Middlesex County

Route 9 Corridor Transit Linkages Study

Prepared by:
Middlesex County Department of Infrastructure Management
Office of County Planning
Division of Transportation
July 19, 2011

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In Memory of Freeholder Director David B. Crabiel

This report is dedicated to the memory of the late Freeholder Director David B. Crabiel in acknowledgement of his dedication, commitment and various contributions he made towards the improvement of transportation facilities and services in Middlesex County. He also served as past Chairman of the North Jersey Transportation Planning Authority and of the Middlesex County Transportation Coordinating Committee.

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1 Executive Summary

1.1 Highlights

The Route 9 Corridor Study Area **("Study Area")** consists of Old Bridge Township and Sayreville Borough, New Jersey covering approximately 54 square miles of land area situated in southeastern Middlesex County. If the populations of Sayreville and Old Bridge were combined to form a single municipality, the resulting total population of over 108,000 would rank as the sixth most populous municipality in all of New Jersey (Census 2010). Population forecasts to the year 2030 anticipate that the total population of the Study Area will grow steadily by approximately 900 persons per year resulting in a total forecasted population of almost 130,000 people, exceeding the current population of Elizabeth and approaching the population of Paterson. With reasonable proximity and accessibility for New York City bound commuters, the Study Area has typically kept pace with the suburbanization of the larger New York metropolitan region.

In preceding decades, much of the population growth in the Study Area has been along mainline access corridors to New York City, particularly along Route 9 as well as along the major County Routes, namely Old Bridge-Matawan Road (CR 516), Washington Road (CR 535), Ernston Road (CR 673), and Main Street in Sayreville (CR 670). In the current decade, however, some areas of previous growth are just now beginning to experience slight declines in population. Yet, overall growth outpaces these minor declines. Significant growth continues in areas where available vacant land remains, such as along the southern Study Area boundary with Monmouth County. This is where the highest growth rates occurred between 2000 and 2008 and where growth is projected to continue.

Throughout the Study Area, the Route 9 Corridor accommodates the largest highway corridor bus operations in the entire state of New Jersey (see page 78), making this an attractive transit corridor for northbound commuters heading to destinations such as New York – Port Authority, New York – Wall Street, Newark Penn Station, Newark International Airport, Jersey City, Hoboken or Weehawken; and for southbound commuters heading to Lakewood, Toms River, Freehold and Manalapan. It includes three NJ Transit regional bus lines operating along Route 9 (64, 67 and shared-schedule 139/130/132/136). The presence of major residential developments along Route 9 has had significant impacts on transit and pedestrian safety improvements. These include the bus shoulder lane project, which allows buses to use the shoulder lanes during the morning and

evening peak hours to provide better flow for commuters; and pedestrian crossing improvements. This focus on regional transit accommodations serving the New York bound commuter has helped to further enhance the attractiveness of the transit corridor for commuters in surrounding areas.

The existing transit infrastructure supporting the regional transit service includes up to 8 major park and ride facilities along Route 9 alone, with a total inventory of nearly 3,000 parking spaces. In most cases, household density, particularly multifamily household density, has clustered within a half-mile radius of these park and ride facilities. While 60,000 workers comprise the labor force in the Study Area, there are less than 20,000 jobs located within the Study Area boundaries. This high ratio of workers to jobs is a key characteristic of being a "bedroom community," where a majority of the working population travels outside of the area to get to work. Also, despite the Study Area's higher percentage of households with one or more vehicles available, there is a higher share of workers using public transportation to get to work than both the county and the state averages. These and other factors point to a relatively high value placed on public transportation within the Study Area and the need for further investigation into ways of continually improving transit access and mobility.

Despite steady population growth in the Study Area paired with the concurrent expansion of regional bus services in general, NJ Transit has not added any local intrastate bus routes in the Study Area since 1990. With federal funding through the North Jersey Transportation Planning Authority, the Middlesex County Office of Planning, Transportation Division has undertaken this project to evaluate possible enhancements to better integrate connections between local and regional services within the Route 9 corridor through Old Bridge and Sayreville. As a highway corridor notable for having among the highest levels of bus operation and ridership in New Jersey, it is within this area that this study seeks to develop recommendations to improve mobility by enhancing existing transit service connections between residential areas and the Route 9 transit corridor. This would help to reduce automobile reliance for local and regional trips and, thereby, reduce the number of automobile trips taken by hundreds of commuters to existing Route 9 park and ride facilities from the surrounding areas in Middlesex County. In this way, the critical number of vehicle miles travelled would also significantly drop.

1.2 Purpose and Intent

Route 9 is generally recognized as being one of the region's most congested and heavily-traveled corridors. The Route 9 corridor also maintains the highest level of bus operation in all of New Jersey (see narrative on page 78 for supporting data). Therefore, improving scheduling of transit connections and offering new linkages via fixed and/or demand responsive services to the Route 9 mainline bus services could potentially reduce the reliance on the single-occupancy vehicle and the overall traffic congestion in this heavily-travelled transit corridor.

The study provides a detailed demographic profile of the combined areas of Sayreville and Old Bridge, including an analysis of population, housing, work travel behavior, employment characteristics and transit needs assessments. These analyses help to highlight and identify isolated pockets of residential development that lack public transit options or, conversely, areas that are well-served by public transportation. The study also addresses the level of coordination and integration among the local, regional and long distance transportation services that are available in the Study Area. Furthermore, it identifies where there have been gaps between these services and which areas are most suited for public transportation improvements.

The focus of this study is to examine strategies for improving transit connections to the Route 9 bus commuter corridor. Inevitably, this will further county and regional goals to provide more accessible transit services that will reduce the reliance on the automobile for trips to park and rides and to distant job sites. Use of commuter shuttles and other connecting fixed route transit services will reduce the growing demand for new park and ride facilities and for oversubscribed parking spaces at existing facilities. This study will provide a framework for analyzing where these new or improved connections should take place.

1.3 Goals and Objectives

The goals of this study are to provide new and improved transit alternatives for people to access the mainline Route 9 commuter bus operations going through Middlesex County. These improvements should accommodate peak period commuter trips as well as off-peak trips for destinations such as work, education, shopping or social activities by way of shuttle buses from major residential points in the nearby areas.

This study has the following objectives:

1. To address strategies and issues of the Regional Transportation Plan which call for transit and pedestrian improvements, better system coordination, efficiency and intermodal connectivity;
2. To reduce automobile trips and traffic congestion along Route 9, one of Middlesex County's major travel corridors;
3. Provide better transit mobility and accessibility between residential and other destination points without the use of the personal automobile; and
4. To improve mobility for people who do not drive:
   - Seniors
   - People who cannot or prefer not to drive
   - People who do not have a car to get to a park-and-ride facility to access commuter buses

1.4 Recommendations

The intent of both the proposed short and long term recommendations is to provide better accessibility to transit and reduced reliance on automobiles within the Study Area. These recommendations are described in detail in Section 9, beginning on page 117. An implementation matrix of the detailed recommendations is provided at Section 12, beginning on page 157.

1.4.1 Operational

- Extend the Middlesex County Area Transit (MCAT) M2 Route to Winding Wood Apartments so residents can travel to destinations on Route 18 and connect to the MCAT M1, M3, M6, and NJ Transit local routes.
- Modify the MCAT M3 Route timetable and route to include time points at Throckmorton Lane (northbound) and Ticetown Road (southbound) for predictable transfers to Route 9 mainline services heading in either direction.
- Provide improved connections among MCAT shuttle services (M3), local NJ Transit routes (815, 818), and regional and long distance Route 9 mainline commuter services at key locations, including:
    - Throckmorton and Ticetown Roads at Route 9;
    - Ferry Road and Trans-Old Bridge Road at Route 9;
    - Westminster Boulevard at Route 9 (i.e. Old Bridge Park & Ride); and
    - Along Ernston Road.
- Create new community shuttles and other feeder services to connect underserved residential areas to the Route 9 bus corridor, including:
    - A peak period MCAT M3 Route variation along Ferry Road, connecting Pine Gate Apartments, Old Bridge Medical Center and Foxborough Village with Route 9 service at Trans-Old Bridge Road;
    - A peak period MCAT M3 route variation to serve residential neighborhoods east of Route 9 in Old Bridge and situated south of County Route 516 and north of Trans-Old Bridge Road;

- Community shuttle service (the MCAT "M7") along Bordentown Avenue connecting Spotswood to the South Amboy Rail Station with stops at Gateway Shopping Center and the Old Bridge Park-n-Ride;
- Peak period MCAT M7 shuttle connecting Winding Wood Apartments to Cheesequake Park-n-Ride with stops at Gateway Shopping Center and Old Bridge Park-n-Ride;
- A looping shuttle service, the MCAT "M8: Sayreville-South Amboy-Old Bridge", filling service gaps in local bus service in the northern end of the Study Area; and
- A commuter peak period variation of the MCAT M8 shuttle running from Lakeview Apartments to South Amboy Station.

- Create and expand shuttle services sponsored and/or operated by housing developments and/or major employers in the Study Area, providing transportation to and from Route 9 commuter bus stops.
- Revise signal timing to allow sufficient time for pedestrians to cross, increase pedestrian level-of-service, and encourage pedestrian signal compliance.
- Consider ordinances to control traffic where appropriate.

1.4.2 Capital Improvements

- Upgrade signal systems to improve visibility and accessibility by installing larger signal heads, installing backplates to reduce the effect of sun glare, and repositioning pedestrian buttons to meet ADA and MUTCD standards.
- Consider relocating select bus stops (listed on page136) on Route 9 southbound from the north side to the south side of the intersection, where the crosswalk is.
- Install recessed bus bays in eight locations throughout the Study Area where stopped buses cause significant traffic congestion.
- Expand existing bus shelters to accommodate current passenger volume, where deemed appropriate.
- Add new bus shelters at select stops along County Route 516 in Old Bridge.
- Add bicycle racks to stops where field observations indicate a need.

- Install or improve pedestrian-scaled lighting for safety and security at and near bus stops where luminance is inadequate.
- Install, repair, and/or extend median fencing along Route 9 where recommended by the Township of Old Bridge.
- Mark and/or relocate crosswalks to improve visibility to motorists using signage and pavement markings such as "zebra striping" and yield bars.
- Add sidewalks near certain bus stops (indicated on page 140) in order to keep pedestrians out of travel lanes.
- Improve safety on existing sidewalks (see page 140):
    - Add tactile surfaces.
    - Reduce turn radii and create "bump-outs" to shorten pedestrian crossings.
    - Reconstruct curb ramps to meet ADA standards.
    - Re-grade sidewalks to eliminate "drop-off" hazards.

1.4.3 Other Recommendations

- Continue to study demographics, evaluate and encourage feedback from transit riders, and examine the condition of pedestrian facilities.
- Identify residential areas and/or commercial activity centers in the Study Area that have insufficient local (intrastate) bus service and/or inadequate connecting access to Route 9 mainline buses, including planned or possible future developments, including:
    - Section Two of Woodhaven Village (Old Bridge);
    - Crossroads Redevelopment Area (Routes 9 and 18, Old Bridge);
    - Brunetti Tracts (Jake Brown Road at Route 9, Old Bridge); and
    - The Point at Sayreville (the former National Lead site).
- Adopt a "complete streets" policy throughout the Study Area, placing special emphasis and focus at bus stops and along roadways where commuters walk and/or bike to and from bus stops.

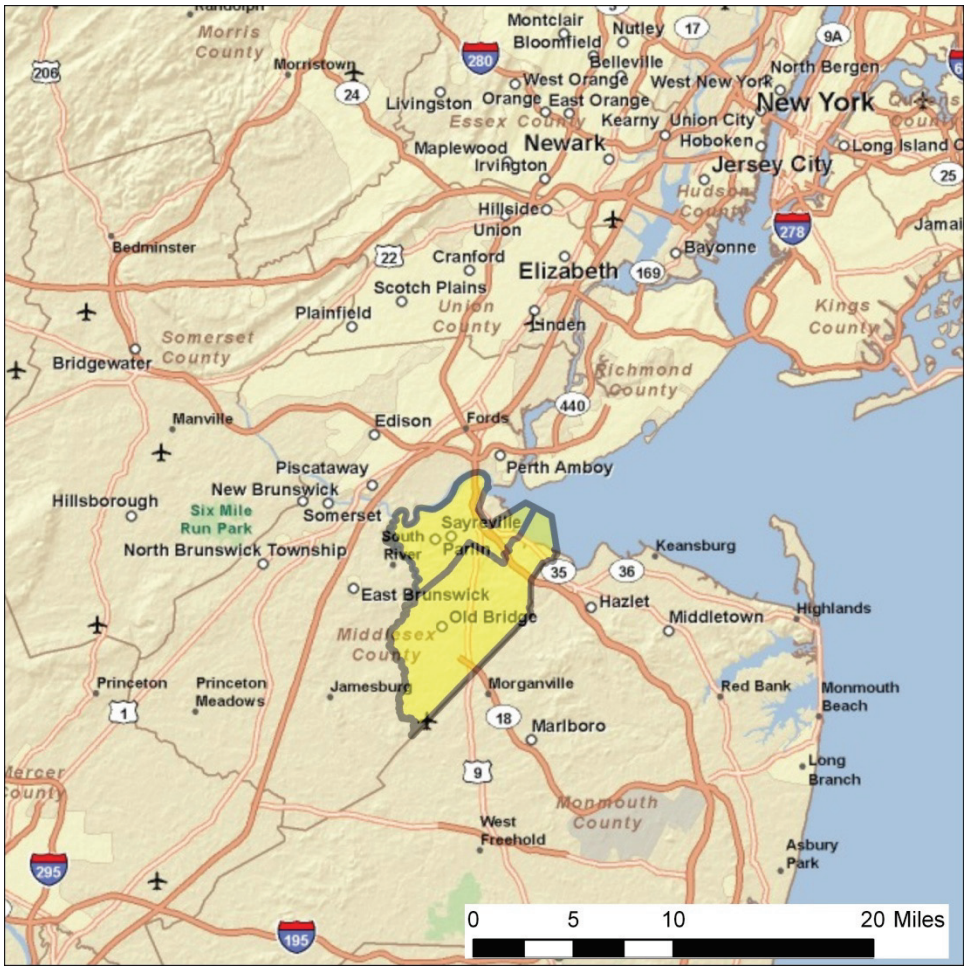
- Continue to educate pedestrians, cyclists and motorists about traffic laws, safety at intersections, and the dangers of distracted walking, biking and driving.
- Work with KMM to market new routes (Section 10.2, p. 147).
- Make understanding transit services easier by revising timetables and route diagrams for clarity, listing transfer points and describing all corresponding connections.
- Work with contiguous counties or municipalities to develop pilot programs to meet the demand for inter-county transportation
- Work with NJTPA, NJ Transit and other transportation planning agencies to identify unmet regional mobility needs.

2 Description of the Study Area

2.1 Location and Setting

The Route 9 Corridor Study Area **("Study Area")**, situated in southeastern Middlesex County, consists of Old Bridge Township and Sayreville Borough, New Jersey. These two municipalities combined, highlighted on the following two maps, contain approximately 54 square miles of land area, which is more than one-sixth of Middlesex County's total land area (310 square miles). The Study Area is bounded by South Amboy, Perth Amboy, and the Raritan Bay to the northeast; Woodbridge and Edison to the north and northwest; South River, East Brunswick, and Spotswood to the west; Monroe and Manalapan to the west and south; and Marlboro, Matawan and Aberdeen to the southeast. The scope of this report did not include South Amboy in the Study Area because it is not served by Route 9 buses.

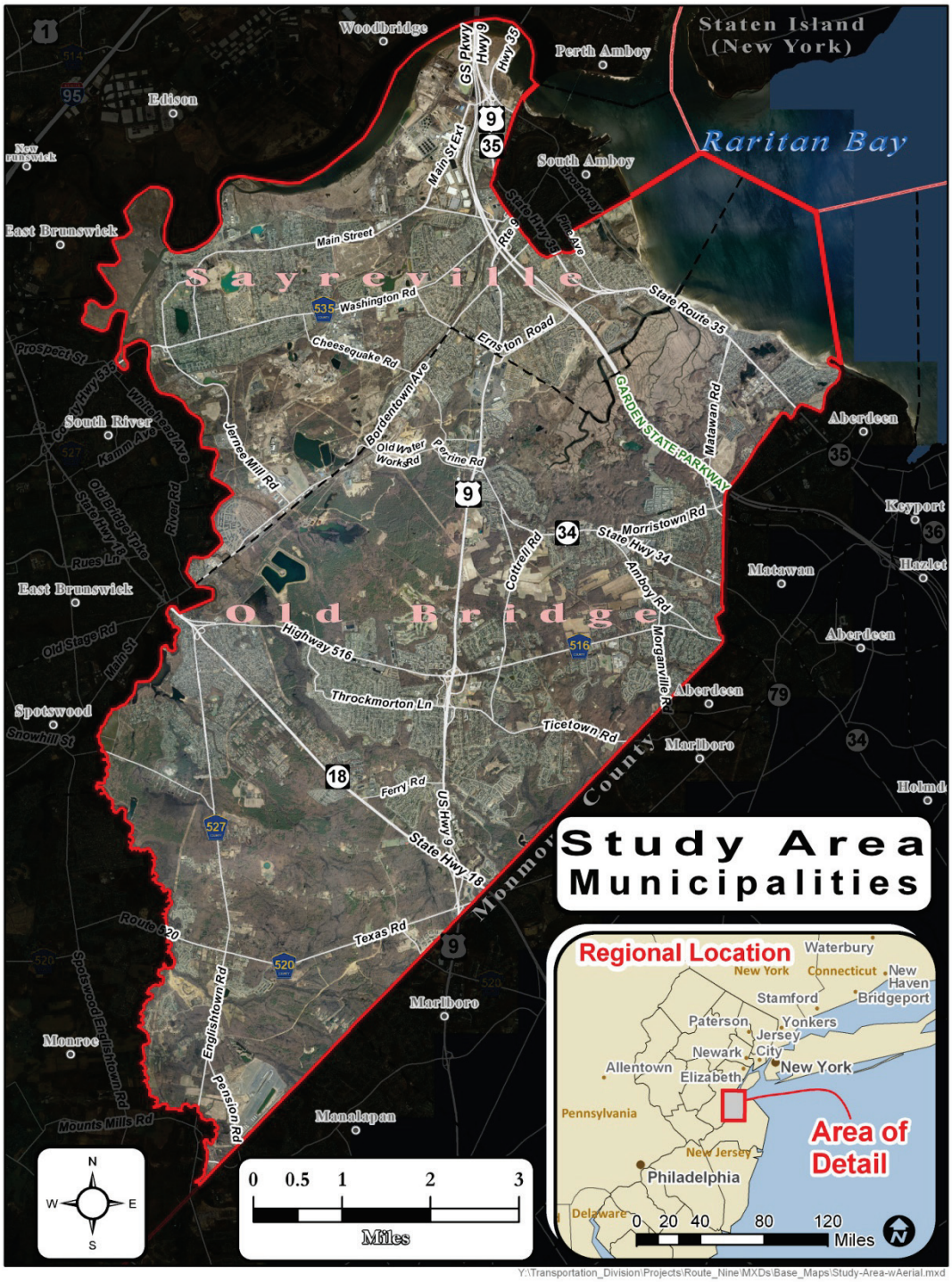
Map 2-1: Regional Location Map



U.S. Route 9 is the most prominent roadway feature in the Study Area bisecting both municipalities north to south. It is a commercial strip, an important highway connection, and a critical transit corridor that connects commuters from south of the Study Area or from local park and ride facilities to points north. At the northern tip of the Study Area, Route 9 also intersects the Garden State Parkway, a limited-access toll road that runs the length of that state from north to south and is perhaps the most travelled highway in the state.

Other major highways include State Routes 34 and 35, which split off from Route 9 southeasterly toward shore points in Monmouth County. Route 18 provides an important connection to commercial areas in East Brunswick, to U.S. Route 1 and the New Jersey Turnpike, all northwest of the Study Area. It runs in a southeasterly direction through Old Bridge. Major Middlesex County roadways include CR 535, CR 516, CR 527, and CR 520. County Route 516 bisects the Study Area, running from East to West through Old Bridge. Main Street, Route 535 (Washington Road), Ernston Road, and Bordentown Avenue are also significant thoroughfares that connect major residential areas as well as major highways within the Study Area.

Map 2-2: Study Area Map



2.2 Access and Linkages

The Study Area is afforded a wide array of transportation access with noteworthy connectivity to an extensive regional roadway system paired with the availability of major public transportation services, both rail and bus. One major toll route (the Garden State Parkway), several state highways, and three major bridge-crossings across the Raritan River are within the Study Area. In addition, the Study Area is within just a few miles of one of the nation's most-traveled highways (the New Jersey Turnpike / I-95) and is within convenient driving distance to three international airports (the closest being Newark Liberty International — 30 minutes by car). Transit Linkage systems made available by these routes have made the Old-Bridge-Sayreville Study Area a significant "bedroom suburb."

Fixed-route passenger bus services in the Study Area are provided by New Jersey Transit, Suburban Transit, Academy Bus, Middlesex County Area Transit (MCAT), and Old Bridge Municipal Jitney Service (operated by MCAT).

Passenger Rail: The Study Area is served by nearby railroad stations located in South Amboy and Matawan with direct commuter rail service northbound to Newark, NJ and Manhattan via NJ Transit's North Jersey Coast Line. Southbound passengers on the North Jersey Coast Line enjoy direct service to shore points including Asbury Park, Belmar, and Point Pleasant.

Passengers to New York Penn Station can connect to the New York City Subway and Long Island Rail Road; and to Amtrak lines serving destinations such as Washington, D.C., Philadelphia, Boston, and Montréal. Coast Line passengers traveling to Newark can connect to many of the same Amtrak services; travel via the Port Authority Trans-Hudson (PATH) system to Midtown, Lower Manhattan and Hudson County (NJ); or transfer to NJ Transit's Northeast Corridor Line with direct service to Trenton. Transfers to the Northeast Corridor Line also provide connecting service to Amtrak's regional rail network offering service to destinations such as Philadelphia, Boston, and Washington, DC.

Major Highways: Routes 9, 18, 34, 35, and 36 are largely known to accommodate trips of a regional nature; however, these major roadways serve vital local trips within the Study Area and surrounding towns. County Routes 516, 527, and 535 are complementary, providing connectivity between the State routes and the local road network.

Major Thruways: There are multiple access points to the **Garden State Parkway (GSP)**: Exit 125 at the end of the Main Street extension in Sayreville; Exit 124 off of Main Street in Sayreville; Exit 123 off of Route 9 in Sayreville; Exit 120 in the Cheesequake section of Old Bridge; and Exit 117 at the Routes 35/36 interchange in nearby Matawan (Monmouth County). Notable access to the **New Jersey Turnpike / I-95** is found only a few miles away in the nearby towns of East Brunswick (Exit 9 to the west) and Woodbridge (Exit 11 to the north)

Major Bridges: The Edison Bridge on U.S. 9, the Driscoll Bridge on the Garden State Parkway, and the Victory Bridge on Route 35.

Other Important Linkages: Crossing the Raritan River to the north provides access to the I-287 corridor, renowned for its numerous office complexes. Access to State Route 440 is also a short trip over the Raritan and offers convenient access to Staten Island via the Outerbridge Crossing (only 8 miles away) as well as Brooklyn, Queens and Long Island via the Staten Island Expressway and the Verrazano Bridge (24 miles away).

Regional Airports: Newark Liberty International is 30 minutes away by car; LaGuardia and JFK are 65 minutes away.

2.3 Residential Neighborhoods

There are numerous residential developments within the Study Area as depicted on the following map. General information for just some of the most notable of these major residential developments is listed below.

- Glenwood Apartments (1,164 units), northwest of the intersection of Route 9 and County Route 516 in Old Bridge.
- Winding Wood Apartments on Bordentown-Amboy Turnpike (1,600 +/- units) in the southwestern corner of Sayreville.
- London Terrace (962 units) along Route 9 (Parlin).
- Brooklawn Gardens (330 units) and Lakeview at Sayreville (330 units) along Washington Road just west of Sayreville High School.
- Madison Gardens (612 units), south of the intersection of Routes 9 and 34 in Old Bridge.
- Nieuw Amsterdam Village (480 units), east of Route 9 in Old Bridge.
- Parkwood Apartments (496 units), east of Route 9 in Old Bridge (north of Nieuw Amsterdam Village).
- Pine Gate Apartments (354 older units; 324 newer units) on Route 18 in Old Bridge.
- Skytop Apartments (500 +/- units), southeast of the intersection of Route 9 and Ernston Road in Sayreville, NJ.
- Park View at Madison (220 units) on Laurence Parkway in Old Bridge.
- Various residential developments along County Route 516 between Cottrell Road (CR 687) and Amboy Road (CR 645) in Old Bridge.
- Residential developments on the northbound side of Route 9 that are situated south of County Route 516 and north of the Spring Valley Road in southeast Old Bridge.

Map 2-3: Major Residential Neighborhoods

Winding Wood Apartments viewed from the southwest (April 9, 2006)

Brooklawn Gardens and Lakeview at Sayreville viewed from the south (April 9, 2006)

Heritage Woods (foreground) and Oakwoode (background) along Trans-Old Bridge Road (center) viewed from the southeast (April 9, 2006)

3 Demographic Profile

Demographic data can help estimate the need for transit based on factors such as population density, age, disabilities, automobile ownership, and income. Because transit helps senior citizens, people with disabilities, and those who may not be able to afford a vehicle or choose to live a car-free lifestyle, this information is useful in determining where changes in transportation may be appropriate.

The series of demographic data tables and graphs presented in this section of the report is primarily drawn from the 2006-2008 American Community Survey (ACS) 3-Year Estimates, which was the most current data source available at the municipal-level geography when this section was being prepared. The 2006-2008 ACS 3-year Estimates represent the average characteristics over the 3-year time period, which is based on data collected between January 2006 and December 2008 and published for selected geographic areas with populations of at least 20,000. Future references in this report to the 2006-2008 ACS data will simply state, "during 2006-2008." Appendix A of this report includes a full series of 2006-2008 ACS summary data tables for Old Bridge, Sayreville, Middlesex County and New Jersey. Margins of error for all ACS 3-year estimates can also be found in Appendix A.

Thematic census block group and census tract maps included in this report are largely based upon Census 2000 data, except where noted, because ACS data was not available at the sub-municipal geographic level when this section of the report was prepared. Therefore, the tabular data from ACS 2006-2008 are not directly comparable to the data presented in the thematic maps. However, despite this shortcoming, the maps offer valuable insights into variation within the Study Area for the respective demographic characteristic being discussed.

3.1 General Characteristics

3.1.1 Total Population

During 2006-2008, the total combined population of Old Bridge and Sayreville was 107,493 (63,804 residents in Old Bridge and 43,689 residents in Sayreville). The Study Area accounted for approximately 14% of Middlesex County's total population, and 1.2% of New Jersey's total population. Twenty-three percent of the Study Area's population was under 18 years of age and 12% was 65 years and older. Both of these percentages are consistent with the respective county- and statewide figures.

Table 3-1: Population Summary (2006-2008)

Geography	Total Population	18 and Over		65 and Over	
		Quantity	%	Quantity	%
Old Bridge	63,804	48,062	75%	6,964	11%
Sayreville	43,689	34,315	79%	5,688	13%
Study Area	107,493	82,377	77%	12,652	12%
Middlesex County	783,646	601,450	77%	94,913	12%
New Jersey	8,658,668	6,597,433	76%	1,137,731	13%

U.S. Census, 2006-2008 American Community Survey

Combining the data of Old Bridge and Sayreville gives the Study Area a population density of 3.1 persons per acre (1,991 persons per square mile), which is significantly higher than the statewide density of 1.82 persons per acre (1,167 persons per square mile). The statewide population density provides important context in that the Study Area figure exceeds the average density in the nation's most densely populated state.

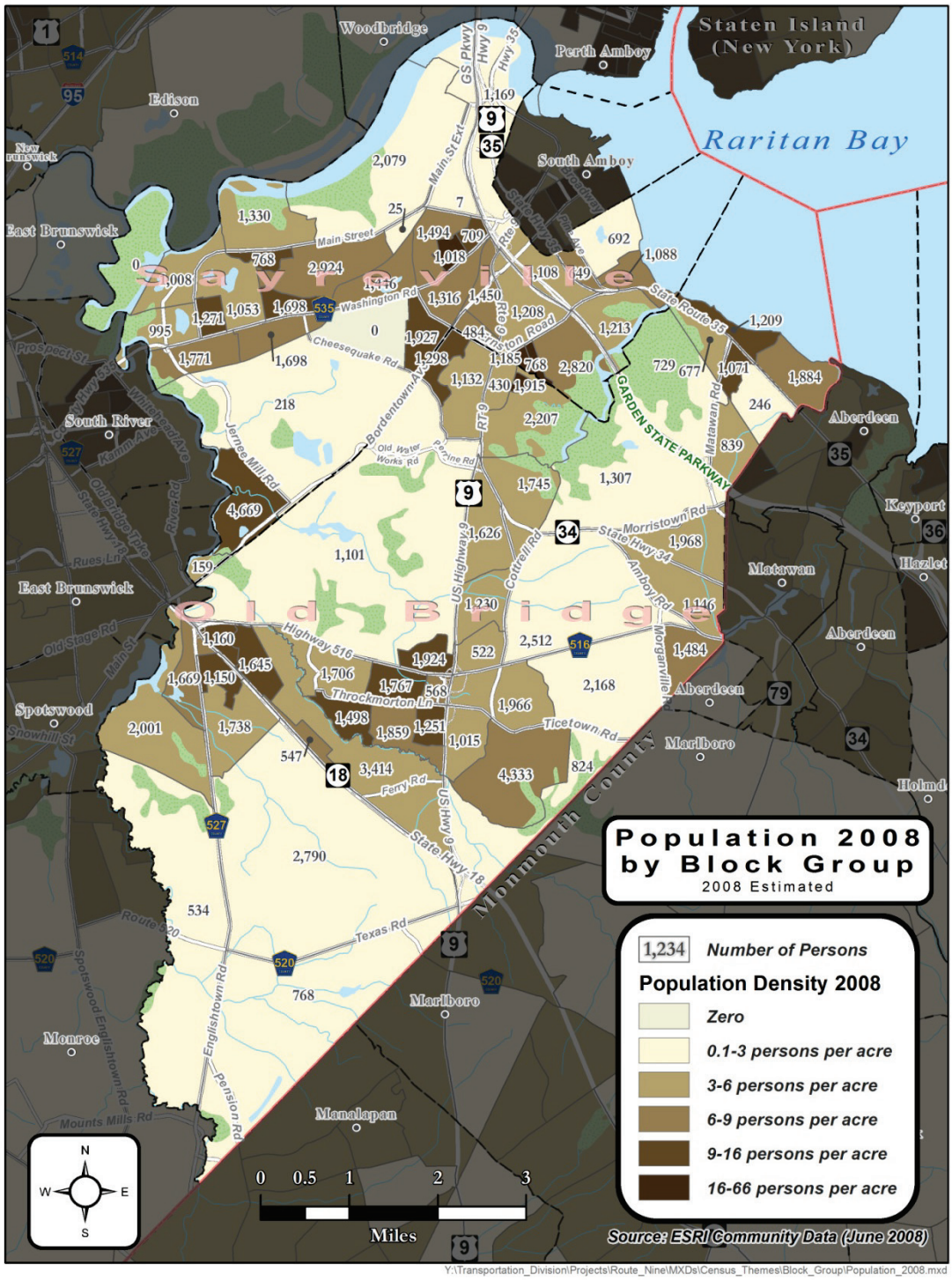
Table 3-2: Population Density in the Study Area, Middlesex County & NJ (2006-2008)

Geography	Population Density (persons per acre of land)
Old Bridge	2.62
Sayreville Borough	4.29
Study Area	3.11
Middlesex County	3.95
New Jersey	1.82

U.S. Census, 2006-2008 American Community Survey

The Study Area's highest population densities occur along U.S. Route 9, State Routes 18 and 35, and County Routes 516 and 535 (Washington Road). Ernston Road is another densely populated corridor. Densities are especially prominent in areas where these major roads converge or intersect.

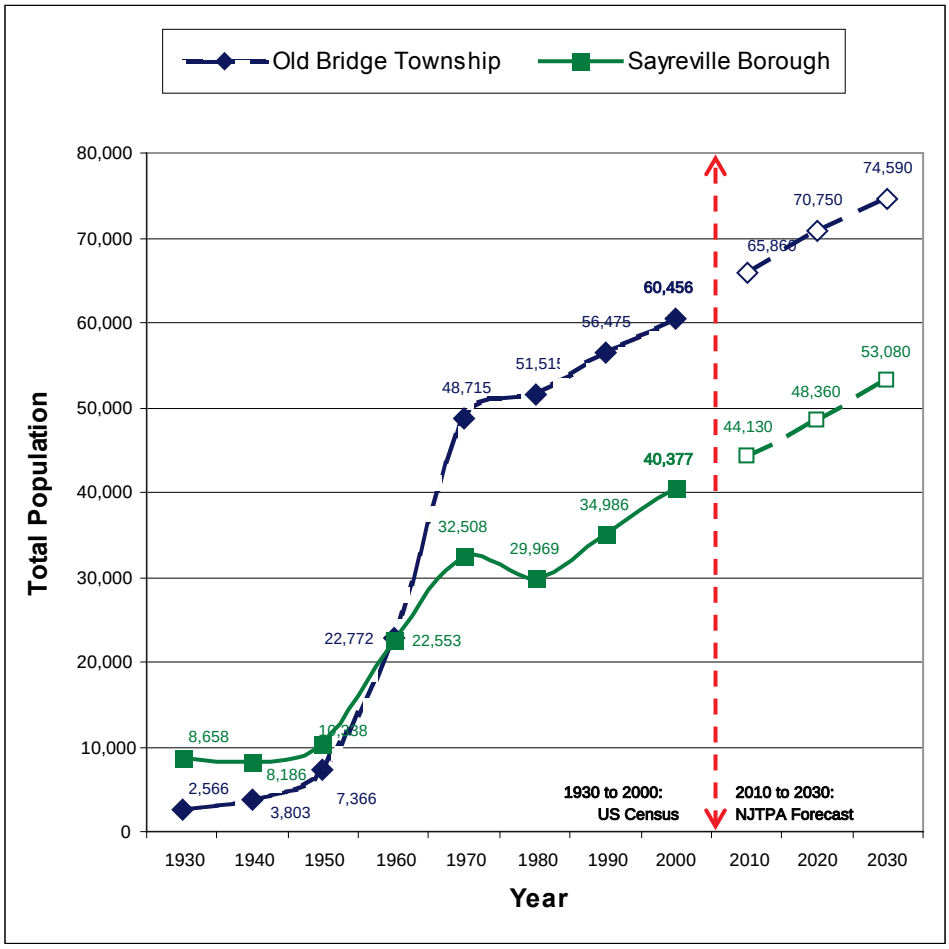
Map 3-1: Total Population and Population Density by Block Group (2008 Estimated)



3.1.2 Population Growth Trends

According to historic data of the US Census, Sayreville's population tripled between 1950 and 1970. The population of Old Bridge increased by almost 600 percent during the same time period. Since 1980, the historic and projected population growth rates have remained relatively constant for both municipalities. Based on North Jersey Transportation Planning Authority (NJTPA) population forecasts for 2010 to 2030 and Census data from 1980 to present, the two towns combined are growing in population by roughly 900 persons per year.

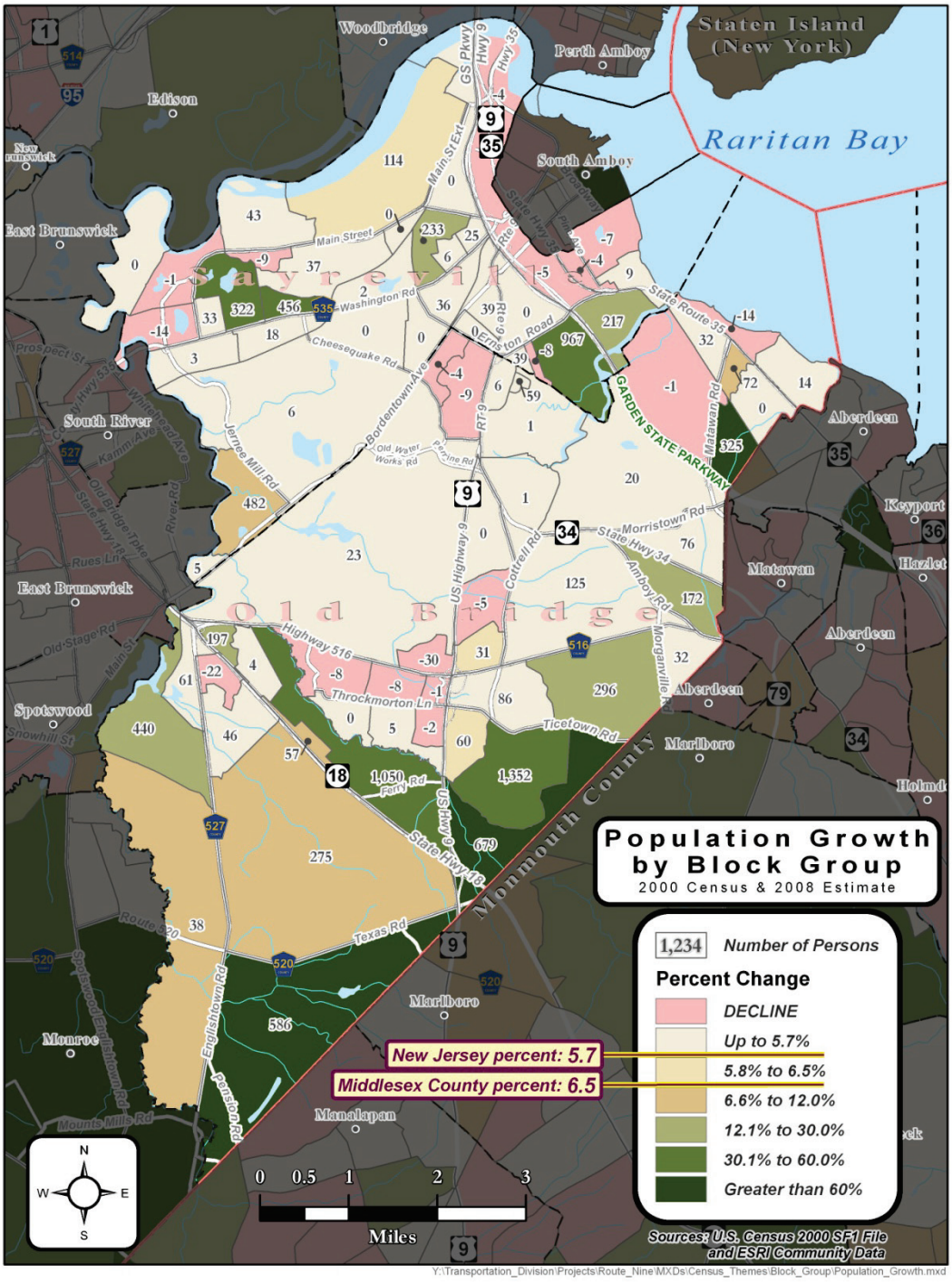
Figure 3-1: Population Growth (1930 to 2030)



Sources: as noted in chart

Between 2000 and 2008, the Study Area's population has experienced notable increases in certain locations. Most of this growth has occurred near Routes 9 and 18 in the southern portion of Old Bridge and along the border with Monmouth County, where vacant land was available for development. The map below depicts these population changes by Census block groups.

Map 3-2: Population Growth by Block Group (2000 to 2008)



3.1.3 Age of Population

During 2006-2008, the median ages for Old Bridge and Sayreville, 38.5 and 38.4 respectively, mirrored the state's median age of 38.5, all of which were slightly higher than Middlesex County's median age of 37.1.

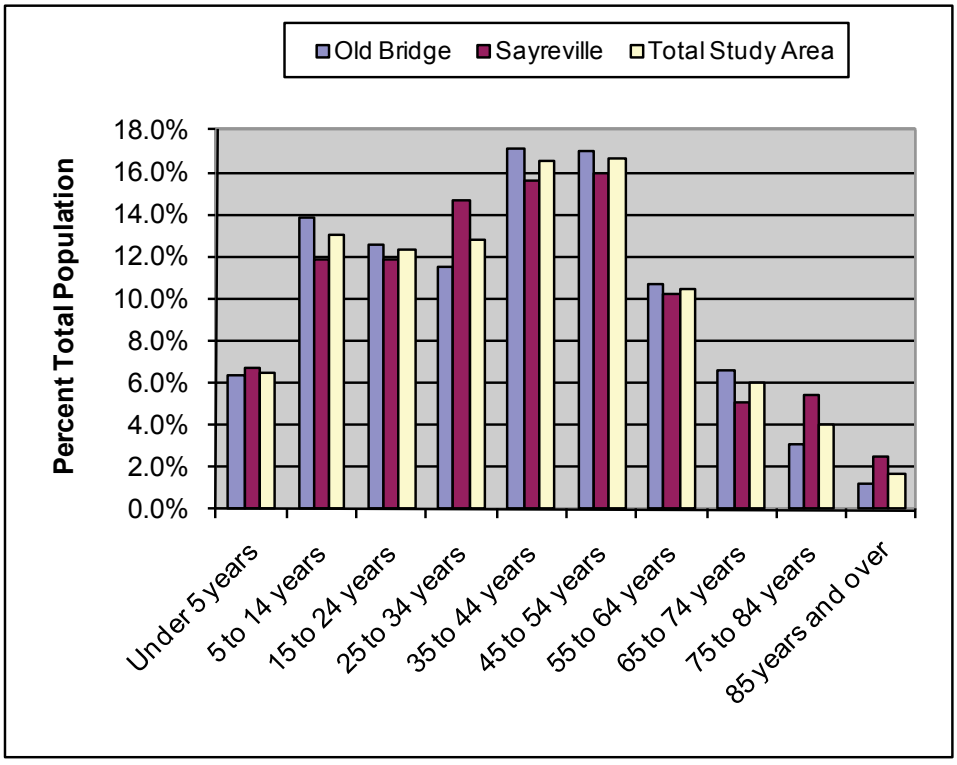
Table 3-3: Median Ages: Study Area, County & NJ (2006-2008)

Geography	Median Age
Old Bridge	38.5
Sayreville	38.4
Study Area	not available
Middlesex County	37.1
New Jersey	38.5

U.S. Census, 2006-2008 American Community Survey

The Study Area was mainly an adult population, with 77% of its residents reported as being 18 years of age and older; one-third of the population was between the ages of 35 and 54; and, 12% of the population was 65 years and over.

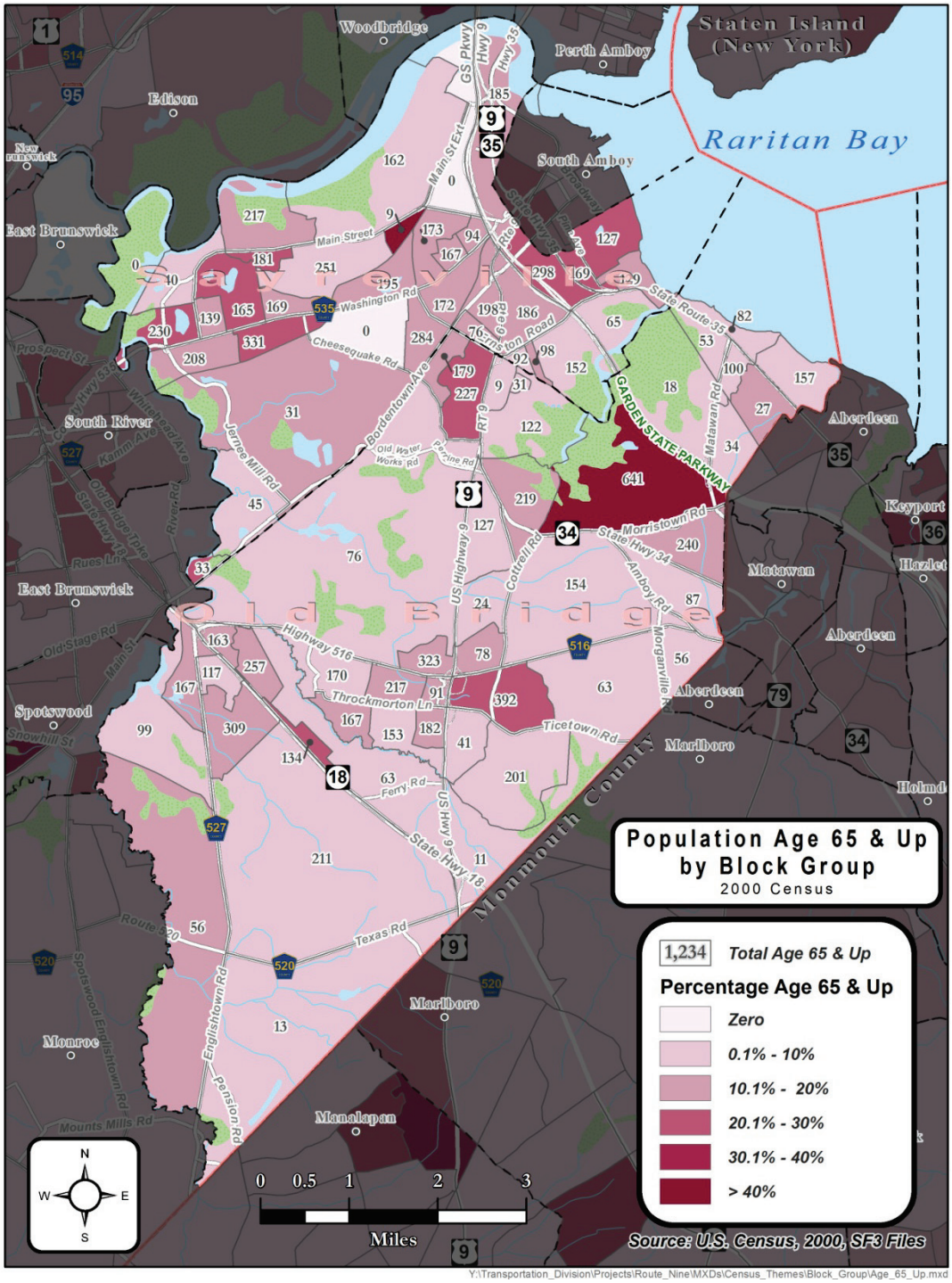
Figure 3-2: Age Cohorts for Old Bridge, Sayreville, and Study Area (2006-2008)



Source: U.S. Census, 2006-2008 American Community Survey

The map below illustrates the relatively strong presence of people ages 65 and up in specific parts of the Study Area. One particular block group, north of Morristown Road in Old Bridge, is an area where more than 40 percent of the population was 65 or older. This larger share was mainly due to the presence of Cheesequake Village, a 55 and over community with 713 units.[1]

Map 3-3: Population Age 65 and Over by Block Group (2000 Census)



3.2 Households

3.2.1 Total Number of Households

American Community Survey data from 2006-2008 shows that among the 38,536 households in the Study Area, 35% had children under 18 years of age, compared to 36% and 33% in the county and state, respectively. Family households comprised 72.3% of the total households in the Study Area, which was slightly higher than both the county and state percentages of 71.5% and 69.3%, respectively. Old Bridge alone had a 74.4% share of family households.

Table 3-4: Households and Household Types (2006-2008)

Households	Study Area		County		NJ	
	Quantity	Percent	Quantity	Percent	Quantity	Percent
Total Households	38,536	100.0%	272,381	100.0%	3,149,545	100.0%
Non-Family Households	10,687	27.7%	77,494	28.5%	969,957	30.8%
Family Households	27,850	72.3%	194,887	71.5%	2,179,588	69.2%
With Own Children Under 18	13,450	34.9%	97,688	35.9%	1,042,765	33.1%

Source: U.S. Census, 2006-2008 American Community Survey

3.2.2 Average Household Size

The average household size in the Study Area was 2.77 persons per household, matching the county average (2.77) and close to the state average (2.69). Broken down by municipality, the average household size of 2.78 persons in Old Bridge was comparable to the county average of 2.77. Sayreville's average of 2.68 more closely resembled the state average of 2.69 persons per household.

Table 3-5: Average Household Size (2006-2008)

Average Household Size	Old Bridge	Sayreville	County	N.J.
All Households	2.78	2.68	2.77	2.69
Owner-Occupied	3.00	2.82	2.90	2.83
Renter-Occupied	2.23	2.41	2.51	2.40

Source: U.S. Census, 2006-2008 American Community Survey

3.2.3 Household Density

During 2006-2008, Sayreville and Old Bridge combined exhibited a household density of 1.12 households per acre — nearly double the state average of 0.66 households per acre, but slightly below the county average of 1.37 households per acre. However, the individual densities for Sayreville and Old Bridge tell different stories due to varying settlement patterns within the respective municipal boundaries. Sayreville, with 1.55 households per acre, had a higher household density than the county average and, as seen in the following map, its households were noticeably distributed more uniformly across the municipality. Even though Old Bridge had a greater number of households, they were geographically dispersed over a larger land area that included large swaths of parkland, preserved open space and a watershed protection area, all of which contributed to its overall lower municipal-level household density figure.

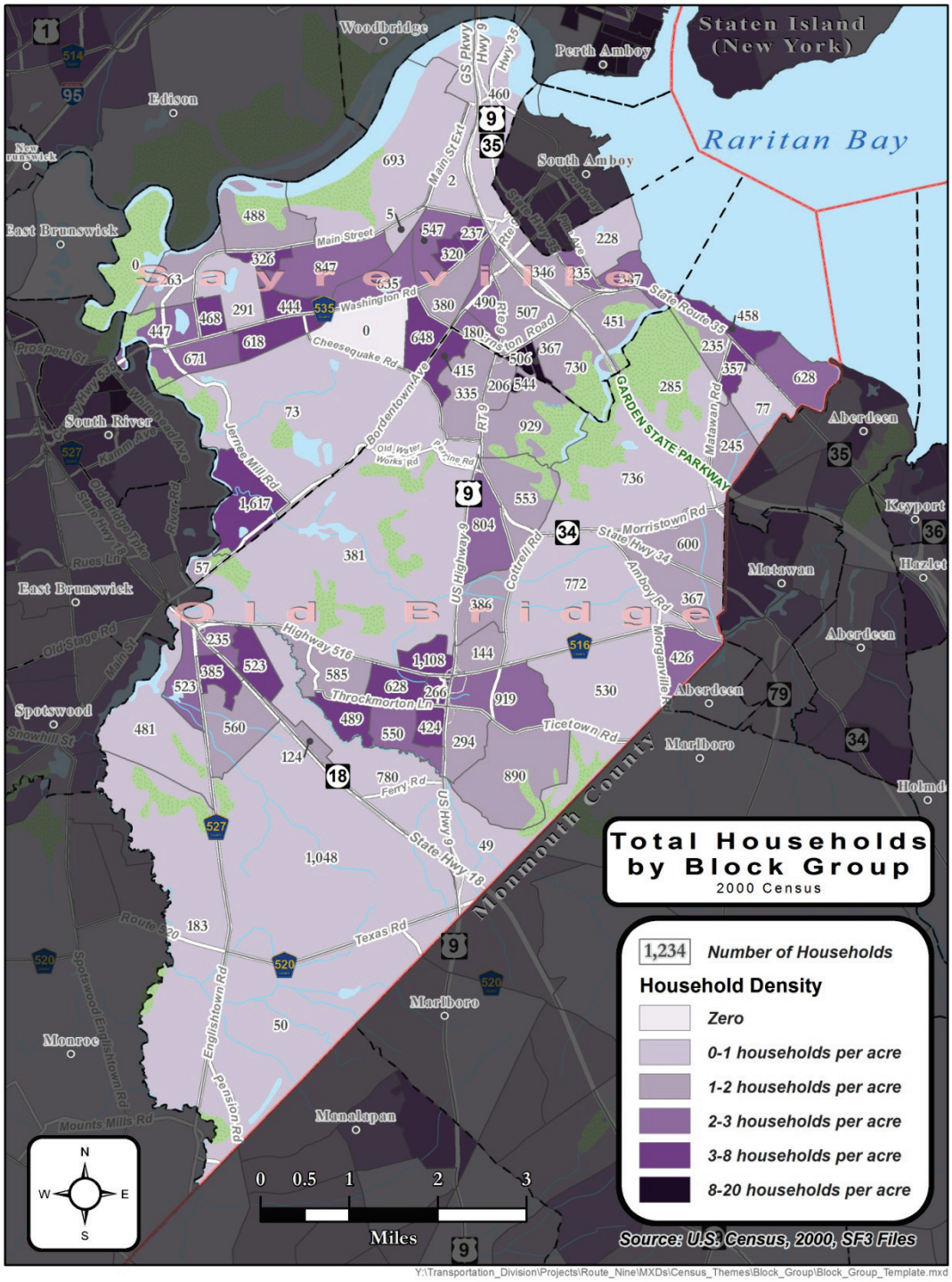
Table 3-6: Household Density (2006-2008)

Geography	Household Density (per acre)
Old Bridge	0.93
Sayreville Borough	1.55
Old Bridge and Sayreville	1.12
Middlesex County	1.37
New Jersey	0.66

Source: U.S. Census, 2006-2008 American Community Survey

The following map illustrating the number of households and density by block group depicts areas with greater concentrations of households clustered along major transportation routes. Typically, the highest household densities occur along Routes 9, 18 and 35; County Routes 516 and 535; and Ernston Road. The Study Area hosts a mixture of residential housing, including clusters of detached single-family dwellings as well as numerous apartment complexes. The higher density of households in certain areas of the following map are attributable to relatively new apartment complexes such as Winding Wood Apartments in Sayreville, located just west of the intersection between Jernee Mill Road and Bordentown Avenue. Higher-than-average household densities can also be attributed to small-lot detached single-family developments in areas such as the neighborhoods flanking Washington Road in Sayreville or the Southwoods section of Old Bridge.

Map 3-4: Total Households and Household Density by Block Group (2000 Census)



3.3 Housing Stock

3.3.1 Type of Housing Unit

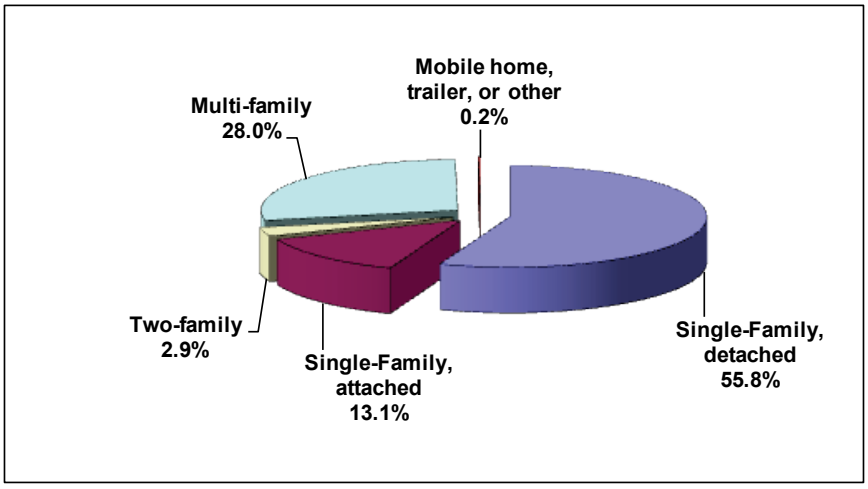
During 2006-2008, single-family dwellings (detached and attached) comprised 69% of the total housing stock in the Study Area. Multi-family dwellings accounted for 28% and two-family dwellings were 3% of the total housing stock. In comparison, the county's housing stock consisted of 65% single family units and 35% multi-family units during the same time period.

Table 3-7: Housing Units in Residential Structures of the Study Area (2006-2008)

Old Bridge and Sayreville	Number of Housing Units
Total	**40,435**
Single-Family, detached	22,550
Single-Family, attached	5,310
Two-family	1,162
Multi-family	11,325
Mobile home, trailer, or other	88

Source: U.S. Census, 2006-2008 American Community Survey Estimates

Figure 3-3: Housing Units in Residential Structures of the Study Area (2006-2008)

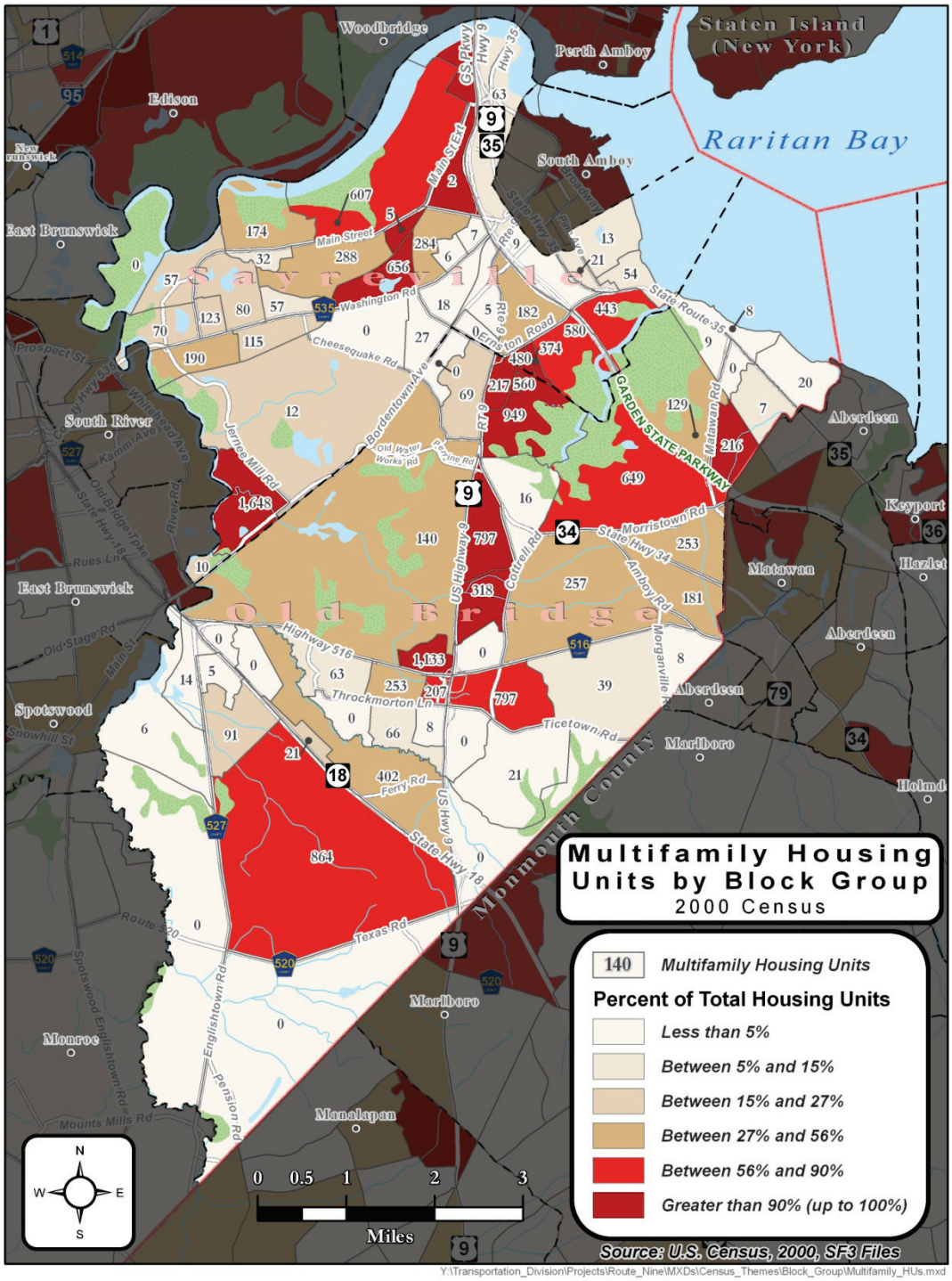


Source: U.S. Census, 2006-2008 American Community Survey

The Census block groups with the greatest share of multi-family housing mostly occurred along Routes 9 and 18, Ernston Road, and Main Street (Map 3-5). In some of these block groups there were obvious contributors to the higher percentage of multi-family households. For example, the higher rate of multi-family housing in the block groups situated near the intersection of Ernston

Road and Route 9 can be attributed to London Terrace developments and Skytop Gardens, which together include 1,400 units.

Map 3-5: Multifamily Housing Units by Block Group (2000 Census)

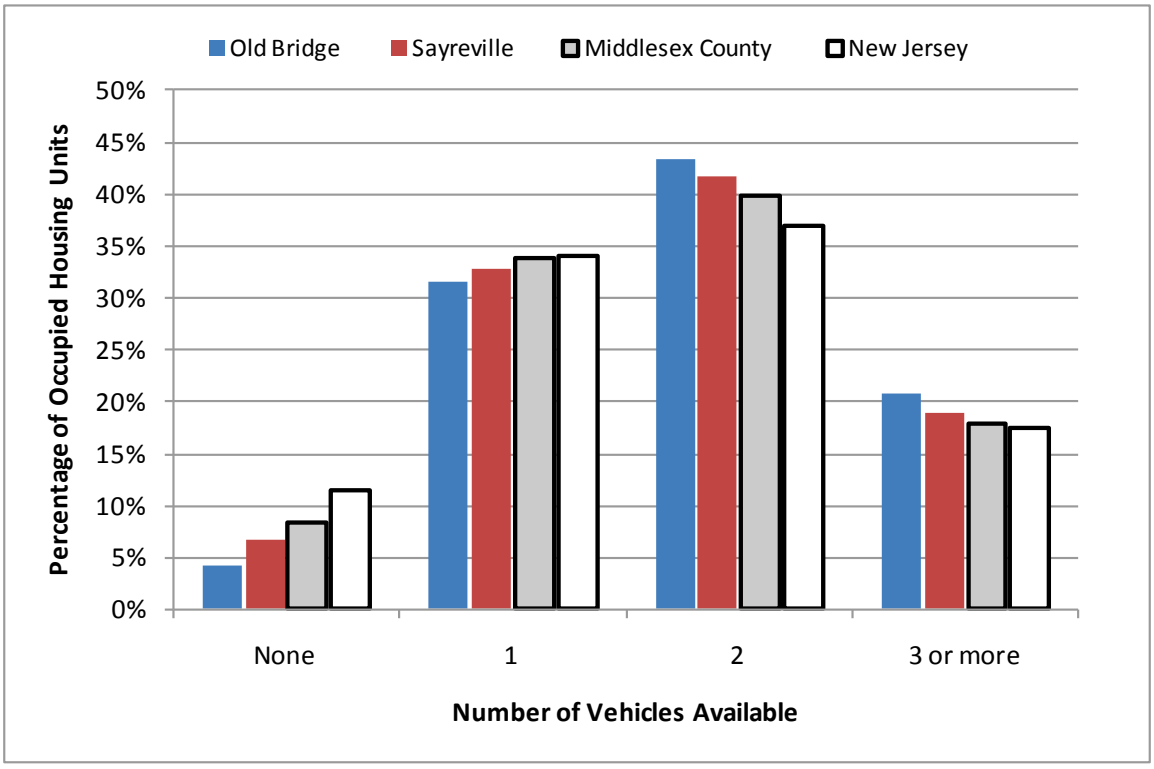


3.3.2 Vehicle Availability

During 2006-2008, there was a higher rate of vehicles per housing unit in Old Bridge and Sayreville than in the county or the state. The percentage of housing units with at least one vehicle available was significantly higher in Old Bridge (96%) and Sayreville (93%) than the state (89%). In addition, the share of housing units with two or more vehicles was nearly ten percentage points higher in Old Bridge (64%) than the state (55%).

The share of housing units with one or no vehicle available was lower in the Study Area (37%) than found in either the county (42%) or the state (46%). Similarly, the share of housing units with no vehicle available was lower in the Study Area (5%) than found in either the county (8%) or the state (12%).

Figure 3-4: Occupied Housing Units by Number of Vehicles Available (2006-2008)



Source: U.S. Census, 2006-2008 American Community Survey Estimates

Table 3-8: Number of Vehicles Available per Occupied Housing Unit: Study Area, County & State (2006-2008)

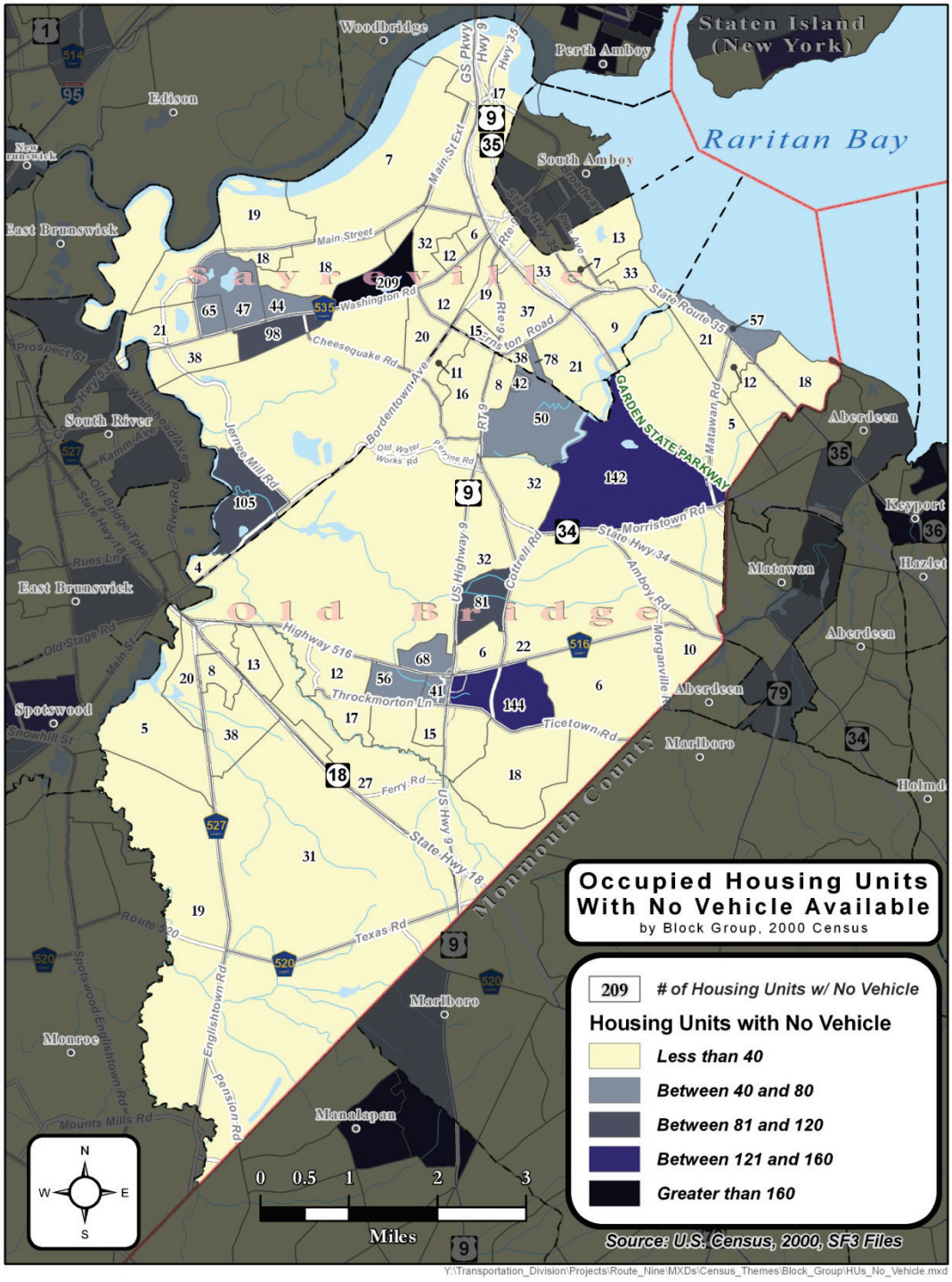
Geography	Number of Vehicles Per Occupied Housing Unit
Old Bridge	1.89
Sayreville	1.81
Study Area	1.86
County	1.75
NJ	1.67

Source: U.S. Census, 2006-2008 American Community Survey Estimates

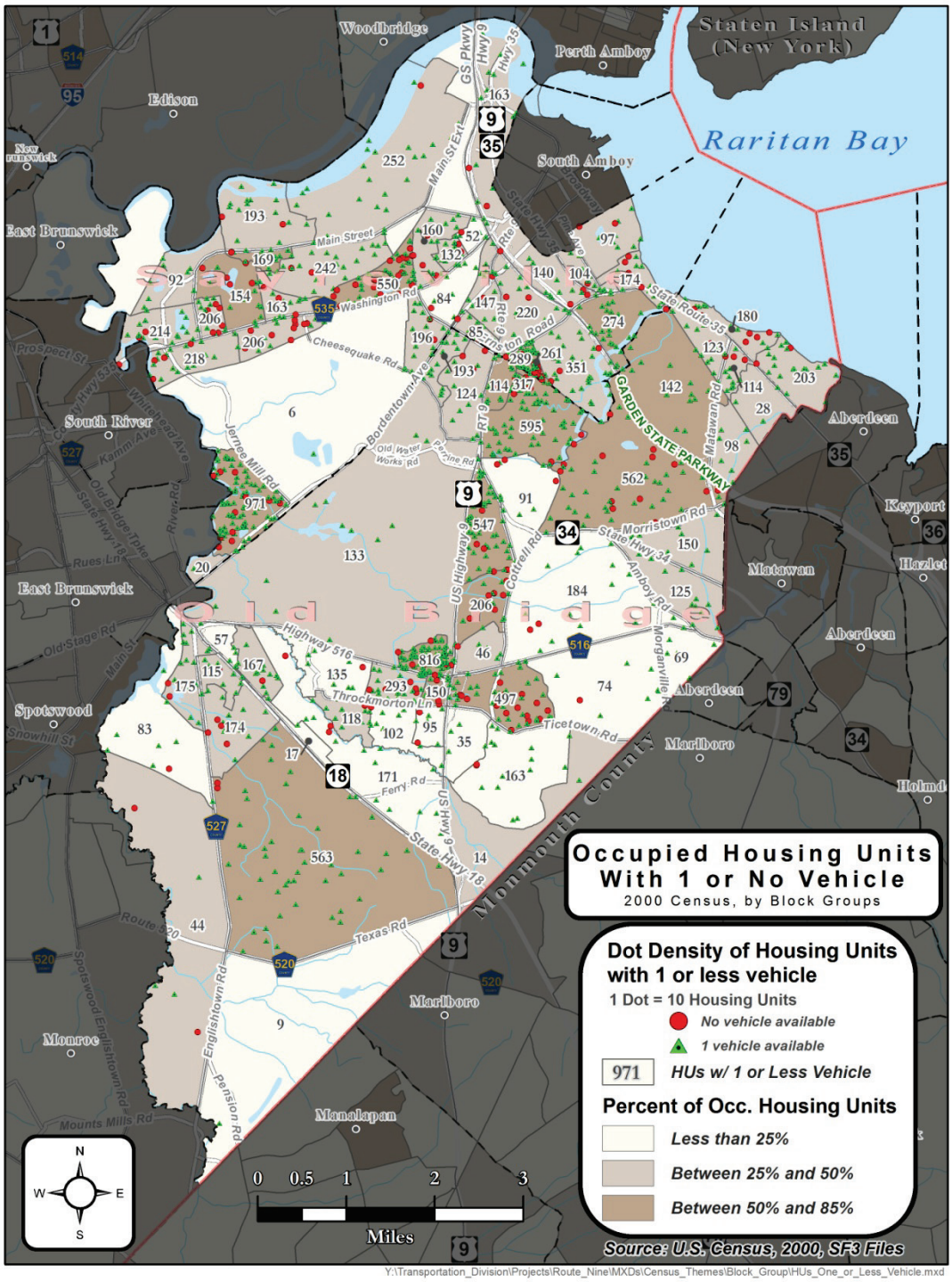
During 2006-2008, approximately 2,000 housing units out of a total occupied housing stock of 39,000 units in the Study Area had no vehicle available. In 2000, the comparable figure was slightly higher at 2,200 housing units without a vehicle available out of 36,000 total occupied housing units.

The darker colors on Map 3-6 shows block groups in the Study Area that had a greater number of housing units with no vehicle available during the 2000 Census. In 2000, housing units with no vehicle available were concentrated along Washington Road; in the multi-family developments surrounding the Old Bridge Park & Ride; and in the vicinity of the CR 516 & Route 9 interchange. Housing units with one vehicle available were noticeably more dispersed (see Map 3-7).

Map 3-6: Occupied Housing Units with No Vehicle Available (2000 Census)



Map 3-7: Occupied Housing Units with One or No Vehicle Available (2000 Census)

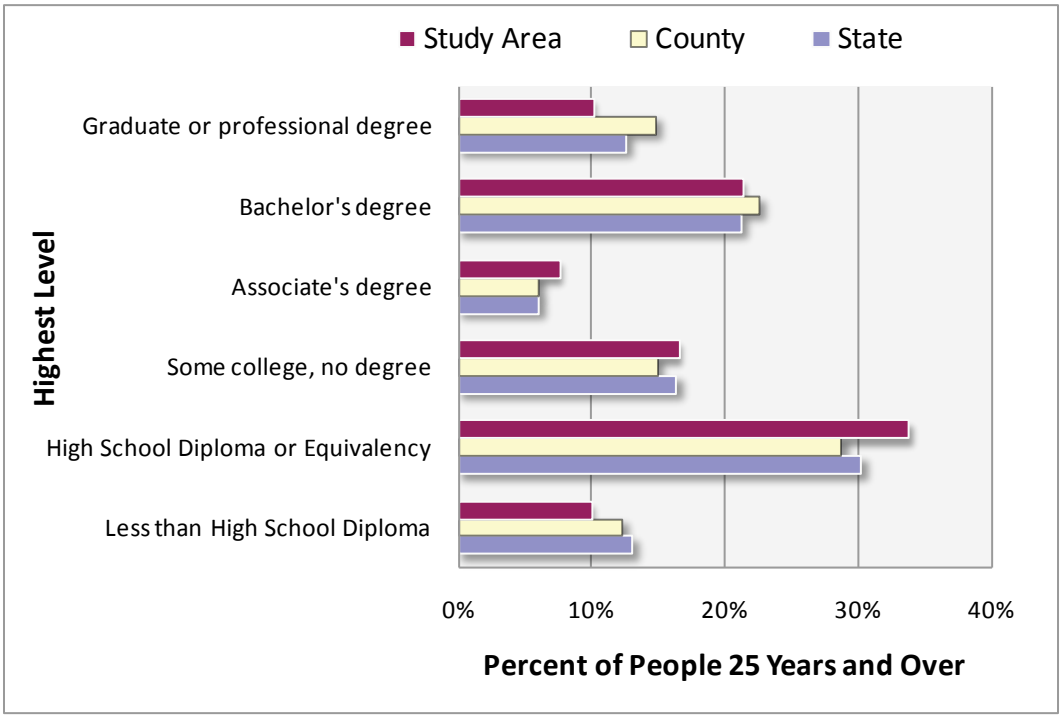


3.4 Social Characteristics

3.4.1 Educational Attainment

During 2006-2008, the U.S. Census estimated that 32% of residents 25 years and older in the Study Area had achieved a Bachelor's degree or higher. This was slightly lower than the 38% for Middlesex County and the 34% at the state level that attained a Bachelor's degree by the age of 25. Conversely, about 34% of the people 25 years and older in the Study Area had achieved a high school diploma or equivalent as the highest level of education, which is greater than the same figures reported at the county or state levels (29% and 30%, respectively).

Figure 3-5: Educational Attainment of Study Area Residents (2006-2008)



3.4.2 Language

Among people at least five years old living in the Study Area during 2006-2008, roughly 29% (29,000 people +/-) spoke a language other than English at home. While there is a significant share of people who spoke a foreign language at home, there was no single dominant foreign language spoken. The very expansive grouping of "other Indo-European languages" was identified as the language category for nearly 8,200 people in the Study Area, which exceeded the number of people who spoke Spanish (7,533), Slavic languages (4,739), or Chinese (1,595).[2]

Slightly more than 3,800 people in the Study Area, or about 3.8% of the total population five years and over, reportedly spoke English "not well" (3,175 people). Approximately 650 people did not speak English at all. The following two tables provide further details regarding language spoken at home and the ability to speak English.

Table 3-9: Language Spoken at Home, Study Area (2006-2008)

For the population 5 years and over

Language Spoken at Home	Old Bridge		Sayreville		Study Area	
	Quantity	Percent	Quantity	Percent	Quantity	Percent
Total Population 5 years and over	**59,770**	**100%**	**40,731**	**100%**	**100,501**	**100%**
Speak only English	43,953	73.5%	27,822	68.3%	71,775	71.4%
Speak language other than English:	15,817	26.5%	12,909	31.7%	28,726	28.6%
Spanish (including Spanish Creole)	3,991	6.7%	3,542	8.7%	7,533	7.5%
French (including Patois, Creole, Cajun)	221	0.4%	273	0.7%	494	0.5%
German or other West Germanic languages	195	0.3%	71	0.2%	266	0.3%
Slavic languages	2,631	4.4%	2,108	5.2%	4,739	4.7%
Other Indo-European languages	4,714	7.9%	3,480	8.5%	8,194	8.2%
Korean	244	0.4%	119	0.3%	363	0.4%
Chinese	1,058	1.8%	537	1.3%	1,595	1.6%
Vietnamese	29	0.0%	137	0.3%	166	0.2%
Tagalog	1,104	1.8%	387	1.0%	1,491	1.5%
Other Asian or Pacific Island languages	412	0.7%	829	2.0%	1,241	1.2%
Other and unspecified languages	1,218	2.0%	1,426	3.5%	2,644	2.6%

U.S. Census, 2006-2008 American Community Survey; for a full description of language categories of the US Census please refer to: http://www.census.gov/hhes/socdemo/language/about/ or http://www.census.gov/prod/2010pubs/acs-12.pdf

Table 3-10: Language Spoken at Home by Ability to Speak English, Study Area (2006-2008)

For the population 5 years and over

Language Spoken at Home / Ability to Speak English	Old Bridge		Sayreville		Study Area	
	Quantity	Percent	Quantity	Percent	Quantity	Percent
Total Population 5 years and over	**59,770**	**100%**	**40,731**	**100%**	**100,501**	**100%**
Speak only English	43,953	73.5%	27,822	68.3%	71,775	71.4%
Speak language other than English:	15,817	26.5%	12,909	31.7%	28,726	28.6%
Speak English "very well"	10,096	16.9%	6,927	17.0%	17,023	16.9%
Speak English "well"	3,595	6.0%	4,284	10.5%	7,879	7.8%
Speak English "not well"	1,821	3.0%	1,354	3.3%	3,175	3.2%
Speak English "not at all"	305	0.5%	344	0.8%	649	0.6%
Speak Spanish:	3,991	6.7%	3,542	8.7%	7,533	7.5%
Speak English "very well"	2,788	4.7%	1,736	4.3%	4,524	4.5%
Speak English "well"	794	1.3%	1,287	3.2%	2,081	2.1%
Speak English "not well"	362	0.6%	415	1.0%	777	0.8%
Speak English "not at all"	47	0.1%	104	0.3%	151	0.2%
Speak other Indo-European languages:	7,776	13.0%	5,932	14.6%	13,708	13.6%
Speak English "very well"	4,522	7.6%	3,186	7.8%	7,708	7.7%
Speak English "well"	1,998	3.3%	1,915	4.7%	3,913	3.9%
Speak English "not well"	1,055	1.8%	624	1.5%	1,679	1.7%
Speak English "not at all"	201	0.3%	207	0.5%	408	0.4%
Speak Asian or Pacific Island languages:	2,847	4.8%	2,009	4.9%	4,856	4.8%
Speak English "very well"	1,885	3.2%	1,114	2.7%	2,999	3.0%
Speak English "well"	619	1.0%	646	1.6%	1,265	1.3%
Speak English "not well"	299	0.5%	230	0.6%	529	0.5%
Speak English "not at all"	44	0.1%	19	0.0%	63	0.1%
Speak other languages:	1,203	2.0%	1,426	3.5%	2,629	2.6%
Speak English "very well"	901	1.5%	891	2.2%	1,792	1.8%
Speak English "well"	184	0.3%	436	1.1%	620	0.6%
Speak English "not well"	105	0.2%	85	0.2%	190	0.2%
Speak English "not at all"	13	0.0%	14	0.0%	27	0.0%

U.S. Census, 2006-2008 American Community Survey; for a full description of language categories of the US Census please refer to: http://www.census.gov/hhes/socdemo/language/about/ or http://www.census.gov/prod/2010pubs/acs-12.pdf

3.5 Economic Characteristics

3.5.1 Household Income

The median household income for Old Bridge Township during 2006-2008 was $81,132, which was just above the county median of $77,315 in the same period. It was 16.5% greater than the state's median income of $69,674, exceeding it by nearly $11,500. On the other hand, the median income for Sayreville Borough was $69,881, which was very similar to the state's median income, yet much lower than the county's median income.

Table 3-11: Median Household Income by Geography (2006-2008)

Geography	Median Household Income (dollars)
Old Bridge	$81,132
Sayreville	$69,881
County	$77,315
State	$69,674

U.S. Census, 2006-2008 American Community Survey

3.5.2 Labor Force

During 2006-2008, the total labor force in the Study Area was nearly 60,000 people. The unemployment rate of 5.0% in the Study Area was better than the state (6.0%) and county (5.2%) rates. With unemployment at 6.0%, Sayreville was on par with state unemployment, while only 4.3% of the Old Bridge labor force was unemployed.

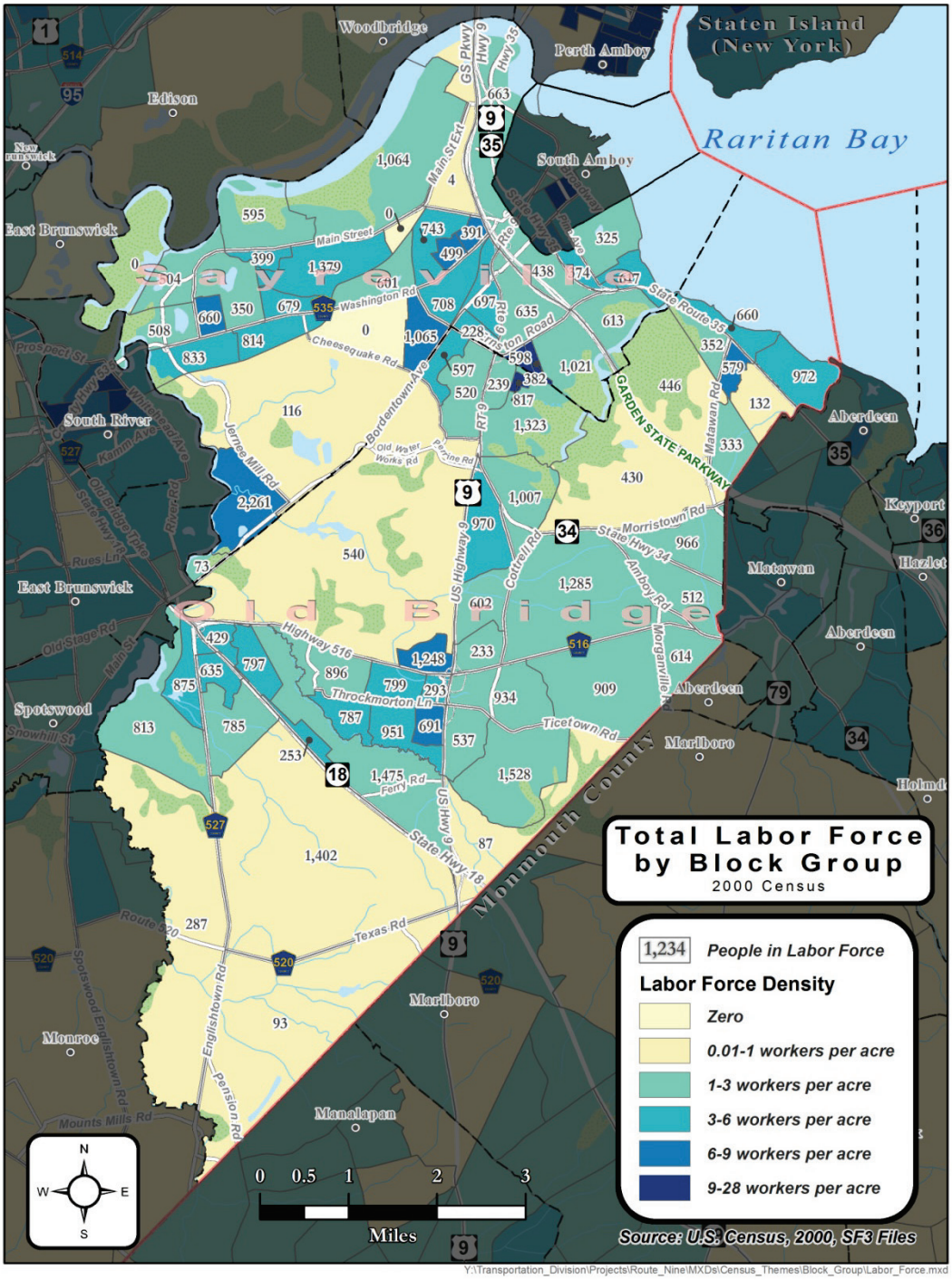
Table 3-12: Total Labor Force (2006-2008)

Employment Status	Old Bridge	Sayreville	Study Area	Middlesex	NJ
Population 16 years and over	50,181	35,096	85,277	623,044	6,841,756
In labor force	35,487	23,835	59,322	418,060	4,561,929
Civilian labor force	35,459	23,835	59,294	417,849	4,552,762
Employed	33,922	22,400	56,322	395,975	4,279,078
Unemployed	1,537	1,435	2,972	21,874	273,684
Percentage Unemployed	4.3%	6.0%	5.0%	5.2%	6.0%
Armed Forces	28	0	28	211	9,167
Not in labor force	14,694	11,261	25,955	204,984	2,279,827

U.S. Census, 2006-2008 American Community Survey

The map below illustrates that the labor force of the Study Area was largely concentrated in the most densely populated areas (Map 3-1) along Washington Road and Ernston Road in Sayreville and along Route 516 in Old Bridge.

Map 3-8: Total Labor Force by Block Group (2000 Census)

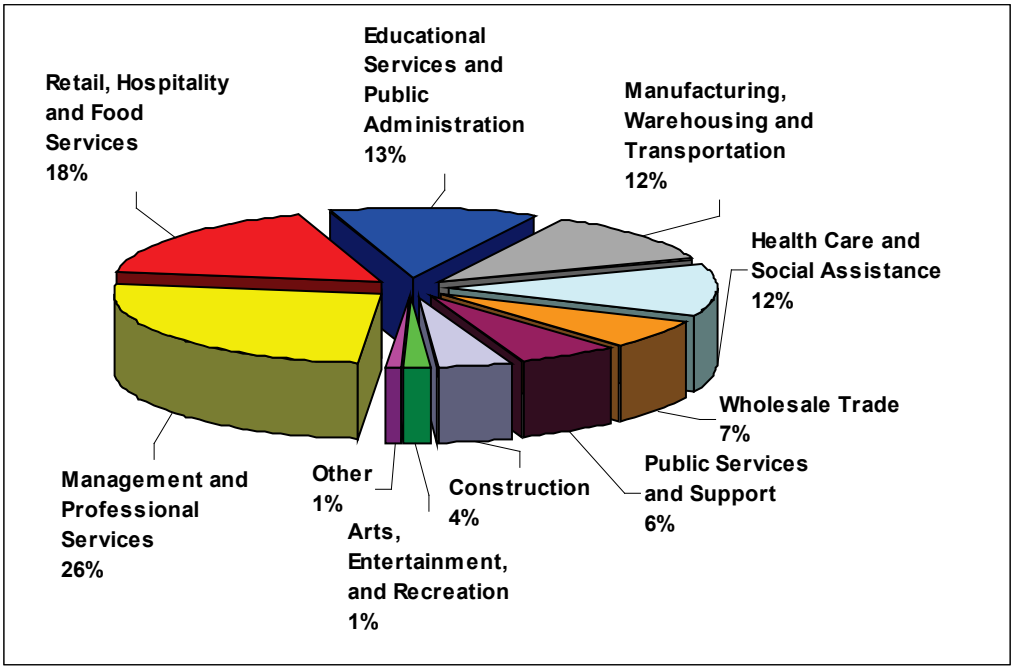


3.5.3 Occupations

A majority of the employed labor force of the Study Area worked in service occupations during 2006-2008. Combining the two largest occupation categories, "Retail, Hospitality and Food Service" and "Management and Professional Service" captured more than 44% of the working population in the Study Area. There were also large segments of the labor force employed in education, manufacturing and health care occupations.

Figure 3-6: Occupations of Old Bridge and Sayreville Residents (2006-2008)

Total Employed Population 16 and Over: 56,322

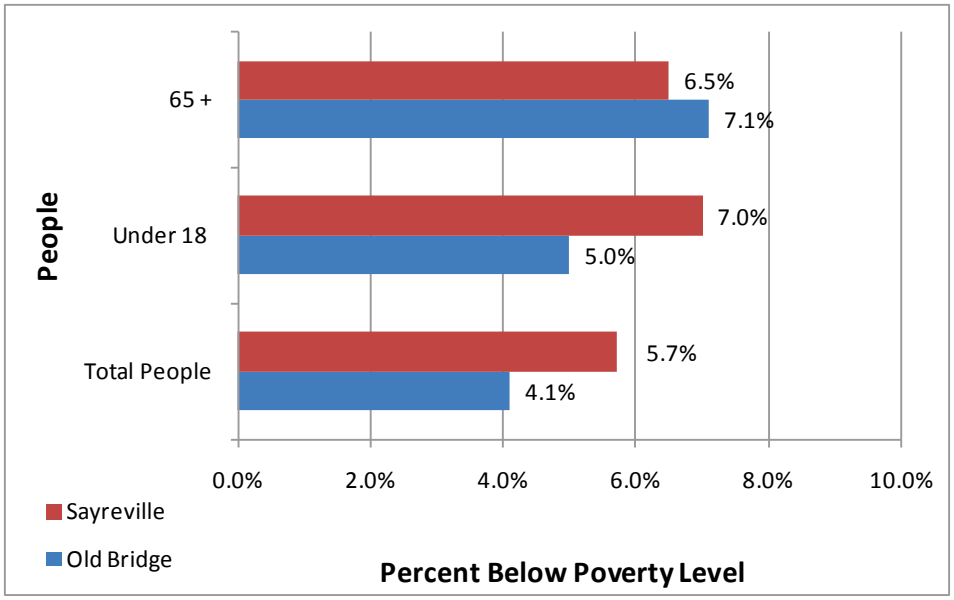


U.S. Census, 2006-2008 American Community Survey

3.5.4 Poverty Rates

During 2006-2008, the poverty rates for all people in Old Bridge (4%) and Sayreville (5.7%) were both lower than the county rate (7%), and significantly lower than the state rate (9%). Seven percent of people under 18 in Sayreville were below the poverty level. In Old Bridge, 5% of minors and 7% of seniors (65+) were below the poverty level.

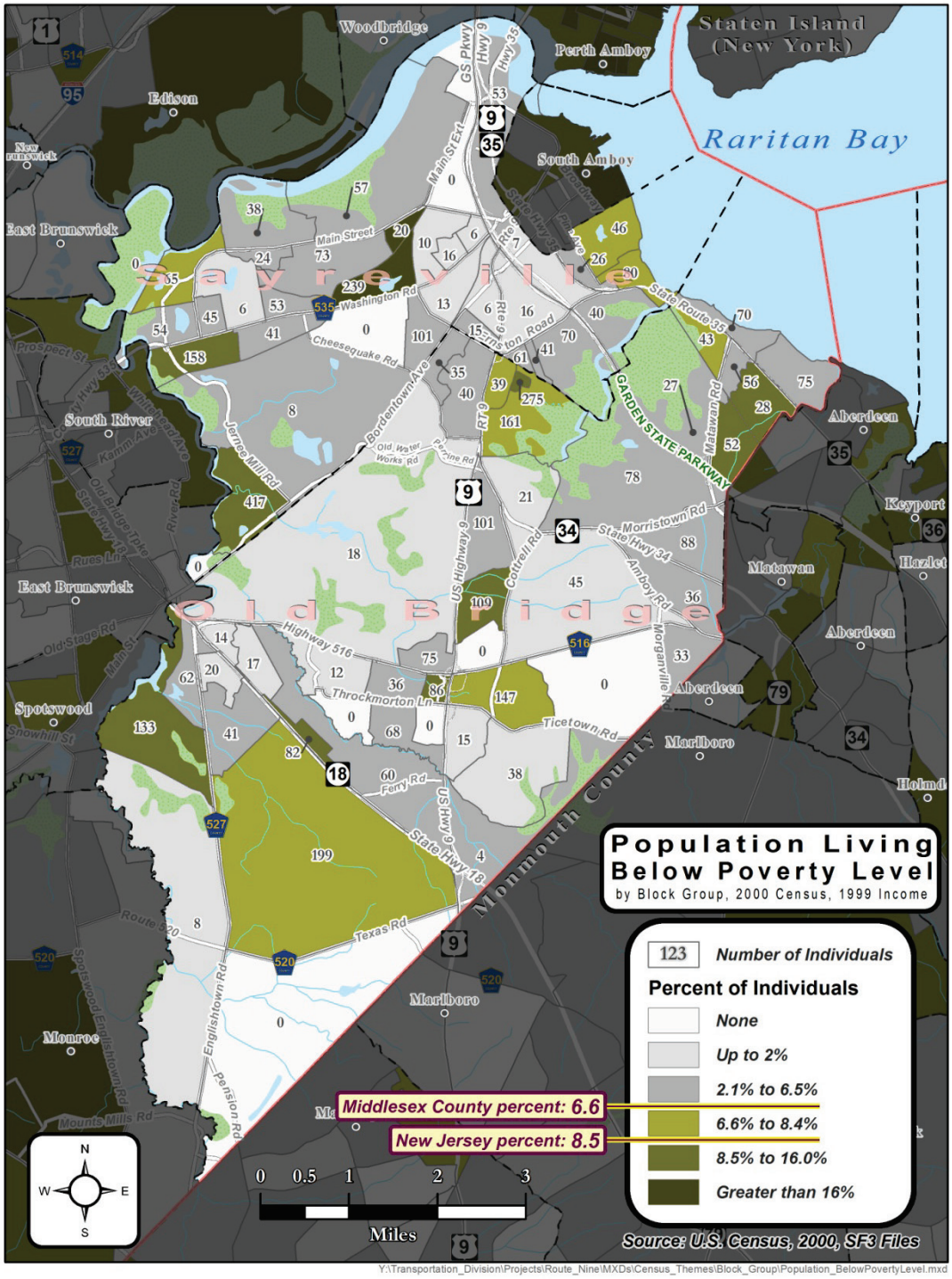
Figure 3-7: Poverty Rates for People in Sayreville and Old Bridge (2006-2008)



U.S. Census, 2006-2008 American Community Survey

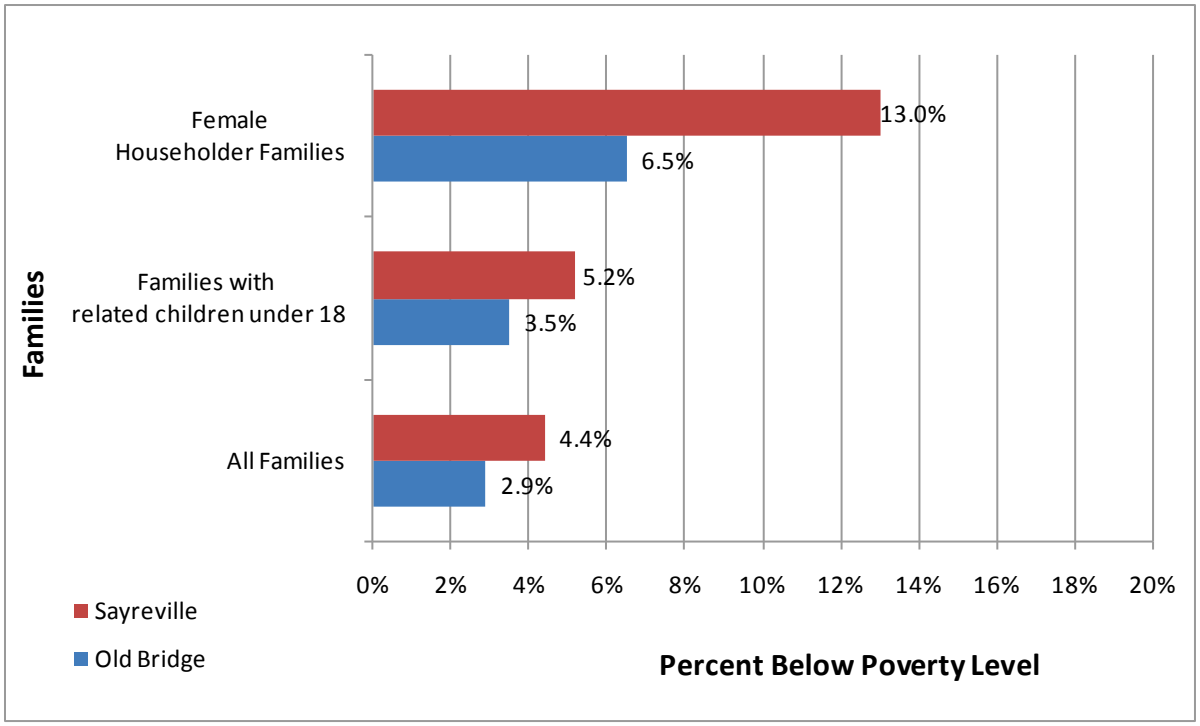
The highest incidences of poverty were scattered throughout the Study Area (Map 3-9). Some of the areas with noticeably higher rates of poverty correlated to certain multi-family residential developments, such as with Winding Wood Apartments west of Jernee Mill Road and Lakeview at Sayreville. The map also illustrates that a significant portion of the Study Area exhibited poverty rates that were lower than both the county and state. However, in other areas, poverty rates were upwards of 16 percent – more than double the county and state poverty rates.

Map 3-9: Population Living Below Poverty Level in 1999, by Block Group (2000 Census)



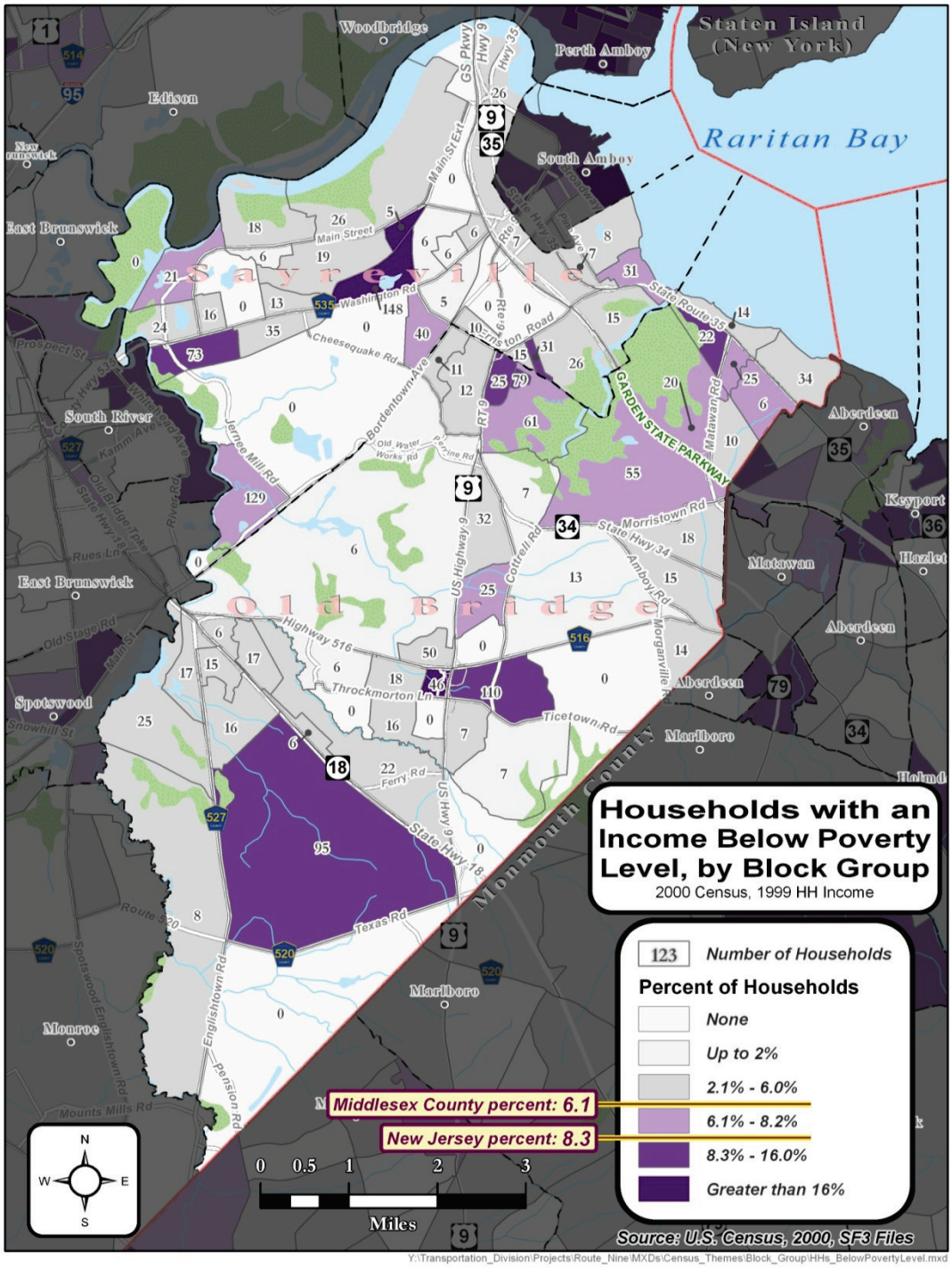
The family poverty rates for Old Bridge (2.9%) and for Sayreville (4.4%) were slightly lower than the poverty rate for all individuals in the Study Area (4.1% and 5.7%, respectively). The poverty rate in Sayreville was only slightly higher than Old Bridge in most categories, and it was significantly higher among female householder families. Among families with a female householder and no husband present, Sayreville's poverty rate (13.0%) was double that of Old Bridge (6.5%).

Figure 3-8: Poverty Rates for Families in Sayreville and Old Bridge (2006-2008)



The map of household poverty rates (Map 3-10) very closely resembles the map of poverty rates among individuals (Map 3-9). Again, block groups with the highest household poverty rates were widely dispersed throughout the Study Area. Likewise, Map 3-10 illustrates that household poverty rates in the Study Area were often lower than or equal to the household poverty rates for the county and state. However, some places in the Study Area stand out, with poverty rates greatly exceeding county and state averages.

Map 3-10: Households with an Income below Poverty Level in 1999, by Block Group (2000 Census)



4 Work Travel Behavior and Employment Characteristics

This section of the report uses work travel behavior data to identify patterns that help provide insight for potential public transportation enhancement throughout the Study Area. First, this section looks at the origins and destinations of workers who live in the Study Area and juxtaposes them with origins and destinations of workers commuting to jobs within the Study Area. The next section focuses on mode share for the journey to work, juxtaposing how workers commute to and from employment centers within the Study Area. It then observes how the mode share estimates have changed over time among three different datasets. The final section of this chapter analyzes employment characteristics for workers employed in the Study Area and for the resident labor force. This section describes primary industries in which people living and working in the Study area are employed.

This chapter draws upon a combination of data sources, including 2006-2008 American Community Survey (ACS) 3-year estimates, the 2000 Census, and Longitudinal Employer-Household Dynamics (LEHD), all of which are data from the Census Bureau. The ACS three-year estimates average characteristics 2006-2008 survey period. The LEHD data, unlike ACS three-year average estimates, represents state labor data for jobs covered under the respective state's unemployment insurance system. The state assigns place of employment information and the Census Bureau assigns place of residence. The 2008 LEHD data that was queried for this report analyzed primary jobs, which are defined as the job that provides the most earnings for each worker. In essence, this "one job per worker" analysis shows the number of employed people in the labor force and the corresponding primary commute patterns of the employed labor force.[3] One important consideration regarding the use of this data is that LEHD may represent only the primary address of the employer, which may not capture the actual origin or destination of each and every work trip (e.g. employees in satellite offices or workers at a construction site).

The thematic census block group maps in this section are based upon Census 2000 data and have been included because ACS data is not available at sub-municipal geographic levels. It is important to note that while these data sources are not directly comparable with each other, they are useful in identifying demographic variations within the Study Area.

The inherent limitation with each of these datasets is that the travel behavior is confined to the limited scope of commute trips. Essentially, they point to work travel behavior, which only

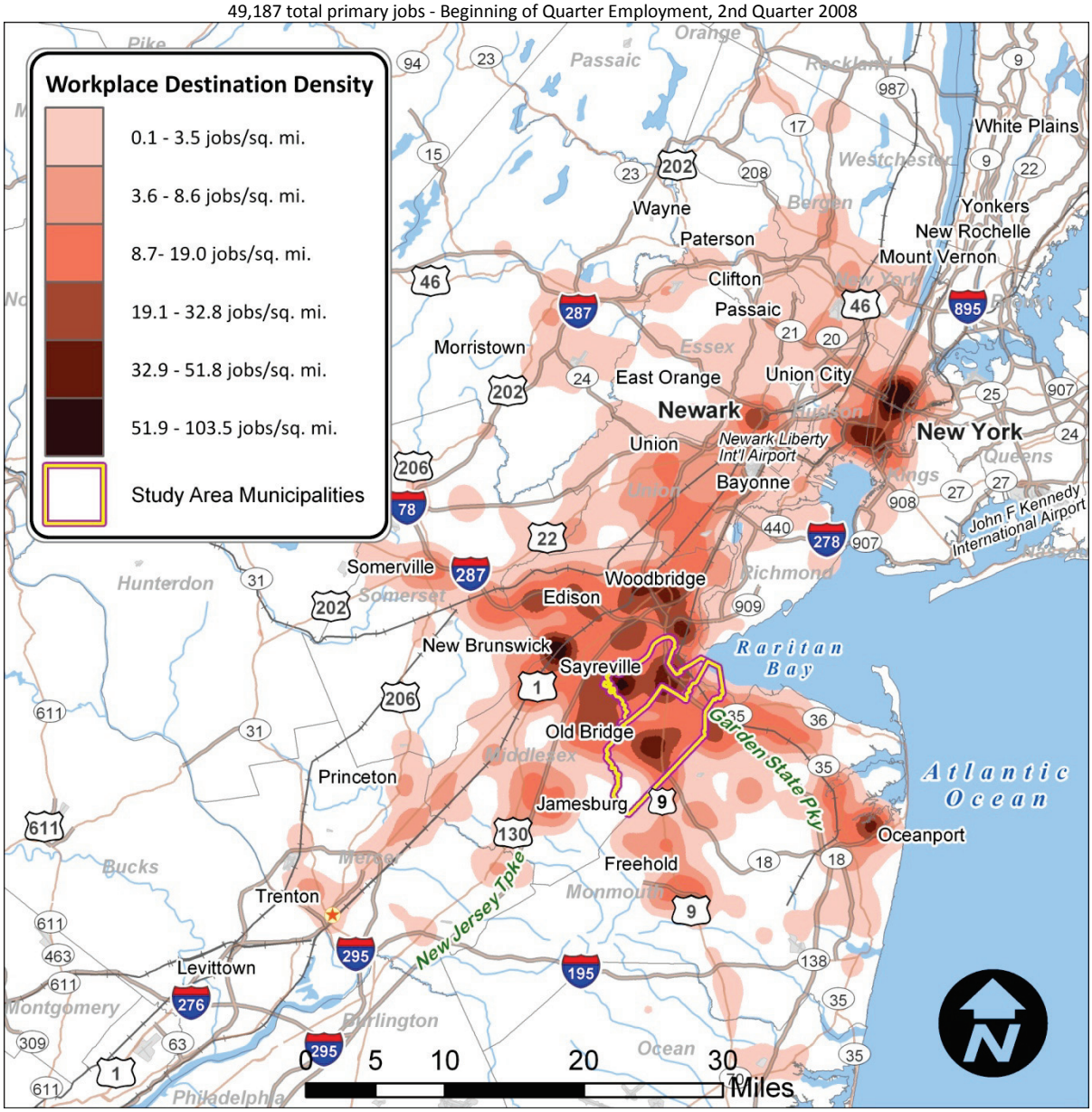
captures a 17% share of all trip purposes in Middlesex County, according to the most recent Regional Travel - Household Interview Survey (RT-HIS) conducted by NJTPA.[4] Other trip purpose categories, such as “social and recreation” and “other”, account for much larger shares of the total trips (36% and 30%, respectively). Nonetheless, the commute trip data offers a representation of peak-time travel behavior that is useful in assessing demand for various public transportation options, one of the primary goals of this study.

4.1 Commute Shed Analysis (CSA)

A Commute Shed Analysis (CSA) illustrates where workers who live in a particular study area are employed. As of 2008, there were 49,187 total **primary** jobs held by Old Bridge and Sayreville residents. The following map graphically depicts the relative land area density (jobs per square mile) of the employment locations where Old Bridge and Sayreville residents were commuting to in 2008.[5]

Map 4-1: Where Residents in the Route 9 Study Area Commute to Work (2008)

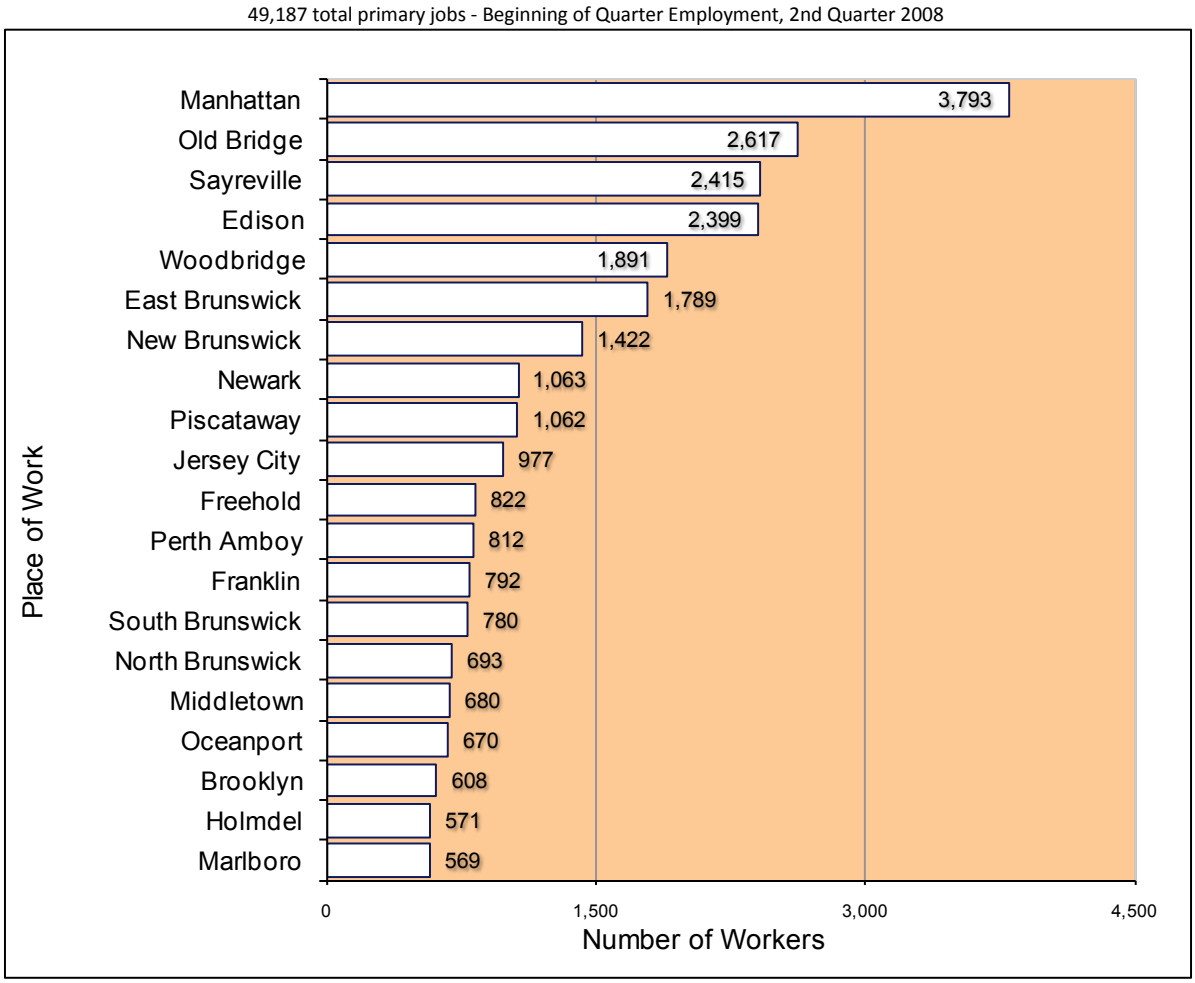
49,187 total primary jobs - Beginning of Quarter Employment, 2nd Quarter 2008



US Census Bureau, LEHD OnTheMap Origin-Destination Database, (http://lehdmap4.did.census.gov/themap4)

The top 20 primary workplace destinations of employed persons living in the Study Area (by municipality as shown in the following illustration) accounted for 54% of the total primary jobs. Manhattan was the top municipal workplace destination for area residents, at 7.7%. Old Bridge was second with 5.3%, and Sayreville was third with 4.9% of the labor force. Other popular workplace destinations included Jersey City, Newark, and Oceanport, NJ, all of which are farther than 20 miles by car. Points north of the Study Area aggregated together, including Manhattan, accounted for 45% of the total workplace destinations. Nineteen percent of primary workplace destinations were actually within the two municipalities of the Study Area. Woodbridge, Edison, East Brunswick, and New Brunswick were also popular destinations.

Figure 4-1: Top 20 Workplace Destinations of Old Bridge and Sayreville Residents, by Municipality (2008)

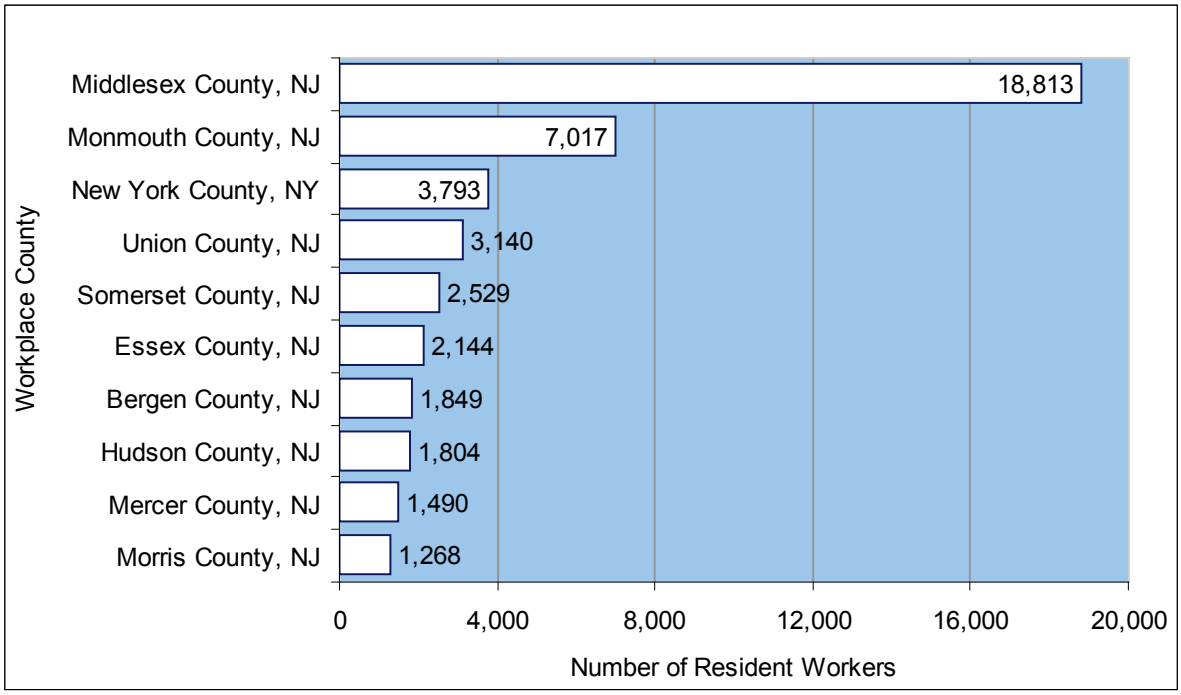


US Census Bureau, LEHD OnTheMap Origin-Destination Database, (http://lehdmap4.did.census.gov/themap4)

Of the total 49,187 primary jobs that Old Bridge and Sayreville residents held during the second quarter of 2008, the top ten counties, ranked in the following chart, accounted for 89% of the primary workplace destinations. More than 60% of the primary jobs held by Old Bridge and Sayreville residents were located outside of Middlesex County.

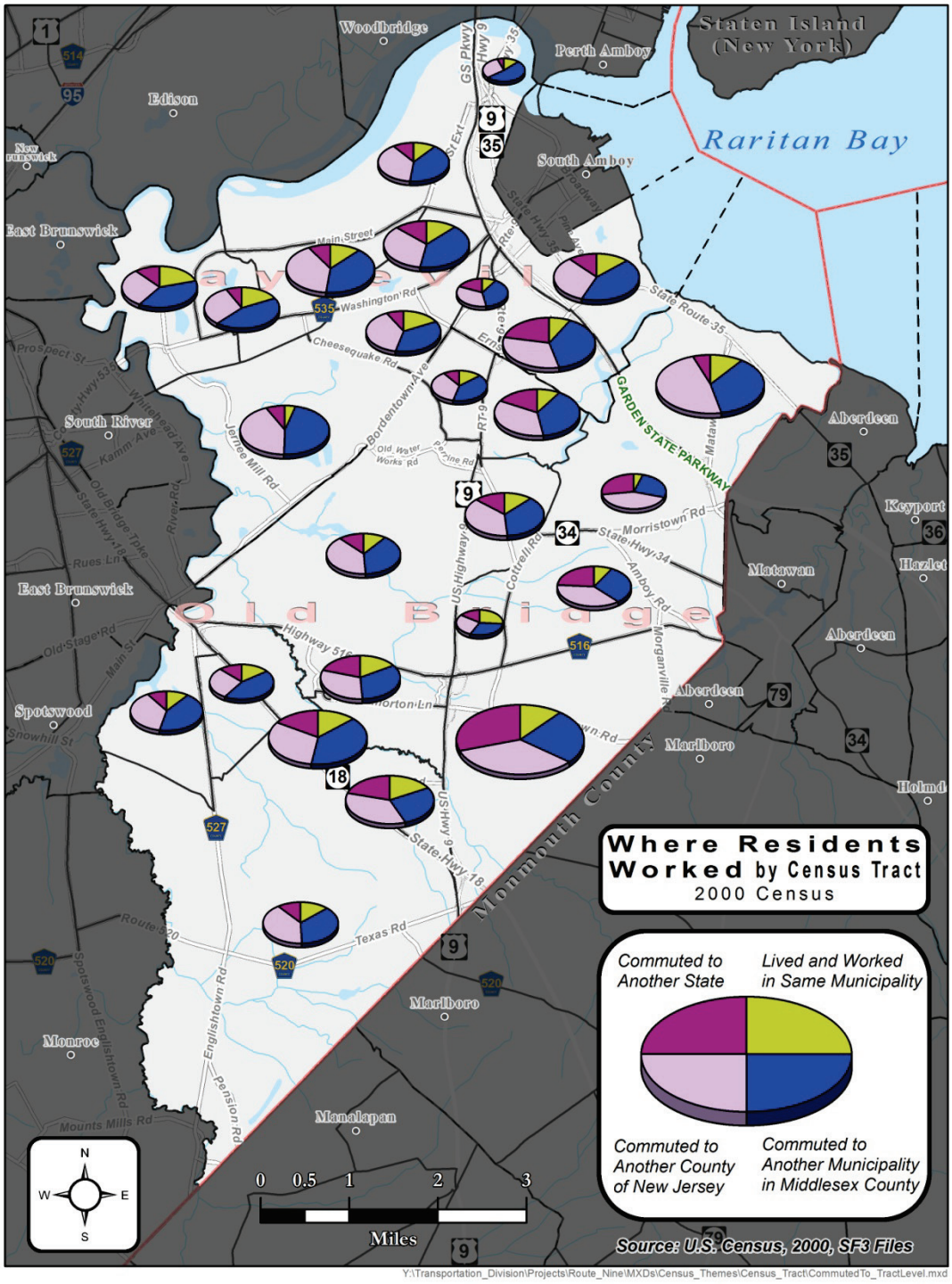
Figure 4-2: Top 10 Counties where Study Area Residents Worked (2008)

49,187 total primary jobs - Beginning of Quarter Employment, 2nd Quarter 2008



US Census Bureau, LEHD OnTheMap Origin-Destination Database, (http://lehdmap4.did.census.gov/themap4)

Map 4-2: Where Residents Worked by Census Tract (2000 Census)

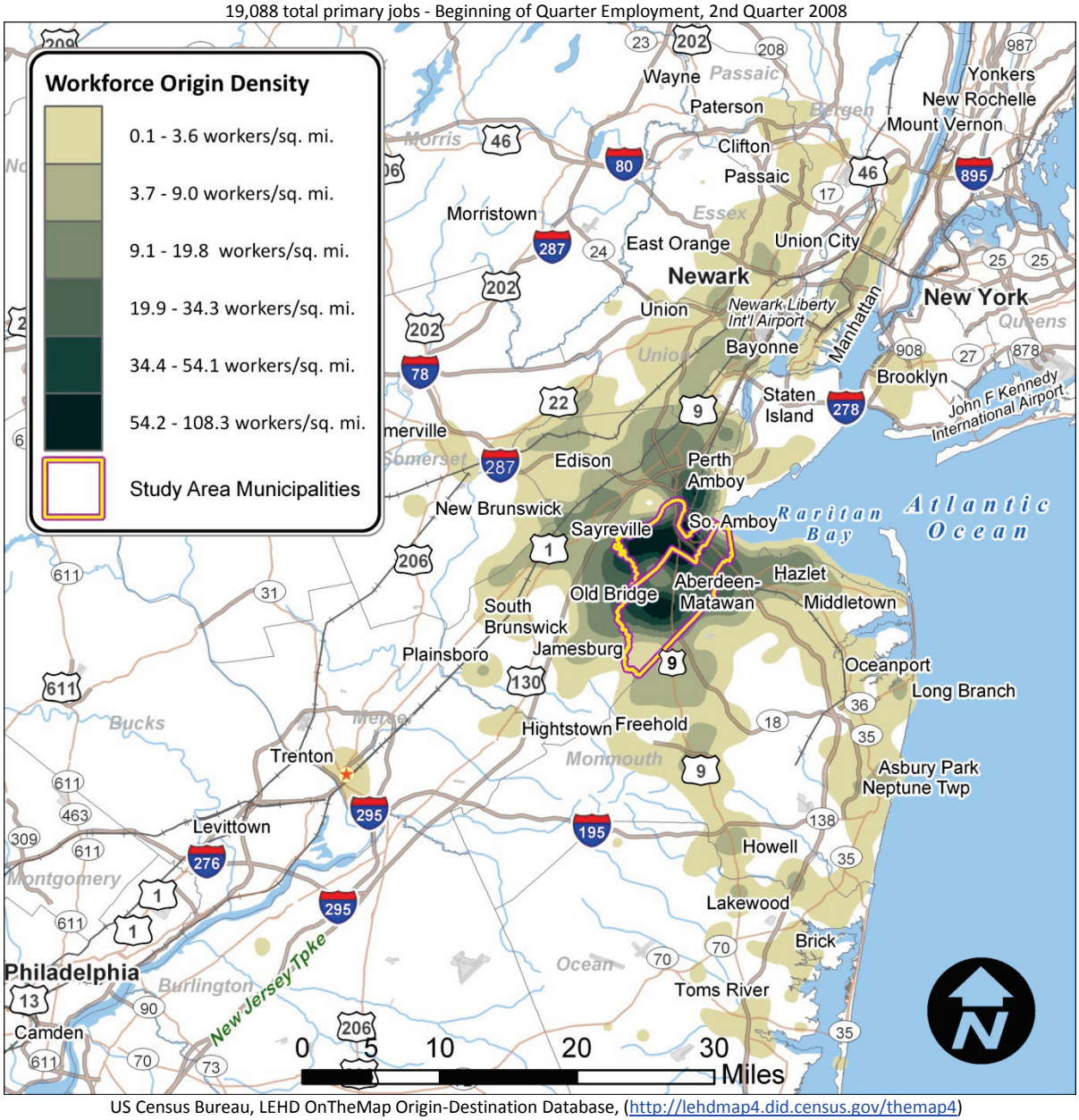


4.2 Labor Shed Analysis (LSA)

A Labor Shed Analysis (LSA) shows the place of residence of the workforce employed in a given area. As the map below illustrates, during 2008 most of the workforce employed the Study Area were people who were living in or near the Study Area itself.

Map 4-3: Where Workers in the Route 9 Study Area Live (2008)

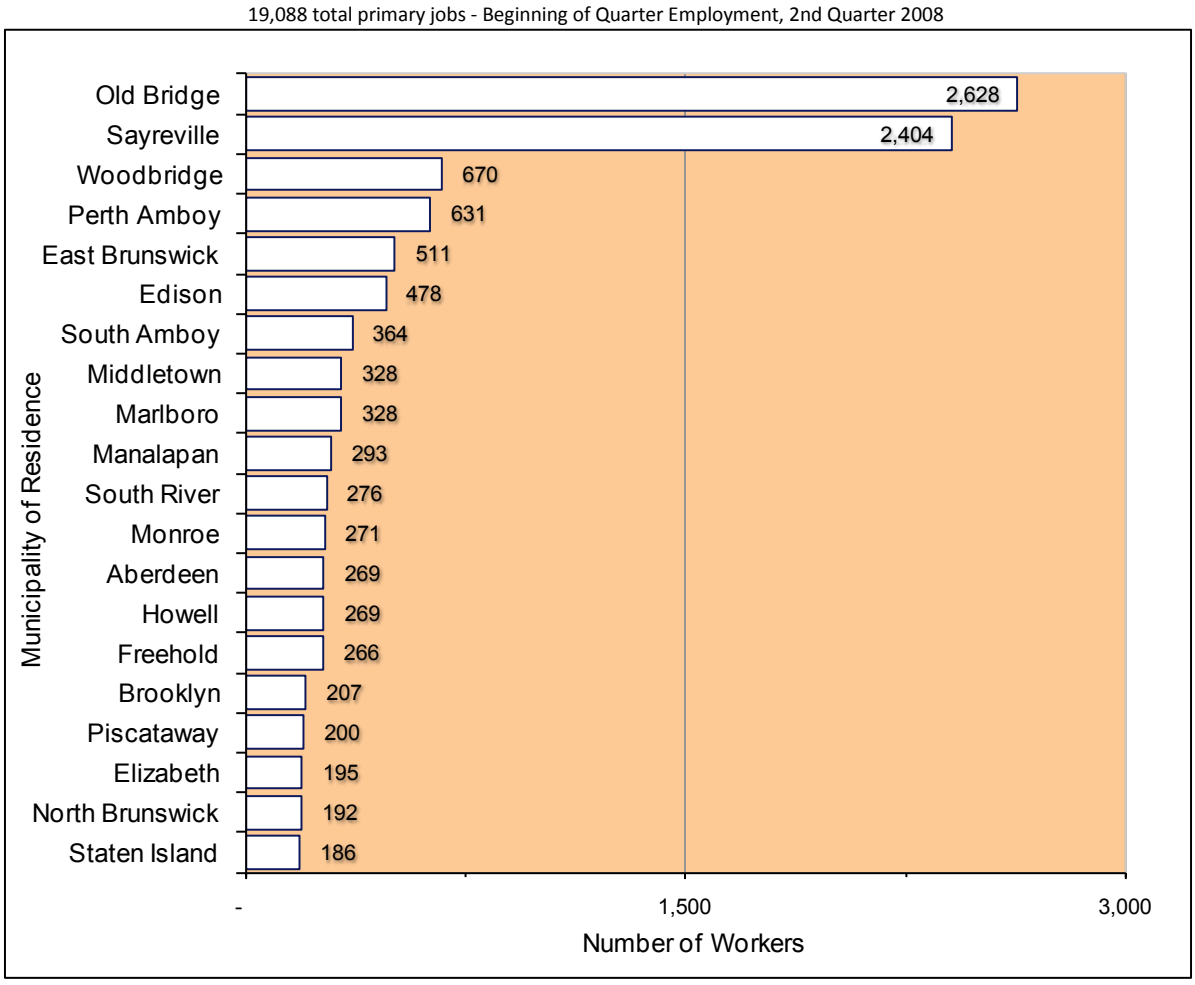
19,088 total primary jobs - Beginning of Quarter Employment, 2nd Quarter 2008



US Census Bureau, LEHD OnTheMap Origin-Destination Database, (http://lehdmap4.did.census.gov/themap4)

Sayreville and Old Bridge employed 19,088 people in primary jobs at the beginning of the second quarter of 2008. While most people living in Old Bridge and Sayreville commuted to destinations outside those two municipalities, 46% of the people that worked in the Study Area also lived there. The second largest share of Study Area's workforce (23%) came from points north. The top 20 municipalities of residency (Figure 4-3) accounted for 57% of those workers. Two New York City boroughs (Staten Island and Brooklyn) also appear on the top 20 list.

Figure 4-3: Top 20 Municipalities of Residence of the Study Area Workforce (2008)

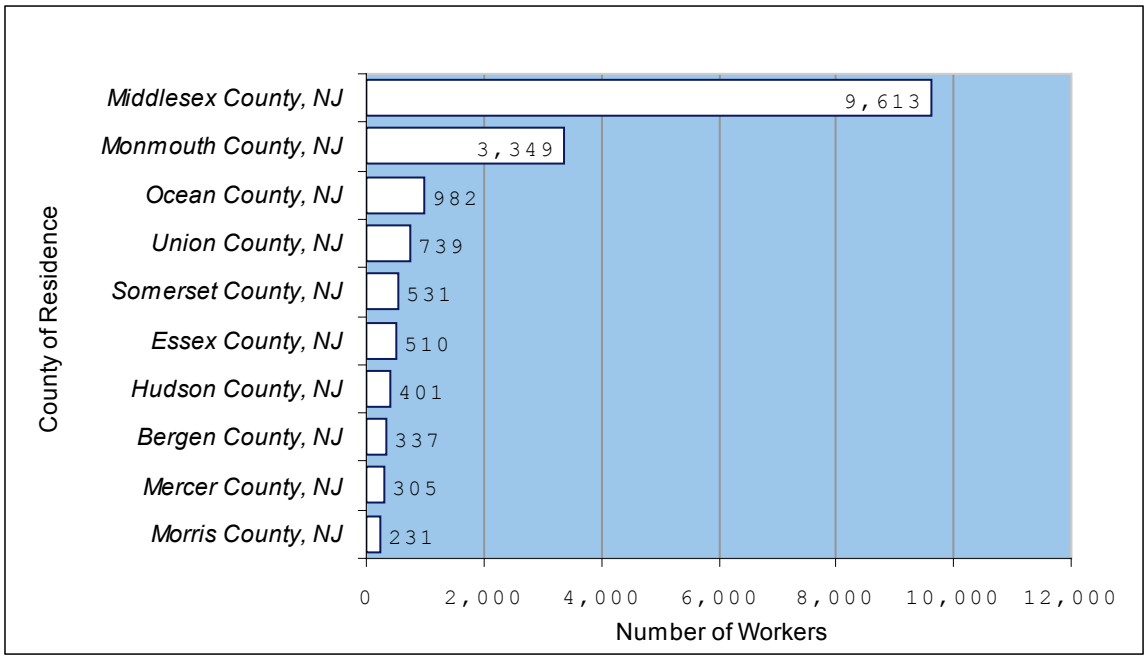


US Census Bureau, LEHD OnTheMap Origin-Destination Database, (http://lehdmap4.did.census.gov/themap4)

Eighty-nine percent of the workers lived in one of the 10 counties listed in the graph below. Approximately half of the Study Area's workforce lived outside of Middlesex County. Over 20% of the Study Area's workforce came from Monmouth and Ocean Counties. In addition, a large number of workers in the Study Area lived in the northern New Jersey region of Bergen, Essex and Hudson Counties.

Figure 4-4: Top 10 Counties of Residence of the Study Area Workforce (2008)

19,088 total primary jobs - Beginning of Quarter Employment, 2nd Quarter 2008



US Census Bureau, LEHD OnTheMap Origin-Destination Database, (http://lehdmap4.did.census.gov/themap4)

4.3 Journey to Work

4.3.1 Labor Force (Study Area Residents)

Old Bridge and Sayreville residents commuting to work accounted for 14% of all Middlesex County commuters during 2006-2008. Nearly 80% of the Study Area's commuters drove alone to work. During 2006-2008, excluding telecommuters, 13% of Old Bridge Township workers and 7% of Sayreville workers took public transportation to get to work. By comparison, 10% of commuters countywide and 11% of commuters statewide took public transit.

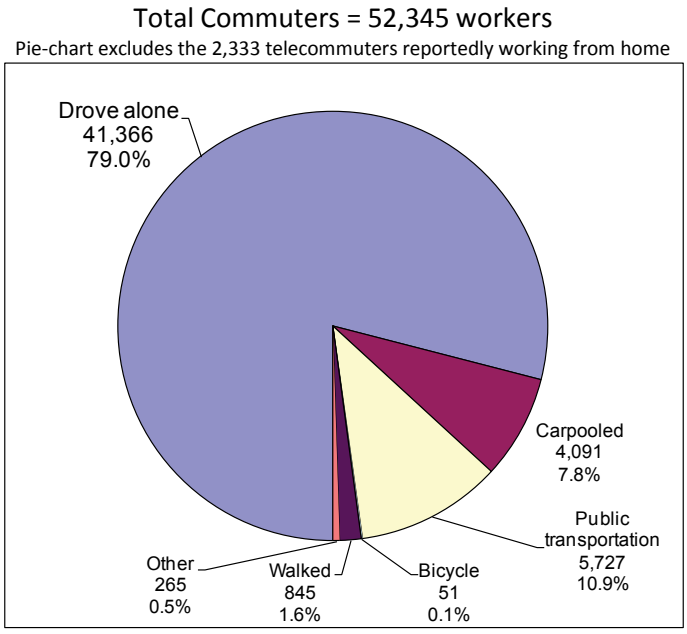
Approximately 11% of the workers in the Study Area reported using public transit, with five bus riders for every train rider. In the Study Area, commute times were also noticeably longer than the county or state averages, particularly among public transit users.

According to 2008 LEHD data, approximately 85% (5,400 workers) of the Study Area's out-of-state employees commuted to New York City. As shown in Figure 4-6, approximately 60% of those working out of state used public transit. Relating out-of-state-bound public transit users to total transit users (in Figure 4-5) reveals that 947 (less than 20 percent) of the Study Area's public transit commuters traveled to jobs within the state. In light of these figures, it is likely that between 4,000 to 4,500 of Study Area residents working in New York City used public transit.

Overall, the transit share for Old Bridge commuters was 12.5%, which was significantly higher than Sayreville (7.3%), the county (9.6%) or the state (10.3%). For the remainder of workers commuting out of state, about 35 percent, or 3,000 workers, drove alone. Presumably, many of these people were commuting to Staten Island, to which public transit connections are virtually non-existent[6], or Brooklyn, where public transit connections require at least one transfer through Manhattan.

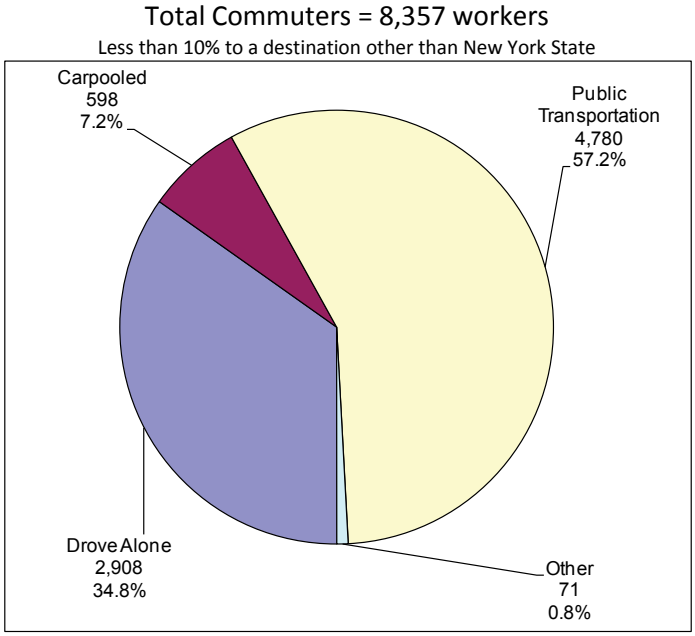
Map 4-4 illustrates that the majority of commuters in most Census tracts drove alone to work. However, in some Census tracts, such as the southeast corner of Old Bridge, the transit commuter share was visibly higher than in the rest of the Study Area.

Figure 4-5: Old Bridge and Sayreville Commuters' Means of Transportation to Work (2006-2008)



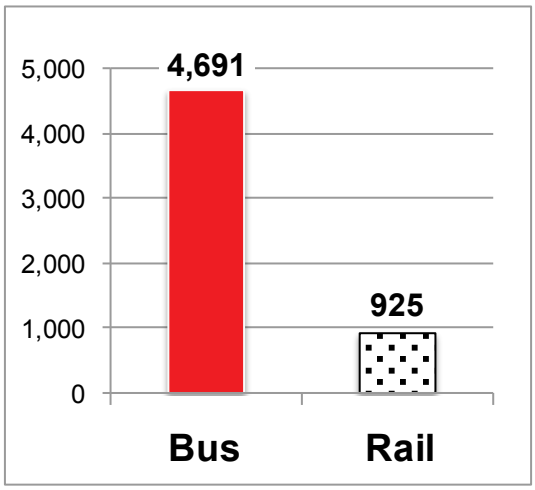
Source: U.S. Census, 2006-2008 American Community Survey
In the 2006-2008 ACS, "other" includes taxi, motorcycle, or other modes; and, public transportation includes: bus, streetcar, subway, railroad, or ferry

Figure 4-6: Old Bridge and Sayreville Commuters' Means of Transportation to Out-of-State Employment Locations (2006-2008)



Source: U.S. Census, 2006-2008 American Community Survey
In the 2006-2008 ACS, "other" includes taxi, motorcycle, or other modes; and, public transportation includes: bus, streetcar, subway, railroad, or ferry

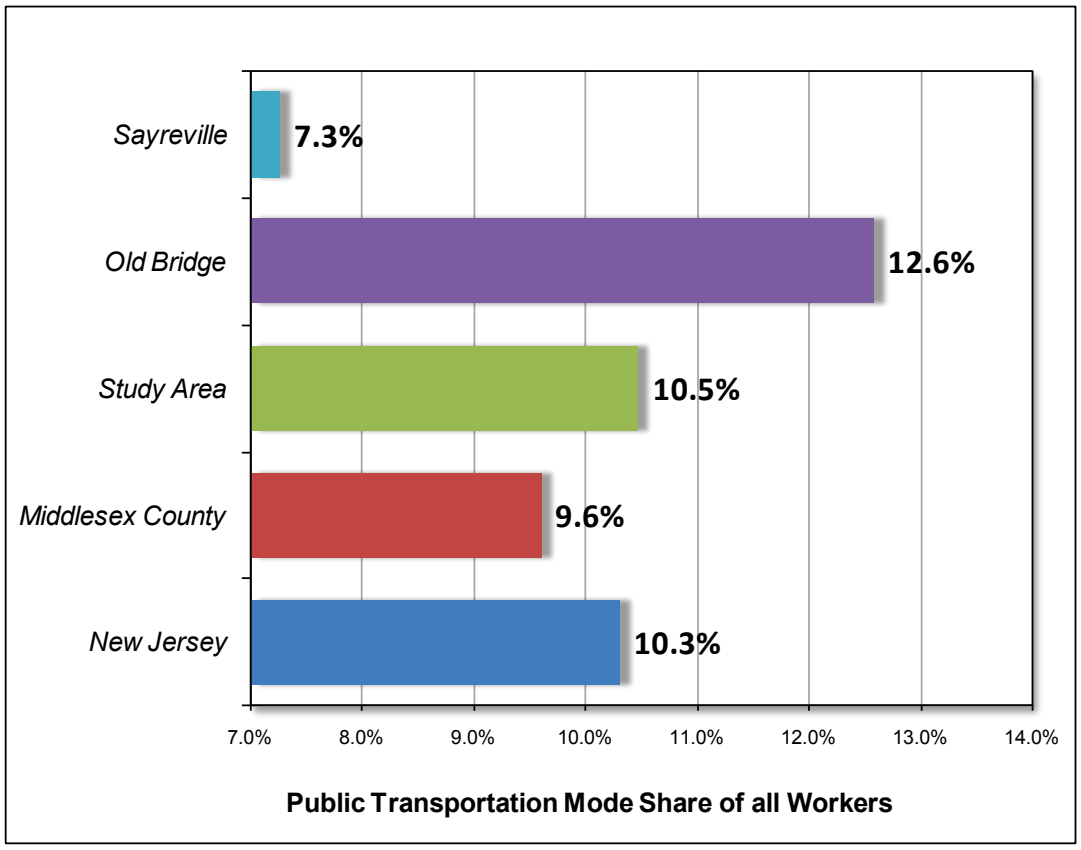
Figure 4-7: Bus vs. Rail Ridership in the Study Area (2006-2008)



Source: U.S. Census, 2006-2008 American Community Survey

Figure 4-8: Percentage of Study Area Residents Taking Public Transit to Work (2006-2008)

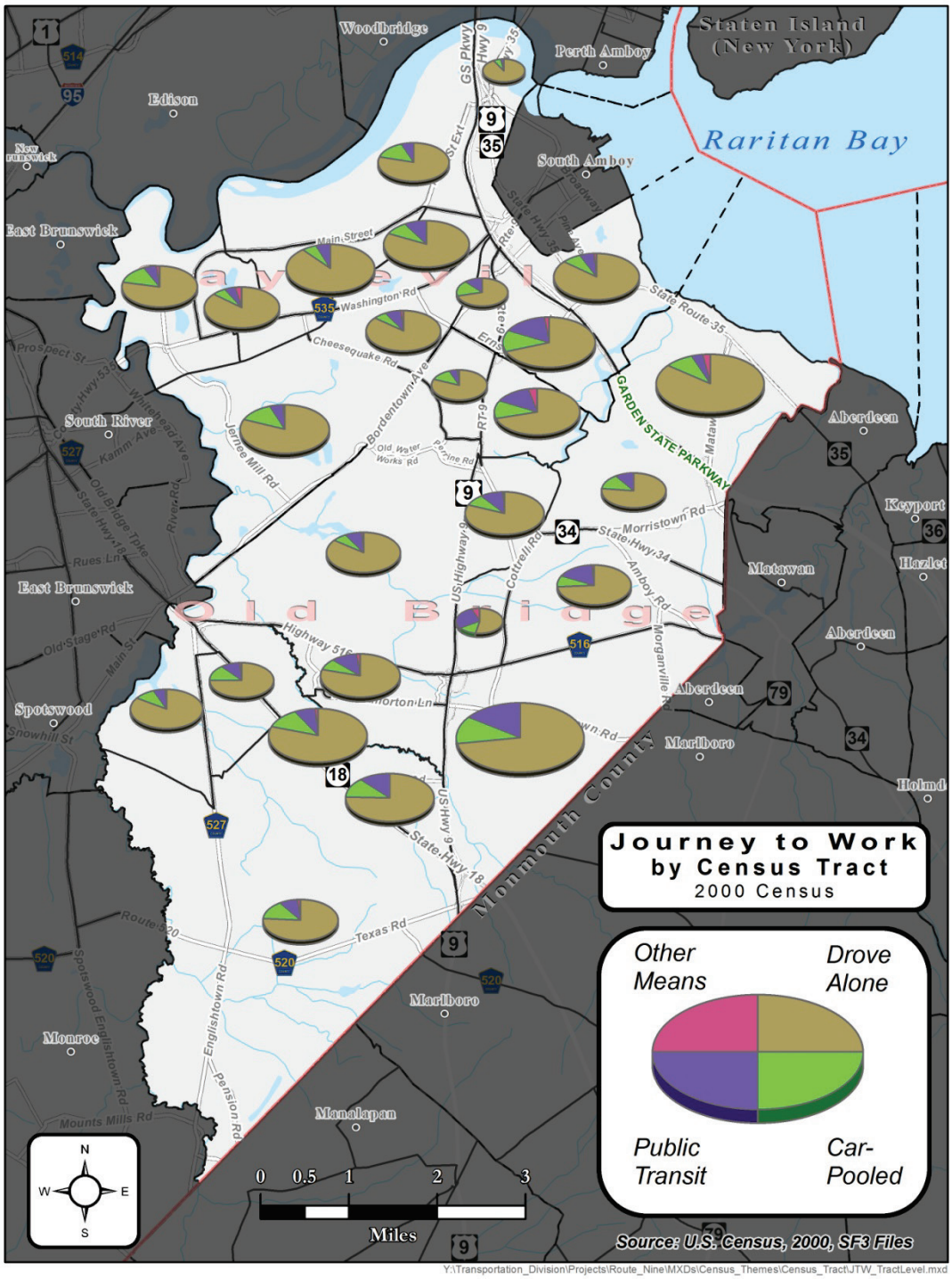
Calculation of Mode Share Percentages includes "Worked at Home"
Public transit includes: bus, streetcar, subway, railroad, or ferry



Source: U.S. Census, 2006-2008 American Community Survey

Map 4-4: Journey to Work by Census Tract (2000 Census)

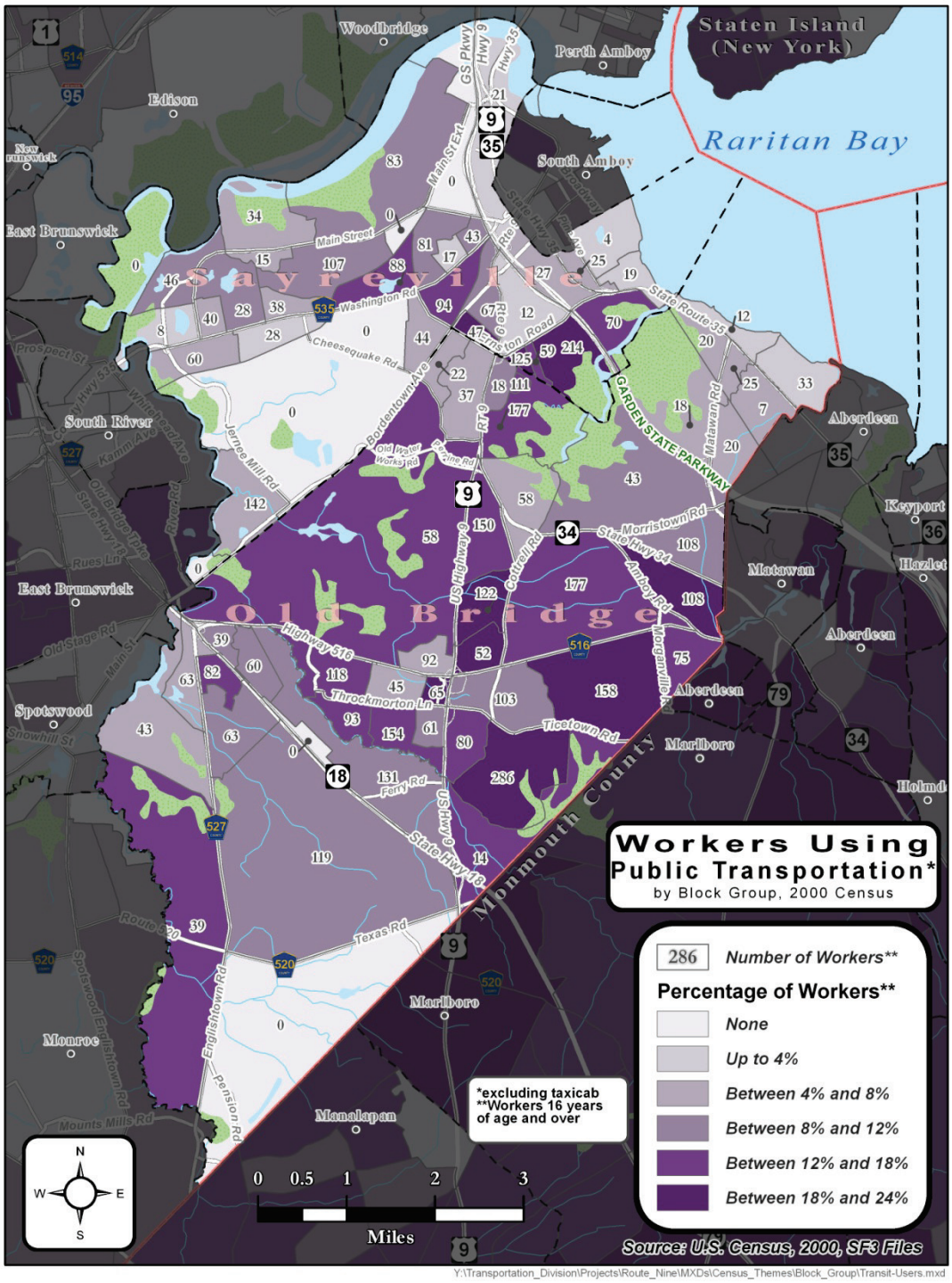
Public transit includes: bus, streetcar, subway, railroad, or ferry—excludes taxicab



The following map illustrates that the highest use of public transportation within the Study Area was near the London Terrace/Ernston Road area and the intersection of Route 9 and Route 516, where both higher density residential development and park and ride facilities exist.

Map 4-5: Residents Using Public Transportation to Work by Block Group (2000 Census)

Public transportation includes: bus, streetcar, subway, railroad, or ferry



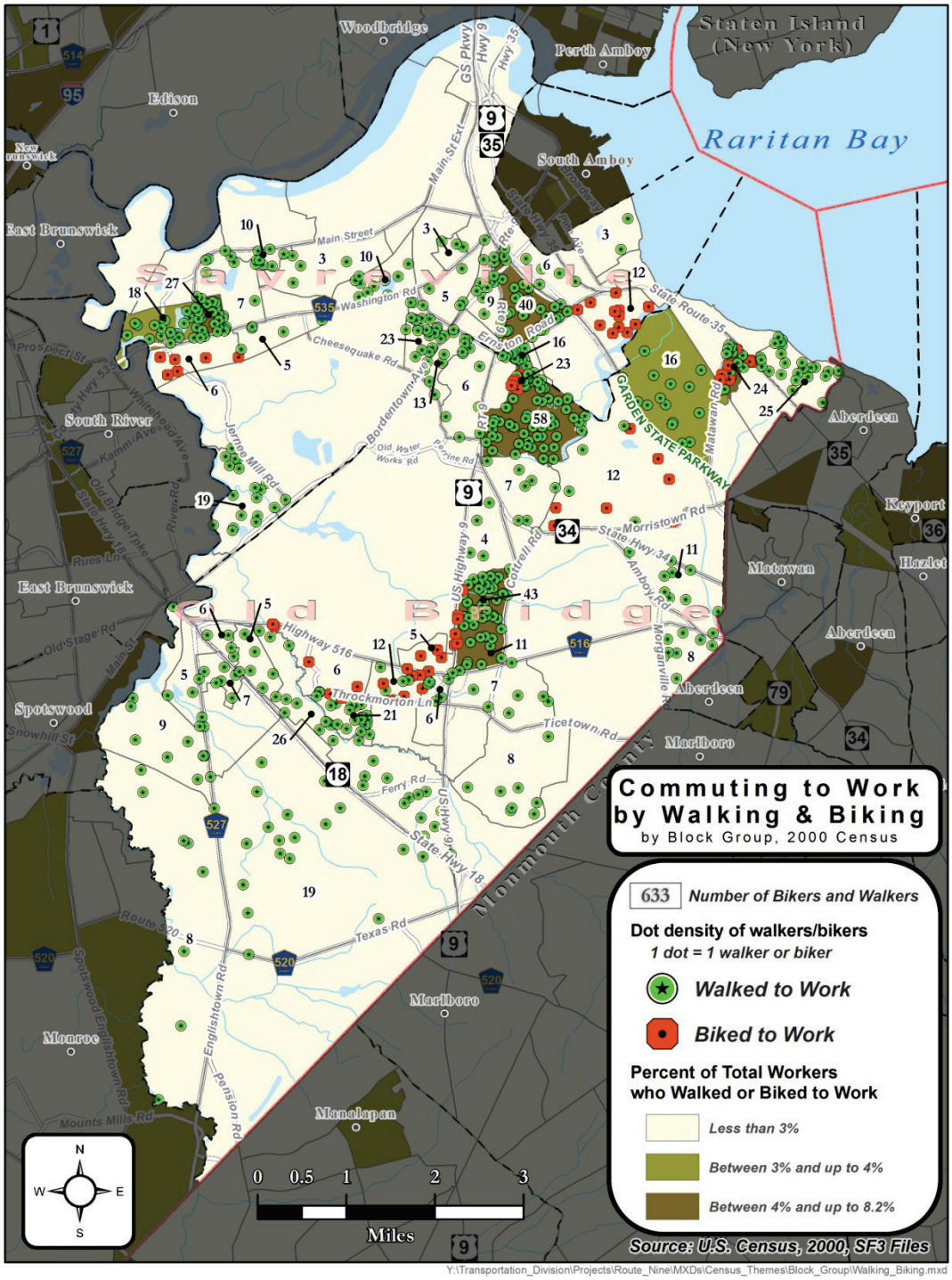
In the 2000 Census, the total number of people that reported commuting by non-motorized transportation modes was 633 people (approximately 1.3% of total workers in the Study Area). As depicted in Map 4-6, more than half of walkers and 46% of cyclists were concentrated in three main locations of the Study Area:

(1) within a half-mile of the Old Bridge Park and Ride;

(2) within a half mile of the intersection of Route 9 and Route 516; and

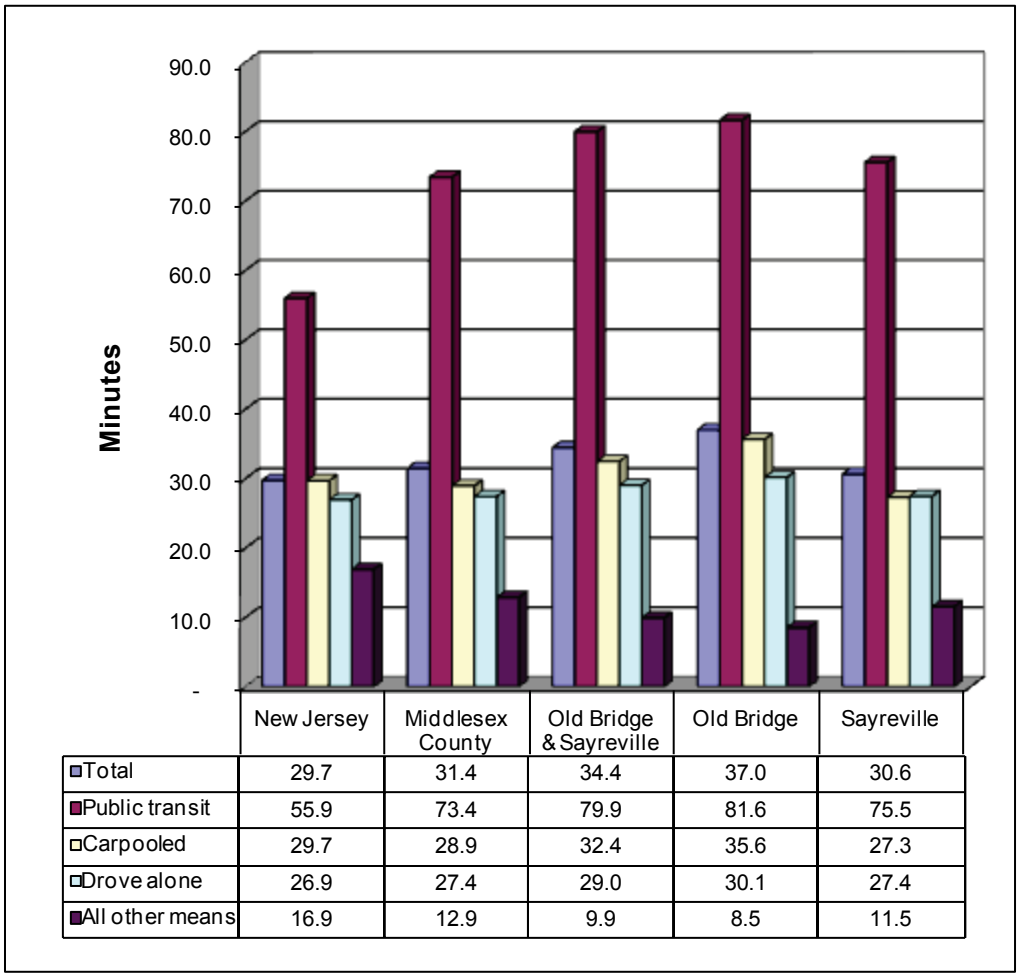
(3) along Washington Avenue at the western edge of the Study Area (coincides with the higher rate of poverty in the same block group, see Map 3-9).

Map 4-6: Commuting to Work by Walking and Biking by Block Group (2000 Census)



During 2006-2008, for Study Area residents, the average travel time to work was more than 34 minutes, which was greater than the county average (31 minutes) or state average (30 minutes). The figure below illustrates that the Study Area residents' average door-to-door commute time of 80 minutes for trips using public transportation for exceeded the state average of 56 minutes. On average, regardless of mode of travel, Old Bridge residents had a longer average commute than Sayreville residents.

Figure 4-9: Average Travel Time to Work by Means of Transportation (2006-2008)



	New Jersey	Middlesex County	Old Bridge & Sayreville	Old Bridge	Sayreville
Total	29.7	31.4	34.4	37.0	30.6
Public transit	55.9	73.4	79.9	81.6	75.5
Carpooled	29.7	28.9	32.4	35.6	27.3
Drove alone	26.9	27.4	29.0	30.1	27.4
All other means	16.9	12.9	9.9	8.5	11.5

Source: U.S. Census, 2006-2008 American Community Survey

4.3.2 Journey to Work Trends

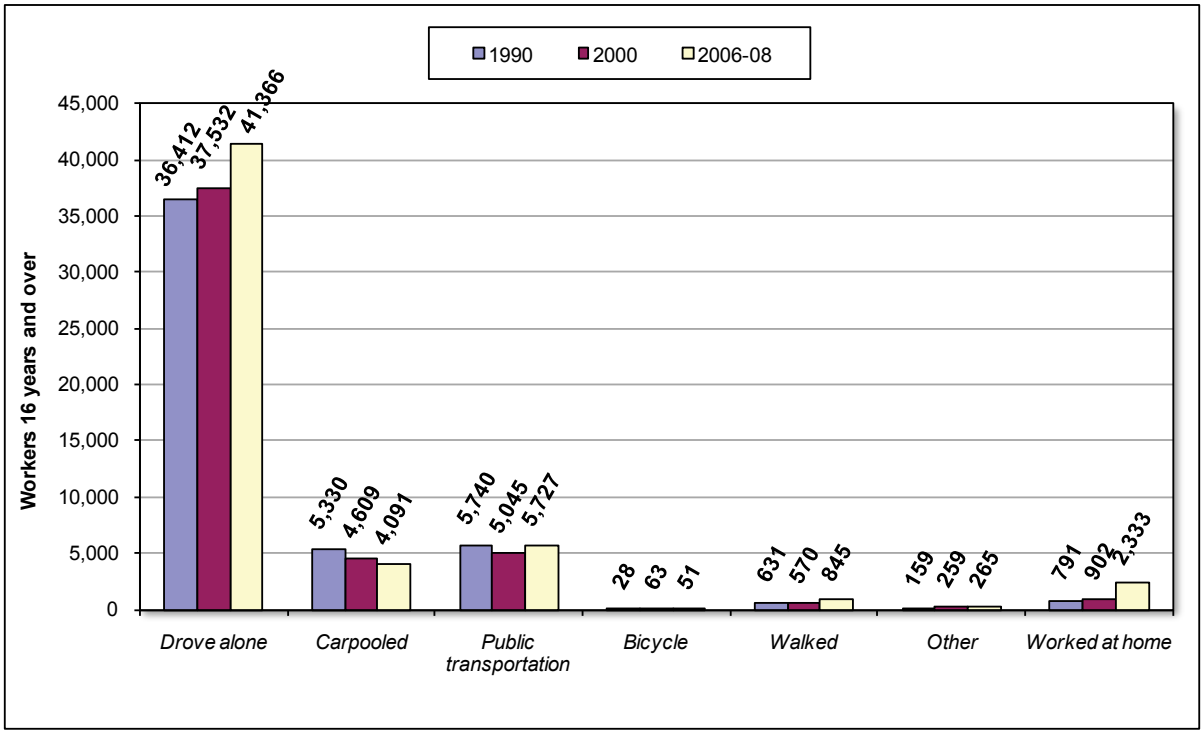
All forms of public transportation maintained fairly steady ridership between the 1990 Census, the 2000 Census and the 2006-2008 ACS, seeing only a 0.2% decrease (a decrease of 13 riders between 1990 and 2006-2008). However, the 0.2% percentage decrease in transit ridership is not the equivalent percentage decrease in mode share. Given the Study Area's increase in working population during that same period, having the same number of riders results a reduced share of total commuters taking public transportation, due to increases in other modes (see Table 4-1).

In 1990, 11.7% of the Study Area workers used public transit to work which fell to 10.5% and during 2006-2008, representing a decline of 1.2 percentage points. On the contrary, other modes, such as "drove alone" and "worked at home", experienced considerable increases from 1990 to 2006-2008, which accounted for much of the 11.4% increase in total workers.

Commuters driving alone increased by approximately 5,000 people or 13.6% in that time period; meanwhile, the number of carpoolers decreased by 23.2% between 1990 and 2006-2008. While the number of people working at home (no commute) was only a small share of total commuters, it is noteworthy that the base number nearly tripled in the same time period (from 791 to 2,333 people). The number of walkers and bicyclists remained very low (see Figure 4-10).

Figure 4-10: Means of Transportation to Work (1990, 2000, and 2006-2008)

Public transportation includes: bus, streetcar, subway, railroad, or ferry
Other includes: taxicab, motorcycle and all other means



Source: U.S. Census, 1990, 2000, and, 2006-2008 American Community Survey

Table 4-1: Journey to Work Trends of Residents in the Study Area (1990 to 2006-2008)

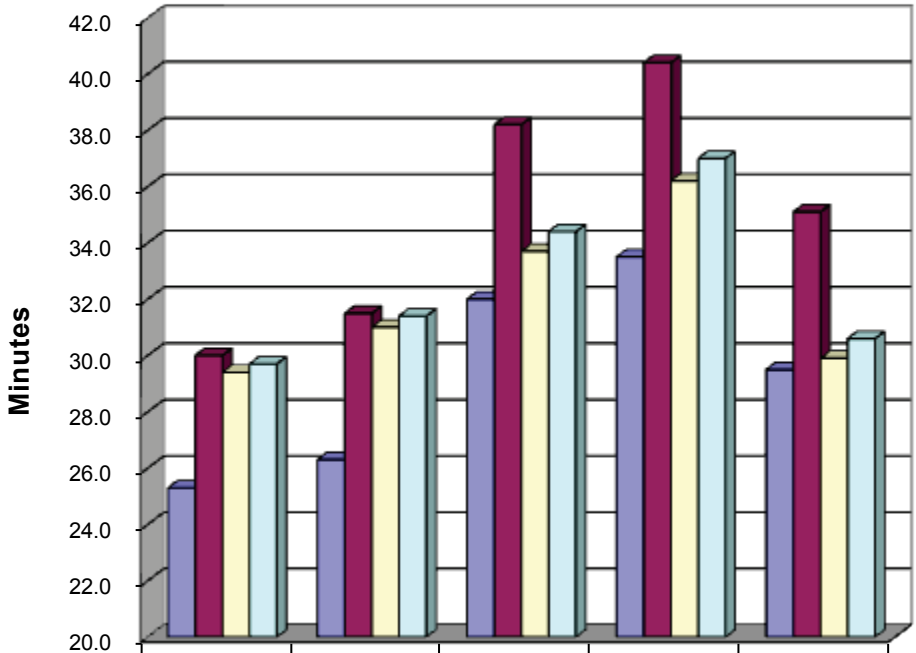
Public transportation includes: bus, streetcar, subway, railroad, or ferry
Other includes: taxicab, motorcycle and all other means

Workers 16 years and over	1990 to 2006-08 Absolute Change	1990 to 2006-08 Percent Change	1990 to 2006-08 Pct. Pts. Change
Drove alone	4,954	13.6%	1.5 pts.
Carpooled	**-1,239**	**-23.2%**	**-3.4 pts.**
Public transportation	**-13**	**-0.2%**	**-1.2 pts.**
Bicycle	23	82.1%	0.0 pts.
Walked	214	33.9%	0.3 pts.
Other	106	66.7%	0.2 pts.
Worked at home	1,542	194.9%	2.7 pts.
Total	**5,587**	**11.4%**	**--**

Source: U.S. Census, 1990, 2000, and, 2006-2008 American Community Survey

From 1990 to 2006-2008, the average commute from the Study Area was slightly longer than the county or state averages. The three-year estimates show that Sayreville's average commute times were comparable to both the county and state. However, when combined with Old Bridge commute estimates, the averages were categorically greater than the county or the state. Map 4-7 highlights the areas of the Study Area where commuters exhibit the longest commute time. At the Census tract level, the areas that stand out in terms of commute time are centrally located, with the longest average commute times emanating from the southeastern tract.

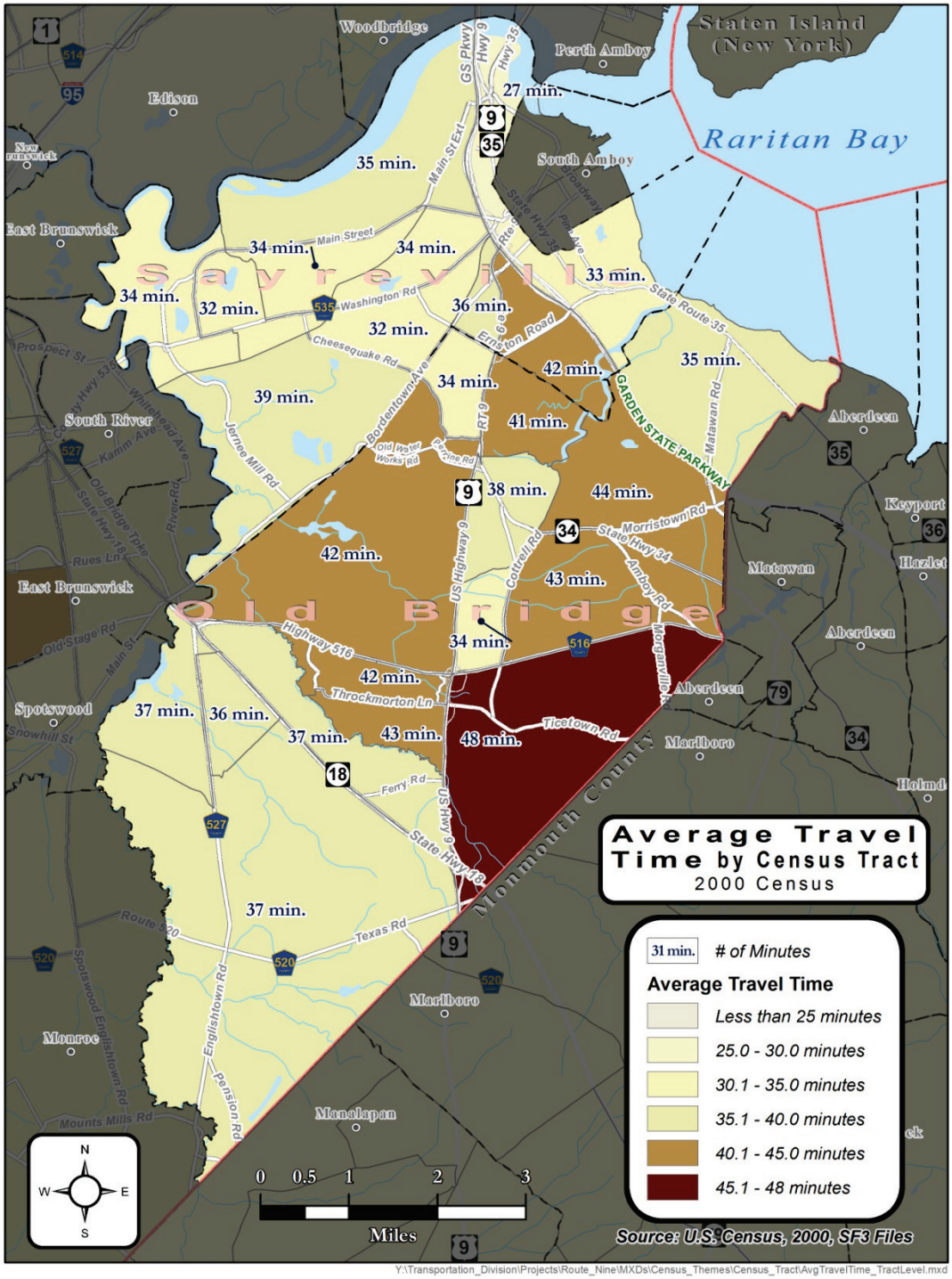
Figure 4-11: Comparative Average Travel Times to Work, NJ, County, Study Area, Old Bridge & Sayreville (2000 to 2006-2008)



	New Jersey	Middlesex County	Old Bridge & Sayreville	Old Bridge	Sayreville
1990	25.3	26.3	32.0	33.5	29.5
2000	30.0	31.5	38.2	40.4	35.1
2005-07	29.4	31.0	33.7	36.2	29.9
2006-08	29.7	31.4	34.4	37.0	30.6

U.S. Census: Decennial 1990 & 2000, American Community Survey 2005-2007 & 2006-2008

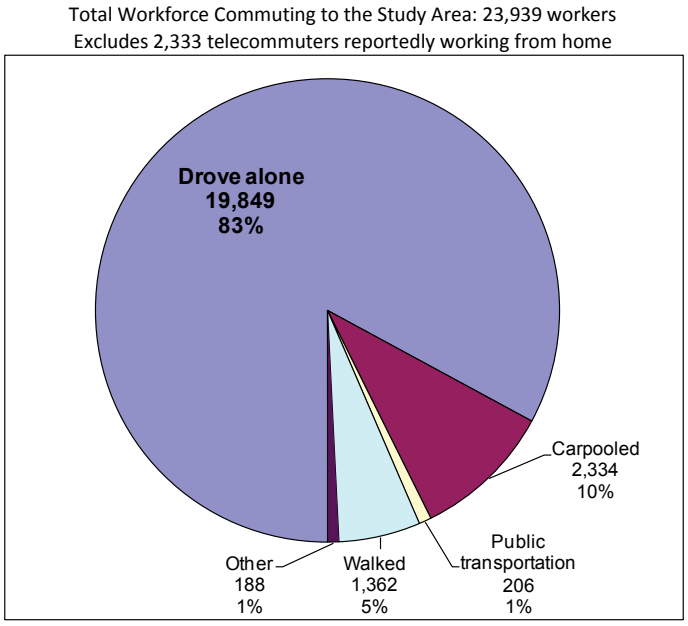
Map 4-7: Average Travel Time to Work by Census Tract (2000 Census)



4.3.3 Means of Transportation to the Study Area (Work Force)

Figure 4-12 illustrates how commuters (members of the work force) traveled to the Study Area as a workplace destination. In contrast to commuters leaving the Study Area to work in New York, the share of public transit users for work in the Study Area was very low. Only 206 of 26,272 estimated workers in the Study Area traveled to work by public transit — amounting to less than 1% of the workforce. Here, the dominant mode choice was driving alone (83%).

Figure 4-12: Means of Transportation to Work in the Study Area



Source: U.S. Census, 2006-2008 American Community Survey

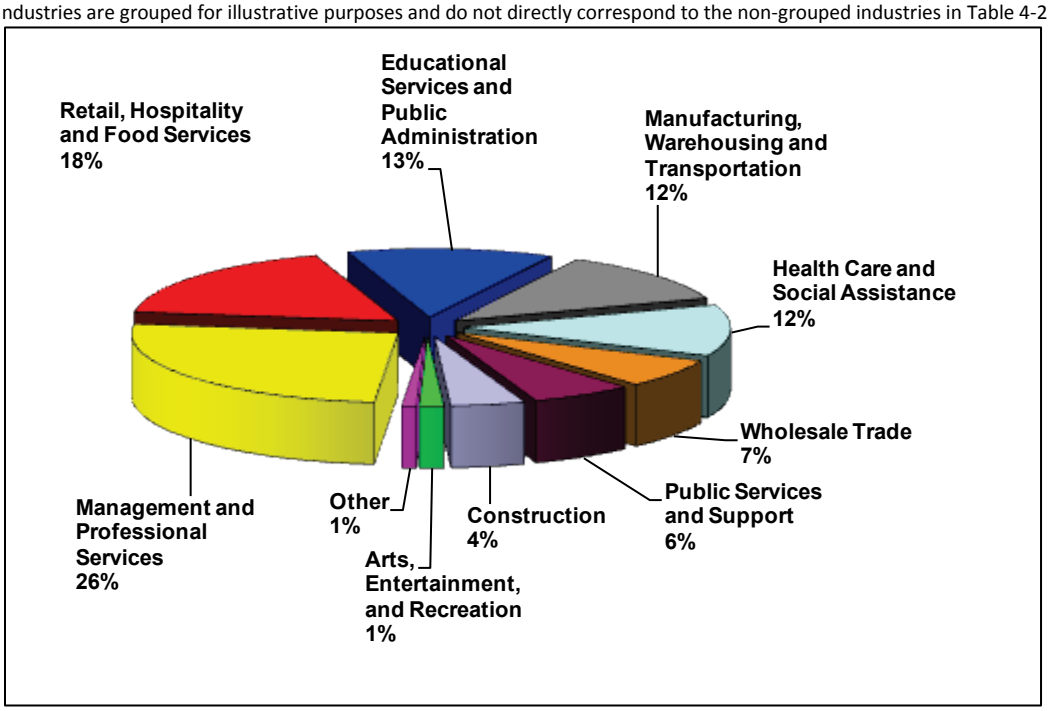
4.4 Employment Characteristics

4.4.1 Resident Labor Force

The labor force described in the pie chart below is comprised of residents of the Study Area The most popular industries of the resident labor force were Management and Professional Services (26%) and Retail, Hospitality and Food Services (18%), which combined to capture 44% of the labor force. A significant segment of the labor force was employed in Educational Services (13%), Manufacturing (12%) and Health Care (12%).

Figure 4-13: Industries of Old Bridge and Sayreville Residents (2008)

Industries are grouped for illustrative purposes and do not directly correspond to the non-grouped industries in Table 4-2



US Census Bureau, LEHD OnTheMap Origin-Destination Database, (http://lehdmap4.did.census.gov/themap4)

Table 4-2 highlights the remarkable similarities between the top 5 industries of the labor force living in Sayreville and Old Bridge. In both municipalities, the single largest industry segments among the resident labor force were (1) Retail Trade; (2) Health Care and Social Assistance; (3) Professional, Scientific and Technical Services; and (4) Educational Services. The only difference between the two municipalities in the table is in the fifth rank – Manufacturing in Sayreville, and Finance & Insurance in Old Bridge. Overall within the Study Area, manufacturing was the fifth largest industry in terms of employment.

Table 4-2: Top 5 Industries of the Labor Force Living in Old Bridge and Sayreville, Ranked by Number of Primary Jobs Held by Residents (2008)

Rank		Sayreville	Old Bridge	Study Area
1	***Industry***	***Retail Trade***	***Retail Trade***	***Retail Trade***
	Count	2,467	3,619	6,086
	Share	12.0%	12.6%	12.4%
2	***Industry***	***Health Care and Social Assistance***	***Health Care and Social Assistance***	***Health Care and Social Assistance***
	Count	2,455	3,434	5,889
	Share	11.9%	12.0%	12.0%
3	***Industry***	***Professional, Scientific, and Technical Services***	***Professional, Scientific, and Technical Services***	***Professional, Scientific, and Technical Services***
	Count	1,908	2,448	4,356
	Share	9.3%	8.6%	8.9%
4	***Industry***	***Educational Services***	***Educational Services***	***Educational Services***
	Count	1,730	2,411	4,141
	Share	8.4%	8.4%	8.4%
5	***Industry***	***Manufacturing***	***Finance and Insurance***	***Manufacturing***
	Count	1,525	1,996	3,418
	Share	7.4%	7.0%	6.9%
Top 5	Count	10,085	13,908	23,890
	Share	49.0%	48.6%	48.6%
Not in Top 5	Count	10,493	14,701	25,297
	Share	51.0%	51.4%	51.4%
Total Primary Jobs		20,578	28,609	49,187

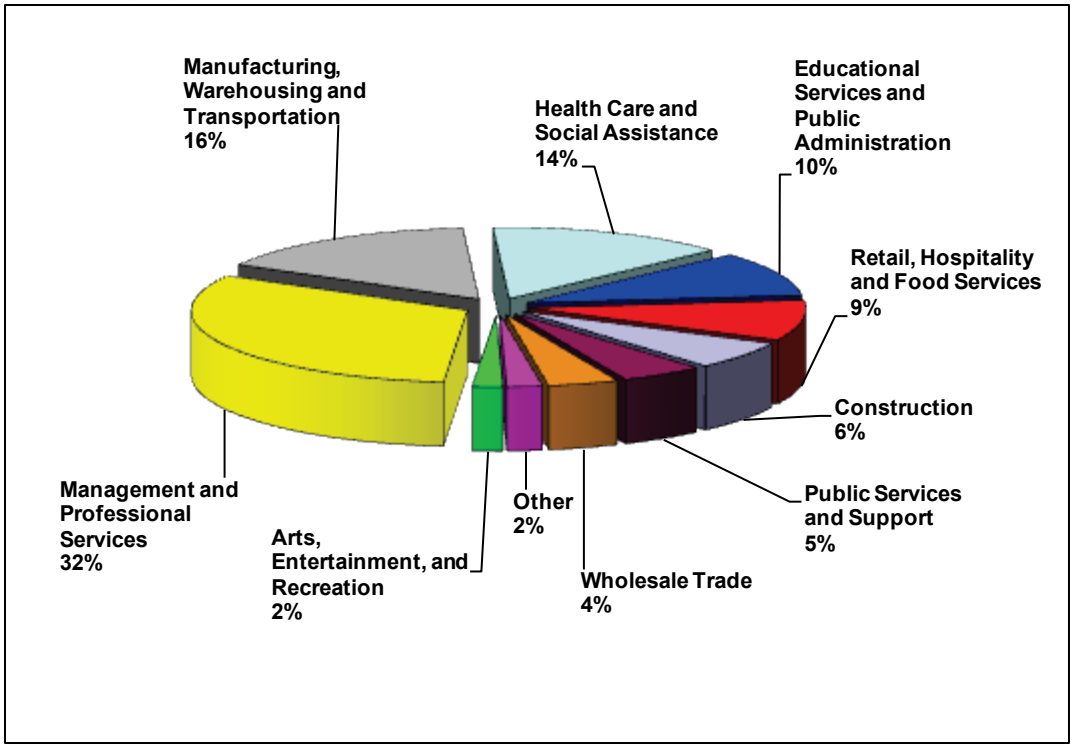
US Census Bureau, LEHD OnTheMap Origin-Destination Database (Http://lehdmap4.did.census.gov/themap4)

4.4.2 Workers Employed in the Study Area (Work Force)

Among the jobs located in the Study Area, the leading industries of Old Bridge Township and Sayreville Borough were Management and Professional Services (32%); Manufacturing, Warehousing and Transportation (16%); Health Care and Social Assistance (14%); and Educational Services and Public Administration (10%).

Figure 4-14: Primary Jobs in the Study Area, by Industry (2008)

Industries are grouped for illustrative purposes and do not directly correspond to the non-grouped industries in Table 4-3.



US Census Bureau, LEHD OnTheMap Origin-Destination Database (http://lehdmap4.did.census.gov/themap4)

The following map shows where jobs are concentrated within the Study Area. In Old Bridge, major employment centers include Raritan Bay Medical Center at Route 18 and Ferry Road, the Metropark South office complex near Exit 120 of the Garden State Parkway, and retail and office centers along Route 9. Sayreville's employment centers include municipal government (including schools) on Washington Road and industrial complexes on the Main Street Extension.

Map 4-8: Employment Centers as of January 2010

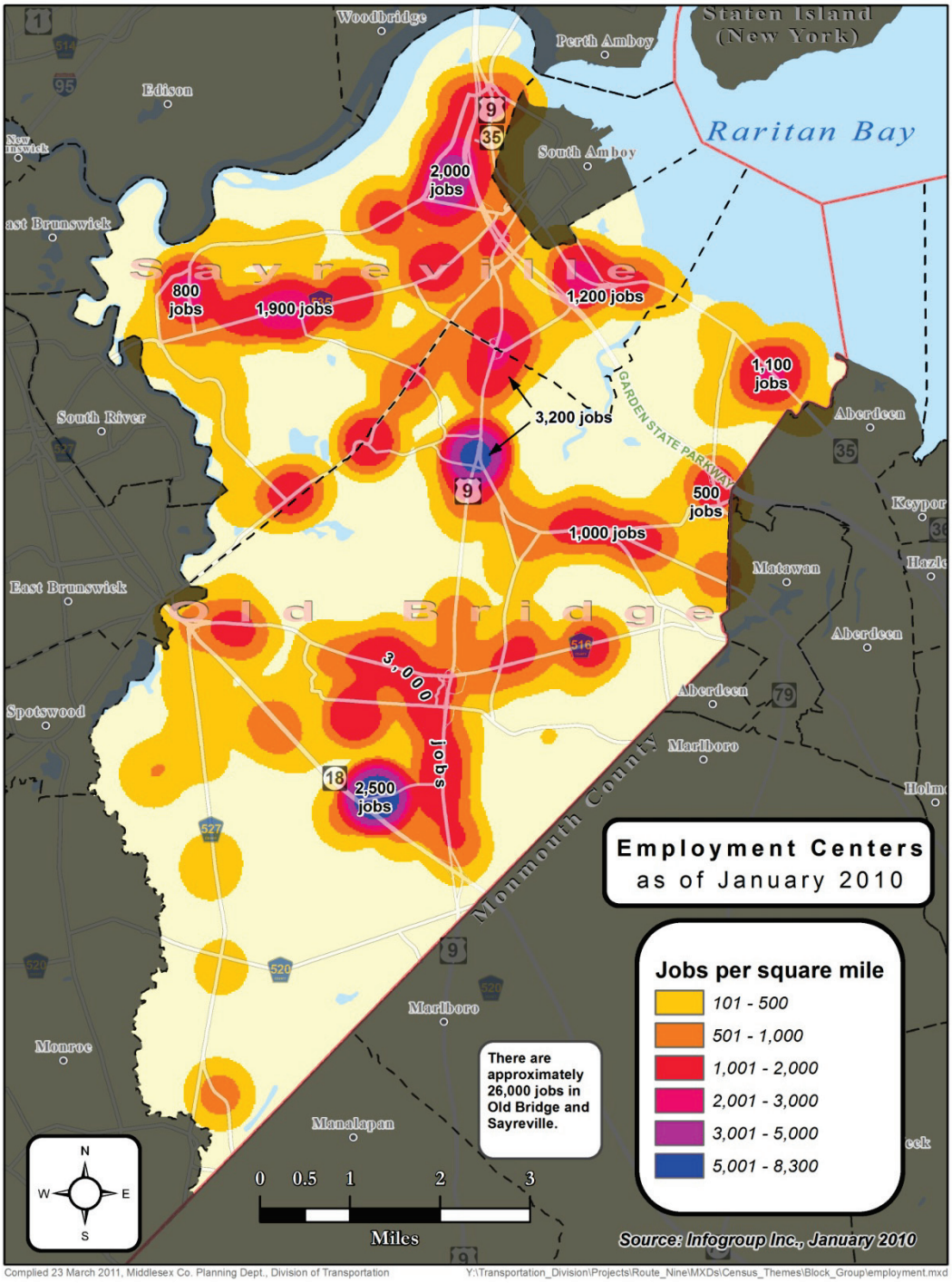


**Table 4-3: Top 5 Industries in Sayreville and Old Bridge,
Ranked by Number of Primary Jobs in Workplace Geography (2008)**

Rank		Sayreville	Old Bridge	Study Area
1	***Industry***	***Manufacturing***	***Health Care and Social Assistance***	***Health Care and Social Assistance***
	Count	1,436	2,123	2,685
	Share	15.9%	21.1%	14.1%
2	***Industry***	***Educational Services***	***Retail Trade***	***Retail Trade***
	Count	957	1,743	2,653
	Share	10.6%	17.3%	13.9%
3	***Industry***	***Retail Trade***	***Accommodation and Food Services***	***Manufacturing***
	Count	910	937	1,931
	Share	10.1%	9.3%	10.1%
4	***Industry***	***Accommodation and Food Services***	***Professional, Scientific, and Technical Services***	***Accommodation and Food Services***
	Count	793	717	1,730
	Share	8.8%	7.1%	9.1%
5	***Industry***	***Transportation and Warehousing***	***Construction***	***Professional, Scientific, and Technical Services***
	Count	708	589	1,357
	Share	7.9%	5.8%	7.1%
Top 5	Count	4,804	6,109	10,356
	Share	53.3%	60.6%	54.3%
Not in Top 5	Count	4,210	3,965	8,732
	Share	46.7%	39.4%	45.7%
Total Primary Jobs		9,014	10,074	19,088

US Census Bureau, LEHD OnTheMap Origin-Destination Database (http://lehdmap4.did.census.gov/themap4)

5 Mobility Needs and Transit Viability Assessments

This section of this report illustrates the use of block group data from Census 2000 to calculate two different evaluation methods for locating geographic areas that would support transit linkages. It is important to clarify that these measures do not reflect the actual use or existence of public transportation in the Study Area. Rather, the measures are simply quantitative methods for highlighting areas that show a potential for high transit use. The results of these calculations are visually displayed in thematic maps of the Study Area.

First, the mobility needs assessment uses variables that target segments of the population that are "transportation-disadvantaged" or "transit-dependent" due to individual characteristics such as being of an older age, having one or more disability, lacking access to a private vehicle and/or earning low income. These input variables are intended to characterize **mobility need**. The second method used in this section is a transit viability index, which employs the simpler method of adding together density characteristics to find areas that are potentially conducive for public transportation linkages. The input factors here are population density, household density, labor force density, and the density of housing units with one or no vehicle available.

5.1 Mobility Needs Assessment

This section presents an overview of the likelihood of transit use and dependency as a composite measure of mobility need and closely follows the approach outlined in the *North Jersey Regional Coordinated Human Services Transportation Plan*.[7] The purpose of performing this mobility needs assessment was to identify those areas with the greatest need and potential demand for public and human service transportation. A dozen variables were used to rate mobility need among all of the block groups in a geographic dataset covering Middlesex County and all counties adjacent to Middlesex County. These 12 variables were derived from Census 2000 data and include both rates and aggregate measures of mobility need. Rates, such as the percentage of persons living below the poverty level and the population density of senior citizens, are useful in understanding the concentration of a certain variable within an area. The aggregate measure (i.e. the absolute value), such as the total number of persons living below the poverty level, can indicate the overall potential for travel in general, and public transit trip-making in particular.

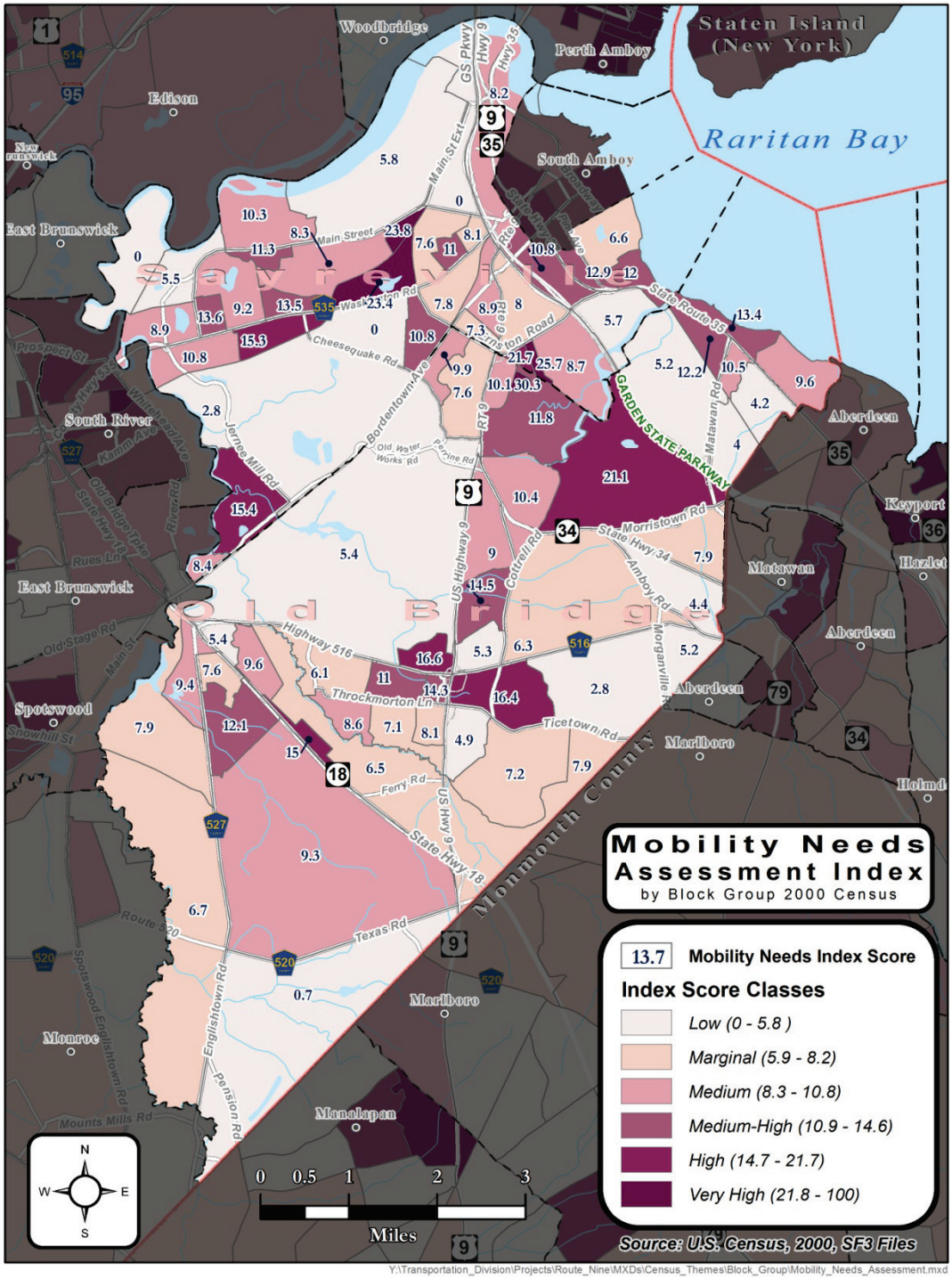
Twelve variables were used to rate the mobility need and were selected from four target groups that are generally recognized for their correlation with mobility needs, sometimes identified

as “transportation-disadvantaged.” These groups include senior citizens (65 years old and above); persons with disabilities; persons at or below the poverty level; and occupied housing units with no vehicle available (sometimes referred to as zero-car households). For each target group, three variables were utilized: the total number (i.e. the aggregate value); the percent total; and density (per acre of gross land area).

For all variables, higher values are indicative of greater need and likelihood of transit dependency. For example, a block group with a relatively high incidence of poverty or a high number of zero-car households exhibits greater mobility need and propensity for transit use and/or dependency. In this analysis, a standardized score approach for all block groups in the dataset has been used to combine the different variables. Standardization of the score is achieved by applying range normalization to each variable as well as to the final summation of the normalized values. For each variable, a block group with the lowest value is assigned a score of zero while a block group with the highest value is assigned a value of 100. The values for all other block groups are computed by normalizing them against the range between the minimum and maximum values. The normalized scores of all 12 variables were summed together; theoretically accounting for a highest possible score of 1,200 (the actual highest score in the dataset was 611). As a final step, the same range normalization method was again applied to the total sum of scores, transforming the final mobility needs score to a standard scale of 0 to 100.

The following map presents the Mobility Needs Score by block group for the Study Area, and illustrates that the areas attaining the highest scores (14.7 and above) are dispersed throughout the Study Area. These results reflect the combined impact of the variables described above. The map also shows that much of the southern and central portions of the Study Area exhibit low mobility needs scores and indicates a low or marginal level of mobility need.

Map 5-1: Mobility Needs Assessment Index by Block Group (2000 Census)



5.2 Transit Viability Index

This index was used to perform a quick comparative illustration of relative transit supportiveness, also known as transit viability. Middlesex County calculated the transit score by block group in the Study Area by summing the (per land acre) values for population density, household density, labor force density, and zero to one car per housing unit density. There is no minimum score for an area to be considered "transit viable." Instead, the score is a way to prioritize locations based on four demographic input factors as a means to prioritize locations within the Study Area based on geographic variations in the resultant simple summation of the individual demographic components.[8]

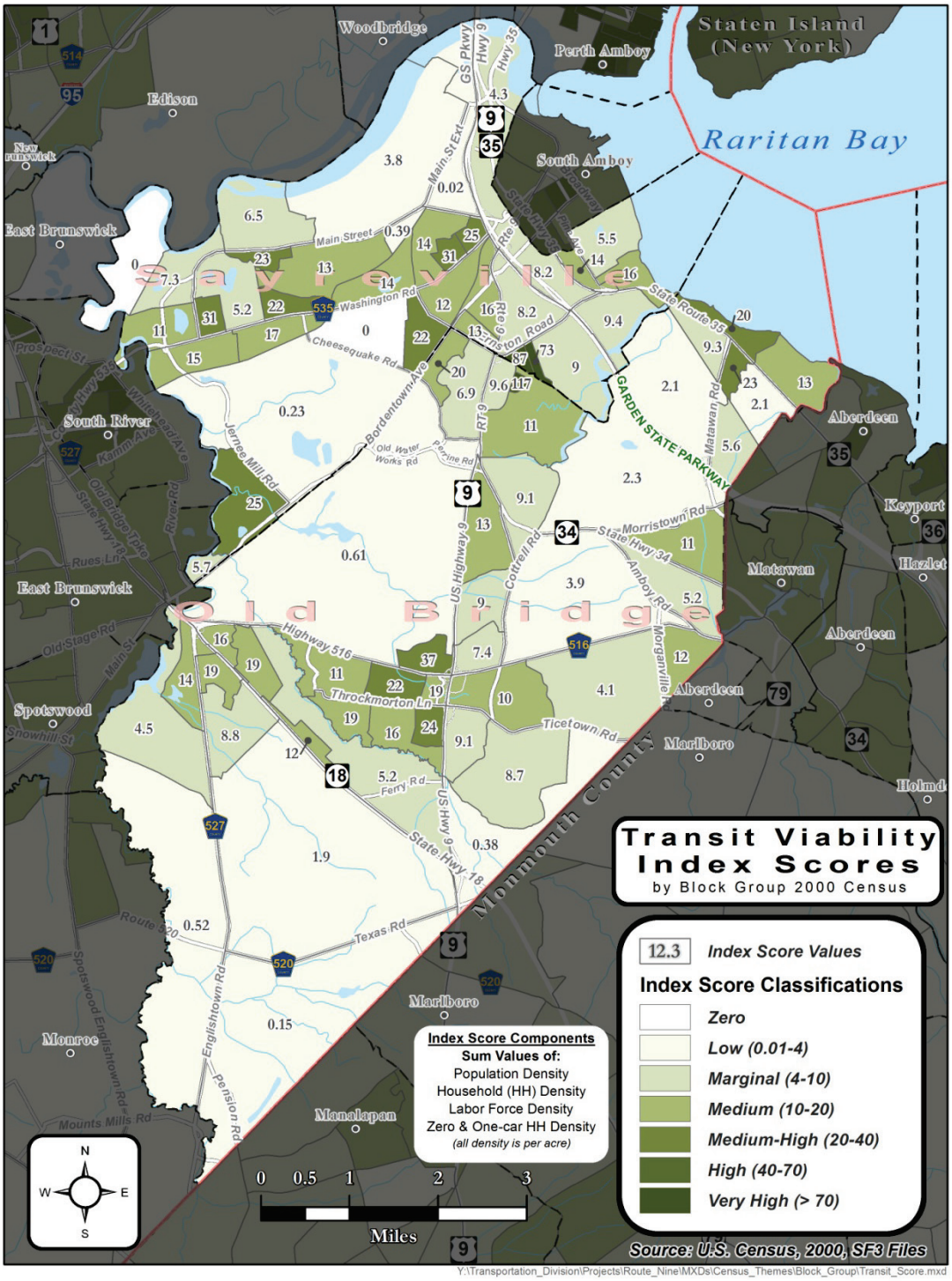
The transit viability map on the next page highlights the areas where these inputs combine to produce the highest values. The results reflect the combined impact of the aforementioned variables. The map closely mirrors its input factors, shown individually on maps found in Section 3 of this report. For example, the labor force density very closely resembled the transit viability outcome.

The following map presents transit viability by block group for the Study Area, and illustrates that the areas attaining the highest scores (40+) are scattered throughout the Study Area, but often located near major junctions. The map also shows that much of the southern and central portions of the study area exhibit low scores, which indicate a low or marginal level of mobility need.

Winding Wood Apartments, at the western nook in the Study Area, stood out here due to relatively high household and population densities. The following map indicates that this area attained a high transit viability value. However, it should be noted again that this high value does not reflect actual transit use or accessibility. On this point, this specific apartment complex had relatively low transit usage as only 142 people (see Map 4-5 on page 56) reported using public transit as their primary mode of transportation to work out of a total labor force of 2,261 people living there (see Map 3-8 on page 37) at the time of the 2000 Census.

Another area of distinction was just east of the intersection of Route 9 and Ernston Road, an area that attained high values for each of the input categories, largely due to the presence of densely populated multifamily housing communities of London Terrace and Skytop Gardens. In this case, the high transit viability score did actually correlate to transit accessibility, with the additional presence of three park and ride facilities in this general area.

Map 5-2: Transit Viability Index by Block Group (2000 Census)



6 Study Area and Existing Transit Services

A variety of local, regional and long distance transportation services, from public and private organizations and businesses, are available in the Study Area. Existing fixed route transit services in the Study Area include NJ Transit commuter bus routes 64, 67, 131, and 139 serving northbound destinations including Jersey City, Weehawken, Newark, and New York Port Authority and southbound destinations including Lakewood, Manalapan, Howell, Toms River and Jackson. Academy Bus routes serve northbound destinations to Midtown Manhattan (34th Street), New York Wall Street, and the New York Port Authority Bus Terminal, and southbound destinations to Lakewood. The Study Area also includes NJ Transit local routes 815, 817 and 818 serving New Brunswick, Woodbridge, Perth Amboy, Keansburg, Port Monmouth and Campbell's Junction.

Refer to Fold-Out Map A: *Existing Fixed-Route Bus Service in the Route 9 Corridor* and Fold-Out Map B: *Middlesex County Area Transit (MCAT)* (pp. 85, 87) illustrating services currently provided within the Study Area. For reference, schedules/timetables for all of the fixed-route bus routes in the Study Area are also included as appendices:

- Appendix B (NJ Transit timetables)
- Appendix D (private carriers timetables)
- Appendix E (MCAT timetables)
- Appendix F (Old Bridge Community Shuttle timetable)

6.1 Inventory of Fixed Route Public Transit Service

The Route 9 Corridor in Old Bridge and Sayreville is served by commuter bus routes originating from Monmouth, Ocean and Middlesex Counties going to New York, Newark & Jersey City with variations accessing the Garden State Parkway and New Jersey Turnpike. The bulk of these services load up and top off at the Old Bridge Park & Ride on Route 9 at Westminster Place.

- NJ Transit Regional services along:
  - Routes 9, 18, 34, 35, 516, & 527
- NJ Transit Local services along:
  - Routes 9, 18, 35, 535, & 516
- Academy services along Route 9 and the Garden State Parkway
- Middlesex County Area Transit:
  - Brunswick Square Mall-South River-Old Bridge (M3) Shuttle
  - Old Bridge Commuter Shuttle

6.1.1 NJ Transit Bus

According to the current Google Transit Feed Specification (GTFS) scheduling dataset, NJ Transit's Route 9 mainline peak period weekday bus services, "topping off" at the Old Bridge Park & Ride for points north each weekday, is by far the busiest bus service corridor in the state. NJ Transit offers commuters living in the Route 9 corridor with more than 120 northbound buses between the hours of 6 and 10 a.m., **amounting to average peak-period headways of one bus every two minutes during the course of the four-hour time span**. The comparable figure for the weekday evening peak-period (4 to 7 p.m.) is approximately 100 buses, which offers more frequent service with average trip headways of 1.8 minutes.[9] Here is a summary of all of NJ Transit's existing bus services within the Study Area:

- NJ Transit **139**, operated in conjunction with the Academy Bus Company from **Lakewood** to the **New York Port Authority** terminal via Route 9
- NJ Transit **64** service from **Lakewood** to **Jersey City** to **Weehawken** via Route 9
- NJ Transit **67** service from **Toms River** to **Lakewood** to **Newark-Penn Station** via Route 9 including some trips operating via Newark International Airport

- NJ Transit **68** peak-period service from **Old Bridge** to **Weehawken** via Routes 516 and 18 (buses also stop at the East Brunswick Transportation Center)
- NJ Transit **131** from **Ernston Road** in Sayreville to the **New York Port Authority** terminal via Washington Road, Main Street, and Raritan Street in Sayreville
- NJ Transit **133** from the **Old Bridge Rotary Senior Center** northbound to the **New York Port Authority** Bus Terminal via County Route 516 and State Route 34, and southbound to **Aberdeen** via Matawan
- NJ Transit **134** from **Browntown** to **Lower Manhattan** and **Wall Street** via County Route 516 and State Route 18 to the Turnpike and Holland Tunnel, continuing down Broadway (effective June 2010 this route has been operated by Coach USA as part of its Line 600 service).
- NJ Transit **135** from **Freehold** to the **New York Port Authority** terminal via Marlboro, Matawan, and Old Bridge**,** accessing the Garden State Parkway at Exit 120
- NJ Transit **138** from **Old Bridge** to the **New York Port Authority** terminal via East Brunswick. The route serves Monroe and Spotswood along County Route 613 and Texas Road, and travels via Route 9 to Ferry Road and State Route 18, connecting to the Turnpike at Exit 9.
- NJ Transit **815 (local)** from **New Brunswick** to **Woodbridge** via the East Brunswick Transportation Center, South Amboy, and Perth Amboy. In Sayreville, riders can board the bus on Washington Road.
- NJ Transit **818 (local)** from the **Old Bridge Civic Center** to the **New Brunswick** Rail Station via State Route 18 and the East Brunswick Transportation Center. The 818 stops at many of the developments along County Route 516. Connections to Route 9 mainline service can be made at Jake Brown Park & Ride and Throckmorton Lane / Ticetown Road.

6.1.2 Academy Bus

The Academy Bus Company operates about 500 buses in the Northeast region, including several that serve commuter routes linking the Route 9 Corridor in the Study Area to Jersey City and various Manhattan locations. These include:

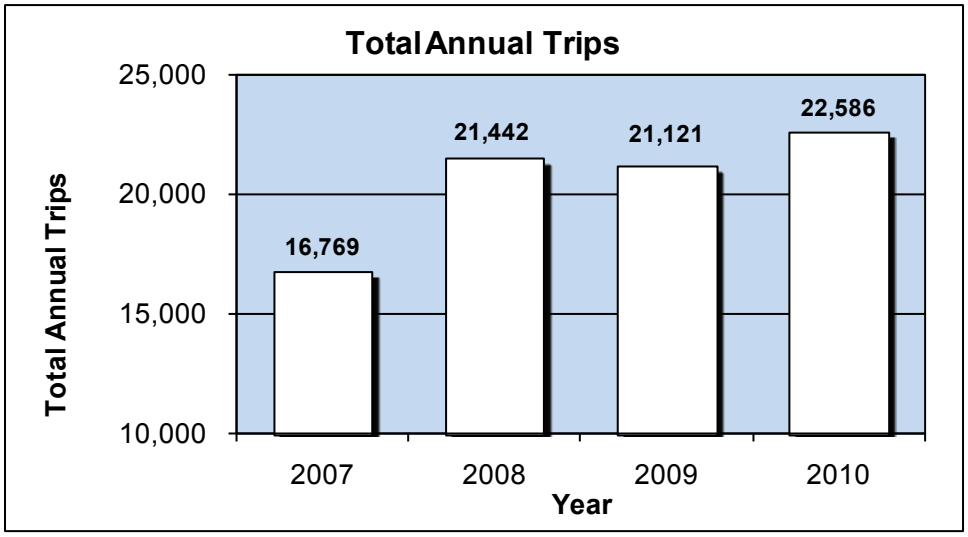
- **139** service to **the New York Port Authority** Bus Terminal jointly with NJ Transit (see above)
- Service from **Cheesequake Park & Ride** to the **New York Port Authority** terminal
- Service from **Cheesequake Park & Ride** to **Wall Street** via Jersey City
- Service from **Winding Wood Apartments** or **Harbour Club** (Sayreville) to **East Midtown** via the Raritan Street Park & Ride
- Weekday service from **Winding Wood Apartments** or **Harbour Club** (Sayreville) to **Wall Street** via the Raritan Street Park & Ride

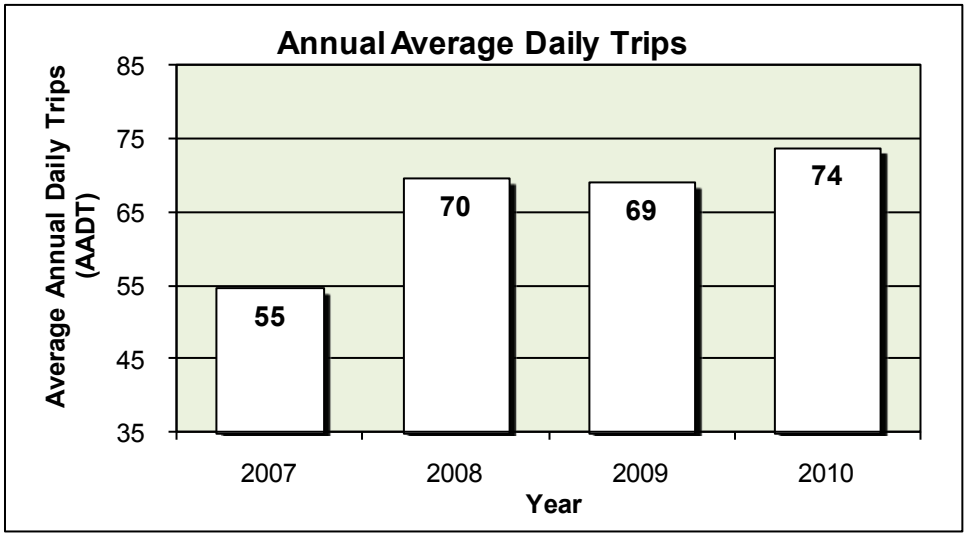
Academy Bus service to Port Authority from Cheesequake Park and Ride

6.1.3 Middlesex County Area Transit (MCAT) M3 Shuttle

Middlesex County Area Transit (MCAT) operates the **M3** (**Brunswick Square Mall-South River-Old Bridge) Shuttle** which serves major stops at key locations including destinations at shopping centers, medical offices and the Raritan Bay Medical Center (Old Bridge Division) on Ferry Road. This shuttle operates on 60-minute intervals from 8:00 a.m. to 4:50 p.m. and is currently funded through FTA Section 5317 (New Freedom) Funding. Passengers using this route can also connect to NJ Transit local bus service at Brunswick Square Mall and the Old Bridge Municipal Complex.

Figure 6-1: MCAT M3 Shuttle Annual Ridership (2007 to 2010)



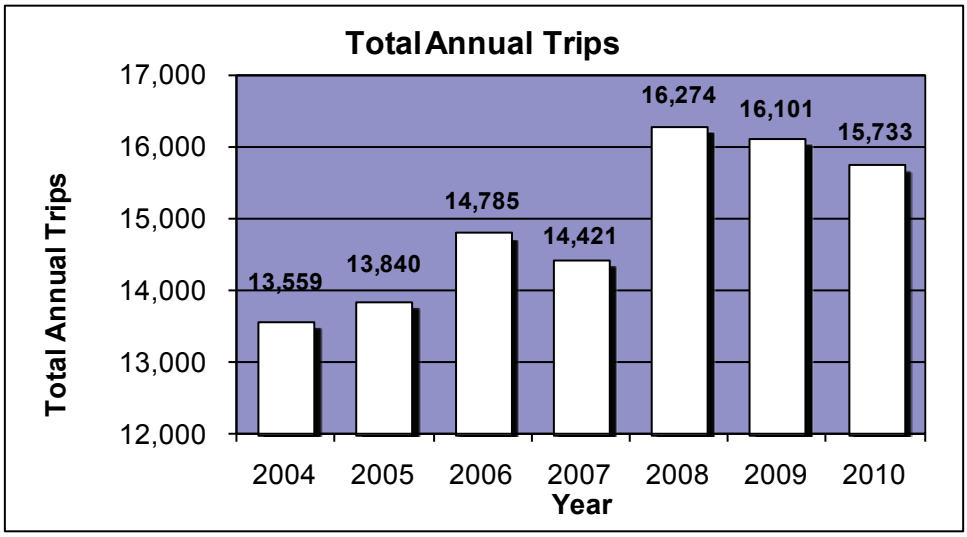


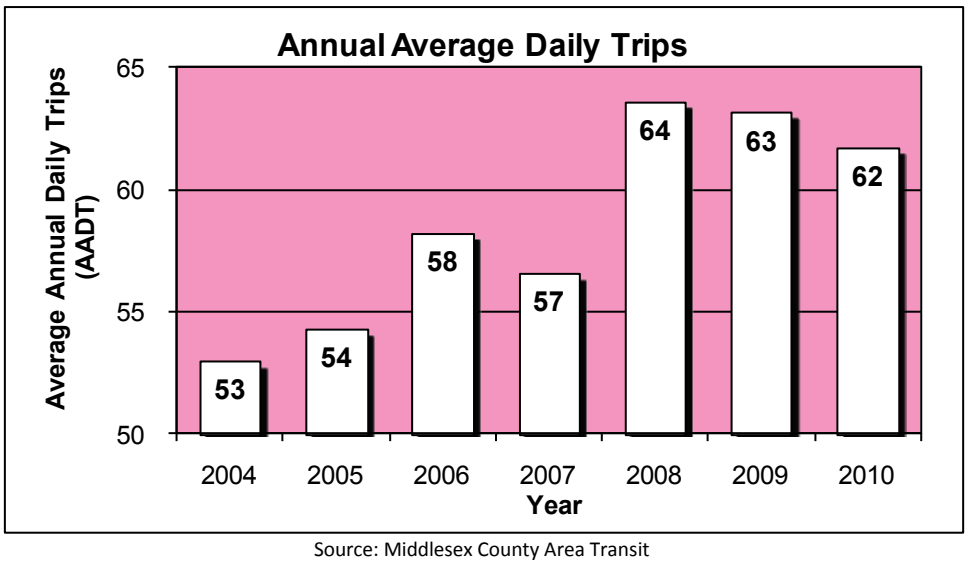
Source: Middlesex County Area Transit

6.1.4 Old Bridge Community Shuttle

Middlesex County Area Transit (MCAT) operates the Old Bridge Community Shuttle to the bus stop at Route 9 with Throckmorton Lane and Ticetown Road. Commuters are picked up at nine locations in the Sayrewoods section of the Township. The shuttle operates Monday through Friday on 30 minute intervals from 5:15 to 7:45 a.m. and from 4:15 to 7:15 p.m.

Figure 6-2: Old Bridge Community Shuttle Annual Ridership (2004 to 2010)



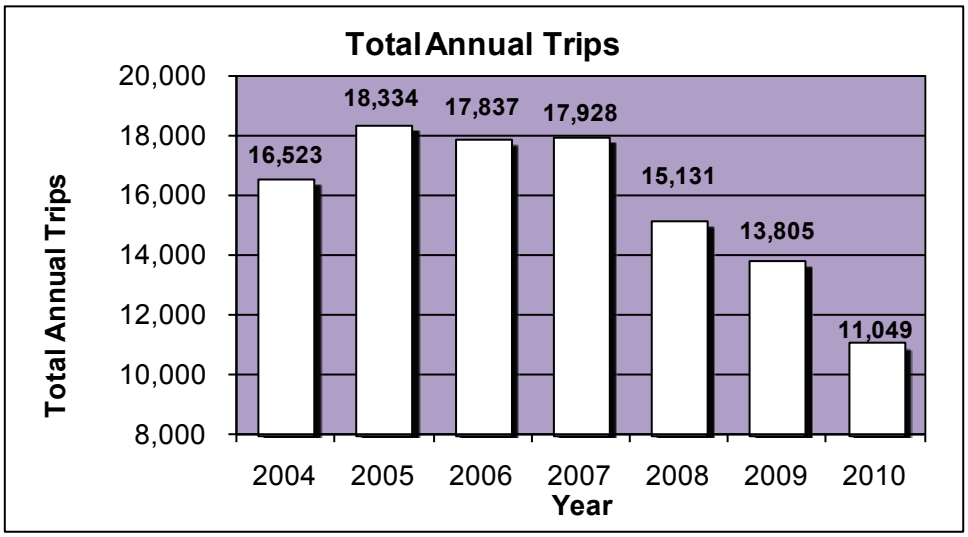


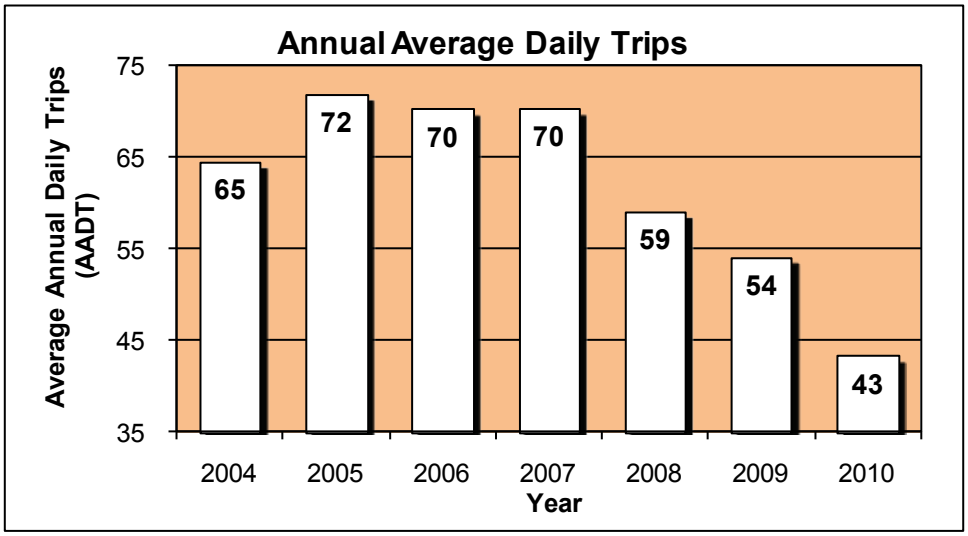
Source: Middlesex County Area Transit

6.1.5 Sayreville Community Shuttle

Funded by the Borough of Sayreville and operated by MCAT, the Sayreville Community Shuttle provides trips to/from the senior center and offers transportation to destinations beyond the Sayreville municipal boundary. Primarily for Sayreville residents over 60 without access to a vehicle, the service provides weekday advance reservation transportation to congregate nutrition, shopping, and medical trips.

Figure 6-3: Sayreville Community Shuttle Annual Ridership (2004 to 2010)





Source: Middlesex County Area Transit

6.1.6 Middlesex County Area Transit (MCAT) Demand Response

MCAT also provides demand responsive transportation services to persons that are at least 60 years old or people with disabilities, and other transportation-dependent residents of Middlesex County. The general purpose of this program is to make transportation available and accessible so that residents may obtain the necessities of life, including, but not limited to, employment, post-secondary education, social and recreational activities, shopping and non-emergency medical services. Transportation is provided within and up to five miles outside of the county. Service is from 8:00 a.m. to 3:30 p.m., with limited service until 10:00 p.m.

6.1.7 Sayreville Borough Office on Aging

Sayreville's "Around the Town" shuttle operates four days per week and provides service for seniors between their homes and destinations such as medical offices, shopping centers, financial institutions, and hair salons. The Borough is divided into two areas, and the bus services each twice weekly. Gillette Manor and Lakeview are serviced four times each week. The bus operates between approximately 8:15 and 10:15 a.m., and the driver makes stops based on the destinations of the passengers. With the exception of Gillette Manor and Lakeview, residents must phone ahead by 3 p.m. the day before to arrange pickup.

6.1.8 Old Bridge Township Office on Aging

Old Bridge Township Office on Aging operates fixed route transportation services for senior citizens and people with disabilities. Transportation service includes local medical, nutritional, recreational, shopping and social trips.

Fold-Out Map A: Existing Fixed-Route Bus Service in the Route 9 Corridor

Back of map a

Fold-Out Map B: Middlesex County Area Transit (MCAT) Shuttle System Map

Back of map b

6.2 Park and Ride Facilities

There are more than 10 park and ride facilities in the Study Area with a total combined capacity of nearly 3,000 spaces. The larger facilities include the Route 9 facility just south of Ernston Road at Westminster Boulevard (900+ spaces), and the Garden State Parkway Cheesequake Rest Area with 771 spaces. Table 6-1 (on the next page) summarizes the park and ride facilities in the Study Area.

Old Bridge Park and Ride looking north (March 29, 2006)


Bus shelters at Raritan Street Park and Ride in Sayreville (December 7, 2009)

Table 6-1: Park & Ride Summary Table

Adjacent to Route 9 (sorted south to north)

Park & Ride Name	Location	Operator	Spaces	Spaces Used	Spaces Available
Inverness	Inverness Drive & Rt. 9	Old Bridge Township	252	252	0
Frederick Pl.	Knights of Columbus-Frederick Place & Throckmorton Lane	Old Bridge Township	30	30	0
Madison Variety (2500 Rte 9 Plaza)	Rt. 9 & Throckmorton Lane	Old Bridge Township	24	24	0
Jake Brown (Brunetti Lot)	Jake Brown Rd. & Rt. 9	Old Bridge Township	151	151	0
Park Circle	Rt. 34 & Park Circle	Old Bridge Township	30	30	0
Old Bridge (Lots 1A thru 1D)	Rt. 9 & Meleta Way	Park America	541	541	0
Old Bridge Township	Rt. 9 North & Westminster Blvd	Park America	398	398	0
Home Depot	Ernston Rd. & Rt. 9	Old Bridge Township	145	20	125
		Subtotal	**1,571**	**1,446**	**125**

Not Adjacent to Route 9

Park & Ride Name	Location	Operator	Spaces	Spaces Used	Spaces Available
GSP Cheesequake	Garden State Parkway (Located in the center median south of Exit #124)	Academy Bus	771	678	93
Raritan Street	Garden State Parkway Exit #124 at intersection of Main St. & Raritan St.	Sayreville Borough	290	113	177
GSP Exit 120	Garden State Parkway Exit #120	NJHA	104	104	0
N. Ernston Road @ Sayrebrook Shpg Ctr	N. Ernston Rd. & Washington Rd.	Sayreville Borough	100	14	86
Carl Sandburg Middle School	Ticetown Road, across from middle school	Old Bridge Township	59	18	41
		Subtotal	**1,324**	**927**	**397**

Grand Totals	**2,895**	**2,373**	**522**

Sources: various (NJDOT shape file, KMM web site, municipal representatives)

6.3 Inventory of Bus Stops and Shelters

There are 218 bus stops in the Study Area — 155 in Old Bridge and 63 in Sayreville. Stops are located along major county and state highways in addition to Route 9. Using information from Keep Middlesex Moving and NJ Transit, these stops were mapped, indicating attributes such as the presence of a shelter or access for people with disabilities (Figure 6-4). Additional maps are included in Appendix G.

Table 6-2: Number of Bus Stops by Transit Agency

Agency	Number of Stops		NOTES
	Quantity	Percent	
Academy	26	11.9%	includes two stops shared with NJ Transit at Raritan Street Park & Ride
Middlesex County Area Transit	46	21.1%	includes 32 stops shared with NJ Transit
New Jersey Transit	180	82.6%	includes two stops shared with Academy and 32 stops shared with MCAT
Total	**218**	**100%**	**Includes all of Old Bridge & Sayreville**

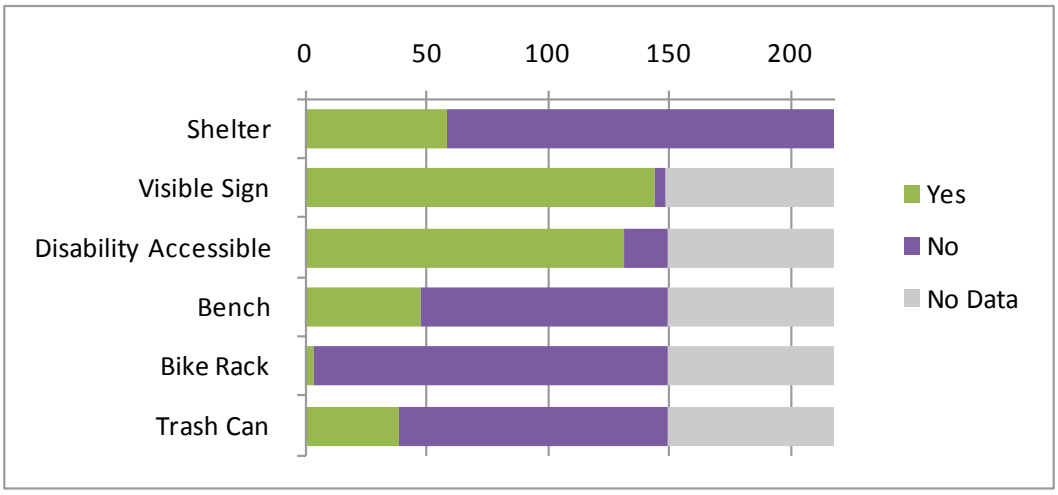
Sources: NJ Transit, Keep Middlesex Moving

In June 2009, Keep Middlesex Moving (KMM) released a report examining 980 bus stop locations throughout 19 of 25 Middlesex County municipalities, including 152 of the 218 stops situated in Sayreville and Old Bridge (according to the KMM report, they surveyed about 84% of the stops countywide).[10] For each stop, KMM's inventory data indicates the condition and/or presence of shelters, bus route signage, benches, trash receptacles, bike racks, lighting, and disabled access.

The KMM bus stop survey of Middlesex County examined about two-thirds of all stops in the Study Area. Shelter information for the Study Area presented in this report is more complete because this information is additionally provided by NJ Transit and the data therefore includes stops that were not necessarily surveyed by KMM. Map 6-1 shows the location of shelters. Many shelters exist along Route 516, and the northbound side of Route 9 (passengers wait to go north in the morning). There are fewer shelters along the southbound direction of Route 9, at Academy Bus stops on Main Street in Sayreville, and along Route 34, Route 527, and Route 516 near Aberdeen and Matawan (Monmouth County).

The majority of stops in the Study Area are reported as accessible to persons with disabilities; however, the KMM survey revealed that many stops along Route 18 remained inaccessible (see map entitled Bus Stop Accessibility included within Appendix G). The KMM survey also suggests that overall, there is little seating, there are few bus stops with trash cans, and only three bus stops with a bike rack (see following graph and table; maps of physical attributes are also included in Appendix G).

Figure 6-4: Physical Attributes of Bus Stops in the Study Area



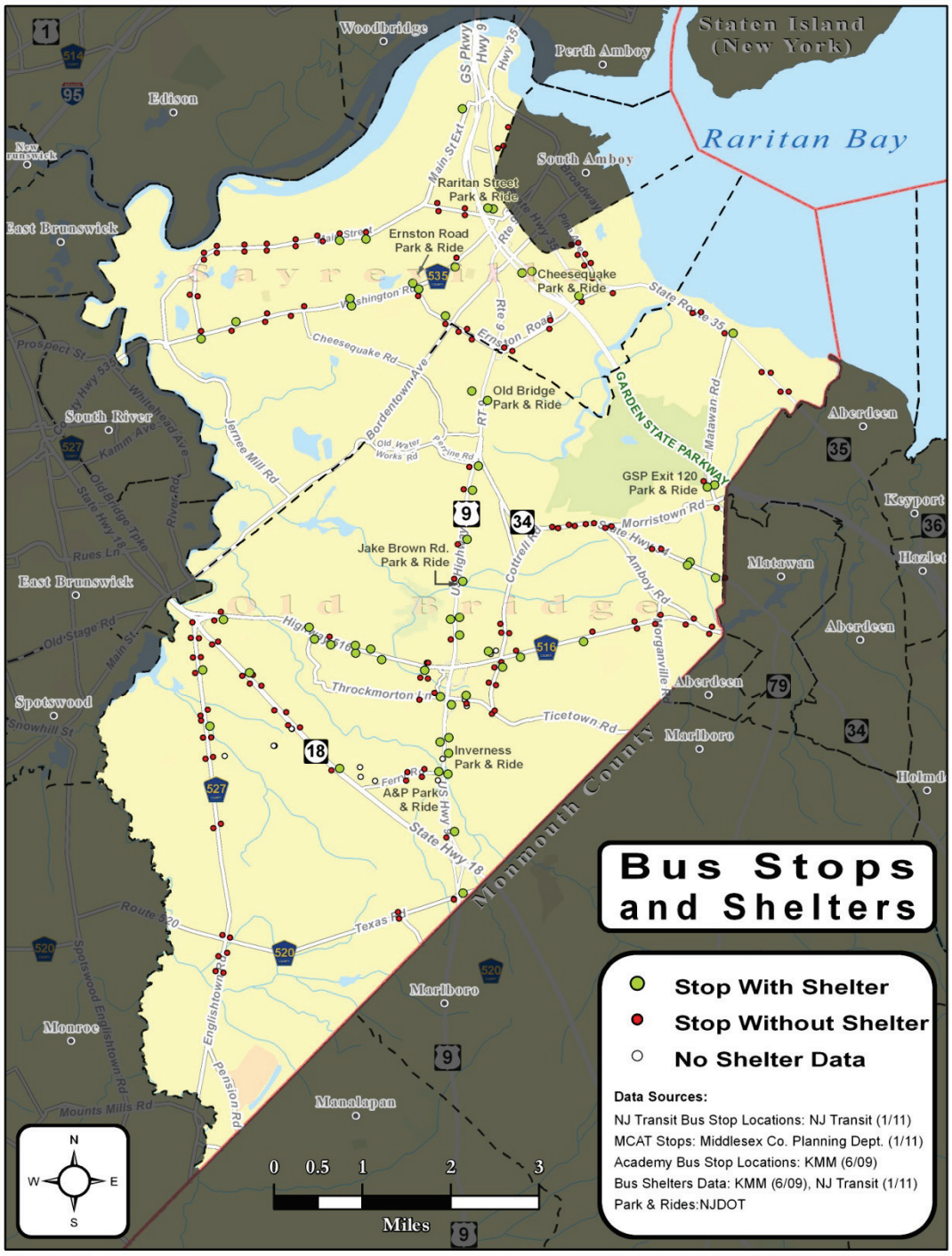
Sources: NJ Transit, Keep Middlesex Moving

Table 6-3: Physical Attributes of Bus Stops in the Study Area

Attribute	Yes		No		No Data	
	Quantity	Percent	Quantity	Percent	Quantity	Percent
Shelter	58	27%	160	73%	0	0%
Visible Sign	144	66%	4	2%	70	32%
Disability Accessible	131	60%	18	8%	69	32%
Bench	47	22%	102	47%	69	32%
Bike Rack	3	1%	146	67%	69	32%
Trash Can	38	17%	111	51%	69	32%

Sources: NJ Transit, Keep Middlesex Moving

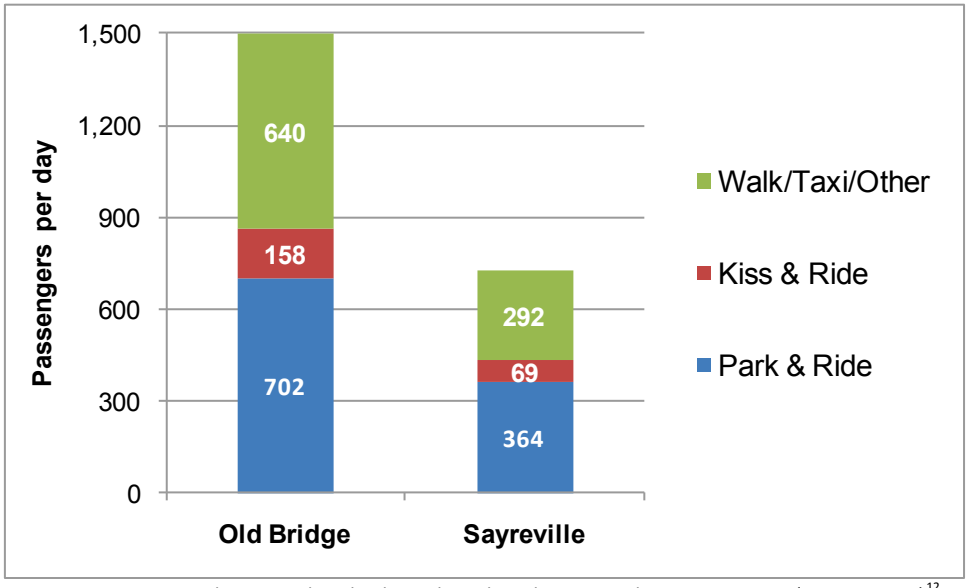
Map 6-1: Bus Stop Locations, With or Without a Shelter



6.4 Mode of Travel to Bus Stops

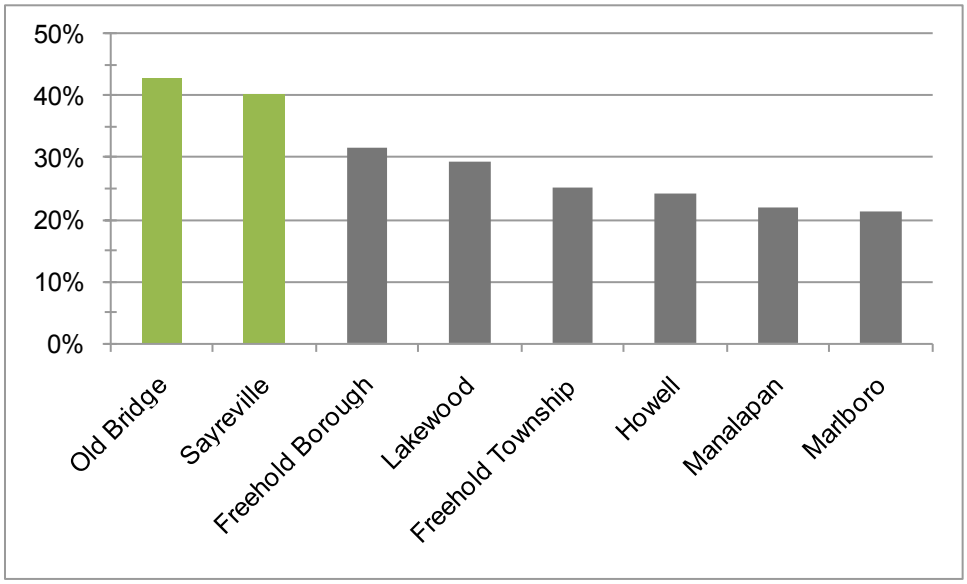
In 1993, NJ Transit released a market analysis of existing conditions along the Route 9 Corridor.[11] Included in this report was the "mode of access to bus stops", disaggregated by municipality, from Sayreville to Lakewood. In the Study Area, 42% of bus passengers were getting to bus stops by walking, bicycle, taxi, or some mode other than driving or being dropped off. Because land use has not changed dramatically since 1993, mode of access is also likely to be similar today.

Figure 6-5: Mode of Access to Bus Stops from Corridor Municipalities (1993)



Source: Route 9 Corridor Bus Park and Ride Study Technical Memorandum #1, NJ Transit (1993, Sep. 24)[12]

Figure 6-6: Share of Riders Accessing Bus Stops via "Walking", "Taxi", or "Other" (1993)



Source: Route 9 Corridor Bus Park and Ride Study Technical Memorandum #1, NJ Transit (1993, Sep. 24)

6.5 Pedestrian and Bike Safety near Bus Stops

Plan4Safety software developed by the Rutgers Center for Advanced Infrastructure and Transportation (CAIT) was utilized to search reported municipal police department crash records. For the purposes of this report, the Plan4Safety crash records database was queried for crashes that occurred in Old Bridge and Sayreville from January 2006 through July 2010 and that involved pedestrians or cyclists. This query resulted in the identification of 267 crashes, including 12 pedestrian and three cycling fatalities. Approximately half of the records downloaded from the Plan4Safety web interface included location information. The Middlesex County Planning Department attempted to geocode all remaining crashes through the use of an address locator tool (GIS software). However, due to insufficient descriptive information in certain individual crash records, five crash locations could not be geocoded at all for mapping purposes (262 were mapped).

The 267 total crashes involving a pedestrian or cyclist within the overall Study Area equates to 58 crashes per year on average (or approximately one pedestrian or bike crash every six days). A cluster analysis of the 262 mapped pedestrian and cyclist crashes identified 16 "hot spots" situated in close proximity to a bus stop. Pedestrian and cyclist crashes in hot spots with a bus stop occurred at an average rate of almost **15 crashes per year** (or, stated another way, **once every 25 days**).

Pedestrian safety issues are not a new problem to the Study Area. A 1968 report published by the Middlesex County Planning Board indicates that “many transit customers must walk across Route 9 without the benefit of traffic signals or exclusive access walks to get to the bus stops…they endanger their lives and slow traffic.”[13] While more signals have been added at intersections, the lack of high-visibility crosswalk markings and sidewalks are still issues, especially to access bus stops located mid-block.

The 1968 report goes on to say that “this [hazardous condition] is particularly evident during the peak rush hours.” [Entire report is provided as Appendix H.] Currently in 2011, peak-period buses operating in the bus shoulder lane make it hazardous for pedestrians in situations where sidewalks are not present. Consequently, as “goat paths” that can be seen along Route 9 indicate, pedestrians often walk in the grass along the highway. However, when the ground is snow-covered, pedestrians will either walk in the shoulder with the peak-period buses or in the opposite shoulder where there is no traffic. However, by walking on the opposite side of the road, pedestrians may be forced to cross “mid-block” across at least six lanes of traffic to reach their destination. On February 10, 2011, an Old Bridge man was pronounced dead on the scene after attempting to cross from

Route 9 southbound south of Ferry Road to get to work on the northbound side of the highway, where peak-period buses were operating in the shoulder.[14] (According to the Federal Highway Administration, "adult pedestrian crashes occur more often in the winter").[15]

Even when pedestrians are crossing at intersections legally – despite recent upgrades to enhance pedestrian safety – vehicle-pedestrian collisions continue to occur. On December 3, 2003, Transportation Commissioner Jack Lettiere held a press conference on the corner of Route 9 and Fairway Lane in Old Bridge, announcing $1.5 million in improvements to facilitate safer pedestrian crossing and better bus access on the highway.[16] However, in 2007 and 2009, two fatal pedestrian collisions occurred at the same intersection. Both crashes occurred at night. However, a recent NJTPA study[17] notes that "the bus stop and intersection were in complete darkness…a few passengers surveyed noted the problem with the lack of lighting...it makes the bus stop feel unsafe". In addition to the lack of lighting, the signal timing is so short that "most people needed to jog across." In fact**,** the time allowed for pedestrians to cross Route 9 is less than half the time required by New Jersey state law.[18] It is important to note that the dangerous conditions at and near the Fairway Lane bus stops also exist at other stops throughout the Study Area (Figure 6-4).

On December 3, 2009, "a 53-year-old Parlin woman…was struck shortly after she stepped off a commuter bus around 5 p.m. on Main Street near Avon Way", according to an article published in the *Suburban*. The woman, who had been working at a construction management firm in Manhattan for 25 years and living in Sayreville for 12 years, "was pronounced dead on the scene", according to the Sayreville Police Department.[19] Because of incidents like this, as well as the high percentage of commuters in the Study Area that walk to and from bus stops (Figure 6-6), it is important to give special attention to pedestrian safety in these areas.

6.5.1 Crash Cluster Analysis Overview

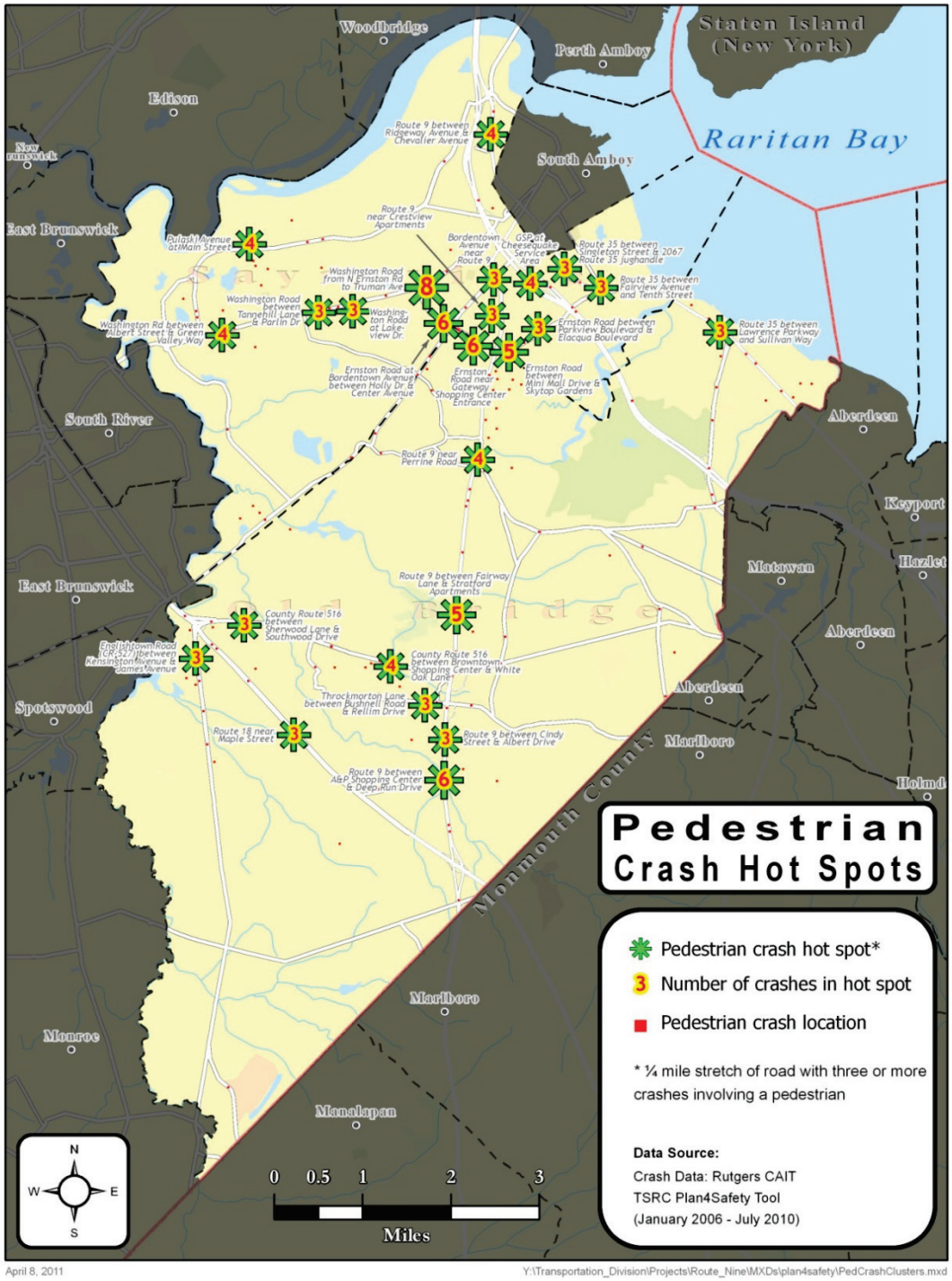
Using the cluster analysis tool in the Plan4Safety web software developed by CAIT, 25 "hot spots" of crashes specifically involving pedestrians and cyclists were identified. Each hot spot location had three or more crashes along a 0.2-mile stretch of roadway. Of the 25 total pedestrian crash hot spots identified overall in the Study Area, sixteen hot spots with 68 crashes were situated at locations where a bus stop was situated along the crash cluster segment of roadway. See Table 6-4Table 6-4 for summation data and refer to Map 6-2 (p. 98) for an illustration of the hot spot locations.

Table 6-4: Pedestrian/Cyclist Crash Hot Spots Summary Table (January 2006 through July 2010)

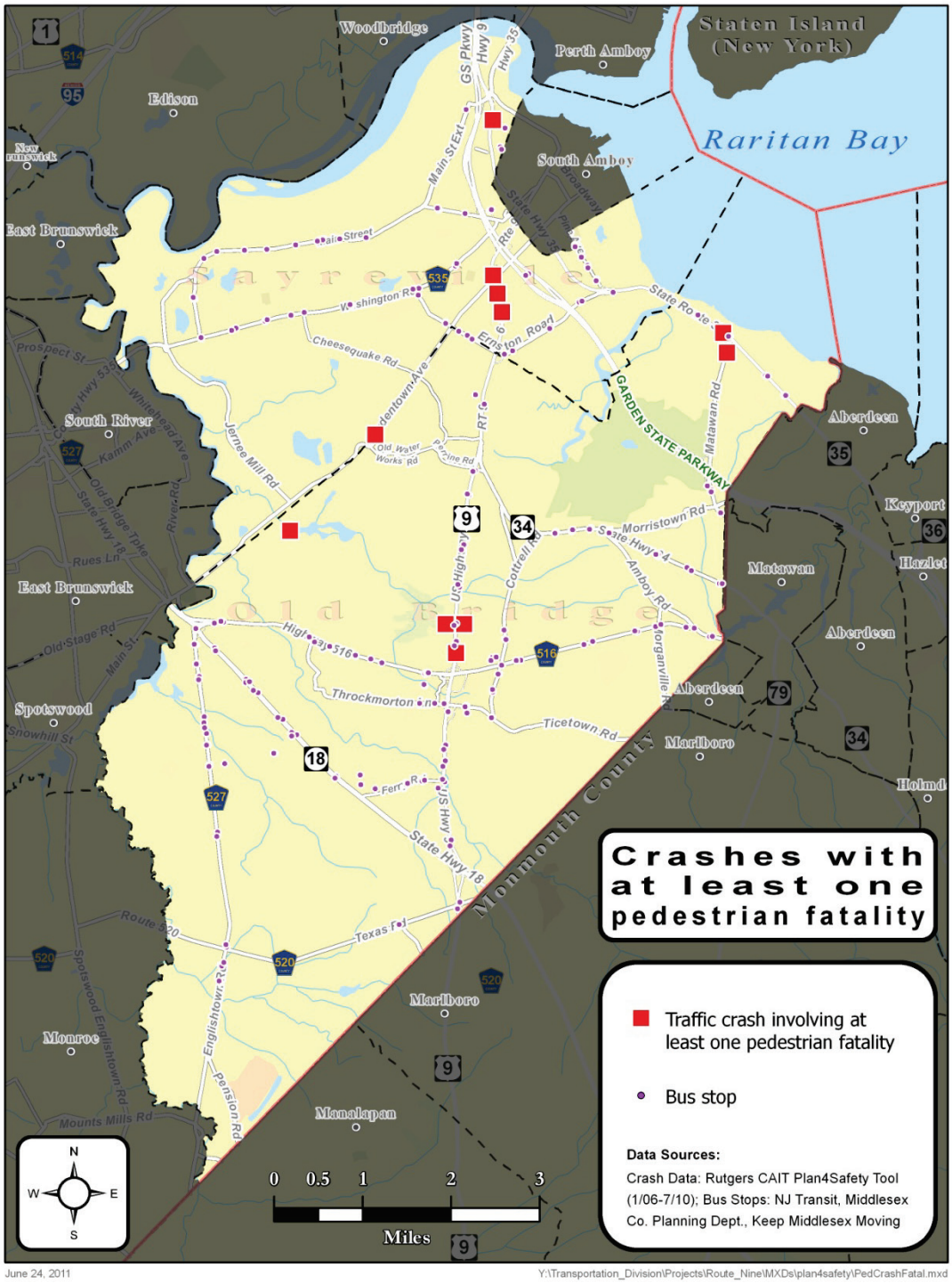
Hot Spot Location	Crashes	Pedestrians	Cyclists	Pedestrians and Cyclists		
				Total	Injured	Killed
Crashes in a Hot Spot near a bus stop	**68**	**64**	**13**	**77**	**57**	**4**
County Route 516 between Browntown Shopping Center & White Oak Lane	4	3	3	6	4	0
Englishtown Road (CR 527) between Kensington Avenue & James Avenue	3	2	1	3	3	0
Ernston Road @ Bordentown Avenue between Holly Dr & Center Avenue	6	5	1	6	6	0
Ernston Road between Mini Mall Drive & Skytop Gardens	5	5	0	5	4	0
Garden State Parkway @ Cheesequake Service Area	4	4	0	4	3	0
Pulaski Avenue at Main Street	4	4	2	6	4	0
Route 18 near Maple Street	3	3	0	3	1	0
Route 35 between Lawrence Parkway & Sullivan Way	3	2	2	4	2	1
Route 9 between A&P Shopping Center & Deep Run Drive	6	7	0	7	5	0
Route 9 between Cindy Street & Albert Drive	3	3	0	3	2	0
Route 9 between Fairway Lane & Stratford Apartments	5	5	0	5	3	2
Route 9 near Perrine Road	4	3	1	4	3	1
Throckmorton Lane between Bushnell Road & Rellim Drive	3	3	2	5	3	0
Washington Rd between Albert Street & Green Valley Way	4	3	1	4	3	0
Washington Road at Lakeview Drive	3	4	0	4	3	0
Washington Road from N Ernston Rd to Truman Ave	8	8	0	8	8	0
Crashes in a Hot Spot not near a bus stop	**31**	**24**	**11**	**35**	**25**	**4**
Bordentown Avenue near Route 9	3	4	0	4	2	1
County Route 516 between Sherwood Lane & Southwood Drive	3	3	0	3	2	0
Ernston Road between Parkview Boulevard & Elacqua Boulevard	3	2	1	3	2	0
Ernston Road near Gateway Shopping Center Entrance	6	2	5	7	6	0
Route 35 between Fairview Avenue & Tenth Street	3	3	0	3	3	0
Route 35 between Singleton Street & 2067 Route 35 jughandle	3	2	1	3	3	0
Route 9 between Ridgeway Avenue & Chevalier Avenue	4	3	1	4	2	2
Route 9 near Crestview Apartments	3	3	1	4	2	1
Washington Road between Tannehill Lane & Parlin Dr	3	2	2	4	3	0
Grand Total	**99**	**88**	**24**	**112**	**82**	**8**

Source: Plan4Safety, Rutgers Center for Advanced Infrastructure and Transportation (CAIT)

Map 6-2: Pedestrian Crash Hot Spots



Map 6-3: Pedestrian Crash Fatalities



6.5.2 Analysis of Pedestrian/Cyclist Crashes in Hot Spots near Bus Stops

Further analysis of the 68 crashes in the sixteen hot spots situated at or near a bus stop revealed contributing circumstances and causes for these crashes, including errors by drivers, pedestrians, and cyclists. For example, accident reports indicate that driver inattention contributed to 34 out of the 68 crashes, while failure to yield contributed to 4 out of 68 crashes.

There appears to be a need for continued efforts to raise pedestrian and cycling awareness. Many of the crashes examined were at least in part caused by wearing dark clothing at night, crossing illegally, or walking on the wrong side of the road. More information about the drivers, pedestrians, and causes of these crashes are provided on pages 100 through 102.

Figure 6-7: Driver Contributing Circumstances in Hot Spot Crashes near Bus Stops

68 total crashes; sum of values does not equal total crashes because there may be more than one contributing factor recorded for an individual crash

Driver Inattention	34
None (Driver/Pedacyclist)	25
Failed to Yield Right of Way to Vehicle/Pedestrian	4
Unknown	3
Other	2
Other Vehicle Factor	2
Backing Unsafely	1
Improper Turning	1
Improper/Inadequate Lane Markings	1
Other Driver/Pedacyclist Action	1

Source: Plan4Safety, Rutgers Center for Advanced Infrastructure and Transportation (CAIT)

Figure 6-8: Drivers' Pre-Crash Action in Hot Spot Crashes near Bus Stops

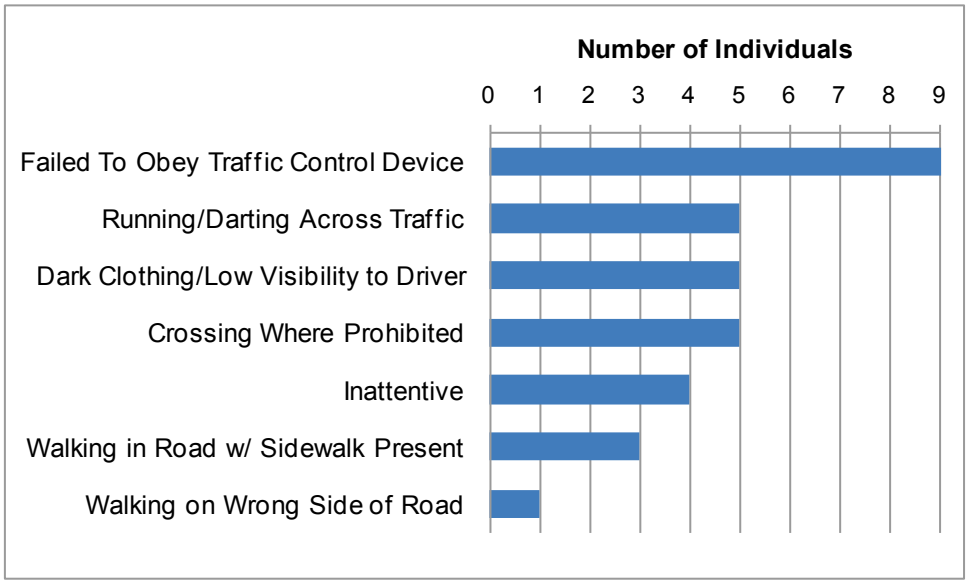
68 total crashes; sum of values does not equal total crashes because there may be more than one contributing factor recorded for an individual crash

Going Straight Ahead	34
Making Left Turn	17
Making Right Turn (not turn on red)	7
Backing	3
Starting in Traffic	2
Unknown	3
Starting From Parking	1
Slowing or Stopping	1
Parking	1

Source: Plan4Safety, Rutgers Center for Advanced Infrastructure and Transportation (CAIT)

Figure 6-9: Pedestrian/Pedacyclist Contributing Circumstances in Hot Spot Crashes near Bus Stops

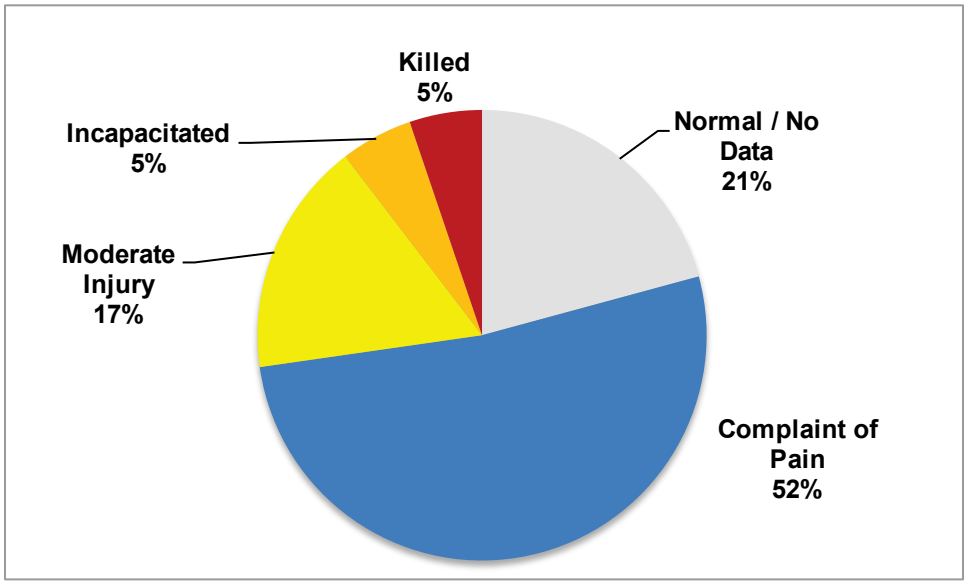
Represents 77 individuals (64 pedestrians and 13 cyclists); not all individuals were associated with a contributing circumstance



Source: Plan4Safety, Rutgers Center for Advanced Infrastructure and Transportation (CAIT)

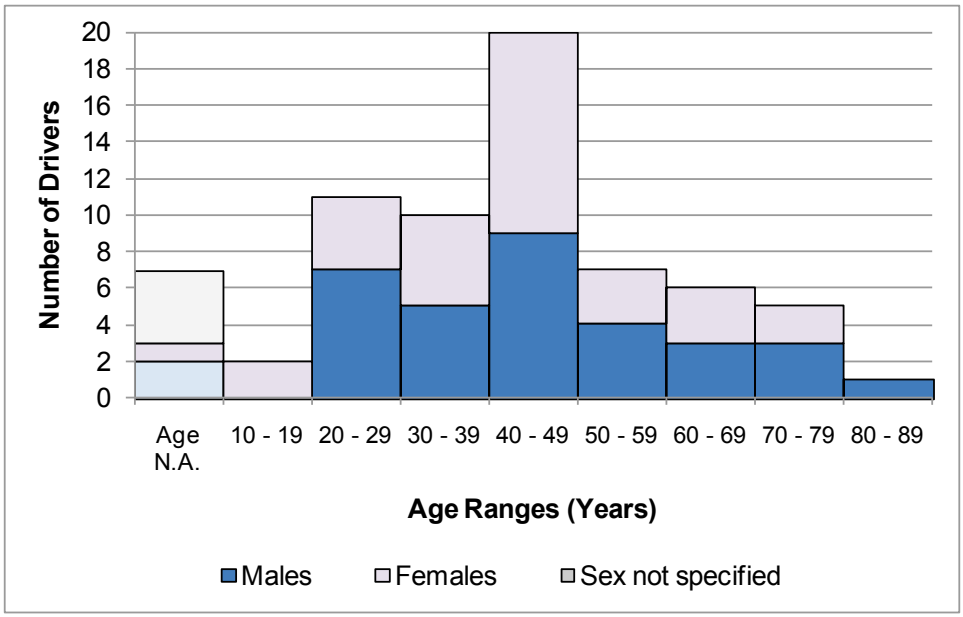
Figure 6-10: Pedestrian/Cyclist Physical Condition & Injury Severity in Hot Spot Crashes near Bus Stops

Represents all 77 individuals (64 pedestrians and 13 cyclists)



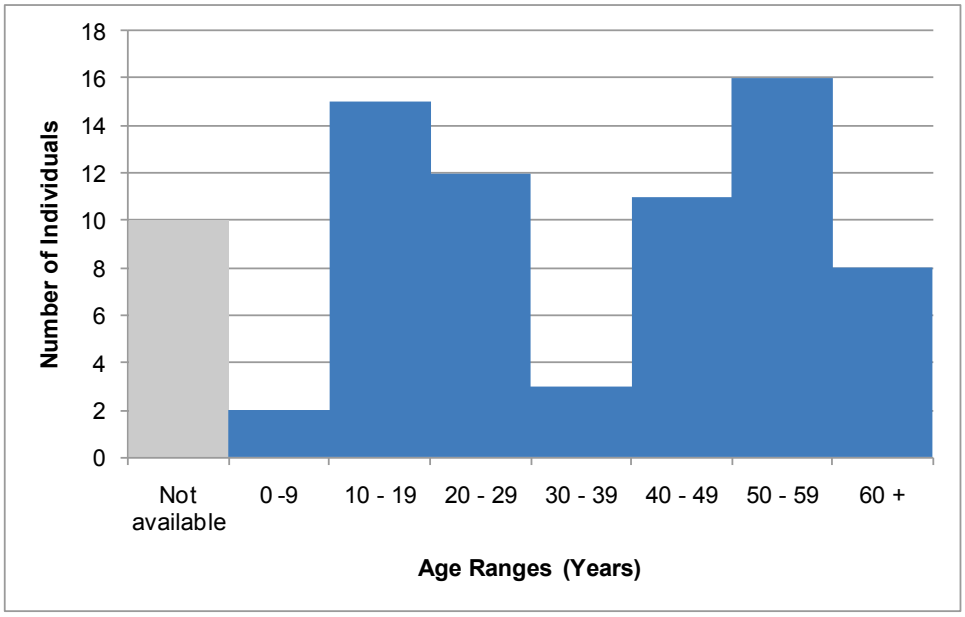
Source: Plan4Safety, Rutgers Center for Advanced Infrastructure and Transportation (CAIT)

Figure 6-11: Histogram of Driver Age, divided by Sex in Hot Spot Crashes near Bus Stops



Source: Plan4Safety, Rutgers Center for Advanced Infrastructure and Transportation (CAIT)

Figure 6-12: Histogram of Pedestrian and Pedacyclist Age in in Hot Spot Crashes near Bus Stops



Source: Plan4Safety, Rutgers Center for Advanced Infrastructure and Transportation (CAIT)

6.5.3 U.S. 9 and Fairway Lane Safety Audit and Passenger Survey

In July 2011, the North Jersey Transportation Planning Authority published the *Pedestrian Safety At and Near Bus Stops Study,* which included a Bus Stop Improvement Report for U.S. 9 & Fairway Lane in Old Bridge. This report assesses the needs of pedestrian access to bus stops and how the stops are designed. Part of this report describes a field audit that took place between 5:30 a.m. and 6:30 a.m. on a Tuesday morning in September 2010.

The audit found that the actuated signal for pedestrians crossing U.S. 9 gives them only 13 seconds to cross once the "Don't Walk" lamp begins flashing. However, the crossing requires 34 seconds, assuming a walk speed of 3.5 feet per second as described in the Manual of Uniform Traffic Control Devices. In the passenger survey, one man stated that he **has to "run" to cross the highway**.

Lack of pedestrian-scaled lighting also presents a hazard for pedestrians, as they are not as easily seen by vehicles. The older, high-pressure sodium lighting also uses twice as much power and only lasts one-fifth as long as LED lamps that are now available.

High vehicle turning speeds also reduces visibility because drivers have less time to see a pedestrian that may be crossing ahead. Large turn radii and curb cuts at the ends of the medians on either side of the intersection and at private driveways encourage these higher speeds. As supported by Figure 6-8, "left-turning vehicles are more often involved in pedestrian collisions than right-turning vehicles". Visibility could be improved by using a "ladder" or "zebra stripe" crosswalk striping pattern instead of the existing two-line crosswalk striping pattern.

6.5.4 Ernston Road Safety Audit

On April 14, 2011, a multi-disciplinary team of transportation, planning, and law enforcement professionals examined the stretch of Ernston Road from Washington Road to the Harbour Club housing development in Sayreville. In May 2011, a final report was published, including findings and recommendations related to safety along the corridor.[20] At one or more locations, the audit found that:

- Worn pedestrian paths were present in areas without sidewalks.
- ADA compliance with respect to curb ramps was lacking.
- Pedestrian push buttons were not clearly marked.
- Pavement markings were faded.
- Crosswalks had dangerously limited sight distances.
- Cyclist accommodations were lacking, despite the observance of bicyclists at most intersections.
- Existing eight-inch signal heads provided less-than-desirable visibility to motorists with poor vision.
- Buses blocked traffic and cause a hazard in intersections.

Selected recommendations based on findings from the Ernston Road safety audit as well as the U.S. 9 and Fairway Lane Safety Audit and Passenger Survey have been incorporated into the "Recommendations" section of this report beginning on page 117.

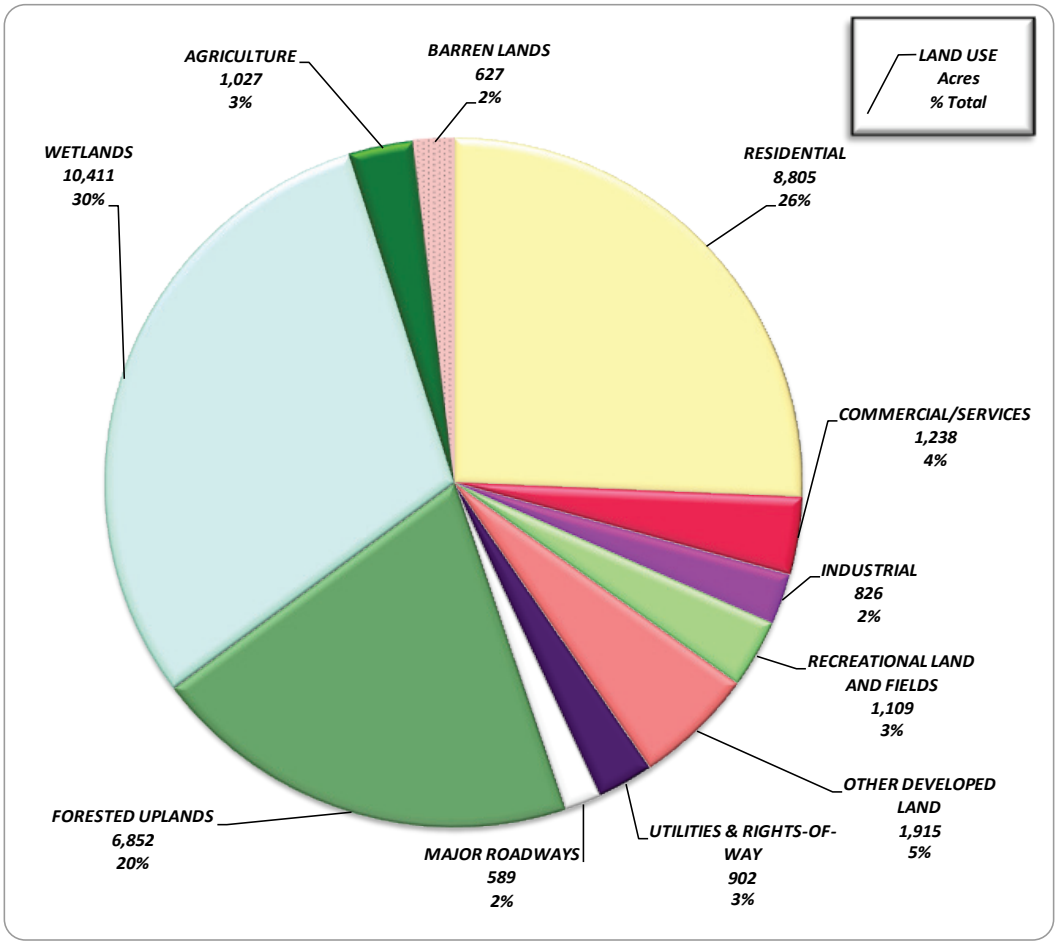
7 Land Use, Zoning and Redevelopment Activities

7.1 Land Use and Land Cover

Both municipalities in the Study Area have a diverse mix of land cover and uses. Approximately half of the land area is classified as urban. One-fifth of the Study Area is upland forest, and 2% is classified as barren lands (landfill, beaches or other altered land). Another third of the area is wetland, including some near the Raritan and South Rivers, Cheesequake Brook, and in southern Old Bridge. There are 8,500 wetland acres in Old Bridge, and 1,900 in Sayreville. While Sayreville is only two-fifths of Old Bridge's size, Old Bridge still has a higher percentage of wetlands.

Figure 7-1: Land Use / Land Cover (2007): Summary Pie Chart

Total land area: 34,300 acres (excludes water)



Source: NJDEP (2007), Generalized by Middlesex County Planning Department, Division of Transportation

Agricultural land covers about 3% of the Study Area. The large majority of this land is in Old Bridge (1,000 acres), as compared to only 30 acres in Sayreville. Most of these farms can be found concentrated in an area east of Route 9, south of State Route 34, and north of County Route 516.

While there is not much farmland in Sayreville, the borough has 2.5 times more land for industrial use compared to Old Bridge, despite Sayreville's relatively smaller size. Combined, both municipalities have 1,200 acres of commercial and office use, mostly along highways and arterial streets. However, across the Study Area, the majority of urban land use is housing, accounting for one-quarter of overall land use.

The existing infrastructure in the Study Area is also a significant land use. Over 2.3 square miles of land, or 5% of the Study Area, is classified as utilities or rights-of-way, including major roadways such as the Garden State Parkway.

Table 7-1: Land Use / Land Cover by Municipality

Total land area: 34,300 acres (excludes water)

Land Use / Land Cover	Sayreville		Old Bridge	
	Acres	*Percent of Sayreville*	Acres	*Percent of Old Bridge*
Residential	2,941	*29.1%*	5,864	*24.2%*
Commercial / Services	438	*4.3%*	800	*3.3%*
Industrial	591	*5.9%*	236	*1.0%*
Recreational / Fields	333	*3.3%*	776	*3.2%*
Other Developed Land	1,024	*10.1%*	892	*3.7%*
Utilities & Rights-of-Way	461	*4.6%*	442	*1.8%*
Major Roadways	299	*3.0%*	289	*1.2%*
Forested Uplands	1,825	*18.1%*	5,027	*20.8%*
Wetlands	1,926	*19.1%*	8,485	*35.0%*
Agriculture	28	*0.3%*	998	*4.1%*
Barren Lands	225	*2.2%*	401	*1.7%*
Total Land Area	**10,091**		**24,209**	

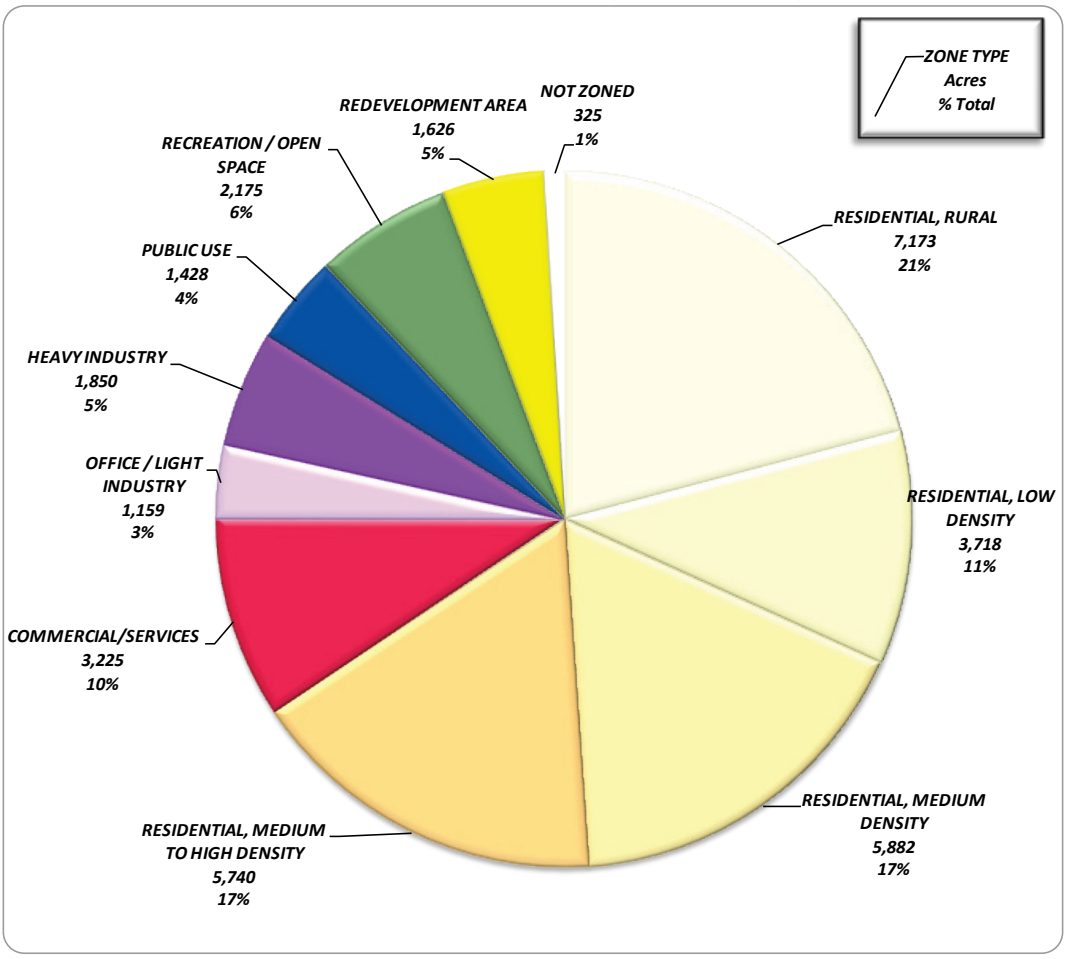
Source: NJDEP (2007), Generalized by Middlesex County Planning Department, Division of Transportation

7.2 Zoning

Nearly two-thirds of the Study Area is zoned for residential use. Eighteen percent is zoned for commercial and industrial use, and the remainder includes public uses, recreation, open space, and special redevelopment areas. In Sayreville, the 325 acres of the Garden State Parkway are "not zoned."

Figure 7-2: Generalized Zoning (2010), Summary Pie Chart

Total land area: 34,300 acres (excludes water)



Source: Middlesex County Planning Department, Division of Data Management & Technical Services

It is interesting to note that 77% of Old Bridge Township's total land area for residential uses, a significantly greater share compared to Sayreville. In Sayreville, only 39% of the land is zoned for residential use, which is zoned exclusively in the categories of medium- and high-density residential (>= 2 dwelling units per acre). Sayreville has a higher proportion of industrial and commercial uses (34% compared to 12% of total land area for each municipality). There is no heavy industrial zoning in Old Bridge.

Table 7-2: Generalized Zoning by Municipality

Total land area: 34,300 acres

Generalized Zoning	Sayreville		Old Bridge	
	Acres	*Percent of Sayreville*	Acres	*Percent of Old Bridge*
Rural Residential (less than one dwelling unit per acre)			7,173	*29.6%*
Low-Density Residential (one to two dwelling units per acre)			3,718	*15.4%*
Medium-Density Residential (two to five dwelling units per acre)	1,213	*12.0%*	4,669	*19.3%*
Medium- to High-Density Residential (more than five dwelling units per acre)	2,675	*26.5%*	3,065	*12.7%*
Commercial / Services	1,607	*15.9%*	1,618	*6.7%*
Light Industry / Office			1,159	*4.8%*
Heavy Industry	1,850	*18.3%*		
Public Use	1,321	*13.1%*	107	*0.4%*
Recreation / Open Space	20	*0.2%*	2,155	*8.9%*
Redevelopment Areas	1,082	*10.7%*	544	*2.2%*
Not Zoned	325	*3.2%*		
Total Area	**10,091**		**24,209**	

Source: Middlesex County Planning Department, Division of Data Management & Technical Services

Fold-Out Map C: Land / Use Land Cover (NJDEP, 2007)

Back of map c

Fold-Out Map D: Generalized Zoning – Old Bridge & Sayreville

Back of map d

7.3 Future Growth Areas

7.3.1 Sayreville Waterfront Redevelopment Area

The 400-acre former National Lead site on the Raritan River waterfront — referred to as "The Point at Sayreville" – has been planned as a mixed-use development by developer O'Neill Properties. In November 2010, the plan was approved by the Borough of Sayreville to include:

- 2.97 million square feet of retail space;
- 0.84 million square feet of hotel space;
- 0.65 million square feet of office space; and
- 2,000 residential dwelling units.

Developer proposals have also included the possibility of a performing arts center, community center, minor league baseball stadium, and/or hockey arena.[21]

7.3.2 Woodhaven Village (Old Bridge)

Mostly located south of Texas Road and east of Old Bridge-Englishtown Road, Woodhaven Village currently includes 383 dwelling units. An additional 733 are approved in Section 2 of the development. The approval for Section 2 consists of the following:[22]

- 97 single-family homes;
- 280 townhomes; and
- 356 multifamily units, including
    - 75 affordable units, and
    - 52 age-restricted units.

7.3.3 Brunetti Tracts (Route 9, Old Bridge)

The Brunetti Tracts include the Jake Brown Road site to the west of Route 9, which has received development approval, as well as Cheesequake Farms properties to the east of Route 9 and along Cottrell Road, where no development is planned at the present time. The 400-acre Jake Brown Road site on the southbound side of Route 9 has received local approvals for 1,200 dwelling units and 600,000 square-feet of commercial floor area. While there are no plans for the 480 acres on the northbound side of the highway, current municipal zoning would theoretically allow for approximately 300 residential units and 1.3 million square feet of commercial space.

7.3.4 Crossroads Redevelopment Area (Routes 9 and 18, Old Bridge)

This 500-acre redevelopment area, named for its proximity to the intersection of Route 9 and 18, is planned to include a retirement community, office campus with hotel and convention facilities, office-warehouse flex space and highway commercial development. An overlay district is provided for offices and data centers. However, the majority of the area – forested wetlands – is planned to remain open space, although walking and biking trails may be constructed based on feedback from the Old Bridge Environmental Commission.[23]

8 Key Findings

8.1 Transit Access in Southern Old Bridge

In southern Old Bridge, the NJ Transit 138 and 139 provide service to the Port Authority terminal. The routes also have connecting service to Weehawken (NJT 64), Newark (NJT 67), and Wall Street (Academy). These five routes make stops in an area of southern Old Bridge around Routes 9 and 18, including Foxborough Village, Twining Brook, Oakwoode, and Heritage Woods. However, some homes in this area exceed a comfortable walking distance to Route 9 commuter stops. The Old Bridge Community Shuttle (p. 82) serves Sayrewoods and other developments west of U.S. 9, but there is no comparable feeder service on the other side of the highway. Residents in and around Society Hill, Maiden Woods, Twining Brook, Old Bridge Manor and Oakwoode may be up to a 30 minute walk away from a Route 9 stop.

The block group containing Society Hill and Maiden Woods has a large share of people over age 65 (Map 3-3, p. 23), who may be in greater need of transit services. More than half of the households in this group have one or no vehicle (Map 3-7, p. 32), and its Mobility Needs Assessment Index is “high” (Map 5-1, p. 73).

Looking towards the future, there are few places where additional development may take place in southern Old Bridge. With the exception of the land around Woodhaven Village and Cheesequake Farms, the area is already built out.

8.2 Transit Access in Northern Old Bridge & Sayreville

The block group including Brooklawn Gardens has a very high Mobility Needs Assessment Index in the Study Area. While it is served by Academy routes to Manhattan and the NJ Transit 815 local route to New Brunswick and Woodbridge, there is no transit access to destinations along Route 9, such as the Old Bridge Park and Ride, Old Bridge Gateway Shopping Center, Pathmark, Kohl’s, Walmart, BJ’s Wholesale, restaurants, and various other retail and service establishments.

Other developments in the area along Ernston Road are also served by commuter routes into North Jersey and New York, but there is no local bus service. These include Laurel Park, Parkwood, and Nieuw Amsterdam Village, which have “medium-high” Mobility Needs Assessment Index scores. Skytop Gardens and London Terrace have “very high” Mobility Needs Assessment

Index scores, as well as "very high" Transit Viability Index scores. Many households in Parkwood, Nieuw Amsterdam Village, Skytop, and London Terrace households have one or no vehicle.

Northern Old Bridge and Sayreville are even more built-out than the southern portion of the Study Area. However, transit planning will be required as redevelopment begins at the former "The Point at Sayreville" (see p. 113).

8.3 Commuter Accommodations

Data from surveys taken between 1990 and 1992 indicate that between 909 and 955 Study Area residents did not use a personal vehicle to get to bus stops in the Study Area.[24,25] This includes those who walked, biked, or took some other means of transportation. Due to the proximity of commuter bus service to housing developments, and because land use in the Study Area has not changed significantly since these surveys, it can be concluded that a large share of passengers in the area walk to bus stops.

Despite these numbers and the fact that the Route 9 corridor is the busiest suburban commuter bus corridor in the State, safe pedestrian and cyclist access to many bus stops is lacking throughout the Study Area. [17,20] On average, there is a crash in the Study Area involving a pedestrian or cyclist every six days.[26] Many of these crashes — including some that have been fatal — have involved bus commuters.

In addition to traffic safety, many bus stops lack lighting that would provide an enhanced sense of security. Many bus stops are simply not convenient, and do not have shelters or bicycle racks in areas where they could be used. Appendix G contains maps showing the locations of these stops.

The park and rides along Route 9 are all at capacity, except for the Home Depot lot on the southbound side of the highway (Table 6-1, p. 90). It is likely that this is due to the inconvenience of the Home Depot location in relation the bus stop, which requires commuters to walk across the entire length of its parking lot and across an overpass to board peak-period morning buses.

9 Recommendations

9.1 Operational Recommendations

9.1.1 Modifications to Existing MCAT M2 Route

The current **MCAT M2 shuttle** can be extended to serve Winding Wood Apartments on Bordentown Avenue. The current route currently operates with a live trip time of 45 minutes. If the route were to be extended to Winding Wood Apartments, it could operate with an estimated live trip time of 50-51 minutes, while still allowing for one-hour headways and 5-10 minutes of recovery time. This would allow Winding Wood residents to access retail and employment centers along Route 18 and to connect to other services including:

- NJ Transit 815 service to New Brunswick;
- MCAT M1 service via U.S. 130 and Exit 8A distribution centers;
- MCAT M3 service to South River and Old Bridge; and
- MCAT M6 service to Princeton Junction via Monroe, Cranbury, and Plainsboro.

9.1.2 Modifications to Existing MCAT M3 Route

In addition to expanding route coverage, it is important that transit services connect to each other. Two major transfer points to the Route 9 mainline services are Throckmorton Lane (U.S. 9 southbound) and Ticetown Road (U.S. 9 northbound), which can be served by the existing **MCAT M3 shuttle** with slight route modifications. It is estimated that these changes would add no more than four minutes to either loop, which would still allow trips to operate on a one-hour headway.

As shown on Map 9-2 (p. 119), the proposed M3 Loop A shuttle would stop on the northbound side of Route 9, just south of Ticetown Road. From there, passengers could transfer to Route 9 mainline service to Newark, Weehawken, or New York. The M3 Loop A would also stop on the southbound side, to pick up passengers coming from New York and to drop off those connecting to mainline service towards Toms River and Lakewood.

In order to facilitate these connections, a portion of the M3 Loop A would be reversed. The existing M3 Loop B already connects to the mainline service (Map 9-3, p. 120), but would also need to have a portion reversed so that both M3 loops still operate in opposing directions throughout the route (Map 9-4, p. 121).

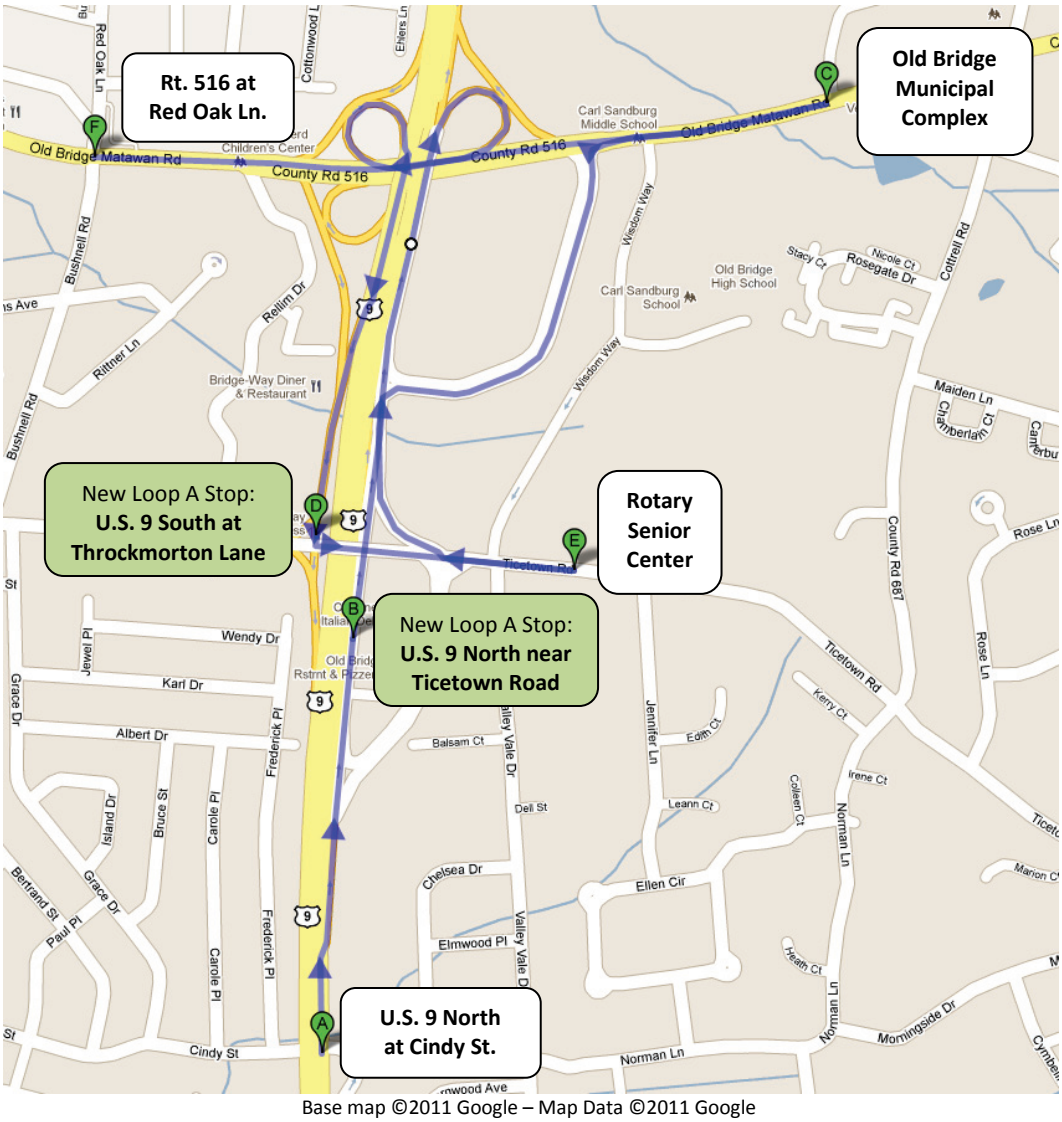
Map 9-1: Existing MCAT M3 Loop A near Rotary Senior Center

(Segment between Ferry Road and Route 516)

Base map ©2011 Google – Map Data ©2011 Google

Map 9-2: Proposed Modification to MCAT M3 Loop A near Rotary Senior Center

(Segment between Ferry Road and Route 516)



Base map ©2011 Google – Map Data ©2011 Google

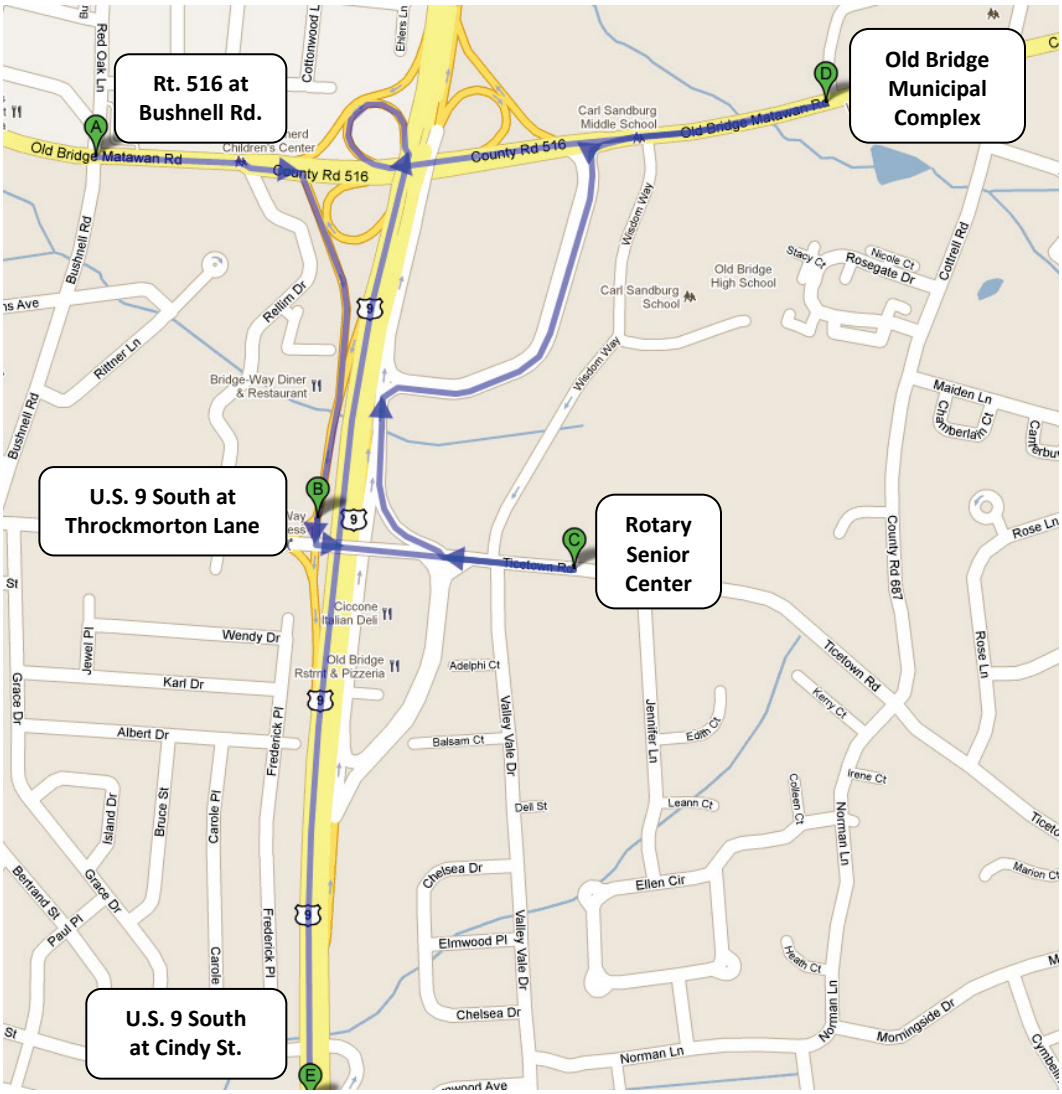
Map 9-3: Existing MCAT M3 Loop B near Rotary Senior Center

(segment between Route 516 and Ferry Road)

Base map ©2011 Google – Map Data ©2011 Google

Map 9-4: Proposed Modification to MCAT M3 Loop B near Rotary Senior Center

(Segment between Route 516 and Ferry Road)



Base map ©2011 Google – Map Data ©2011 Google

9.1.3 Proposed MCAT M3 Peak Loops (Old Bridge)

The MCAT **M3 Peak** service (shown on Fold-Out Map E, p. 125) is one of three proposed peak-period services primarily designed to connect residents of the Study Area to transit services that bring them to jobs (see Map 4-1, p. 45). The service would consist of two distinct, unidirectional loops operating on 30-minute headways within Old Bridge Township. These loops are designed to provide service to communities near Route 9 park and rides that are not currently served by the existing Old Bridge Community Shuttle. The proposed routes, existing Old Bridge Community Shuttle route, and transfer points are shown on page 125.

9.1.4 Proposed Peak Period Winding Woods to Cheesequake Park-n-Ride Commuter Shuttle (MCAT M7 Peak)

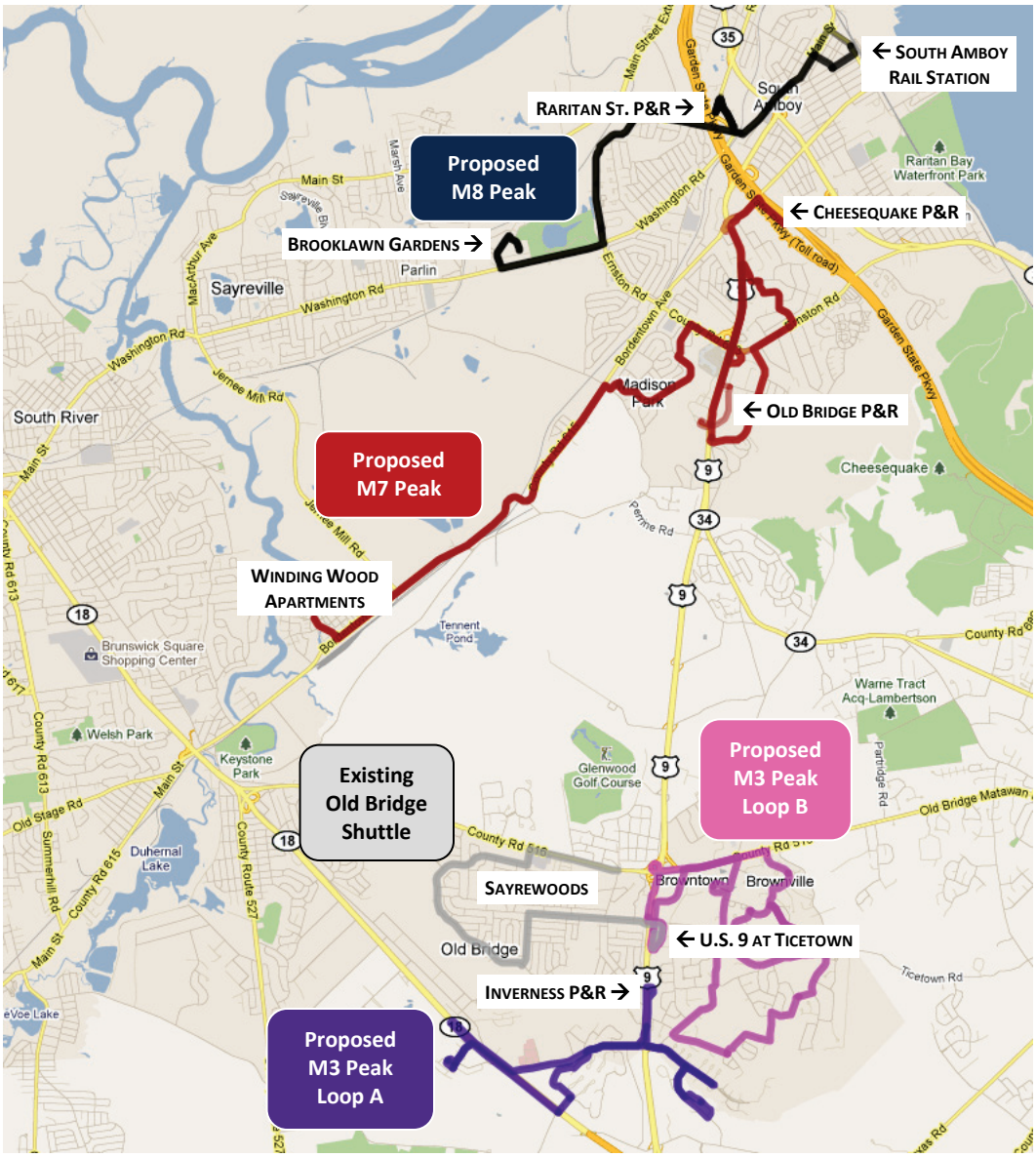
The proposed MCAT **M7 Peak** (see Fold-Out Map F, p. 127) service would connect Sayreville's Winding Wood Apartment complex and housing developments in Old Bridge to Route 9 mainline service at the Old Bridge and Cheesequake Park-n-Rides. While both park and rides have connecting service to Lower and Midtown Manhattan, the Old Bridge Park-n-Ride also has connecting service to Newark, Jersey City, and Weehawken.

9.1.5 Proposed Peak Period Sayreville – South Amboy Commuter Shuttle (MCAT M8 Peak)

Feeder service to the South Amboy Rail Station would be provided by the proposed MCAT **M8 Peak** shuttle originating at Lakeview Apartments in Sayreville (see Fold-Out Map F, p. 127). The MCAT M8 Peak would also provide service to and from the Raritan Street Park-n-Ride, which can also be used as an overflow lot for passengers on the North Jersey Coast Line. This railway is an important connection because, in addition to New York, it also serves Woodbridge and Newark which are major employment destinations for Study Area resident (as illustrated on Map 4-1).

The proposed MCAT M7 and M8 peak period routes are shown on page 127.

Map 9-5: Proposed MCAT Peak Period Shuttle Overview



Base map ©2011 Google – Map Data ©2011 Google

9.1.6 Proposed Off-Peak Bordentown Avenue Shuttle (MCAT M7)

The proposed **MCAT M7 Off-Peak** route would operate primarily along the Bordentown Avenue corridor through Sayreville, running between Spotswood (to the West) and South Amboy (to the East). Two versions of the M7 Off-Peak are being proposed for consideration, each version being exactly the same except at their west ends. The westerly terminus in the original proposal is Brunswick Square Mall. This proposal was approved for a $733,935 Congestion Mitigation and Air Quality (CMAQ) funding grant in May 2010, and is shown on page 131.[27]

The proposed alternative, shown on page 129, would be shorter than the current proposal but would offer greater ridership opportunities with more stop points along the way. It would begin/end in Spotswood rather than go to Brunswick Square Mall, by staying on Main Street in East Brunswick and stopping at shopping centers, residential developments and transit transfer points, including:

- Main and Summerhill in Spotswood,
- ShopRite on Summerhill Road,
- Old Bridge Gateway Shopping Center,
- Old Bridge Park-n-Ride (with direct northbound service to Newark and Midtown Manhattan and direct southbound service to Lakewood via Route 9),
- Cheesequake Park-n-Ride (with nonstop service to Midtown Manhattan and direct service to Long Branch via Route 36), and
- South Amboy Station (with southbound service to Long Branch, Red Bank, and Bay Head and northbound service to Newark-Liberty International Airport, Newark Penn Station, Hoboken, and New York Penn Station).

9.1.7 Proposed Off-Peak Sayreville – South Amboy – Old Bridge Loop (MCAT M8)

The proposed **MCAT M8 Off-Peak** route, further detailed on page 129, would be a loop connecting shopping centers and over one dozen residential developments to the Old Bridge Park-n-Ride and South Amboy Rail Station. Unlike the proposed MCAT M7 Off-Peak route, the MCAT M8 Off-Peak would not pull into the Cheesequake Park-n-Ride, although it is only about 1,000 feet off of the route. The MCAT M8 Off-Peak route would also stop at Sayrebrook Towne Center, connecting to NJ Transit 815 service to New Brunswick and Woodbridge Center.

Fold-Out Map E: Proposed MCAT Peak Period M3 Service

Back of map e

Fold-Out Map F: Proposed M7 & M8 Peak MCAT Service

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Fold-Out Map G: Proposed Off-Peak MCAT Service in the Route 9 Corridor – Preferred Alternative

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Fold-Out Map H: Proposed Off-Peak MCAT Service in the Route 9 Corridor – Original Proposal

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9.1.8 Privately Funded Shuttles

There are many multi-family housing developments operated by management companies that could create, operate, and fund shuttle services providing transportation to and from Route 9 commuter bus stops as a service to their residents. Employers in the Study Area may have the ability to provide similar services to employees who commute to the Study Area via Route 9 mainline buses.

9.1.9 Signal Timing

As mentioned in Section 6.5.3 (p. 103), the current signal timing of some intersections presents a hazard to pedestrians as they do not have enough time to cross roads and highways at a normal pace. The Manual on Uniform Traffic Control Devices specifies that one second should be allowed for every 3½ feet of roadway that a pedestrian must cross. This is a known issue at the intersection of Route 9 and Fairway Lane in Old Bridge; however, there are many other intersections in the Study Area that have not been reviewed to determine whether or not the signal timing is appropriate for pedestrians.

Furthermore, even if pedestrians have time to cross, it may be difficult for turning vehicles to see them if they are just beginning to step into the road as the green signal comes on. As a safer alternative, a **Leading Pedestrian Interval** would give pedestrians the "walk" signal while all vehicular traffic has a red signal. This timing configuration gives pedestrians exclusive use of the intersection, making them more visible to motorists. It should be considered at intersections where there is frequent pedestrian travel or where conditions make pedestrians especially hard to see. **It is recommended that all signalized intersections be evaluated to determine the appropriateness of a leading pedestrian interval.**

Another issue is the length of each signal phase. At Route 9 and Fairway Lane, the average pedestrian delay for crossing Route 9 is 49 seconds[28] based on the following equation, where C is cycle length and g is the walk interval plus 4 seconds, as recommended in the *2000 Highway Capacity Manual*:

$$d_p = \frac{0.5 \times (C - g)^2}{C}$$

A 49-second average pedestrian delay indicates a pedestrian service level of “E”, the second-worst on the six-point scale. At LOS “E”, the Transportation Research Board indicates that there is a “high” probability of noncompliance. During times of heavy volume on Route 9, it may be unlikely for someone to attempt to cross, despite how long they have to wait. However, when there is not as much traffic – such as in the dark early morning hours when commuters are walking to bus stops – pedestrians may be more likely to try crossing the highway against the walk signal. At these times of day, consideration should be given to shortening signal cycles in order to discourage impatient pedestrians from crossing unlawfully and unsafely. It is recommended that all pedestrian crossing timings at signalized intersections near bus stops conform to the standards and best practices outlined in the most recent edition of the MUTCD as well as best practices accepted by the Middlesex County Engineering Department.

9.1.10 Traffic Ordinances

Due to pedestrian and bicycle activity observed at Ernston and Washington roads paired with heavy motor vehicle traffic volume on Ernston Road, a revised right-turn-on-red prohibition should be considered on the southbound approach from Ernston Road onto Washington Road. Other intersections should also be reviewed to see if similar right-turn-on-red restrictions would be warranted and appropriate.

9.1.11 Snow Removal

In the winter, snow presents an obstacle to safe pedestrian travel, especially at bus stops. As a result, riders are forced to climb over snow banks or unsafely walk in the road, where the snow has been plowed. Stops with recessed bus bays are especially an issue, since plows will push snow into the bay, instead of removing snow from it. Additionally, sidewalks often have not been shoveled until days after a snow event has occurred. And even when they are quickly cleared of snow, sometimes snow plows may still come and cover the sidewalks with snow again, doubling the effort to keep bus stop accessible to riders who walk to the bus. It is recommended that agencies responsible for snow removal coordinate with each other to avoid these types of issues, and establish policies that ensure that snow is removed within a reasonable amount of time.

9.2 Capital Improvements

This section of the report outlines recommended physical infrastructure improvements and amenities associated with bus service including the addition of shelters, sidewalks, crosswalk markings, pedestrian lighting, highway median fencing, bicycle racks, and recessed areas for buses to safely pull to the side of the road. Recommendations also include the possible relocation of bus stops for safety reasons. These recommendations were developed based upon staff field observations, feedback received during Steering Committee meetings, and an April 1, 2011 letter submitted by the Old Bridge Township Planner outlining the results of the township's March 2011 field study of Route 9 Corridor bus stops (see Appendix I). Old Bridge Township made several recommendations, primarily relating to safe and convenient pedestrian access to bus service. In this same regard, relevant recommendations were also directly adapted from two road safety audit reports (Ernston Road and Fairway Lane). These are location-specific studies which were conducted when this study was being prepared.

9.2.1 Signal Systems

In addition to reviewing and modifying signal timing as appropriate (Section 9.1.8), upgrades are also recommended to make the signals more visible to motorists and more accessible to pedestrians. Three specific recommendations were made in the Ernston Road Safety Audit (p. 104), although these are also important considerations when analyzing other intersections:

- **Replace 8-inch signal heads with 12-inch signal heads** at the intersection of Ernston and Washington roads.
    - A Bayesian analysis in a before-and-after study of signal heads replaced with 12-inch lenses and higher wattage bulbs in British Columbia shows that the number of crashes was reduced by approximately 24%.[29]
    - 12-inch signal lenses installed in Winston-Salem lead to an estimated 10% reduction in all crashes, and a **47% reduction in right-angle crashes** at intersections where they were installed.[30]
    - According to the USDOT, 12-inch signal heads only cost "nominally more" than 8-inch signal heads.[31]
- **Install backplates on all signal faces** at U.S. 9 northbound and Minimall Drive to reduce the chance of drivers not being able to see the signal due to sun glare. It

is important to note that installing backplates increases the surface area affected by wind, and may require stronger signal poles.[32] As a result, a structural analysis is necessary before installation.

- **Reposition pedestrian buttons** and signage to meet ADA[33] and MUTCD[34] standards at Ernston Road and Westminster Boulevard. According to the report, "signs at the northwest corner of the intersection are confusing to pedestrians as to which crosswalk they are for." [20]

9.2.2 Bus Stop Relocation

Along the southbound direction of Route 9 in Old Bridge, there are several stops situated on the near side (north side) of the intersection, even though the crosswalks are on the far side (south side) of the intersection. The Township's bus stop safety review states that "consideration should be given to relocating" stops at these cross streets:

- Ehlers Lane
- Jake Brown Road
- Old Mill Road
- Schulmeister Road
- Ticetown Road

9.2.3 Recessed Bus Bays

Recessed bus bays or "turnouts" are ideal in areas where a stopped bus negatively impedes the flow of traffic. Bus stop turnouts are recommended in the following eight locations (four in Old Bridge and four in Sayreville):

- Route 9 northbound north of Texas Road (Old Bridge)
- Route 9 northbound service road at Ticetown Square Mini Mall / Ticetown Road (Old Bridge)
- Route 9 southbound at Ferry Road; newly relocated far-side stop (Old Bridge)
- County Route 516 westbound at Ridge Road; near Old Matawan Road (Old Bridge)
- Washington Road eastbound at Ernston Road (Sayreville)

- Washington Road eastbound at Lakeview Drive (Sayreville)
- Washington Road westbound at Lakeview Drive (Sayreville)
- Ernston Road southbound (towards Route 9) at School Drive (Sayreville)

9.2.4 Bus Shelters

Another advantage of recessed bus bays is that they help distance passengers from highway traffic. Safety for commuters waiting alongside the road can also be improved by placing a **guiderail** or other barrier near the stop, as is recommended for the shelter at Route 9 southbound and Cindy Street.

The following **existing bus shelters should be enlarged/expanded** to sufficiently accommodate current passenger volumes since they were deemed undersized by Old Bridge representatives familiar with usage at these locations:

- Route 9 northbound at Fairway Plaza (Old Bridge)
- Route 9 southbound at Fairway Lane (Old Bridge)
- Route 9 southbound service road at Throckmorton Lane (Old Bridge)

The installation of a **new bus shelter** is recommended at the following stops which do not currently have such any shelter:

- County Route 516 westbound at Ridge Road, near Old Matawan Road (Old Bridge) – the elevation of this stop would need to be raised to accommodate the new shelter.
- County Route 516 westbound at Worth Place (eastbound stop has a shelter, Old Bridge)
- County Route 516 westbound at Red Oak Lane/Bushnell Road (Old Bridge)
- County Route 516 eastbound at Morganville Road (Old Bridge)

9.2.5 Bicycle Racks

Bicycling activity can be seen throughout the corridor and bicycle usage to transit in particular is evident through field observations of bikes chained to sign poles at certain bus stop locations. To encourage and better facilitate bicycle access to bus service, **Bicycle Racks** are recommended at the following bus stops:

- Old Bridge Park & Ride northbound (existing bike lockers/racks are not currently utilized; bike facilities are hidden from view and distant from bus stop)
- Old Bridge Park & Ride southbound
- Route 9 northbound service road at Ticetown Square Mini Mall / Ticetown Road
- Route 9 southbound service road at Throckmorton Lane
- Route 9 northbound at Trans Old Bridge Road / Ferry Road
- Route 9 southbound at Perrine Road

9.2.6 Pedestrian Lighting

Pedestrian Lighting was found to be either inadequate or non-existent at many stops:

- Jake Brown Park and Ride (both directions, for the walkway and shelters)
- Route 9 northbound at Inverness Park & Ride
- Route 9 northbound at Texas Road (Old Bridge)
- Route 9 northbound at Trans Old Bridge Road
- Route 9 northbound at Cindy Street
- Route 9 northbound at the Ticetown Square Mini Mall
- Route 9 northbound at Phillips Drive
- Route 9 northbound at Fairway Plaza
- Route 9 southbound at Old Mill Road
- Route 9 southbound and Route 9 median at Fairway Lane
- Route 9 southbound at Ehlers Lane
- Route 9 southbound at Texas Road
- Route 516 at Old Matawan Road

9.2.7 Median Fencing

To help prevent accidents caused by jaywalking, a **median fence** is recommended for Route 9 northbound near Ferry and Trans Old Bridge roads. Additionally, repairs to existing fences are recommended:

- Texas Road (repair and extend)
- Cindy Street (new)
- Phillips Drive (repair and extend south; use more visible fence color)
- Fairway Plaza (new)
- Ehlers Lane (repair and extend)
- Ticetown Road & Throckmorton Lane (repair and extend)

It is interesting to note that in a 1968 report by the Middlesex County Planning Board, Cindy Street, Ehlers Lane, and Throckmorton Lane each were listed as three of five stops where it was found to be "particularly evident" that "transit customers must walk across Route 9…endanger their lives and slow traffic."[13] The issue is now more compounded as Route 9 has since expanded from two lanes. Based on the recent Old Bridge Township field study, these same areas continue to be a problem today.

9.2.8 Line Striping and Crosswalks

To encourage safe and legal pedestrian travel, **crosswalk markings** are recommended at the following locations:

- Route 9 northbound at Old Mill Road;
- Route 9 at Fairway Lane (all sides);
- Sayre Woods Shopping Center (move crosswalk for visibility on off-ramp);
- Ernston Road at Villanova Road; and
- Ernston Road at Washington Road.

At the intersection of Ernston and Washington roads, it is also recommended to relocate the crosswalk and yield sign, add yield bars, and move back stop bars if needed. According to the Federal Highway Administration, stop bars can be moved 15 to 30 feet farther back in order to improve visibility of pedestrians and cyclists and give roadway users more time to react.[31] It can also be effective to install pedestrian warning signs telling motorists to stop for pedestrians, as indicated

in the Route 9 at Fairway Lane study.[17] Bicycle usage was observed along Washington Road and Ernston Road during the field observations, but these roadways lack bicycle accommodations. It is recommended that shared lane use signage and pavement markings be installed, as appropriate.

9.2.9 Curbs and Sidewalks

To keep pedestrians out of travel lanes, **sidewalks** are recommended at the following locations:

- Along Route 9 northbound from Phillips Drive to CR 516 (extend approx. 2,000 ft.)
- Along Route 9 northbound from Jake Brown Park & Ride to Stratford Apartments (approx. 1,000 ft.)
- Along Route 9 southbound from Ehlers Lane to CR 516 (approx. 2,000 ft.)
- Along Route 9 southbound from Ferry Road to Spring Valley Road (approx. 3,600 ft.)
- Along Route 9 northbound from Spring Valley Road to Trans Old Bridge Road (approx. 3,600 ft.)
- Along Perrine Road between Routes 9 & 34 (approx. 500 ft.)
- To the bus stop on Route 516 westbound at Ridge Road (near Old Matawan Rd.)
- To the bus stop on Route 516 eastbound at Morganville Road
- Along Ernston Road westbound between Mary Lou Lane and Washington Road (approx. 700 ft.)

*Sidewalks at Phillips Drive, Ehlers Lane, and Ferry Road were also recommended in a September 2002 report by NJ Transit. However, nearly ten years later, these locations are still an issue.

Other physical improvements recommended to improve pedestrian safety include:

- Adding tactile surfaces to make sidewalks and bus stops more accessible at Route 9 and Fairway Lane;
- Reducing the turn radius of the driveway for the convenience store near Route 9 and Fairway Lane;

- Reconstructing curb ramps at Ernston and Washington roads to comply with ADA standards;
- Reconstructing curb ramps at the intersections of Ernston Road with the Route 9 south ramp and the Gateway Shopping Center driveways to comply with ADA standards;
- Building ADA-compliant curb ramps and create bump-out at Ernston and Villanova roads to shorten the crosswalk; and
- Re-grading the sidewalk on the southwest corner of Ernston Road and Westminster Boulevard to eliminate the present drop-off hazard.

9.3 Other Recommendations

9.3.1 Recommended Studies and Monitoring

There is notable historic evidence of relatively high levels of walking and biking activity as the mode of travel to bus stops. The March 1968 report issued by the Middlesex County Board entitled Transit Facilities Recommended along U.S. Route 9 noted "a significant level of transit customers" walking to bus stops (despite unsafe conditions on Route 9). Furthermore, NJ Transit later sponsored a study in 1993 which found that over 40% of total bus passengers surveyed did not drive to bus stops (see Figure 6-5 and Figure 6-6). This phenomenon is likely attributable to the fact that there is such an extensive amount of residential development in close proximity to Route 9. An analysis of bicycle and pedestrian crash records since 2006 and general field observations made during the course of this study found that overall accommodations for non-motorized access to transit services are still in need of improvement. It is apparent that a better understanding of this particular issue is warranted. Therefore, as a follow-up to NJ Transit's 1993 study, it is **recommended that a more-detailed study be conducted that is led by NJ Transit which specifically evaluates current pedestrian and bicycle usage as the mode of access to and from bus stops on Route 9, Route 516 and Ernston Road**. While many transit riders walk to/from home, even those who drive to park and rides or are dropped off, are, for at least part of their trip, pedestrians. Survey data that is focused on the origins and destinations of transit riders walking and biking to bus stops can more definitely identify the locations and extent of necessary improvements for pedestrians and cyclists.

In order to identify the ongoing need for creating new transportation linkages and improving existing access, it will be important to have programs in place to periodically **monitor the construction of major developments, review demographic changes**, **evaluate feedback** from transit users, and **examine the condition of physical assets**. By examining data released by the U.S. Census Bureau, the New Jersey Department of Labor and Workforce Development, and other surveys, employment and travel trends can be identified in order to plan for transit accordingly. This demographic information is also important because it can help identify areas where residents are older, have lower incomes, or have disabilities that would make them more likely to use transit.

9.3.2 Complete Streets Policy

Complete streets are roadways that are designed to accommodate, motorists, bicyclists, and pedestrians. In 2009, NJDOT adopted a complete streets policy for state highways, and has encouraged municipalities to do the same (as Montclair, West Windsor, and Red Bank already have). In March 2010, USDOT also announced a similar policy statement. Complete streets provide a way for commuters to safely walk or bike to transit stops and encourage better public health.

For seniors and people with disabilities, making stops more accessible decreases the need for and cost of paratransit services. Improving bicycle and pedestrian access also reduces the need for expansion and maintenance of park and ride lots, and allows commuters to keep more money in their wallets by avoiding parking fees and the expenses associated with driving.

The added convenience and cost savings may also raise property values. A 2008 Coldwell Banker survey indicates that 78% of its clients are interested in living places where they can reduce what they spend on gas. According to NJDOT, 55% of Americans “would prefer to drive less and walk more”, and 52% “want to bike more than they do now.”

9.3.3 Education

To encourage safety, it will be important to continue to **educate** pedestrians and motorists about traffic laws, using caution at intersections, and avoiding distracted driving. Many educational campaigns are already taking place throughout the state, which can also be used successfully in the Study Area:

- Keep Middlesex Moving has placed **PSAs on the exterior of MCAT buses**.
- Middlesex County has constructed a **portable sign** alerting drivers about the state law requiring drivers to stop for pedestrians in crosswalks.[35]

- "**Cops in the Crosswalk**" – a program funded by the N.J. Division of Highway Traffic Safety uses undercover police officers in crosswalks. If motorists do not stop for the pedestrian officer when they are legally required to do so, they are stopped by uniformed officers a short distance away. In Atlantic, Cape May, Cumberland, and Ocean counties, between April and September, police issued 1,074 citations – more than threefold the number of summonses issued during the same time period in 2009. Comparing pedestrian crashes from January to September 2010 to the same period in 2009, pedestrian deaths went down by 19%, far exceeding the state goal of 1%.[36]
- The **WalkSafe** curriculum was developed by the New Jersey Traffic Safety Education Task Force, and includes safety videos, quizzes, and classroom lesson plans emphasizing student participation where children interact with a "virtual street obstacle course." In pedestrian crash "hot spots" near bus stops in the Study Area, the pedestrian age group with the second-highest incidence of being hit was people between 10 and 19 years old (Figure 6-12, p. 102), underscoring the need for pedestrian safety education to school-age children.
- Hunterdon County's TMA, HART, developed the **Let Yourself Be Seen / Hazte Visible Program**, which emphasizes Latino outreach and provides residents with reflective vests and tape that can be put on bicycles, backpacks, and other items to increase visibility at night.[37] Many of the "reverse commuters" along the Route 9 Corridor fall into this demographic or have low income, which means that they are more likely to walk or bicycle and have jobs that may start or end outside of normal business hours, when it is dark.

9.3.4 Marketing and Outreach

In cooperation with Keep Middlesex Moving, new and existing routes can be marketed to major employers, as well as housing developments in the Study Area. Marketing recommendations include:

- Revising MCAT route guides to update timetables, improve diagrams, and clearly mark transfer points with information about connecting services;

- Working with other transit agencies to share route information in each other's publications to help market each agency's services;
- Integrating fares with these providers would increase customer convenience and make the regional transit system more appealing; and
- Encouraging feedback from the community to understand the needs and concerns about transit service, park and ride locations, and scheduling.

In addition to receiving community feedback, it will be useful to work with other agencies directly to coordinate the recognition of unmet mobility needs. Specifically, it will also be useful to work with other counties and municipalities to develop pilot programs to meet the demand for inter-county transportation serving destinations within the Study Area.

10 Funding and Coordination

10.1 Funding Sources

Funding that will be sought to implement the recommendations of this study will include federal, state, and local sources. County funding sources could be derived from fare and advertising revenues received from the existing routes operated by the Middlesex County Department of Transportation.

10.1.1 Federal funding sources

- The **Job Access and Reverse Commute (JARC) Program** (FTA Section 5316) helps transport low-income people and welfare recipients to jobs that are difficult to access, such as those in suburban or rural areas. Funding can be used for capital expenses (up to 80%), planning, and operating expenses (up to 50%).[38] The current MCAT M1 service is funded through this program during peak hours. In the 2010 fiscal year, the FTA granted over $163 million to 187 different programs through the JARC Program.[39]
- The **New Freedom Program** (FTA Section 5317) helps provide adequate transportation to people with disabilities. This funding can be used for capital expenses (up to 80%) and operating expenses (up to 50%).[40] In the 2010 fiscal year, the FTA granted over $89 million to 170 different projects through the New Freedom Program.[39]
- The NJTPA **Transportation Improvement Program (TIP)** is updated annually and authorizes design, construction, and real estate purchases for rights-of-way.
- The **Congestion Mitigation and Air Quality (CMAQ)** Program aims to reduce congestion and the use of single-occupancy vehicles in order to abate the pollution they cause. The NJTPA established the Local CMAQ Mobility Initiatives program which can be used to help meet transit usage goals and mitigate traffic. Transit usage inherently mitigates traffic, but in the Route 9 Corridor, traffic can also be reduced by encouraging linkages to transit that do not require driving, such as walking and bicycling facilities. Proposals for this program must use

strategies described in the NJTPA Regional Transportation Plan. The proposed M7 shuttle (pp. 122, 124) has been authorized for CMAQ funding.

- The NJTPA **Local Safety Program (LSP)** support "quick-fix, high-impact safety improvements on county and local roadway facilities."

10.1.2 State funding sources

- **County aid** is available from the State and funds projects listed in the county's NJDOT-approved **Annual Transportation Program (ATP)**.
- **Municipal aid** is also available from the State. NJDOT encourages municipalities to use this money for pedestrian safety projects, bikeways, and streetscapes.[20] After being screened by municipal engineers and NJDOT staff, the Commissioner of Transportation notifies municipalities of approved projects.
- A county or municipality may also apply for aid from a **discretionary fund**, which is used to "address emergencies" and "for local pedestrian safety and bikeway projects."[41]
- The **NJDOT Centers of Place Program** helps municipalities that have participated in the State Development and Redevelopment Plan (SDRP). Eligible projects include:
    - Pedestrian and bicycle facilities;
    - Parking and circulation management;
    - Improvements to public spaces associated with transportation facilities;
    - Street landscaping and furniture; and
    - Rehabilitation of publicly-owned transit structures.
- Among other qualifications, a municipality is eligible if it is within a State Planning Commission (SPC) "designated Corridor Region", is a SPC-designated center, or has an SPC-approved Strategic Revitalization Plan and Program.[42] However, neither Study Area municipality was listed as eligible for the Centers of Place Program for the 2011 financial year.[43]
- The NJDOT **Safe Streets to Transit (SSTT)** program is intended to make walking safer and to make transit riders more comfortable with leaving their cars at

home. According to the NJDOT, "many commuters cite safety as the main reason they drive instead" of walking. Examples of SSTT projects include:

- Traffic-calming projects;
- Sidewalk construction;
- Traffic control devices that benefit pedestrians; and
- Pedestrian-scaled lighting.

  Each county or municipality may submit one application each year under the SSTT program, which is reviewed by NJDOT and/or NJ Transit representatives. Projects are approved by the Commissioner of Transportation, who notifies the local government of grant approval.[44]

- The New Jersey **Casino Revenue Fund** has budgeted over $29 million in the 2011 fiscal year for transportation assistance to senior citizens and people with disabilities.[45]

10.2 Coordination with Keep Middlesex Moving and Middlesex County Department of Transportation

Implementation of certain recommendations of this Study will be coordinated with the efforts of Keep Middlesex Moving (KMM), especially those relating to the improvement of transit services and implementation of transportation demand management (TDM) strategies in the ongoing work programs of KMM. These efforts include:

- Participation in the outreach process for stakeholder input from municipalities, housing development management and associations, major employers and other appropriate organizations to assist in the development and provision of proposed shuttle services; and
- Participation in the creation of a marketing package to promote the proposed shuttle routes as they commence operation.

There will also be considerable coordination with the Middlesex County Department of Transportation when the shuttle routes conceptualized in this report are finalized for operation.

11 Relationship to Other Plans and Planning Studies

The Route 9 Corridor Study is consistent with the goals and objectives of the State Development and Redevelopment Plan, with state, county and regional plans for smart growth and other transportation system investments linked to land use and improving mobility in the region.

Furthermore, this study supports transportation coordination efforts of the County Transportation Plan, the NJTPA Subregional Transportation Planning (STP) Program and the NJTPA Regional Transportation Plan – through its Strategy Evaluation efforts. As noted in the RTP, the region's bus network serves some two thirds of transit passengers and provides an effective mobility system for communities and long distance commutes from many areas. It is the intent of this study to further enhance the appeal of regional bus trips by making access to main corridor bus routes easier and less reliant on driving to overcrowded park and ride facilities. By 2035, projections show that population and employment growth in the region will significantly increase the demand for transit services with many people continuing to work and commute beyond the traditional retirement age.

In advancing this study, collaboration to improve local transit services and transportation demand management activities has occurred between Middlesex County, NJ Transit and Keep Middlesex Moving (KMM). The staff of the Middlesex County Department of Planning worked closely with the staff of: Middlesex County Area Transit (MCAT); Keep Middlesex Moving (KMM) and NJ Transit Service Development Office; and municipal officials to identify major residential developments and complexes within the Study Area that are lacking adequate transit and to examine how these facilities could be served by a shuttle to the Route 9 buses. The study identifies potential routes will and develops appropriate TDM measures to market and implement these services.

Possible TDM measures include marketing support through radio and print advertising, timetable distribution to residential areas served in target areas, development of timetables for new shuttle services, and outreach to residential and employment locations. Cost estimates will be developed with the MCDOT and potential federal, state, county and municipal, and private funding resources will be identified.

11.1 Middlesex County Transportation Plan

The county's transportation plan places emphasis on providing adequate and safe mobility through a continually growing region. The objectives include:[46]

- implementing projects to reduce traffic congestion, particularly during peak hours, with varying cost ranges;
- promoting safety on the roads;
- promoting public transit improvements that enhance capacity, safety and security;
- enhancing intermodal transit connections to promote convenience, economic development and energy conservation;
- providing improved bicycle and pedestrian facilities to increase connectivity to public transportation; and
- integrating transportation system improvements with land use plans.

The transportation plan follows the principle that the layout of local bus routes aims to connect dense residential areas to jobs, schools, shopping centers, medical facilities, and various other points of interest. Moreover, the plan recognizes that the local service does not effectively connect all corners of the county, nor does it connect well with regional bus services, which effectively puts more vehicles on already-congested highways such as Route 9. The Route 9 Corridor Study falls in line with the plan's recommendations to raise attractiveness and efficiency of the countywide transit system. The overlapping recommendations include:

- coordinating transit services and facilitating transfers;
- strategically providing park and ride facilities;
- ensuring safer and more productive routing;
- reducing travel time and increasing service frequency;
- extending service to growing areas; and
- matching supply to demand.

11.2 Middlesex Department of Transportation, the Strategy Highway Safety Plan (CSHP)

This Route 9 Study supports various Emphasis Areas of the New Jersey Comprehensive Strategic Highway Safety Plan (CSHSP). It seeks to improve accessibility for low income, senior citizen, minority and/or mobility impaired populations by making transit more convenient for people who do not drive or cannot afford an automobile. By identifying public transportation alternatives for commuters, the study aims to improve mobility for various age groups that otherwise need to drive to a job site or to a commuter bus park and ride location. The study would thereby help reduce the critical total of vehicle miles travelled and help achieve the following goals of the New Jersey Comprehensive Strategic Highway Safety Plan:

- Emphasis Area 1 – Minimize Roadway Departure Crashes;
- Emphasis Area 5 – Reduce Young Driver Crashes;
- Emphasis Area 6 – Sustain Safe Senior Mobility; and
- Emphasis Area 8 – Reduce Pedestrian, Bicycle, Rail and Vehicular Conflicts.

11.3 Middlesex County (NJ): A Community Transit Stakeholder Coordination Plan

This plan was prepared by the Middlesex County Department of Transportation in cooperation with Keep Middlesex Moving (KMM) to address the growing demand for community transit. It includes recommendations for funding, developing and implementing expanded services toward meeting those needs. It also addresses needs for safe, efficient and affordable transit throughout Middlesex County, including isolated pockets of residential development such as those in the Route 9 Study Area.

The implementation of key initiatives under the Middlesex County community shuttle program has been successful in receiving for federal and state funding assistance to improve fixed route services. The Middlesex County Area Transportation (MCAT) operation as a feeder service to NJ Transit bus and rail systems provides a model for executing expanded services to meet the challenges of increasing demand for community transit.

The MCAT mission statement, written in 2004, was driven by four principle human service transportation tenets that fundamentally coincide and overlap with the Route 9 Corridor Study. These are:

- (1) Expand community transit mobility options for all transportation dependent residents;
- (2) Integrate the use of community transit vehicles with the traditional fixed route bus and rail network;
- (3) Identify opportunities to expand transportation coordination with public, private and not-for-profit community transit providers; and
- (4) Work with regional planning agencies to assist implementing transportation services that address unmet needs.

11.4 NJTPA: North Jersey Regional Coordinated Human Services Transportation Plan

This plan consolidated county human services transportation coordination plans for all counties in the NJTPA region. It represents the coordinated vision of local and regional stakeholders to identify opportunities for improving mobility within a broad regional framework, particularly for disadvantaged populations. It identifies ways of addressing the variety of needs for distinct metropolitan, suburban and rural planning areas with the goal of improving access to the fixed route services that connect them. The plan includes focus on overlapping themes such as addressing the needs of transportation dependent residents, coordinating fare integration among local and regional fixed route systems, and providing improved outreach and education about transportation service options.

The Route 9 Corridor Study reflects this NJTPA plan in that it will coordinate the inputs of various constituents, including MCAT, KMM, municipalities, NJ Transit, NJDOT and other stakeholders. Also, the findings of this study will parallel the regional approach by including recommendations for coordinating transfers between existing local and regional bus services, and reducing fares for passengers who transfer.

11.5 Plan 2035: Regional Transportation Plan for Northern New Jersey

Primary elements of the NJTPA 2035 Regional Transportation Plan that relate to the Route 9 Corridor include improvements in increased Route 9 bus service, feeder and community shuttle service, bicycle and pedestrian access, and safety (such as intersection redesign).

Improving bus service from the Route 9 corridor to Midtown Manhattan is one of 21 places where NJTPA has identified "significant needs" in its transportation plan (p. 62). It is also important to improve links to this service, such as community shuttles, which NJTPA recommends should be funded "on a more permanent basis" based on performance (p. 75). The shuttles help provide a "last mile" transit connection but also serve other purposes during the day.

In addition to shuttles, Plan 2035 calls for improving pedestrian and bike facilities near transit to facilitate "efficient travel connections", and reduce the need for parking. While the plan also calls for the expansion of park and rides, this is focused on more "low-density suburban areas".

11.6 Route 18 Corridor Pedestrian Crossing Study to Enhance Safety and Public Transit Use

This study aimed to provide safe and convenient pedestrian access to transit along the urban arterial highway in Old Bridge and to alleviate congestion along Route 18 from Old Bridge to New Brunswick. Missing sidewalks and nonexistent shoulders, unsafe intersections and high vehicle speeds severely impact pedestrian access along the highway's employment centers and trip generators. The study identified those problem areas and made recommendations for enhancing safe pedestrian, bike and transit access, thereby aiming to reduce reliance on automobiles and increase accessibility for low income, minority and mobility-impaired populations in the area.

The Route 9 Corridor Study has significant overlap with the Route 18 study in terms of its geographic area and characteristics and the overall scope of the project. Route 9 intersects Route 18 in the south section of the Study Area, where the area of overlap is somewhat indistinguishable in terms of trip generation. The Route 9 corridor through Old Bridge and Sayreville hosts the greatest volume of peak period bus operations in the state, yet the study indicates that access to these transit services is deficient in many areas. Like the Route 18 study, the Route 9 study aims to develop recommendations for improving access to existing transit, reducing reliance on automobiles, and providing safe access for the lower orders of transportation such as walking and biking.

11.7 The Old Bridge Crossroads Redevelopment Plan

Old Bridge Township designated the former Olympia & York property between Route 18 southbound, Route 9, Texas Road, East Greystone Road and Marlboro Road as a redevelopment area (according to a plan prepared by Schoor DePalma Inc. in 2004). The redevelopment plan proposed mixed residential and commercial development on upland portions of an area that is primarily wetlands. The plan will impact the Route 9 Study Area by encouraging economic development through alternative housing types and large-scale retail highway shopping centers. This plan proposed a number of off-site improvements to roadways and intersections – costs that would be apportioned to each redevelopment project based on trip generation formulas.

The Route 18 Corridor Study, the Route 9 Corridor Study and the Old Bridge Master Plan all recommend maintaining an efficient transportation circulation system by using townwide traffic models to identify existing and future system needs and other access management strategies (The Old Bridge Crossroads Redevelopment Plan, p 34). These documents also coincide on recommending efficient utility of suitable land for development, while preserving wetlands and open space. This includes the use of cluster development to preserve open space.

11.8 The Monmouth-Ocean-Middlesex (MOM) Rail Project

NJ Transit has proposed to extend commuter rail service to/from Ocean County via one of three alternative alignments. The first two alignments would connect Lakehurst in Ocean County to the North Jersey Coast Line in Monmouth County at either Red Bank or Aberdeen-Matawan. The Aberdeen-Matawan train station is in close proximity to Old Bridge Township. The third alternative would restore diesel commuter rail service to/from Manchester in Ocean County to the Northeast Corridor Line at Monmouth Junction (South Brunswick, Middlesex County). Middlesex County does not support this alignment.

NJ Transit prepared a draft environmental impact statement (DEIS) and a travel demand forecasting study on the three alignments. The DEIS included proposals for feeder bus service to the existing rail station and park and ride lots, and parking improvements. This included new express bus service from Toms River to New Brunswick via Routes 9 and 18. Middlesex County supports this project, which would provide expanded, better coordinated and more efficient regional and local bus and shuttle service. This is also consistent with park and ride and commuter bus or shuttle service between Old Bridge and New Brunswick.

Since the publication of this study, NJ Transit has advanced several bus improvements as part of the "Baseline Alternative", including low-cost Transportation Systems Management (TSM) improvements that can reasonably be implemented and are cost-effective. The MOM study identified needs and opportunities to improve the Route 9 suburban bus corridor. The demand for bus system improvements was related to increased ridership in the corridor and overburdened park and ride facilities along Routes 9 and 18.

As a result, a variety of improvements have included the addition of bus shoulder lanes on Route 9, which allow buses to jump queues; the construction of new park and ride facilities in Old Bridge, such as at Inverness Drive; and the enhancement of bus stations and pedestrian access to park and ride facilities in Old Bridge, such as at the Throckmorton Lane bus station.

11.9 Middlesex County Bicycle Pedestrian Plan

The 2002 Middlesex County Bicycle Pedestrian Plan identified problems with existing facilities and recommended solutions, including physical improvements to provide safer biking and walking environments in the County.[47] The proposals aimed to connect pedestrians and cyclists from residential areas to schools, parks, employment centers and transit, offering viable alternatives to the automobile.

Within the Study Area, there has been overlap with the bicycle and pedestrian plan on a number of fronts. The Old Bridge Master Plan, Traffic and Circulation Element adopted in 2000 called for the inclusion of bicycle and pedestrian accommodations in planning transportation facilities. The interchange of Routes 18, 527 and 516 included pedestrian and bicycle compatibility features in its reconstruction design of 2002. The project has since been tabled.

However, there are other projects mentioned in the plan that are still anticipated, including:

- A bike route from Route 18 to Morganville Road, representing the majority of the road's extent through the Study Area (the route would also cover Throckmorton Lane, Ticetown Road, Cottrell Road, Valley Vale Road and the Inverness Park-n-Ride);
- A proposed bikeway / walkway system running along Ernston Road, Westminster Boulevard, and Perrine Road, linking housing, transit, and municipal parks; and

- Completion of the sidewalk network on the commercial thoroughfares of Main Street and Washington Road in Sayreville (for which the Borough has already received a grant).

12 Implementation Matrix

Report Section	Location / Project	Goal(s)	Participating Agencies/Entities	Time Frame*
9.1.1	MCAT M2 Shuttle - modify to serve Winding Wood Apartments	Transit access	MCAT	Quick Fix
9.1.2	Modify current MCAT M3 route and timetable w/ reg. timed stop at Throckmorton and Ticetown for transfers to U.S. 9 mainline service	Transit access	MCAT	Quick Fix
9.1.3	New MCAT M3 Peak Period Loops	Transit access	MCAT	Short
9.1.4	New MCAT M7 Peak Period Shuttle - Winding Woods to Cheesequake Park-n-Ride	Transit access	MCAT	Quick Fix
9.1.5	New MCAT M8 Peak Period Shuttle - Sayreville to South Amboy	Transit access	MCAT	Long
9.1.6	New MCAT M7 Off-Peak Shuttle - Bordentown Avenue	Transit access	MCAT	Quick Fix
9.1.7	New MCAT M8 Off-Peak Shuttle - Sayreville - South Amboy - Old Bridge	Transit access	MCAT	Long
9.1.8	Create and expand shuttle services sponsored and/or operated by housing developments and/or major employers in the study area, providing transportation to and from Route 9 commuter bus stops.	Transit access	Property Management, Homeowners Associations, Employers	Long
9.1.9	Route 9 at Fairway Lane (Old Bridge) - adjust signal timing for adequate pedestrian crossing time and reduced pedestrian signal delay	Pedestrian safety, congestion relief	Old Bridge Township, NJDOT	Short
9.1.9	Evaluate signal phasing of all signalized intersections to determine the appropriateness of a leading pedestrian interval	Pedestrian safety	NJDOT, Middlesex County, Old Bridge Township, Sayreville Borough	Short
9.1.9	Ensure all pedestrian crossing timings at signalized intersections near bus stops conform to current standards and best practices	Pedestrian safety	NJDOT, Middlesex County	Short
9.1.10	Evaluate all signalized intersections to determine the appropriateness of right-turn-on-red restrictions	Pedestrian safety	NJDOT, Middlesex County, Sayreville Borough, Old Bridge Township	Short

* The definitions of the time frames are included at the end of this table.

Report Section	Location / Project	Goal(s)	Participating Agencies/Entities	Time Frame*
9.1.10	Ernston Road (CR 673) at Washington Road (Sayreville) - consider revised turning prohibition on southbound approach	Pedestrian safety	Middlesex County, Sayreville Borough	Short
9.1.11	Create and implement operational guidelines to ensure that bus bays, shelters, and sidewalks are cleared of snow within a reasonable period of time	Pedestrian safety	NJDOT, Middlesex County, Old Bridge Township, Sayreville Borough	Quick Fix
9.2.1	Ernston Road (CR 673) at Washington Road (Sayreville) - Replace eight-inch signal heads with 12-inch signal heads	Pedestrian safety	Middlesex County, Sayreville Borough	Short
9.2.1	Route 9 N. / Minimall Dr. (Sayreville) - Install backplates on all signal faces	Pedestrian safety, motorist safety	NJDOT	Short
9.2.1	Ernston Road at Westminster Boulevard (Sayreville) - reposition pedestrian buttons to meet ADA / MUTCD standards	ADA compliance	Sayreville Borough	Short
9.2.2	Route 9 southbound at Ehlers Lane (Old Bridge) - relocate stop to far side	Pedestrian safety	NJDOT, NJ Transit, Old Bridge Township	Short
9.2.2	Route 9 southbound at Jake Brown Road (Old Bridge) - relocate stop to far side	Pedestrian safety	NJDOT, NJ Transit, Old Bridge Township	Short
9.2.2	Route 9 southbound at Old Mill Road (Old Bridge) - relocate stop to far side	Pedestrian safety	NJDOT, NJ Transit, Old Bridge Township	Short
9.2.2	Route 9 southbound at Schulmeister Road (Old Bridge) - relocate stop to far side	Pedestrian safety	NJDOT, NJ Transit, Old Bridge Township	Short
9.2.2	Route 9 southbound at Ticetown Road (Old Bridge) - relocate stop to far side	Pedestrian safety	NJDOT, NJ Transit, Old Bridge Township	Short
9.2.3	Route 9 northbound north of Texas Road (Old Bridge) - build recessed bus bay	Congestion Relief, Pedestrian Safety	NJDOT, NJ Transit, Old Bridge Township	Short
9.2.3	Route 9 northbound service road at Ticetown Square Mini Mall / Ticetown Road (Old Bridge) - build recessed bus bay	Congestion Relief, Pedestrian Safety	NJDOT, NJ Transit, Old Bridge Township	Short
9.2.3	Route 9 southbound at Ferry Road; newly relocated far-side stop (Old Bridge) - build recessed bus bay	Congestion Relief, Pedestrian Safety	NJDOT, NJ Transit, Old Bridge Township	Short

Report Section	Location / Project	Goal(s)	Participating Agencies/Entities	Time Frame*
9.2.3	County Route 516 westbound at Ridge Road; near Old Matawan Road (Old Bridge) - build recessed bus bay	Congestion Relief, Pedestrian Safety	Middlesex County, NJ Transit, Old Bridge Township	Short
9.2.3	Washington Road eastbound at Ernston Road (Sayreville) - build recessed bus bay	Congestion Relief, Pedestrian Safety	Middlesex County, NJ Transit, Sayreville Borough	Short
9.2.3	Washington Road eastbound at Lakeview Drive (Sayreville) - build recessed bus bay	Congestion Relief, Pedestrian Safety	Middlesex County, NJ Transit, Sayreville Borough	Short
9.2.3	Washington Road westbound at Lakeview Drive (Sayreville) - build recessed bus bay	Congestion Relief, Pedestrian Safety	Middlesex County, NJ Transit, Sayreville Borough	Short
9.2.3	Ernston Road eastbound (towards Route 9) at School Drive (Sayreville) - build recessed bus bay	Congestion Relief, Pedestrian Safety	Middlesex County, NJ Transit, Sayreville Borough	Short
9.2.3	Ernston Road eastbound (towards Route 9) past Villanova Rd (far side, Sayreville) - build recessed bus bay	Congestion Relief, Pedestrian Safety	Middlesex County, NJ Transit, Sayreville	Short
9.2.4	Route 9 southbound at Cindy Street (Old Bridge) - install guardrail ahead (i.e. north) of shelter	Pedestrian safety	NJDOT	Short
9.2.4	Route 9 northbound at Fairway Plaza (Old Bridge) - expand shelter	Increased convenience	NJ Transit, Old Bridge Township	Short
9.2.4	Route 9 southbound at Fairway Lane (Old Bridge) - expand shelter	Increased convenience	NJ Transit, Old Bridge Township	Short
9.2.4	Route 9 southbound on service road at Throckmorton Lane (Old Bridge) - expand shelter	Increased convenience	NJ Transit, Old Bridge Township	Short
9.2.4	Route 516 westbound at Ridge Road, near Old Matawan Rd (Old Bridge) - add shelter	Increased convenience	NJ Transit, Old Bridge Township	Short
9.2.4	Route 516 westbound at Worth Place (Old Bridge) - add shelter	Increased convenience	NJ Transit, Old Bridge Township	Short
9.2.4	Route 516 westbound at Red Oak Lane / Bushnell Rd (Old Bridge) - add shelter	Increased convenience	NJ Transit, Old Bridge Township	Short
9.2.4	Route 516 eastbound at Morganville Rd (Old Bridge) - add shelter	Increased convenience	NJ Transit, Old Bridge Township	Short
9.2.5	Old Bridge Park & Ride northbound - improve visibility/awareness of bike rack(s) and bike lockers	Transit access	NJ Transit, Old Bridge Township	Short

Report Section	Location / Project	Goal(s)	Participating Agencies/Entities	Time Frame*
9.2.5	Old Bridge Park & Ride southbound - add bike rack(s)	Transit access	NJ Transit, NJDOT, Old Bridge Township	Short
9.2.5	Route 9 northbound service road at Ticetown Square / Ticetown Road (Old Bridge) - add bike rack(s)	Transit access	NJ Transit, NJDOT, Old Bridge Township	Short
9.2.5	Route 9 southbound service road at Throckmorton Lane (Old Bridge) - add bike rack(s)	Transit access	NJ Transit, NJDOT, Old Bridge Township	Short
9.2.5	Route 9 northbound at Trans Old Bridge Road / Ferry Road (Old Bridge) - add bike rack(s)	Transit access	NJ Transit, NJDOT, Old Bridge Township	Short
9.2.5	Route 9 southbound at Perrine Road (Old Bridge) - add bike rack(s)	Transit access	NJ Transit, NJDOT, Old Bridge Township	Short
9.2.6	Jake Brown Park & Ride (Old Bridge, both directions) – add pedestrian lighting at shelters and along walkways	Pedestrian safety	Old Bridge Township	Medium
9.2.6	Route 9 northbound at Inverness Park & Ride (Old Bridge) - add pedestrian lighting at shelter	Pedestrian safety	Old Bridge Township	Medium
9.2.6	Route 9 northbound at Texas Road (Old Bridge) - add pedestrian lighting	Pedestrian safety	NJDOT, Old Bridge Township	Medium
9.2.6	Route 9 northbound at Trans Old Bridge Road (Old Bridge) - add pedestrian lighting	Pedestrian safety	NJDOT, Old Bridge Township	Medium
9.2.6	Route 9 northbound at Cindy Street (Old Bridge) - add pedestrian lighting	Pedestrian safety	NJDOT, Old Bridge Township	Medium
9.2.6	Route 9 northbound at Ticetown Square (Old Bridge) - add lighting at shelter.	Pedestrian safety	NJDOT, Old Bridge Township	Medium
9.2.6	Route 9 northbound at Phillips Drive (Old Bridge) - add lighting at shelter	Pedestrian safety	NJDOT, Old Bridge Township	Medium
9.2.6	Route 9 northbound at Fairway Plaza (Old Bridge) - add lighting at shelter	Pedestrian safety	NJDOT, Old Bridge Township	Medium
9.2.6	Route 9 southbound at Old Mill Road (Old Bridge) - add pedestrian lighting	Pedestrian safety	NJDOT, Old Bridge Township	Medium
9.2.6	Route 9 southbound at Fairway Lane (Old Bridge) - add lighting at shelter	Pedestrian safety	NJDOT, Old Bridge Township	Medium
9.2.6	Route 9 median at Fairway Lane (Old Bridge) - add pedestrian lighting	Pedestrian safety	NJDOT, Old Bridge Township	Medium
9.2.6	Route 9 southbound at Ehlers Lane (Old Bridge) - add pedestrian lighting	Pedestrian safety	NJDOT, Old Bridge Township	Medium
9.2.6	Route 9 southbound at Texas Road (Old Bridge) - add lighting at shelter	Pedestrian safety	NJDOT, Old Bridge Township	Medium

Report Section	Location / Project	Goal(s)	Participating Agencies/Entities	Time Frame*
9.2.6	Route 516 at Old Matawan Road (Old Bridge) - add pedestrian lighting	Pedestrian safety	Middlesex County, Old Bridge Township	Medium
9.2.7	Route 9 at Texas Road (Old Bridge) - repair and extend median fence	Pedestrian safety	NJDOT	Short
9.2.7	Route 9 at Cindy Street (Old Bridge) - new median fence	Pedestrian safety	NJDOT	Short
9.2.7	Route 9 at Phillips Drive (Old Bridge) - repair median fence and extend south using more visible color	Pedestrian safety	NJDOT	Short
9.2.7	Route 9 at Fairway Lane (Old Bridge) - new median fence	Pedestrian safety	NJDOT	Short
9.2.7	Route 9 at Ehlers Lane (Old Bridge) - repair and extend median fence	Pedestrian safety	NJDOT	Short
9.2.7	Route 9 at Ticetown Rd / Throckmorton Ln (Old Bridge) - repair and extend median fence	Pedestrian safety	NJDOT	Short
9.2.8	Route 9 northbound at Old Mill Road (Old Bridge) - paint crosswalk	Pedestrian safety	NJDOT	Quick Fix
9.2.8	Route 9 at Fairway Lane (Old Bridge) - repaint crosswalk	Pedestrian safety	NJDOT, Old Bridge Township	Quick Fix
9.2.8	Ernston Road at Gateway / Sayre Woods Shopping Ctr. (Old Bridge/Sayreville) - relocate crosswalk on US 9 off-ramp	Pedestrian safety	NJDOT	Quick Fix
9.2.8	Villanova Road at Ernston Road (CR 673, Old Bridge) - mark crosswalk	Pedestrian safety	Middlesex County, Old Bridge Township	Quick Fix
9.2.8	Ernston Road (CR 673) at Washington Road (Sayreville) - add high visibility crosswalk markings & yield bars	Pedestrian safety	Middlesex County, Sayreville Borough	Quick Fix
9.2.8	Ernston Road (CR 673) at Washington Road (Sayreville) - relocate yield sign ahead of crosswalk	Pedestrian safety	Middlesex County, Sayreville Borough	Quick Fix
9.2.8	Ernston Road (CR 673) at Washington Road (Sayreville) - SE corner - move stop bars if needed	Pedestrian safety	Middlesex County, Sayreville	Quick Fix
9.2.8	Ernston Road (CR 673) at Washington Road (Sayreville) - accommodate bicyclists with “sharrows”, shared lane use pavement markings and signage[48]	Bicycle safety	Middlesex County, Sayreville	Quick Fix
9.2.9	Route 9 northbound from Phillips Drive to CR 516 (Old Bridge) - extend sidewalk (approx 2,000 ft.)	Pedestrian safety, transit access	NJDOT, Old Bridge Township	Long

Report Section	Location / Project	Goal(s)	Participating Agencies/Entities	Time Frame*
9.2.9	Route 9 northbound from Jake Brown Park & Ride (Old Bridge) - add sidewalk to Stratford Apartments (approx. 1,000 ft.)	Pedestrian safety, transit access	NJDOT, Old Bridge Township	Long
9.2.9	Route 9 southbound from Ehlers Lane to CR 516 (Old Bridge) - add sidewalk (approx. 2,000 ft.)	Pedestrian safety, transit access	NJDOT, Old Bridge Township	Long
9.2.9	Route 9 southbound from Ferry Road to Spring Valley Road (Old Bridge) - add sidewalk (approx. 3,600 ft.)	Pedestrian safety, transit access	NJDOT, Old Bridge Township	Long
9.2.9	Route 9 northbound from Spring Valley Road to Trans Old Bridge Road (Old Bridge) - add sidewalk (Approx. 3,600 ft.)	Pedestrian safety, transit access	NJDOT, Old Bridge Township	Long
9.2.9	Perrine Road between Route 9 & 34 (Old Bridge) - add sidewalk (approx. 500 ft.)	Pedestrian safety, transit access	NJDOT, Old Bridge Township	Long
9.2.9	Route 516 westbound at Ridge Road / near Old Matawan Road (Old Bridge) - add sidewalks to Ridge Road bus stop	Pedestrian safety, transit access	Middlesex County, Old Bridge Township	Long
9.2.9	Route 516 eastbound at Morganville Rd (Old Bridge) - add sidewalk to bus stop	Pedestrian safety, transit access	Middlesex County, Old Bridge Township	Long
9.2.9	Ernston Road (CR 673) westbound between Mary Lou Lane and Washington Road (Sayreville) - add approx. 700 ft. of sidewalk	Pedestrian safety, transit access	Middlesex County, Sayreville Borough	Long
9.2.9	Route 9 at Fairway Lane (Old Bridge) - add "Stop for pedestrian" signage	Pedestrian safety	Old Bridge Township, NJDOT	Quick Fix
9.2.9	Route 9 at Fairway Lane (Old Bridge) - install tactile surfaces	ADA compliance	Old Bridge Township, NJDOT	Long
9.2.9	Route 9 at Fairway Lane (Old Bridge) - Store driveway - reduce turn radius	Pedestrian safety	Old Bridge Township, NJDOT	Long
9.2.9	Ernston Road (CR 673) at Washington Road (Sayreville) - reconstruct accessible curb ramps	ADA compliance	Middlesex County, Sayreville Borough	Short
9.2.9	Sayre Woods / Gateway Shopping Ctr. driveways along Ernston Road (Old Bridge) - reconstruct curb ramps to meet ADA guidelines	ADA compliance	Middlesex County, Old Bridge Township	Short
9.2.9	Ernston Road (CR 673) at Villanova Road - install ADA-compliant ramp / shorten length of crossing	Pedestrian safety	Middlesex County, Old Bridge Township	Long
9.2.9	Ernston Road at Westminster Boulevard - regrade sidewalk SW of intersection to eliminate dropoff hazard	Pedestrian safety	Middlesex County, Sayreville Borough	Long

Report Section	Location / Project	Goal(s)	Participating Agencies/Entities	Time Frame*
9.3.1	Evaluate level of pedestrian and bicycle usage and patterns to/from bus stops on U.S. 9, Route 516, and Ernston Road	Pedestrian safety, transit access	NJ Transit, Middlesex County, KMM, Old Bridge	Short
9.3.1	Monitor growth in the Corridor to identify new areas for transit opportunities	Transit access, ridership	NJ Transit, KMM, Middlesex County, NJTPA, both municipalities	Ongoing
9.3.1	Ernston Road (CR 673) at Washington Road - SE corner - review truck turning radii	Pedestrian safety	Middlesex County, Sayreville Borough	Short
9.3.1	Study pedestrian signal phasing to ensure adequate pedestrian crossing time	Pedestrian safety	NJDOT, Middlesex County	Short
9.3.2	Adopt complete streets policy	Pedestrian safety, transit access, livability	Middlesex County, Old Bridge, Sayreville	Short
9.3.3	Continue educational campaigns encouraging riders / motorists to be conscious of safety near bus stops	Pedestrian safety	KMM	Ongoing
9.3.4	Market new routes with housing developments and employers	Ridership	KMM, MCAT	Ongoing
9.3.4	M2, M3 - Improve stick diagrams and timetables to include all connecting services at transfer points, especially those along Route 9	Ridership, transit access	MCAT	Ongoing
9.3.4	Encourage community participation and feedback in mobility improvement (park and ride, fare integration, scheduling)	Increase mobility, increased convenience	Academy Bus Co., NJ Transit, MCAT, Old Bridge Township, Sayreville Borough, KMM	Ongoing
9.3.4	Work w/ other agencies to coordinate the recognition of unmet regional mobility needs	Mobility	NJ Transit, NJTPA, Middlesex County KMM	Ongoing
9.3.4	Work with contiguous counties and/or municipalities to develop pilot programs to meet the demand for inter-county transportation	Transit access	Middlesex County, Monmouth County, municipalities surrounding the Study Area	Ongoing

Time Frames	Duration
Quick Fix	0 – 6 months
Short	6 – 24 months
Medium	2 – 5 years
Long	5+ years
Ongoing	continual

Endnotes

[1] Information regarding Cheesequake Village as per: http://55plusinmonmouth.com/55plusinmonmouth/Cheesequake%20Village.htm.Retrieved July 13, 2010.

[2] The Indo-European languages category of the US Census includes most languages of Europe (including Russian) and the Indic languages of India. For a full description of language categories of the US Census please refer to: http://www.census.gov/hhes/socdemo/language/about/ or http://www.census.gov/prod/2010pubs/acs-12.pdf. Based on a review of the 2006-2008 ACS estimates ancestry tables for Old Bridge and Sayreville (included in Appendix A of this report), it does not appear likely that there was any single dominant "Indo-European" language within the Study Area.

[3] All data downloaded from the LEHD OnTheMap Origin-Destination Database for year 2008 represents employment at the beginning of the second quarter of 2008.

[4] North Jersey Transportation Planning Authority (February 2005). *Regional Travel – Household Interview Survey: Updated Compendium of Results Reweighted With Census 2000 Figures*. Trip Data Table T-2, p. 30; downloaded on September 29, 2009 (http://www.njtpa.org/DataMap/Perf/HIS/documents/compendium_reweight.pdf).

[5] The commute shed and labor shed data for 2008 represents the beginning of quarter employment, 2nd quarter 2008 (US Census Bureau, LEHD OnTheMap Origin-Destination Database). The 2nd quarter of 2008 falls in the middle of the late-2000s recession of the United States, which officially began in December 2007 and ended in June or July of 2009. However, major job losses and high unemployment rates resulting from this economic downturn did not begin to materialize until the latter half of 2008. For example, the April 2008 unemployment rate of Middlesex County was 4.2%; it quickly increased thereafter to 8.0% by April 2009; it peaked at 9.5% in July 2009; and it continues to hover between 8% and 9% (Jan to May 2011). Therefore, the 49,187 primary jobs held by residents of Old Bridge and Sayreville and the 19,088 primary jobs located in the Study Area at the beginning of the 2nd quarter of 2008 does not necessarily reflect job losses that may have been experienced locally as a result of this major downturn in the economy. The 2008 data was the most current available at the time the analyses were conducted. At the time of publication of this report the latest data available from the LEHD OnTheMap application was limited to the beginning of the 2nd quarter of 2009. The number of primary jobs held by Study Area residents fell slightly from 49,187 to 48,417 (a decline of 770). The number of primary jobs located in the Study Area fell from 19,088 to 18,666 (a decline of 422).

[6] In order to commute from the Study Area to Staten Island via transit, the most direct route would be to take the NJ Transit 64 route to Exchange Place, Jersey City; transfer to the Hudson-Bergen Light Rail Flyer; and transfer again to the MTA S89 route. A commuter leaving from the Old Bridge Park & Ride at 6:33 a.m. could arrive at Port Richmond on the north shore of Staten Island by 8:03 a.m. – a total transit trip time of 90 minutes just to get on the island. Additional time would be needed to get to the final destination point. The same trip by automobile would take between 25 and 30 minutes (19 miles).

[7] *North Jersey Regional Coordinated Human Services Transportation Plan (May 12, 2008). Prepared for North Jersey Transportation Authority, Inc.; Prepared by: Wilbur Smith Associates in association with: Abrams-Cherwony & Associates, Howard/Stein-Hudson Associates, and Mundle & Associates, Inc.; page 5-20 & 5-21; downloaded on October 8, 2010 (http://www.njtpa.org/Project/Mobility/CHSTP/default.aspx).*

[8] The creation of a Transit Viability Index specific for this particular study was used in lieu of the "Transit Score" methodology used by NJ Transit, as developed by the Delaware Valley Regional Planning Commission (DVRPC). The "2035 Transit Score" currently used by NJ Transit is a Traffic Analysis Zone ("TAZ") level approach that utilizes coefficient values based upon a regression-analysis of transit mode share against three independent variables (population density, employment density, and zero-car households). The Transit Score equation results in an expected public transit mode share value for each TAZ. The "Transit Score" values are assigned score ranges which are associated with particular transit service investments that would be broadly appropriate. The TAZs of the Route 9 Corridor Study Area are

primarily categorized as "Medium-High" and "High" (2035 Transit Score values)--categories associated with all modes of transit investment except for heavy-urban rail. These relatively high Transit Score values, overall, simply correspond to the appropriateness of the already existing levels and types of bus service throughout the Study Area in general and the bus priority treatment on Route 9 in particular (i.e. bus shoulder lanes). The Transit Viability Index developed for this report was created and used as a neighborhood-level tool for prioritizing specific locations warranted for peak-period feeder services and complementary off-peak local shuttle routes (to be operated by MCAT).

[9] NJ Transit's level of bus service (i.e. number of trips) tabulated using their GTFS dataset covering bus service during the period between January 20, 2011 and July 18, 2011. GTFS dataset was downloaded on January 31, 2011 from NJ Transit (https://www.njtransit.com/mt/mt_servlet.srv?hdnPageAction=MTDevLoginTo); a morning peak period trip is defined as a trip that arrives at its final destination between the hours of 6 and 10 a.m.; an evening peak period trip is defined as a trip that departs from its origin between the hours of 4 and 7 p.m.; Route 9 mainline services consist of NJ Transit's 139, 132, 67 and 64. See Appendix C with summary data tables.

[10] Keep Middlesex Moving. (2009, June). *Middlesex County Bus Stop Inventory–Examining Signage, Shelters, Benches, Route Designations, and Accessibility.*

[11] Prepared by Parsons Brinckerhoff Quade & Douglas, Inc.

[12] To stay consistent with 1990 surveys, passenger trips originating within the Parlin ZIP Code boundary are aggregated with Sayreville, even though the area contains parts of both Sayreville and Old Bridge (p. 8).

[13] Middlesex County Planning Board. (1968, March). *Transit Facilities Recommended Along U.S. Route 9*. A copy of this entire report is included as Appendix H.

[14] Pedestrian Killed Crossing Rt. 9. (2011, Feb. 17). *East Brunswick Sentinel*.

[15] United States. Department of Transportation. Federal Highway Administration. (2003, November).*A Review of Pedestrian Safety Research in the United States and Abroad*.

[16] Slutsky, Irina. (2003, Dec. 4). Rt. 9 in Central Jersey due for safety upgrades: Work to begin immediately on Middlesex-Monmouth stretch of road. *The Star-Ledger*. 19.

[17] The NJTPA is currently conducting a study entitled *Pedestrian Safety at and Near Bus Stops*, which is scheduled for completion in June 2011 and yet to be published.

[18] As authorized by N.J.S.A 39:4-120, the commissioner of NJDOT adopted the 2009 Edition of the Federal Highway Administration's Manual on Uniform Traffic Control Devices into N.J.A.C 16:27.

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