction started on a pedestrian bridge across US Route 202/206 between Somerville and Clarks Woods in Bridgewater. When completed, it will serve as a spine in the Regional Center's pedestrian circulation system and provide a north-south linkage between residential areas, open space and recreational facilities, schools, commercial districts, and employment centers, located between the Raritan River in Somerville and Bridgewater-Raritan High School.

Figure 2.7 depicts the above-described greenways and the key destinations they serve.

2.8. Bikeways

Bikeways are facilities that provide opportunities for commuting and traveling by bicycle. They may include: shared roadways; bicycle-compatible roadways, which are roadways that are designed in such a manner that they can safely accommodate bicycle and vehicular traffic; roadways with shared lane markings; bicycle routes; and, bicycle lanes. Table 2.8 provides full clarification on these terms.

Table 2.8: Bikeway Characteristics

Facility	Characteristics
Shared Roadway	• Roadway shared between bicycles and motor vehicles • Bicycles travel on wide outside lanes or wide shoulders • Bicycle-safe inlet grates provided • Striping used to dedicate bike lanes
Bicycle-Compatible Roadway	• Roadway shared between bicycles and motor vehicles • Bicycles travel on wide outside lanes or wide shoulders, or in main travel lane if roadway has low traffic volumes and speeds • Bicycle-safe inlet grates provided • No dedicated bike lane provided
Roadways with Shared Lane Markings	• Roadway with shared lanes • Markings indicate where bicycle should operate, and alert motorists
Bicycle Routes	• Roadway shared between bicycles and motor vehicles • Bicycles travel on wide outside lanes or wide shoulders • Bicycle-safe inlet grates provided • Striping used to dedicate bike lanes • Identified by wayfinding signage for bicyclists
Bike Lanes	• Delineated, on-road lane for bicyclists • Dedicated or preferential use by bicycles
Off-Road Trail	• Multiuse trails may accommodate other users • Total separation from vehicular traffic • Often found in scenic areas, such as greenways

Somerset County maintains approximately ten miles of bikeways on shared roadways. These are depicted in Figure 2.7.

In addition, many of the County's roadways are compatible with bicycling. As such, RideWise of Raritan Valley, an affiliate of the Somerset County Business Partnership, actively promotes bicycling as a means of commuting. It is also noted that the New Jersey Department of Transportation has outlined several bicycle routes in Somerset County, as described below:

- **High Point to Cape May Bicycle Route:** This route connects High Point in Sussex County with Cape May, at New Jersey's most southerly point. Approximately 40 miles of this route is located within Somerset County, largely on: Montgomery Road; River Road (County Route 533); Millstone River Road (County Route 533); Weston Canal Road (County Route 623); Dock Watch

Hollow Road; Round Top Road; Dead River Road; and, Acken Road. The New Jersey Department of Transportation intends that the High Point to Cape May Bicycle Route provide a spine to encourage the expansion of localized bicycle facilities.

- **Lamington River Valley:** This route extends in a northerly direction from Raritan Valley Community College in Branchburg Township into Morris County. Eight miles of this route are within Somerset County, largely on Black River Road and Rattlesnake Bridge Road (County Route 665).

- **Canal Road:** This circuitous route connects Franklin Township with Rocky Hill Borough, and Montgomery Township. It is about 20 miles long, and includes large sections of Canal Road (County Route 603), Millstone River Road (County Route 533), and River Road (County Route 533).

- **Great Swamp:** This circuitous route connects with Lord Stirling Park and links Bernards Township and Bernardsville Borough with Morris County. About 16 miles of this route is within Somerset County, largely on: Liberty Corner Road (County Route 512); Lyons Road (County Route 640); Mount Airy Road (County Route 525); and, Whitenack Road. This route is significant insofar as it provides an impetus for the expansion of other localized bicycle accommodations.

Figure 2.7 illustrates the bikeways in Somerset County. Please note that while County and other parks often contain bike trails, they are not shown in Figure 2.7 or discussed above since they are not regionally connective.

2.9. Freight

Somerset is centrally positioned in New Jersey as a regional distribution location. Similar to other Counties in New Jersey, Somerset contains a mix of road and rail operations that move goods into, out of, within and through the area. However, Somerset is unique in certain aspects of the goods movement system located in the County:

- The County has a diverse economic base, which ranges from heavy manufacturing and quarries to high tech data centers.
- Somerset is situated at the edge of the Conrail Shared Assets Area, meaning that some sites in the County are located within the Shared Assets Area while other sites are immediately outside of it, served directly by Norfolk Southern and/or CSX Railroad, at a cost savings to shippers.
- The roadways used by trucks each have distinctive characteristics and purposes.

Somerset County has a diverse array of industries and freight-related operations including:

- Quarries, including Stravola (which supplies NJ Transit) and Trap Rock Industries.
- Medical and pharmaceutical companies, such as Centrocor Ortho Biotech, Ortho Clinical, Oticon, and Roche.
- Transload operations, such as Dameo in Bridgewater.
- Regional sort and distribution operations, such as UPS and Baker and Taylor, both located in Bridgewater.
- Fabrication of structural steel.
- Lumber and building material distribution, including Mid-State Lumber.

In 2007, nearly 10.4 million tons of freight moved into, out of, and within Somerset County (Figure 2.9). In addition, a vast amount of goods moved through the County without stopping in Somerset, primarily on the Interstate roadways and rail lines. Ninety-five percent of the aggregate tonnage moved is moved via truck.

The major commodities moved include "non metallic minerals" primarily moving outbound (likely ballast quarried for NJ Transit and others), retail products moving outbound from the distribution centers in the County, and farm products moving into Somerset. These data are depicted in Table 2.9.

Table 2.9 Somerset County Commodity Movements, 2007 Tons and Dollars

	2007 Tons	2007 Dollars
County Internal	520,391	$ 1,242,535,177
Inbound	4,511,413	$ 12,474,383,153
Outbound	5,335,094	$ 20,811,772,617
Grand Total	10,366,898	$ 34,528,690,946

Source: Global Insight Transsearch data as analyzed by Cambridge Systematics for the New Jersey Department of Transportation.

2.9.1. Shipper Base and Market

The industrial base of the County is diverse. As shown in Appendix D, the largest employment type is in professional, business, and administrative services. However, the fourth largest number of workers can be found in chemical production, with over 8,300 employees. Wholesalers are also a leading employer, with over 9,300 workers in two industrial sectors.[1]

Somerset County also has significant mining and agricultural activities. The quarry located at Chimney Rock Road is a major supplier of ballast material to New Jersey Transit.

The County's industrial base has been changing and continues to evolve. Yet, the diversity of the industrial base remains evident. As shown in Appendix D, the greatest employment growth occurred in healthcare sectors. Some transportation and manufacturing operations have also grown. However, similar to New Jersey and the northeastern United States, the County's largest job losses occurred in manufacturing operations. The impacts of downsizing in the financial and insurance sectors are also evident in the job loss figures.[2]

2.9.2. Warehouse, Distribution and Industrial Space

Somerset County has nearly 40 million square feet of industrial property, having added about two million square feet since 2000[3]. About ten percent of the industrial property was available in the fourth quarter of 2010. During this same period, the Interchange 8A area of Middlesex County experienced a 19 percent vacancy rate, the Carteret area had a 14 percent rate, and the Trenton/I-295 area had a rate of 21 percent.

New Jersey Transit Ballast Train

As comparisons, Somerset has more industrial property than Mercer County (which contains major distribution operations in the Interchange 7A area), Gloucester County (which includes the Pureland Industrial Complex) and Burlington County (which includes the Haines Industrial Complex). Middlesex County, which includes the major distribution center hub at Interchange 8A and Raritan Center has 209 million square feet of industrial space. Union County has over 81 million square feet.

Discussions undertaken as part of this assessment revealed that companies generally view and use Somerset County locations for regional distribution, rather than national distribution. Accordingly, the average size of industrial buildings tends to be smaller than the big box distribution centers in Middlesex County.

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[1] State of New Jersey Department of Labor & Workforce Development, Top Employers in Somerset County in 2009, http://www.wnjpin.net/OneStopCareerCenter/LaborMarketInformation/Indfocus.html.

[2] State of New Jersey Department of Labor & Workforce Development, Changing Industrial Employment in Somerset County 2008 to 2009, http://www.wnjpin.net/OneStopCareerCenter/LaborMarketInformation/Indfocus.html.

[3] CB Richard Ellis. First quarter 2010 and 2000 market data.

Even with the large overhang of industrial property in 2010, the average asking lease rate in the County is $5.67/square foot triple net, up from about $5.40/square foot in 2000. The asking lease rate reflects the higher use of industrial space within the County for flex and research and development operations. In comparison, the average asking lease rate in Middlesex County was $3.94/square foot. The asking lease rate in the Princeton area was $4.99, and the asking lease rate in the Trenton/I-295 area was $3.91.[4]

2.9.3. Freight System

The rich industrial and production heritage of the County, along with Somerset County's central location in the metropolitan area, is reflected in its freight transportation infrastructure. The County's freight system involves surface transportation links that serve the area, all of New Jersey, and North America.

2.9.3.1. Truck Routes and Function

Truck routes serve to minimize unnecessary commercial truck traffic on local streets, and facilitate the smooth flow of traffic. In New Jersey, truck routes are classified into four categories, namely: the National Network, which includes federal roadways; the New Jersey Access Network, which includes interstate highways; local unrestricted roads; and, roadways designated by regulation with limited accessibility.

Somerset County has 78.4 miles of roadway within the National Network, and 71.6 miles within the New Jersey Access Network. A total of 394.26 miles make up the local unrestricted roads, and 56.8 miles are designated by regulation with limited accessibility. Figure 2.9 shows these roadways.

The major truck routes located in Somerset County include:

- Interstates 287 and 78
- U.S. Routes 202 and 206
- NJ State Route 22

Each of these routes has distinctive characteristics and challenges. Interstate 287 provides connectivity to the New Jersey Turnpike, and also provides direct access to New York via NJ Route 440 and the Outerbridge Crossing. Because of this access, industrial space has located along this route. However, excessive congestion and delays during peak hours has caused firms to reconsider the location and incur additional costs. Where possible, according to firms that participated in discussions with the County, trucks have been shifted to off-peak travel subject to the needs of the delivery locations.

Interstate 78 provides east-west access through the County. The route is heavily used for industrial properties in eastern Pennsylvania that are receiving products from New Jersey locations (including the Port of New York and New Jersey) and delivering to shipments to customers in the State.

Route 22 has long been used for regional movements. The main concerns voiced regarding this route relate to the existing turnaround facilities. County officials noted during discussions with industry that

[4] CB Richard Ellis. First quarter 2010 and 2000 market data.

some of the turnarounds are being addressed. For example, a new grade-separated interchange is planned at Chimney Rock Road. Improvements are also planned by NJDOT at the Grove Street and Foothill Road interchanges in Bridgewater.

Truck traffic on Route 206 has been a concern of communities and residents along this roadway. However, a 2009 survey of truck drivers found that the majority of the shipments either originated or terminated at a business located on this corridor.[5]

2.9.3.2. Rail Routes and Facilities

Somerset is unique in terms of its location in the national rail freight system: The County is situated at the edge of the Conrail Shared Assets Area, meaning that some sites are located within the Shared Assets Area and other sites are located along rights of way owned by one Class I railroad. Customers located along Conrail's lines in the shared asset areas have access to the nation's rail network through either Norfolk Southern or CSX.

The major rail lines in the County include:

- Norfolk Southern's Lehigh Line
- CSX's West Trenton (Trenton Subdivision) Line
- Conrail's Port Reading Secondary

Rail provides for cost-effective and low-emission movement of freight while reducing stress on the County's roadway system. Its continued existence and use is of great benefit to the region.

At present, CSX Transportation and Norfolk Southern, both of which are Class 1[6] railroads, operate freight rail lines in the County. Both carriers meet at the Manville Rail Yard, which is the western edge of Conrail's[7] North Jersey Shared Assets Area as it exists in the County. Figure 2.9 depicts the freight railroad lines within Somerset County.

Both the Lehigh and West Trenton lines are vital rail routes for New Jersey. The lines carry containerized cargo to and from the Port of New York and New Jersey, including domestic containers of products and carload shipments (such as plastic pellets, paper, food, and ethanol). The Lehigh Line has an average of 23 trains per day, the West Trenton line carries approximately 20 trains per day, while three trains per day were recorded at the Port Reading Secondary crossing in Bound Brook.[8]

Freight is also transported on New Jersey Transit's Raritan Valley Line. For example, Dameo receives plastic pellets in hopper cars

Manville Yard

[5] New Jersey Department of Transportation, Truck Origin/Destination Survey, 2009, p. 19.

[6] Class 1 railroads are defined by the Surface Transportation Board of the United States Depar annual carrier operating revenue of $250,000,000 or more.

[7] Conrail is jointly owned by CSX Transportation and Norfolk Southern.

[8] North Jersey Transportation Planning Authority, Rail Crossing Assessment, 2007.

partially via a New Jersey Transit rail line. In addition, the track connects to the quarry in Bridgewater.

CSX, Norfolk Southern, and Conrail all use Manville Yard, which is a carload facility that is essentially at capacity and cannot be expanded.

In the vicinity of Manville Yard is Port Reading Junction, where CSX's West Trenton Line, Norfolk Southern's Lehigh Valley Line, and Conrail's Port Reading Secondary Line intersect. As part of the Liberty Corridor Phase I Improvement Program[9], the Port Reading Junction is being upgraded from single track to double track operations along the West Trenton and Lehigh Valley Lines. The project includes 2,400 feet of new track and associated switches and crossovers between the tracks. The project will eliminate an existing bottleneck that is operating at or near capacity and allow two trains to operate on this section of railroad simultaneously, greatly improving the efficiency of rail operations through the County and services to the Port of New York and New Jersey and the national rail network. With the expanded capacity, the junction is projected to handle up to 75 trains per day by 2025.[10]

[9] The Liberty Corridor is a Project of National and Regional Significance in the SAFETEA-LU bill. It includes a multi-modal transportation system in northeastern New Jersey that serves a vital role in linking manufacturing and commerce industries to global markets. The Phase I Improvement Program includes ten projects to enhance the Corridor that have both regional and national benefits. The Corridor is overseen by a group of more than 20 public and private sector partners, including NJDOT.

[10] New Jersey Department of Transportation, FY 2010 - 2019 Transportation Improvement Program.

2.10. Somerset County Bridges

Bridges provide passage over natural and man-made structures, including watercourses, roadways, and railway lines. There are a total of 762 bridges maintained by Somerset County, located on both municipal and County roadways. Somerset County has sole jurisdiction of 701 of these, and shares jurisdiction over 61 bridges with neighboring counties.

Bridges are characterized by their length (span). Of the 762 County maintained bridges: a total of 37 have spans of less than five feet, 471 have spans of between five and twenty feet and, 254 have spans of greater than twenty feet.

While the County inspects all bridges on a regular basis, it is noted that bridges of more than twenty feet are covered by the federal government's National Bridge Inspection Standards (NBIS). Bridges covered by the NBIS are required to be regularly inspected at intervals of no more than 24 months. Additionally, special federal funding for inspection, rehabilitation, and replacement is made available to bridges subject to the NBIS.

It is also noted that many of the bridges that are not subject to the NBIS are historic structures that were built when traffic volumes, and vehicle widths and weights were considerably lower than present levels. As such, many of these bridges are adversely impacted by inadequate capacities, and are the subject of vehicle weight and other restrictions.

2.11. At-Grade Rail Crossings

At-grade rail crossings exist where a railway line crosses a road or path without the use of a bridge or tunnel. There are seven at-grade railroad crossings located along Somerset County roadways. They are located in Montgomery, Bridgewater, Bound Brook, and Branchburg. These crossings are predominately associated with freight railway lines.

All of the County's at-grade crossings are signalized and equipped with boom barriers to prevent vehicles and pedestrians from crossing in the presence of railway traffic. None of these crossings are considered high crash-frequency locations based on the crash data analysis performed as part of this study.

Main Street, Bound Brook Grade Crossing

Although they are not considered high-frequency crash locations, these at-grade crossings may have substantial impacts on the communities in which they are located. Though specific impacts will vary on a case-by-case basis, some examples of the types of impacts associated with at-grade crossings include prolonged or excessive stacking in the presence of railway traffic, and the perception of decreased pedestrian mobility. In addition to the above, it is important to note that such impacts may not be limited to the area immediately surrounding the at-grade crossing. For instance, if a high number of vehicles are stacked at an at-grade crossing, the flow of traffic on connecting streets may also be impacted.

2.12. Crash Data

In order to review crash incidence for the three most recent years available via NJDOT's crash database (July 2006 – June 2009), the Somerset County crash database was pared down to include only those crashes which occurred on Somerset County's 500/600 series route network. Furthermore, crashes where a clear location was not provided within the database (approximately 400 crash records) were removed, resulting in a database of 8,620 crash records.

Crash percentages for Somerset County's 500/600 series network were then compared against statewide 2008 average percentages for county roadways, as well as the three year average percentages for all crashes within Somerset County. This analysis aimed to review overrepresentations of crash types, severities, and factors along the Somerset County roadway network. Only significant under- or overrepresentations are discussed in detail below.

Crash clusters along the county's 500/600 series network were reviewed and mapped, concentrating on locations where the following types of clusters were identified:

- **All crashes** – A review of those locations with the highest incidence of crashes within the county
- **Crashes involving injuries** (annotated with locations of fatalities) – Identifying where the most severe crashes are occurring within the county
- **Angle** (Right Angle or Left Turn) crashes – Angle crashes are often the most severe type of crashes to occur at signalized and non-signalized intersections
- **Fixed Object crashes** – Fixed object crashes often have a high rate of injuries and/or fatalities, and a cluster review may indicate locations where hazards exist
- **Crashes on wet pavement** – A review of these locations may indicate potential drainage concerns
- **Crashes during dawn, dusk, or night** – A review of these locations may indicate potential lighting concerns

2.12.1. Key Crash Locations

Data from the New Jersey Department of Transportation on motor vehicles crashes in Somerset County are mapped in Figure 2.12. The data indicates that there are seven locations with at least 20 crashes, four of which had at least 30 crashes. These locations are summarized in Table 2.12.1 below.

Table 2.12.1: Key Crash Locations

Number of Crashes	Location	Municipality
86	Easton Avenue (CR 527) and Landing Lane (CR 617)	Franklin
83	Easton Avenue (CR 527) and Cedar Grove Lane (CR 619)	Franklin
74	East Main Street (CR 612) and Finderne Avenue (CR 533)	Bridgewater
46	Valley Road (CR 527) and Hillcrest Road (CR 531)	Watchung
37	Hamilton Street (CR 514) and JFK Boulevard	Franklin
33	Amwell Road (CR 514) and Thompson Parkway (CR 615)	Franklin
21	Mount Horeb Road (CR 618) and King George Road	Warren

Source: New Jersey Department of Transportation

2.12.2. County Strategic Projects to Address Crash Locations

In an effort to improve roadway safety, Somerset County actively upgrades high-frequency crash locations. Table 2.12.2 lists the location of some of the recent improvements made by Somerset County.

Table 2.12.2: Location of Strategic Projects to Address Crash Locations

Location	Municipality	Improvement
State Road (US Route 206) and Blawenburg – Belle Mead Road (CR 601)	Montgomery	NJDOT project to replace adjacent bridge and realign intersection (pending)
Hamilton Street (CR 514) and Franklin Boulevard (CR 617)	Franklin	Intersection improvements (pending; design complete)
Roycefield Road, New Center Road (CR 627) and Dukes Parkway West	Hillsborough	New signal (2010)
Amwell Road (CR 514) and Cedar Grove Lane (CR 619)	Franklin	Upgraded intersection (2009)
US Route 22 and Warrenville Road (CR 651)	Green Brook	Intersection improvements (2009)
Main Street (CR 533) and Dukes Parkway East (CR 608)	Manville	Intersection improvements (2009)
Amwell Road (CR 514), Auten Road and Raider Boulevard	Hillsborough	Intersection improvements (2009)
Amwell Road (CR 514) at South Middlebush Road (CR 615)/Thompson Parkway	Franklin	Intersection improvements (2009)
Hamilton Street (CR 514) and JFK Boulevard	Franklin	Intersection improvements (2010)
Mount Horeb Road (CR 618) and King George Road	Warren	Traffic signal planned
Hillcrest Road (CR 531) and Valley Road (CR 527)	Watchung	Intersection improvements (2010)
Source: Somerset County		

2.12.3. Crash Analysis

2.12.3.1. Crash Severity

In terms of crash severity, Somerset County's 500/600 series roadway network experiences an overrepresentation of crashes involving Property Damage Only versus the 2008 statewide average (74.25% versus 71.63%). Likewise, the county's 500/600 series roadway network experiences an underrepresentation of crashes involving injuries (25.66% versus 28.15%). However, when compared to Somerset County's entire roadway network, the county's 500/600 series roadway network experiences an overrepresentation of crashes involving injuries (25.66% versus 20.34%) and an underrepresentation in crashes involving Property Damage Only (74.25% versus 79.53%).

2.12.3.2. Crash Types

Several crash types are either under- or overrepresented when compared to either the 2008 statewide average or all of Somerset County. Four crash types are under-represented when compared to the 2008 statewide average – Same Direction-Side (9.08% versus 11.02%) and Pedestrian (0.88% versus 1.93%) crashes are under-represented compared to New Jersey, but occur at a rate comparable to all of Somerset County. Right Angle crashes on the Somerset County 500/600 route network are under-represented compared to all county roads in New Jersey (15.74% versus 18.61%) but are over-represented compared to all of Somerset County (15.74% versus 10.89%). Crashes involving parked vehicles are underrepresented compared to all county roads in New Jersey (2.91% versus 5.60%) and also underrepresented compared to all of Somerset County (2.91% versus 9.59%).

Three crash types are over-represented when compared to the 2008 statewide average for county roads. Fixed Object crashes are over-represented compared to all of New Jersey (13.98% versus 12.59%) but occur at a comparable rate to all of Somerset County. Left Turn crashes (6.67% versus 5.48%) and Animal crashes (10.06% versus 4.58%) are overrepresented when compared to all county roads in New Jersey, and are also overrepresented when compared to all roads in Somerset County (6.67% versus 3.67% and 10.06% versus 6.68%).

2.12.3.3. Pavement Conditions

In terms of pavement conditions (dry, wet, snow/ice), crash rates for Somerset County's 500/600 series roadway network are comparable to statewide rates. However, crashes on wet pavement on the county's 500/600 series network are overrepresented compared to all of Somerset County (21.26% versus 19.24%).

2.12.3.4. Lighting Conditions

The analysis of light conditions (day versus dawn/dusk/night), indicated that crash rates for Somerset County's 500/600 series roadway network are comparable to statewide rates. However, crashes during dawn, dusk, or night on the county's 500/600 series network are overrepresented compared to all of Somerset County (30.80% versus 28.47%).

2.12.4. Crash Trends

Several crash trends were noted based on an analysis of one-year increments for the most recent three years available. In terms of crash severity, crashes involving injuries have trended down from 26 percent to 24 percent during the three years reviewed, while crashes involving property damage only have trended up similarly. Same Direction-Rear and Right Angle type crashes have also trended down approximately two percent each over that period. Fixed Object crashes have trended up slightly, while crashes coded as Other or Unknown have increased more than four times during the three year period. Crashes on dry pavement have trended down significantly from 76 percent to 72 percent during the three years reviewed, while crashes on both wet pavement or those on snow or ice have increased approximately two percent each.

2.13. County Functional Road Classifications

Functional classification is the process by which roadways are grouped according to the character of the traffic they serve. The Somerset County Planning Board has adopted a functional classification system for all County roadways. This system includes four categories. Figure 2.13 depicts the functional classification of Somerset County Roadways.

Table 2.13-1: Roadway Functions

Class	Functions
Major Arterial	• Facilitate regional through movements • Accommodate high traffic volumes • Maximize mobility, minimize interference
Minor Arterial	• Facilitate through movements within Somerset County • Connect major arterial roadways with the collector system • Link centers
Major Collector	• Bidirectional connection between local streets to the arterial system • Connect residential developments with adjacent land uses
Minor Collector	• Bidirectional connection between local streets to the arterial system, albeit at lower volumes than major collectors • Connect residential developments with adjacent land uses • May include County roadways without collector function that provide access to adjacent land uses

Source: Somerset County

The New Jersey Department of Transportation's (NJDOT) Urban Functional Classification System provides functional classes for all roadways in the County. The map further classifies roadways within the County into rural or urban roadways. Table 2.13-2 provides a summary of roadways within the County by functional class.

Table 2.13-2: Summary of Roadways by Functional Class

Functional Class	Number of Miles
Rural Interstate (1)	4.08
Rural Principal Arterial (2)	0.81
Rural Minor Arterial (6)	3.49
Rural Major Collector (7)	24.05
Rural Minor Collector (8)	9.97
Rural Local (9)	117.50
Urban Interstate (11)	31.91
Urban Freeway/Expressway (12)	4.13
Urban Principal Arterial (14)	66.54
Urban Minor Arterial (16)	161.97
Urban Collector (17)	147.66
Urban Local (19)	1154.99
Total Mileage	**1727.10**
Total Rural Mileage	**159.90**
Total Urban Mileage	**1567.20**

Source: NJDOT

Table 2.13-3: Functional Class by Mileage Percent Range

Functional Class	Actual Percent	FHWA Allowable Percent Range
Rural Principal Arterial (1,2)	3.06%	2 to 4%
Rural Principal Arterial Plus Minor Arterial (1, 2, &6)	5.24%	6 to 12%
Rural Collector (7 & 8)	21.28%	20 to 25%
Rural Local Road (9)	73.48%	65 to 75%
Urban Principal Arterial (11, 12, 14)	6.55%	5 to 10%
Urban Principal Arterial Plus Minor Arterial (11, 12, 14, 16)	16.88%	15 to 25%
Urban Collector (17)	9.42%	5 to 10%
Urban Local Road (19)	73.70%	65 to 85%

Source: NJDOT

Somerset County's percentage of roadway miles for each functional class falls within the allowable percent range required by the Federal Highway Administration. When compared with statewide data, the County has a higher percentage of arterial roadways than the statewide percentages and lower percentage of both urban and rural collectors and local roads.

The right-of-way and cartway widths and number of lanes that characterize each class are described in Table 2.13-4.

Table 2.13-4: Roadway Characteristics

Class	Right-of-Way	Cartway	Lanes
Major Arterial	80 Ft.	58 Ft.	4
Minor Arterial	66 Ft.	46 Ft.	2 to 4
Major Collector	60 Ft.	40 Ft.	2
Minor Collector	50 Ft.	30 to 36 Ft.	2

Source: Somerset County

In addition to the above, full-width shoulders of eight feet in width are typically provided on all reconstructed or new County roadways. Depending on the classification of the roadway and other factors, shoulder widths of less than eight-feet may be provided, where appropriate.

Somerset County also designates scenic roads, as set forth in the *Somerset County Scenic Corridor and Roadway Study*. Regardless of functional class, the standard roadway width for scenic roadways is 34 feet, except in historic districts of less than one (1) mile in length, in which case the standard width is 30 feet.

2.14. Overview of Key Roadways

Table 2.14 provides an overview of Somerset County's key roadways and the issues they face.

Table 2.14: Overview of Key Roadways

Roadway	General Location	Key Issues
US Route 22	Bound Brook; Branchburg; Bridgewater; Green Brook; North Plainfield; Somerville; Watchung	• Congestion/Delays • Safety • Animal-Vehicle Collisions
US Route 202	Bedminster; Branchburg; Bridgewater; Peapack-Gladstone; Raritan; Somerville	• Congestion/Delays • Safety • Animal-Vehicle Collisions • Lack of NJ Transit or other regular bus service
US Route 206	Bedminster; Bernards; Bernardsville; Bridgewater; Far Hills; Hillsborough; Montgomery; Raritan; Somerville	• Congestion/Delays • Safety • Animal-Vehicle Collisions • Safety and functionality of Somerville Circle
Interstate 78	Bedminster; Bernards; Bridgewater; Warren; Watchung	• Congestion/Delays • Safety • Left lane merge from Interstate 287 with frequent congestion
Interstate 287	Bedminster; Bernards; Bridgewater; Far Hills; Franklin	• Congestion/Delays • Safety • High traffic volumes and backups at Interchange 9 (River Road) and Interchange 10 (Easton Avenue)
NJ Route 27	Franklin	• Congestion/Delays • Safety • Animal-Vehicle Collisions
NJ Route 28	Bound Brook; Bridgewater; Raritan; Somerville	• Congestion/Delays • Safety • Safety and functionality of Somerville Circle
Amwell Road/ Hamilton Street (CR 514)	Hillsborough; Millstone; Franklin	• Congestion/Delays • Safety • High frequency of crashes in multiple locations

Table 2.14 (Continued): Overview of Key Roadways		
Easton Avenue (CR 527)	Franklin	• Congestion/Delays • Safety • High frequency of crashes in multiple locations
River Road/ Millstone River Road (CR 533)	Millstone; Montgomery	• Congestion/Delays • Safety • Animal-Vehicle Collisions • High frequency of crashes

2.15. Scenic Byway Study

Scenic Byways are roadway corridors that have outstanding scenic, natural, recreational, cultural, historic, or archeological characteristics. Scenic byways help balance preservation and mobility needs. They are designated by New Jersey's Transportation Commissioner with the assistance of the Scenic Byways Advisory Committee, and are intended to showcase the State's uniqueness and diversity.

The Somerset County Scenic Corridor and Roadway Study (1992) undertook an examination of scenic roadway programs across the nation to design a program that fit the unique needs and conditions of Somerset County. The study was initiated in response to two separate efforts that recognized the need to identify and preserve the region's unique visual resource and heritage.

The study developed a set of designation criteria that enabled the County to evaluate and identify potential scenic roadways and corridors. The Millstone Valley Scenic Byway and an additional 15 County roads and 14 corridors were recommended for scenic designation and preservation. The Millstone Valley Scenic Byway and the scenic County roads and corridors are depicted in 2.15.

Millstone River Valley Scenic Byway

The Millstone River Valley Scenic Byway, designated in 2001 and also recognized as a National Scenic Byway, encircles a large portion of Delaware and Raritan Canal State Park in Franklin Township, Millstone Borough, Montgomery Township, and Rock Hill Borough in Somerset County, and Princeton Township in Mercer County. It is approximately 27.5 miles and primarily located on: Lincoln Highway (State Route 27); Canal Road (County Route 603); Amwell Road (County Route 514); River Road (County Route 533); and, Millstone River Road (County Route 533). The Millstone Valley Scenic Byway includes historic structures and landscapes representing three periods – the Revolutionary War Era, Early Dutch and American Heritage, and the Canal Era. The byway also supports recreational activities such as walking, bicycling, boating, and birding, which are popular along the river and the D&R Canal Towpath. The Millstone River Valley Scenic Byway Corridor Management Plan includes a host of context sensitive design recommendations to preserve the historic and scenic qualities of the byway, improve safety, maintain the byway's 'ribbon of green', and relieve traffic pressure through the corridor.

In addition to the nationally designated byway, the *Somerset County Scenic Corridor and Roadway Study* (1992) used a rating system to identify 15 County Roads and 14 corridors (including the Millstone Valley Scenic Byway route) that were recommended for County scenic designation and preservation, as shown in Figure 2.15. These county roads are generally clustered in the northwestern and southwestern corners of the County, as well as the Millstone River Valley. The County designated scenic corridors include the area beyond the properties immediately adjacent to the roadway to include the entire landscape visible from the right-of-way, whereas the area of influence for the County designated scenic roadway is generally restricted to the roadway right-of-way and adjacent properties, focused on the visual foreground along the roadway.[11]

[11] *Somerset County Scenic Corridor and Roadway Study*" 1992

To preserve the rustic and scenic character of these roadways and corridors, the County also adopted several design and maintenance standards to balance safety and aesthetic goals. As noted in section 2.13, roadway width is limited to 34 feet and 30 feet in historic districts. Other aesthetic guidelines are in place for bridge railings, guide rails, curbing, landscaping, intersection treatments, and signage. Encouraging local land use and zoning ordinances by municipalities to promote context sensitive design of new developments along scenic corridors and byways is also recommended.

2.16. Sidewalk Inventory

Somerset County's current policy is not to provide or maintain sidewalks along County roadways. The County places all responsibility for the provision and maintenance of sidewalks with its constituent municipalities. However, in the event that existing sidewalks are disturbed by County-initiated roadway realignment and reconstruction projects, the County will assume financial responsibility for the provision of replacement sidewalks, though all responsibility for maintenance remains at the municipal level.

At present, there are slightly more than 158 miles of sidewalks or paths along Somerset County roads. Figure 2.7 shows the location of these sidewalks.

With regard to additions to the inventory of sidewalks and paths along county roadways, it is noted that a corridor study for Chimney Rock Road (CR 675) has been completed. This study recommends the addition of sidewalks to improve the streetscape, pedestrian connectivity, and level of pedestrian safety within the Chimney Rock Road corridor, which, as shown by Figure 2.7, currently has limited sidewalk amenities.

2.17. Roadway and Bridge System Deficiencies

2.17.1. Roadway System Deficiencies

Peak period congestion is a major concern for portions of Somerset County's roadway network. As travel demand approaches or exceeds roadway capacity, congestion occurs, which can lead to longer travel times, spill over of traffic from main arterials onto secondary roads, and increased fuel usage and air pollution. Congestion data for major roadways in Somerset County is available through the NJDOT's Congestion Management System (CMS). The NJDOT CMS priority ratings are based on a segment's overall score, which is a function of volume to capacity (v/c) ratio and average daily traffic (ADT) per lane. NJDOT's criteria for describing congestion levels are defined in Table 2.17.1 below.

Table 2.17.1-1: NJDOT definitions for levels of congestion

V/C Min	V/C Max	Priority Rating (function of V/C and ADT)	Description
0.00	< 0.7	Any	Not Congested
0.70	< 0.9	Any	Moderately Congested
0.90	< 1.0	Low	Moderately Congested
0.90	< 1.0	Medium, High	Very Congested
1.00	< 1.1	Any	Very Congested
1.10	< 1.2	Medium, Low	Very Congested
1.10	< 1.2	High	Severely Congested
1.20	1.5+	Any	Severely Congested

2006 CMS data is available for Interstates 78 and 287; U.S. Routes 22, 202, and 206; N.J. Routes 27 and 28; and County Route 527. Analysis of the data shows that throughout the County, a total of 36% (39.69 miles) of these major roadways may be classified as very congested, while 25% (27.40 miles) is categorized as severely congested. The County's interstate highways have minimal severe congestion; however, high levels of congestion are prevalent, with 62% of I-78 through the County described as very congested, and 46% of I-287.

The vast majority of the severe congestion in Somerset County is concentrated on its U.S. Routes. U.S. Route 22 in particular is plagued by extremely high levels of congestion – 77% of US 22 through the County is severely congested and 18% is very congested, totaling 17.43 miles. Additionally, 33% of U.S. Route 202 is severely congested. Segments of these two routes dominate the list of the top 10% of congested roadway segments in Somerset County (Table 2.17.1-3). Nearly the entire stretch of US 22 from western Bridgewater to the North Plainfield / Watchung border is among the top 10% of congested roadway segments in the County. Segments of US 202 in the vicinity of intersections with US 22, US 206, NJ 28, and I-78 are also among the most congested roadway in Somerset County.

Of state and county routes through Somerset County, N.J. Route 28 experiences the most congestion, with 49% of the route described as severely congested. NJ 28 through Bound Brook Boro is in the top

8th percentile of congested roadway segments in the County. Over 60% of County Route 527 is also classified as either severely or very congested. Congestion levels on the major roadways through Somerset County are summarized in Table 2.17.1-2 below.

Table 2.17.1-2: Somerset County CMS data summary

	I-78		I-287		US 22		US 202		US 206	
Congestion level	**Miles**	**%**	**Miles**	**%**	**Miles**	**%**	**Miles**	**%**	**Miles**	**%**
Not Congested	1.90	(12%)	3.15	(16%)	0.30	(2%)	3.52	(16%)	2.55	(14%)
Moderate	4.25	(26%)	7.8	(36%)	0.67	(4%)	7.60	(35%)	5.02	(27%)
Very Congested	9.89	(62%)	9.20	(46%)	3.23	(18%)	3.36	(15%)	9.69	(52%)
Severe	0.00	(0%)	0.40	(2%)	14.20	(77%)	7.21	(33%)	1.44	(8%)
Total	**16.04**	**(100%)**	**19.9**	**(100%)**	**18.40**	**(100%)**	**21.69**	**(100%)**	**18.7**	**(100%)**

	NJ 27		NJ 28		CR 527		County Total	
Congestion level	**Miles**	**%**	**Miles**	**%**	**Miles**	**%**	**Miles**	**%**
Not Congested	1.42	(44%)	1.35	(16%)	1.38	(27%)	15.57	(14%)
Moderate	1.79	(56%)	1.59	(19%)	0.63	(12%)	28.73	(26%)
Very Congested	0.00	(0%)	1.25	(15%)	3.07	(59%)	39.69	(36%)
Severe	0.00	(0%)	4.07	(49%)	0.08	(2%)	27.40	(25%)
Total	**3.21**	**(100%)**	**8.26**	**(100%)**	**5.16**	**(100%)**	***111.39***	***(100%)***

Source: NJDOT 2006 CMS data

Table 2.17.1-3: Somerset County highest areas of congestion

Somerset County Top Percentile	Route	Begin Milepost	End Milepost	Maximum Hour V/C	Overall Score	System Top Percentile	MPO	MPO Top Percentile
1	22	34.25	34.77	1.50	10.00	1	NJTPA	1
2	22	38.50	39.75	1.49	9.81	1	NJTPA	2
2	22	41.75	42.20	1.50	9.67	1	NJTPA	2
3	22	33.92	34.25	1.40	9.65	1	NJTPA	2
3	202	25.17	25.50	1.31	9.36	2	NJTPA	2
4	202	25.04	25.17	1.27	9.22	2	NJTPA	3
4	22	40.75	41.75	1.50	9.18	2	NJTPA	3
5	22	39.75	40.75	1.47	9.04	3	NJTPA	3
5	22	42.75	44.40	1.29	8.99	3	NJTPA	4
6	22	34.77	35.37	1.19	8.98	3	NJTPA	4
7	22	46.05	46.35	1.18	8.93	3	NJTPA	4
7	22	36.35	36.60	1.18	8.91	3	NJTPA	4
8	22	35.37	36.35	1.18	8.89	3	NJTPA	4
8	28	6.90	8.22	1.50	8.60	4	NJTPA	5
9	22	33.70	33.92	1.29	8.59	4	NJTPA	5
9	202	24.43	25.04	1.18	8.54	4	NJTPA	5
10	22	32.60	33.70	1.50	8.53	5	NJTPA	6
10	202	29.36	29.82	1.50	8.45	5	NJTPA	6

Source: NJDOT 2006 CMS data

2.17.2. Bridge System Deficiencies

Bridges are critical nodes in any transportation network, allowing traffic to efficiently cross geographic features or other roadways. NJDOT employs a Bridge Management System (BMS) to maintain an inventory of all bridges with a span over 20 feet in New Jersey with information on their physical characteristics, condition, and ownership. These bridges are covered by the federal National Bridge Inspection Standards (NBIS) and inspected biennially, as required by the NBIS, to assess the condition of various bridge elements using the National Bridge Inventory (NBI) rating system. The rating scale ranges from zero to nine, with a zero representing a failed condition and a nine representing an excellent condition.

There are 385 bridges in Somerset County recorded in the NJDOT's BMS. The bulk of these bridges are either maintained by the County (57%) or NJDOT (42%), with the remainder operated by NJ Transit or a private owner. A review of the 2010 NJDOT BMS data indicated that 58 (15%) of the structures are functionally obsolete[12] and 37 (10%) are structurally deficient[13]. The majority of the structurally

[12] A bridge is classified as functionally obsolete if the deck geometry, underclearances (vertical and horizontal), approach roadway alignment, overall structural evaluation for load capacity, or waterway adequacy has an appraisal rating of 3 (serious) or less. Functional obsolescence typically means that the bridge geometry (clearances, lane widths, etc) no longer meets the current design criteria for the roadway system for which it is a part.

[13] A bridge is deemed structurally deficient if the condition rating of its deck, superstructure, substructure or culvert is 4 (poor) or less; or if either its structural evaluation for load capacity or its water adequacy has an appraisal rating of 2 (critical) or less. Structural deficiency does

deficient bridges are State maintained, while the number of functionally obsolete structures is divided equally between County and State responsibility. The data is summarized in Table 2.17.2-1. The condition of County and State maintained structures are illustrated in the charts in Figure 2.17.2-1.

Table 2.17.2-1: Summary of Structurally Deficient and Functionally Obsolete Bridges

Maintenance Responsibility	Structurally Deficient		Functionally Obsolete		Total Bridges
	No.	% of County SD Bridges	No.	% of County FO Bridges	No.
County/Muni	12	32%	28	48%	219
State	24	65%	28	48%	162
NJ Transit	1	3%	2	3%	3
Private	0	0%	0	0%	1
County Total	**37**	**10%**	**58**	**15%**	**385**

Source: NJDOT Bridge Management System Database – 2010

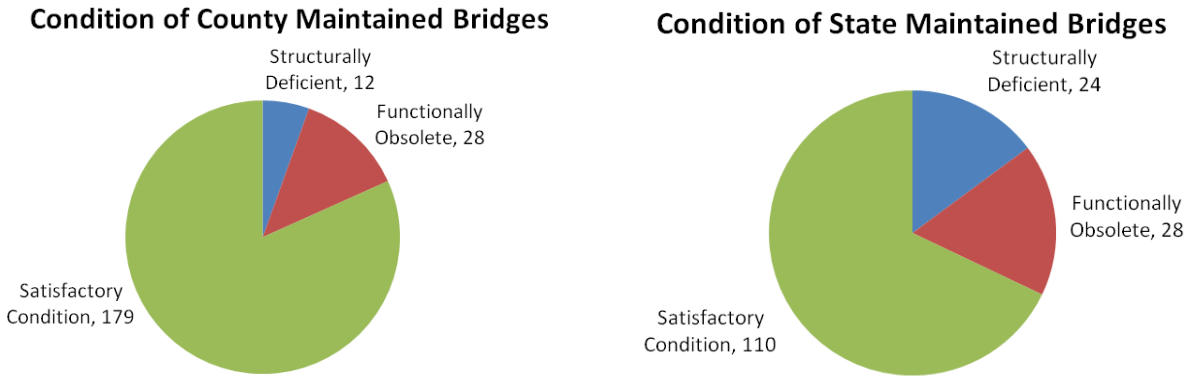

Figure 2.17.2-1: Condition of County and State Maintained Bridges in Somerset County

not necessarily mean that a bridge is unsafe. It often indicates that a bridge has been load posted and is unable to handle vehicle loads that would normally be expected on the roadway, requires rehabilitation to remain to open, or is closed. Any bridge that is classified as structurally deficient is excluded from the functionally obsolete category.

Furthermore, 34 bridges (9%) are load posted, capacity restricted, closed, or temporarily retrofitted to maintain unrestricted traffic flow. These bridges are largely County maintained (74%) and are generally located on county routes or local roads. The major route included on the list is U.S. Route 22 Ramp P (Commons Way) over U.S. 22 westbound (connection from Bridgewater Commons Mall and shopping plazas to U.S. 22 eastbound). This bridge has been load-capacity restricted (vehicle speed, number of vehicles on bridge, etc).

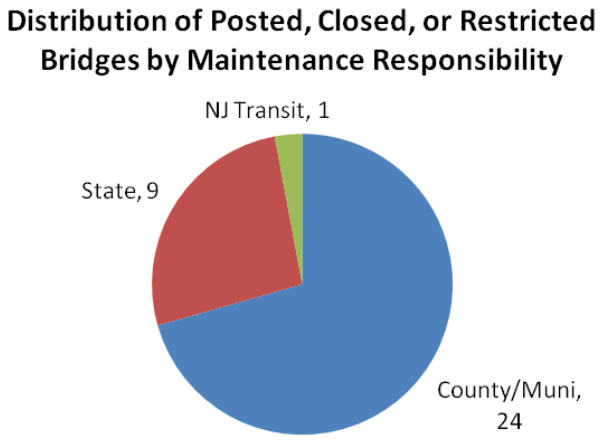

Figure 2.17.2-2: Distribution of Load Posted/Restricted Bridges

Bridges that are structurally deficient and/or load posted or restricted may adversely impact traffic throughout the region, particularly if the load posted bridges are on routes typically used by freight traffic. While several major interstate, U.S., and state routes in the County are classified as structurally deficient, as shown in Table 2.17.2-2, they are generally not load posted or restricted. However, the maintenance, rehabilitation, or replacement work required to return the structurally deficient bridges to a satisfactory level of service would likely cause major traffic disruptions in the form of lane closures, reduced lane widths, slower speeds, or lengthy detours.

Table 2.17.2-2: Structurally Deficient Bridges in Somerset County

Maintenance Responsibility	Route Designation	Structure Name	Milepost	Bridge No.	Status
State	local	Entrance Rd (ZBI) over D&R Canal	n/a		
State	CR 623	Manville Causeway (CR 623) over D&R Canal	0.48		
State	CR 514	Amwell Rd (CR 514) over D&R Canal	16.72		
State	CR 518	CR 518 over D&R Canal	17.83		
State	CR 632	Griggstown Causeway over D&R Canal	3.05		
State	US 202	U.S. Route 202 over North Branch Raritan River	32.54		

Source: NJDOT Bridge Management System Database – 2010

Table 2.17.2-2 (Continued): Structurally Deficient Bridges in Somerset County

Maintenance Responsibility	Route Designation	Structure Name	Milepost	Bridge No.	Status
State	I-287	I-287 Ramp A over Ramp B	10.43		
State	US 202	U.S. Route 202 over Passaic River	39.08		
State	US 206	U.S. Route 206 Over CSX RR	62.75		
State	US 206	U.S. Route 206 over Crusers Brook	61.82		
State	CR 620	Burnt Mills Rd over I-287 SB	3.59		
State	CR 620	Burnt Mills Rd over I-78 & Ramps A & B	3.06		
State	I-78	I-78 WB over N Branch Raritan River	28.81		
State	I-78	I-78 EB over Cowperthwaite Rd	28.58		
State	Local	Woodlawn Ave over I-287	n/a		
State	CR 639	North Bridge St (CR 639) over I-287 NB	0.08		
State	Local	Homestead Rd over Trenton Line (CSX RR)	n/a		
State	Local	Hillsborough Rd over Trenton Line (CSX RR)	n/a		
State	CR 602	Camp Meeting Ave (CR 602) over Trenton Line (CSX RR)	0.00		
State	Local	Hamilton Rd over New York Branch (Conrail RR)	0.97		
State	I-78	I-78 WB over Washington Valley Rd (CR 620)	31.96		
State	I-78	I-78 EB over Washington Valley Rd (CR 620)	31.96		
State	I-78	I-78 WB over U.S. Route 202 & U.S. 206	31.25		

Source: NJDOT Bridge Management System Database – 2010

Table 2.17.2-2 (Continued): Structurally Deficient Bridges in Somerset County

Maintenance Responsibility	Route Designation	Structure Name	Milepost	Bridge No.	Status
State	I-78	I-78 EB over U.S. Route 202 & US 206	31.25		
County/Muni	Local	Newman's Lane over W. Branch Middle Brook	n/a[1]	G0903	Under Design for Replacement/Start Construction in 2012
County/Muni	CR 533	Main Street (CR 533) over Cuckholds Brook	30.64[1]	G0703	Under Design for Replacement/Start Construction at End of 2011
County/Muni	CR 615	S Middlebush Rd (CR 615) over Six Mile Run	3.14[1]	H0403	Under Design for Replacement/Start Construction in 2012
County/Muni	Local	Mercer St over Peters Brook	n/a[2]	F0808	Under Construction – Complete Replacement
County/Muni	Local	Sycamore Ave over Green Brook	n/a[2]	M0904	Superstructure Replacement (May 2011)
County/Muni	Local	Geraud Ave over Green Brook	n/a[3]	M0903	Closed to Traffic – Undetermined Status to Repair or Remove Crossing
County/Muni	Local	New Brunswick Rd over Al's Brook	n/a	K0607	
County/Muni	Local	Jefferson Ave over Green Brook	n/a	L0904	
County/Muni	Local	Mountain Ave over Cory's Brook	1.07[2]	K1102	Under Construction – Complete Replacement
County/Muni	Local	River Rd over Tributary of N. Branch Raritan River	n/a[1]	E1104	Under Design for Replacement/Start Construction in 2012
County/Muni	CR 671	Main St (CR 671) over Peapack Brook	0.09[1]	D1306	Under Construction – Complete Replacement
County/Muni	Local	Zion-Wertsville Rd over Rock Brook	n/a	B0301	
NJ Transit	Local	River Rd over Raritan Valley Line (NJ Transit)	n/a		

Source: NJDOT Bridge Management System Database – 2010

[1] Under design by Somerset County
[2] Under construction by Somerset County
[3] Closed to traffic

Technical Memorandum 3: Planning Context

November 2011

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3. Planning Context

3.1. Somerset County Development Trends

3.1.1. Historic Development Patterns in Somerset County

Somerset County was first settled during the latter part of the seventeenth century. Because water was the primary means of transportation in the area, the County's first permanent settlement took place along the banks of the Raritan in what is now known as Bound Brook. By the mid-eighteenth century, development had spread upstream into present-day Somerville, which began as a small and sparsely populated agricultural village with a church, tavern and courthouse at its center.

For the better part of the century to follow, Somerset County was largely rural and agriculture was the centerpiece of its economy. Overland distances were long, and early settlers relied on the Raritan and its tributaries as a transportation lifeline. Accordingly, the earliest of the County's communities are located within close proximity to water sources, such as the Raritan and Millstone rivers.

In the mid-nineteenth century, with the arrival of the railroads and the Delaware and Raritan Canal, the character of these early settlements began to change. A prime example of this transformation is the Borough of Somerville, which received an influx of industry and population when it was connected to the railroad and quickly became a major regional center.

As Somerville grew, its transportation connections with the hinterland became stronger and more efficient. As a result, further settlement of the County was made possible and new communities developed in areas that were located with increasing distance from the Borough. This trend culminated with the development of Route 22, and the subsequent construction of interstates 287 (I-287) and 78 (I-78).

The arrival of modern and efficient roadways created significantly improved access and the County witnessed a remarkable amount of residential, commercial and industrial development during the second half of the twentieth century. While this development was originally concentrated within close proximity to the major thoroughfares, it has increasingly spread into former agricultural areas and resulted in the sprawling development patterns that characterize much of the County in its present form.

3.1.2. Population Development

At the time of the 2010 US Census, the total resident population of Somerset County was 323,444, which is an increase of 25,954 (8.0 percent) over the County's 2000 population of 297,490 residents. More than sixty percent of this increase is attributable to Montgomery and Franklin Townships, where the resident population grew by 4,773 (27.3 percent) and 11,397 (22.4 percent), respectively.

Table 3.1.2-1 provides complete details on the growth that has occurred in the County's population since 2000.

Table 3.1.2-1: Population Development (2000-2010)

Municipality	Population 2000	Population 2010	Change 2000-2010
Bedminster Township	8,302	8,165	-1.7%
Bernards Township	24,575	26,652	8.5%
Bernardsville Borough	7,345	7,707	4.9%
Bound Brook Borough	10,155	10,402	2.4%
Branchburg Township	14,566	14,459	-0.7%
Bridgewater Township	42,940	44,464	3.5%
Far Hills Borough	859	919	7.0%
Franklin Township	50,903	62,300	22.4%
Green Brook Township	5,654	7,203	27.4%
Hillsborough Township	36,634	38,303	4.6%
Manville Borough	10,343	10,344	0.0%
Millstone Borough	410	418	2.0%
Montgomery Township	17,481	22,254	27.3%
North Plainfield Borough	21,103	21,936	3.9%
Peapack & Gladstone Borough	2,433	2,582	6.1%
Raritan Borough	6,338	6,881	8.6%
Rocky Hill Borough	662	682	3.0%
Somerville Borough	12,423	12,098	-2.6%
South Bound Brook Borough	4,492	4,563	1.6%
Warren Township	14,259	15,311	7.4%
Watchung Borough	5,613	5,801	3.3%
Somerset County (Total)	**297,490**	**323,444**	**8.7%**
New Jersey	**8,414,350**	**8,791,894**	**4.5%**
Source: US Census Bureau			

With regard to the prospect of future population growth, the North Jersey Transportation Planning Authority has prepared projections for 2035. These projections forecast a total resident population of 370,950, which represents a total increase of 47,506 (14.7 percent) over the population recorded by the 2010 US Census.

Interesting trends are revealed when the population growth rates are annualized. For instance, the total increase of 47,506 Somerset County residents that is forecasted from 2010 to 2035 translates into an average annual increase of 0.55 percent. This is a significant decrease from the annual average 0.84 percent that occurred between 2000 and 2010. In comparison, the overall rate of growth in New Jersey is expected to increase, with the annual average population increase of 0.44 percent that was experienced from 2000 to 2010 expected to rise to 0.66 percent through 2035.

Regardless of the rate at which it occurs, any increase will translate into an increased demand on the County's transportation infrastructure. Table 3.1.2-2 provides full details on the 2035 population projection.

Table 3.1.2-2: NJTPA Population Projections (2000-2035)

Municipality	Population 2010	Population 2035	Change 2010-2035
Bedminster Township	8,165	8,800	7.8%
Bernards Township	26,652	28,240	6.0&
Bernardsville Borough	7,707	8,500	10.3%
Bound Brook Borough	10,402	13,720	31.9%
Branchburg Township	14,459	16,860	16.6%
Bridgewater Township	44,464	47,730	7.3%
Far Hills Borough	919	1,030	12.1%
Franklin Township	62,300	72,400	16.2%
Green Brook Township	7,203	7,440	3.3%
Hillsborough Township	38,303	50,970	33.1%
Manville Borough	10,344	11,160	7.9%
Millstone Borough	418	810	93.8%
Montgomery Township	22,254	22,650	1.8%
North Plainfield Borough	21,936	22,540	2.8%
Peapack & Gladstone Borough	2,582	3,200	23.9%
Raritan Borough	6,881	7,830	13.8%
Rocky Hill Borough	682	730	7.0%
Somerville Borough	12,098	16,670	37.8%
South Bound Brook Borough	4,563	4,910	7.6%
Warren Township	15,311	18,420	20.3%
Watchung Borough	5,801	6,340	9.3%
Somerset County (Total)	**323,444**	**370,950**	**14.7%**
New Jersey	**8,791,894**	**10,354,180**	**17.8%**

Source: 2010 – US Census Bureau; 2035 – North Jersey Transportation Planning Authority; 2035 New Jersey Population – North Jersey Transportation Planning Authority, Delaware Valley Regional Planning Commission, and South Jersey Transportation Planning Organization

3.1.3. Key Demographic Indicators

Key demographic indicators with immediate relevance to transportation planning and travel include the number of households, median household income, vehicle ownership, and means of commuting to work. Each of these indicators is introduced and discussed below.

With regard to the number of households, it is noted that at the time of the 2000 US Census, there were a total of 108,984 households in the County. According to the American Community Survey, this number had increased by 4.2 percent and reached a total of 113,514 households by 2009. This is a smaller increase than the 8.7 percent that was experienced in overall population (see: Table 3.1.2-1), which suggests that the average number of members (i.e., household size) in the County's households has increased. This is confirmed by the 2000 US Census estimate of 2.69 and the 2005-2009 American Community Survey estimate of 2.80 (as of April 2011, a 2010 US Census estimate of average household size has not been published).

With regard to the future number of households, the North Jersey Transportation Planning Authority forecasts a total of 138,200 households in 2035. This represents an increase of 17.4 percent over the 2010 US Census estimate of 117,759 households. Any growth in the number of households has the potential to add vehicles to Somerset County's roadways. The relationship between households and vehicle ownership is discussed below.

The 2005-2009 estimates of the US Census Bureau's American Community Survey indicate that approximately ninety-five percent of Somerset County's households owned at least one vehicle. A total of 5,797 (slightly more than five percent) of the County's households did not own a vehicle. Of the households that did not own a vehicle, 2,154 (1.9 percent of all households) occupied their own units, and 3,643 (3.2 percent of all households) occupied rented units.

The rate of vehicle ownership at the municipal level was at or above 94.9 percent in all but nine of the County's municipalities. Municipalities with a lower rate of vehicle ownership included (municipality name – rate of vehicle ownership): Bound Brook – 88.5 percent; Manville – 89.1 percent; Somerville – 89.4 percent; North Plainfield – 90.6 percent; South Bound Brook – 91.1 percent; Bridgewater – 92.8 percent; Raritan – 93.9 percent; Far Hills – 94.7 percent; and, Watchung – 94.7 percent. These are among the County's most urbanized areas.

With regard to income, it is noted that most of the municipalities with a rate of vehicle ownership that was lower than Somerset County's overall rate of 94.9 percent also had a median household income that was less than the County's median of $96,233. In addition, the percentage of households where no vehicle was present was often higher in households occupying rental units, which typically have lower median household incomes than households not occupying rental units. Thus, there is an identifiable relationship between income and vehicle ownership in Somerset County – generally, as income decreases the percentage of households with no car present increases.

Table 3.1.3-1 provides complete details on income and vehicle ownership by housing tenure.

Table 3.1.3-1: Median Household Income and Vehicle Ownership by Tenure
(2005-2009 American Community Survey)

Municipality	Median Household Income	Total Households (Number)	Total Households (Percent)	Total Households, no Vehicle (Number)	Total Households, no Vehicle (Percent)	Total Households, 1 Vehicle (Number)	Total Households, 1 Vehicle (Percent)	Total Households, ≥ 2 Vehicle (Number)	Total Households, ≥ 2 Vehicle (Percent)
Bedminster (Total)	$100,151	4,036	100.0	180	4.5	1,970	48.8	1,886	46.7
Bedminster (Own)	$103,574	3,567	88.4	108	2.7	1,731	42.9	1,728	42.8
Bedminster (Rent)	$56,932	469	11.6	72	1.8	239	5.9	158	3.9
Bernards (Total)	$123,470	9,590	100.0	273	2.8	2,719	28.4	6,598	68.8
Bernards (Own)	$133,229	8,583	89.5	173	1.8	2,175	22.7	6,235	65.0
Bernards (Rent)	$60,388	1,007	10.5	100	1.0	544	5.7	363	3.8
Bernardsville (Total)	$139,340	2,563	100.0	72	2.8	633	24.7	1,858	72.5
Bernardsville (Own)	$153,393	2,127	83.0	13	0.5	464	18.1	1,650	64.4
Bernardsville (Rent)	$49,440	436	17.0	59	2.3	169	6.6	208	8.1
Bound Brook (Total)	$69,657	3,143	100.0	363	11.5	948	30.2	1,832	58.3
Bound Brook (Own)	$75,504	1,827	58.1	49	1.6	400	12.7	1,378	43.8
Bound Brook (Rent)	$58,798	1,316	41.9	314	10.0	548	17.4	454	14.4
Branchburg (Total)	$116,759	5,471	100.0	56	1.0	1,130	20.7	4,285	78.3
Branchburg (Own)	$122,247	5,014	91.6	41	0.7	852	15.6	4,121	75.3
Branchburg (Rent)	$88,438	457	8.4	15	0.3	278	5.1	164	3.0
Bridgewater (Total)	$105,990	16,027	100.0	1,147	7.2	3,853	24.0	11,027	68.8
Bridgewater (Own)	$117,577	13,737	85.7	410	2.6	2,901	18.1	10,426	65.1
Bridgewater (Rent)	$39,214	2,290	14.3	737	4.6	952	5.9	601	3.7
Far Hills (Total)	$110,625	319	100.0	17	5.3	71	22.3	231	72.4
Far Hills (Own)	$145,000	256	80.3	6	1.9	37	11.6	213	66.8
Far Hills (Rent)	$45,938	63	19.7	11	3.4	34	10.7	18	5.6
Franklin (Total)	$88,118	21,985	100.0	964	4.4	8,316	37.8	12,705	57.8
Franklin (Own)	$97,342	16,723	76.1	479	2.2	5,383	24.5	10,861	49.4
Franklin (Rent)	$61,829	5,262	23.9	485	2.2	2,933	13.3	1,844	8.4
Green Brook (Total)	$115,549	2,118	100.0	37	1.7	465	22.0	1,616	76.3
Green Brook (Own)	$118,551	2,017	95.2	37	1.7	405	19.1	1,575	74.4
Green Brook (Rent)	$71,953	101	4.8	0	0.0	60	2.8	41	1.9

Source: US Census Bureau

Table 3.1.3-1 (Continued): Median Household Income and Vehicle Ownership by Tenure
(2005-2009 American Community Survey)

Municipality	Median Household Income	Total Households (Number)	Total Households (Percent)	Total Households, no Vehicle (Number)	Total Households, no Vehicle (Percent)	Total Households, 1 Vehicle (Number)	Total Households, 1 Vehicle (Percent)	Total Households, ≥ 2 Vehicle (Number)	Total Households, ≥ 2 Vehicle (Percent)
Hillsborough (Total)	$102,834	12,827	100.0	409	3.2	3,158	24.6	9,260	72.2
Hillsborough (Own)	$110,210	11,084	86.4	127	1.0	2,133	16.6	8,824	68.8
Hillsborough (Rent)	$47,824	1,743	13.6	282	2.2	1,025	8.0	436	3.4
Manville (Total)	$54,397	3,899	100.0	425	10.9	1,447	37.1	2,027	52.0
Manville (Own)	$65,250	2,795	71.7	211	5.4	802	20.6	1,782	45.7
Manville (Rent)	$41,696	1,104	28.3	214	5.5	645	16.5	245	6.3
Millstone (Total)	$95,625	152	100.0	2	1.3	38	25.0	112	73.7
Millstone (Own)	$95,938	133	87.5	2	1.3	27	17.8	104	68.4
Millstone (Rent)	$94,375	19	12.5	0	0.0	11	7.2	8	5.3
Montgomery (Total)	$145,827	7,410	100.0	179	2.4	1,319	17.8	5,912	79.8
Montgomery (Own)	$166,013	6,233	84.1	100	1.3	891	12.0	5,242	70.7
Montgomery (Rent)	$74,882	1,177	15.9	79	1.1	428	5.8	670	9.0
N. Plainfield (Total)	$64,492	6,729	100.0	630	9.4	2,133	31.7	3,966	58.9
N. Plainfield (Own)	$81,266	4,108	61.0	187	2.8	982	14.6	2,939	43.7
N. Plainfield (Rent)	$43,297	2,621	39.0	443	6.6	1,151	17.1	1,027	15.3
Peapack & Gladstone (Total)	$121,382	845	100.0	15	1.8	227	26.9	603	71.4
Peapack & Gladstone (Own)	$137,361	684	80.9	4	0.5	140	16.6	540	63.9
Peapack & Gladstone (Rent)	$50,938	161	19.1	11	1.3	87	10.3	63	7.5
Raritan (Total)	$70,979	2,645	100.0	162	6.1	945	35.7	1,538	58.1
Raritan (Own)	$78,302	1,616	61.1	54	2.0	469	17.7	1,093	41.3
Raritan (Rent)	$63,274	1,029	38.9	108	4.1	476	18.0	445	16.8
Rocky Hill (Total)	$97,656	269	100.0	0	0.0	75	27.9	194	72.1
Rocky Hill (Own)	$93,333	238	88.5	0	0.0	65	24.2	173	64.3
Rocky Hill (Rent)	$128,194	31	11.5	0	0.0	10	3.7	21	7.8
Somerville (Total)	$68,559	4,648	100.0	495	10.6	1,921	41.3	2,232	48.0
Somerville (Own)	$81,537	2,541	54.7	83	1.8	723	15.6	1,735	37.3
Somerville (Rent)	$58,836	2,107	45.3	412	8.9	1,198	25.8	497	10.7

Source: US Census Bureau

Table 3.1.3-1 (Continued): Median Household Income and Vehicle Ownership by Tenure (2005-2009 American Community Survey)

Municipality	Median Household Income	Total Households (Number)	Total Households (Percent)	Total Households, no Vehicle (Number)	Total Households, no Vehicle (Percent)	Total Households, 1 Vehicle (Number)	Total Households, 1 Vehicle (Percent)	Total Households, ≥ 2 Vehicle (Number)	Total Households, ≥ 2 Vehicle (Percent)
S. Bound Bk. (Total)	$70,034	1,739	100.0	154	8.9	555	31.9	1,030	59.2
S. Bound Bk. (Own)	$79,762	1,238	71.2	21	1.2	310	17.8	907	52.2
S. Bound Bk. (Rent)	$49,620	501	28.8	133	7.6	245	14.1	123	7.1
Warren (Total)	$131,329	4,843	100.0	98	2.0	650	13.4	4,095	84.6
Warren (Own)	$150,793	4,250	87.8	15	0.3	410	8.5	3,825	79.0
Warren (Rent)	$42,875	593	12.2	83	1.7	240	5.0	270	5.6
Watchung (Total)	$100,000	2,256	100.0	119	5.3	540	23.9	1,597	70.8
Watchung (Own)	$157,670	1,605	71.1	34	1.5	220	9.8	1,351	59.9
Watchung (Rent)	$46,480	651	28.9	85	3.8	320	14.2	246	10.9
Somerset County (Total)	**$96,233**	**113,514**	**100.0**	**5,797**	**5.1**	**33,113**	**29.2**	**74,604**	**65.7**
Somerset County (Own)	**$110,215**	**90,376**	**79.6**	**2,154**	**1.9**	**21,520**	**19.0**	**66,702**	**58.8**
Somerset County (Rent)	**$53,001**	**23,138**	**20.4**	**3,643**	**3.2**	**11,593**	**10.2**	**7,902**	**7.0**

Source: US Census Bureau

The 2005-2009 estimates of the American Community Survey also provide information on the means of commuting that were used by Somerset County residents. Overall, an estimated 81.5 percent of County residents who commuted to a place of employment self-drove in private automobiles. The remaining 19.5 percent of County residents used another means (i.e., carpooling, transit, walking, bicycling, etc.). In several municipalities, a lower percentage of residents self-drove in private automobile, and, therefore, relied on another means of transportation for their commute to work. Among these municipalities were (name of municipality – rate of self-driving to work in private automobiles): Bernardsville – 74.2 percent; Bound Brook – 64.3 percent; Far Hills – 69.6 percent; North Plainfield – 69.0 percent; Rocky Hill – 74.9 percent; and, Somerville – 70.9 percent.

In addition to the above, Somerset County overall exhibited lower levels of carpooling, transit use, walking, and commuting by other means than the State of New Jersey's overall population. At the State level, 28.2 percent of the total commuting population used one of these forms of transportation. In Somerset County, just 19.5 percent of the commuting population used these transportation means. Table 3.1.3-2 provides complete details on the means of commuting to work used by Somerset County residents.

Table 3.1.3-2: Means of Commuting to Work (2005-2009 American Community Survey)

Municipality	Commuting to Work	Commuting to Work, Self-Drive (Number)	Commuting to Work, Self-Drive (Percent)	Commuting to Work, Carpool (Number)	Total Households, Carpool (Percent)	Commuting to Work, Transit (Number)	Commuting to Work, Transit (Number)	Commuting to Work, Walk/Other (Number)	Commuting to Work, Walk/Other (Number)
Bedminster	4,626	3,996	86.4	316	6.8	158	3.4	156	3.4
Bernards	11,125	9,509	85.5	607	5.5	752	6.8	257	2.3
Bernardsville	3,424	2,540	74.2	166	4.8	428	12.5	290	8.5
Bound Brook	5,301	3,411	64.3	1,245	23.5	270	5.1	375	7.1
Branchburg	6,953	6,327	91.0	399	5.7	157	2.3	70	1.0
Bridgewater	20,445	17,705	86.6	1,620	7.9	815	4.0	305	1.5
Far Hills	358	249	69.6	58	16.2	31	8.7	20	5.6
Franklin	29,165	23,032	79.0	3,018	10.3	2,504	8.6	611	2.1
Green Brook	3,015	2,412	80.0	238	7.9	300	10.0	65	2.2
Hillsborough	18,979	16,180	85.3	1,673	8.8	772	4.1	354	1.9
Manville	5,291	4,530	85.6	402	7.6	147	2.8	212	4.0
Millstone	195	177	90.8	6	3.1	7	3.6	5	2.6
Montgomery	9,845	8,528	86.6	491	5.0	705	7.2	121	1.2
N. Plainfield	10,841	7,479	69.0	2,057	19.0	593	5.5	712	6.6
Peapack & Gladstone	1,157	936	80.9	123	10.6	80	6.9	18	1.6
Raritan	3,472	2,774	79.9	397	11.4	200	5.8	101	2.9
Rocky Hill	295	221	74.9	42	14.2	25	8.5	7	2.4
Somerville	6,325	4,482	70.9	1,091	17.2	406	6.4	346	5.5
S. Bound	2,484	1,945	78.3	419	16.9	108	4.3	12	0.5
Warren	6,846	5,801	84.7	553	8.1	364	5.3	128	1.9
Watchung	3,111	2,642	84.9	248	8.0	206	6.6	15	0.5
Somerset County (Total)	**153,253**	**124,876**	**81.5**	**15,169**	**9.9**	**9,028**	**5.9**	**4,180**	**2.7**
New Jersey	**3,962,961**	**2,947,301**	**74.4**	**374,463**	**9.4**	**434,290**	**11.0**	**206,907**	**5.2**

Source: US Census Bureau

Note: Telecommuters are not reported in this Table; Transit includes taxicabs.

3.1.4. Employment Dynamics

Local and regional employment dynamics greatly impact Somerset County's transportation infrastructure, since they generate trips to and from places of employment and consumption (for example, retail establishments) within the County.

The New Jersey Department of Labor and Workforce Development provides information on the total number of people employed within the County. While this indicator is prone to fluctuate, and did so with a range of 12,950 jobs and average of 167,632 jobs between 2000 and 2010, it is useful as a general overview. This information is displayed in Table 3.1.4-1.

Table 3.1.4-1: Historic Employment (2000-2010)

Year	Number Employed	Rate of Change
2000	161,350	Not Calculated
2001	162,350	0.6%
2002	163,500	0.7%
2003	163,300	-0.1%
2004	166,050	1.7%
2005	169,050	1.8%
2006	174,250	3.1%
2007	174,300	0.0%
2008	174,000	-0.2%
2009	168,550	-3.1%
2010	167,250	-0.8%
2000-2010 Average	**167,632**	**Not Calculated**
2000-2010 Range	**12,950**	**Not Calculated**

Source: New Jersey Department of Labor and Workforce Development

Future employment projections have been prepared by the North Jersey Transportation Planning Authority. These projections foresee a total of 247,820 jobs in the County during 2035, which represents an increase of 80,570 (48.2 percent) over the 167,632 jobs that were reported by the New Jersey Department of Labor and Workforce Development in 2010. This growth will result in an increased demand on the County's transportation infrastructure.

Table 3.1.4-2 provides full, municipal-level details on the North Jersey Transportation Planning Authority's 2035 employment projections and compares them to the 2006 counts of the New Jersey Department of Labor and Workforce Development.

Table 3.1.4-2: Employment Projection (2006-2035)

Municipality	Employment 2006	Employment 2035	Change 2006-2035
Bedminster Township	6,884	6,680	-3.0%
Bernards Township	11,973	16,460	37.5%
Bernardsville Borough	3,169	4,180	31.9%
Bound Brook Borough	3,962	3,000	-24.3%
Branchburg Township	8,865	15,540	75.3%
Bridgewater Township	33,439	38,430	14.9%
Far Hills Borough	763	310	-59.4%
Franklin Township	31,588	60,450	91.4%
Green Brook Township	4,135	5,260	27.2%
Hillsborough Township	9,684	16,060	65.8%
Manville Borough	1,957	2,240	14.5%
Millstone Borough	108	180	66.7%
Montgomery Township	8,560	17,980	110.0%
North Plainfield Borough	3,563	4,200	17.9%
Peapack & Gladstone Borough	1,297	2,880	122.1%
Raritan Borough	9,452	9,210	-2.6%
Rocky Hill Borough	337	570	69.1%
Somerville Borough	13,825	16,710	20.9%
South Bound Brook Borough	434	410	-5.5%
Warren Township	13,117	17,180	31.0%
Watchung Borough	5,660	9,890	74.7%
Not Reported at Municipal Level	1,478	N/A	N/A
Somerset County (Total)	**174,250**	**247,820**	**42.2%**

Source: 2006 – New Jersey Department of Labor and Workforce Development; 2035 – North Jersey Transportation Planning Authority

Note: In cases where there are a small number of employers within a particular sector at the municipal level, the New Jersey Department of Labor and Workforce Development does not provide municipal level information for the respective sector. This is done to protect the privacy of individual employers and is the reason for the entry entitled "Not Reported at Municipal Level".

In addition to providing the total projected employment in 2035, Table 3.1.4-2 also serves to identify the municipalities in which these jobs will be concentrated. With specific regard to municipalities with more than 10,000 jobs, there will be eight, namely: Bernards Township; Branchburg Township; Bridgewater Township; Franklin Township; Hillsborough Township; Montgomery Township; Somerville Borough; and, Warren Township. Of these municipalities, all but Branchburg, Hillsborough and Montgomery townships had more than 10,000 jobs during 2006.

3.1.5. County Development

Residential development activity within Somerset County has been robust during the period from 2000 through 2010. Within this period, a total of 9,869 new residential units have been constructed throughout the County, with more than sixty percent having occurred in Franklin and Montgomery

townships. At the County level, residential development activity peaked during 2001 with a net[1] total of 1,660 new units certified. However, from 2008 through 2010, the County's net residential development has ranged from 351 to 373 units per annum. The global financial crisis is a likely cause for the drastic decline in residential development activity.

Table 3.1.5-1 provides complete details on the net residential development activity that occurred within Somerset County from 2000 through 2010.

Table 3.1.5-1: Net Residential Development Activity (2000-2010)

Municipality	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Bedminster	6	3	3	0	6	5	0	-6	1	1	0
Bernards	219	132	174	34	8	5	9	6	4	7	8
Bernardsville	15	37	29	20	-4	-2	1	1	12	4	-3
Bound Brook	0	2	-3	0	0	0	0	-9	2	1	0
Branchburg	43	35	29	10	8	1	10	7	3	2	22
Bridgewater	86	51	49	19	10	15	1	32	33	28	17
Far Hills	4	2	2	2	1	2	0	0	1	2	1
Franklin	416	774	130	304	648	912	457	210	72	107	130
Green Brook	169	145	63	10	14	34	13	2	-1	4	2
Hillsborough	65	87	54	4	3	5	20	29	184	134	103
Manville	2	-20	5	-2	-2	2	0	7	1	6	6
Millstone	0	0	0	0	0	0	0	0	1	0	0
Montgomery	410	264	261	185	146	331	118	44	8	11	14
North Plainfield	2	0	4	3	2	-1	-1	0	-1	0	0
Peapack & Gladstone	31	8	4	0	-1	1	1	-2	3	1	-5
Raritan	11	0	1	5	4	5	0	242	0	2	2
Rocky Hill	0	0	1	0	0	0	1	0	0	1	0
Somerville	1	3	3	3	-1	0	2	6	0	-1	0
South Bound Brook	2	0	2	-5	0	9	114	36	3	2	0
Warren	121	121	96	82	38	18	14	32	20	32	74
Watchung	15	16	142	145	4	-3	21	7	5	7	2
Somerset County (Total)	1,618	1,660	1,049	819	884	1,339	781	644	351	351	373

Source: NJ Division of Codes and Standards

With regard to future residential construction, the North Jersey Transportation Planning Authority has issued a 2035 household projection of 138,200 for Somerset County. Based on a 2010 US Census count of 117,759 households, these data forecast an additional 20,441 households in the period from 2010 to

[1] Net residential development is calculated as the sum of all permanent certificates of occupancy issued for new residential units, minus the sum of all permits issued for the complete demolition of a residential structure.

2035. It is anticipated that the distribution of these new households among the County's municipalities will be generally consistent with the population projections that have been discussed in Section 3.1.2.

Somerset County's non-residential development activity was also quite robust during the period from 2000 to 2010, when more than 15.5 million square feet of non-residential space was constructed throughout the County. With more than five million square feet constructed, office space was the single largest type of use to which this space was devoted, followed by storage space with nearly 2.9 million square feet constructed, and educational facilities with almost 2.4 million square feet constructed.

As was the case with residential development, the municipality with the largest amount of non-residential development activity was Franklin, where over 3.7 million square feet of non-residential space was constructed. Branchburg, with 3.25 million square feet of new non-residential space constructed, had the second-highest rate of non-residential development activity. In addition, a combined total of more than 3.8 million square feet of non-residential space was constructed in Warren, Bernards, and Bridgewater. Together, these five municipalities contain nearly seventy percent of non-residential space that was constructed throughout the decade.

Table 3.1.5-2 provides complete details on the distribution of the new non-residential space among the County's municipalities.

Table 3.1.5-2: Total Gross Square Footage of Non-Residential Space Constructed, by Municipality (2000-2010)

Municipality	Office	Retail	Assembly	Hotel/Motel	Education	Industrial	Hazardous	Institutional	Storage	Total
Bedminster	346,459	0	12,438	8,412	13,877	0	0	0	87,876	469,062
Bernards	518,307	42,132	146,271	199,626	178,038	0	0	151,673	99,541	1,335,588
Bernardsville	119,759	0	35,526	0	141,518	0	0	0	119,300	416,103
Bound Brook	9,584	45,820	0	0	0	0	0	0	0	55,404
Branchburg	1,529,378	107,852	13,517	75,226	176,610	820,565	0	10,564	522,880	3,256,592
Bridgewater	535,763	143,408	99,757	14,875	154,931	20,199	0	102,536	186,782	1,258,251
Far Hills	0	0	0	8,652	0	0	0	0	0	8,652
Franklin	655,417	502,086	658,177	120,803	718,382	25,843	468	85,463	976,462	3,743,101
Green Brook	33,946	155,288	1,512	0	78,213	0	0	10,370	75,948	355,277
Hillsborough	225,521	184,453	88,116	200	56,133	57,500	0	70,162	55,302	737,387
Manville	3,897	10,733	8,000	0	0	0	0	0	8,453	31,083
Millstone	0	0	22,613	0	0	0	0	0	0	22,613
Montgomery	26,821	17,426	122,014	0	406,856	4,004	0	70,189	146,538	793,848
N. Plainfield	4,297	0	0	0	0	0	0	0	0	4,297
Peapack & Gladstone	5,196	0	30,122	0	0	0	0	4,344	17,900	57,562
Raritan	246,660	3,403	0	0	0	37,782	0	0	12,000	299,845
Rocky Hill	200	0	120	0	0	0	0	0	1,082	1,402
Somerville	337,936	0	12,820	0	53,879	0	0	85,093	0	489,728
S. Bound Brook	0	0	300	0	47,000	0	0	0	737	48,037
Warren	411,668	75,120	38,869	0	242,242	8,297	0	0	458,450	1,234,646
Watchung	33,296	617,127	35,477	0	123,094	0	0	0	125,625	934,619
Somerset County (Total)	**5,044,105**	**1,904,848**	**1,325,649**	**427,794**	**2,390,773**	**974,190**	**468**	**590,394**	**2,894,876**	**15,553,097**

Source: NJ Division of Codes and Standards

In addition to the above, Table 3.1.5-3 provides information on the temporal distribution on non-residential construction activity at the County level. As is clearly indicated in Table 3.1.5-3, the level of non-residential development activity peaked in 2002, and was nearly matched in 2004. Since 2006, however, non-residential development activity has been declining, and in 2010 just slightly more than 390,000 square feet of new residential space was constructed. As with residential development, the cause for the decline in non-residential development activity is likely the global financial crisis.

Table 3.1.5-3: Total Gross Square Footage of Non-Residential Space Constructed in Somerset County, by Year (2000-2010)

Year	Office	Retail	Assembly	Hotel/Motel	Education	Industrial	Hazardous	Institutional	Storage	Total
2000	518,471	139,158	126,794	72,061	142,285	2,409	0	46,238	267,042	1,314,458
2001	453,526	381,794	46,629	14,876	129,023	172,340	0	67,092	162,502	1,427,782
2002	827,263	145,227	93,395	130,153	155,503	260,215	0	139,849	584,420	2,336,025
2003	429,496	57,095	144,657	8,412	129,962	1,326	0	14,544	238,713	1,024,205
2004	1,388,134	132,403	107,601	0	56,099	202,179	0	107,093	169,376	2,162,885
2005	218,882	278,079	344,552	1,906	868,638	15,550	0	92,189	22,810	1,842,606
2006	403,928	237,665	108,838	120,800	175,154	248,427	0	0	563,375	1,858,187
2007	317,546	178,766	44,616	4,200	213,454	12,001	468	70,162	241,327	1,082,540
2008	239,904	150,988	77,344	0	395,522	33,032	0	44,167	499,818	1,440,775
2009	148,748	113,547	193,052	0	103,633	26,711	0	9,060	78,875	673,626
2010	98,207	90,126	38,171	75,386	21,500	0	0	0	66,618	390,008

Source: NJ Division of Codes and Standards

3.1.6. Somerset County Land Use

At the time of the 2007 aerial flyover of the New Jersey Department of Environmental Protection, residential uses comprised 30.5 percent of the County's total surface area and were the most prominent land use classification in the County. Covering 24.9 percent of the total surface area, forests were the second most prominent land use classification at the county level, followed by (land use classification – percent of total surface area covered): agricultural uses – 14.8 percent; and, wetlands and open water – 14.5 percent. All other land use classifications, including commercial and industrial uses, individually comprised less than five percent of the County's total surface area.

In addition to the above, and with specific regard to the County's municipalities, residential land uses covered the largest percentage of land surface area in all of the County's municipalities, with the exceptions of: Bedminster; Bernardsville; Far Hills; Hillsborough; and, Peapack and Gladstone. In each of these five municipalities, forests covered the highest percentage of land surface area and were the most prominent land use. Residential land uses were the second most prominent land use classification in Bernardsville and Hillsborough. In the remaining three municipalities (Bedminster, Far Hills, and Peapack and Gladstone), agricultural uses were the second most prominent land use.

Table 3.1.6 provides complete details on Somerset County's land use patterns at both the municipal- and county-levels.

Table 3.1.6: Percent of Total Land Use/Land Cover (2007)

Municipality	Agriculture	Barren Land	Forest	General Infrastructure	Commercial	Industrial	Mixed-Use	Recreational	Residential	Wetlands/Open Water	Other	Total
Bedminster	35.3	0.9	36.3	1.4	1.5	0.0	0.0	3.5	11.1	7.4	2.6	100.0
Bernards	4.1	1.3	22.6	1.7	3.1	0.1	0.0	4.5	36.7	19.4	6.5	100.0
Bernardsville	7.9	0.2	46.7	0.3	1.9	0.4	0.0	3.0	34.9	2.7	2.0	100.0
Bound Brook	0.0	0.1	1.7	3.8	12.7	1.5	0.4	3.0	60.4	12.8	3.6	100.0
Branchburg	19.0	0.3	17.9	1.4	2.6	2.7	0.0	3.8	34.1	11.9	6.1	100.0
Bridgewater	1.4	1.8	20.6	3.3	5.6	1.7	0.0	3.3	41.0	14.8	6.5	100.0
Far Hills	21.8	0.1	42.9	1.4	0.4	0.0	0.1	2.1	19.9	9.0	2.2	100.0
Franklin	17.0	1.9	19.6	0.7	3.6	2.5	0.0	3.5	27.3	18.1	5.8	100.0
Green Brook	0.4	0.7	22.1	1.5	8.2	1.0	0.0	3.4	43.5	17.1	2.1	100.0
Hillsborough	22.0	1.6	25.4	0.8	1.6	1.2	0.0	3.0	22.6	16.4	5.3	100.0
Manville	0.0	1.2	1.8	3.9	15.1	0.6	0.4	3.9	47.5	19.6	6.2	100.0
Millstone	17.7	0.0	13.4	0.0	2.4	0.0	0.0	0.2	29.8	25.9	10.7	100.0
Montgomery	19.1	0.4	25.8	0.5	2.6	0.2	0.0	3.3	30.3	12.8	4.9	100.0
N. Plainfield	0.2	0.1	2.0	2.2	13.1	0.2	0.0	2.3	49.9	28.1	2.0	100.0
Peapack & Gladstone	22.3	0.2	42.5	1.6	2.2	0.1	0.0	1.3	22.1	3.8	4.0	100.0
Raritan	0.1	0.3	12.4	5.0	15.8	5.8	0.7	3.2	41.3	5.9	9.4	100.0
Rocky Hill	11.0	0.0	10.1	0.0	2.8	1.8	1.1	17.4	46.7	5.7	3.4	100.0
Somerville	0.0	0.3	5.0	2.8	19.0	2.9	1.3	4.2	48.4	10.8	5.3	100.0
S. Bound Brook	0.2	1.2	1.9	0.0	5.1	1.2	0.0	1.6	62.9	25.3	0.7	100.0
Warren	2.4	0.7	25.0	1.1	3.2	0.5	0.0	1.6	40.0	22.5	3.2	100.0
Watchung	0.1	4.1	28.6	1.2	6.3	0.1	0.0	3.2	48.7	4.9	2.7	100.0
Somerset County (Total)	**14.8**	**1.2**	**24.9**	**1.3**	**3.4**	**1.1**	**0.0**	**3.3**	**30.5**	**14.5**	**4.9**	**100.0**

Source: NJ Division of Codes and Standards

Note: The land use classification "Other" may include: undeveloped upland rights-of-way; developed upland rights-of-way; stormwater basins; stadiums, theaters, cultural centers and zoos; miscellaneous urban or built-up land; lands previously used for military purposes; military installations; and, cemeteries.

3.2. Benefits of Coordinating Transportation and Land Use Decisions

The complexities of the relationship between transportation and land use are indisputable. Land use patterns impact the feasibility of various transportation systems, and transportation systems impact the type and viability of land use patterns. They share a reciprocal relationship.

Without proper coordination of transportation and land use policy, their goals are often divergent and counter-productive. Moreover, the quality of our environment and everyday life is diminished by a range of issues, which are not limited to: traffic congestion; absent or deficient public transportation; sprawl; increased pollution; unnecessarily long travel times; and, fragmented development patterns. These issues, however, are effectively mitigated with proper coordination of transportation and land use policy.

Smart, sustainable growth is unattainable without policy coordination. When policy is coordinated, land use decisions are made within the context of how they impact the transportation system, and decisions regarding transportation systems are made with regard to how they impact existing and future land use patterns. This results in synergies between transportation and land use programs by ensuring that each are mutually supportive of, and informed by, the other.

The benefits of coordinating transportation and land use policy are innumerable. First and foremost, policy coordination provides an effective vehicle for the implementation of smart growth planning principles. Coordination is widely regarded as a key to smart growth and sustainable development, which is immediately desirable for its support of the efficient use of natural and financial resources, as well as its promotion of vibrant communities with a balanced mix of uses and wealth of opportunities within easy reach.

Coordination of land use and transportation policy is also beneficial to the environment. It prevents the formation of sprawl-type development patterns by promoting compact forms of new development, encouraging redevelopment, and limiting growth to areas with appropriate existing or planned transportation infrastructure. This is not only desirable because it preserves natural areas; it also serves to limit fossil fuel consumption and, therefore, lowers greenhouse gas emissions. Additionally, it can foster an intensity of development that is supportive of public transport, which eases congestion, facilitates access, and provides increased reduction in emissions.

In addition to the above, coordination of land use and transportation policy increases roadway and pedestrian safety since it allows for the coordination of roadway functional class and land use. By coordinating these factors, development typologies and land uses can be located along a roadway of an appropriate functional class. As an example, this type of coordination could result in the avoidance of residential uses along roadways that are more suited to commercial traffic, and not desirable or safe for pedestrians or bicyclists that may be generated by residential uses. In addition, connecting land use and transportation policy can result in targeted roadway improvements to support an existing or planned land use.

To effectuate the coordination of land use and transportation policy, it is imperative that the County continue to work closely with the municipal level. This is due to the fact that the County has no zoning

powers, and, therefore, limited control over local land use decisions. By maintaining and fostering synergistic relationships with its constituent municipalities, Somerset County can strengthen linkages between transportation and land use policy.

3.3. County Transportation Policies

3.3.1 Capital Programs

3.3.1.1. County

The current Somerset County Capital Improvement Program for years 2010-16 includes 165 projects totaling nearly $190 million in project costs. These projects include highway improvements, highway resurfacing, traffic safety improvements, and bridge improvements. Somerset County identifies and prioritizes projects for its capital improvement program based on safety and other concerns, and uses the program to increase the safety of roadways throughout the County.

3.3.1.2. NJTPA

The current NJTPA Transportation Improvement Program (TIP) for years 2010-16 includes 20 projects totaling nearly $400 million in project costs. Roadway enhancement projects include improvements along Route U.S. 22 (Long-Term Improvements, Short-Term Improvements, Chimney Rock Road Interchange, and Traffic Signal Improvements/Coordination, and Park Avenue/Bonnie Burn Interchange), five bridge projects involving the replacement or rehabilitation of existing structures within the county, and two roadway resurfacing projects. Both roadway expansion projects involve the construction of the Route U.S. 206 bypass. Other projects include the Route U.S. 22 ITS Closed Loop System, Port Reading Junction rail freight project, and three safety improvement projects.

3.3.2 Land Development

As mentioned in the County's 2003 Circulation Element Update, the underlying cause for Somerset County's traffic congestion is the decentralized, suburban development patterns that have been the predominant form of development in the County since the mid-twentieth century.

In recognition thereof, the County, in its 2003 Circulation Element Update, outlined a number of land use planning strategies to improve the efficiency and operation of its circulation system. Among these are:

- Transit Oriented Development (TOD), which is the concept of placing moderate to high-density, mixed-use development within close proximity to transit stops;
- Transit Corridor Planning (TCP), where higher densities are concentrated within close proximity to major, transit-compatible thoroughfares;
- Active regional planning measures to achieve a sustainable balance between housing and jobs;
- Creating transit-compatible developments through appropriate site design;
- Promote center-based development;
- Promote home-based business development through the establishment of ordinances that allow and encourage their establishment;

- Integrate improved pedestrian and bicycle amenities, transit access, and location of transit amenities into the site plan and subdivision process;
- Advance transit-supportive land use and zoning policy;
- Encourage participation in the Transit Village Program of the New Jersey Department of Transportation;
- Explore possibilities for the establishment of a transfer of development rights program;
- Work with municipalities to site assisted living facilities and nursing homes near existing transportation resources; and,
- Redevelopment and revitalization of existing corridors.

3.3.3 United We Ride

The United We Ride program initiative was established in February 2004 by an executive order of President George W. Bush. This order mandated that agencies coordinate to improve federally-supported transportation services for those who are considered to be transportation disadvantaged or dependent, with particular emphasis on the physically- and developmentally-challenged, as well as those who are over the age of 55 years, have a low income, or are reliant on public transportation.

To ensure compliance with this order, Somerset County prepared a United We Ride Plan in 2007. This plan outlined the existing coordination of transportation services within the County, and noted that some service providers do not coordinate with the County. However, these providers offer services that are substantially different from those offered by the County, such as: same-day or short-notice medical trips; recreational trips; and social service agency trips.

3.3.4 Para-Transit Programs

As described, in Section 2.4.3, Somerset County operates community shuttles, namely the: Davidson Avenue Shuttle (DASH); SCOOT; and, Community Access Transit (CAT). These services comprise the County's para-transit program. All services operate with accessible buses, and the drivers are trained to provide assistance to passengers boarding or alighting buses. In addition, all routes offer route deviation for riders who have a documented need and pre-register with the County.

The para-transit services offered by the County are supplemented by New Jersey Transit's Wheels 884 service. This route is operated with accessible buses. Further details on this route are provided in Section 2.4.1.

3.4 Making Connections Survey

A key part of the public outreach strategy in updating Somerset County's Circulation Element was the development and deployment of a survey aimed at gauging the community's priorities for future transportation improvements and investments. The survey was developed in conjunction with Somerset County Planning staff and was deployed on the RideWise website (www.ridewise.org). The survey included 9 major categories, with several subcategories included within each category. For each subcategory, residents were asked to define how important they believed that element was in prioritizing future investments, with a "1" classifying it as "Not Important," and a "5" classifying it as "Very Important." A final, open-ended question was included to allow residents to provide specific feedback regarding future transportation improvements in Somerset County. Basic demographic information was requested as well. The survey was posted in February and closed on April 9, 2010. A total of 160 responses were provided, with an overall mean score of 4.11. A summary of average scores for each subcategory is included in Table 3.4-1.

Table 3.4-1: Summary of Making Connections Survey Scoring

Subcategory	Score
2e: Improve pedestrian, bicycle & public transit connections to employment, shopping & residential centers.	4.48
3b: Enhance public transit, walking, biking & car/van pooling options to reduce automobile usage.	4.46
3a: Maintain & improve the efficiency of existing roadways.	4.43
4d: Improve pedestrian, bicycle & public transit connections to employment, shopping & residential centers.	4.43
9a: Reduce automobile dependency by enhancing the existing public transit system & improving conditions for walking, biking & car/van pooling.	4.37
9c: Reduce vehicle emissions by minimizing the amount of time vehicles idle in traffic	4.33
5b: Use new technologies to modernize the transportation network & improve maintenance.	4.32
5a: Improve the efficiency & safety of the existing transportation system.	4.31
2b: Expand public transit service.	4.28
1b: Reduce adverse impacts on environmentally sensitive areas.	4.27
4e: Encourage development around public transit services.	4.27
1c: Improve air quality by promoting walking, biking, carpooling & increased public transit use.	4.23
1a: Preserve the region's cultural, natural & historical assets.	4.20
1d: Cleanup & redevelop vacant industrial & Brownfield sites.	4.18
4a: Prevent sprawl development.	4.16
8a: Evaluate system needs & allocate available funding to maintain a safe & reliable transportation system.	4.13
6d: Improve the site design & review process to better link transportation & land use planning.	4.13
6c: Encourage development around public transit services.	4.12
4c: Encourage the revitalization & redevelopment of older town centers & business corridors.	4.09
6a: Target transportation improvements to support town centers & business corridors.	4.08
7d: Identify & prioritize the most critical safety & operational needs.	4.07
7e: Improve bicycle & pedestrian safety.	4.06
4b: Support growth in existing & proposed town centers & business corridors.	4.05
3c: Reduce traffic impacts of through traffic on neighborhoods & municipalities.	4.04
7b: Improve emergency management & planning preparedness in the event of a crisis or disaster.	4.01
7a: Use new technologies to provide a high level of security throughout the transportation system.	4.00
9b: Address sprawl development & encourage mixed-use development.	3.98
8d: Measure the performance & effectiveness of proposed improvements.	3.97
2c: Improve road & rail connections that increase the efficiency of freight traffic.	3.95
2a: Improve travel options for senior citizens, people with disabilities & low-income groups.	3.88
6b: Address sprawl development & encourage mixed-use development.	3.86
7c: Expand the use of Intelligent Transportation Systems (ITS) countywide.	3.86
8c: Uses performance measures & benchmarks to track progress.	3.81
2d: Balance the impacts of truck deliveries with their role in filling consumer & business needs.	3.76
8b: Set regional performance goals.	3.75
4f: Promote mixed-use & compact development, where appropriate.	3.68

Of the top five scoring subcategories, four included improvements to bicycle, pedestrian, and public transit facilities (2e, 3b, 4d, and 9a). However, specific questions for bicycle, pedestrian, and public transit improvements (2b, 7e) did not score as highly indicating that respondents are supporting of bicycle, pedestrian, and transit improvements, but may wish to see them included as part of a comprehensive circulation system rather than as stand-alone improvements. Other subcategory elements consistently scored above the mean, including air quality improvements, reducing environmental degradation, and improving the overall efficiency of the county's transportation network. Subcategory elements that consistently score below the mean included improvements targeting freight movement, town centers, mixed-use development, performance goals/benchmarks, and security/emergency management.

Table 3.4-2: Summary of Top Five Scoring Subcategories

Category	Score
5. Maintain and Modernize the County Transportation System	4.31
3. Reduce Traffic Congestion	4.31
9. Reduce Green House Gas Emissions Contributing to Climate Change	4.23
1. Protect and Enhance the Natural and Built Environment	4.22
4. Support Economic Activity in Town Centers and Business Corridors	4.11
2. Improve Mobility and Connections between Travel Modes	4.07
6. Integrate Transportation, Land Use, and Site Design	4.05
7. Maintain a High Level of Safety and Security	4.00
8. Monitor the Performance of the Transportation System	3.91

Of the 9 major survey categories, four consistently score above the survey mean, including two related to the natural environment (9, 1), reducing traffic congestion (3), and overall upgrades to the county's transportation system (5). Categories that consistently scored below the mean included improving multi-modal connections (2), integrating transportation and land use (6), improving safety and security (7), and monitoring transportation system performance (8).

The open-ended question provided a multitude of responses regarding future transportation improvements, existing services, and other general comments regarding Somerset County. Comments that were mentioned more than once included:

- Increase/Improve Public Transportation (bus and/or rail) (15)
- Improve conditions for bicyclists and pedestrians (15)
- Remove truck traffic from Dukes Parkway West/ Extend Brown Avenue from Route 206 to Roycefield Road as alternate (8)
- Improve maintenance/fix potholes (6)
- Encourage businesses to promote flextime options (2)

The complete survey results, including demographic information, along with answers to the open-ended question, are included in Appendix B.

3.5 Planning and Infrastructure Challenges

Based on the pool of information provided above, an inventory of key planning and infrastructure challenges relevant to circulation and mobility within Somerset County has been developed. These challenges are numerous and range from congestion on key roadways to the regional coordination of land use and transportation planning. They are listed below.

1. Regional Mobility – congestion on key roadways, a lack of arterial highway capacity, particularly for east-west travel, and significant congestion on the Interstate highways, currently constrain regional mobility.
2. Viability of U.S. Route 206 – as the region's only major north-south arterial roadway, Route 206 shoulders a significant burden and must accommodate both local access and regional mobility trips. Route 206 is also the center for commercial and retail activity south of Somerville, and serves as a major thoroughfare for goods movement and trucking activity as it provides access to many of the county's industrial and warehouse-distribution businesses. In addition Route 206 serves as primary direct link between I-95 in Mercer County and I-78 and I-287 in Somerset County. As such it represents a critical link for regional and interstate travel and must bear the burden for the decision to not complete I-95 through central New Jersey.
3. Freight Impacts – the combination of Route 206's conflicting roles as Main Street, land access highway, and as the de-facto I-95 connector for central New Jersey means that the roadway attracts many more trucks than other central New Jersey roadways of a similar type and functional classification. Because of this, the host communities, particular those south of Somerville continue to express concerns about the impact of heavy trucks passing through their communities.
4. Regional coordination and integrating land use and transportation planning – Somerset County is a collection of rural and suburban communities and small urban centers connected by an incomplete roadway network. Land use planning and regulation is spread out amongst the county's 21 townships and boroughs. Although the county is responsible for planning and prioritizing transportation improvements, it has little direct authority over the land use decisions that drive travel demand and mobility needs.
5. Retaining the region's industrial base – the industrial base is critical to shoring up the region's economy, employment, and tax base. Conflicts among residential and industrial land uses, and traffic impacts to local communities, must be addressed
6. Reuse of vacant office space – many of Somerset's large office complexes are located along the heavily congested 202/206 and I-287/78 corridors. During the recent economic downturn many jobs were lost and vacancy rates remain high. Access is considered a critical issue to addressing the problem of office vacancy.
7. The Access to the Region's Core (ARC) project was intended to provide a new passenger rail tunnel between New Jersey and New York City. The new tunnel was anticipated to improve capacity, access, and frequency of rail service, with impacts to many New Jersey communities. Though the project has since been cancelled, at least two alternatives are being considered by the Port Authority of New York and New Jersey, and other state and regional agencies. To fully leverage the benefits of any alternative, Somerset must keep abreast of the latest developments

and proactively address a broad range of issues including station access and parking, pedestrian access, transit centers, and housing and jobs in proximity to rail.

8. West Trenton line service restoration – reactivation of rail service along the West Trenton line is among the leading transit proposals currently under study for central New Jersey. Planning for adjacent development, including transit supportive densities that integrate the rail line into the fabric of adjacent communities will be needed in order for the line to achieve its full potential and to leverage the potential benefits to individual communities, Somerset as a whole, and to realize a reduction in traffic congestion as well. NJ TRANSIT has completed its study of the West Trenton Line.
9. Maintain Somerset's high standard of living– long sought out by residents and business alike for its outstanding high quality of life and standard of living, Somerset County has seen some erosion of its advantages due to the rise in traffic congestion and loss of employment base.
10. Bicycle and pedestrian mobility – given the constrained street system and arterial network in Somerset County, and the limited opportunities to expand access through new sidewalks, shoulders, and bike lanes, creative solutions and leveraging of off-street trails, greenways, and the D&R Canal towpath, will be essential.
11. Limited mobility groups – in addition to the county's bicycle and pedestrian deficiencies, many residents have mobility limitations or no access to a motor vehicle. Transit service is also constrained, leaving large areas, and segments of Somerset County's population, underserved or unserved by public transit. Many jobs, community facilities, or social services are reachable only by motor vehicle. A combination of land use decisions, limited transportation infrastructure, and geographic constraints contribute to these constraints.
12. Vulnerable Infrastructure – the planning process must identify at-risk infrastructure, target and prioritize investments, and reinforce evacuation routes
13. Protect and enhance the natural environment – the rural landscape is a significant component of Somerset County's heritage and quality of life. Transportation initiatives that help to sustain the region's natural assets include the development and projection of scenic byways, establishing a network of greenways and trail systems, and through integrated land use and transportation planning efforts.

Technical Memorandum 4: Climate Change and Somerset County Government Greenhouse Gas Emission Reduction Plan

November 2011

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4. Climate Change

4.1. The Challenge and Potential Impacts of Climate Change

Climate Change is increasingly being integrated into the overall transportation planning process as various agencies, in particular those in the transportation sector, look to address the challenges set out in the legislation and action plans being adopted in many states. The County's 1998 Master Plan Reexamination Report acknowledges that traffic congestion in Somerset County degrades local air quality, and notes that exhaust from motor vehicles is the greatest contributor to air pollution in the County. Exhaust from transportation is a significant source of greenhouse gas emissions, as indicated in Figure 4.1.

On July 6, 2007, New Jersey enacted the Global Warming Response Act (GWRA) (P.L. 2007, c.112). The GWRA calls for a reduction in Greenhouse Gas (GHG) emissions to 1990 levels by 2020, approximately a 20 percent reduction below estimated 2020 business-as-usual emissions, followed by a further reduction of emissions to 80 percent below 2006 levels by 2050. 35% of GHG emissions at the state level can be attributed to the transportation activities and as such the sector has a large role to play in mitigating the amount of heat-trapping gases released into the atmosphere. The New Jersey Climate Change Action Plan has set a tentative target to limit growth in Vehicle Miles of Travel (VMT) to no more than 1% per year going forward. Additionally, transportation infrastructure is uniquely vulnerable to the general climatic and weather impacts that will likely accompanying the gradual rise in ambient temperatures. While the specific impacts of climate change in Somerset County are not fully understood, an increase in the number of extreme heat events, severe precipitation events, snow melt, and paradoxically drought conditions are all potential outcomes.

The dual focus approach, ***mitigation*** of GHG emissions and ***adaptation*** to climate change impacts, has direct implications for Somerset County's Circulation Plan. As the County's transportation evolves there will be a need to address both of these goals more directly and quantitatively.

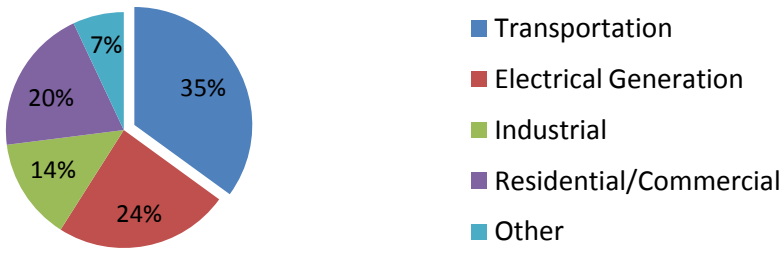

Figure 4.1: New Jersey Statewide 2004 GHG Emissions by Sector, MMT CO_2e [1]

1 Meeting New Jersey's 2020 Greenhouse Gas Limit: New Jersey's Global Warming Response Act Recommendations Report. New Jersey Department of Environmental Protection, December 2009. http://www.nj.gov/globalwarming/home/documents/pdf/njgwra_final_report_and_appendices_dec2009.pdf

4.2. Mitigation of Greenhouse Gas Emissions

Mitigation of transportation related GHG emissions is often conceptualized using a "Four Leg Stool," illustrating the major factors that can influence and help control and reduce GHG emissions:

- *Fuels:* Adoption of renewable and low carbon fuels.
- *Vehicle Technology:* Creating a more fuel efficient vehicle fleet.
- *Vehicle Miles of Travel (VMT):* Adopting policies, in particular land use policies, that support transportation alternatives and minimize the number of private vehicle trips.
- *Vehicle and Systems Operations:* Encouraging driving behaviors that lower emissions ("eco-driving"), maximizing the efficiency of the roadway network and minimizing traffic flow interruptions.

While the first two factors are best addressed by policy or regulation at the national or state level, the last two factors have direct implications to the County's Circulation Plan. Reducing VMT growth is a major factor so it is paramount to invest in transportation infrastructure that supports lower impact development or discourages projects that may inadvertently encourage less efficient travel choices. Land use scenarios and transportation investments that minimize or reduce VMT growth will also provide a future benefit by contributing to GHG emission reductions. Travel Demand Management (TDM), transit services, and non-motorized travel modes also have a significant role to play in meeting future goals and should be considered in the development of the County's Circulation Plan. VMT projections under various development scenarios are provided in subsequent sections of this report.

It should be noted that while the transportation sector is striving to reduce its contribution to GHG emissions, proportionally transportation will not internally meet the goal of reducing GHG emission by 80% in 2050. Even with more efficient vehicles and low carbon fuel standards, additional reductions in other sectors will be needed to offset the transportation shortfall. While such a tradeoff is reasonable given transportation's role in supporting the broader economy, it also highlights the need for the transportation sector to be aggressive in achieving all reductions possible. With New Jersey's population expected to double by 2050, the reduction goal on a per capita basis is 90% of current levels (excluding any carbon offsets such as increased forestation, sequestration and other offset techniques). The Somerset County circulation element should reflect this in the selection of preferred projects and land use alternatives, noting that relying entirely on sectors and outside factors cannot make up for less than an aggressive approach.

4.3. Adaptation to Climate Change by the Transportation Sector

The transportation sector is unique in both its contribution to GHG emissions and the potential for direct impacts due to climate change on infrastructure and facilities. Anticipating increased likelihood of extreme weather events and planning/building to address these eventualities, addressing the need for increased routine maintenance of infrastructure and retaining and expanding quick response capabilities for emergencies and catastrophic events are all factors that need to be considered. There is a large body of research underway the seeks to define the methods to better integrate climate change into the

overall planning process, however it will be some time before consensus on preferred approach is reached.

The County's existing hazard mitigation plan[2] provides the most current and best estimation of those facilities most vulnerable to flooding, the primary consideration in locating and relocating infrastructure and facilities to respond to climate change. This work can be used to identify the structures most in need of reinforcement and redesign. This report does not attempt to update the County's hazard mitigation plan as the mitigation plan continues to represent the most complete listing of assets in the County and employs techniques still considered to be best practice.

When climate change considerations are integrated into the planning process the impact is increased scrutiny on investment decisions and shifting the focus from congestion mitigation to demand management. This results in a wider array of issues being considered at the planning stage of all plans, programs and individual projects. Some of the notable factors that have renewed importance when climate change is considered include the following:

4.3.1 Location

While traditional hazard planning encourages key facilities and development to be located outside flood prone and other hazard prone areas, assuming an increase frequency of these events can significantly alter the Circulation Plan and proposed development areas.

4.3.2 Design Specifications

With climate change it is expected that more severe conditions will be more commonplace and as such there is a need to re-evaluate design criteria. Note that design specifications related to energy efficiency, choosing locally sourced materials, minimizing construction related emissions and maintaining traffic during construction could also play a role in mitigation efforts.

4.3.3 Materials

Increased occurrence of extreme weather events will force the need to choose stronger and more heat resistive materials. As with the design specifications, choosing energy efficiency products and building practices, selecting low emission pavements, using locally sourced materials and selecting lower energy input products (recycled and lightweight materials) would also assist in mitigation efforts.

4.3.4 Emergency Management/Evacuation

With the increased occurrence of severe weather events, emergency management and evacuation takes on increasing importance. As identified in the County's hazard mitigation plan, a number of police stations, schools, fire departments and other facilities required in an emergency are located in hazard-prone areas.[3] Consideration should be given to relocating such facilities on the assumption that the events for which they are most needed may also render them unusable. The current evacuation plan for the County identifies the following as key departure routes:

[2] Tetra Tech EM, Inc. Somerset County Multi-Jurisdictional Multi-Hazard Mitigation Plan. June, 2008

[3] Section 5: Risk Assessment in the *Somerset County Multi-Jurisdictional Multi-Hazard Mitigation Plan* (June, 2008) provides a detailed listing and ranking of vulnerable infrastructure and facilities within Somerset County.

- Interstate 287 and State Highways 27, and U.S. Highway 206 (major north/south routes)
- Interstate 78, U.S. Highways 22 and 202, and State Highway 28 (major east/west routes)
- County Routes 523, 525, 527, 531 and 533 (alternate north/south routes)
- County Routes 512, 514, 518, 523, 525, 531, 533, 567 and 601 (alternate east/west routes)

These routes should be given even more heightened importance for redesign and ongoing maintenance. The Circulation Plan should also consider the need for redesign and re-routing of these facilities. See Figure 4.3.4 (from the Somerset County Hazard Mitigation Plan) for a review of these routes.

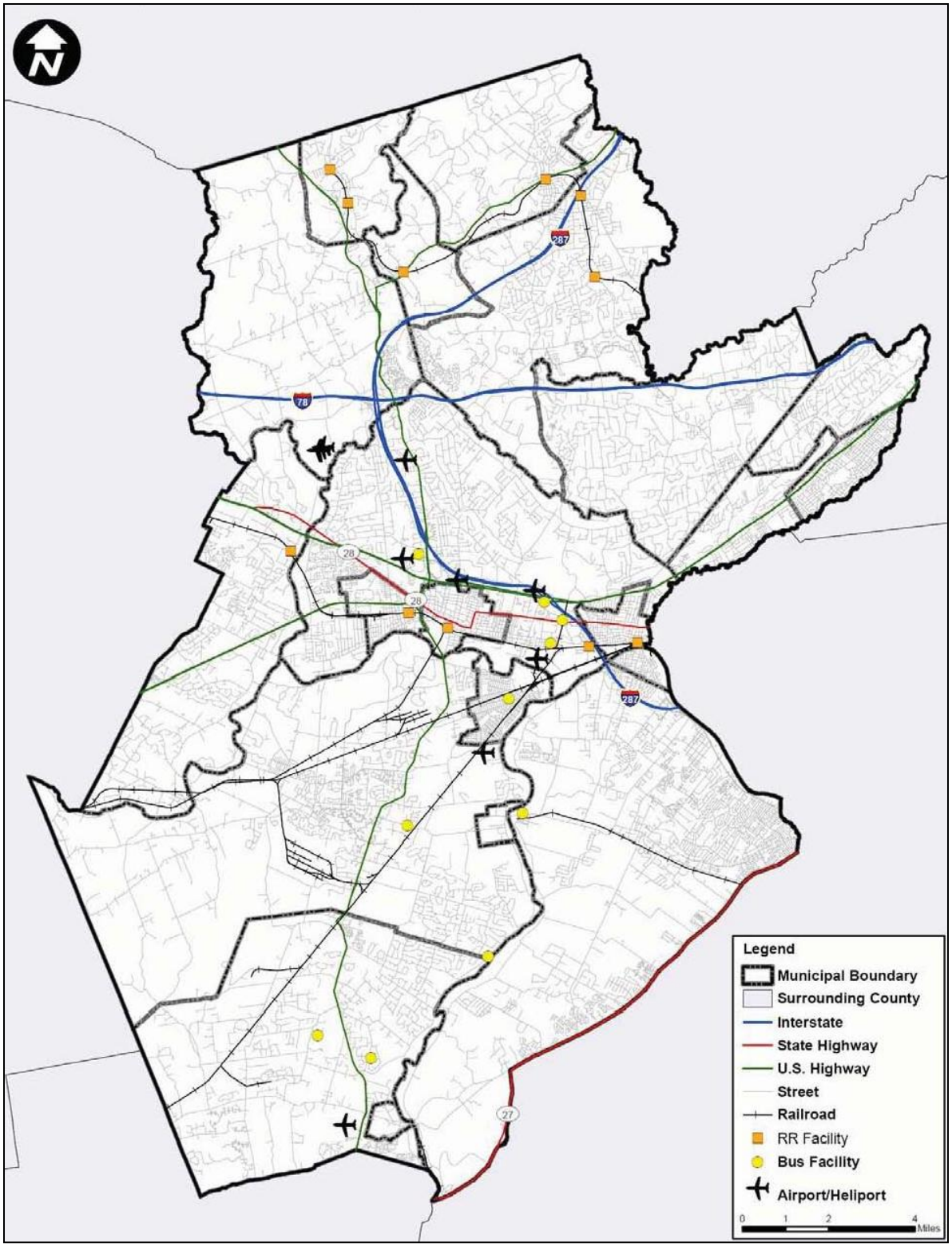

Figure 4.3.4: Transportation Lifelines, Somerset County. Source: DMA 2000 Hazard Mitigation Plan – Somerset County, New Jersey/Somerset County MIS

4.3.5 Increase Frequency in Replacement/Repair Schedules

With extreme weather events comes increased and accelerated deterioration of infrastructure and facilities. Extending beyond increased design specification, the County should expect increased costs due to more frequent maintenance. This also speaks to system planning where the extent of the transportation network may need to be optimized to reduce the amount of infrastructure requiring ongoing maintenance.

4.3.6 Interim Proactive Steps to Address Climate Change

While the state of the practice is still evolving in regards to planning for climate change, there are proactive steps the County may wish to consider in future circulation plans, in particular in relation to increased flood potential[4]:

- In areas where flooding is likely, improving the rainfall capture and storage capacity of a catchment (e.g. by enhancing or mimicking the water storage capacity of the soil) are potential adaptation measures;
- Increasing conveyance capacity to disperse floodwaters;
- Develop policies to maintain existing levels of service which incorporate climate change factors at the time of repairs or upgrades;
- Establishing physical protection measures, e.g. building stop-banks;
- Managing the effects of flooding by removing at-risk land use such as infrastructure and the built environment in floodplains; and
- Managing the expectations of communities in flood-prone areas to expect and cope with flood events.

While the extent to which climate change will lead to increased frequency of severe precipitation events is unclear, there is evidence that it would be prudent to anticipate that what is currently defined as the 100 and 500 year storms will occur more frequently. It may be more likely that infrastructure built in vulnerable locations will experience a 100 year event and perhaps a 500 year event within in the project's lifespan. From the perspective of the Circulation Plan, infrastructure not built to withstand these events must be considered at risk and alternate routes, either for evacuation or safety, must be in place for all communities. See Figure 4.3.6: 100 and 500 Year Floodplains within Somerset County.

[4] NZ Transport Agency, Climate Change Effects on the Land Transport Network, Volume Two: Approach to Risk Management, 2009

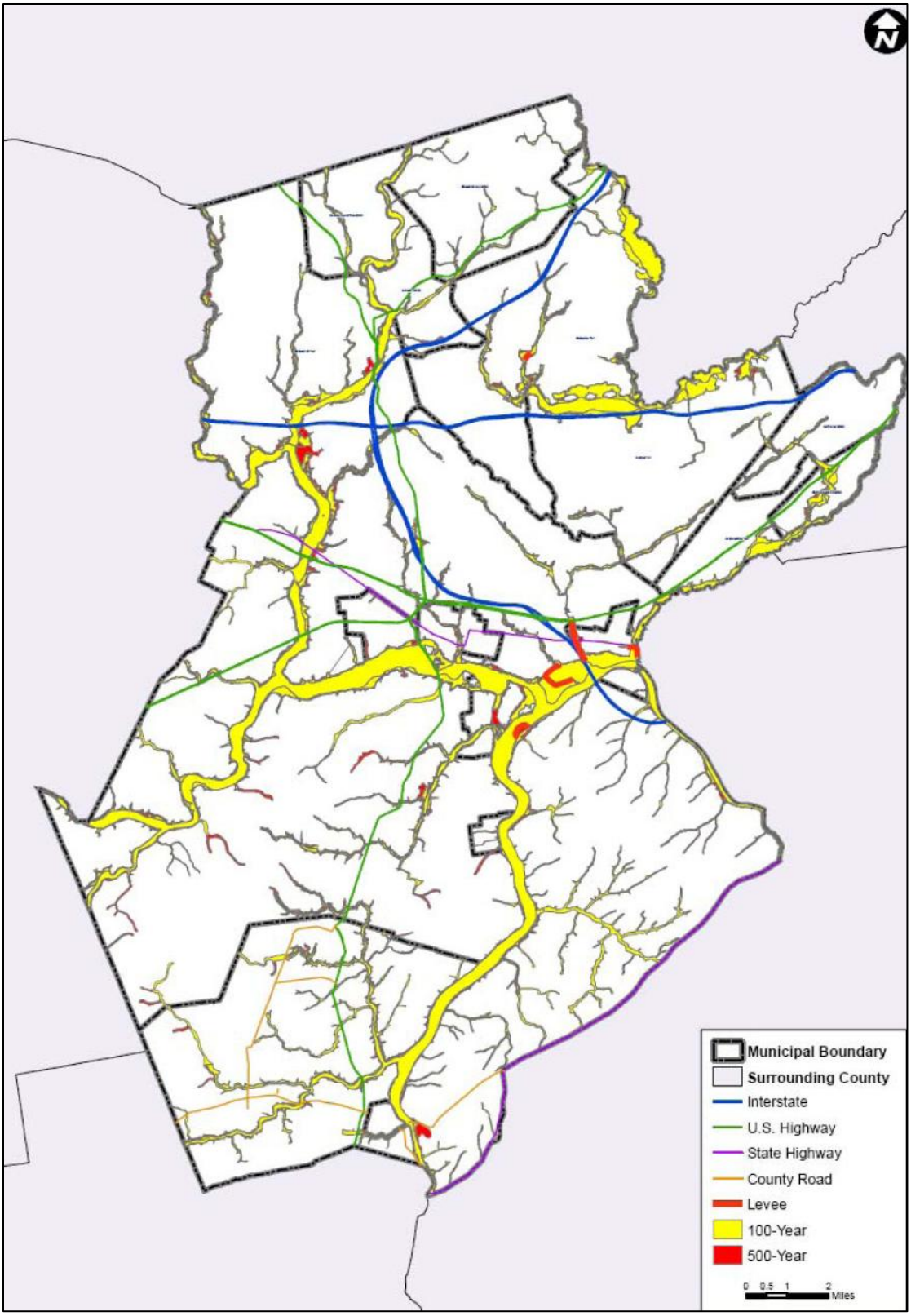

Figure 4.3.6: 100 and 500 Year Floodplains within Somerset County. Source: Source: DMA 2000 Hazard Mitigation Plan – Somerset County, New Jersey/FEMA Digital Flood Insurance Rate Maps, 2007

4.3.7 Actions by Other Agencies

While climate change may directly impact the planning process in Somerset County, actions by both larger and smaller local agencies may complement countywide efforts and goals:

4.3.8 New Jersey Global Warming Response Act and Recommendations Report

In December 2009, the State released "Meeting New Jersey's 2020 Greenhouse Gas Limit: New Jersey's Global Warming Response Act Recommendations Report" as required by the Global Warming Response Act. This report provides analyses of significant sources of greenhouse gas emissions, details a broad range of options for meeting New Jersey's statewide 2020 greenhouse gas limit, and provides a framework for how the State needs to move forward to meet its statewide 2050 greenhouse gas limit.

The resulting report[5] provides eight transportation related recommendations including fuel related, vehicle mileage standards and planning activities. The last of these general recommendations requires that NJDOT and the MPOs include climate change considerations in their investment decisions. This further underscores the need for the County to incorporate similar considerations in their planning process to ensure continuity with statewide goals.

4.3.9 Climate Change Planning at the NJTPA[6]

The NJTPA is currently engaged in a multi-year climate change initiatives program, including:

- A greenhouse gas (GHG) emissions inventory and forecast for the NJTPA region.
- Support for sub-regional climate change mitigation and adaptation efforts, including greenhouse gas emissions inventories and forecasts.
- A region-wide inventory and analysis of vulnerable infrastructure to future climate change impacts.
- Evaluation of greenhouse gas reduction options and development of a regional GHG reduction action plan.
- Adaptation research and planning for an inventory of vulnerable transportation infrastructure (climate impacts include temperature, sea level, storm surge intensity and precipitation changes).
- Integration of climate change and energy concerns throughout NJTPA activities (infrastructure impacts: structures, pavement and serviceability; and mitigation demand management impacts: trip reduction, mode shift and financing).
- Consideration of CO_2 quantification in air quality conformity analysis.
- Coordination of NJTPA climate change efforts with local, regional, and state agencies.

Completion of this effort and an interim report are not expected for some time, however NJTPA increasingly is incorporating GHG reduction considerations into their project selection process. As more finalized approaches become available Somerset County may look to adopt this framework into local planning and decision making exercises. Also, the inventory of vulnerable infrastructure assembled as part of this effort may prove useful to and supplement the County's efforts in this regard. Finally, the

[5] Ibid

[6] NJTPA Climate Change Initiative, NJTPA Website: www.njtpa.org/Plan/Element/Climate/ClimateChangeInitiative.aspx

support being offered by the MPO may be an opportunity for the County to gain assistance in planning and potentially in perusing individual projects.

4.3.10 NJTPA Greenhouse Gas Inventory Study

In 2011 The North Jersey Transportation Planning Authority, Inc. (NJTPA) undertook a study to prepare a GHG inventory and forecast (I&F) for the entire region. Sector by sector estimates of emissions were calculated using a variety of techniques and accounting methods. The intent was to provide a baseline to help direct migration efforts across and within sectors of the economy. As is common in GHG I&F studies, assigning emissions across various sectors can be a challenge. In the case of on-road (highway) GHG emissions, the accounting method can significantly alter the overall benefit attributed to local efforts. Direct Emissions is an accounting method that looks solely at tailpipe emissions for vehicles traveling within the County. This is likely an inappropriate approach as most local mitigation efforts are unlikely to impact trips passing through the region. Consumption-based emissions represent emissions associated with the consumption of a product or process. In the transportation sector, the consumption-based emissions associated with any trip are allocated to the origin and destination (half of the emissions to each location). The 'consumption' in this case is the actual generation of the trip itself. These trips are the trips that the municipalities or counties have some control over and could apply mitigation measures, making this method the most representative baseline to report. Energy-cycle GHG emissions take Consumption-Based emissions and estimates the GHG associated with the production, refining, and transport of diesel fuel and residual oil. While local initiatives to purchase alternative fuels could provide a GHG mitigation opportunity, from an inventory perspective the fact that fuel could be obtained inside or outside the County makes this approach less informative to local decision makers.

4.3.11 Vulnerable Infrastructure

The following table lists the vulnerable bridges in each Somerset County municipality, listed by those located in the 100 year floodplain, and in the 500 year floodplain.

Table 4.3.11: Highway Bridges Located in the 100- and 500-year Floodplains

Jurisdiction	Highway Bridges	
	Number in 100-Year Floodplain	Number in 500-Year Floodplain
Township of Bedminster	24	24
Township of Bernards	20	20
Borough of Bernardsville	16	16
Borough of Bound Brook	7	7
Township of Branchburg	36	38
Township of Bridgewater	39	41
Borough of Far Hills	5	6
Township of Franklin	67	69
Township of Green Brook	4	4
Township of Hillsborough	42	60
Borough of Manville	6	6
Borough of Millstone	2	4
Township of Montgomery	39	41
Borough of North Plainfield	25	25
Borough of Peapack-Gladstone	12	12
Borough of Raritan	3	3
Borough of Rocky Hill	2	2
Borough of Somerville	12	12
Borough of South Bound Brook	0	0
Township of Warren	31	31
Borough of Watchung	16	19
Somerset County (Total)	**408**	**440**

Inundation Mapping

Somerset County has also developed inundation mapping to aid emergency managers during large storm events. These maps are designed to inform emergency personnel and show inundation areas for flood levels at 2 foot increments along with impacted buildings, roads, railroads, rivers, and streams (Slutsky and Andreassen, 2007). Use of this mapping could provide a helpful source in future planning efforts to identify at-risk roadway infrastructure, assist in locating and relocating roadways, and limiting development in areas that would become inaccessible during a flooding event.

Below is the list of projects the townships have specifically called out as goals. All townships mention supporting the County plan, which in turn references the flood mapping.

Specific Roadway Infrastructure Improvement Recommendations from the Somerset County Flood Insurance Study –Township Initiatives

Bernardsville

- Reconstruct and replace culvert and/bridge over Minebrook at Municipal Complex. The bridge is currently closed as it is unsafe. The culvert constantly jams with debris during periods of heavy rain and causes flooding and soil erosion
- Reconstruct and replace footbridge over Mine Brook at Nervine Memorial Park. The bridge is in poor repair and constantly jams with debris during periods of heavy rain and causes flooding, soil erosion and damage to the bridge.

Far Hills

- Work with county to evaluate flooding problems along Peapack Road

Franklin

- Work with neighboring municipalities to establish an emergency access entrance to route 287 from Elizabeth Avenue for flood evacuation route from Bound Brook

Manville

- Construct Pump Station at Railroad Underpass on North Main Street

Watchung

- Rehabilitation and Reconstruction of Phillips Field Bridge and Embankment

4.3.12 Emerging Concepts

A variety of emerging technical innovations and planning paradigms can support achieving the goals, policies, and vision of the Making Connections Plan. These include new technologies and policies such as electric vehicle charging stations and the FHWA's livability initiative, and simple, but effective low technology storm water alternatives such as bioswales.

Photo courtesy of Portland General Electric

Electric Vehicle Charging Stations

With a growing number of electric vehicle and plug-in hybrid vehicle models entering the marketplace, there is a need to create a publicly available network of charging stations to provide for on-demand vehicle charging needs. Development of a charging station network will alleviate anxiety over vehicle range limitations and spur consumer adoption of electric vehicles, which may reduce greenhouse gas emissions and improve air quality. Charging stations can be installed anywhere there is access to the electric grid and are particularly suitable for retailers, conventional gas stations, parking lots/garages, or curbside locations through smart parking meters. Technology is developing to provide high-speed charges in less

than 30 minutes. In New Jersey, the State legislature is currently considering a requirement for electric vehicle charging stations along the State's toll roads.[7]

Compressed Natural Gas Fleets

Natural gas is a domestically produced, clean-burning alternative to petroleum based fuels such as gasoline and diesel products. A CNG-powered vehicle gets about the same fuel economy as a conventional gasoline vehicle on a gasoline gallon equivalent (GGE) basis. Compared with vehicles fueled with conventional diesel and gasoline, natural gas vehicles can produce significantly lower amounts of harmful emissions such as nitrogen oxides, particulate matter, and toxic and carcinogenic pollutants as well as the greenhouse gas carbon dioxide.[8]

Similar to providing electric vehicle charging stations, delivery and availability of natural gas -based fuels is critical to gaining widespread acceptance and market penetration.

Because of this, fleet applications can provide the opportunity to justify the necessary investment in fueling stations. Large fleets of public transportation vehicles, school buses, taxis, delivery vehicles, and refuse haulers are all examples of potential customer for alternative fuels.

Intelligent Transportation Systems (ITS)

A variety of ITS tools are available to help improve the efficiency of the transportation network through real-time data collection; dissemination of information to users, operations staff, and emergency personnel; and adaptive control systems. Providing users with real-time traffic information, such as travel time or incident reports, allows drivers to plan ahead and adjust to current road conditions. This may encourage some travelers to divert from congested roadways, thus better managing available capacity to the roadway and relieving congestion without capital intensive roadway construction.[9] Variable message signs (VMS) are one tool to communicate travel information to users, as are websites (e.g. http://511nj.org/), telephone hotlines, and smart phone applications. Several agencies in the U.S. offer a service that allows commuters to receive real time updates regarding travel conditions and incidents via one-stop service that provides updates from various agencies (State/regional and local) into a single source.

Adaptive signal systems are an effective tool for arterial management, particularly where there is highly variable or unpredictable traffic demand. On site sensors continuously collected traffic information to optimize and update the signal timing, which can improve average metrics, such as travel time and fuel consumption, by 10 % or more.[10]

Widespread implementation of ITS systems and technologies can help mitigate the need for some roadway improvements and extend the useful service life of existing roadway, intersection, and bridge capacity.

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[7] http://www.nj.com/news/index.ssf/2011/02/nj_bill_permitting_charging_st.html
[8] http://www.afdc.energy.gov/afdc/fuels/various, accessed May 23,2011
[9] http://ops.fhwa.dot.gov/travelinfo/dms/signs.htm
[10] http://www.fhwa.dot.gov/everydaycounts/pdfs/asct_brochure.pdf

FHWA Livability Initiative

Livability is major policy initiative currently being promoted by the U.S. Department of Transportation that focuses on enhancing communities and creating a balance among land uses and transport modes.

The six key principles of livability are:

- Provide transportation choices
- Expand location and energy efficiency housing choices
- Improve economic competiveness of neighborhoods
- Support existing communities
- Coordinate policies and leverage investment
- Enhance the unique characteristics of all communities

Advancing transportation and integrated land use strategies along with livability principles creates safe, healthy, and walkable neighborhoods to benefit all users, whether in a rural, suburban, or urban setting.

Several NJDOT policies and programs overlap with the USDOT's livability program, such as Complete Streets Policy, Transit Village Initiative, and Smart Growth Planning. Livability supports sustainability goals by encouraging alternative modes of travel and enhancing existing communities and neighborhoods.[11]

Storm Water Alternatives

Impervious cover, whether from roadways, parking lots, or building roofs, prevents rain water from naturally percolating into the ground and causes storm water run-off. As storm water flows over impervious surfaces, it accumulates debris, chemicals, and other pollutants that can adversely impact the water body into which the untreated storm water flows. However, several innovative best management practices (BMPs) are gaining traction as alternative methods for reducing storm water and treating it on site.

Photo courtesy of EcoSRQ.com

New Jersey's storm water management regulations have become more stringent in recent years, creating significant constraints for both private development and the planning and implementation of transportation improvements. Storm water alternatives can prove beneficial to improving environmental quality and provide cost effective solutions for buildings and transportation infrastructure.

Bioswales

One alternative BMP is the use of bioswales adjacent to roadways, parking lots, or other impervious surfaces. The storm water flow is guided into a gently sloped swale, where vegetation, rip-rap, and/or

[11] http://www.dot.gov/livability/index.html

Photo courtesy of EcoSRQ.com

soil slow the flow of water and act as a natural filter to remove sediments and pollutants from the run-off. The reduced flow rate allows the water to percolate into the ground, recharging the groundwater and reducing the amount of untreated storm water discharged from the site into the local watershed.

Green Roofs

Another alternative BMP, green roofs, similarly takes advantage of the natural filtering abilities of vegetation and soil microbes to treat storm water on-site. Traditional roofing materials, such as asphalt, are replaced with a waterproof membrane covered by a drainage system, soil media, and vegetation. A 3.5 – 4 inch deep green roof is capable of retaining over 50% of annual precipitation, which is circulated back into the atmosphere through evapotranspiration. The remaining 50% of annual precipitation percolates through the vegetation and drainage system and is slowly discharged off the roof, where it can recharge the groundwater on-site.[12]

Photo courtesy of greenroofs.com

These alternative storm water management practices reduce total storm water run-off and serve a host of environmental benefits, including improved water quality by filtering and reducing non-point source pollution, increased groundwater recharge, expanded green space for wildlife habitat, improved air quality and human health, reduced heat island effect, and carbon sequestration.

The reduction in both total storm water run-off and peak flow also makes them effective in mitigating flood events and reducing the strain on existing sewer systems.[13]

Green Building & LEED Certification

With buildings accounting for nearly 40% of the nation's carbon footprint and 68% of electricity use[14], green building practices are becoming more widespread and even mandated by a variety of institutions and government entities, such as the General Services Administration and throughout California through the 2010 California Green Building Standards. LEED certification is an industry standard for green building that rates a building's adherence to green practices based on criteria for building siting, water efficiency, energy usage and atmosphere, materials and resources, and indoor environmental quality.[15]

When integrated into the design process early on, there is no significant difference in average construction cost for LEED certified buildings compared to non-LEED buildings.[16] Green building practices do have several benefits for the triple bottom line of sustainability goals – people, profit, and planet. Green buildings improve occupant comfort and overall quality of life. Workplaces report greater

[12] "Green Roofs for Stormwater Runoff Control." US EPA. February 2009

[13] http://cfpub.epa.gov/npdes/home.cfm?program_id=298

[14] http://www.epa.gov/greenbuilding/pubs/whybuild.htm

[15] http://www.usgbc.org

[16] "Cost of Green Revisited." Davis Langdon. July 2007.

productivity and lower absenteeism. Due to water and energy efficiency measures, operating costs are notably lower, yet owners can also command higher rents due to high demand and the appeal of green buildings to occupants.

Furthermore, there are numerous environmental benefits, including reduced emissions, water usage, and waste streams; improved air and water quality; and conservation of natural resources, local ecosystems, and biodiversity.[17]

The full benefits of green building are more fully realized and enhanced when the buildings are integrated into regional planning strategies such as livability, smart growth, new urbanism, or complete streets that improve connectivity and efficient, alternative transport modes between the buildings. The U.S. Green Buildings Council's recent implementation of the LEED 2009 for Neighborhood Development rating system recognizes the importance of these strategies and emphasizes site selection, land use, and connectivity with the local community. This rating tool is used for new developments to verify they are designed in a sustainable, environmentally responsible manner.[18]

LEED 2009 for Neighborhood Development Rating System Guide (http://www.usgbc.org)

[17] http://www.epa.gov/greenbuilding/pubs/whybuild.htm
[18] "LEED 2009 for Neighborhood Development Rating System." http://www.usgbc.org