SECTION 4 COUNTY PROFILE

This profile provides general information for Putnam County and critical facilities located within the county. This in addition to an examination of Putnam County's history, governance, physical setting, population and demographics, general building stock, land use, and population trends can lead to a better understanding of the study area, including economic, structural, and population assets at risk as related to the impacts of the hazards of concern identified in this plan.

4.1 GENERAL INFORMATION

Putnam County was formed in 1812 from Dutchess County. It is one of the most affluent counties in the U.S., ranked 7th by median household income. Putnam County covers over 240 square miles and is home to an estimated population of 99,070 residents as of 2018. The County is one of the 62 counties in New York State and is comprised of six towns and three incorporated villages. Putnam County is the 29th most populated County in the State and ranks 55th in total land area.

Putnam County Political Jurisdictions

Towns	Villages
Carmel	Brewster
Kent	Cold Spring
Patterson	Nelsonville
Philipstown	
Putnam Valley	
Southeast	

The County contains six town governments, three village governments, and the County government. State and federal government statutes and regulations control how the local governments operate. The town and village governments include the towns of Carmel, Kent, Patterson, Philipstown, Putnam Valley and Southeast, and the villages of Brewster, Cold Spring and Nelsonville. The County and each municipality operate under the limits prescribed by various rules and laws of New York State. Each government entity has various responsibilities, funding sources, staffing levels, elected positions, and administrative capacities (Putnam County Division of Planning and Development 2010).

4.2 MAJOR PAST HAZARD EVENTS

To understand the context of hazards that present a potential for significant impacts to the health, safety, and economy of the County, a history or presidentially declared disaster events is provided in this section. Presidential disaster declarations are issued for hazard events that cause more damage than state and local governments can handle without assistance from the federal government. These are independent of specific dollar loss thresholds per event. Presidential disaster declarations operationalizes federal recovery programs to assist disaster victims, businesses and public entities. In addition, a review of presidential disaster declarations helps establish the probability of reoccurrence for each hazard and identify targets for risk reduction. Table 4.2-1 shows FEMA disaster declarations that have included Putnam County through 2020 (records date back to 1954).

Table 4.2-1. History of Hazard Events in Putnam County, New York

Disaster Number	Declaration Date	Event Date	Incident Type	Title
DR-4480	3/20/2020	January 20, 2020 -- Ongoing	Biological	COVID-19 Pandemic
EM-3434	3/13/2020	January 20, 2020 -- Ongoing	Biological	COVID-19
DR-4085	10/30/2012	October 27, 2012 -- November 8, 2012	Hurricane	Hurricane Sandy
EM-3351	10/28/2012	October 27, 2012 -- November 8, 2012	Hurricane	Hurricane Sandy

Disaster Number	Declaration Date	Event Date	Incident Type	Title
DR-4020	8/31/2011	August 26, 2011 -- September 5, 2011	Hurricane	Hurricane Irene
EM-3328	8/26/2011	August 25, 2011 -- September 5, 2011	Hurricane	Hurricane Irene
EM-3299	12/18/2008	December 11, 2008 -- December 31, 2008	Severe Storm(s)	Severe Winter storm
DR-1692	4/24/2007	April 14, 2007 -- April 18, 2007	Severe Storm(s)	Severe Storms and Inland Coastal Flooding
EM-3262	9/30/2005	August 29, 2005 -- October 1, 2005	Hurricane	Hurricane Katrina Evacuation
DR-1589	4/19/2005	April 2, 2005 -- April 4, 2005	Severe Storm(s)	Severe Storms and Flooding
DR-1534	8/3/2004	May 13, 2004 -- June 17, 2004	Severe Storm(s)	Severe Storms and Flooding
EM-3186	8/23/2003	August 14, 2003 -- August 16, 2003	Other	Power Outage
EM-3184	3/27/2003	February 17, 2003 -- February 18, 2003	Snow	Snow
DR-1391	9/11/2001	September 11, 2001	Fire	Fires and Explosions
EM-3155	10/11/2000	May 22, 2000 -- November 1, 2000	Other	West Nile Virus
DR-1296	9/19/1999	September 16, 1999 -- September 18, 1999	Hurricane	Hurricane Floyd Major Disaster Declaration
EM-3149	9/18/1999	September 16, 1999 -- September 18, 1999	Hurricane	Hurricane Floyd Disaster Declaration
DR-1095	1/24/1996	January 19, 1996 -- January 30, 1996	Flood	Severe Storms and Flooding
DR-1083	1/12/1996	January 6, 1996 -- January 12, 1996	Snow	Blizzard of '96 (Severe Snow Storm)
EM-3107	3/17/1993	March 13, 1993 -- March 17, 1993	Snow	Severe Blizzard
DR-801	11/10/1987	October 4, 1987	Snow	Severe Winter Storm
DR-487	10/2/1975	October 2, 1975	Flood	Storms, Rains, Landslides, and Flooding
DR-311	9/13/1971	September 13, 1971	Flood	Severe Storms & Flooding
DR-204	8/18/1965	August 18, 1965	Drought	Water Shortage

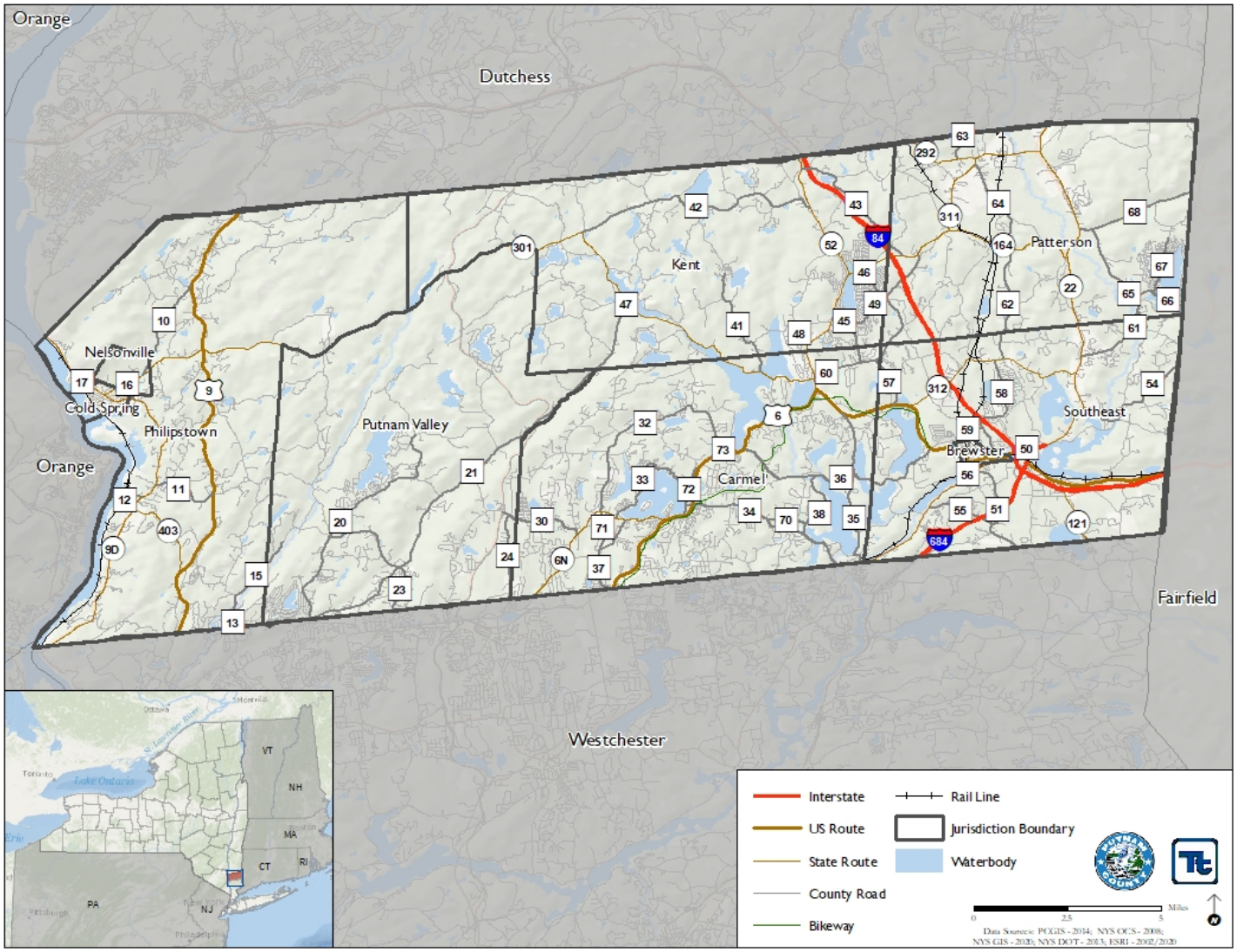
4.3 PHYSICAL SETTING

This section presents the physical setting of the county, including land use/land cover, location, climate, hydrography and hydrology, topography and geology.

4.3.1 Location

Putnam County is located in the Mid-Hudson Region of New York State. It is approximately 50 miles north of New York City and is on the outer ring of the New York City metropolitan area. The County is bordered to the west by the Hudson River, to the north by Dutchess County, to the east by the State of Connecticut, and to the south by Westchester County. The County is included in the New York-Newark-Jersey City, NY-NJ-PA Metropolitan Statistical Area.

Figure 4.3-1. Location of Putnam County, New York and its Municipalities



4.3.2 Topography and Geology

Putnam County is located in the southeastern part of New York State, between the Hudson River on its western border and the New York State-Connecticut border on its east. The County is largely within the New England uplands physiographic province. The New England uplands area is geologically complex and exhibits moderate relief. Landforms in this area show a strong correlation to the relative hardness of the underlying bedrock. Elevation ranges from 200 to 500 feet above mean sea level in southern Westchester County and is more than 1,000 feet in the Hudson Highlands. The Highlands extend from the southwest corner of Rockland County, which is west of the Hudson River, through northern Westchester County and into Putnam County (Putnam County Division of Planning and Development 2010).

Approximately three-quarters of Putnam County lie within the New York City Watershed, which is described later in this profile. More than nine-tenths of the County's land area is part of the Hudson Highlands, which extend from the northern Housatonic Valley of Connecticut into New Jersey and Pennsylvania. The remainder of the County is part of a metamorphic geological formation known as the Manhattan Prong. This area is found in the northeast and southeast corners of the County (Putnam County Division of Planning and Development 2010).

Putnam County's highest elevation is in the Town of Philipstown at Scofield Ridge (1,540 feet above sea level) (Peakbagger.com 2020). The Towns of Philipstown and Putnam Valley and the western part of the Town of Kent have the most rugged terrain, with many high peaks having elevations of over 1,000 feet. There are several ranges in these municipalities which are significant because they form a natural east-west barrier. These ranges are separated by Peekskill Hollow Creek. The first range is known as Granite Mountain and is located west of the Creek. Moving towards the north, elevations increase up to 1,100 feet above sea level (Putnam County Division of Planning and Development 2010).

The northern and western borders of the County are similar due to the number of high peaks. These peaks range from Mount Ninham in the Town of Kent (elevation of 1,270 feet above sea level) to Birch Hill in the Town of Patterson which reaches 1,260 feet above sea level (Putnam County Division of Planning and Development 2010). The Towns of Carmel, Southeast, Patterson and the eastern portion of the Town of Kent, while all retaining still relatively high peaks and variable relief, maintain more of a consistent terrain characterized by a greater number of more level parcels (Putnam County Division of Planning and Development 2010).

4.3.3 Hydrography and Hydrology

Numerous ponds, lakes, creeks, and rivers make up the waterscape of Putnam County. The major waterways within the County include East Branch Reservoir, West Branch Reservoir, Croton Falls Reservoir, East Branch Croton River, West Branch Croton River, Canopus Creek, and the Hudson River. The eastern half of Putnam County is drained by tributaries of the Croton River. The western half is drained by streams flowing directly into the Hudson River or by tributaries of Canopus and Peekskill Hollow Creeks. The major streams in the County generally follow pre-glacial stream valleys whose alignment was determined by the structure or hardness of the underlying bedrock (USDA 1994).

Watershed Location

Putnam County is located in the Lower Hudson Watershed (Figure 4-3). The Lower Hudson Watershed makes up approximately 40% of the larger Hudson/Mohawk River Basin, which is one of the largest drainage areas on the eastern seaboard of the U.S. The Lower Hudson Watershed extends from the Battery at the southern end of Manhattan to the Troy Dam at the confluence of the Mohawk River. This watershed covers 4,982 square miles of land and contains 8,861 miles of freshwater rivers and streams. There are 324 significant freshwater lakes, ponds and reservoirs located within the Watershed that include: Ashokan Reservoir, Rondout Reservoir, New

Croton Reservoir, Alcove Reservoir, Cross River Reservoir, and Muscoot/Upper New Croton Reservoir (NYSDEC 2014).

Croton Watershed

Putnam County is located in the Croton Watershed (Figure 4.3-2) which makes up a portion of the New York City Watershed (Figure 4-4). Over 9 million people live in New York City, Westchester, Putnam, Orange, and Ulster Counties and most get their drinking water from the Croton, Catskill and Delaware watersheds. The 6,000-mile network of pipes, shafts, and subterranean aqueducts carry an average of 1.2 billion gallons of water each day from 19 upstate reservoirs (Riverkeeper 2014). Most of the waterbodies (Croton Falls Reservoir, Diverting Reservoir, Bog Brook Reservoir, East Branch Reservoir, Middle Branch Reservoir, and Kirk Lake) within the Croton Watershed are located within the Croton System; the remainder (Boyds Corner Reservoir, West Branch Reservoir, and Lake Gleneida) are part of the Catskill/Delaware System in Putnam County.

Figure 4.3-2. Croton Watershed

Source: New York City Department of Environmental Protection 2007

4.3.4 Climate

Putnam County has a continental climate wherein airflow and weather systems that affect the area are primarily of continental origin. The climate also is designated as humid because the major circulation patterns of the atmosphere carry generous quantities of moisture toward the northeastern U.S. (USDA 2004). The climate of Putnam County is one of long summers and short winters. The average annual temperature is approximately 50°F, with extremes varying from -24°F to 106°F. The average annual precipitation for the County is approximately 45 inches with observed annual extremes ranging from 29.54 to 68.31 inches. The distribution of precipitation throughout the year is fairly uniform with slightly higher amounts during the summer months (FEMA FIS 2013).

4.3.5 Land Use and Land Cover

The most dominant land uses in Putnam County are forested land, wetlands, undeveloped vacant land, and waterbodies. Residential is the next largest land use in the County (Putnam County Division of Planning and Development 2010).

Residential land uses are typically represented by single-family, detached homes in Putnam County. More concentrated areas of residential development occur in the County's three villages, lake communities, and several condominium complexes (Putnam County Division of Planning and Development 2010).

Forested land, wetlands, vacant land and waterbodies are found throughout Putnam County. Large blocks of forested and vacant land are typically found in the western and northwestern portions of the County, while major lakes and reservoirs are found in the eastern part of the County (Putnam County Division of Planning and Development 2010).

Commercial and industrial land uses are found in and around the villages of the County and along State Routes 6, 9, 22, and 52. Commercial uses are also found at the intersections of Interstate 84 (I-84) and Route 312 and I-84 and Ludingtonville Road. Industrial uses are scattered throughout the County and include the hospital, government buildings, non-profit affiliated facilities, and schools. Significant blocks of land occupied by institutional uses are found in the Towns of Philipstown, Patterson, Kent, Putnam Valley, and Carmel (Putnam County Division of Planning and Development 2010).

Wetlands have a dramatic influence on Putnam County's past growth patterns; they are found throughout the County. New York State delineated wetlands of 12.4 acres or more are found in all municipalities of Putnam County. Smaller local wetland areas have been regulated in all the municipalities, at varying degrees. The most significant wetland in the County is the Great Swamp. The Great Swamp is a 4,200 acre wetland located in a 62,300 acre watershed that covers portions of New York State (specifically the Town of Patterson in Putnam County) and Connecticut (Putnam County Division of Planning and Development 2010).

Table 4.3-1 summarizes the land use for Putnam County. Figure 4.3-3 shows the distribution of land use throughout the County.

Table 4.3-1. Land Use Summary for Putnam County, 2016

Land Use	Total Acreage	Total Area (sq. mi.)	Percent of County (%)
Agricultural	3,994.1	6.2	2.5
Barren Land	275.8	.4	.2
Developed	26,564.6	41.5	16.9
Forest	107,407.5	167.8	68.1

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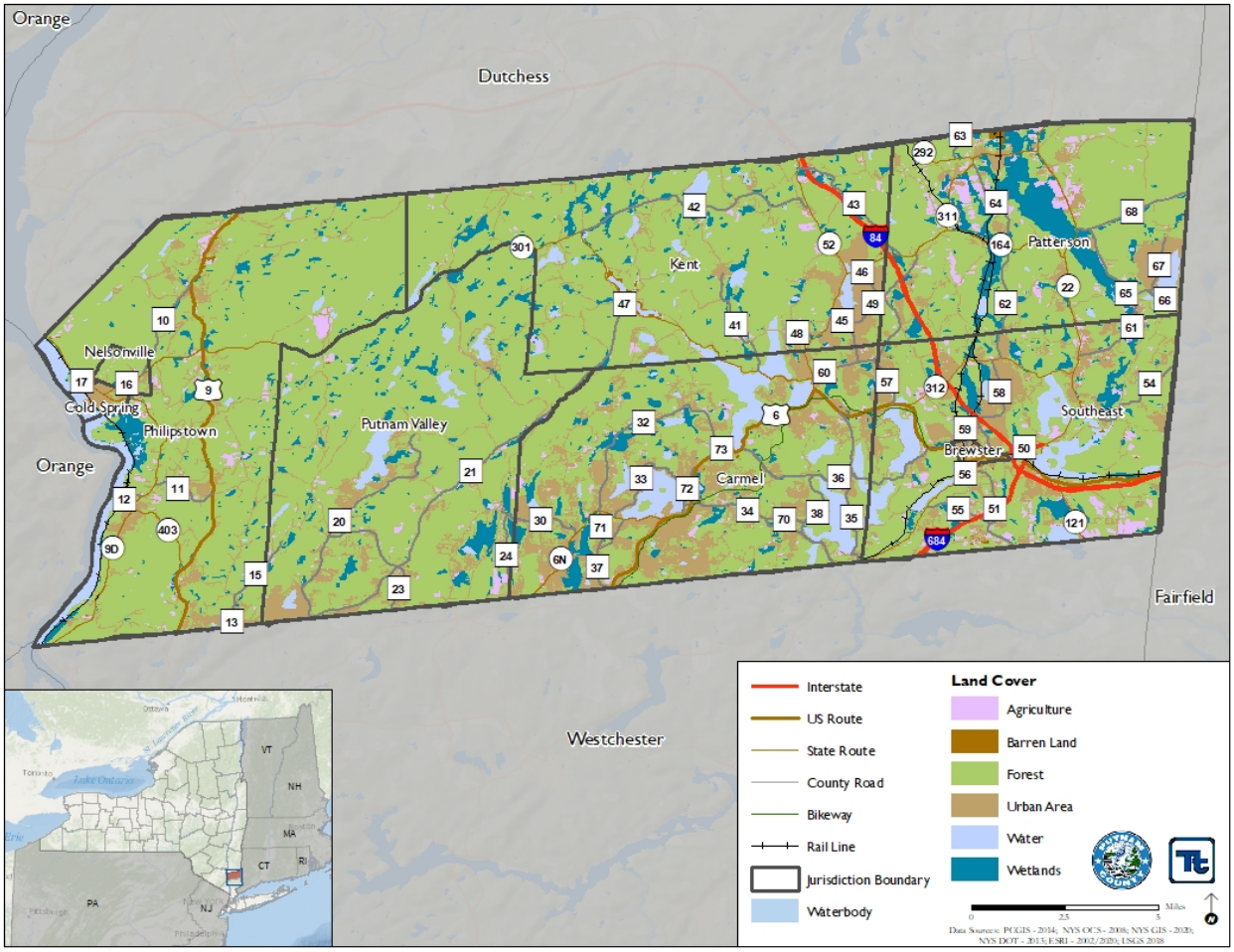
Land Use	Total Acreage	Total Area (sq. mi.)	Percent of County (%)
Water	9,090.5	14.2	5.8
Wetlands	10,279.9	16.1	6.5
Putnam County:	**157,610.9**	**246.2**	**100**

Source: USGS, 2016
Note: sq. mi. = square miles

Figure 4.3-3. 2016 Land Use in Putnam County, New York



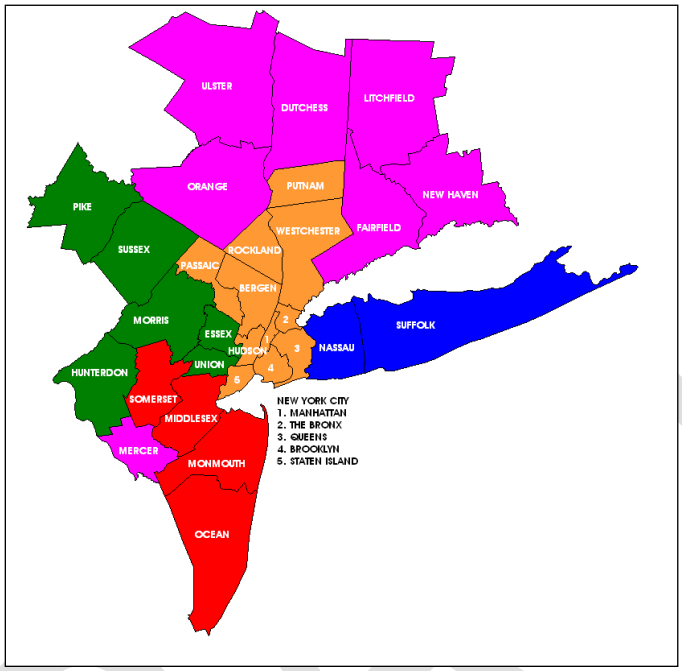
4.4 POPULATION AND DEMOGRAPHICS

4.4.1 Metropolitan/Urban Area Demographic

Putnam County is one of the 23 counties within the New York–Northern New Jersey–Long Island NY-NJ-PA Metropolitan Statistical Area, which is the most populous metropolitan area in the United States and the fourth most populous in the world. The largest urbanized area in the United States is at the heart of the metropolitan area, the New York-Newark, NY-NJ-CT Urbanized Area (with a 2010 population of 18,897,109 by the U.S. Census). With approximately 3,353 square miles of land, it is the largest urbanized area in the United States. It is also the fourth most densely populated urbanized area in the country, with 5,635 persons per square mile (as of the 2010 Census) (U.S. Census Bureau 2012). Based on commuting patterns, the Census Bureau also defines

a wider functional metropolitan area, the *New York-Newark-Bridgeport, NY-NJ-CT-PA* Combined Statistical Area with an estimated population of 22,085, (as of 2012). This metropolitan area is made up of five divisions as indicated in Figure 4.4-1. Despite its location within the New York-White Plains-Wayne, NY-NJ Metropolitan Division, Putnam County is not considered an Urban Area by the Census Bureau.

Figure 4.4-2. New York-Northern New Jersey-Long Island, NY-NJ-PA Metropolitan Statistical Area



Source: *U.S. Census, 2012*
Note: *Putnam County is located in the New York-White Plains-Wayne, NY-NJ Metropolitan Division (circle)*
New York-White Plains-Wayne, NY-NJ Metropolitan Division
Nassau-Suffolk, NY Metropolitan Division
Newark-Union, NJ-PA Metropolitan Division
Edison, NJ Metropolitan Division
Rest of the New York-Newark-Bridgeport, NY-NJ-CT Combined Statistical Area

According to the 2010 U.S. Census, Putnam County had a population of 99,710 people which represents a slight increase from the 2000 U.S. Census population of 95,745 people. Table 4.4-1 below shows population statistics for Putnam County based on the 2000 and 2010 U.S. Census data. The population of the County increased between 2000 and 2010, then declined somewhat between 2010 and 2018

Figure 4.4-3 shows the distribution of the general population in 2010 by Census block. For the purposes of this plan, the 5-year American Community Survey (ACS) estimates from the U.S. Census Bureau was used where the data was available and supplemented with HAZUS-MH data (representing 2010 data).

Additional population trends are reported in Section 4.5.2 of this document.

Various Census Bureau products were used as sources for the population trends section. The Decennial Census is the official population count taken every 10 years. American Community Survey 5-Year Estimates are used to show annual population changes, but it is not an official population county. 5-Year Estimates are used because they are the most accurate form of American Community Survey with the largest sample size which allows for greater accuracy at smaller geographic areas. The American Community Survey 5-Year Estimate products were used to establish annual changes in population. The numbers provided are not official census counts, but are official estimates provided to communities so that they may have a greater understanding in population changes within their jurisdictions.

Table 4.4-2. Population Statistics in Putnam County

Municipality	2000 Census	2010 Census	2018 ACS
Village of Brewster	2,162	2,390	2,087
Town of Carmel	33,006	34,305	34,227
Village of Cold Spring	1,983	2,013	1,862
Town of Kent	14,009	13,507	13,325
Village of Nelsonville	565	628	699
Town of Patterson	11,306	12,023	11,922
Town of Philipstown	6,874	7,021	7,163
Town of Putnam Valley	10,686	11,809	11,654
Town of Southeast	15,154	16,014	16,131
Putnam County (TOTAL)	**95,745**	**99,710**	**99,070**

Source: U.S. Census, 2000, 2010; American Community Survey 2018
Note that the 2018 population estimates should be considered a "moment in time" and should not be directly compared against the 2000 or 2010 Census totals due to differences in methodology.

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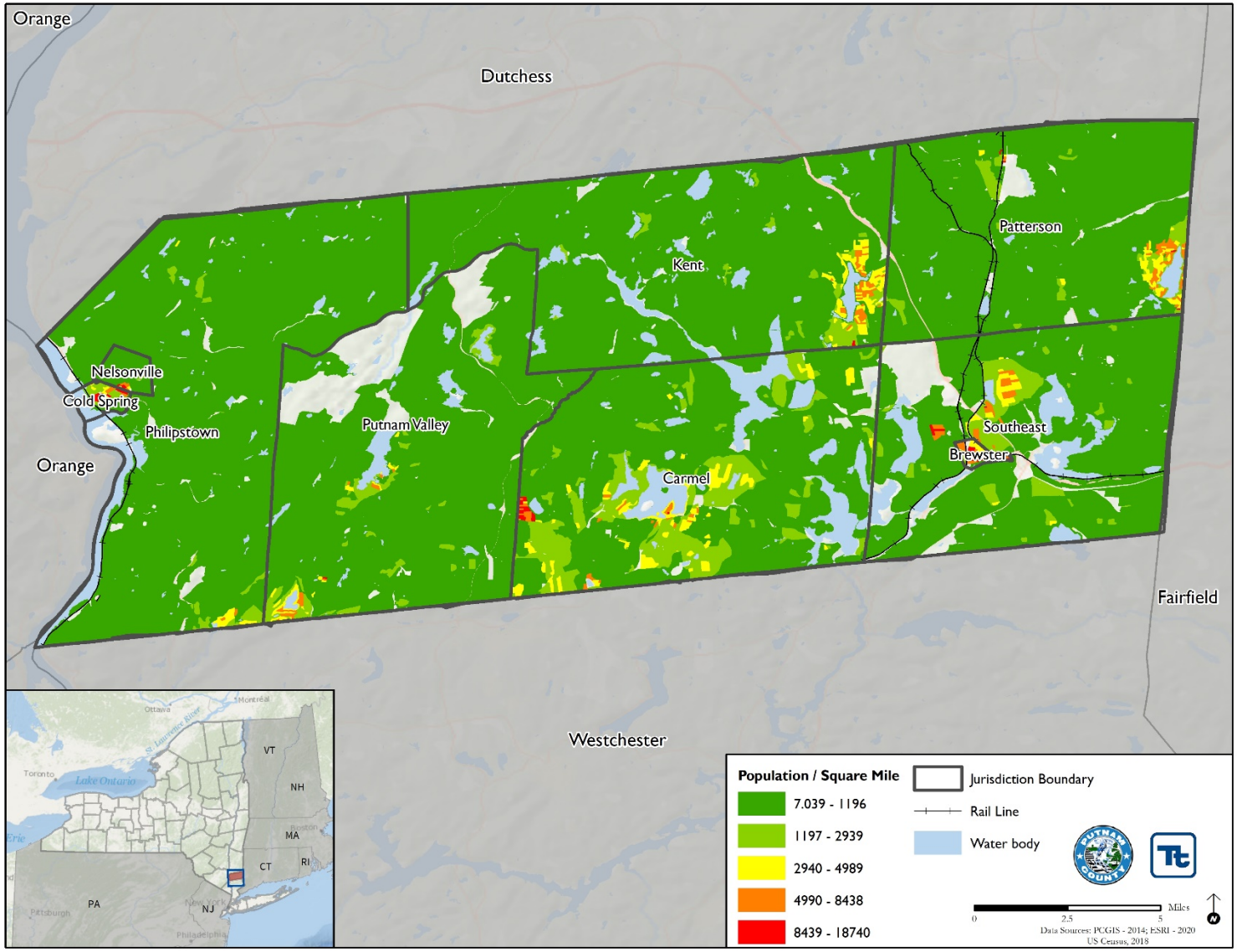
Figure 4.4-3. Distribution of General Population for Putnam County, New York



4.4.2 Population and Demographic Trends

This section discusses population trends to use as a basis for estimating future changes that could result from the seasonal character of the population and significantly change the character of the area. Population trends can provide a basis for making decisions on the type of mitigation approaches to consider and the locations in which these approaches should be applied. This information can also be used to support planning decisions regarding future development in vulnerable areas.

According to the U.S. Census Bureau, the 2010 population for Putnam County was 99,710 persons, which is a 4.0% increase from the 2000 Census population of 95,745. Over the last 110 years, from 1900 to 2010, the County has seen an overall growth in population, with the exception of 1920. The largest increase was seen between 1960 and 1970 when the County experienced a 78.7% increase (24,974 persons). The smallest increase was experienced from 2000 to 2010 when the County saw only a 4.1% increase in population. The largest decrease in population occurred from 1910 to 1920, with the County seeing a 26.3% decrease. Table 4.4-3 displays the population and change in population from 1900 to 2010 in Putnam County.

Putnam County's population totals do not account for the second home/seasonal population. While estimates for this number could not be found for this Planning Process, the 2018 American Community Survey data notes that nearly ten percent of homes in the County are vacant- a significant share of which may be due to seasonal use.

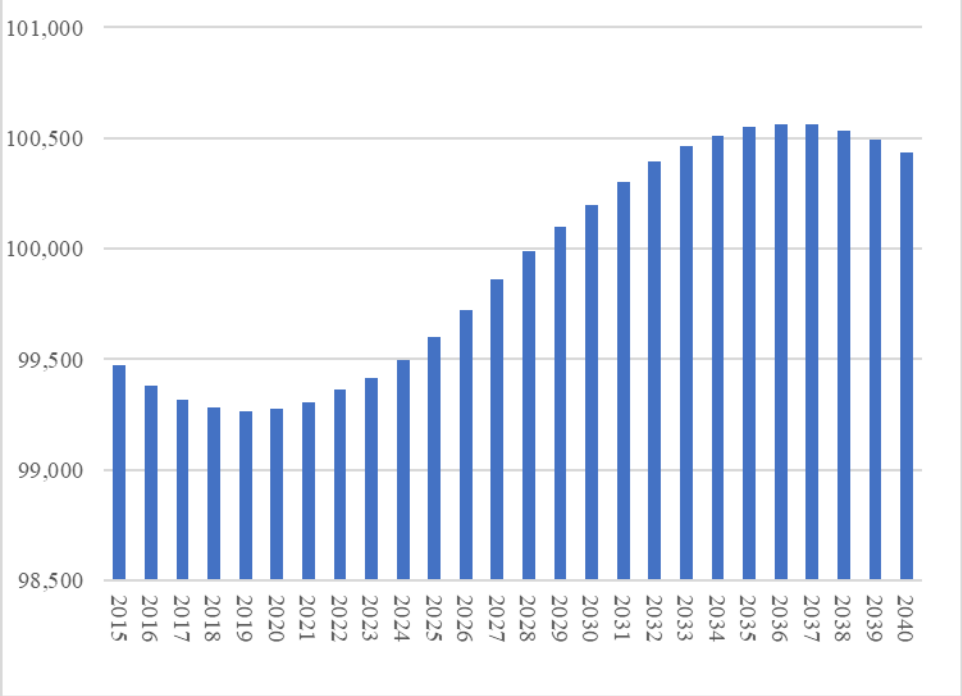
Table 4.4-3. Population Change in Putnam County

Year	Population	Change in Population	Percent (%) Population Change
1900	13,787	N/A	N/A
1910	14,665	878	6.4
1920	10,802	-3,863	-26.3
1930	13,744	2,942	27.2
1940	16,555	2,811	20.5
1950	20,307	3,752	22.7
1960	31,722	11,415	56.2
1970	56,696	24,974	78.7
1980	77,193	20,497	36.2
1990	83,941	6,748	8.7
2000	95,745	11,804	14.1
2010	99,710	3,965	4.1

Source: U.S. Census 1995; U.S. Census 2010
Note: Change in population and percent in population change were calculated from available data.

Cornell University's Program on Applied Demographics produced population projections by county and by age and sex for New York State. The projections were completed in 2018 and are available in one-year intervals up to the year 2040. The projections are based upon rates of change estimated from historic data. According to this data, over the next 20 years, Putnam County's population is expected to increase through the late 2030s. (see Figure 4.4-4. Putnam County Population Estimates and Projection, 2010 to 2040). The ACS-estimated 2018 population of the County (99,070) is near to Cornell's estimate of 99,284 people. Compared to the Cornell-estimated 2018 population, the County's population by 2018 is expected to be 1.3% greater.

Figure 4.4-4. Putnam County Population Estimates and Projection, 2010 to 2040



Source: Cornell University 2018;

4.4.3 Vulnerable Populations

DMA 2000 requires that HMPs consider socially vulnerable populations. These populations can be more susceptible to hazard events, based on a number of factors including their physical and financial ability to react or respond during a hazard and the location and construction quality of their housing. For the purposes of this study, vulnerable populations shall include (1) the elderly (persons aged 65 and over) and (2) those living in low-income households.

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Table 4.4-4 Putnam County Vulnerable Population Statistics

Municipality	U.S. Census 2010			2014-2018 ACS										
	Total	Population Over 65	Percent Population Over 65	Total	Population Over 65	Percent Population Over 65	Pop Under 5	Percent Under 5	Below Poverty Level*	Percent Below Poverty Level	Non-English Speaking	Percent Non-English Speaking	Persons with Disability	Percent Persons with Disability
Brewster (V)	2,390	182	7.6%	2,087	190	9.1%	96	4.6%	542	26.0%	749	35.9%	206	9.9%
Carmel (T)	34,305	4,263	12.4%	34,227	5,681	16.6%	1,728	5.0%	1,144	3.3%	1,848	5.4%	3,506	10.2%
Cold Spring (V)	2,013	342	17.0%	1,862	345	18.5%	86	4.6%	105	5.6%	28	1.5%	263	14.1%
Kent (T)	13,507	1,716	12.7%	13,325	2,372	17.8%	547	4.1%	731	5.5%	959	7.2%	1,540	11.6%
Nelsonville (V)	628	79	12.6%	699	73	10.4%	58	8.3%	20	2.9%	2	0.3%	60	8.6%
Patterson (T)	12,023	1,205	10.0%	11,922	1,620	13.6%	446	3.7%	1,134	9.5%	711	6.0%	1,171	9.8%
Philipstown (T)	7,021	1,076	15.3%	7,163	1,463	20.4%	354	4.9%	382	5.3%	216	3.0%	657	9.2%
Putnam Valley (T)	11,809	1,374	11.6%	11,654	1,807	15.5%	438	3.8%	759	6.5%	460	3.9%	1,175	10.1%
Southeast (T)	16,014	2,180	13.6%	16,131	2,502	15.5%	760	4.7%	374	2.3%	843	5.2%	1,439	8.9%
Putnam County (TOTAL)	**99,710**	**12,417**	**12.5%**	**99,070**	**16,053**	**16.2%**	**4,513**	**4.6%**	**5,191**	**5.2%**	**5,816**	**5.9%**	**10,017**	**10.1%**

Source: Census 2010 (U.S. Census Bureau); Census 2014-2018 (American Community Survey)
*Note: * Individuals below poverty level (Census poverty threshold for a 3-person family unit is approximately $18,500). Note that the 2018 population estimates should be considered a "moment in time" and should not be directly compared against the 2010 Census totals due to differences in methodology.*

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It is noted that the Census data for household income provided in HAZUS-MH includes two ranges ($0-10,000 and $10,000-$20,000/year) that were totaled to provide the "low-income" data used in this study. This does not correspond exactly with the "poverty" thresholds established by the 2013 U.S. Census Bureau, which identifies households with three adults and no children with an annual household income below $18,222 per year, or households with one adult and two children with an annual household income below $18,769 per year as "low income" for this region. This difference is not believed to be significant for the purposes of this planning effort.

The 2018 American Community Survey data identified approximately 3,239 households as having an annual income of less than $25,000. This is a decrease from 2012, when approximately 3,600 households reported having incomes of less than $25,000. Figure 4.4-5 shows the distribution of persons over age 65 in Putnam County, and the distribution of low income persons. The following maps indicate distribution based on Census Block designations.

Income

The 2018 American Community Survey 5-Year Estimates provides that the median household income in Putnam County was $102,186, and the per capita income was $45,905. The U.S. Census Bureau identifies households with two adults and two children with an annual household income below $25,465 per year as *low income* (U.S. Census 2018). The 2018 American Community Survey 5-Year Estimates indicates that a total of six percent of persons are below the poverty level within the county.

Physically or Mentally Disabled

According to the Centers for Disease Control, "Persons with a disability include those who have physical, sensory, or cognitive impairment that might limit a major life activity" (Centers for Disease Control 2015). Cognitive impairments can increase the level of difficulty that individuals might face during an emergency and reduce an individual's capacity to receive, process, and respond to emergency information or warnings. Individuals with a physical or sensory disability can face issues of mobility, sight, hearing, or reliance on specialized medical equipment. According to the 2018 American Community Survey, 10.2 percent of residents in Putnam County are living with a disability. Figure 4.4-5 shows the geographic distribution of disabled individuals throughout Putnam County, including individuals living with hearing, vision, cognitive, ambulatory, self-care, and independent living difficulties.

Non-English Speakers

Individuals who are not fluent or working proficiency in English are vulnerable because they can have difficulty with understanding information being conveyed to them. Cultural differences also can add complexity to how information is being conveyed to populations with limited proficiency of English (Centers for Disease Control 2015). According to the 2018 American Community Survey, nearly one-fifth or 18.5 percent of the county's population over the age of 5 primarily speaks a language other than English at home; within that group approximately 3.2 percent of households are reported as speaking English "less than very well." Of the county's population, 9.6 percent speak Spanish and 7.2 percent speak other Indo-European languages Figure 4.4-5 shows the geographic distribution of individuals who speak English less than "very well."

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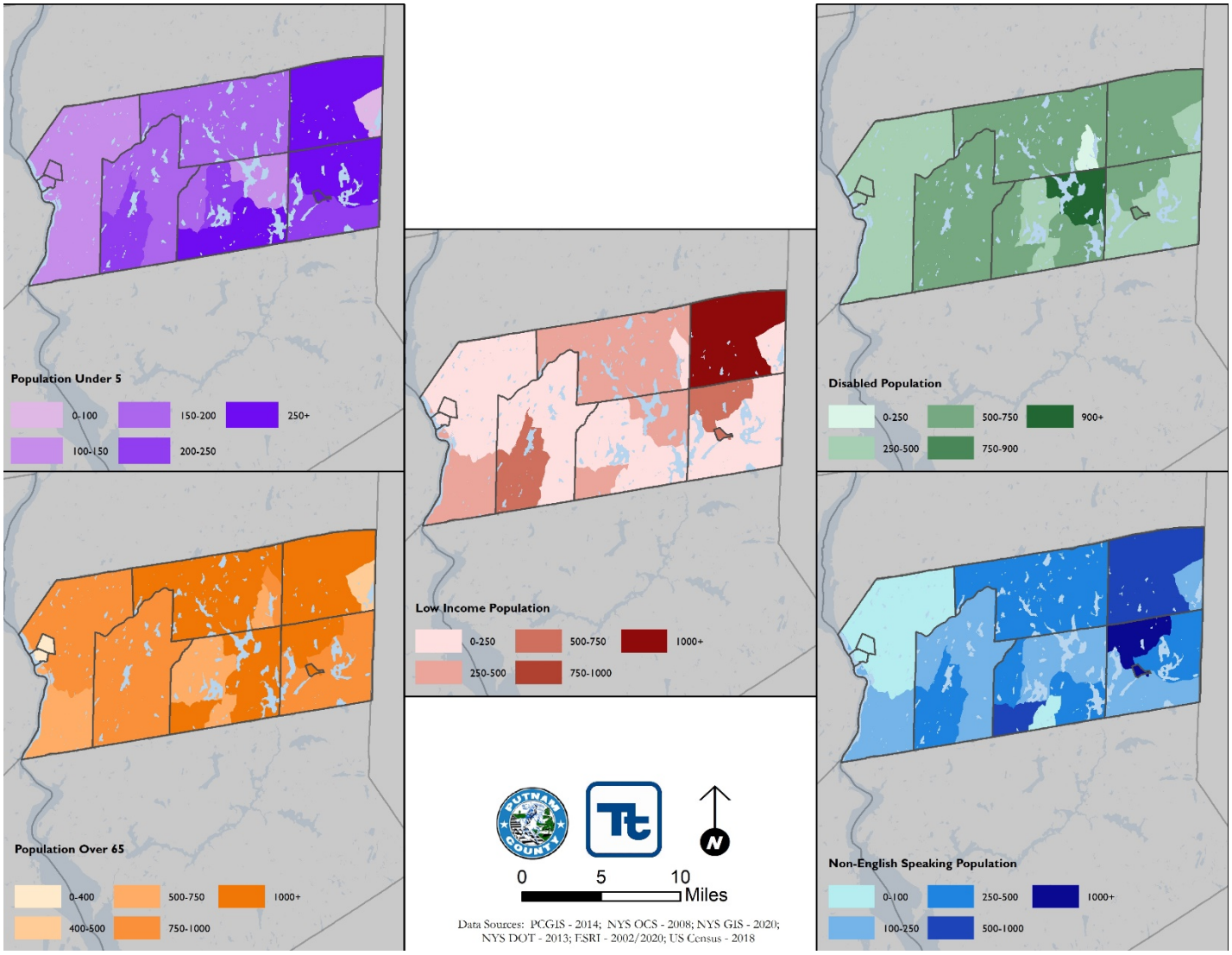
Figure 4.4-5. Distribution of Vulnerable Populations in Putnam County



4.4.4 General Building Stock

The 2018 American Community Survey data identified 34,847 households (38,605 housing units) in Putnam County. The 2010 U.S. Census reported 35,041 households (38,224 housing units) in Putnam County. The County experienced an increase in both households and housing units from 2000 to 2010. As for households, between 2000 and 2010, the County saw a 7% increase. As for housing units, the County experienced an increase of 8.9% between 2000 and 2010. Between 2010 and 2018, there was a modest decrease in the number of households and a slight decrease in the number of housing units. The U.S. Census defines household as all the persons who occupy a housing unit, and a housing unit as a house, an apartment, a mobile home, a group of rooms, or a single room that is occupied (or if vacant, is intended for occupancy) as separate living quarters. Therefore, there may be more than one household per housing unit. The median price of an owner-occupied housing unit in Putnam County was estimated at $356,300 (U.S. American Community Survey, 2018).

For this Plan, the previous general building stock was updated with RS Means 2019 values to updated the estimated replacement cost values. The building stock update was performed using the previous parcel and the New York State Department of Taxation and Finance tax assessment data provided by Putnam County. The replacement cost value was calculated using the square footage value of each building and RS Means 2019 data.

For the purposes of this plan, there are approximately 31,225 parcels with structures identified through data provided by the County (Real Property tax data). These parcels with structures account for a replacement cost value of approximately $27.5 billion (structure and contents). Estimated content value was calculated by using 50-percent of the residential replacement cost value, and 100-percent of the non-residential replacement values. Using this methodology, there is approximately $9.9 billion in contents within these properties. Approximately 96% of the total buildings in the County are residential, which make up approximately 84% of the building stock structural value associated with residential housing. Table 4.4-5 present building stock statistics by occupancy class for Putnam County.

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Table 4.4-5. Number of Buildings and Improvement Value by Municipality and Occupancy Class

Municipality	All Occupancies				Residential		Commercial		Industrial	
	Count	Replacement Cost Value (Structure Only)	Replacement Cost Value (Contents Only)	Total Replacement Cost Value (Structure + Contents)	Count	Total Replacement Cost Value (Structure + Contents)	Count	Total Replacement Cost Value (Structure + Contents)	Count	Total Replacement Cost Value (Structure + Contents)
Brewster (V)	406	$421,759,638	$243,873,724	$665,633,363	347	$533,657,742	39	$62,396,916	4	$6,542,153
Carmel (T)	10,170	$5,969,847,642	$3,334,523,345	$9,304,370,987	9793	$7,905,972,891	278	$829,296,526	31	$66,478,185
Cold Spring (V)	679	$499,490,797	$290,915,166	$790,405,963	625	$625,726,892	31	$63,876,437	1	$1,844,634
Kent (T)	5,021	$1,938,044,342	$1,045,240,220	$2,983,284,562	4,891	$2,678,412,365	96	$184,979,508	12	$16,682,745
Nelsonville (V)	261	$134,193,597	$75,210,660	$209,404,256	244	$176,948,810	8	$13,715,502	2	$4,811,628
Patterson (T)	3,393	$1,862,653,208	$1,065,211,970	$2,927,865,178	3,231	$2,392,323,714	114	$335,719,651	10	$49,953,394
Philipstown (T)	2,767	$1,686,766,709	$942,624,845	$2,629,391,554	2,627	$2,232,425,594	107	$285,557,538	9	$12,963,541
Putnam Valley (T)	4,521	$2,166,657,355	$1,148,093,174	$3,314,750,529	4,412	$3,055,692,545	77	$157,180,603	5	$5,253,669
Southeast (T)	4,128	$2,935,967,880	$1,781,543,607	$4,717,511,487	3,829	$3,463,272,818	194	$876,664,459	67	$187,745,305
Putnam County (TOTAL)	**31,346**	**$17,615,381,168**	**$9,927,236,710**	**$27,542,617,878**	**29,999**	**$23,064,433,373**	**944**	**$2,809,387,140**	**141**	**$352,275,253**

Source: Putnam Count Real Property tax data, 2014; RS Means 2019
Notes: T = Town; V= Village

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The 2018 American Community Survey data identified that the majority of housing units (77.1% or 29,828 units) in Putnam County are single-family detached units. The 2017 U.S. Census Bureau's County Business Patterns data identified 2,898 business establishments employing 21,449 people in Putnam County. The construction industry represents the most establishments in the County, with 582 establishments. This is followed by the retail trade industry with 332 establishments and the professional, scientific, and technical services industry with 312 establishments (U.S. Census, 2012).

Figure 4.4-6 and Figure 4.4-7 show the distribution and exposure density of residential and commercial buildings, respectively, in Putnam County based on the New York State Department of Taxation and Finance Property Class Code. Exposure density is the dollar value of structures per unit area, including building content value. Generally, contents for residential structures are valued at about 50 percent of the building's value. For commercial facilities, the value of the content is generally about equal to the building's structural value. Actual content value various widely depending on the usage of the structure. The densities are shown in units of $1,000 ($K) per square mile.

Viewing exposure distribution maps, such as Figure 4.4-6 through Figure 4.4-8 can assist communities in visualizing areas of high exposure and in evaluating aspects of the study area in relation to the specific hazard risks.

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Figure 4.4-6. Distribution of Residential Building Stock and Value Density in Putnam County

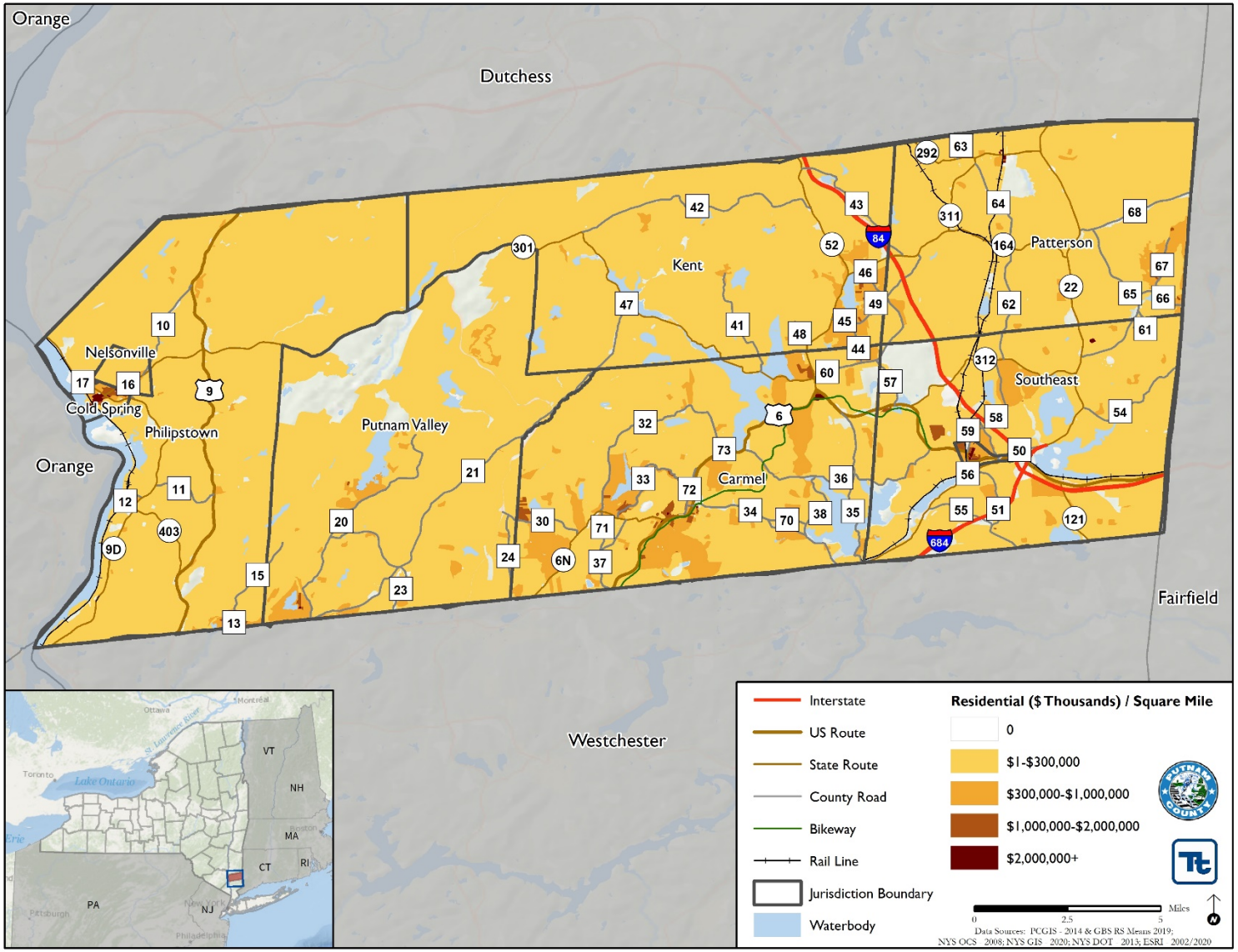


Figure 4.4-7. Distribution of Commercial Building Stock and Exposure Density in Putnam County

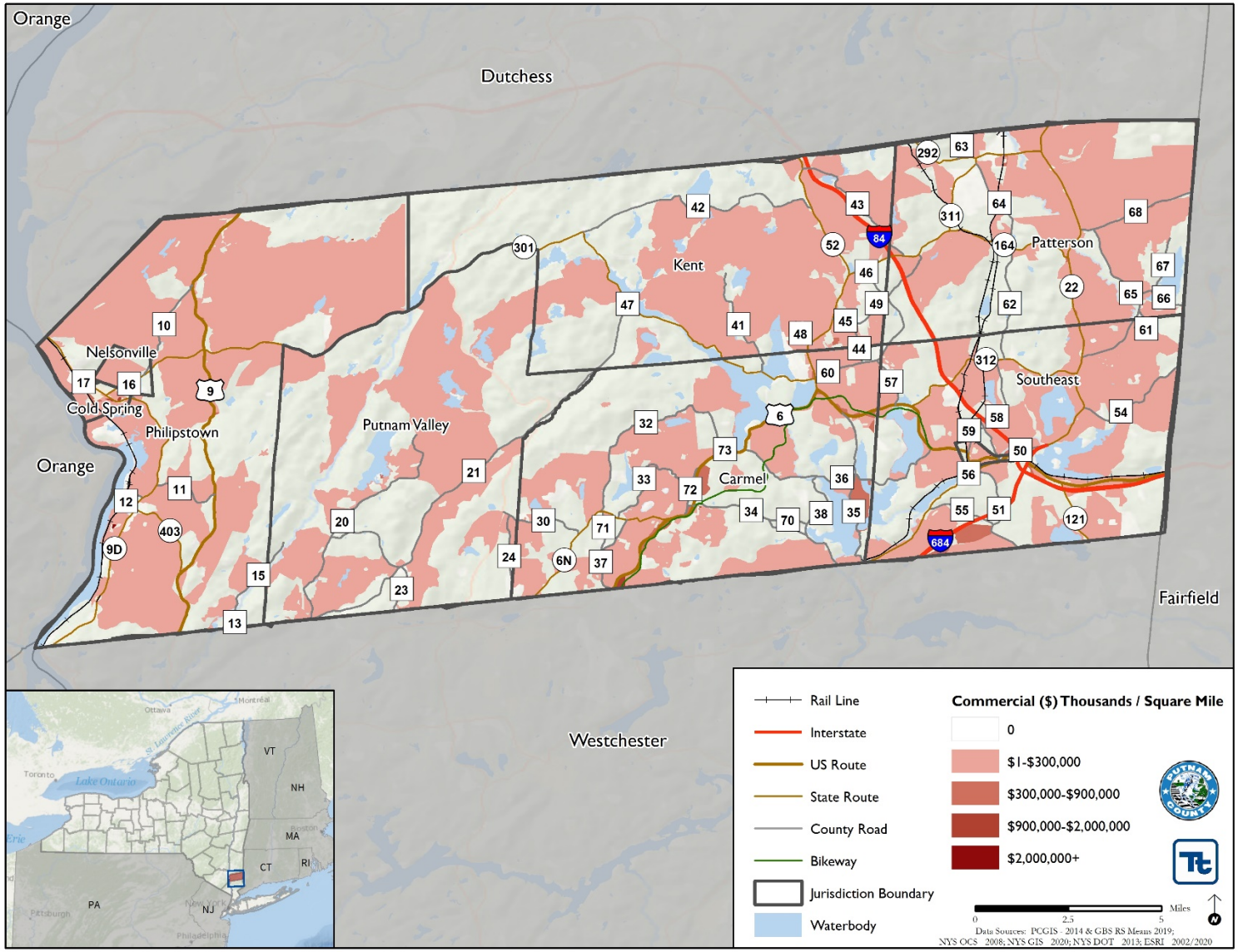
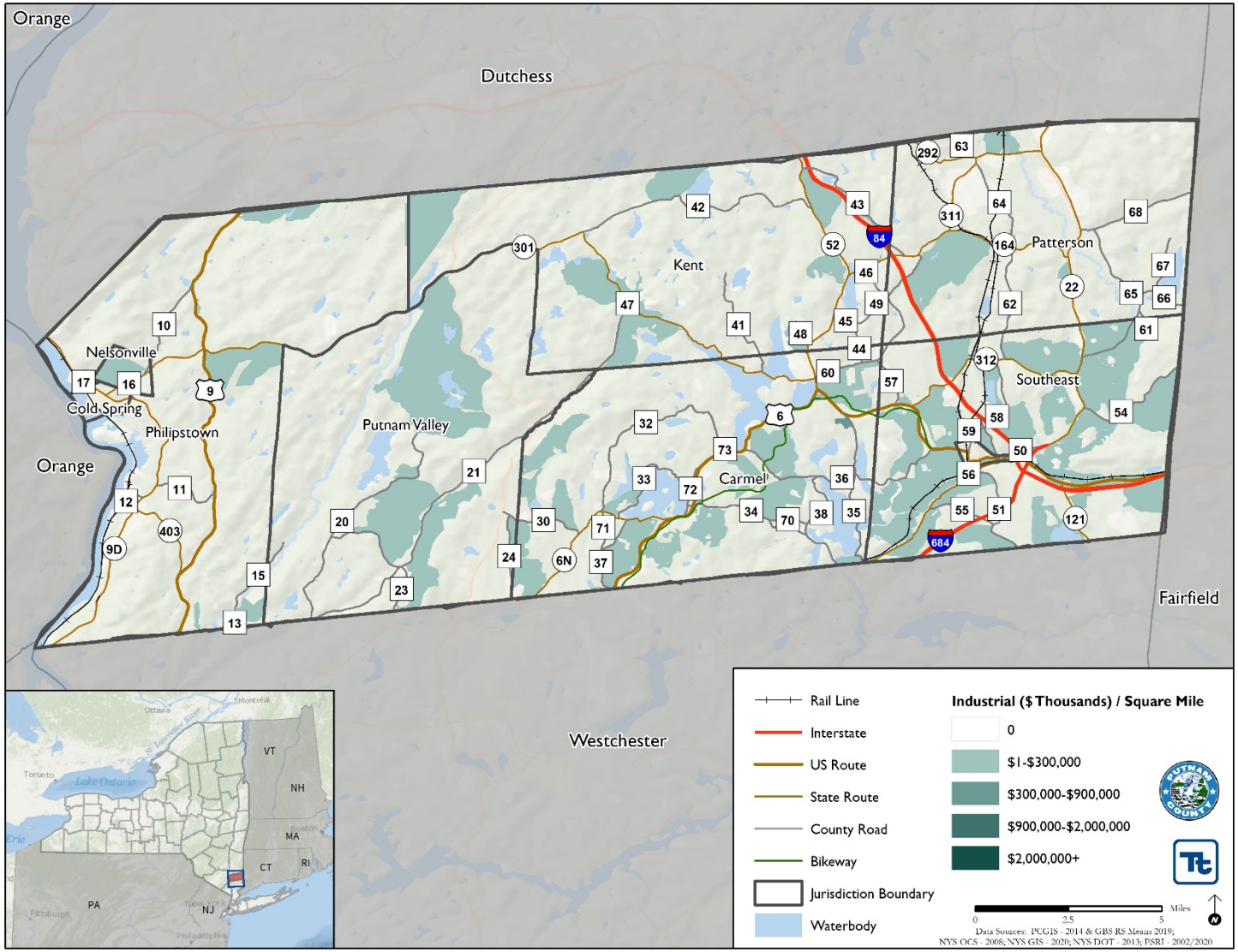


Figure 4.4-8. Distribution of Industrial Building Stock and Value Density in Putnam County, New York



4.5 LAND USE AND POPULATION TRENDS

Land use regulatory authority is vested in New York State's towns, villages, and cities. In Putnam County, each town and village are empowered by the Municipal Home Rule Law to plan and zone within its boundaries. However, many development and preservation issues transcend location political boundaries. DMA 2000 requires that communities consider land use trends, which can impact the need for and prioritization of mitigation options over time. Land use trends significantly impact exposure and vulnerability to various hazards. For example, significant development in a hazard area increases the building stock and population exposed to that hazard.

This plan provides a general overview of population, land use, and types of development occurring within the study area. An understanding of these development trends can assist in planning for further development and ensuring that appropriate mitigation, planning, and preparedness measures are in place to protect human health and community infrastructure.

County and community capabilities to manage development so as to minimize increased natural hazard risk are discussed in the capability assessment subsection of Chapter 6, as well as within each jurisdictional annex in Section 9. Also identified within each annex are actions the community has or will take to further integrate the findings and recommendations of this plan into other planning mechanisms and programs, many of which support land use and development so as to minimize the increase of natural hazard risk.

4.5.1 Land Use Trends

Putnam County's land use reflects its history as a lakeside vacation destination and bedroom community for New York City. The creation of lakes and reservoirs throughout the County became a tourist draw for city dwellers, and eventually led to the creation of a year-round residential community (Putnam County Historian 2007). Putnam County's three villages and six Towns are set among more than 150,000 acres, with much of the population clustered in the central-southern section of the County, where suburban residential development predominates then gives way to wetlands and forests heading north and along the Hudson River.

Economy

The U.S. Census Bureau's County Business Pattern provides an annual series of sub-national economic data by industry covering the majority of the country's economic activity. According to the 2017 Putnam County Business Pattern, the county had a total of 2,898 business establishments. Health care and social assistance businesses totaled 255 but had the largest number of employees (52,000) and the highest total payroll ($264.8 million). The construction industry had the largest number of business establishments (582) and one of the larger numbers of employees (2,267). The retail sector had the second-greatest number of businesses (324) and the second-highest number of employees (2,916). These three industries represent nearly half of both the countywide workforce and payroll Table 4.5-1. provides 2017 industry and employment information in Putnam County.

Table 4.5-1. 2017 County Business Patterns for Putnam County, New York

Sector	# of Establishments	# of employees	Annual payroll ($1,000)
Total for all sectors	**2,898**	**21,449**	**$965,278**
Agriculture, forestry, fishing and hunting	12	23	$561
Utilities	4	c	S
Construction	582	2,267	$133,089
Manufacturing	72	1,359	$75,209

Sector	# of Establishments	# of employees	Annual payroll ($1,000)
Wholesale trade	128	1,204	$72,637
Retail trade	324	2,916	$83,652
Transportation and warehousing	77	474	$21,735
Information	53	230	$14,629
Finance and insurance	120	521	$30,152
Real estate and rental and leasing	89	244	$11,204
Professional, scientific, and technical services	297	1,207	$77,034
Management of companies and enterprises	9	121	$7,893
Administrative and support and waste management and remediation services	222	925	$37,924
Educational services	41	231	$7,280
Health care and social assistance	255	5,200	$264,822
Arts, entertainment, and recreation	91	840	$26,853
Accommodation and food services	224	2,146	$43,822
Other services (except public administration)	294	1,417	$44,106

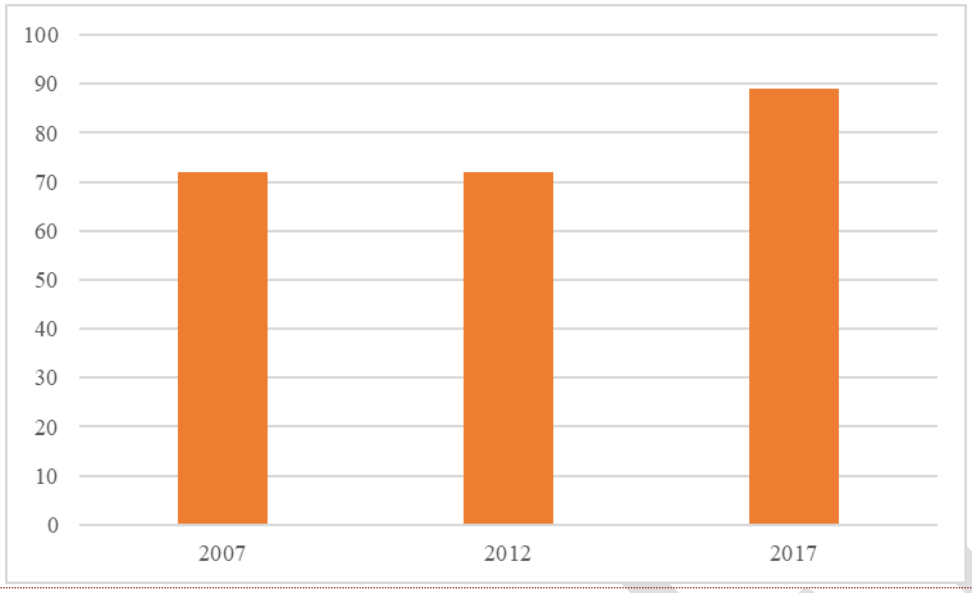
Source: U.S. Census, County Business Pattern 2017
c = 100-249 employees
S = Withheld because estimate did not meet Census publication standards

Agriculture

The 2017 U.S. Department of Agriculture (USDA) Census of Agriculture reported 89 farms in Putnam County. The market value of agricultural products sold from Putnam County farms totaled $3.1 million. The farms, which average 84 acres in size, comprise 7,472 acres of land. Cropland is just 2,624 acres, or 35 percent of farm area. However, crop sales accounted for the vast majority (91%) of total agricultural sales, whereas livestock sales accounted for just 9% of total sales. Though specific data is limited due to the amount of agricultural sales, grains, oilseeds, dry beans, dry peas; fruits, tree nuts, berries; nursery, greenhouse floriculture, sod; vegetables, melons, potatoes, sweet potatoes; and other crops and hay comprise the County's crop sales that totaled $2.86 million. Cattle and calves and sheep/goats/wool/mohair/milk comprise the majority of livestock and poultry sales, which totaled $279,000 (U.S. Department of Agriculture 2017).

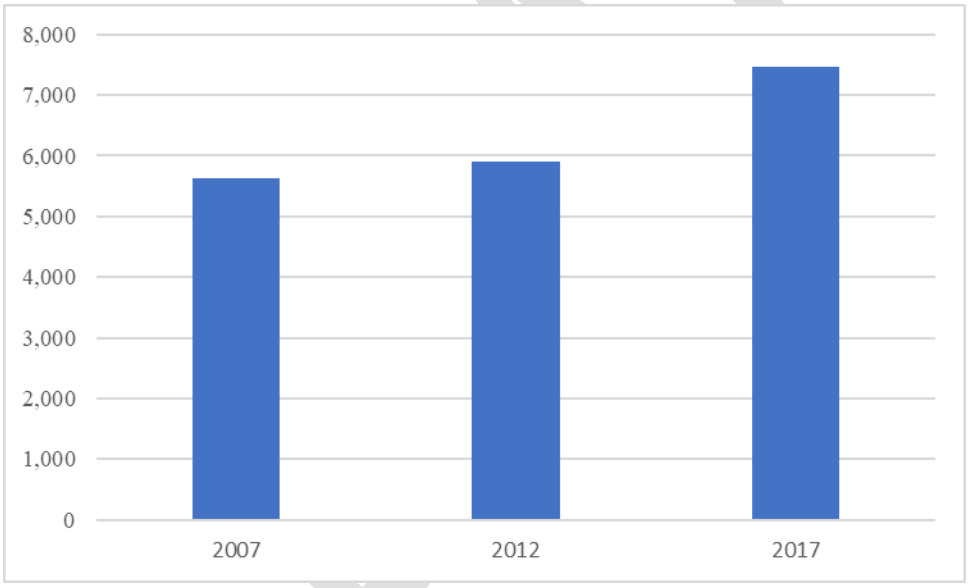
Between 2012 and 2017, the County gained more than 1,500 acres of agricultural land, representing a 26% change. The number of farms also increased by 24% from 72 farms in 2012 (U.S. Department of Agriculture 2012). This trend is part of an overall growth trend in agriculture observed in the County. The 2004 Farm plan examined Census of Agriculture data from 1987 to 2002, which by 2004 demonstrated a decrease in the number of farms to 52 and increase of farm acreage to 6,720 acres. The 2017 figures – demonstrating 89 farms on 7,472 acres – indicates a clear increase in agricultural activity. The nominal value of agricultural sales has also increased from $1.9 million in 1992 to $2.4 million in 2002 to $3.1 million in 2017 (Putnam County Agricultural and Farmland Protection Board 2004). Figure 4.5-1 and Figure 4.5-2 below show the change of the number and acreage of farmland in the County between 2007 and 2017.

Figure 4.5-1: Number of Farms in Putnam County



Source: USDA Census of Agriculture, 2007, 2012, 2017

Figure 4.5-2: Putnam County Land in Farms in Acres



Source: USDA Census of Agriculture, 2007, 2012, 2017

Corridors and Gateways

Putnam County's transportation routes create a network of gateways, corridors, and by-ways that drive land use patterns. With the northern and western sections of the County largely wooded and undeveloped, road systems string together the pockets of development within the County as well as those outside of the County's boundaries. Figure 4.5-3 illustrates the transportation corridors in Putnam County.

The main route traveling through Putnam County is Interstate 84, which connects central Massachusetts to northeast Pennsylvania. The route travels in a southwest-northeasterly direction from Pennsylvania to Massachusetts, before becoming a north-south route in Dutchess and Putnam County and an east-west route

leaving Putnam County for Danbury, Connecticut. East of Brewster, Interstates 84 and 684 meet at an interchange. Interstate 684 terminates at this intersection and becomes NYS Route 22. Interstate 684 continues south to the Hutchinson River Parkway. These interstates, along with NYS Route 22, NYS Route 52, US-9, NYS Route 9D, and the Taconic State Parkway comprise the major north-south routes in the County.

NYS Route 9D is a major scenic route that follows the Hudson River. It begins at the Purple Hearth Memorial Bridge and continues north through Putnam County to points north. In the western part of the County, the only major cross-county route is NYS Route 301, which connects Cold Spring with Carmel Hamlet. In the eastern section of the County, US-6, NYS Route 311, and NYS Route 312 comprise the major east-west roadways.

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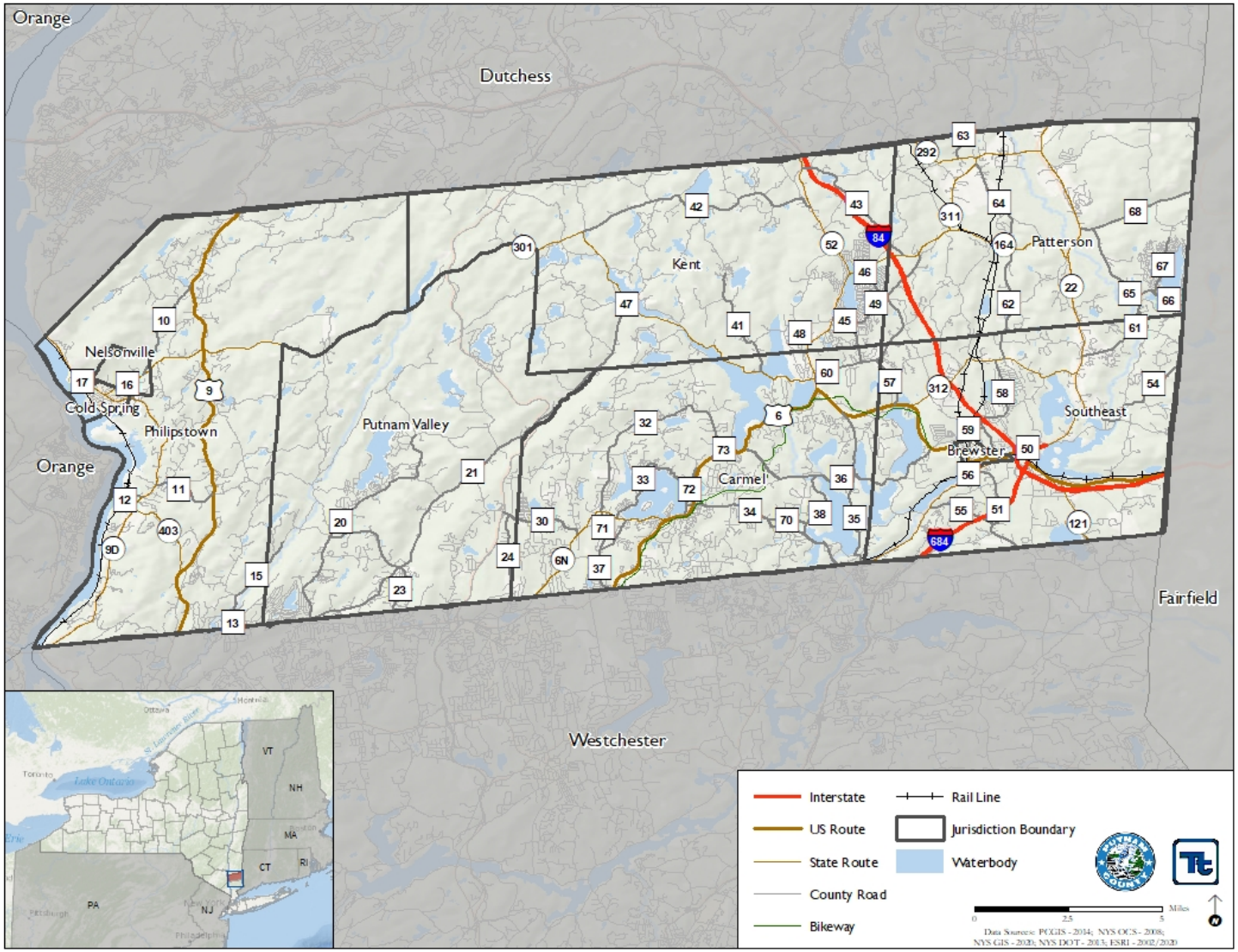
Figure 4.5-3. Transportation Corridors of Putnam County, New York



Zoning

Historical land use patterns show how the community has developed over time. Zoning and related ordinances are used to guide development within the county. Traditional zoning divides a community into various districts and permits or disallows land uses by zoning district. In Putnam County, each municipal has its own zoning districts and regulations. The County reviews certain developments pursuant to Section 239-N of General Municipal Law of the Consolidated Laws of New York. However, the County Planning Department does not maintain records of municipal zoning.

4.5.2 Population Trends

Although Putnam County's population has not undergone any notable change since the last hazard mitigation plan, there is a current trend of slight population decline as illustrated in Figure 4.5-4 below, which shows the annual population estimate from the 2010 American Community Survey 5 Year Estimate to the 2018 American Community Survey 5 Year Estimate. The American Community Survey is performed on a more frequent basis to provide updated population and demographics information to communities.

Overall, most municipalities in Putnam County have decreased slightly in total population between 2010 and 2018. Based on historical data, population projections have been created which show Putnam County's population to stay relatively steady. Based on existing aging patterns, however, there is a possibility that the County's population continues to decline slightly heading into the future. While the County's total population decrease has been relatively modest since 2010, the number of residents under five years old has decreased by nearly one-fifth (17.6%) and the number of residents over the age of 65 has increased by 40% in the same period. No municipality had a decrease in those over the age of 65, yet all but three (the villages) had decreases in those under the age of five.

Putnam County grew rapidly in the post-war years, when its population increased from approximately 20,000 residents in 1950 to just over 77,000 by 1980. Since 2000, the County's population has kept steady. By 2040, the population is anticipated to increase only slightly. However, between 2010 and 2018, the County's population decreased slightly.

Figure 4.5-4 demonstrates the County population and its changes from 1950 to 2040 while Figure 4.5-5 indicates the annual estimated population change from 2010 to 2018. Figure E-1 in Appendix E (Supplementary Data) illustrates the municipal population change over this period.

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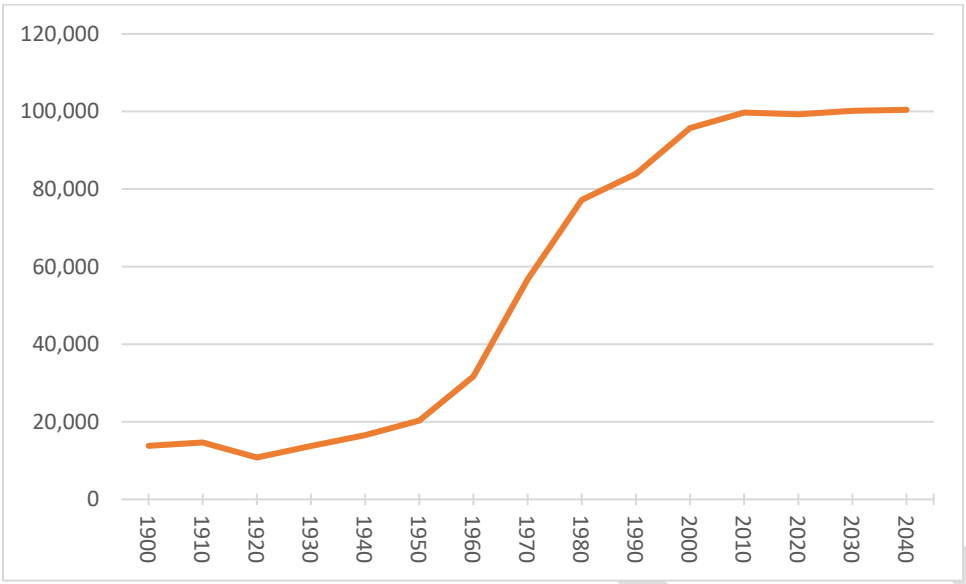
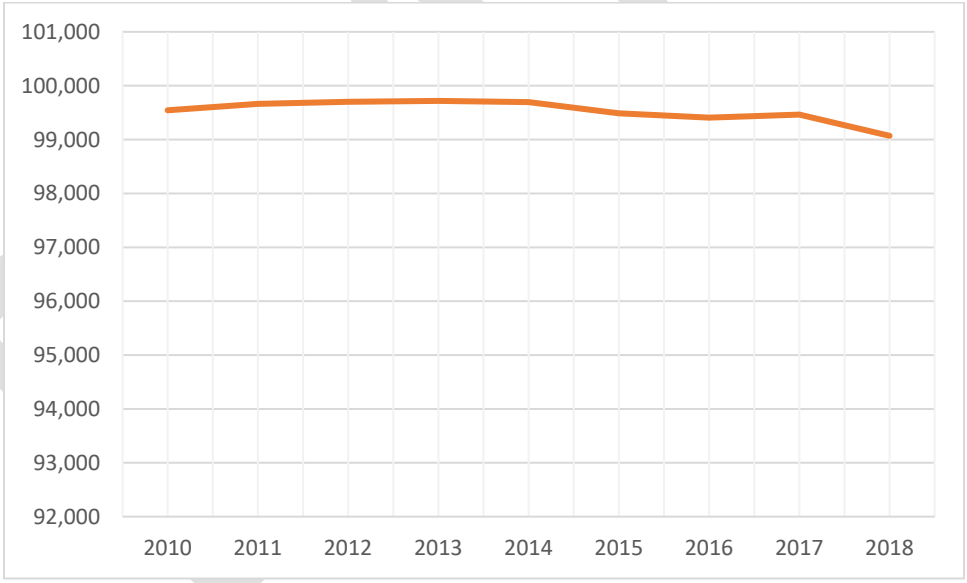
Figure 4.5-4. Population Change 1950 to 2040 in Putnam County, New York



Source: U.S. Census Bureau 2012, University of Virginia 2007, Cornell University 2018

Figure 4.5-5 Annual Population Change, 2010 to 2018 American Community Survey Estimates in Putnam County, New York



Source: U. S. Census Bureau American Community Survey; 5 Year Estimates 2010-2018

4.5.3 Future Growth and Development

According to the "Report of the Task Force on Vision 2010, Guiding Putnam into the Next Decade" prepared by the Putnam County Division of Planning and Development, "despite the historical trend in development (suburbanization), the most dominant land uses in the County continue to be forested land, wetlands, undeveloped vacant land, and water bodies. Residential land use would be the next largest land use. Generally speaking, residential land use occurs throughout the County on large lot subdivisions or in rural areas."

Table 4.5-2 identifies known and anticipated new development in Putnam County as of October 2020. Municipalities that did not identify any significant residential/commercial, or infrastructure development within the next 5 years are not included in the table.

Table 4.5-2: Anticipated New Development in Putnam County

Brewster (V)
Brewster Honda Dealership
Multi-Family Dwelling
Carmel (T)
Braemar at Carmel
Carmel Center Senior Housing - Lot 3
Carmel Center Senior Housing - Lot 5
Gateway Summit - Lot 6
Gateway Summit - Staybridge Suites Hotel
Hickley Holdings LLC/ Paladin Group
Hillcrest Commons
Lakeview Development at Carmel
MacDonald Marine
Nejame & Sons
Old Forge Estates
One Hundred Twelve Crossroads, L.P.
Parkash Estates, LLC
RPK Precision Homes
Swan Cove
Tompkins Recycling
Union Place
Yankee Land Development and Random Ridge Subdivision
Cold Spring (V)
Butterfield Redevelopment
Kent (T)
Carmel School District bus garage
Hilltop Estates Subdivision
Kent Manor
Route 311 Plaza
Titan Concrete Plant
Nelsonville (V)
New Cell Tower
Patterson (T)
2160 Route 22 Site Plan
Fox Run Estates
Ice Pond Estates
Philipstown (T)

Glassbury Court (aka Quarry Pond)
Olspan, LLC
Southeast (T)
Fortune Ridge (aka Meadows at Dean's Corners)
Lyons Development
Southeast Plaza, LLC

Source: Community Input

While any development increases the risk of damage and loss to natural hazards, a number of factors indicate that this increase in risk is low and mitigated by existing Federal, State, County and local regulations, policies and programs. In general, development occurring in the County is outside of high hazard areas (e.g. floodplains and steep slopes). All communities have planning and regulatory mechanisms in place that control and limit the increased natural hazard risk of new development and re-development. All communities have planning boards and site plan review requirements that include review and appropriate consideration of hazard areas. All development and construction in the County requires conformance with NYS Building Code. Further all Putnam County communities participate, and are in good standing, in the National Flood Insurance Program which by State regulation requires two-feet of freeboard above the FEMA 1% chance base flood elevation (BFE+2) for all new construction and substantial improvement, and BFE+2 for all other construction types. Some communities have adopted ordinances to further protect against natural hazards (e.g. Steep Slope Ordinances) and protect natural resources that provide natural mitigation benefits (e.g. wetlands and wetland buffers, stream courses and stream banks, areas of retention/detention). Most of the Putnam municipalities are MS4 communities and have adopted and enforce Stormwater Management Plans that minimize the impacts of stormwater resulting from both existing and new development, with respect to both stormwater quality and quantity.

Details regarding development specific to each participating municipality is provided in Appendix E. Locations of development are indicated on the Hazard Area Extent and Location Maps included in Section 9 (Jurisdictional Annexes).

4.6 CRITICAL FACILITIES AND LIFELINES

Critical infrastructure and facilities are those that are essential to the health and welfare of the population. These facilities are especially important after any hazard event. Critical facilities are those that maintain essential and emergency functions and are typically defined to include police and fire stations, schools, and emergency operations centers. Critical infrastructure can include the roads and bridges that provide ingress and egress and allow emergency vehicles access to those in need and the utilities that provide water, electricity, and communication services to the community. Also included are Tier II facilities (hazardous materials) and rail yards; rail lines hold or carry significant amounts of hazardous materials with a potential to impact public health and welfare in a hazard event.

Critical Facilities are those facilities considered critical to the health and welfare of the population and that are especially important following a hazard. As defined for this HMP, critical facilities include transportation systems, lifeline utility systems, high-potential loss facilities, and hazardous material facilities, and essential facilities

Essential facilities are a subset of critical facilities that include those facilities that are important to ensure a full recovery following the occurrence of a hazard event. For the county risk assessment, this category was defined to include police, fire, EMS, schools/colleges, shelters, senior facilities, and medical facilities.

Lifelines enable the continuous operation of critical business and government functions and are essential to human health and safety or economic security.

Beginning in 2017, FEMA developed a new construct to increase effectiveness for disaster operations and position response to catastrophic incidents. This construct, known as "community lifelines", represents the most fundamental services in the community that, when stabilized, enable all other aspects of society. Following a disaster event, intervention is required to stabilize community lifelines. Lifelines are divided into seven categories which include:

- Safety and Security
- Food, Water, Shelter
- Health and Medical
- Energy (Power and Fuel)
- Communications
- Transportation
- Hazardous Materials

To facilitate consistency with the National Response Framework, FEMA Strategic Plan, and guidance for the Building Resilient Infrastructure and Communities grant program, critical facilities in Putnam County are discussed in terms of lifelines.

A comprehensive inventory of critical facilities and lifelines in Putnam County was developed from various sources including input from the Planning Committees. The inventory of critical facilities presented in this section represents the current state of this effort at the time of publication of the HMP and was used for the risk assessment in Section 5 (Risk Assessment). Figure 4.6-1 shows the location of Putnam County lifelines.

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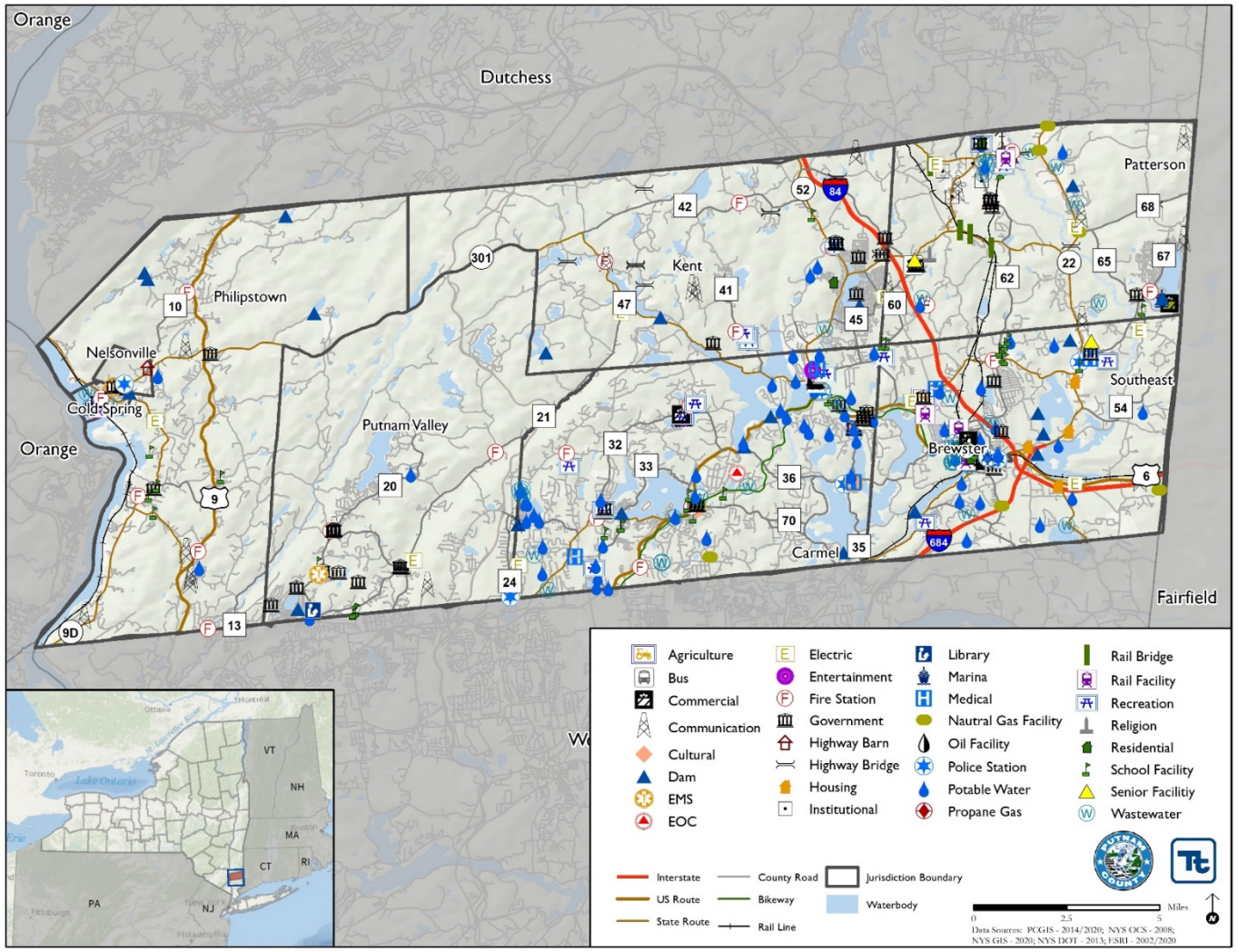
Figure 4.6-1. Planning Area Lifelines in Putnam County, New York



4.6.1 Safety and Security

This section provides information on Safety and Security lifelines. Components of this lifeline category include law enforcement/security, fire services, search and rescue services, government services, and community safety (e.g. dams). Figure 4.6-2 shows the location of these facilities in Putnam County.

Emergency Facilities

For the purposes of this Plan, emergency facilities include police, fire, emergency medical services (EMS) and emergency operations centers (EOC).

Police Departments

Table 4.6-1 identifies County and local police stations within Putnam County. Figure 4.6-2 identifies the location of these facilities.

Table 4.6-1 Police Stations in Putnam County

Facility Name	Facility Location	Backup Power
BREWSTER POLICE	Brewster (V)	-
BREWSTER POLICE DEPT	Brewster (V)	-
CARMEL POLICE DEPT	Carmel (T)	-
CARMEL POLICE DEPT SUBSTATION	Carmel (T)	-
PUTNAM COUNTY SHERIFF	Carmel (T)	-
COLD SPRING POLICE DEPT	Cold Spring (V)	-
KENT POLICE DEPT	Kent (T)	-
PUTNAM COUNTY SHERRIFF SUBSTATION	Nelsonville (V)	-
NY STATE POLICE	Southeast (T)	Y

Sources: *Putnam County*
PD *Police Department*
Y *Yes*
- *Unknown/not available*

Fire Departments and Emergency Medical Service Facilities

Table 4.6-2 identifies fire stations and rescue squads/emergency medical service facilities within Putnam County. Figure 4.6-2 identifies the location of these facilities.

Table 4.6-2 Fire Stations and Rescue Squads in Putnam County

Facility Name	Facility Location	Backup Power
BREWSTER FD	Brewster (V)	-
BREWSTER FIRE HOUSE	Brewster (V)	-
CARMEL AMBULANCE	Carmel (T)	-
CARMEL FIRE DEPARTMENT	Carmel (T)	-
MAHOPAC FALL FD - STATION 1	Carmel (T)	-
MAHOPAC FALLS FD STATION 2	Carmel (T)	-
MAHOPAC FD STATION 1	Carmel (T)	-
MAHOPAC FD STATION 2	Carmel (T)	-

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Facility Name	Facility Location	Backup Power
MAHOPAC FD STATION 3	Carmel (T)	-
COLD SPRING FIRE DEPT	Cold Spring (V)	-
PHILIPSTOWN AMBULANCE	Cold Spring (V)	-
KENT FD	Kent (T)	-
LAKE CARMEL FD	Kent (T)	-
LAKE CARMEL FD STATION 2	Kent (T)	-
PC FIRE TRAINING CENTER	Kent (T)	-
PATTERSON FD & AMB.	Patterson (T)	Y
PATTERSON FIRE DEPT. STATION 2	Patterson (T)	-
PUTNAM LAKE FIRE DEPT	Patterson (T)	Y
CONTINENTAL VILLAGE FD	Philipstown (T)	-
GARRISON VFD - STATION #1	Philipstown (T)	-
GARRISON VFD - STATION 2	Philipstown (T)	-
NORTH HIGHLANDS FD	Philipstown (T)	-
PUTNAM VALLEY FD - STATION 2	Putnam Valley (T)	-
PUTNAM VALLEY VFD	Putnam Valley (T)	-
PV VOLUNTEER AMBULANCE	Putnam Valley (T)	-
BREWSTER FD - STATION 2	Southeast (T)	-

Sources: Putnam County BES
Notes: FD= Fire Department; EMS = Emergency Medical Service
Y Yes
- Unknown/not available

Emergency Operations Centers

Table 4.6-3 identifies Emergency Operations Centers (EOCs) in Putnam County. The Bureau of Emergency Services, located in the Town of Carmel, is responsible for maintaining the County EOC, a county-wide communications system, as well as the Enhanced 911 system.

Table 4.6-3. Emergency Operation Centers in Putnam County

Facility Name	Facility Location	Backup Power
BUREAU OF EMERGENCY SERVICES	Carmel (T)	-

Sources: Putnam County BES
- Unknown/not available

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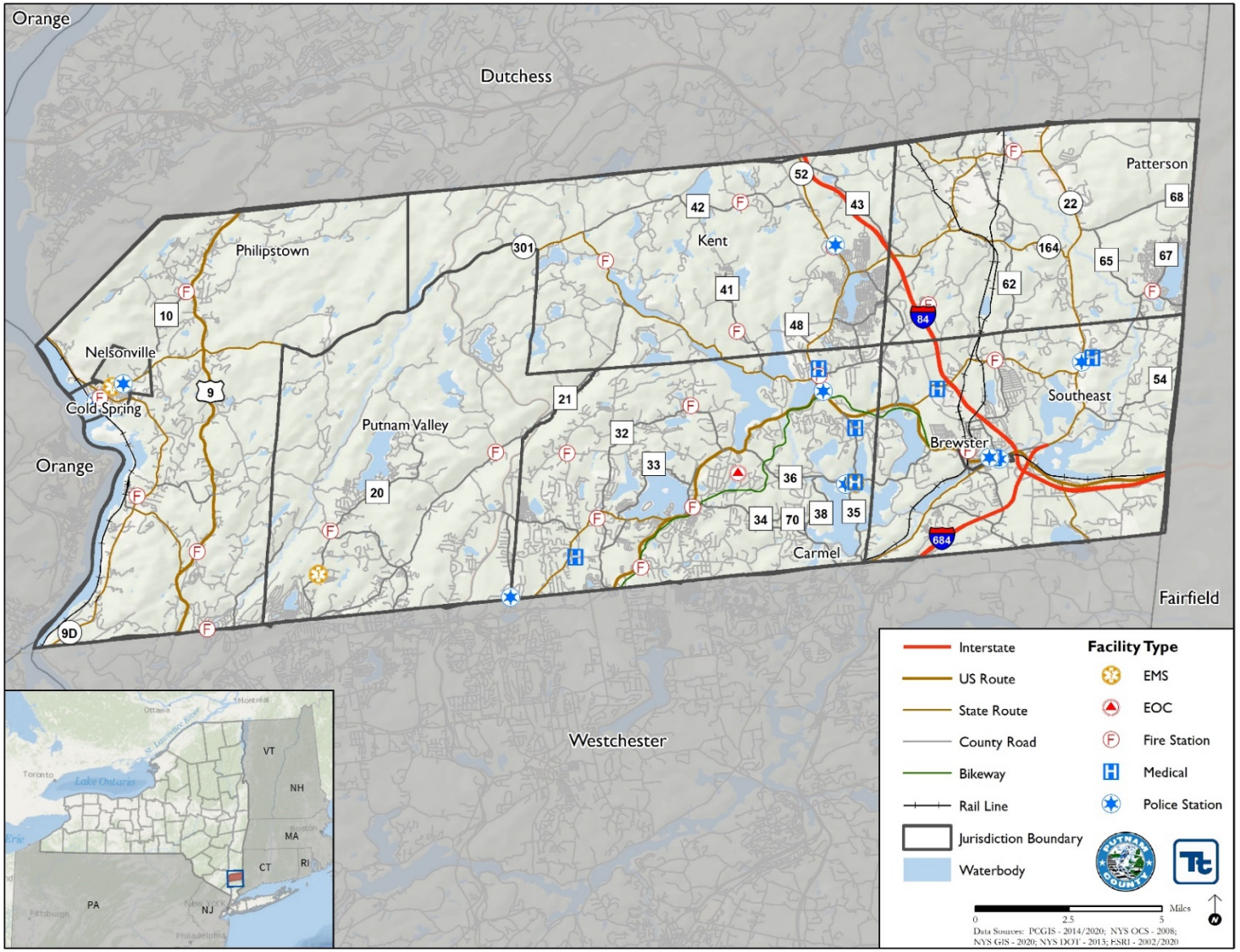
Figure 4.6-2. Critical Facilities in Putnam County, New York



Schools

There are six public school districts in Putnam County - Brewster, Carmel, Garrison, Haldane, Mahopac and Putnam Valley. Enrollment in these district schools totaled 13,744 students in the 2018-19 school year. The number of students enrolled in public schools has been declining. In the 2016-2017 school year, there were 14,237 students enrolled. In 2002-2003, 16,815 students were enrolled. Since the 2014-2015 school year, all public school districts have seen enrollment decline.

Within these districts, there are four parochial elementary schools. Additionally, there are several regional private high schools, a number of nursery and daycare facilities, and several facilities to accommodate special needs education (Putnam County Division of Planning and Development 2010). Table 4.6-4 identifies the school facilities in Putnam County and Figure 4.6-3 shows the locations of schools throughout the planning area.

Table 4.6-4. Schools in Putnam County

Facility Name	Facility Location	Backup Power
LONGVIEW SCHOOL	Brewster (V)	-
ST. LARENCE SCHOOL	Brewster (V)	-
AUSTIN RD ELEMENTARY SCHOOL	Carmel (T)	-
CARMEL CENTRAL SCHOOL DISTRICT	Carmel (T)	-
CARMEL HIGH SCHOOL	Carmel (T)	-
FULMAR RD ELEMENTARY SCHOOL	Carmel (T)	-
LAKEVIEW ELEMENTARY SCHOOL	Carmel (T)	-
MAHOPAC CENTRAL SCHOOL DISTRICT	Carmel (T)	-
MAHOPAC HIGH SCHOOL	Carmel (T)	-
MAHOPAC MIDDLE SCHOOL	Carmel (T)	-
ST. JAMES THE APOSTLE SCHOOL	Carmel (T)	-
ST. JOHN SCHOOL	Carmel (T)	-
HALDANE JR/SR HS	Cold Spring (V)	-
KENT SCHOOLS & TRANS	Kent (T)	-
GEORGE FISHER MIDDLE SCHOOL	Patterson (T)	-
GEORGE FISHER MIDDLE SCHOOL	Patterson (T)	-
GREEN CHIMNEYS SCHOOL FOR LITTLE PEOPLE	Patterson (T)	-
MATTHEW PATTERSON ELEMENTARY SCHOOL	Patterson (T)	-
GARRISON ELEMENTARY/MIDDLE SCHOOL	Philipstown (T)	-
GARRISON SCHOOL DIST	Philipstown (T)	-
GARRISON SCHOOL DIST.	Philipstown (T)	-
GARRISON UNION FREE SCHOOL DISTRICT	Philipstown (T)	-
SCHOOL	Philipstown (T)	-
GOVERNMENT	Putnam Valley (T)	-
PUTNAM VALLEY HS	Putnam Valley (T)	-
PUTNAM VALLEY MS	Putnam Valley (T)	-
PV ELEMENTARY SCHOOL	Putnam Valley (T)	-
PV GRANGE	Putnam Valley (T)	-
BREWSTER HIGH SCHOOL	Southeast (T)	-

Facility Name	Facility Location	Backup Power
BREWSTER SCHOOL ADMIN BLDG	Southeast (T)	-
BREWSTER SCHOOL BUS GARAGE	Southeast (T)	-
CV STARR SCHOOL	Southeast (T)	-
HH WELLS MIDDLE SCHOOL	Southeast (T)	-
JFK ELEMENTARY SCHOOL	Southeast (T)	-
SE SCHOOLHOUSE	Southeast (T)	-

Sources: Putnam County BES
- Unknown/not available

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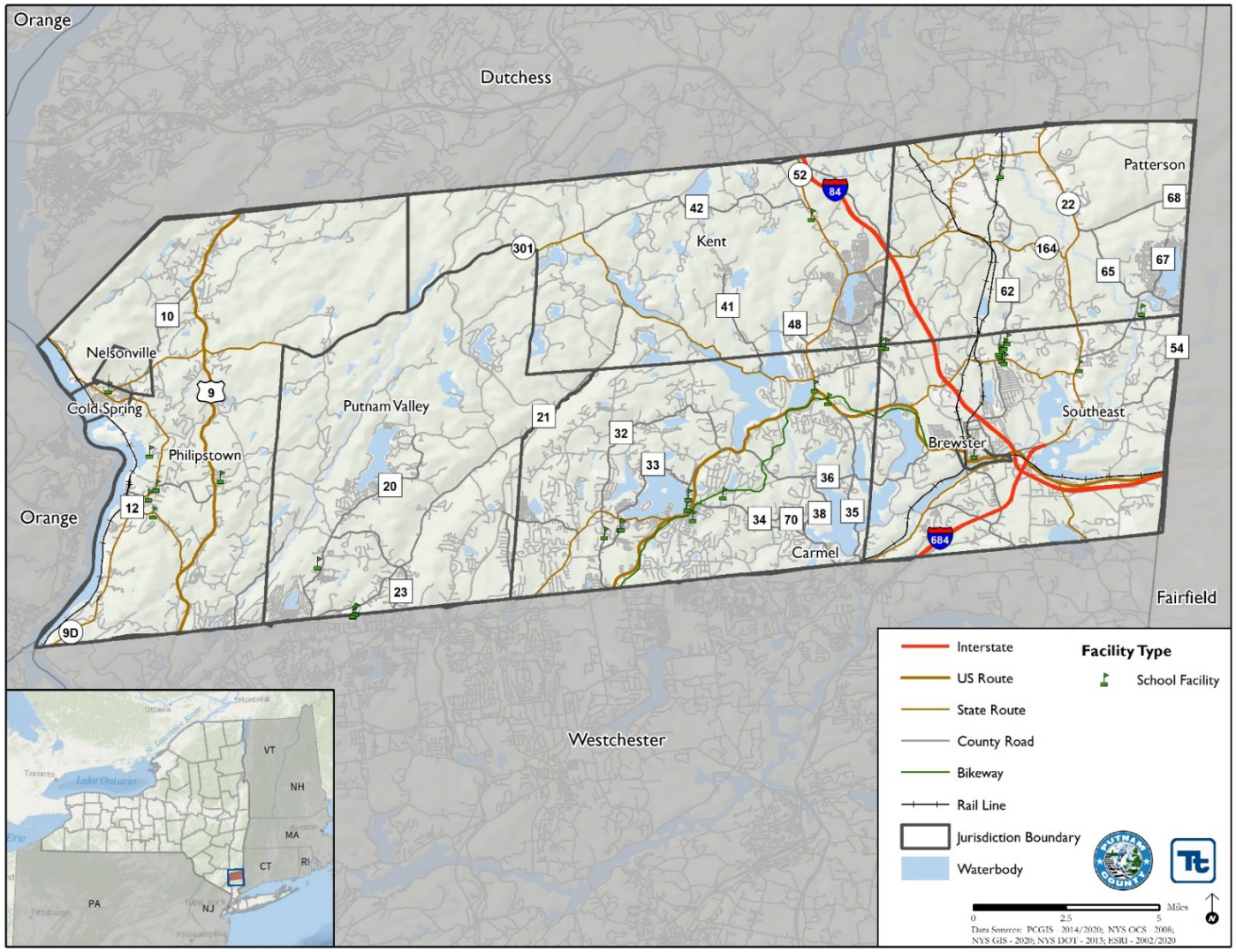
Figure 4.6-3. Schools in Putnam County, New York



Dams

According to the New York State Inventory of Dams there are 130 dams in Putnam County. NYSDEC classifies dams into four categories that are described below.

- Class A – Low Hazard - A dam failure is unlikely to result in damage to anything more than isolated or unoccupied buildings, undeveloped lands, minor roads such as town or county roads; is unlikely to result in the interruption of important utilities, including water supply, sewage treatment, fuel, power, cable or telephone infrastructure; and/or is otherwise unlikely to pose the threat of personal injury, substantial economic loss or substantial environmental damage.
- Class B – Intermediate Hazard - A dam failure may result in damage to isolated homes, main highways, and minor railroads; may result in the interruption of important utilities, including water supply, sewage treatment, fuel, power, cable or telephone infrastructure; and/or is otherwise likely to pose the threat of personal injury and/or substantial economic loss or substantial environmental damage. Loss of human life is not expected.
- Class C – High Hazard - A dam failure may result in widespread or serious damage to home(s); damage to main highways, industrial or commercial buildings, railroads, and/or important utilities, including water supply, sewage treatment, fuel, power, cable or telephone infrastructure; or substantial environmental damage; such that the loss of human life or widespread substantial economic loss is likely.
- Class D - Negligible or No Hazard - A dam that has been breached or removed, or has failed or otherwise no longer materially impounds waters, or a dam that was planned but never constructed. Class "D" dams are considered to be defunct dams posing negligible or no hazard. The department may retain pertinent records regarding such dams.
- 0 – hazard code has not been assigned

The majority of Putnam County's dams are designated to be a low hazard. Just over one-third of dams are rated as a high or intermediate hazard. As Table 4.6-5 and Table 4.6-6 describe, the high and intermediate dams are distributed throughout the County.

Table 4.6-5 Putnam County Dam Hazard Potential Classifications

Dam Classification	Dam Count	Percent
High	21	16.2%
Intermediate	28	21.5%
Low	66	50.8%
Negligible/No Hazard	10	7.7%
None Assigned	1	0.8%
Unknown	4	3.1%
Total	**130**	

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Table 4.6-6 Putnam County Dam Hazard Potential Classifications by Municipality

	Carmel	Kent	Patterson	Philipstown	Putnam Valley	Southeast	Unknown	Brewster	Cold Spring
Total	**19**	**35**	**22**	**20**	**18**	**12**	**2**	**1**	**1**
High	4	3	2	3	4	5	0	0	0
Intermediate	6	8	2	8	3	0	0	1	0
Low	8	21	11	6	11	7	1	0	1
Negligible/No Hazard	1	2	3	3	0	0	1	0	0
None Assigned	0	0	1	0	0	0	0	0	0
Unknown	0	1	3	0	0	0	0	0	0

4.6.2 Food, Water, Shelter

This section provides information on Food, Water, and Shelter lifelines. Components and subcomponents of this lifeline category include food (supply chains and distribution programs), water (potable and wastewater), shelter (housing, shelters, hotels), and agriculture. Figure 4.6-4 and Figure 4.6-5 show the locations of the facilities for these various lifeline utility systems in Putnam County.

Senior Care and Living Facilities

It is important to identify and account for senior facilities, as they are highly vulnerable to the potential impacts of disasters. Understanding the location and numbers of these types of facilities can help manage effective response plan post disaster. Table 4.6-7 identifies senior living and senior care facilities in the County.

Table 4.6-7 Senior Facilities in Putnam County

Facility Name	Facility Location	Backup Power
SENIOR HOUSING	Brewster (V)	-
SENIOR HOUSING	Brewster (V)	-
SENIOR CITIZEN BUILDING	Carmel (T)	-
THE PLAZA AT CLOVER LAKE	Patterson (T)	-
PUTNAM RIDGE NURSING HOME	Southeast (T)	-

Sources: Putnam County BES
- unknown/not available

Potable Water

In Putnam County, water is provided from various facilities as a public service or through private supplies, such as wells. Many of these systems rely on deep wells, while a few systems rely on surface water supplies. All of the community supplies have a distribution system. A majority of County water users obtain their water from deep wells which tap groundwater resources (Putnam County Division of Planning and Development 2010). Table 4.6-8 lists the facilities associated the treatment, storage, and transport of potable water to the County.

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Table 4.6-8 Potable Water Facilities in Putnam County

Facility Name	Facility Location	Backup Power
VILLAGE OF BREWSTER HIGHWAY & WELL	Brewster (V)	-
AEROBIC DIGESTER	Carmel (T)	-
LAKE GLENEIDA PUMP STATION	Carmel (T)	-
PRIMARY CLARIFIER	Carmel (T)	-
PUMP STATION	Carmel (T)	-
PUMP STATION	Carmel (T)	-
RAINBOW WATER CO., INC	Carmel (T)	-
RBD TANKS	Carmel (T)	-
SD 1 LIFT STATION (WHITE SAIL)	Carmel (T)	-
SD 2 BELDEN N PUMP	Carmel (T)	-
SD 2 BELDEN S PUMP	Carmel (T)	-
SD 2 HUGHSON N PUMP	Carmel (T)	-
SD 2 MECHANIC STREET PUMP	Carmel (T)	-
SD2 301 PUMP	Carmel (T)	-
SD2 CENTENNIAL RIDGE PUMP	Carmel (T)	-
SD2 HUGHSON S PUMO	Carmel (T)	-
SD2 KELLY ROAD PUMP	Carmel (T)	-
SD2 LAUREL FARMS PUMP STATION	Carmel (T)	-
SD2 LITTLE POND MANOR	Carmel (T)	-
SD2 PUTNAM PLAZA PUMP STATION	Carmel (T)	-
SD2 WILLOWRIDGE PUMP	Carmel (T)	-
SD4 PUMPHOUSE	Carmel (T)	-
SD4 PUMPHOUSE	Carmel (T)	-
SD4 PUMP STATION	Carmel (T)	-
SD6 LIFT STATION	Carmel (T)	-
SD8 PUMP STATION	Carmel (T)	-
SECONDARY SETTLE	Carmel (T)	-
STORAGE BUILDING	Carmel (T)	-
TENNIS COURT/SWING SET/2 PUMPHOUSES	Carmel (T)	-
TOWN OF CARMEL PUMP STATION	Carmel (T)	-
WATER PUMP HSE VER	Carmel (T)	-
WATER TANK	Carmel (T)	-
WD 14 PUMP HOUSE #2	Carmel (T)	-
WD 2 LAKE SHORE PUMP STATION	Carmel (T)	-
WD 2 SHOPRITE WATER TANK	Carmel (T)	-
WD 2 WATER TANK	Carmel (T)	-
WD 2 WATER TREATMENT PLANT	Carmel (T)	-
WD 5 PUMPHOUSE	Carmel (T)	-
WD 8 TANK	Carmel (T)	-

Facility Name	Facility Location	Backup Power
WD2 WATER TANK	Carmel (T)	-
WD3 WATER TANK	Carmel (T)	-
WD3 WELL BUILDING 1	Carmel (T)	-
WD3 WELL BUILDING 2	Carmel (T)	-
WD4 PUMPHOUSE	Carmel (T)	-
PUMP HOUSE	Kent (T)	-
PUMP HOUSE	Kent (T)	-
PUMP HOUSE	Kent (T)	-
ALPINE ACRES WATER TREATMENT PLANT	Patterson (T)	-
DORSETT HOLLOW WATER TREATMENT PLANT	Patterson (T)	-
FOX RUN WATER TREATMENT	Patterson (T)	-
PUMP HOUSE	Patterson (T)	-
LOWER PUMP HOUSE	Philipstown (T)	-
NYC DEP AQUEDUCT	Philipstown (T)	-
GLENMAR GARDENS PUMPHOUSE	Putnam Valley (T)	-
PV PUMP STATION	Putnam Valley (T)	-
BIRCH HILL WATER	Southeast (T)	-
BLACKBERRY WELL	Southeast (T)	-
BLACKBERRY WELL	Southeast (T)	-
BREWSTER HEIGHTS WATER	Southeast (T)	-
BREWSTER HEIGHTS WATER	Southeast (T)	-
BREWSTER WATER SUPPLY- PUMP HOUSE	Southeast (T)	-
BREWSTER WATER SUPPLY- WELL FIELD	Southeast (T)	-
DURKIN WATER	Southeast (T)	-
FOX HILL WATER	Southeast (T)	-
HILLCREST WATER	Southeast (T)	-
LAKE TONETTA	Southeast (T)	-
MOUNTAIN BROOK WATER	Southeast (T)	-
SPRINGHOUSE WATER	Southeast (T)	-
STARR RIDGE WATER	Southeast (T)	-
STARR RIDGE WATER	Southeast (T)	-
VILLAGE OF BREWSTER WATER PUMPHOUSE	Southeast (T)	-
VILLAGE OF BREWSTER WATER TANK	Southeast (T)	-
VILLAGE OF BREWSTER WELLS	Southeast (T)	-
WATER TANK	Southeast (T)	-
WATER TANK, PUMPHOUSE	Southeast (T)	-
WATER TREATMENT	Southeast (T)	-
WELL AND CLUBHOUSE	Southeast (T)	-

Sources: Putnam County Department of Health
- unknown/not available

Wastewater Facilities

Putnam County is home to distributed systems of wastewater treatment plants that discharge effluent to surface waters. All but seven of the treatment plants are located in the New York City Watershed. There are a combination of public and privately owned treatment plants and collection systems. The Town of Carmel has the most public sewer districts. Other public districts are found in the Villages of Cold Spring and Brewster, and the Town of Southeast. In addition to wastewater treatment plants, there are many residents and businesses that rely on individual septic systems (Putnam County Division of Planning and Development 2010).

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Figure 4.6-4. Potable Water Facilities in Putnam County

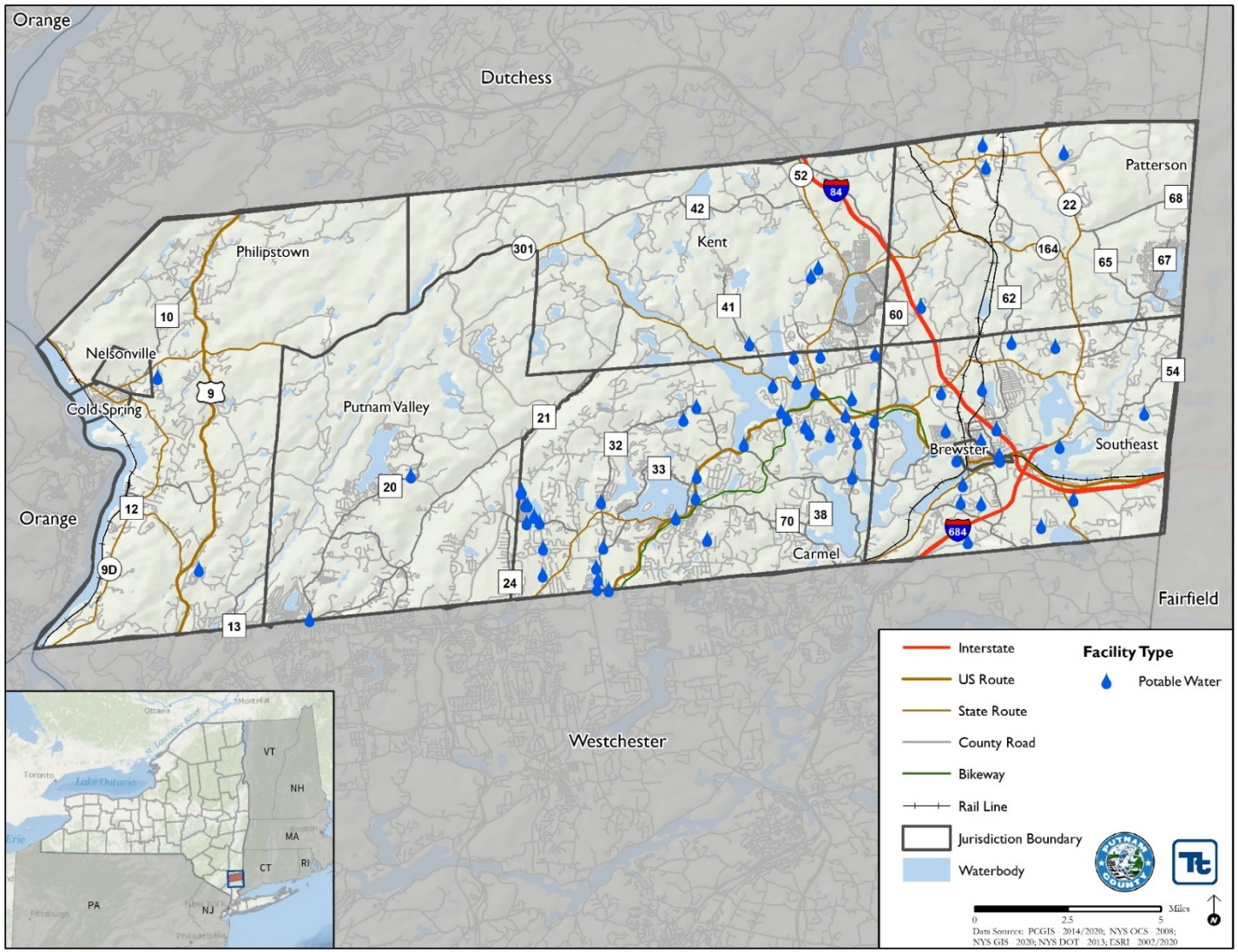

Table 4.6-9 lists both the wastewater treatment facilities and pump stations located in Putnam County. According to the table, the wastewater treatment system for the County appears to be mainly located within the Town of Carmel with other facilities and pump stations located around the County.

Table 4.6-9 Putnam County Wastewater Treatment Facilities and Pump Stations

Facility Name	Facility Location	Backup Power
MARVIN AVENUE PUMP STATION	Brewster (V)	-
PUTNAM AVENUE PUMP STATION	Brewster (V)	-
MAIN STREET PUMP STATION	Brewster (V)	-
CARMEL AVENUE PUMP STATION	Brewster (V)	-
PAR STREET PUMP STATION	Brewster (V)	-
VILLAGE OF BREWSTER WWTP	Brewster (V)	-
WASTE WATER HEAD WORKS	Brewster (V)	-
WWTP	Brewster (V)	-
MAHOPAC PUMP STATION	Carmel (T)	-
CARMEL WASTE WATER	Carmel (T)	-
MICROFILTER BLDG- SEWER #4	Carmel (T)	-
RBC BLDG	Carmel (T)	-
SD4 SEWER TREATMENT PLANT #4	Carmel (T)	Y
SD7 SEWER TX #1 CONTROL BLDG	Carmel (T)	Y
SEWAGE TREATMENT	Carmel (T)	Y
SEWER PLANT - LONG DRIVEWAY	Carmel (T)	-
SEWER PLANT #5	Carmel (T)	-
SEWER PLANT #6	Carmel (T)	-
SEWER PLANT 2 PRIMARY SETTING TANK	Carmel (T)	-
SEWER PLANT-LONG DRIVEWAY	Carmel (T)	-
SEWER TX #1 TANK/ SEW 7 SAND FLTR	Carmel (T)	-
WASTEWATER TREATMENT PLANT	Carmel (T)	-
WD6 WATER PLANT & TANKS	Carmel (T)	Y
COLD SPRING WWTP	Cold Spring (V)	-
MARKET STREET PUMP STATIONI	Cold Spring (V)	-
SEWAGE PUMP 3	Cold Spring (V)	-
WEST STREET PUMP STATION	Cold Spring (V)	-
KENT SEWER DISTRICT	Kent (T)	-
CORNWALL MEADOWS PUMP STATION	Patterson (T)	Y
COVINGTON GREENS PUMP STATION	Patterson (T)	Y
EDUCATION ALLIANCE CAMP	Patterson (T)	-
FOX RUN CONDOMINIUMS	Patterson (T)	Y
FRONT STREET PUMP STATION	Patterson (T)	Y
PATTERSON COMMONS PUMP STATION	Patterson (T)	Y
PATTERSON HAMLET WWTP	Patterson (T)	-
PATTERSON VILLAGE PUMP STATION	Patterson (T)	Y

Facility Name	Facility Location	Backup Power
SOUTH STREET PUMP STATION	Patterson (T)	Y
THUNDER RIDGE SKI AREA	Patterson (T)	Y
WATCHTOWER EDUCATION CENTER	Patterson (T)	Y
BLACKBERRY WWTP	Southeast (T)	-
BREWSTER - SEWAGE LIFT STATION	Southeast (T)	-
BREWSTER - SEWAGE LIFT STATION	Southeast (T)	-
BREWSTER - SEWAGE LIFT STATION	Southeast (T)	-
BREWSTER - SEWAGE LIFT STATION	Southeast (T)	-
BREWSTER - SEWAGE LIFT STATION	Southeast (T)	-
BREWSTER - SEWAGE LIFT STATION	Southeast (T)	-
SEWERAGE SYSTEMS	Southeast (T)	-
VAILS GROVE WWTP	Southeast (T)	-
WASTEWATER TREATMENT PLAN	Southeast (T)	-
WW TREATMENT PLANT	Southeast (T)	-

Sources: *Putnam County Health Department*
- *unknown/not available*
Y *Yes*

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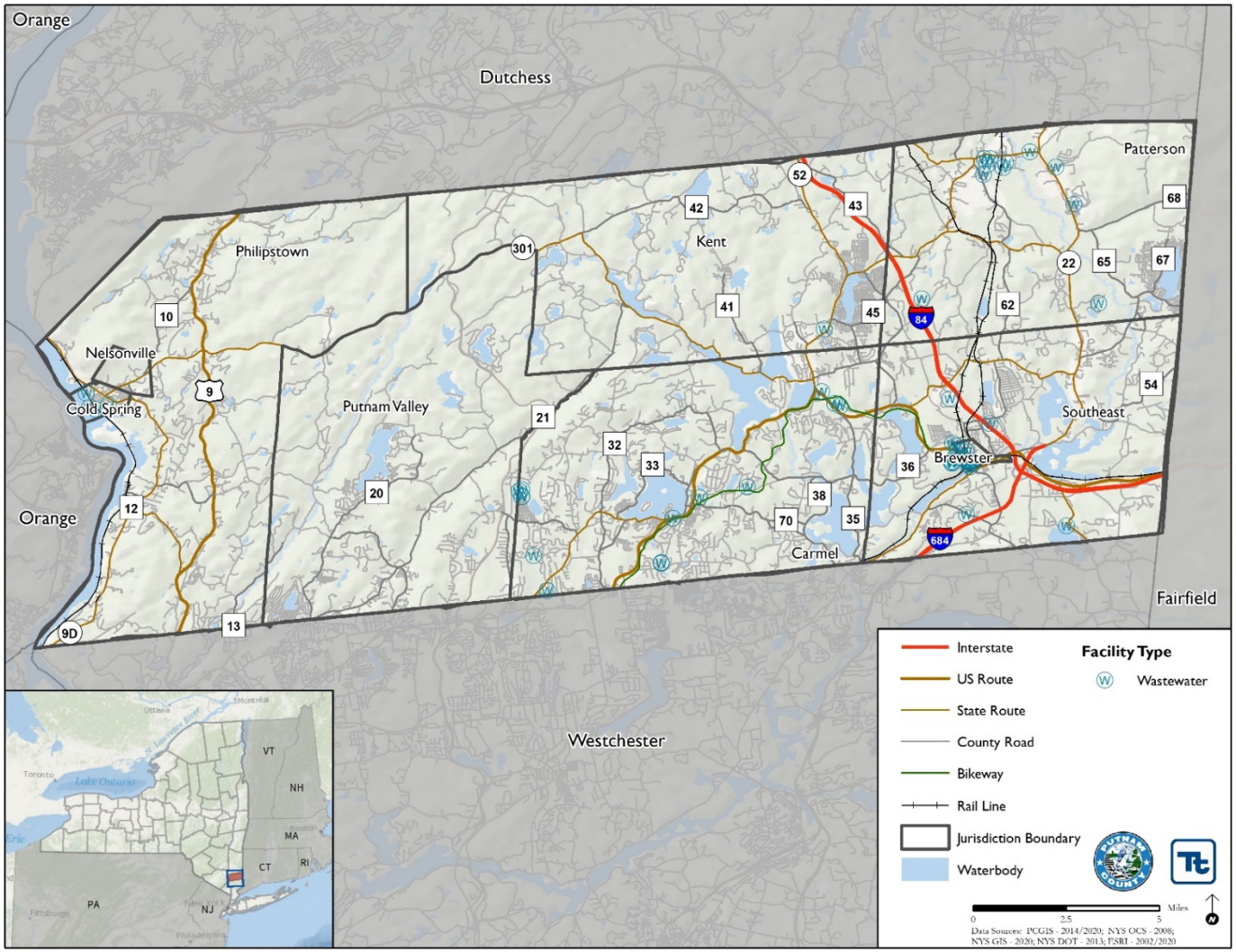
Figure 4.6-5. Wastewater Facilities in Putnam County



4.6.3 Health and Medical

This section provides information on Health and Medical lifelines. Components and subcomponents of this lifeline category include medical care providers, patient movement services, fatality management services, public health, and medical supply chain. Figure 4.6-2 shows the location of the facilities and a list of the critical facilities is provided in Appendix F (Critical Facilities).

Hospitals and Medical Facilities

Table 4.6-10 identifies hospitals and medical facilities in Putnam County. One major hospital is located within the County in the Town of Carmel.

Table 4.6-10. Hospital and Medical Facilities in Putnam County

Facility Name	Facility Location	Backup Power
COUNTY RECORD FACILITY	Brewster (V)	-
CAMARDA CARE CENTER	Carmel (T)	-
COVECARE CENTER	Carmel (T)	-
PHC AMBULATORY CARE OFFICES	Carmel (T)	-
PHC- EMERGENCY ROOM	Carmel (T)	-
GREEN GLASS BUILDING	Southeast (T)	-
HUDSON VALLEY UNITED CEREBRAL PALSY	Southeast (T)	-

Sources: *Putnam County*
- *Unknown/unavailable*

4.6.4 Energy (Power and Fuel)

This section provides information on Energy lifelines. Components and subcomponents of this lifeline category include facilities associated with the power grid (including transmission and distribution systems) and fuel (including refining, pipelines, and fuel distribution).

Energy Resources

New York State Electric and Gas Corporation (NYSEG) is the primary electric and gas utility company in Putnam County. Natural gas services are also provided by smaller, private companies. Table 4.6-11 lists the natural gas facilities in Putnam County, and Table 4.6-12 lists the electric generating facilities and electric substations in the County.

Table 4.6-11 Natural Gas Facilities in Putnam County

Facility Name	Facility Location	Backup Power
CEN HUD - STILLWATER ROAD	Carmel (T)	-
CHGE TRANSMISSION STATION	Carmel (T)	-
COUNTYLINE GETTY	Patterson (T)	-
PATTERSON AUTOMOTIVE	Patterson (T)	-
PATTERSON MOBIL	Patterson (T)	-
STATELINE FOOD & BEVERAGE	Patterson (T)	-
ALGONQUIN - TULIP ROAD	Southeast (T)	-
NYSEG - BREWSTER CITY GATE	Southeast (T)	-

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Sources: NYSEG and Central Hudson
- Unknown/not available

Table 4.6-12. Electric Substations and Transfer Facilities in Putnam County

Facility Name	Facility Location	Backup Power
NYSEG - CARMEL	Carmel (T)	-
NYSEG - WOOD STREET	Carmel (T)	-
NYSEG - KENT CLIFFS	Kent (T)	-
NYSEG - HAVILAND HOLLOW SUBSTATION	Patterson (T)	-
NYSEG - KENT SUBSTATION	Patterson (T)	-
NYSEG - WEST PATTERSON SUBSTATION	Patterson (T)	-
CENHUD - INDIAN BROOK ROAD	Philipstown (T)	-
NYSEG - ADAMS CORNERS	Putnam Valley (T)	-
NYSEG - DINGLE RIDGE	Southeast (T)	-
NYSEG - PUTNAM LAKE	Southeast (T)	-
NYSEG - TILLY FOSTER	Southeast (T)	-

Sources: NYSEG and Central Hudson
- Unknown/unavailable

4.6.5 Communications

This section provides information on Communication lifelines. Components and subcomponents of this lifeline category include telecom infrastructure, alert, warning, and messaging systems, 911 and dispatch, responder communications, and financial facilities. Table 4.6-13 lists the communication towers and facilities located in the County. Figure 4.6-6 shows the locations of the facilities for communication facilities.

Table 4.6-13 Communication Facilities in Putnam County

Facility Name	Facility Location	Backup Power
KENT VOLUNTEER FIRE DEPARTMENT	Town of Kent	-
COMMUNICATIONS TOWER	Town of Kent	-
COMMUNICATIONS TOWER	Town of Kent	-
COMMUNICATIONS TOWER	Town of Kent	-
CELL TOWER IN SILO	Town of Patterson	-
ECHO ROAD TELECOMMUNICATIONS TOWER	Town of Patterson	-
MALDUNN TELECOMMUNICATIONS TOWER	Town of Patterson	-
NOLETTI TELECOMMUNICATIONS TOWER	Town of Patterson	-
TOWER HILL	Town of Patterson	-
VERIZON	Town of Patterson	-
WIRELESS EDGE TELECOMMUNICATIONS TOWER	Town of Patterson	-
CELL TOWER	Town of Philipstown	-
CELL TOWER	Town of Philipstown	-
COMMUNICATIONS TOWER	Town of Philipstown	-
COMMUNICATIONS TOWER	Town of Philipstown	-
CROWN ATLANTIC TOWER	Town of Philipstown	Y

Facility Name	Facility Location	Backup Power
CELL TOWER/POWER LINES	Town of Putnam Valley	-
VERIZON CELL TOWER	Town of Putnam Valley	-
CELL TOWER	Town of Southeast	-
CELL TOWER WAY BACK IN DRIVEWAY	Town of Southeast	-
DPW- TELEPHONE COMMUNICATIONS	Village of Brewster	-
TELEPHONE COMMUNICATIONS, EXCEPT RADIOTE	Village of Brewster	-
VERIZON COMM	Village of Brewster	-

Sources: *Putnam County*
Y *Yes*
- *Unknown/unavailable*

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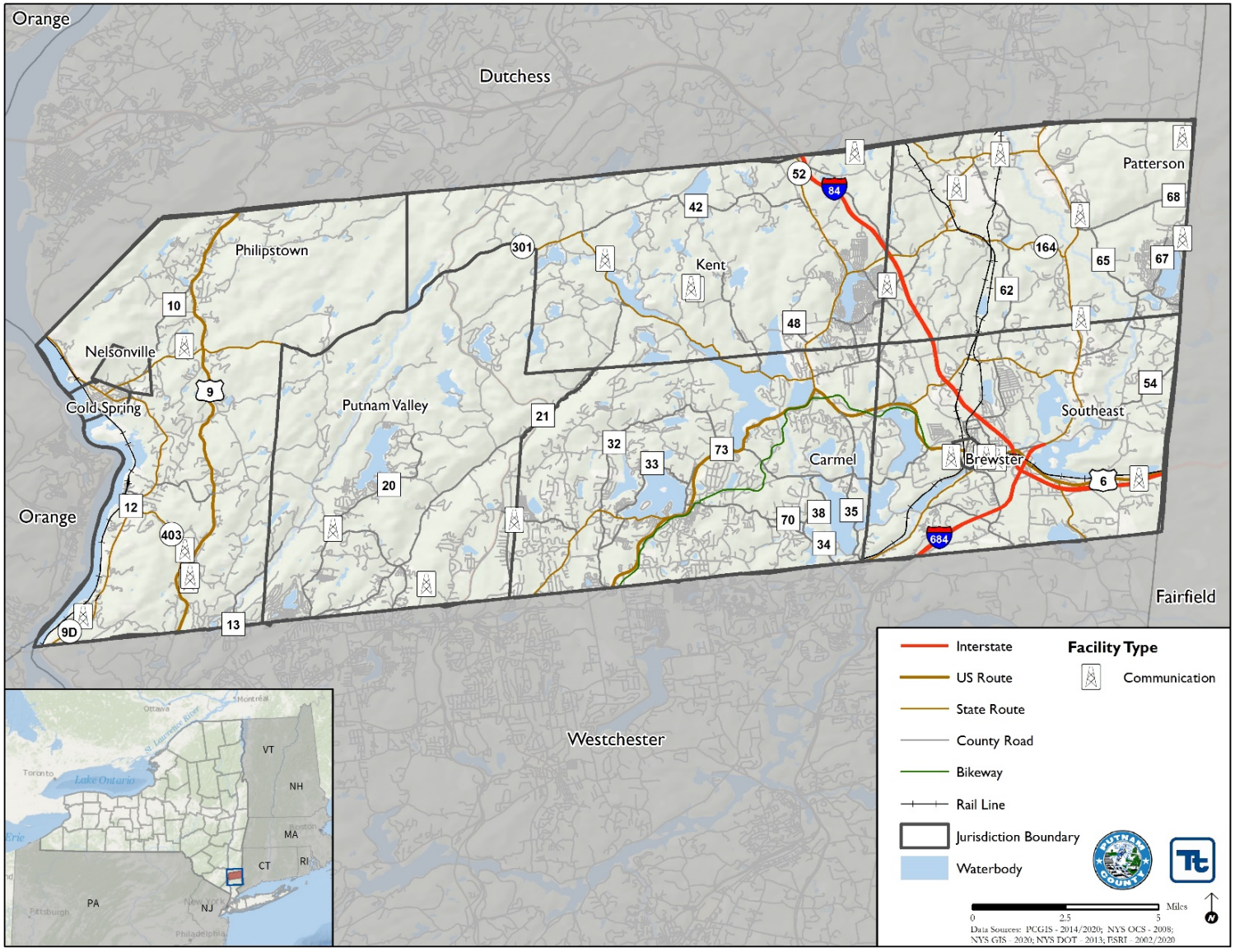
Figure 4.6-6. Communication Facilities within Putnam County



4.6.6 Transportation

This section provides information on Transportation lifelines. Components and subcomponents of this lifeline category include highway/roadway/motor vehicle facilities, mass transit, railway, aviation, and maritime facilities. Table 4.6-14 through Table 4.6-16 and Figure 4.6-7 identify the transportation systems found in Putnam County.

Highway, Roadways and Associated Systems

Many of New York State's major highways and roadways pass through the County. While Interstate 84 runs generally east-west through New York to Connecticut, it runs diagonally through the eastern part of Putnam County. Route 684 runs in a general north and south direction, connecting the eastern half of the County to surrounding counties, as well as New Jersey and Connecticut. The Taconic Parkway, which also runs in a north and south direction, connects the western half of the County to most of these same regions as the Interstates. U.S. Routes 6 and 9 also serve as important roadways for intra- and inter-county travel.

Bus and Other Transit Facilities

Public bus service in Putnam County consists of the County's bus system, Putnam Area Rapid Transit (PART), several Westchester County Bee Line routes, and a Housatonic Area Regional Transit (HART) route that operates between Danbury, Connecticut and Brewster (Putnam County Division of Planning and Development 2010).

PART service is generally concentrated in the eastern part of the County, where service can be provided to more densely populated areas and where linkages can be made to other buses and train services. The Westchester Bee Line provides commuter service through the Town of Carmel, along Route 6 from the hamlet of Carmel to White Plains, and a Croton Falls commuter run between the Croton Falls train station and the Mahopac area, along Croton Falls Road. The HART service provides commuter and midday service (Putnam County Division of Planning and Development 2010).

Table 4.6-14 identifies bus and other transit facilities in Putnam County.

Table 4.6-14 Bus and Other Transit Facilities in Putnam County

Facility Name	Facility Location	Backup Power
PUTNAM COUNTY BUS GARAGE	Patterson (T)	-

Sources: *Putnam County*
- *Unknown/not available*

Railroad Facilities

Two Metro-North rail lines run north and south through both the eastern and western halves of the County. The Harlem Line in the east and the Hudson Line in the west connect the County to Albany to the north, and New York City and farther regions via Grand Central Terminal. There are seven railroad stops in Putnam County including Brewster Village, Brewster North, Patterson, Cold Spring, Garrison, Breakneck, and Manitou. Ridership on the rail service is operated by Metro North and has increased between 1980 and 2002, from 669,031 rides per year to over 1.6 million rides per year. The busiest stations are Brewster Village, Southeast, Cold Spring and Garrison (Putnam County Division of Planning and Development 2010).

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Table 4.6-15 Rail Facilities in Putnam County

Name	Municipality	Backup Power
Metro-North – Manitou Station (Hudson Line)	Town of Philipstown	-
Metro North – Garrison Station (Hudson Line)	Town of Philipstown	-
Metro North - Cold Spring Station (Hudson Line)	Village of Cold Spring	-
Metro North – Breakneck Ridge Station (Hudson Line)	Village of Cold Spring	-
Metro North - Brewster Station (Harlem Line)	Village of Brewster	-
Metro North - Southeast Station (Harlem Line)	Town of Southeast	-
Metro North – Patterson Station (Harlem Line)	Town of Patterson	-
MTA Brewster Yard	Town of Southeast	-

Source: Putnam County
- Unknown/not available

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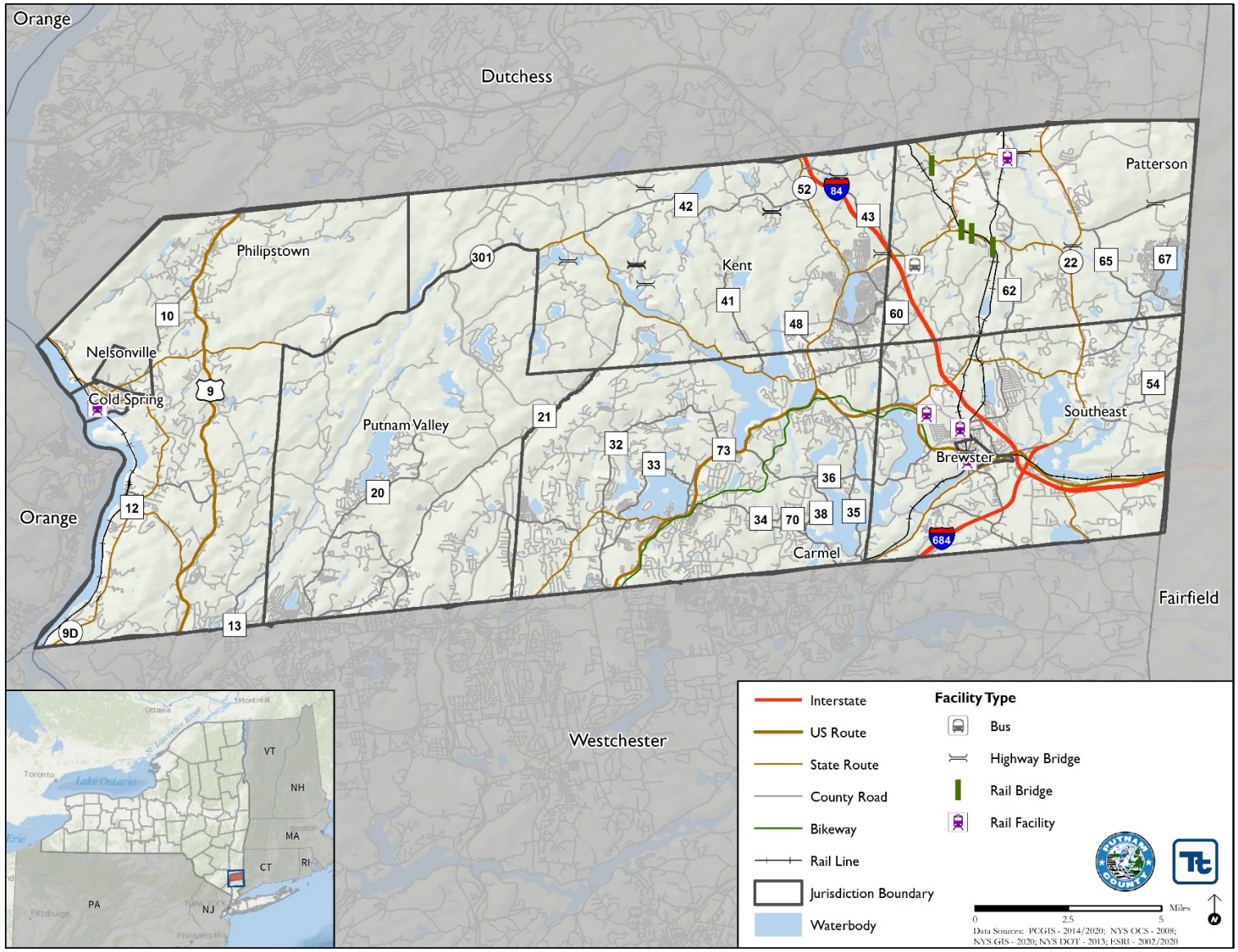
Figure 4.6-7 Transportation Features in Putnam County, New York



Bridges

Of the highway bridges in the County, those identified in Table 4.6-16 are listed as critical. There were also five railroad bridges that were listed as critical that include Mooney Hill Bridge in the Town of Patterson and four bridges located along NYS Route 164 in the Town of Patterson.

In addition to the bridges identified in the Table, the following bridges were rated as "poor" by the New York State Department of Transportation as of June 2020 (New York State Department of Transportation 2020). Some bridge projects are identified in individual municipal annexes.

- MetroNorth (Brewster)
- Drewville Road/County Route 36 Bridge (Carmel)
- Lunn Terrace/MetroNorth (Cold Spring)
- Ludington Court (Kent)
- Brimstone Road (Patterson)
- Mooney Hill Road/MetroNorth (Patterson)
- US 9 at Clove Creek (Philipstown)
- Horton Hollow Road at Canopus Creek (Putnam Valley)
- Oscawanna Lake Road at Peekskill Hollow Creek (Putnam Valley)
- Peekskill Hollow Road at Peekskill Hollow Creek (Putnam Valley)
- Doansburg Road/County Route 65

Table 4.6-16 Critical Highway Bridges in Putnam County

Facility Name	Facility Location	Backup Power
CARMEL AVE. BRIDGE	Brewster (V)	-
E BOYDS ROAD	Kent (T)	-
SCHRADE ROAD/WHANGTOWN ROAD	Kent (T)	-
SCHRADE ROAD/WHANGTOWN ROAD	Kent (T)	-
DEANS ROAD	Kent (T)	-
EAST BOYDS 1	Kent (T)	-
MOONEY HILL	Kent (T)	-
NIHMAM ROAD	Kent (T)	-
NIHMAM ROAD	Kent (T)	-
SAGAMORE ROAD	Kent (T)	-
TOWN OF KENT	Kent (T)	-
TOWN OF KENT	Kent (T)	-
BRIDGE	Patterson (T)	-
ROUTE 22 BRIDGE	Patterson (T)	-
ROUTE 311 BRIDGE	Patterson (T)	-

Sources: Putnam County GIS 2020
- Unknown/not available

4.6.7 Hazardous Materials

This section provides information on Hazardous Material lifelines. Components and subcomponents of this lifeline category include oil/hazmat facilities or incidents, radiological/nuclear incidents, and oil/HAZMAT/toxic incidents from non-fixed facilities.

A Superfund site consists of land in the United States that has been contaminated by hazardous waste and identified by the U.S. Environmental Protection Agency (EPA) as a candidate for cleanup because it poses a risk to human health or the environment. These sites are placed on the National Priorities List (NPL), the list of national priorities among the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and its territories. The NPL is intended primarily to guide EPA in determining which sites warrant further investigation.

Abandoned hazardous waste sites placed on the federal NPL include those that EPA has determined present *a significant risk to human health or the environment*, with the sites being eligible for remediation under the Superfund Trust Fund Program. As of 2018, Putnam hosts four hazardous sites in the federal Superfund Program that are listed as on the NPL (US EPA 2020).

The EPA Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) (Superfund) Public Access Database (CPAD) reports that there are currently 15 archived Superfund sites located in Broome County (US EPA 2020). An archived Superfund site is one that has no further interest under the Federal Superfund Program based on available information and is no longer part of the CERCLIS inventory. Archived and active Superfund sites are accessible through the same database but are differentiated by status.

In addition to the hazardous waste sites, there are numerous hazardous facilities in Putnam County cataloged by the NYSDEC's Bulk Storage Program Database. The Bulk Storage Program includes three types of facilities; Petroleum Bulk Storage (PBS), Major Oil Storage Facilities (MOSF), and Chemical Bulk Storage (CBS) that require registration with NYSDEC for all facilities with a total storage capacity of petroleum products of the following:

- PBS—1,100 gallons or more
- CBS underground tanks and all stationary aboveground tanks—185 gallons or more
- MOSF sites—400,000 gallons or more.

As of April 2020, 2,213 sites are listed in the NYSDEC's Bulk Storage Program Database in Putnam County, New York (NYSDEC 2020). These include 46 CBS tank sites, 14 major oil storage facilities, and 2,153 petroleum bulk storage sites.

4.6.8 Housing and Relocation

Putnam County and municipalities recognize the need to identify potential sites for temporary housing and relocation and ensuring residents are aware of these facilities is critical.

Temporary Housing

During the planning process, each municipality was asked to identify potential locations for temporary housing. Table 4.6-17 lists the locations of the potential temporary housing locations identified by each municipality.

Table 4.6-17. Potential Locations for Temporary Housing

Municipality	Location Name	Location Address
Philipstown	Grounds of the Town Recreation Center	107 Glenclyffe Drive, Garrison
	Grounds of the Philipstown Highway Center	Fishkill Road, Cold Spring NY
	Open areas designated by the Town	-
Putnam Valley	Grounds of the Town Park	Town Park Lane (off) Oscawana Lake Road
	Grounds of the Putnam Lake VFW	154 Oscawana Lake Road

Municipality	Location Name	Location Address
	Grounds of the Clarence Fahnestock State Park (Putnam Valley NY)	Route 301
	Open areas designated by the Town	-
Kent	Grounds of the Huestis Field Town Park	Farmers Mills Road, Kent
	Clarence Fahnestock State Park (Putnam Valley NY)	Route 301
	Open areas designated by the Town	-
Carmel	Grounds of the Sycamore Lake Town Park	Long Pond Road, Mahopac
	Putnam County Highways / Facilities Stock Pile	Route 6N, Mahopac
	Open areas designated by the Town	-
Patterson	Location of the Old Town Hall	Route 311 & 164
	–Community Service Property (open Space)	Open space
	West Street Open Lot	West Street and South Street, Patterson
	Putnam Lake VFW Hall – parking area	Fairfield Drive, Brewster
	Open areas designated by the Town	-
Southeast	Green Chimney School	400 Doansburg Road, Brewster
	Grounds of the Putnam County Highways / Facilities Stock Pile	Doansburg and Gage Road, Brewster
	Southeast Ball Fields	Zimmer Road, Brewster

Note: The Villages of Brewster, Cold Spring and Nelsonville will partner with the towns in which they reside.

Long-Term Housing

To support identification of potential sites suitable for relocating houses out of hazard areas (i.e., the floodplain) or building new homes once properties in hazard areas or the floodplain are acquired, the County performed a buildable parcel analysis. The analysis identified potential areas for post-disaster development in accordance with the 2017 NYSDHSES Hazard Mitigation Planning Standards Guide requirement "to identify long-term housing options for relocating displaced residents to maintain post-disaster social and economic stability". The County analysis provides an indication of vacant land suitable for development (Figure 4.6-8). In this case, vacant land is defined as a parcel that is classified as vacant and is located outside the following hazard areas:

1) FEMA floodplain.
2) Wetlands.
3) Federal, state and county park land.
4) Land that has steep slopes (>20% gradient) without consideration of ownership or availability. provides potential long-term housing locations in Putnam County.

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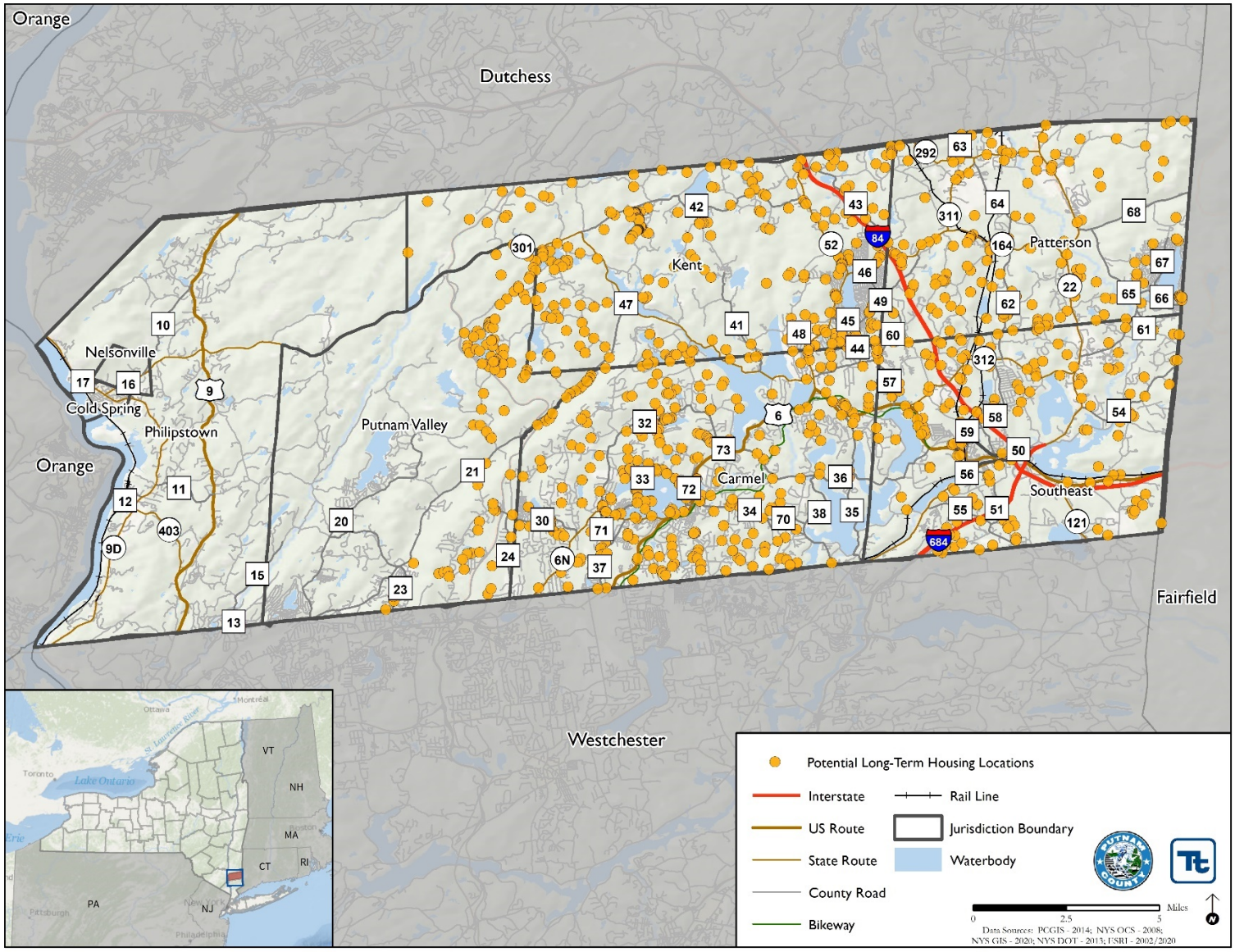
Figure 4.6-8 Potential Long-Term Housing Locations in Putnam County, New York



Evacuation Routes

As part of the planning process, Putnam County identified evacuation routes and procedures in the event of a disaster that would warrant an evacuation. Figure 4.6-9 illustrates the evacuation routes identified by the County, shown in green. Additionally, the County maintains specific evacuation plans for hurricanes and radiological emergencies. The Hurricane Evacuation Plan, revised February 2014, provides details regarding evacuations in the event of a hurricane. Due to the County's close proximity to Indian Point Energy Center in Buchanan (Westchester County), Putnam County has specific evacuation routes and procedures. Emergency information pertaining to the Indian Point Energy Center in Putnam County can be found here: https://alert.ny.gov/system/files/documents/2019/12/putnam_2019-2020_web.pdf and details are discussed in the Putnam County Radiological Emergency Response Plan (July 2018). It should be noted that the Indian Point Energy Center will be decommissioned in 2021.

The evacuation routes identified for all hazards include:

- Route 9D
- Route 9
- Sprout Brook Road
- Oscawana Lake Road
- Peekskill Hollow Road
- Taconic State Parkway
- Route 301
- Route 84
- Route 311
- Route 6
- Route 22
- Route 684

The County has identified a number of mitigation actions within their County annex (Section 9.1) that will improve county-wide emergency management capabilities, including evacuation and sheltering.

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Figure 4.6-9. Evacuation Routes in Putnam County