



02

INTRODUCTION

The goal of this study, *Mobility Initiatives For An Aging Population: A Scan of Current Practices*, is to help the city better address the mobility needs of its growing senior population and to present the travel patterns of older adults. This report lays the foundation for potential mobility solutions for the older adult population by first providing demographic information and trends of the aging population in New York City. It then describes the challenges older adults face as their capacity for mobility decreases and that are addressed through the examples presented in this report. Additionally, it identifies key agencies and organizations that are involved with the implementation of mobility initiatives for older adults, and may have contributed to this study. Finally, 17 case studies are presented that analyze existing transportation data and solutions that are currently in place within the United States and around the world. These potential mobility solutions have been evaluated by the New York City Department of City Planning, Transportation Division to determine what opportunities may exist for New York City.

The Demographic Information and Trends portion of this report contains data supporting the phenomenal projected growth of the 65 and over population both citywide and by boroughs. According to citywide demographic projections, the older adult population is

expected to increase 44.2 percent between the year 2000 and 2030.¹ Three sets of maps are presented using recent data. The first set indicates the number of people over 65 living in each census tract. The next set shows the percentage of older residents living in each census tract, and the last set indicates the usage of subway stations by senior riders. Current and projected driving trends for the older population are examined, as well as mode of transportation to work data. All of this information will facilitate the planning and policy formation concerning the growing older adult population.

This study documents the efforts of New York City to improve mobility for all who reside here. The chapters cover the following themes: driving, public transportation, taxi and for-hire vehicles, pedestrianism, planning tools, innovative technologies and educational programs.

There are several recent projects and initiatives that study the mobility and accessibility issues that affect older New Yorkers. This report is intended to both complement those that already exist, as well as uncover new opportunities to enhance the mobility and accessibility of the older adult population currently in New York City and in the future. *Age-Friendly NYC: Enhancing Our City's Livability for Older New Yorkers* was issued by the Office of the Mayor in August of 2009

¹ Based on 2000 U.S. Census and New York City Department of City Planning, new York City Population Projections by Age/Sex & Borough 2000-2030.

and identified 59 issues and initiatives relating to older adults. This study is one of those initiatives – “Conduct a study to better address the mobility needs of older New Yorkers.” Fourteen of the 17 case studies analyzed in this document relates to an issue or initiative that is included in *Age-Friendly NYC*.

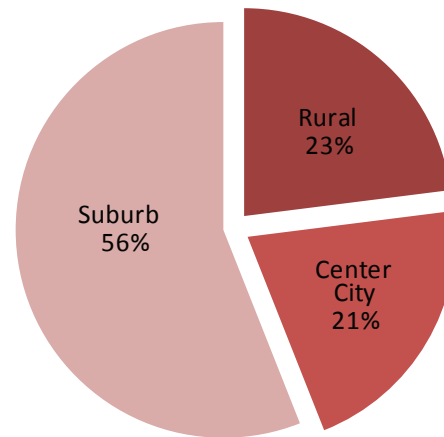
Mobility Initiatives For An Aging Population: A Scan of Current Practices sets out to: identify current mobility issues and transportation needs of older adults in New York City, recognize the current agencies and departments that address those needs, provide demographic data, include case studies from other world cities that have innovative mobility solutions or policies, and then conclude with potential applications and opportunities based on the cases studies and literature review. The purpose of this report is to provide ideas and recommendations that can be applied to New York City to address the mobility and accessibility needs of the current senior and aging population as well as the older adult populations to come.

I. Aging Population Demographics And Trends

Americans over 65 represent the fastest growing population segment in the United States. According to the 2000 Census, there are 35 million seniors (12.5 percent of the U.S. population, or one in eight). By 2030, that population is projected to more than double. Within this elderly population, the segment 85 years old and over is also expected to rise significantly. Currently 4.5 million Americans are 85 or older, 1.6 percent of the total U.S. population. By 2030, it is projected to increase to 9.0 million.

The over age 85 cohort is the fastest growing cohort in the U.S population because life expectancy has dramatically increased. Such that, the average expectancy of additional years at age 65 increased from 14.3 years in 1960 to 17.4 years in 1991.¹ Although many Americans remain active well into their later years, studies show that the longer one lives, the more likely personal assistance was needed.²

FIGURE 1: Percent of U.S. Elderly by Residential Location



For many older Americans, the location of their homes can impact their mobility choices. Land use planning is an important strategy to solving transportation problems. Currently, 56 percent of the older adult population resides in suburban locations, 23 percent in rural areas, and 21 percent in city centers (FIGURE 1).³ These figures reflect an overall pattern of suburbanization in the second half of the twentieth

century, due in large part to Federal policies subsidizing mortgages and interstate highway growth. These policies have contributed to

¹ Giuliano, *Travel Patterns of the Elderly*.

² United States Census Bureau, *65+ in the United States. Current Population Reports 1996*.

³ Rosenbloom, *The Mobility Needs of Older Americans: Implications for Transportation Reauthorization*.

the rise in automobile ownership throughout the nation, as suburban developments are typically less dense, have a greater separation of land uses and limited mass transit options in comparison to more urbanized areas. With the majority of the senior population residing in suburban and low-density areas where auto-dependency is more prevalent, it will be necessary to address the mobility challenges of driving while also promoting more accessible alternatives.

This pattern of suburban living has intensified over decades due to “aging in place.” According to the Brookings Institution, a public policy organization that conducts independent research, approximately only one-fourth of retirees move after they retire.⁴ The choice to age in place can be attributed to many factors, but typically intensifies during recessions as economic factors limit financial choices.

AGING POPULATION IN NYC

According to the U.S. Census, released in 2000, New York City has a population of 8.1 million people.⁵ The population is projected to increase to 9.1 million by 2030; an increase of 13.9 percent.⁶ The 65 and over population in certain areas of New York City has experienced a significant increase. Based on the 2000 Census, there are 937,857 people in New York City 65 and over. That figure is projected to increase to 1,352,375 by 2030; an increase of approximately 44 percent (FIGURE 2).⁷ The following graphics illustrate data from the 2000 U.S. Census and the Department of City Planning, Population Division projections for 2030.

The citywide population percentage change is modest compared to the projected elderly population percentage change. The percentage increases for the total city population and the 65 and over city population are 13.9 percent and 44.2 percent respectively. In 2030, the total 65 and over population is projected to account for 14.8 percent, up from 11.7 percent per the 2000 Census (FIGURE 3).⁸ The Bronx’s elderly population is 133,948 according to the 2000 Census, which is 10.8 percent of the borough total population of 1,332,650.

FIGURE 2: Total Population by Borough

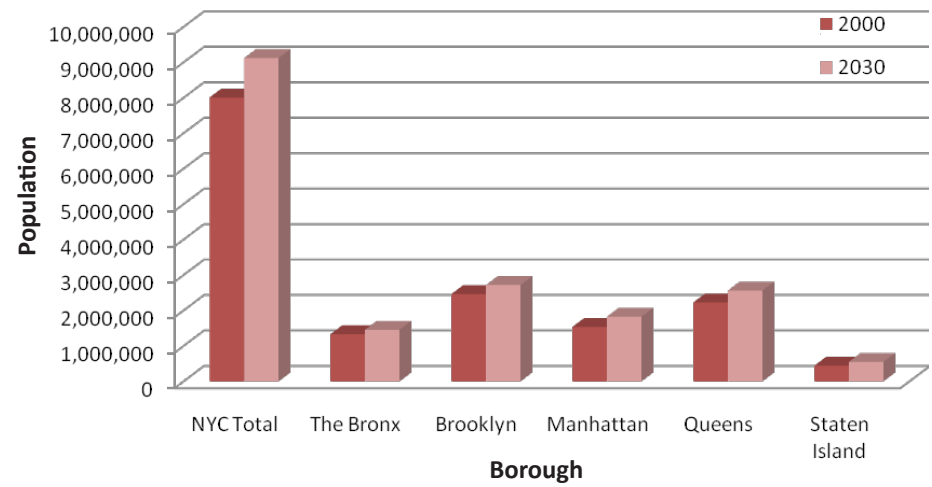
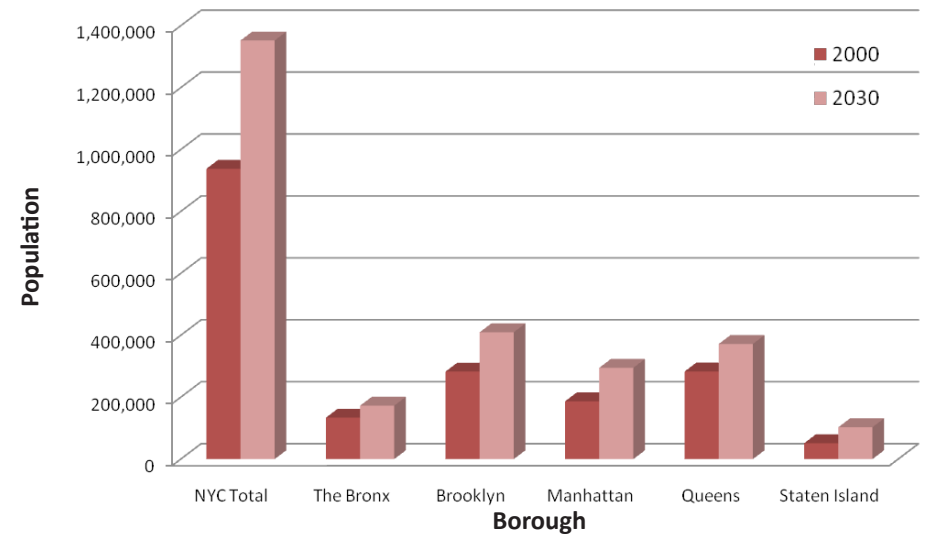


FIGURE 3: Elderly Population in Borough



4 Ibid.

5 U.S. Census Bureau, 2000.

6 New York City Department of City Planning, *New York City Population Projections by Age/Sex & Borough 2000-2030*.

7 Ibid.

8 Based on 2000 U.S. Census and New York City Department of City Planning, *New York City Population Projections by Age/Sex & Borough 2000-2030*.

For the year 2030 it is projected to increase to 172,653, which will be 11.9 percent of the borough total of 1,457,039.

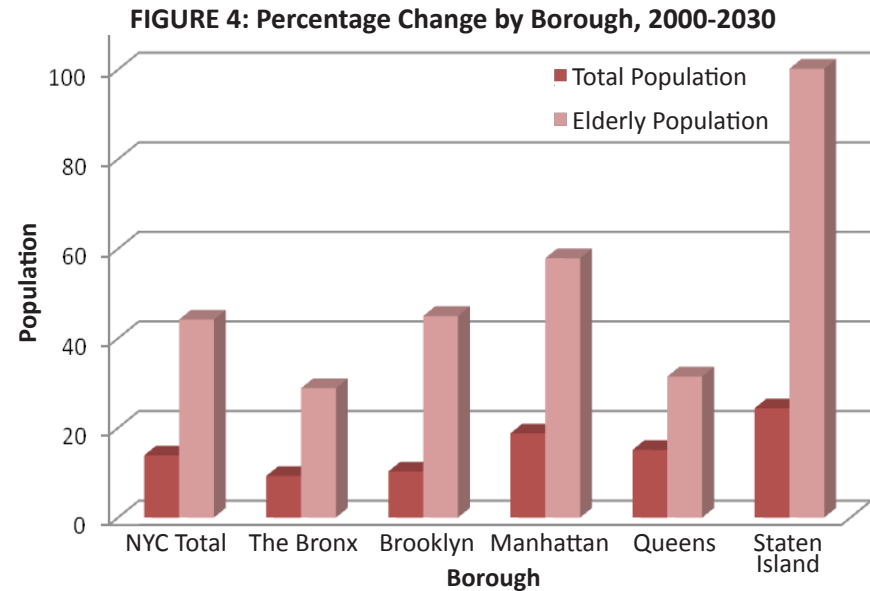
Brooklyn has the largest total population of any borough; totaling 2,465,326 as of the 2000 Census. Brooklyn’s elderly population component is 282,658 or 11.5 percent of the borough’s population. In 2030 the elderly population is projected to reach 409,769, which will represent 15.1 percent of the borough’s total population of the projected 2,718,967.


Manhattan has a senior population of 186,776 according to the 2000 U.S. Census. The senior population accounts for 12.2 percent of the borough’s total of 1,537,195. It is projected that by 2030, Manhattan’s elderly population will total 294,919. According to the projection, the elderly share will increase to 16.2 percent of the borough’s total 2030 projected population of 1,826,547.

Queens, in 2000, has the second highest borough total population, reaching 2,229,379. Its share of the senior population is also the largest of all five boroughs, amounting to a current population of 283,042. The senior population of Queens is 12.7 percent of the borough’s total population. By the year 2030, the senior population will increase to 372,068 older adults, which will represent 14.5 percent of the borough’s total population of 2,565,352.

According to the 2000 Census, Staten Island has the smallest number of senior citizens, 51,433, constituting 11.6 percent of the boroughs total population of 443,728. In the year 2030, the elderly population is projected to nearly double to 102,966. The increase will make the senior component 18.6 percent of the borough’s total population of 551,906.

Staten Island is projected to have the largest percentage change in its older population; a 100.2 percent increase. Manhattan comes in second, with a 57.9 percent increase. Brooklyn follows, with a 45.0 percent change. Queens ranks fourth with a 31.5 percent change and finally the Bronx which has the smallest, a 28.9 percent increase (FIGURE 4).





The next set of maps labeled, 'People Over Age 65 by Census Tract, 2000,' (FIGURES 5-9) indicate the number of people over age 65 living in each census tract. The number ranges are based on the natural groupings methodology identified in the ArcMap software. ArcMap selects the break points in a way that separates the values in the most natural way. By identifying values in this manner there often are big jumps in the data values.⁹

Figure 5 illustrates where the 65 and over population live in Manhattan. According to the map there are a few neighborhoods and geographic areas that stand out; parts of Chinatown, the East Village, Upper West Side, and Lenox Hill. These neighborhoods are indicated on the map as the areas in red. The areas in red contain between 1,911 and 5,090 people over age 65 per census tract.

Figure 6 displays where the 65 and older population live in the borough of Brooklyn. Brighton Beach and the areas near it have the highest concentrations of older adults in Brooklyn. Elderly residents in the neighborhoods of Sheepshead Bay and Mill Basin range between 1,071 and 1,910 per census tract.

Figure 7 presents where the 65 and older population live in the borough of Queens. Some of these neighborhoods with elderly concentrations ranging between 1,911 and 5,090 per census tract are well served by transit, such as Forest Hills and Flushing. Bay Terrace, which is located in eastern Queens does have bus service, but lacks the convenience of subway rail transit. Many of the neighborhoods that border Nassau County such as Glen Oaks and Floral Park have between 1,071 and 1,910 older residents per census tract.

Figure 8 illustrates where the 65 and older population live in the borough of the Bronx. The Riverdale section and parts of nearby neighborhoods such as Marble Hill and Spuyten Duyvil have the largest concentrations of older residents. Another neighborhood that has a large concentration of elderly residents is Co-op City. These neighborhoods have elderly concentrations ranging between 1,911 and 5,090 older residents per census tract. Pelham Gardens, Parkchester, and Country Club have elderly concentrations ranging between 1,071 and 1,910 older residents per census tract.

Figure 9 displays where Staten Island's older population lives in the borough. The areas that have the highest concentrations of elderly residents are St. George, New Dorp Beach, and Manor Heights. These neighborhoods have concentrations ranging from 1,071 and 1,910 elderly persons per census tract.

⁹ ArcGIS 9.2. *Desktop help.*

FIGURE 5

People Over Age 65 By Census Tract 2000 Manhattan

Legend

- 1 - 297
- 298 - 594
- 595 - 1,070
- 1,071 - 1,910
- 1,911 - 5,090

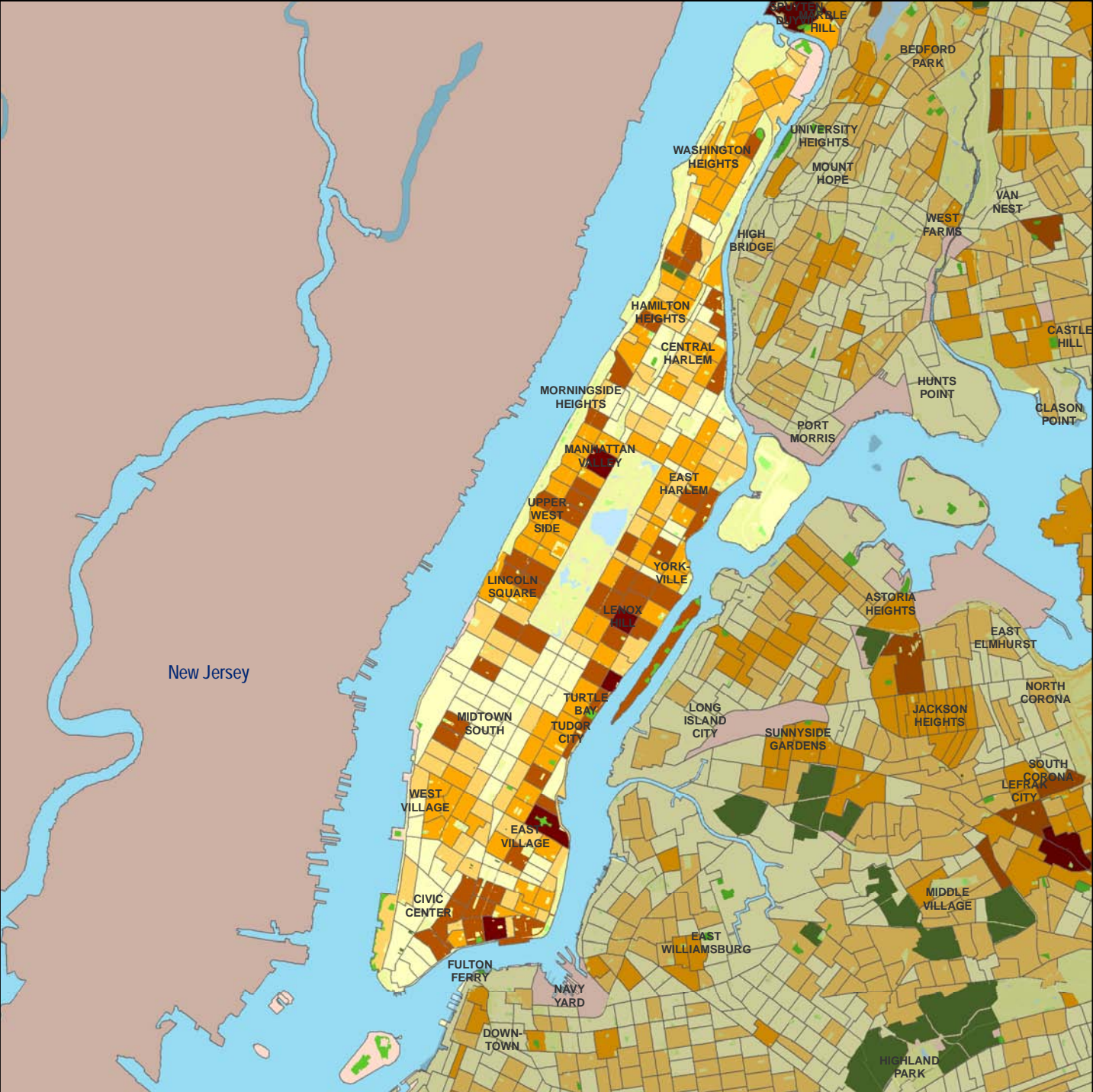
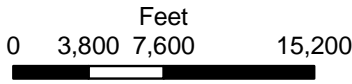
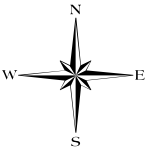




FIGURE 6

People Over Age 65 By Census Tract 2000 Brooklyn

Legend

- 1 - 297
- 298 - 594
- 595 - 1,070
- 1,071 - 1,910
- 1,911 - 5,090

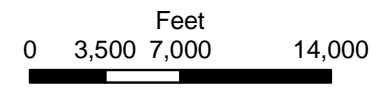
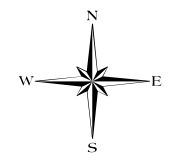
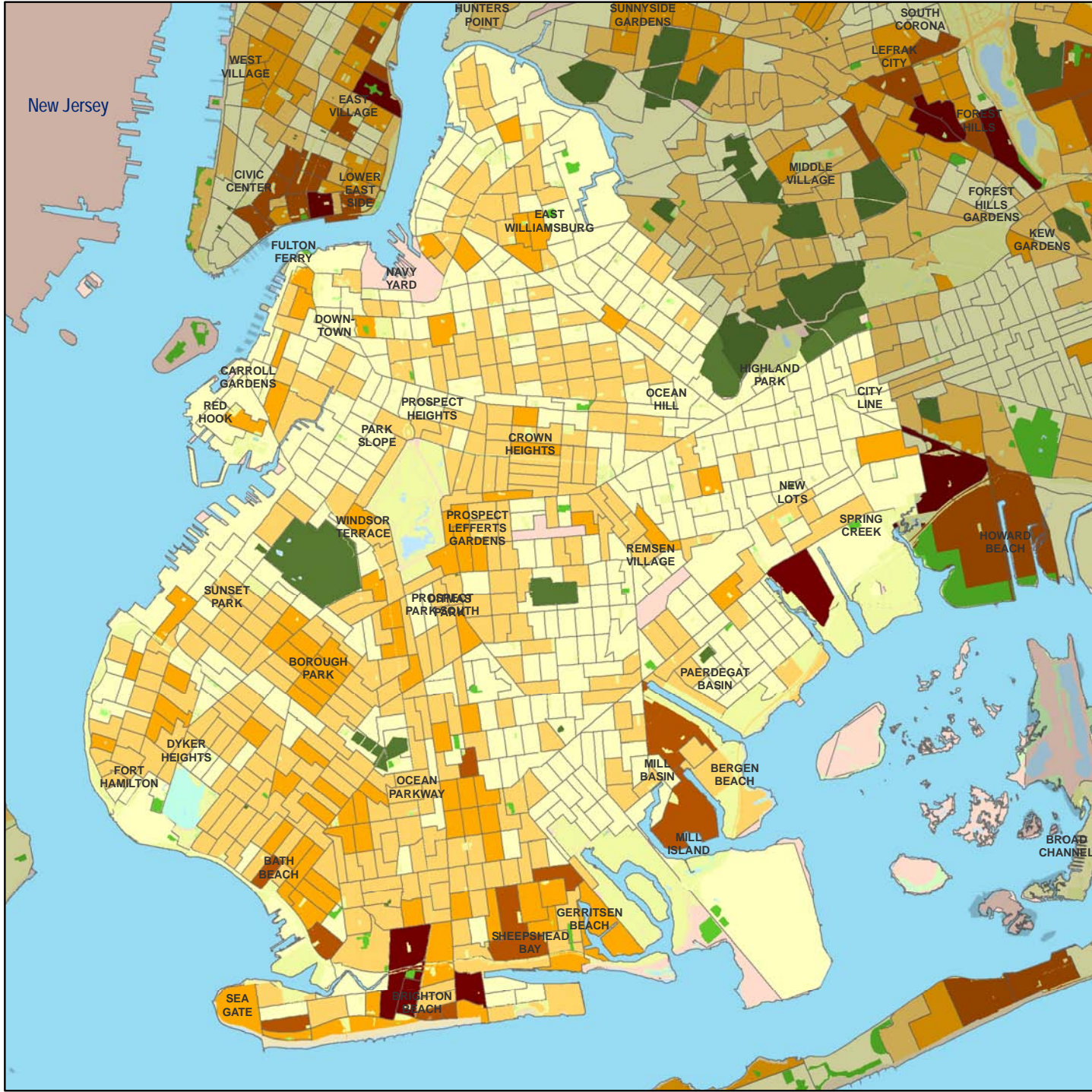


FIGURE 7

People Over Age 65 By Census Tract 2000

Queens

Legend

- 1 - 297
- 298 - 594
- 595 - 1,070
- 1,071 - 1,910
- 1,911 - 5,090

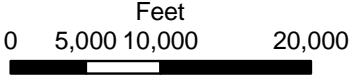




FIGURE 8

People Over Age 65 By Census Tract 2000 The Bronx

Legend

- 1 - 297
- 298 - 594
- 595 - 1,070
- 1,071 - 1,910
- 1,911 - 5,090

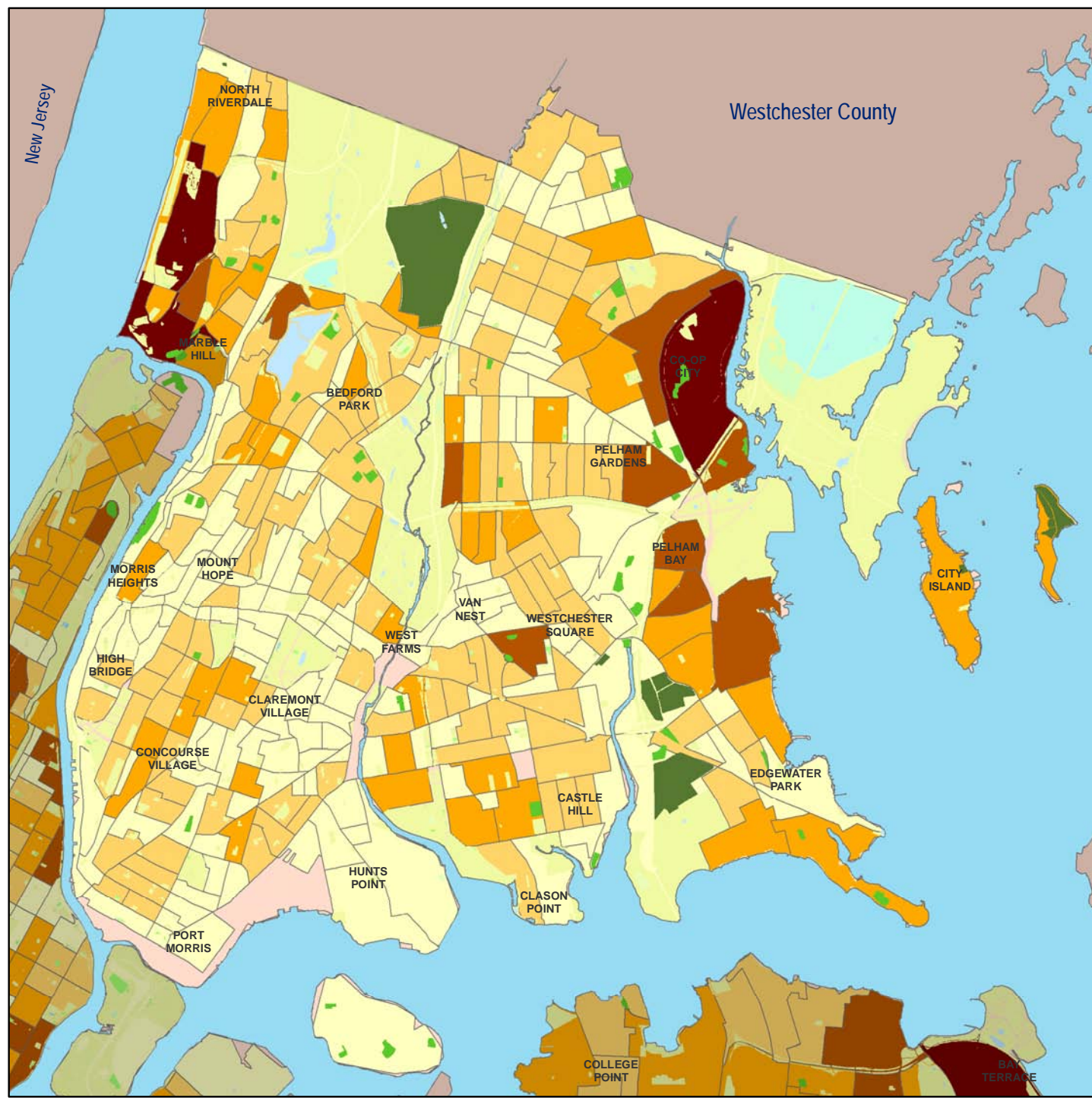
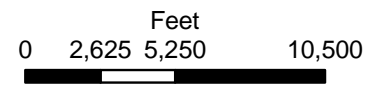
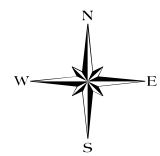
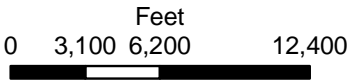
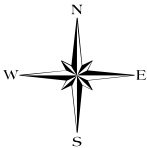
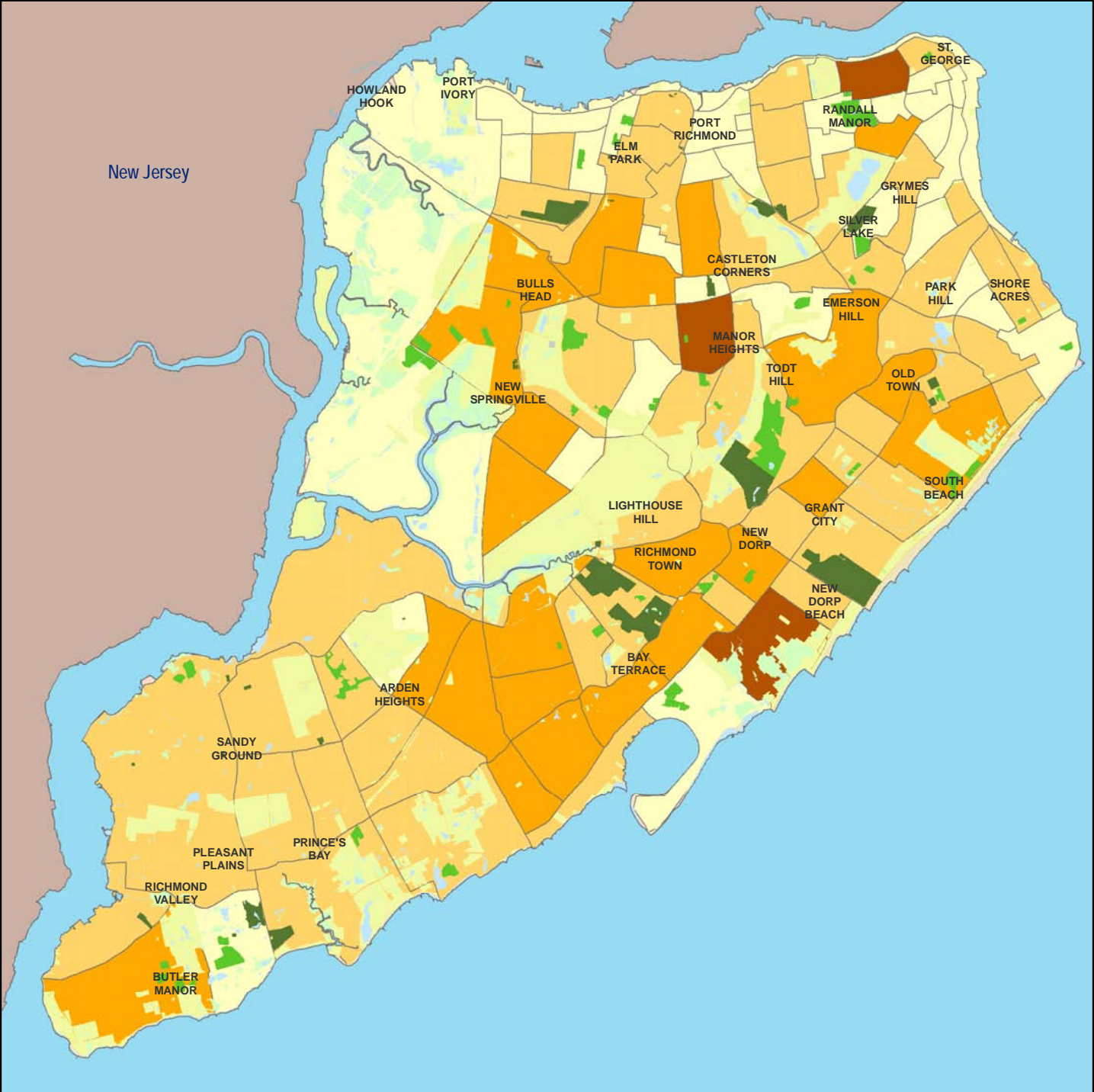



FIGURE 9

People Over Age 65 By Census Tract 2000 Staten Island

Legend

- 1 - 297
- 298 - 594
- 595 - 1,070
- 1,071 - 1,910
- 1,911 - 5,090





The next set of maps (FIGURES 10-14) labeled, Percent over Age 65 by Census Tract 2000, indicate the percentage of older residents living in each census tract. The percentages range from 0 percent to 90 percent. The data is displayed by variations in color; and the darker the color, means that more seniors age 65 live in that census tract.

Figure 10 illustrates the percentage of elderly residents per Manhattan neighborhood. According to the data, Manhattan does not contain any census tracts with elderly concentrations greater than 47.5 percent. The neighborhoods of Chinatown, the Lower East Side, and the Upper East Side contain census tracts that have elderly populations ranging from 22.3 percent and 47.4 percent.

Figure 11 displays Brooklyn's census tracts and the percentage of senior residents. According to the maps, the Brighton Beach neighborhood has the highest concentration of 65 and over residents. Some census tracts in Brighton Beach contain high concentrations of the elderly ranging from 47.5 percent to 90 percent. Additionally, there are a number of neighborhoods spread throughout Brooklyn that contain census tracts with high concentrations of elderly residents ranging from 22.3 percent to 47.5 percent.

Figure 12 illustrates the neighborhoods in Queens with the highest senior concentrations per census tract. There are two areas in Queens that contain census tracts with 47.5 and 90 percent of residents over 65. The first is the neighborhood of Glen Oaks, which is also the location of the North Shore Towers and Country Club. The second is located in the neighborhood of St. Albans. When examining the area more closely, it was discovered that the tract includes a VA hospital on Linden Boulevard which is a nursing home and domiciliary specializing in geriatric care. There are many neighborhoods throughout Queens that contain concentrations of seniors ranging from 22.3 percent to 47.4 percent. Some of these neighborhoods include: Bay Terrace, Breezy Point, Forest Hills, Middle Village, Oakland Gardens, and Little Neck.

Figure 13 displays the Bronx neighborhoods with high concentrations of older adults. Parts of the Riverdale and Schuylerville sections of the Bronx have census tracts with concentrations of older adults ranging

from 47.5 percent to 90 percent. Other neighborhoods that have high numbers of senior residents include: Pelham Gardens, Edgewater Park, and Spuyten Duyvil.

Figure 14 illustrates Staten Island's census tracts with high concentrations of seniors. One tract with the highest concentration of seniors in Staten Island, which contains a range from 47.5 and 90 percent, is also the location of the Sea View Hospital and Rehabilitation Center. There are a few neighborhoods that have elderly concentrations ranging from 22.3 percent to 47.4 percent, such as: St. George, Old Town, and parts of New Dorp.



FIGURE 11

Percent Over Age 65 By Census Tract 2000 Brooklyn

Legend

- 0.48% - 8.84%
- 8.85% - 14.16%
- 14.17% - 22.15%
- 22.16% - 47.38%
- 47.39% - 89.97%

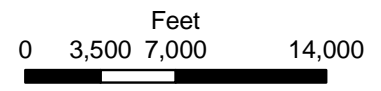
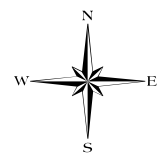
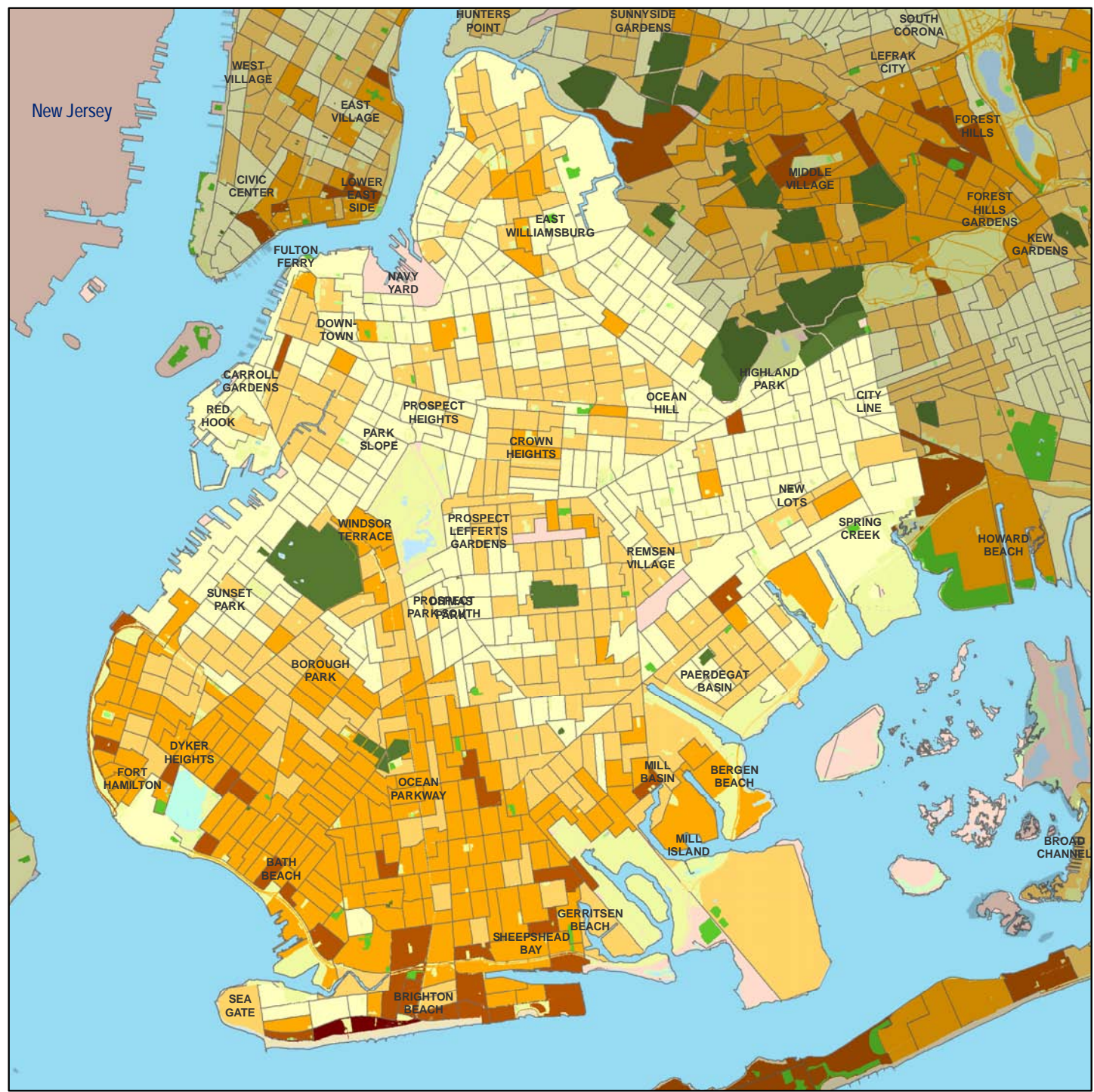


FIGURE 12

Percent Over Age 65 By Census Tract 2000 Queens

Legend

- 0.48% - 8.84%
- 8.85% - 14.16%
- 14.17% - 22.15%
- 22.16% - 47.38%
- 47.39% - 89.97%

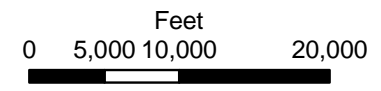
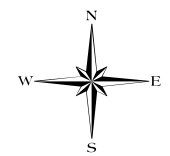
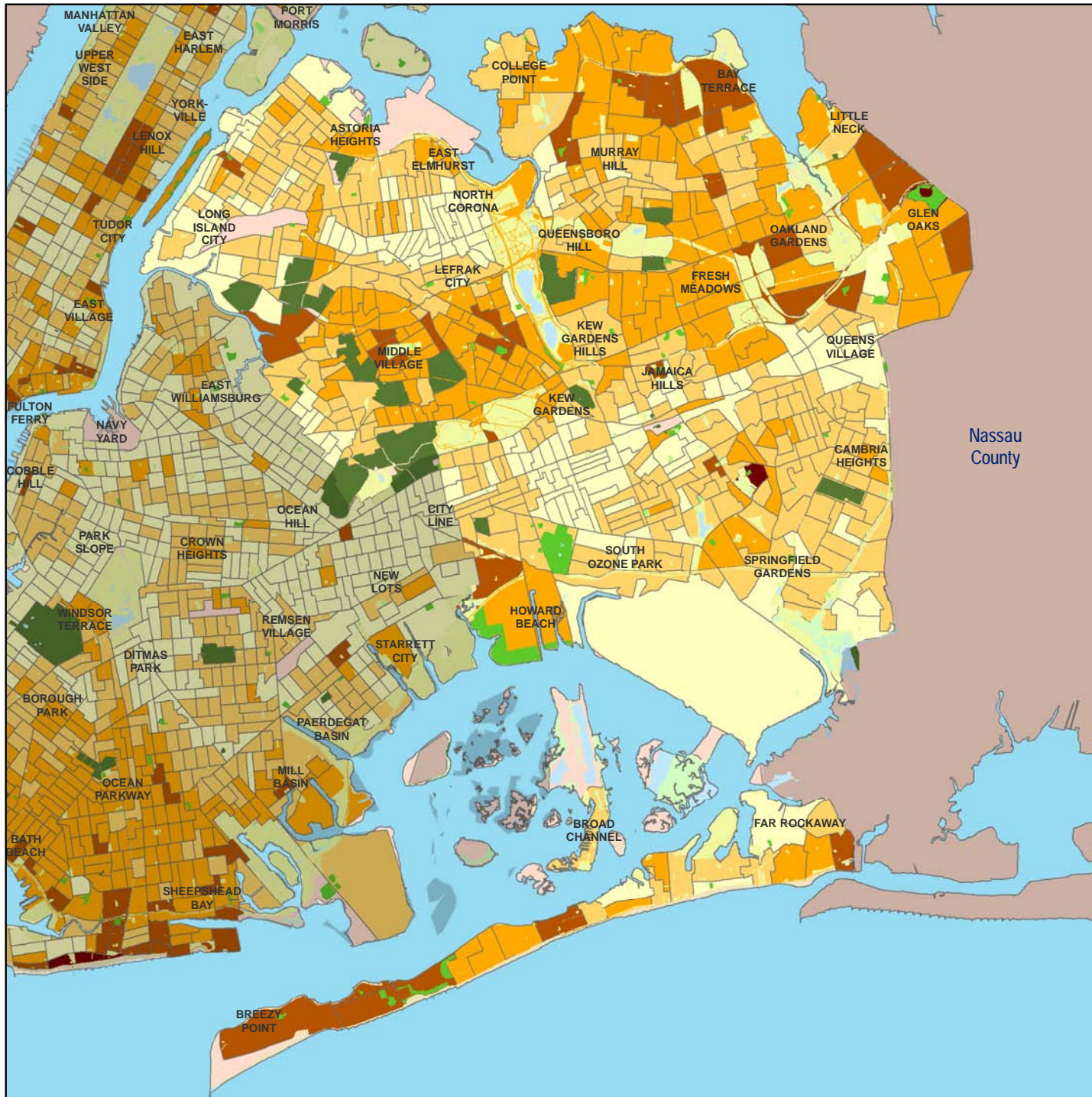




FIGURE 13

Percent Over Age 65 By Census Tract 2000 The Bronx

Legend

- 0.48% - 8.84%
- 8.85% - 14.16%
- 14.17% - 22.15%
- 22.16% - 47.38%
- 47.39% - 89.97%

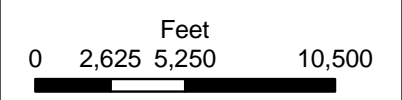
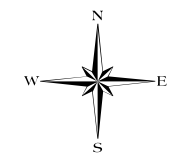
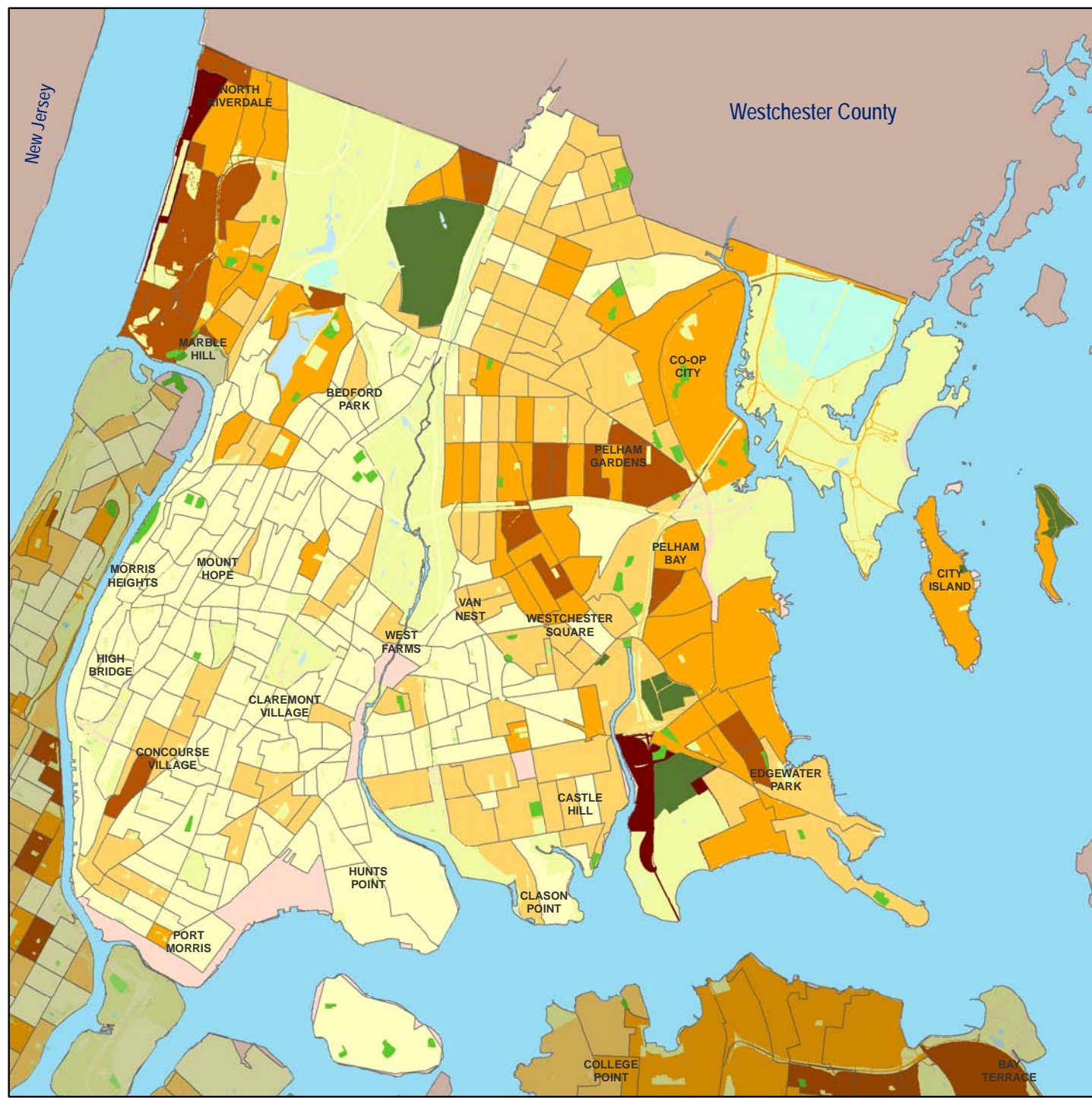
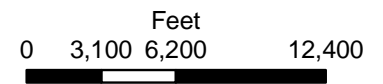
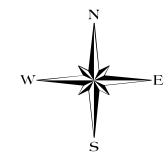
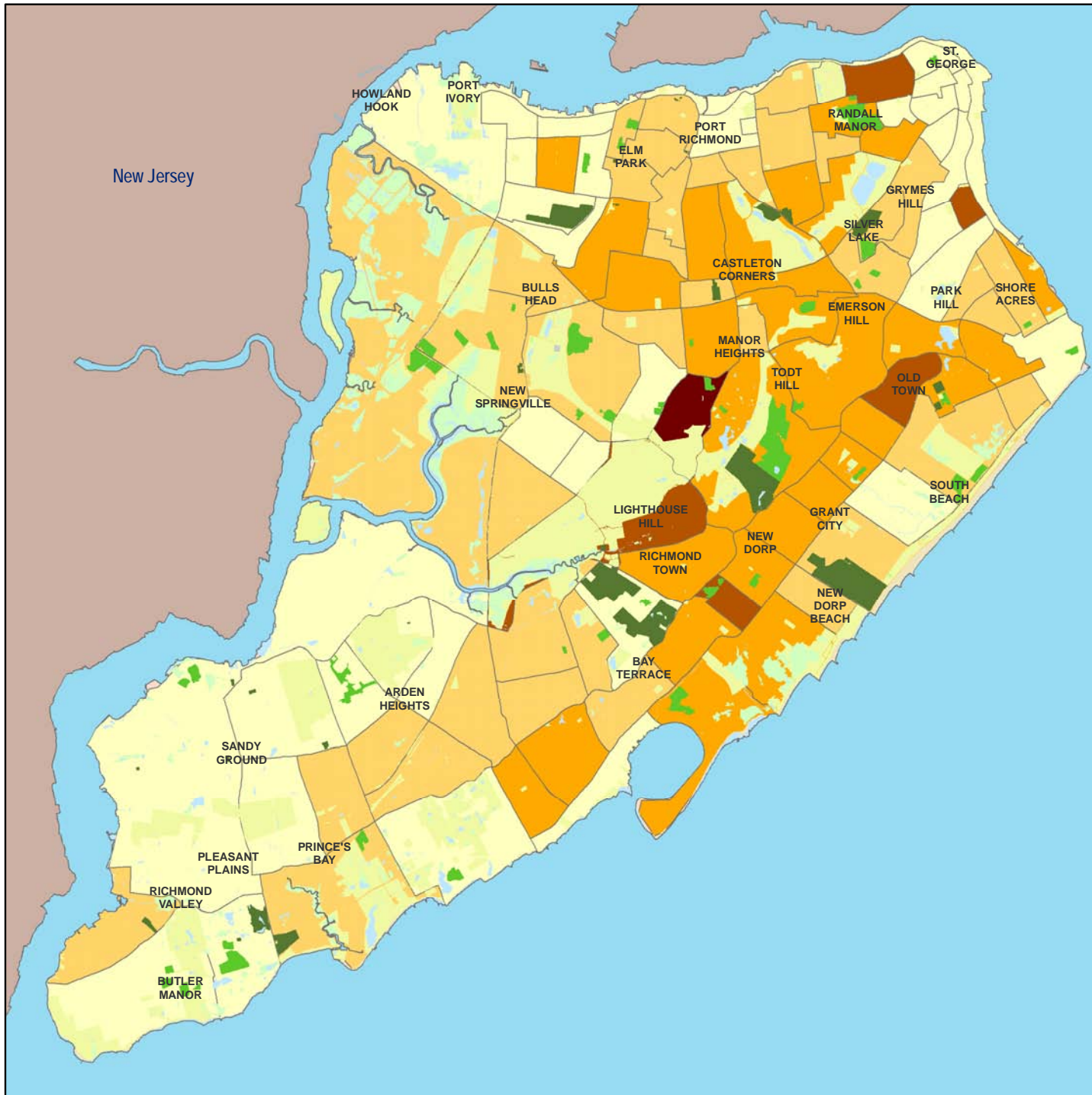



FIGURE 14

Percent Over Age 65 By Census Tract 2000 Staten Island

Legend

- 0.48% - 8.84%
- 8.85% - 14.16%
- 14.17% - 22.15%
- 22.16% - 47.38%
- 47.39% - 89.97%





The last set of maps (FIGURES 15-19) labeled ‘Percent of Ridership Using Senior Fare 2008 by Subway Station,’ shows usage of subway stations by seniors. They also indicate which stations are ADA accessible and partially accessible, and the stations that will be accessible by 2020. The data illustrates the percentage of senior ridership for each New York City Transit station in the city for 2008. Data for the Staten Island Railway is not available. The subway network shown in the maps reflects the network as of 2008.

Figure 15 illustrates senior ridership in Manhattan. According to the data, there is an agglomeration of senior ridership rates between 4 percent and 7.6 percent in both the Lower East Side and Chinatown neighborhoods and the Upper West Side neighborhoods between 59th Street/Columbus Circle (A, B, C, D) and 96th Street (1, 2, 3).

Figure 16 displays the 65 and over ridership levels in Brooklyn. According to the data, one downtown Brooklyn station, Clark Street (2, 3), has elderly ridership levels between 4 percent and 7.6 percent. Other stations that have similar elderly ridership levels are located primarily along the F, N, and Q trains in neighborhoods such as: Brighton Beach, Sheepshead Bay, and parts of Bay Ridge.

Figure 17 illustrates Queens’s subway station ridership percentages. One station, Aqueduct-North Conduit Avenue (A), has ridership levels ranging from 7.7 percent to 24.3 percent. Overall ridership levels are low at this train station that primarily serves the Aqueduct Racetrack. According to the data, there are three Queens’s neighborhoods that stand out. The neighborhoods of Rego Park (R, V, G), Forest Hills (E, F, R, V, G), and Flushing (7) all have stations that have senior ridership levels between 4 percent and 7.6 percent.

Figure 18 shows the senior subway ridership levels in the Bronx. The neighborhoods of Kingsbridge (1) and Woodlawn (4) have senior ridership levels ranging from 4 percent to 7.6 percent. The majority of Bronx stations have senior ridership levels ranging from 0.8 percent to 1.9 percent.

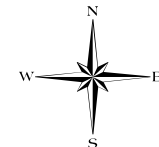
Figure 19 shows the Staten Island Railroad, but no senior subway ridership data was available for Staten Island.

FIGURE 15

Percent of Ridership Using Senior Fare 2008 by Subway Station Manhattan

Legend

- 0.8% - 1.9%
- 2% - 2.7%
- 2.8% - 3.9%
- 4% - 7.6%
- 7.7% - 24.3%
- Park
- Cemetery
- ADA Accessible
- Partially Accessible
- Accessible by 2020



0 50,000 100,000 Feet



FIGURE 16

Percent of Ridership Using Senior Fare 2008 by Subway Station Brooklyn

Legend

- 0.8% - 1.9%
- 2% - 2.7%
- 2.8% - 3.9%
- 4% - 7.6%
- 7.7% - 24.3%

- Park
- Cemetery
- ADA Accessible
- Partially Accessible
- Accessible by 2020



0 50,000 100,000 Feet



FIGURE 18

Percent of Ridership Using Senior Fare 2008 by Subway Station The Bronx

Legend

- 0.8% - 1.9%
- 2% - 2.7%
- 2.8% - 3.9%
- 4% - 7.6%
- 7.7% - 24.3%
- Park
- Cemetery
- ADA Accessible
- Partially Accessible
- Accessible by 2020



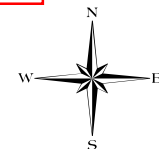
0 50,000 100,000 Feet

FIGURE 19

Percent of Ridership Using Senior Fare 2008 by Subway Station Staten Island

Legend

- 0.8% - 1.9%
- 2% - 2.7%
- 2.8% - 3.9%
- 4% - 7.6%
- 7.7% - 24.3%
- Park
- Cemetery
- ADA Accessible
- Partially Accessible
- Accessible by 2020



0 50,000 100,000 Feet

Existing Mobility Trends

Throughout the nation, driving provides independence to seniors and is their preferred mobility option because it is available on-demand as compared with other forms of transit. Dependency on the automobile for mobility appears to have given older people more choices, a wider range of possible activities, and flexibility.¹⁰ Most baby boomers consider driving to be indispensable to their well being. Increased availability and affordability of automobiles has made the personal automobile the defacto choice for personal mobility.¹¹ This trend has been increasing for several generations as suburbanization intensified, increasing our total population living in suburban areas without access to mass transit, and as this generation of seniors age in increasingly suburban places.

However, in New York City, the many mass transit options available to many seniors make travel by methods other than automobile a more prevalent option. New York City provides accessible key stations in its subway system, accessible buses, and Access-A-Ride to individuals who cannot use the public transportation system. The current Select Bus Service combines some of the features of a rail system with the cost and flexibility of bus transit to provide improved service to riders by innovating the way buses operate.

POPULATION OF DRIVERS

The following information examining existing senior mobility trends is from two sources; the New York State Department of Motor Vehicles 2006 (NYS DMV) licenses in force data and the 2005-2007 U.S. Census American Community Survey 3-year estimates. Some specific data sets that will be extrapolated include: population age 45 and over, driver's license holders age 45 and over, vehicle availability per occupied housing unit, and disabled population by borough.

In order to compare the number of adult drivers to elderly drivers, we looked at the population estimates of adults ages 45 to 85. By dividing this age range into cohorts we can better identify senior drivers. The table below displays the population estimates for adults ages 45 to

¹⁰ National Research Council (U.S.) Transportation Research Board. *Transportation in an Aging Society: A Decade of Experience: Technical Papers and Reports from a Conference: Conference Proceedings 27.*

¹¹ Weber, David and Lisa J. Mollner, et al. *Maintaining Safe Mobility in an Aging Society*, 2009.

85 and over per the 2005-2007 American Community Survey (TABLE 1).¹² The largest population cohort in each borough according to the data is currently between the ages 45 and 54. The data suggests that Brooklyn has the largest total population, but that Queens has the most residents age 85 and over.

TABLE 1: Population Age 45 and Over by Borough

Age	Bronx	Brooklyn	Manhattan	Queens	Staten Island	NYC Total
45-54	169,980	335,964	219,049	330,488	72,050	1,127,531
55-64	119,261	248,228	166,207	238,841	54,399	826,936
65-74	74,540	156,756	103,681	150,852	30,073	515,902
75-84	47,778	107,710	69,749	104,394	19,742	349,373
85+	20,445	40,770	27,845	42,528	6,904	138,492

Table 2 displays 2006 total New York City licenses in force for residents ages 45 and older, from data received from the NYS DMV.¹³ Licenses in force are the number of active registered licenses on record in New York City. The data indicates that there are more people between the ages of 45 and 64 driving than persons over 65. In New York City, persons over the age of 75 were less likely to drive than persons between the ages of 45 and 64. Residents in Queens possess the most licenses in force in each age range examined.

TABLE 2: New York City Licenses in Force: 45+ Calendar Year 2006

Age	Bronx	Brooklyn	Manhattan	Queens	Staten Island	Nyc Total
45-54	83,589	162,002	129,080	207,444	60,241	642,356
55-64	57,551	116,678	99,996	144,129	44,291	462,645
65-74	29,726	57,638	51,673	76,630	22,100	237,767
75-84	14,829	29,493	26,271	45,539	12,153	128,285
85+	3,668	7,097	6,180	13,049	2,869	32,863

Table 3 shows the percentage of driver license holders by borough, by age cohort.¹⁴ The percentage is derived by dividing the NYS DMV licenses in force by the U.S. Census 2007 American Community Survey

¹² U.S. Census Bureau, *2005-2007 American Community Survey.*

¹³ NYS DMV Data Services, *Licenses in Force in NYC Age 45+, 2006.*

¹⁴ Based on *NYS DMV Data Services and 2005-2007 American Community Survey.*

population estimates. The Staten Island figures display the highest percentage of licenses. The New York City total percentage of driver's license holders for people age 45-54 is 57 percent; in Staten Island that figure spikes to 84 percent for the same age range. 42 percent of the 85 and over Staten Island residents maintain a driver's license compared to 18 percent of 85 and over residents from the Bronx (TABLE 3). In every borough, people drive less as they age.

TABLE 3. Percentage of License Holders Compared to Total Population

<i>Age</i>	<i>Bronx</i>	<i>Brooklyn</i>	<i>Manhattan</i>	<i>Queens</i>	<i>Staten Island</i>	<i>NYC Total</i>
45-54	49%	48%	59%	63%	84%	57%
55-64	48%	47%	60%	60%	81%	56%
65-74	40%	37%	50%	51%	73%	46%
75-84	31%	27%	38%	44%	62%	37%
85+	18%	17%	22%	31%	42%	24%

SENIORS WITH MOBILITY IMPAIRMENTS

Table 4 displays the disabled population by borough age 65 and over.¹⁵ According to the ADA, a person is considered to be elderly at 65 years old and an individual has a disability when a physical or mental impairment substantially limits one or more major life activities.

The data shows that Brooklyn has both the largest group of 65 and over residents as well as the largest amount of disabled seniors. According to the data, 298,737 people, 48 percent of Brooklyn residents 65 and over, have a disability. The data also shows that Staten Island has the lowest percentage of disabled 65 and over residents at 37 percent or 54,097 respectively.

TABLE 4. Disabled Population Age 65 and Over by Borough

	<i>Bronx</i>	<i>Brooklyn</i>	<i>Manhattan</i>	<i>Queens</i>	<i>Staten Island</i>	<i>Nyc Total</i>
Population 65 and over	133,005	298,737	195,385	285,785	54,097	967,009
With a Disability	63,080	144,172	77,310	114,066	19,750	418,378

The NYS DMV also maintains a database of driver's license restrictions, such as corrective lens users and daytime drivers only. According to the data, there are approximately 700,000 licensed drivers age 45 and above that wear corrective lenses while driving. The number of drivers 45 and over restricted to daytime driving only is very small. There are approximately 250 drivers within the five boroughs that are restricted from night time driving; the majority of these restrictions apply to people over age 75.

¹⁵ U.S. Census Bureau, 2005-2007 American Community Survey.

TABLE 5: Mode of Transportation to Work - Total Workers

County	Total Population	Total Workers	Drove to Work - Total*	Used Mass Transit - Total†	Walked to Work - Total	Cab, Bike, Motorcycle - Total	Worked at Home - Total
Bronx	1,382,793	527,364	166,512	296,520	38,441	10,737	15,154
Kings	2,539,617	1,066,782	271,746	644,069	92,659	20,763	37,545
New York	1,624,225	843,541	79,891	482,209	178,344	46,452	56,645
Queens	2,278,482	1,062,345	420,597	537,379	61,704	14,238	28,427
Richmond	483,046	216,335	135,100	68,368	5,282	2,093	5,492
New York City	8,308,163	3,716,367	1,073,846	2,028,545	376,430	94,283	143,263

TABLE 6: Mode of Transportation to Work - By Percentage of Total Workers

County	Total Population	Total Workers	% Drove to Work - Total*	% Used Mass Transit - Total†	% Walked to Work - Total	% Cab, Bike, Motorcycle - Total	% Worked at Home - Total
Bronx	1,382,793	527,364	31.57	56.23	7.29	2.04	2.87
Kings	2,539,617	1,066,782	25.47	60.37	8.69	1.95	3.52
New York	1,624,225	843,541	9.47	57.16	21.14	5.51	6.72
Queens	2,278,482	1,062,345	39.59	50.58	5.81	1.34	2.68
Richmond	483,046	216,335	62.45	31.6	2.44	0.97	2.54
New York City	8,308,163	3,716,367	29	55	10	3	4

TABLE 7: Mode of Transportation to Work - Total Workers Over 65

County	Population Over 65	Workers Over 65	Drove to Work - Over 65*	Used Mass Transit - Over 65†	Walked to Work - Over 65	Cab, Bike, Motorcycle - Over 65	Worked at Home - Over 65
Bronx	145,701	14,319	5,112	6,734	1,401	411	661
Kings	310,363	29,733	9,406	14,604	3,096	538	2,089
New York	205,790	38,352	5,175	16,747	7,755	2,705	5,970
Queens	302,655	35,647	16,027	13,930	2,493	686	2,511
Richmond	57,928	6,843	4,671	1,694	240	15	223
New York City	1,022,437	124,894	40,391	53,709	14,985	4,355	11,454

TABLE 8: Mode of Transportation to Work - Percentage of Total Workers Over 65

County	% of Population Over 65	Workers Over 65 as Percent of Total Workers	% Drove to Work - Over 65*	% Used Mass Transit - Over 65†	% Walked to Work - Over 65	% Cab, Bike, Motorcycle - Over 65	% Worked at Home - Over 65
Bronx	10.54	2.72	35.7	47.03	9.78	2.87	4.62
Kings	12.22	2.79	31.63	49.12	10.41	1.81	7.03
New York	12.67	4.55	13.49	43.67	20.22	7.05	15.57
Queens	13.28	3.36	44.96	39.08	6.99	1.92	7.04
Richmond	11.99	3.16	68.26	24.76	3.51	0.22	3.26
New York City	12.31	3.36	32.34	43	12	3.49	9.17

MODE OF TRANSPORTATION TO WORK

Tables 5 and 6 displays the mode of transportation to work for total workers by the total number of workers from home in each borough, as well as New York City in its entirety, and by the percentage of total workers in each borough and New York City.

Tables 7 and 8 show the mode of transportation to work for the total workers over 65, by the total number of workers over 65 from home in each borough, as well as New York City in its entirety, and by the percentage of total workers over 65 in each borough and New York City.

Comparing tables 6 and 8 show that for transportation to work, the 65 and over group tended to drive more, use mass transit less and work at home more than the general population. For example: in New York City, 32.34 percent of total workers over 65 drove to work, as compared to 29 percent of total workers, 43 percent of total workers over 65 used mass transit as compared with 55 percent of total workers, and 9.17 percent of total workers over 65 worked at home as compared to 4 percent of total workers.¹⁶ This data shows that older adults use public transit less than their younger counterparts and are likely to depend on driving as a mode of transportation.

SUMMARY

As previously noted, the United States is only one of the many countries that are experiencing a shift in demographics. This shift in demographics will provide challenges for people and will change the way mobility needs are addressed. The aging populations in all five boroughs will increase significantly by 2030. Current mobility trends indicate that there will be an increased demand for accessible mobility options to address the needs of the current aging younger cohorts as they grow older. People who are approaching the over age 65 cohort have been drivers throughout their adult lives. As aging progresses, the physical disabilities that are natural and common with age will begin, and lead to mobility challenges for older adults. Without practical alternatives to driving, mobility will be compromised for them. With data regarding existing trends and demographics we will be able to address those mobility needs.

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

II. Challenges To Mobility For An Aging Population

Aging is a complex natural process potentially involving every molecule, cell and organ in the body. It can be defined as a progressive functional decline or gradual deterioration of physiological function with age, resulting in the intrinsic loss of viability and increase in vulnerability.

For seniors, mobility impairments can result from many of the natural results of aging. Loss of vision, hearing, reaction time, muscle strength, sense of balance, reduced flexibility, and cognitive skills such as memory, thought patterns, and speed of information processing are all affected by the aging process and in turn greatly impact mobility. Functional limitations as well as medication for chronic conditions can cause older adults to be at increased risk of falls, which according to New York City Department of Health is the leading cause of injury and death among the elderly.¹

As we plan for a future New York that preserves the quality of life for all New Yorkers, we must make sure our plans take into account these many risks and challenges unique to our growing senior population. As we consider the design of our infrastructure, our city services, and our neighborhoods, we can incorporate design principles that assist in accommodating the widest range of New Yorkers. Some of these challenges are:

- Pedestrians face the challenge of visibility impairments. These impairments are effected in part by the signals and lights at crosswalks and intersections, the time it takes for drivers to yield and brake at intersections, and the time it takes for a pedestrian to cross an intersection. This leads to a need for an alternative mode of transportation for those who are auto-dependent or an improvement of our current roadways as seen in the Showcase Roadway Project (Detroit, MI), the incorporation of pedestrian signs and sign visibility using flashing beacons or ground flashers as in the LED Crosswalk Signs (Naval Station Mayport, FL or San Jose, CA) or even the installation of pedestrian-actuated crosswalk flashers

¹ New York City Department of Health and Mental Hygiene. "City Health information: Preventing Falls in Older Adults in the Community."

(Kirkland, WA).

- Higher speed rates of moving vehicles prohibits people from crossing streets in a timely manner and keeping a safe distance between seniors and vehicles, leading to a need for reducing speeds, which results in a safer environment as in 20MPH Zones (London, UK).
- Driving visibility impairments involving recognizing signage and cognitive disabilities leading to providing incentives for seniors to make alternative transportation decisions when driving is no longer a safe choice as in Elderly Licensing and Labeling Safety Policies (Tokyo, Japan).
- Access to mass transit, especially the issues of rider subscription, rider satisfaction, trip efficiency, and affordability, are addressed through practices of the removal of all steps or barriers at sites of public transportation, the provision of alternative access at train stations, and newly constructed models that must ensure ADA-compliance in Step-Free Access (London, UK) and Access at the MBTA (Boston, MA).
- The affordability and accessibility of alternative forms of transportation is provided for by the practice of accessible taxis (London, UK) and a privately-run on a volunteer basis program - ITN Portland-Dignified Transportation Services (Portland, ME).
- The distance between seniors and the people that can assist them, the inclusion of design in relation to safety, accessibility, and creation of sustainable neighborhoods (Massachusetts), and the incorporation of universal design into policy (Norway) to both reconfigure and change the physical environment creating and encouraging an age-friendly environment for everyone are identified with zoning and Complete Streets strategies, and are addressed by a transit-oriented development that includes market-rate rental housing, senior independent living units and elderly assisted-living units near public transportation facilities as in Russellville Park Transit-Oriented Development (Portland, OR) or encouraging the use of accessory dwelling units (Portland, OR).
- Senior participation, the engagement of older adults in

healthier lifestyles, keeping seniors active and mobile, and incorporating technology will be addressed by innovative technologies (Japan) and educational programs such as programs through the Parks and Recreation Department, Active Aging Programs (Portland, OR) or identifying the need to better educationally outfit older adults with a driver's knowledge of his or her vehicle in the CarFit Program (United States).

Since reaction time and vision are among the two primary abilities that tend to decrease with age, enhanced wayfinding and street design will be explored in the Case Studies section as well. Additionally, improved signage for drivers and innovative technologies that can aid elderly drivers will also be discussed further as current practices are examined in the next part of the report.

The case studies section of the report that follows is divided into the categories listed below. Within each section are current practices illustrating innovative solutions in transportation, mobility and accessibility for an aging population that are currently in place within cities in the United States and other world cities.

The Driving - Roadway Improvements and Licensing Policy Changes section of this study is comprised of three case studies:

- The Showcase Roadway Project in Detroit, Michigan, shows how improved signage can make a difference.
- The 20 MPH Zones in the United Kingdom illustrates how lower speeds greatly reduce serious injuries and fatalities.
- The Regulation of Elderly Licensing and the Vehicle Labeling Policy in Tokyo, Japan, are examples of setting new requirements for older drivers.

The Public Transportation, Taxis and For-Hire Vehicles section consists of four case studies:

- Step-Free Access in London, England, focuses on making adjustments to London's underground rail system to provide step-free access.
- Access at the Massachusetts Bay Transportation Authority (MBTA) in Boston, Massachusetts, is an example of how a class action lawsuit had a major impact on MBTA and other

- transit systems across the country.
- Accessible Taxis in London, England, include three taxi programs that provide alternative modes of transportation with on-demand options.
- The Independent Transportation Network in Portland, Maine, expands transit options by providing on-demand transportation by both paid and volunteer drivers.

The Pedestrian Improvements – Signage and Crosswalk Changes section is composed of three case studies:

- LED Crosswalk Signs in Naval Station Mayport, Florida, address the challenges of sign visibility at crosswalks and intersections.
- Flashing Beacons and Ground Flashers in San Jose California, observe yielding and braking at intersections in order to provide more safety at crosswalks.
- Pedestrian Actuated Crosswalk Flashers in Kirkland, Washington, are geared towards increasing safety by highlighting crosswalks.

Planning Tools - Smart Growth and Street Design section considers four case studies:

- Smart Growth and Transit-Oriented Development in Portland, Oregon, presents a policy of integrating housing, transportation and environmental policies.
- The Russellville Park Transit-Oriented Development in Portland, Oregon, is an example of transit-oriented development specifically aimed at growth designed for seniors.
- Complete Streets Policy in Massachusetts promotes safely designed streets to benefit all users.
- Universal Design in Norway applies the principles of Universal Design to the planning design of places, transportation facilities, and information technologies so as to be usable by all people.

Innovative Technologies and Educational Programs explore three case studies:

- Active Aging programs in Portland, Oregon, provide programs for older adults that encourage cycling and walking to keep them mobile.
- The Car-Fit Program in the United States is an educational program that offers older adults the opportunity to check how well their vehicles fit them to attain maximum comfort and safety.
- Pedestrian Navigation System in Japan incorporates technology to help older adults to navigate their surroundings safely whether they are driving, utilizing public transportation, or making other drivers aware of their presence.

