6.0 Hazard Vulnerability

In January 2018, the Orange County CEPA risk assessment was completed to identify the hazards with the highest potential to impact the County and associated jurisdictions.   This information was used to guide the subsequent ranking of such hazards in order of the most severe and/or frequently occurring type, to help determine the highest priority of need with respect to implementation of pre-disaster action, and to guide the focus for recommendations and mitigation actions to be included in this HMP Update.   After these pertinent hazards were identified and profiled, the vulnerability assessment, as described below, was completed to provide a quantitative estimate of the people and property that may be susceptible to a particular hazard event.

Each City, Town, and Village was asked to provide information concerning the occurrence of hazards in their community and to help identify what areas these hazards affected.   This information was combined with information provided by FEMA, via the FEMA website, and from the NYSDHSES with respect to relative cost of damages reported for various declared disaster events in New York State.

6.1   Identify Assets

Critical facilities identified within Orange County include, but are not limited to, the Orange County Emergency Operations Center, schools, fire departments, hospitals, medical centers, County and municipal highway garages, government agencies, municipal offices, police departments, local operational offices for telephone and electrical power utilities, airports, water supply facilities, waste water treatment facilities, etc.   These facilities represent the critical assets located within the County.   For the purpose of this planning document, lists of these critical facilities were prepared using information provided by the County, Cities, Towns, and Villages and are provided in Sections 2.8, 7.5, and 10.2 in each jurisdiction's respective annex.

6.2   Damage Potential

The damage potential for housing within Orange County was estimated using housing characteristics and housing values reported by the U.S.   Census Bureau's American Fact Finder.   In 2014, 125,000 occupied housing units were identified in Orange County; 87,000 (70 percent) were owner occupied and 38,000 (30 percent) were renter occupied.   These numbers represent a 9.8 percent vacancy rate among existing residential structures in the County.   Tables 6.2a, 6.2b, and 6.2c, below, further detail the housing type and values reported for the County.

Table 6.2a: Housing Types *(2010-2014 American Community Survey – U.S. Census Bureau)*	
Type of housing	Percent of Total Occupied Housing Units in County
Single unit structures	68.8%
Multi-unit structures	28.7%
Mobile homes	2.5%

Table 6.2b: Age of Structures *(2010-2014 American Community Survey – U.S. Census Bureau)*	
Structure Built Date	Percent of Total Owner Occupied Housing Units in County
2010 or later	0.9%
2000 – 2009	7.7%
1980 – 1999	25.2%
1960-1979	25.6%
1940-1959	13.3%
1939 or prior	28.1%

Table 6.2c: Housing Values *(2007-2011 American Community Survey – U.S. Census Bureau)*	
Value	Percent of Total Owner Occupied Housing Units in County
$50,000 or less	7.8%
$50,000 - $99,000	12.6%
$100,000 - $149,000	21.2%
$150,000 - $199,000	20.3%
$200,000 - $299,000	22.2%
$300,000 - $499,000	12.4%
$500,000 or greater	3.3%

These data reveal that housing construction in Orange County has been relatively consistent since 1960, with roughly 12 percent of the County's total housing stock being built in each of the following decades. A considerable amount, 39.5 percent, of residential infrastructure in the County was constructed before 1960 and 25.1 percent before 1940. Older houses are typically more susceptible to impacts or damage from an ice storm, winter storm, windstorm, fire event, etc., 2.5 percent of occupied housing in Orange County is represented by mobile homes that also are more vulnerable to damage from major disasters. In addition, nearly 10 percent of all housing within the County remains unoccupied. Vacant structures and properties often fall into a state of disrepair, making them more susceptible to damage from storm events.

The approximate median value of an occupied housing unit in Orange County is $268,500. If one percent (869 units) of the total occupied housing units in Orange County were demolished by a severe storm event, a tornado for example, the potential value of damage could amount to $351,289,974. Granted, natural storm damage does not typically amount to complete destruction of homes in Orange County, but this scenario does demonstrate how significant the damage has the potential to be when only a limited amount of total infrastructure within the County is affected. Even if one percent of houses in the County each sustained only $1,000 in minor damage from a storm event, it would still amount to a considerable sum: $869,000.

6.3   Development Trends

The growth rate of the population and households has a direct impact on the County's land use patterns and, by extension, natural hazard vulnerability.   Increasing numbers of single family homes and commercial developments outside urban areas has required conversion of farmland and open space into other uses.   The County will continue to grow – some areas will grow more rapidly than others.   According to the 2010 Orange County Comprehensive Plan areas where growth may be expected to be more rapid are those which are located in close proximity to Routes I-87, I-84 and NY 17 (soon to be I-86).   The Towns of Monroe, Montgomery, Newburgh, Wallkill and Warwick are among the more populated and are anticipated to see continued growth.

Among the most striking growth trends in all of New York State is occurring the Orange County Village of Kiryas Joel – a predominantly Satmar Hasidic community.   The Village's population of about 22,000 is a 70 percent increase over the 2000 population of 13,138.   Furthermore, an August 2015 report on the Village's proposed annexation by CGR, Inc.   for Orange County estimates the Village population in 2025 of 39,700 and in 2040 of 80,000.   The County has also commissioned another study to recommend how to increase sewage treatment capacity in southeastern Orange County by at least three million gallons per day to accommodate this growth.

The 2010 Orange County Comprehensive Plan points out that if current trends continue much of the residential development in the next twenty years will occur in Monroe, Chester, Warwick, Blooming Grove, Woodbury, Montgomery and New Windsor – areas that have experienced sustained development in the past.   Other areas like Deerpark, Greenville, Wawayanda, Minisink and Mount Hope are also likely to experience growth in residential development, though as the existing population base is relatively small these increases will not represent as many new residents as in the larger towns.   Large-scale residential developments in the southeastern part of the County could further skew the geographic distribution of growth over the next decade.   Since housing construction in the County's villages and cities is generally in-fill or redevelopment, units in these areas don't represent large-scale conversion of vacant or agricultural land – except in the case of potential annexation.

The 2010 Comprehensive Plan also illustrates priority growth areas within the County.   These areas are illustrated on Figure 6.3a on the following page.

In general, historic and future growth patterns for such uses are expected to mirror the availability of public infrastructure and services.   The primary elements of this infrastructure are roads and centralized sewer and water.

Figure 6.3a: Priority Growth Areas in Orange County
(Orange County Planning Department, 2010)
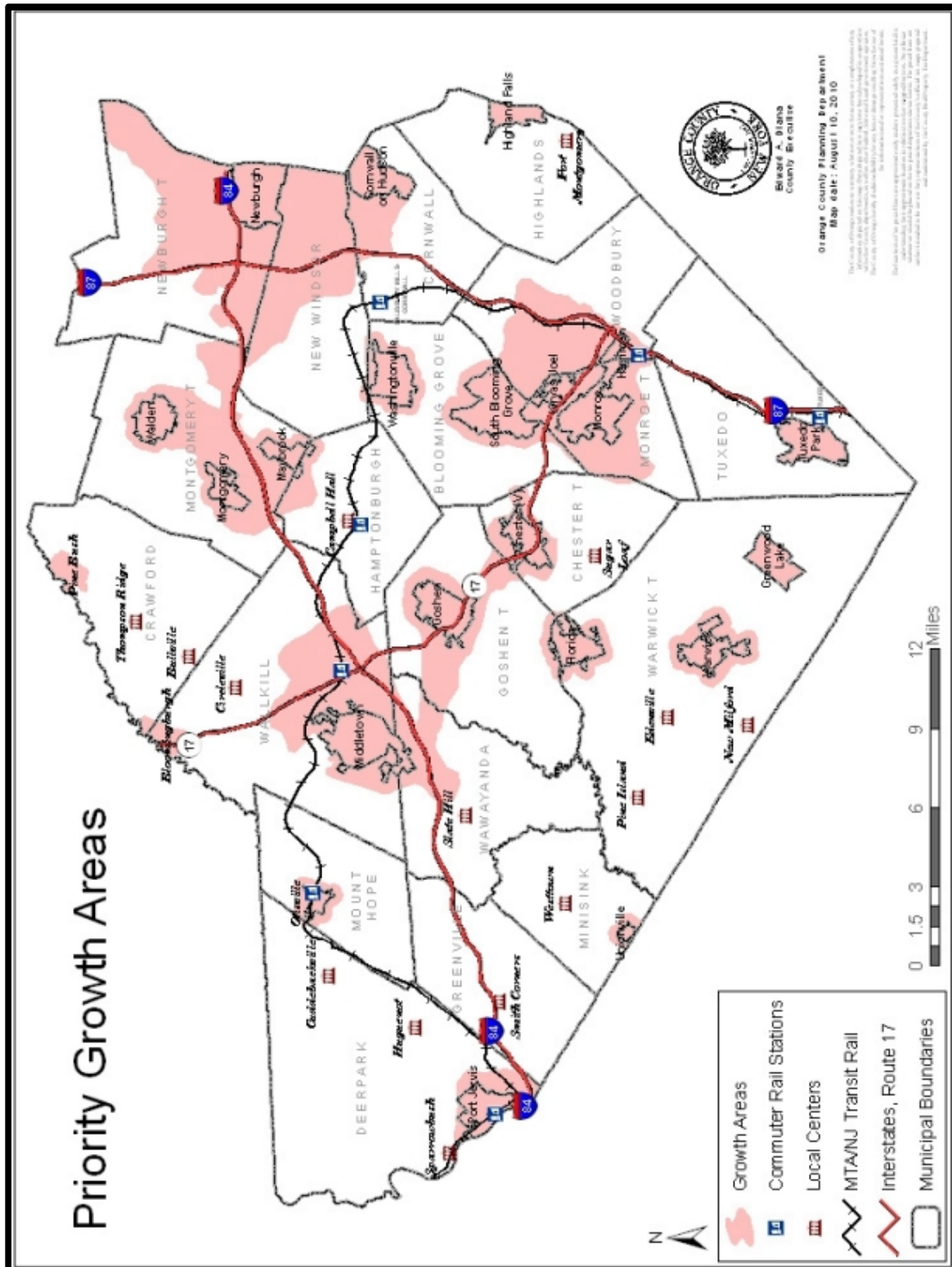
6.3.1 Vulnerable Populations

According to the 2009-2013 American Community Survey, over 68,000 people are considered "vulnerable populations" based on age – that is, age cohorts under the age of 5 and age 65 and over. This accounts for 18.3 percent of the total county population. The municipalities with the highest percentage of vulnerable populations include the Town of Tuxedo, Village of Goshen, and the Village of Kiryas Joel at 23.5, 23.5, and 24.4 percent respectively. The two municipalities with the lowest percentage of vulnerable populations include the Towns of Highlands and Mount Hope at 10.5 and 10.8 percent respectively.

Senior citizen centers are located across Orange County. However, the County Office for the Aging is located in the City of Middletown in the center of the County.

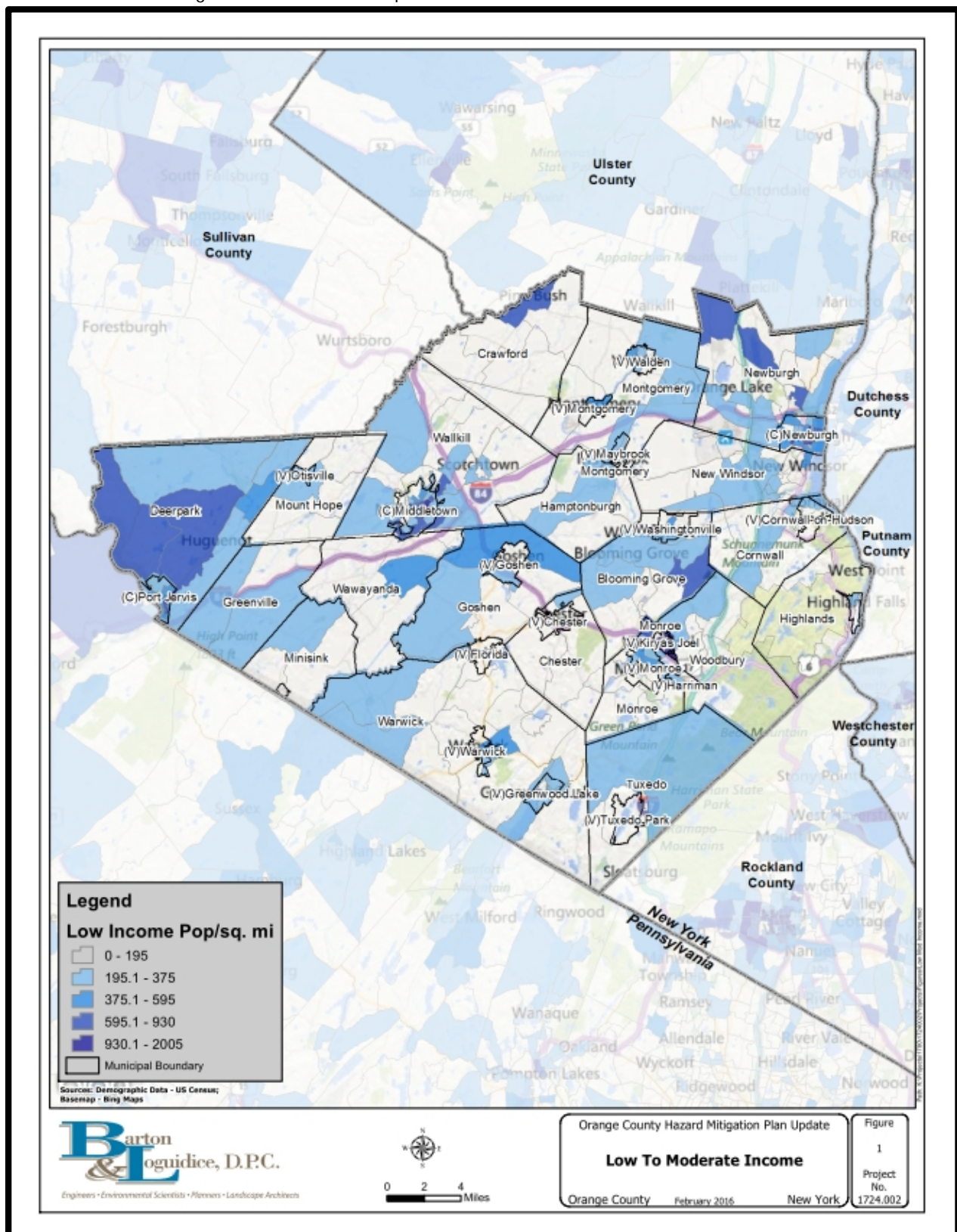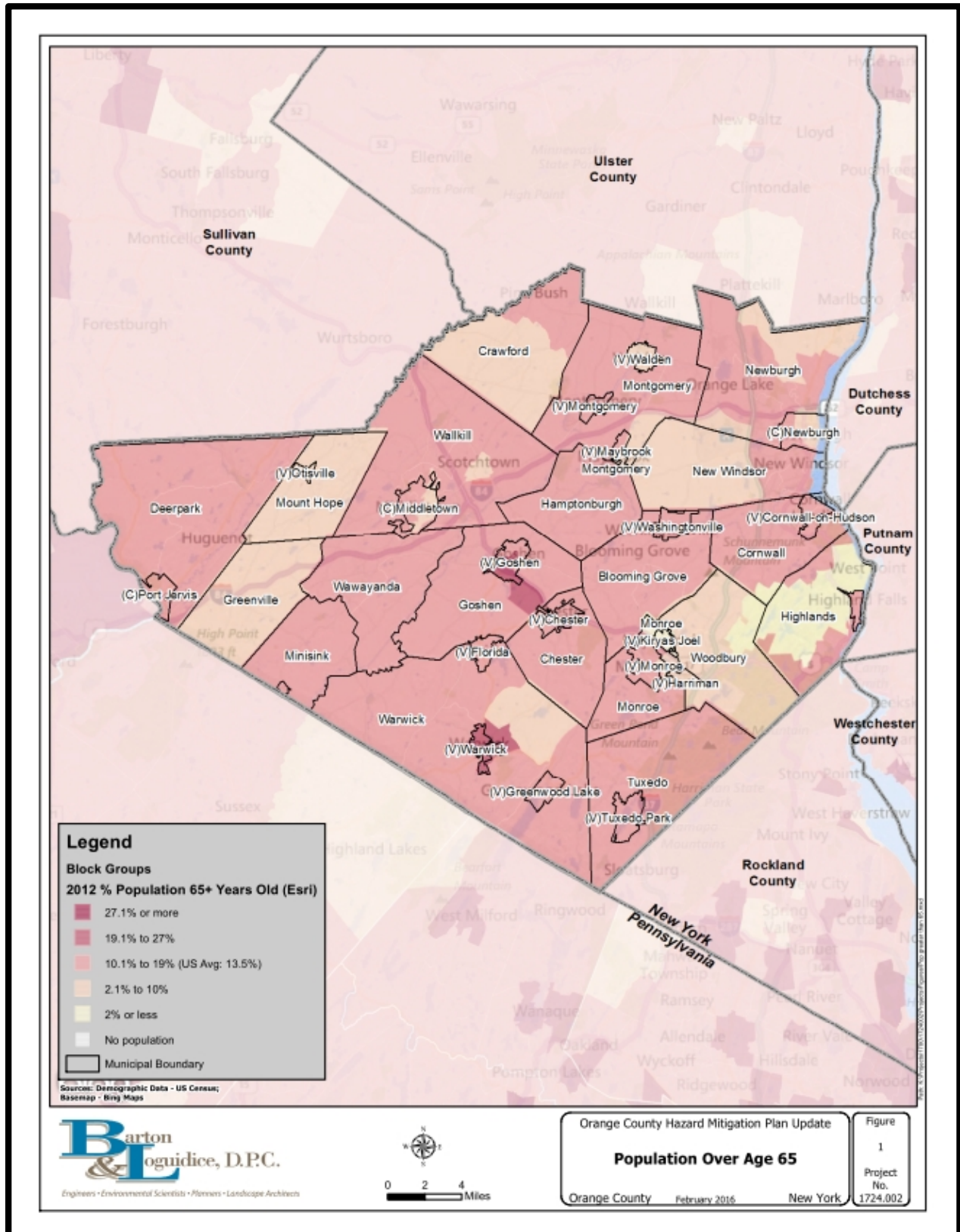Figure 6.3b: Vulnerable Populations: Low-to-Moderate Income Households

Figure 6.3c: Vulnerable Populations: Population 65 Years of Age and Older

6.3.2 Crude Oil Trains and Natural Gas Pipelines

A recent study in the Hudson River Valley by the NYS Water Resources Institute found that while most communities are aware that oil trains pass through their communities and have some form of emergency plans, most communities rely on local volunteer emergency services that may not have the capacity to respond if major accidents happen.

Crude oil transport by rail has increased dramatically since 2010.   Many Orange County communities such as Newburgh, New Windsor, and Cornwall-on-Hudson are located along the routes where oil trains travel every day.   There are increased risks to communities traversed by crude oil trains.   Although train accidents have detrimental environmental, human and economic consequences, prior research that assesses whether communities have adequate emergency preparations is limited.

In August 2014, the Orange County Legislature passed a resolution expressing concerns about transporting crude oil by rail, barge and ship and calling on federal and state agencies to enact stringent rules and regulations for such transport.   The resolution also urged and encouraged the exploration of alternative means for the transportation and distribution of crude oil.

Oil trains traverse several densely-populated areas of Orange County particularly along the Hudson River shoreline communities.   The nationwide volume of crude oil transported by rail has increased from 9,500 carloads in 2008 to 400,000 carloads by 2013.   As much as 20% of the crude oil from the Bakken formation makes its way through New York State communities and has proven to be more explosive and corrosive than typical crude.

Natural gas pipelines are also of concern in Orange County.   The Millennium Pipeline cuts across the western and southern towns of Orange County, a CPV Valley Energy Center electric generation facility is located in the Town of Wawayanda and a natural gas compressor station is located in the Town of Minisink.   Local concerns regarding this lines and stations include terrorism, flooding impacts, and emergency response.