ENVIRONMENTAL RESOURCE INVENTORY

ERI

JULY 2012

For the Borough of:

HIGHTSTOWN

Mercer County, New Jersey

by:

DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

with:

The Hightstown Environmental Commission

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The Delaware Valley Regional Planning Commission is dedicated to uniting the region's elected officials, planning professionals, and the public with a common vision of making a great region even greater. Shaping the way we live, work, and play, DVRPC builds consensus on improving transportation, promoting smart growth, protecting the environment, and enhancing the economy. We serve a diverse region of nine counties: Bucks, Chester, Delaware, Montgomery, and Philadelphia in Pennsylvania; and Burlington, Camden, Gloucester, and Mercer in New Jersey. DVRPC is the federally designated Metropolitan Planning Organization for the Greater Philadelphia Region — leading the way to a better future.

The symbol in our logo is adapted from the official DVRPC seal and is designed as a stylized image of the Delaware Valley. The outer ring symbolizes the region as a whole while the diagonal bar signifies the Delaware River. The two adjoining crescents represent the Commonwealth of Pennsylvania and the State of New Jersey.

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Acknowledgments

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The impetus for the creation of this document, and its guidance and review, came from the Borough of Hightstown Environmental Commission.

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Executive Summary

Hightstown is a municipality of about 5,500 people and covers just 1.25 square miles (808 acres). Hightstown developed as a mill town in the early 1700s, and grew into a commercial and industrial hub in the 1800s. Hightstown was once the crossroads of two railroads, the Camden & Amboy and the Pemberton & Hightstown. Today, the history of Hightstown is preserved through the restoration of many historic homes in the downtown.

Hightstown lies in the Inner Coastal Plain with well-drained and nutrient-rich soils. Rocky Brook flows through Hightstown and receives stormwater runoff from the borough. Peddie Lake, formed by an impoundment of Rocky Brook, is used extensively for recreation. Part of the downtown area on the banks of Rocky Brook is located in the floodplain, and has experienced severe flooding over the years. The flooding during late summer 2011 was particularly widespread.

Peddie Lake

Photo by DVRPC

Over 90% of the borough is developed land, which is primarily residential. Wetland areas are located along Rocky Brook and in the northeastern portion of the borough. There are also small forested areas along Rocky Brook and in other small patches scattered about the borough.

Although within a highly urbanized area, Rocky Brook provides natural habitat for a variety of plant and animal species. The threatened wood turtle and other herptile species are known to be present, and the stream also provides potential foraging habitat for the rare bald eagle.

Hightstown draws its public water supply from wells that tap the Potomac-Raritan-Magothy aquifer. This water is treated at the Water Treatment Plant on Bank Street before being delivered to borough residents.

The Roger G. Cook Greenway was recently created as a trail linking the parks and natural areas of the borough. This greenway links the borough's environmental and historic resources and provides opportunities for residents and visitors to enjoy the nature and recreation available in Hightstown.

CHAPTER 1

Introduction

The purpose of an Environmental Resource Inventory is to identify and describe the natural resources of a community. A community's natural resources – its soil, water, air, forests, fields, and waterways – are fundamental to its character. The protection and wise use of those resources is essential to the public health, safety, and welfare of current and future residents.

The Environmental Resource Inventory provides the basis for the development of methods and steps to preserve, conserve, and utilize those resources, although it does not include specific recommendations to those ends. It is, instead, a compendium of all the existing information that can be found about a municipality's natural resources, presented in a form that is useful to a broad audience. The Inventory reflects a particular moment in time, and should be updated as new data becomes available.

Sources

Several documents and reports were utilized in preparing the *Environmental Resource Inventory (ERI) for Hightstown*. These reports and references are listed at the end of this document.

The maps and data relating to natural resources are mainly derived from the New Jersey Department of Environmental Protection's (NJDEP's) Geographic Information System mapping, the Landscape Project produced by the Endangered and Nongame Species Program of the NJDEP Division of Fish and Wildlife, reports by the United States Geologic Service (USGS) and New Jersey Geologic Service, and data and maps compiled by the Delaware Valley Regional Planning Commission (DVRPC). Information from these sources specific to Hightstown has been included whenever it was available. Information from other reports about specific sites has also been incorporated, along with data provided by the borough and county. The ERI has been reviewed and revised by members of the Environmental Commission and other municipal officials.

Descriptive introductions to some topics have been included in the ERI to give readers background on various complex topics. The hope is that this information will also assist the Environmental Commission and other township officials in obtaining additional data from state sources in the future and to determine the types of investigations that still need to be conducted.

CHAPTER 2

Brief History

Long before European settlement, various peoples occupied the lands that would become Mercer County. By the time of European arrivals, the Algonquin-speaking Native Americans called themselves the Lenni Lenape. Later, they were called the “Delaware” by Europeans. The Lenni Lenape inhabited much of present-day New Jersey, southeastern New York, northern Delaware, and eastern Pennsylvania. The Lenni Lenape valued this region for its rich soils and abundance of fish and game. Agriculture provided a substantial portion of their diet. The regional creeks were extensively used by the Lenni Lenape for transportation. In Algonquin, Lenni Lenape means “true men” or “original people.” The Europeans called them “Delaware Indians” because they inhabited the Delaware Valley, which itself was named in honor of the Governor of Virginia, Sir Thomas West, and Third Lord de la Warr.

Although indigenous people lived in the region for thousands of years while leaving a minimal mark on the land, they succumbed to the diseases and encroachment of the newly arrived European settlers. Many departed to areas of New York, Ohio, Wisconsin, and eventually to Oklahoma. By 1758, all remaining Native Americans south of the Raritan River were encouraged to live in the 3,258-acre reservation called Brotherton in what is now Shamong Township, New Jersey; this has been recognized as the first Indian Reservation in the country.

The first European settlers in the Delaware Valley were the Dutch, who, in 1623, established Fort Nassau near what is today Gloucester City, Camden County. In 1644, King Charles II of England took control of much of America’s eastern seaboard, and deeded most of present-day New Jersey to his brother, the Duke of York, who split it into East and West. The “Keith line” dividing East and West Jersey now forms the diagonal municipal boundary line within Mercer County, and also continues to form the eastern boundary of Burlington County. The land that would become Hightstown Borough was located in East Jersey. The East Jersey Board of Proprietors, whose headquarters were in Perth Amboy, managed the distribution of land in East Jersey as early as 1679. Early deeds for the Hightstown and East Windsor area show that the Board of Proprietors once owned large tracts of land in this area.

Hightstown is named for John and Mary Hight (formerly spelled Haight), who purchased much of the land that is now Hightstown in 1721. The Hights built a blacksmith shop in 1749 and a mill in 1751 near the spot where an Indian trail

crossed Rocky Brook. The Indian trail ran between Perth Amboy and Burlington and would eventually become Main Street. A small village with an inn and other businesses formed around the blacksmith shop and mill of John Hight. A Baptist Church with a 180-foot spire was built in 1785. Early in the borough's history, there were numerous mills along Rocky Brook and Peddie Lake (formerly called Hightstown Lake).

During colonial times, Hightstown was a stop on a stagecoach route that served New Jersey. Hightstown was also a crossroads for troops during the Revolutionary War. Mercer Street was a main thoroughfare for troops en route to the Battle of Monmouth.

Historic Stockton Street

Photo by DVRPC

In 1778, Captain William Smith purchased a large tract of land that extended from Rocky Brook to Etra Road. He built Hightstown's first store in 1783. Smith also rebuilt John Hight's old mill when it burned and built a dam for the mill pond, which would become Peddie Lake. The Smiths were an important family in Hightstown and a descendant of Captain Smith, Rescarrick M. Smith, owned the main hotel in town built in 1850.

In 1816, Mercer Street became a toll road between South Amboy and Bordentown. Hightstown developed rapidly into a commercial and agrarian center for farm produce headed to New York to the north and Camden and Philadelphia to the south. A post office was established in 1819.

In 1830, a charter was granted for the creation of the state's first commercial railroad, the Camden and Amboy Railroad and Transportation Company (C&A). At first, the railroad ties were laid on top of large stones, although a delay in shipment led to the use of wooden ties, which became the industry standard. The C&A rail line was completed to Hightstown by 1832 and the entire line was completed by 1834. In 1833, the "John Bull," the first steam locomotive, traveled this rail line. The Pemberton and Hightstown Railroad was chartered in 1864 and completed in 1868. The Hightstown station joined these two rail lines, and the borough quickly

Historic stone rail ties

Photo by DVRPC

evolved from a small village to a bustling town and transportation hub.

The Borough of Hightstown was incorporated by an Act of the State Legislature on March 5, 1853. This established the distinct municipal governments of Hightstown and East Windsor. By the time of its incorporation, Hightstown had multiple stores, taverns, mills, churches, an academy, a hotel, a variety of mechanics, over 100 dwellings, and a population of over 500 people.

The first public school in Hightstown was established in 1841 in a two-room schoolhouse, which was expanded many times in the following years. In 1894, a new school built of brick was made to replace the old wood frame school. In 1898, Hightstown and East Windsor formed the East Windsor Consolidated School District. New elementary and middle schools were constructed in 1912 and 1922 on Stockton Street. The Hightstown Female Seminary, which would eventually become Peddie School, was established overlooking Peddie Lake in 1864. The academy was renamed Peddie School in honor of philanthropist and politician Thomas B. Peddie in 1872.

Many residents of Hightstown fought in the Civil War, and the Soldier's Monument at the intersection of Rogers Avenue and Stockton Street was unveiled on July 4, 1876 to commemorate their service. Memorial Park at Peddie Lake was dedicated to those who served in the Spanish-American War. Memorial Park is located where John Hight's first mill once stood. A great fire in 1920 burned the flour and feed mills that were there at the time, and the land was purchased by William H. Thompson and D. Herbert Davison and donated to the Borough. The current Peddie Lake Dam was constructed in 1923.

Peddie Lake Dam

Photo by DVRPC

The Industrial Revolution of the late nineteenth century brought manufacturing to Hightstown. Early industries included the Hightstown Smyrna Rug Company, Native Lace Works, and the Reed Brothers Brick Plant. Like the growth that followed the construction of the railroads, the Industrial Revolution propelled Hightstown into a period of growth and prosperity. A number of newspapers were active, water works were installed, and businesses, churches, schools, and banks were built or expanded. By 1900, the population of Hightstown had grown to about 2,000 people.

In the mid-twentieth century, deindustrialization and the increased dominance of automobile traffic led to the decline of the railroads. Traffic on the railroad through Hightstown stopped sometime in the mid-twentieth century and the railroad trestle was taken down in the 1980s.

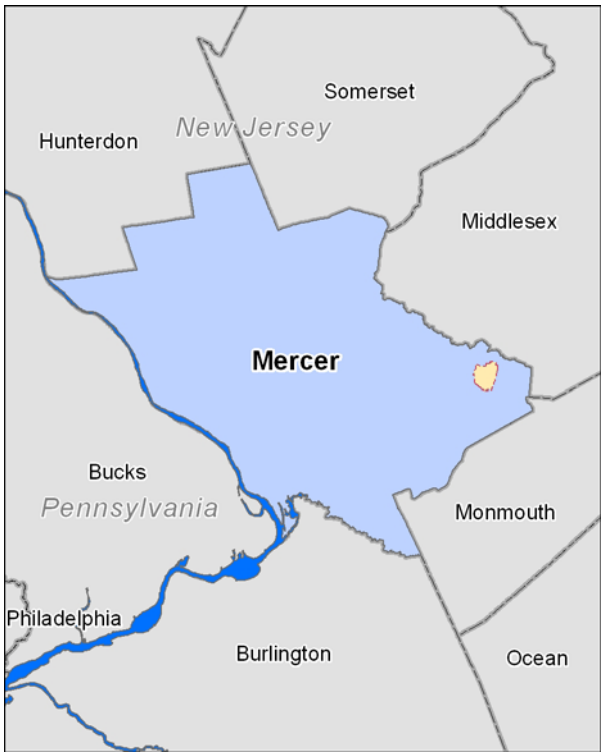
In 1951, Exit 8 of the New Jersey Turnpike was constructed, which led to industrial expansion and population growth in the Hightstown area. In recent years, downtown Hightstown has been revitalized and its history has been honored through preservation of historic homes. Improvements to the borough's parks and the development of the Roger G. Cook Greenway have also brought new life into this historic town.

CHAPTER 3

Location, Size, and Land Use

Hightstown is a borough in western Mercer County, New Jersey. It is entirely surrounded by East Windsor Township. See **Map 1: Borough of Hightstown** and **Figure 1: Location of Hightstown** below.

Figure 1: Location of Hightstown



Source: DVRPC, 2011

Hightstown occupies a total area of just 1.26 square miles, or 808 acres. Hightstown is a mature, developed community and over 90% of the borough is developed land.

About half of the land in Hightstown is categorized as single-family residential. About 10 percent of the borough is categorized as "community services," which includes public buildings and facilities. Another eight percent of the borough is made up of commercial properties. All land uses are detailed in the tables below.

Table 1: Hightstown General Land Cover (2007) shows Hightstown's land cover grouped into general categories. The categories are based on data from the New Jersey Department of Environmental Protection's (NJDEP's) 2007 color infrared digital imagery, which is obtained every five years. NJDEP's categorization separates wooded wetlands from upland forest areas and includes the former in the wetlands category. See **Map 3: NJDEP Land Cover (2007)**. For more detailed NJDEP vegetative cover, see **Map 12: Natural Vegetation (2007)** and **Table 11: Hightstown Natural Vegetation**.

Table 2: Hightstown Detailed Land Use (2005) is from DVRPC and is based on 2005 aerial flights. There are some differences between the NJDEP and DVRPC in how land is categorized. For example, the DVRPC data does not identify wetlands or other types of vegetation beyond "wooded land," although it does specify differences in urban land uses. See **Map 4: DVRPC Land Use (2005)**.

Table 1: Hightstown General Land Cover (2007)

General Land Classes	Area (Acres)	Percent
Agriculture	4.71	0.6%
Barren Land	14.93	1.8%
Forest	18.09	2.2%
Urban	733.05	90.8%
Water	24.69	3.1%
Wetlands	12.03	1.5%
Total	**807.51**	**100.0%**

Source: NJDEP, 2007

Table 2: Hightstown Detailed Land Use (2005)

Type	Area (Acres)	Percentage
Agriculture	16.33	2.0%
Commercial	65.87	8.2%
Community Services	83.98	10.4%
Manufacturing: Heavy Industrial	16.07	2.0%
Parking: Agriculture	0.28	0.0%
Parking: Commercial	18.23	2.3%
Parking: Community Services	13.84	1.7%
Parking: Heavy Manufacturing	2.10	0.3%
Parking: Multi-Family	8.62	1.1%
Parking: Recreation	1.57	0.2%
Recreation	43.80	5.4%
Residential: Multi-Family	46.73	5.8%
Residential: Single-Family Detached	392.45	48.6%
Transportation	0.17	0.0%
Utility	8.74	1.1%
Vacant	47.23	5.8%
Water	22.58	2.8%
Wooded	18.92	2.3%
Total	**807.51**	**100.0%**

Source: DVRPC, 2005

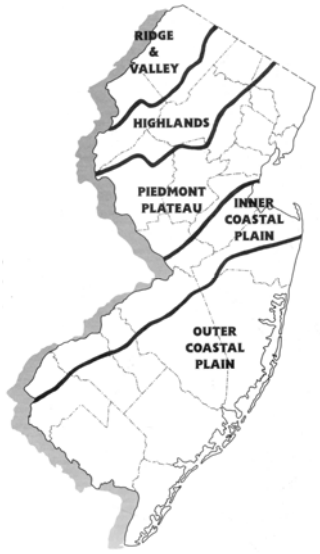
CHAPTER 4

Natural Resources

Physiography

Physiography is the study of a location in relation to its underlying geology. New Jersey is characterized by four main physiographic provinces (see **Figure 2: The Physiographic Regions of New Jersey**). The rocky terrain of the Appalachian Province is at one extreme and the sands of the coast are at the other. Hightstown is located in the Inner portion of the Atlantic Coastal Plain.

Figure 2: The Physiographic Regions of New Jersey



Source: NJGS

The Atlantic Coastal Plain landscape extends from Massachusetts to Texas and is divided into Inner and Outer sections. The Coastal Plain generally consists of unconsolidated sands, silts, and clays. As these sediments are prone to erosion, the Coastal Plain is generally characterized by regions of low topographic relief. In New Jersey, the Inner Coastal Plain is made up of interbedded sand and clay. Deposits originating in the breakdown of Appalachian and Catskill sedimentary, metamorphic, and igneous rocks are interbedded with layers formed by oceanic (marine) deposition, which occurred as the ocean shoreline advanced and receded over geologic time.

The Inner Plain layers date from the Cretaceous Period, 135 to 65 million years ago. Generally, soils of the Inner Coastal Plain are quite fertile. The Outer Coastal Plain was formed more recently than the Inner Coastal Plain. It was laid down by the ocean and developed during the mid-to-late part of the Cenozoic Era, 65 million years ago to the present. Outer Coastal Plain soils are sandier and less fertile than those of the Inner Plain and do not hold water as well.

Due to its location in the Inner Coastal Plain, the soils of the Hightstown area are very fertile and would be categorized as prime farmland had they not been developed. The topography of Hightstown is generally flat, which is typical of

areas in the Inner Coastal Plain. The highest elevation in the borough is about 123 feet above sea level, as shown in **Map 5: Elevation**.

Soils

Soil is the foundation for all land uses. A region's soil defines what vegetation is possible, therefore influencing agricultural uses. Soil properties also affect the location of wells and septic facilities, often determining development potential in certain areas. Soil is a natural resource that cannot be replenished on the human time-scale.

Hightstown's soils consist of a variety of series types and variations within those series as identified by the U.S. Department of Agriculture's Natural Resources Conservation Service. All soil types in the borough are listed in **Table 3: Hightstown Soils** and shown on **Map 6: Soils**.

Soil Series

Several soil series appear more frequently in Hightstown than others and are briefly described as follows according to the NRCS soil database.

Sassafras

The most abundant soil series in Hightstown is the Sassafras series, which makes up over 40 percent of borough soils (333 acres). Sassafras soils are well drained and the seasonal high water table tends to be greater than 72 inches. This soil series is strongly-to-extremely acidic and is considered prime farmland. These soils are highly suitable for construction, onsite effluent disposal, and recreational development. Native vegetation is mixed upland hardwoods, with some shortleaf and Virginia pine. This soil is a sandy loam, which is well-drained and nutrient-rich and an ideal soil for gardening.

Dawes Park

Photo by DVRPC

Othello

The Othello series makes up about 14 percent (110 acres) of borough soils. This series is generally found on lowland areas and is very shallow or poorly drained, with a water table from zero to 10 inches. The soil is strongly-to-extremely acidic.

The Othello series is used for woodland and cropland, and is considered a soil of Statewide Importance when drained. Where wooded, the dominant vegetation is wetland hardwoods, mostly sweetgum, black gum, red maple, wetland oaks, loblolly pine, and pond pine.

Udorthents

Covering about eight percent (63 acres) of the borough, the third most common soil type in Hightstown is Udorthents soils, which are composed of fill materials with a stratified substratum. Udorthents soils vary from well-drained to somewhat poorly drained soils and are formed in stratified sandy or loamy fill materials. The properties of these soils vary greatly with depth and location; however, they are generally well suited to use as building sites, in addition to their frequent use for parks, recreation fields, lawns, and landscaping. Restrictive layers and buried objects generally obstruct deep excavations. In urban areas, vegetable gardens generally can be planted if soil tests are made to identify possibly contaminated soil, as with heavy metals.

Table 3: Hightstown Soils

Soil Family	Soil Name	Soil Symbol	Acres	% of Borough	Ag. Quality*	Hydric?
Elkton	Elkton silt loam, 0 to 2 percent slopes	EkbA	11.14	1.4%	S-1	Yes
Evesboro	Evesboro loamy sand, 0 to 5 percent slopes	EvgB	43.52	5.4%	NA	No
Fallsington	Fallsington sandy loam, 0 to 2 percent slopes	FamA	7.30	0.9%	S-1	Yes
Fluvaquents	Fluvaquents, loamy, 0 to 3 percent slopes, frequently flooded	FmhAt	21.93	2.7%	NA	Yes
Fort Mott	Fort Mott loamy sand, 0 to 5 percent slopes	FodB	1.21	0.1%	S-1	No
	Fort Mott loamy sand, 5 to 10 percent slopes	FodC	15.95	2.0%	NA	No
Glassboro and Woodstown	Glassboro and Woodstown sandy loams, 0 to 5 percent slopes	GKAWOB	40.35	5.0%	P-1	Yes
Mattapex and Bertie	Mattapex and Bertie loams, 0 to 5 percent slopes	MBYB	14.28	1.8%	P-1	Yes
Matapeake	Matapeake loam, 2 to 5 percent slopes	MbpB	55.08	6.8%	S-1	No
Othello	Othello silt loam, 0 to 2 percent slopes	OthA	110.47	13.7%	S-1	Yes

Soil Family	Soil Name	Soil Symbol	Acres	% of Borough	Ag. Quality*	Hydric?
Portsmouth	Portsmouth variant silt loam, 0 to 2 percent slopes	PortA	0.40	0.1%	S-1	Yes
Sassafras	Sassafras sandy loam, 2 to 5 percent slopes	SacB	330.43	40.9%	P-1	Yes
	Sassafras sandy loam, 5 to 10 percent slopes, eroded	SacC2	2.82	0.3%	S-1	No
Sassafras-Woodstown	Sassafras-Woodstown sandy loams, 2 to 5 percent slopes	SaoB	59.86	7.4%	P-1	No
Udorthents	Udorthents, stratified substratum, 0 to 8 percent slopes	UdstB	63.15	7.8%	NA	No
Water	Water	WATER	17.19	2.1%	NA	NA
Woodstown-Fallsington	Woodstown-Fallsington sandy loams, 0 to 5 percent slopes	WomfB	12.44	1.5%	S-1	Yes
Total			**807.51**	**100.0%**		

Source: USDA Natural Resources Conservation Service (NRCS), 2004

* Explanation of Agricultural Quality Codes	
P–1	Prime Farmland
S–1	Statewide Importance
L–1	Local Importance
N/A	Soil not rated for agricultural use by NRCS, but may be suitable or currently used for such use.

Hydric Soils

Over two-thirds of all soils in Hightstown are considered hydric. Hydric soils, as defined by the Natural Resources Conservation Service (NRCS), are soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic (oxygen-free) conditions in their subsurface. These soils have unique soil properties and are an important element of wetland areas. If a soil is classified as “hydric,” land use may be restricted due to the relationship of hydric soils to the definition of wetlands and to laws regarding wetland preservation. Soils that have limitations, such as a high water table or flooding, can qualify as prime and statewide when the limitations are overcome by measures such as drainage or flood control.

Climate

Geographically situated approximately halfway between the Equator and the North Pole, New Jersey's climate is extremely variable. The state's temperate, continental climate is influenced by hot, cold, dry, and humid airstreams that create highly variable local weather conditions. From May through September, New Jersey is dominated by moist, tropical air originating in the Gulf of Mexico and carried by prevailing winds from the southwest. In winter, winds generally prevail from the northwest, bringing cold, polar air masses from subarctic Canada.

Association Park

Photo by David Zaiser

Although New Jersey is one of the smallest states in the country, it has five distinct climate regions. The state's climate varies across these five regions: North, Central, Southwest, Pine Barrens, and Coastal. Distinct variations between these climate regions is due to a combination of factors, including geology, distance from the Atlantic Ocean, and prevailing atmospheric flow patterns

Hightstown is located within the Central climate zone, which stretches from New York Harbor to the great bend of the Delaware River near Trenton. This region contains many urban areas, such as Hightstown, Princeton, New Brunswick, and Trenton, whose paved surfaces and buildings affect local temperatures by retaining more heat. This causes nighttime temperatures to generally be warmer than surrounding rural areas. This is known as the "heat island effect."

The National Climate Data Center (NCDC) operates over 4,000 stations in the United States, one of which is located directly in Hightstown. This station has collected temperature and precipitation data since 1893.

Based on this long-range data, the mean (average) annual temperature in Hightstown is 52.7 degrees Fahrenheit. January is the coldest month with a mean temperature of 30.8 degrees, and July is the hottest month with a mean temperature of 74.5 degrees. Average monthly temperatures between March and October of 2010 surpassed the long-range averages, as shown in **Figure 3**. Between the years 1893 and 2010, the annual average temperature has fluctuated between 49.4 (in 1916) and 55.4 (in 1955) degrees Fahrenheit, as shown in **Figure 4**. The trend line (the red dashed line) indicates a slight warming trend since 1893.

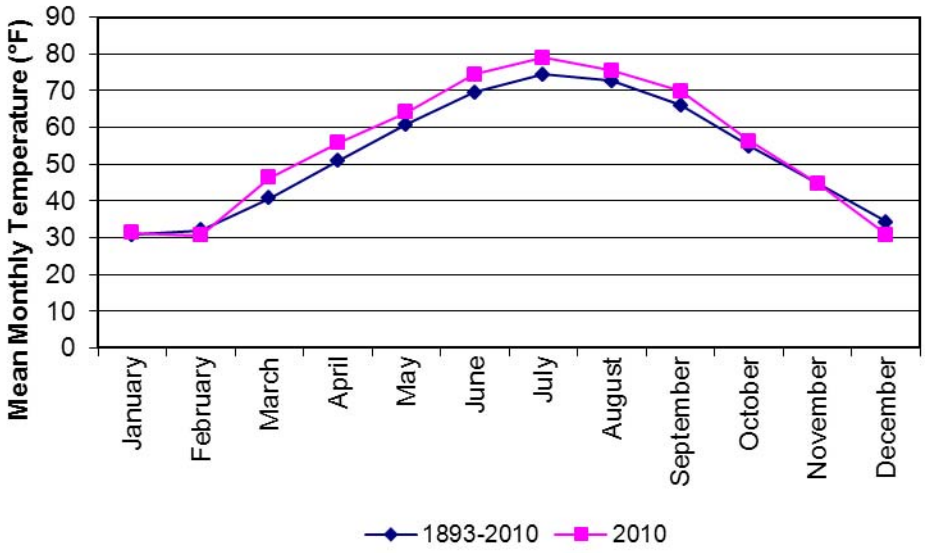
This long-term data shows that the annual mean precipitation in Hightstown is 45.07 inches. July is the wettest month with a mean precipitation of 4.77 inches, and February is the driest month with an average of just 2.90 inches. The annual mean precipitation between 1894[1] and 2010 ranged from 27.03 inches (in 1916) to 65.92 inches (in 1975). As shown in **Figure 5**, the trend line (the red dashed line) indicates that Hightstown has been experiencing an increase in its annual mean precipitation.

Peddie Lake

Photo by DVRPC

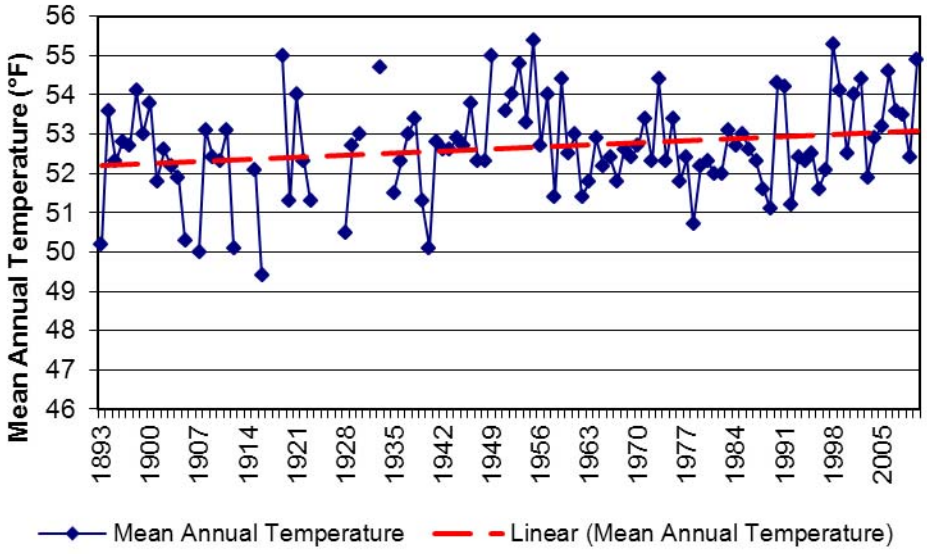
[1]There was insufficient data for the year 1893.

Figure 3: Monthly Mean Temperatures in Hightstown, 1893-2010 and 2010



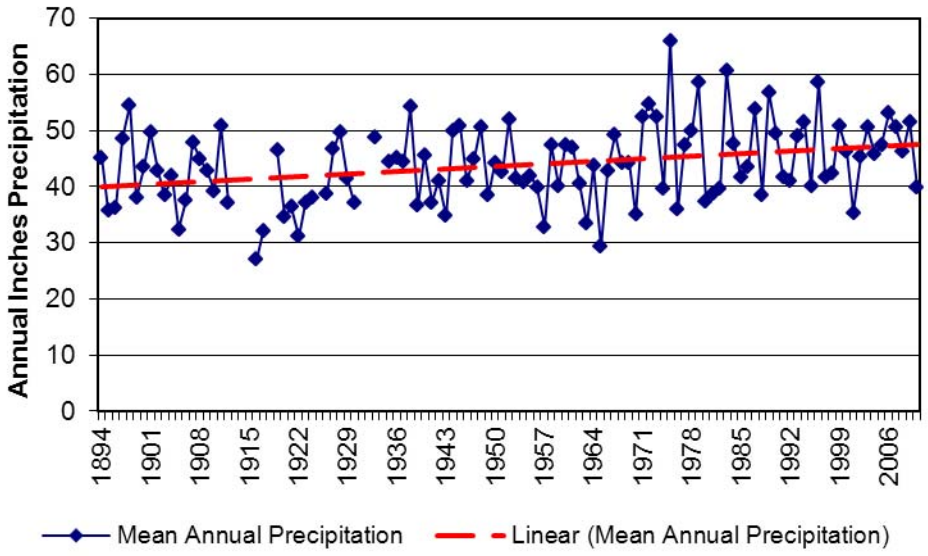
Source: NCDC, 2011

Figure 4: Annual Mean Temperatures in Hightstown, 1893-2010



Source: NCDC, 2011

Figure 5: Annual Mean Precipitation in Hightstown, 1894-2010



Source: NCDC, 2011

Snowfall typically occurs in New Jersey when moist air from the south converges with cold air from the north. In Hightstown, snowfall may occur from October to April, but is most likely to occur from December to March. Based on data collected between 1893 and 2010 from the Hightstown station, the average seasonal snowfall is 24.6 inches and the median seasonal snowfall is 22.1 inches. The highest recorded seasonal snowfall was during 1995-1996, when a total of 65.6 inches accumulated. During the winter of 2010-2011, a total of 37.2 inches were recorded at the Hightstown station. The highest monthly snowfall was 35 inches recorded during the historic blizzard of February 1899. A total of 23.4 inches were recorded during January of 2011. The average monthly snowfall is greatest in February, which has a historic average of 7.9 inches.

Growing Seasons

Hightstown is located within U.S. Department of Agriculture (USDA) Plant Hardiness Zone 6B, where annual minimum temperatures are typically between -5°F and 0°F. Hardiness zones are based on average annual minimum temperatures and are helpful in indicating which plant species are able to survive the winter in each area. Garden planting schedules vary based on plant hardiness zones.

The agricultural growing season of Hardiness Zones 6 and 7 is approximately six months, or 180 days, from mid-April through mid-October. The growing season is generally defined as the period between the last spring frost and the first autumn frost. However, the harvest of grain crops typically continues throughout

November and winter crops such as broccoli, cauliflower, and cabbage are grown until the first hard freeze, usually in early January.

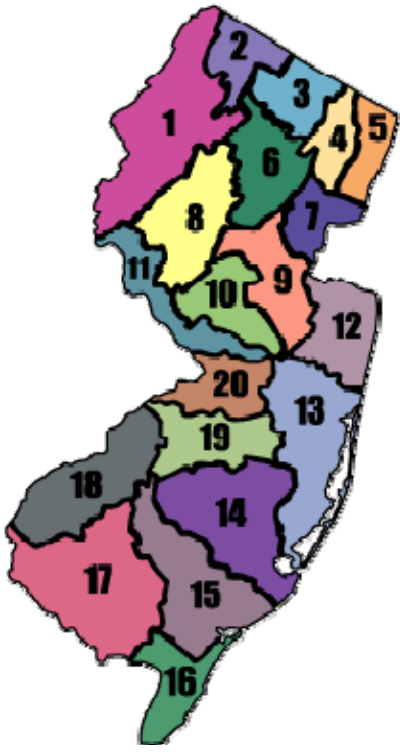
Surface Water Resources

Most of the land in Hightstown drains directly to Peddie Lake and Rocky Brook, which flows through the borough. Rocky Brook is a tributary to the Millstone River, which itself is a tributary to the Raritan River. The Raritan River drains into the Raritan Bay, which empties into the Atlantic Ocean south of Staten Island.

Watersheds

A watershed is all the land that drains to a particular waterway, such as a river, stream, lake, or wetland. The high points in the terrain, such as hills and ridges, define the boundaries of a watershed. Large watersheds are made up of a succession of smaller ones, and smaller ones are made up of the smallest area down to the catchment area of a local site. So, for example, the Raritan River watershed is made up of many smaller watersheds, such as the Millstone River watershed, which itself consists of smaller subwatersheds. These subwatersheds can be further subdivided into smaller ones, each surrounding smaller tributaries that flow to the larger channel, and so on down to the catchment level. Watersheds are natural ecological units, where soil, water, air, plants, and animals interact in a complex relationship.

Figure 6: Watershed Management Areas in New Jersey



Source: NJDEP

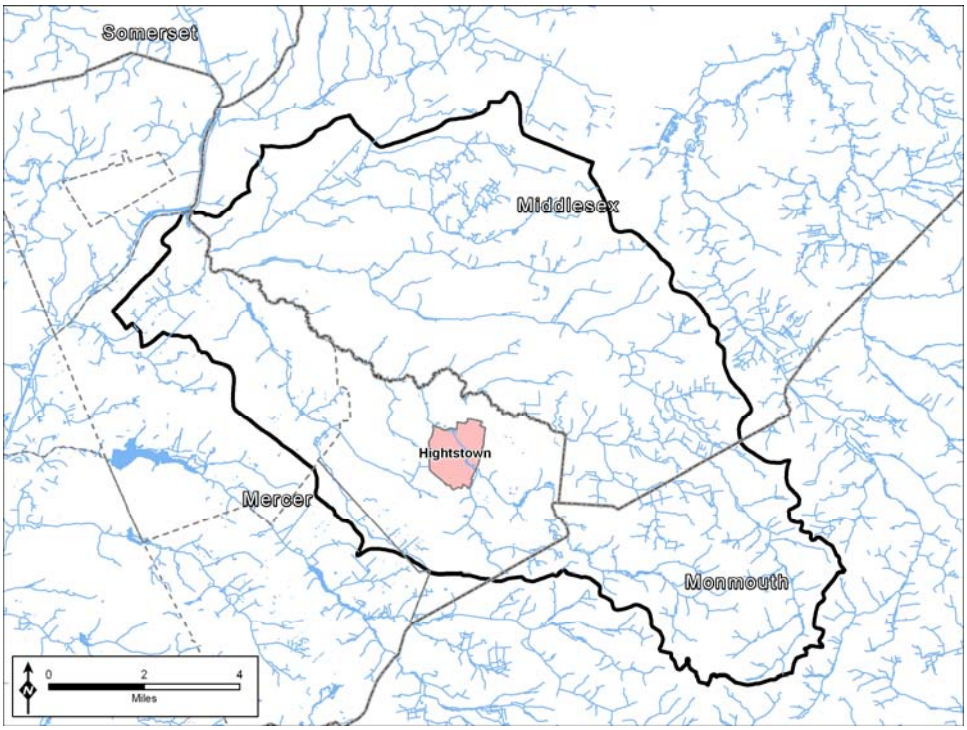
Each watershed corresponds to a hydrological unit code (HUC), as delineated by the United States Geological Survey (USGS). A HUC 11 watershed (identified by an 11-digit code) contains a number of HUC 14 subwatersheds (each identified by a 14-digit code). The State of New Jersey has 152 HUC 11 watersheds and over 900 HUC 14 subwatersheds. Hightstown lies entirely within the Millstone Watershed, which is divided into two HUC 11 Watersheds: one above and including Carnegie Lake and one below Carnegie Lake. Hightstown is within the region of the Millstone Watershed above Carnegie Lake. This HUC 11 watershed is then further divided into a number of smaller HUC 14 subwatersheds. Hightstown is located within four HUC 14 subwatersheds, listed in **Table 4.**

Watershed Management Area 10: Millstone River

The NJDEP manages natural resources on a watershed basis. The state has been divided into 20 Watershed Management Areas (WMAs) as shown in **Figure 6: Watershed Management Areas in New Jersey**. Hightstown is located entirely within WMA 10: Millstone River, as shown in **Figure 7: Millstone River Watershed**. WMA 10 includes subwatersheds that drain either directly to the Millstone River, or to one of its tributaries, including Stony Brook, Cranbury Brook, Bear Brook, Ten Mile River, Six Mile River, and Beden Brook. WMA 10 is located within parts of Hunterdon, Somerset, Middlesex, Mercer, and Monmouth Counties. The largest impoundment in the WMA is Carnegie Lake on the border of Princeton Township and Plainsboro Township. However, there is little impact to the borough from this downstream waterway.

The percentage of land that is within each watershed in Hightstown is listed in **Table 4: Watersheds and Subwatersheds in Hightstown**. Also see **Map 7: Watersheds** and **Map 8: Surface Water, Wetlands, and Dams**.

Figure 7: Millstone River Watershed



Source: DVRPC, 2011

Table 4: Watersheds and Subwatersheds in Hightstown

Watershed Name (HUC 11 #)	HUC 14 Subwatershed Name	HUC 14 #	Total Area (Acres)
Millstone River (above Carnegie Lake) (02030105100)	Millstone R (Cranbury Brook to Rocky Brook)	02030105100060	23.03
	Millstone River (Rocky Brook to Applegarth Road)	02030105100030	0.26
	Rocky Brook (below Monmouth County line)	02030105100050	732.18
	Bear Brook (above Trenton Road)	02030105100120	52.04
Total			**807.51**

Source: NJDEP, 2010

Rocky Brook

Photo by DVRPC

Streams

Rocky Brook flows northwest through Hightstown. Rocky Brook is a tributary of the Millstone River, which itself is a tributary of the Raritan River. Rocky Brook begins in Millstone Township near Perrineville and drains into the Millstone River, which forms the boundary between East Windsor and Cranbury Townships. Rocky Brook is impounded by the dam at the northern end of Peddie Lake. Rocky Brook and its small tributaries are classified as FW2-NT, meaning these waters are freshwater and do not support trout.

Lakes and Ponds

The only named lake in Hightstown is Peddie Lake, although there are other small unnamed ponds and water impoundments in the northwest area of the borough. Peddie Lake covers a total of over 16 acres and is entirely located in Hightstown. Peddie Lake is owned by the Borough of Hightstown and is used for recreational purposes.

Wetlands

Wetlands support unique communities that serve as natural water filters and as incubators for many beneficial species. The term “wetland” is applied to areas where water meets the soil surface and supports a particular biological community. The source of water for a wetland can be an estuary, river, stream, lake edge, or groundwater that rises close to the land surface. Under normal circumstances, wetlands are those areas that support a prevalence of defined wetland plants on a wetland soil. The U.S. Fish & Wildlife Service designates all large vascular plants as wetland (hydric), non-wetland (non-hydric) or in-between (facultative). Wetland soils, also known as hydric soils, are areas where the land is saturated for at least seven consecutive days during the growing season. Wetlands are classified as either tidal (coastal) or nontidal (interior). Tidal wetlands can be either saline or freshwater. There are also special wetlands categories to denote saturated areas that have been altered by human activities.

New Jersey protects freshwater wetlands under the New Jersey Freshwater Wetlands Protection Act Rules: N.J.A.C. A 7:7A. The law also protects transition areas, or “buffers,” around freshwater wetlands. The New Jersey freshwater wetlands maps provide guidance on where wetlands are found in New Jersey, but they are not the final word. Only an official determination from DEP, called a “letter of interpretation (LOI),” can legally determine for sure if there are freshwater wetlands on a property. An LOI verifies the presence, absence, and boundaries of freshwater wetlands and transition areas on a site. Activities permitted to occur within wetlands are very limited and usually require a permit. Additional information on wetlands rules and permits is available through NJDEP. See **Sources of Information**.

All of Hightstown’s wetlands are freshwater. Natural wetlands cover 10 acres within Hightstown, of which three acres are deciduous scrub/shrub wetlands and seven acres are deciduous wooded wetlands. See **Map 8: Surface Water, Wetlands, and Dams**.

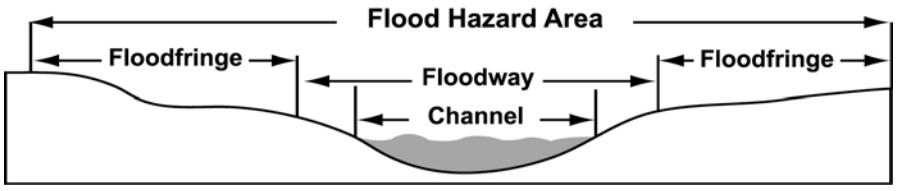
In addition to natural wetlands, Hightstown also includes two acres of modified or disturbed wetlands. Specifically, these wetlands are classified as managed wetlands in a built-up maintained recreational area. Modified wetlands are former wetland areas that have been altered by human activities and no longer support typical wetland vegetation, or are not vegetated at all. Modified wetland areas do, however, show obvious signs of soil saturation and exist in areas shown to have hydric soils on U.S. Soil Conservation Service soil surveys.

Floodplains

Areas naturally subject to flooding are called floodplains, or flood hazard areas. Floodplains encompass a floodway, which is the portion of a floodplain subject to high velocities of moving water, and the adjacent flood fringe, which helps to hold and carry excess water during overflow of the normal stream channel. The 100-

year floodplain is defined as the land area that will be inundated by the overflow of water resulting from a 100-year flood (a flood that has a one percent chance of occurring in any given year).

Figure 8: Parts of a Flood Hazard Area



Source: NJDEP

Although the terms “flood hazard area” and “100-year floodplain” refer to similar concepts, NJDEP defines them in slightly different ways. New Jersey’s regulations define the flood hazard area as the area inundated by a flood resulting from the 100-year discharge increased by 25 percent. See **Figure 8: Parts of a Flood Hazard Area**. This type of flood is called the “flood hazard area design flood” and it is the flood regulated by NJDEP (NJAC 7:13).

Floodplains require protection in order to prevent loss to residents, especially within the boundaries of the floodway. Equally important is the preservation of the environmentally sensitive aquatic communities that exist in floodplains. These communities are often the first link in the food chain of the aquatic ecosystem. In addition, floodplains serve the function of removing and mitigating various pollutants through the uptake by their vegetation of excess chemical loads in the water and by the filtering of sediments generally. All efforts to keep development out of floodplains will help to preserve the flood-carrying capacity of streams and their water quality.

Peddie Lake after flooding

Photo by David Zaiser

In New Jersey and throughout the country, building in areas subject to flooding is regulated to protect lives, property, and the environment. New Jersey regulates construction in the flood hazard area under the Flood Hazard Area Control Act, NJSA 58:16A-50 et seq., and its implementing rules at NJAC 7:13. Activities that are proposed to occur in a flood hazard area will require a flood hazard area permit or a letter of nonapplicability from the NJDEP.

New Jersey’s flood hazard area maps are not available in digital form. Consequently, it is only possible to approximate the spatial extent of the flood hazard area in Hightstown by using the Federal Emergency Management

Agency's (FEMA's) 100-year floodplain maps. FEMA's maps show that almost 49 acres, or six percent, of Hightstown is within the 100-year flood hazard area, and an additional 10 acres are within the 500-year flood hazard area. See **Map 9: Floodplains (2008)** and **Table 5** below.

All of Hightstown's floodplain areas are located along the main stem of Rocky Brook and its tributaries. Portions of Bank Street, Main Street, Purdy Street, Mechanic Street, Stockton Street, and Ward Street are located within a floodplain and are subject to flooding. Hightstown has been inundated with massive flooding several times during the past 100 years, including flooding of the entire downtown area in 1915, 1934, and 2011. See section on **Flooding** in **Environmental Issues** chapter.

Table 5: Floodplains in Hightstown

Flood Plain	Area (Acres)	% of Borough in Floodplain
100-Year Floodplain	48.93	6.1%
500-Year Floodplain	10.28	1.3%
Total	59.21	7.4%
Total Hightstown Area	**807.51**	**100.0%**

Source: FEMA, 2008

Surface Water Quality

Water quality standards are established by federal and state governments to ensure that water is suitable for its intended use. The ultimate objective of the Federal Clean Water Act (P.L. 95-217) is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Standards are intended to restore the quality of the nation's waters to provide for the protection and propagation of fish, shellfish, and wildlife and to provide for recreation in and out of the water, wherever attainable.

All water bodies in New Jersey are classified by NJDEP as either freshwater (FW), pinelands water (PL), saline estuarine water (SE), or saline coastal water (SC). Freshwater is further broken down into freshwater that originates and is wholly within federal or state parks, forests, or fish and wildlife lands (FW1) and all other freshwater (FW2). The water quality for each of these groups must be able to support designated uses that are assigned to each waterbody classification (see Surface Water Quality Standards N.J.A.C. 7:9B-1.12). In addition to being classified as FW1 and FW2, fresh water bodies are classified as trout producing (TP), trout maintaining (TM), or nontrout waters (NT). Each of these classifications may also be subject to different water quality standards.

Rocky Brook, Peddie Lake, and its tributaries throughout Hightstown are all FW2-NT. According to NJDEP rules, FW2-NT waters have the following designated

uses: (1) the maintenance, migration, and propagation of the natural and established biota; (2) primary and secondary contact recreation (i.e., swimming and fishing); (3) industrial and agricultural water supply; (4) public potable water supply after conventional filtration and disinfection, but not chemical removal; and (5) any other reasonable uses (NJAC 9:9B-1.12.c).

Peddie Lake

Photo by David Zaiser

The determination of whether or not water quality is sufficient to meet a body of water's designated use(s) is based on an analysis of certain surface water quality parameters, including fecal coliform, dissolved oxygen, pH, phosphorous, and toxic substances. The NJDEP also evaluates water quality by examining the health of aquatic macroinvertebrate life in a stream.

New Jersey's Integrated Water Quality Monitoring and Assessment Report

The Federal Clean Water Act mandates that states submit biennial reports to the U.S. Environmental Protection Agency (EPA) that describe the quality of their waters. States must submit two reports: the first is the Water Quality Inventory Report, or 305(b) Report, which documents the status of principal waters in terms of overall water quality and support of designated uses; the second is the 303(d) List, which lists the water bodies that are not attaining water-quality standards. States must also prioritize the impaired water bodies on the 303(d) List for Total Maximum Daily Load (TMDL) analyses and identify those high-priority water bodies for which they anticipate establishing TMDLs in the next two years.

Beginning in 2002, the NJDEP combined the 305(b) Report and the 303(d) List into a single report, according to the EPA's guidance. The biennial Integrated Water Quality Monitoring and Assessment Report places the state's waters on one of five "sublists." Sublists 1 and 2 contain waters that are attaining standards. Sublist 3 contains waters that have insufficient data to determine their status. Sublist 4 contains waters that do not attain water-quality standards, but which meet one of the following three conditions: (1) a TMDL has been completed for the pollutant causing nonattainment; (2) other enforceable pollution control requirements are reasonably expected to result in conformance with the applicable water-quality standards; or (3) nonattainment is caused by something other than a pollutant. Sublist 5, equivalent to the 303(d) List, contains waters that do not attain their designated use and for which a TMDL is required.

In 2006, NJDEP began reporting water quality data on a HUC-14 subwatershed basis, and so the assessments of portions of rivers and streams are reported by the subwatershed they fall within. Subwatersheds (assessment units) are assessed on their attainment of eight different designated uses, although not all uses are applicable to all subwatersheds. The designated uses are as follows:

- Aquatic life (general)
- Aquatic life (trout)
- Recreation
- Drinking water supply
- Industrial water supply
- Agricultural water supply
- Shellfish harvesting
- Fish consumption

As none of the waters in Hightstown support trout or shellfish, these designated uses are not applicable. As shown in **Table 6**, all four subwatersheds in which Hightstown is partially located do not support at least one designated use. For aquatic life, the most general and encompassing parameter of water quality, all four subwatersheds are impaired. See **Table 6: Integrated Water Quality Monitoring and Assessment Report, 2010**.

Total phosphorus and dissolved oxygen were the causes of aquatic life impairment for three of the four subwatersheds, with an unknown cause impairing the fourth subwatershed. For the designated use of primary recreational contact (swimming), fecal coliform was the cause of impairment for three subwatersheds and E. coli was the cause for the fourth. The designated use of drinking water supply was not supported by three of the four subwatersheds due to arsenic. For all subwatersheds, the causes of impairment were identified by NJDEP in the Integrated Report as agriculture, urban runoff/storm sewers, and industrial point source discharges. Three of the four subwatersheds were also impaired due to municipal point source discharges according to the NJDEP.

Causes of Impairments in Hightstown Subwatersheds

Phosphorus exists naturally at low levels within the environment, although excess phosphorus can lead to harmful algae blooms. As the excess algae dies and its decomposition uses up the oxygen, “dead zones” can develop where no aquatic life can survive. Typical causes of phosphorus pollution include over-fertilization of lawns and agricultural areas; runoff from impervious surfaces like parking lots, lawns, rooftops, and roadways; discharge from waste-water treatment plants; and overflow from septic systems. Soil erosion is a major contributor of phosphorus to streams, and streambank erosion occurring during

floods can transport high quantities of phosphorous into the water system. According to monitoring conducted by the Stony Brook-Millstone Watershed Association, excessive vegetation is present in the borough's waterways during most of the year, a sign of excess phosphorus.

Fecal coliform bacteria inhabit the intestinal tract of humans and other warm-blooded animals and enter waterways through human and animal waste. E. coli (Escherichia coli) is the most common type of fecal coliform. Levels of fecal coliform in water may increase after periods of flooding when stormwater runoff may carry manure or animal waste from upstream agricultural production into streams. Fecal coli itself is not necessarily a health hazard but serves as an indicator of the presence of sewage or animal waste, which may contain other more harmful microbes that are not as easily monitored. Hightstown has had elevated fecal coliform levels at times.

Dissolved oxygen (DO) is necessary for almost all aquatic life and so its concentration provides a good indicator of the health of an aquatic ecosystem. Under low DO conditions, fish are more susceptible to the effects of other pollutants, such as metals and toxins, and at very low DO levels, trace metals from sediments are released into the water column. Summer algal bloom die-off has been implicated as a cause of low DO concentrations.

Peddie Lake

Photo by Barbara Jones

Table 6: Integrated Water Quality Monitoring and Assessment Report, 2010

HUC 14 Name - ID#	Acres in Hightstown	Agricultural Water Supply	Aquatic Life - Cause	Fish Consump-tion	Industrial Water Supply	Primary Contact Recreation - Cause	Public Water Supply - Cause	Source of Contamination
Millstone River (Cranbury Brook to Rocky Brook) - 02030105100060	23.03	Fully Supporting	Not Supporting - Dissolved Oxygen, Phosphorus (Total)	Insufficient Information	Fully Supporting	Not Supporting - Fecal Coliform	Not Supporting - Arsenic	*Industrial Point Source Discharges *Municipal Point Source Discharges *Agriculture *Urban Runoff/Storm Sewers
Millstone River (Rocky Brook to Applegarth Road) - 02030105100030	0.26	Fully Supporting	Not Supporting - Dissolved Oxygen, Phosphorus (Total)	Insufficient Information	Fully Supporting	Not Supporting - Fecal Coliform	Fully Supporting	*Industrial Point Source Discharges *Municipal Point Source Discharges. *Agriculture *Urban Runoff/Storm Sewers
Rocky Brook (below Monmouth County line) - 02030105100050	732.18	Insufficient Information	Not Supporting - Dissolved Oxygen, Phosphorus (Total)	Insufficient Information	Fully Supporting	Not Supporting - Fecal Coliform	Not Supporting - Arsenic	*Industrial Point Source Discharges *Municipal Point Source Discharges *Agriculture *Urban Runoff/Storm Sewers
Bear Brook (above Trenton Road) - 02030105100120	52.04	Fully Supporting	Not Supporting - Cause Unknown	Insufficient Information	Fully Supporting	Not Supporting - Escherichia coli	Not Supporting - Arsenic	*Agriculture *Urban Runoff/Storm Sewers *Industrial Point Source Discharge

Source: NJDEP, 2010

Total Maximum Daily Loads (TMDLs)

For impaired waterways with a high priority ranking for remediation, the state is required by the EPA to establish a Total Maximum Daily Load (TMDL). A TMDL quantifies the amount of a pollutant that a water body can assimilate (its loading capacity) without violating water-quality standards. The purpose of a TMDL is to initiate a management approach or restoration plan based on identifying the sources of a pollutant and determining the percentage reductions of the pollutant that must be achieved by each source. These sources can be point sources, such as sewage treatment plants, or nonpoint sources, such as stormwater runoff. A TMDL goes through four stages. First, it is proposed in a report by NJDEP. Then it is established when NJDEP finalizes its report. Next, it is approved by the EPA, and finally it is adopted when NJDEP adopts it as an amendment to a water-quality management plan.

In general, implementation of a TMDL relies on actions mandated by the Municipal Stormwater Management program, which includes the ordinances that municipalities are required to adopt under that program. It also depends on voluntary improvements in stormwater management in agricultural and other areas.

A TMDL determines the percentage reduction needed in order for a stream segment to meet the water-quality standard. Nonpoint stormwater sources are the largest contributors, as runoff from various land uses transports pollutants into water bodies during rain events. Nonpoint sources also include inputs from sources such as failing sewage conveyance systems, sanitary sewer overflows, and failing or inappropriately located septic systems. Hightstown has three septic systems located on Oak Lane, Summit Street, and Etra Road.

In the state's TMDL schedule for 2010, Hightstown falls within two subwatersheds that both have a medium priority for remediation. Rocky Brook (below Monmouth County line) (HUC 02030105100050) and Millstone River (Rocky Brook to Applegarth Road) (HUC 02030105100030) are both prioritized for TMDLs for dissolved oxygen and total phosphorus.

Water-Quality Monitoring Networks

New Jersey's *Integrated Report* is based on the water-quality assessments of a number of different monitoring networks. The Ambient Stream Monitoring Network (ASMN) and the Ambient Biological Monitoring Network (AMNET) are the two primary sources of surface water monitoring data.

The ASMN is a cooperative network between USGS and NJDEP that samples surface water quality at 112 stations in the state, none of which is located within Hightstown.

AMNET is another water quality monitoring system that the Integrated Report is based upon. AMNET, administered solely by NJDEP, consists of over 800 stream sites in the state and provides long-term biological data. The program routinely samples and evaluates the benthic macroinvertebrate population at each site as a biological indicator of water quality. Benthic macroinvertebrates are bottom-dwelling aquatic insects, worms, mollusks, and crustaceans that are large enough to be seen by the naked eye. There is one AMNET monitoring site in Hightstown, Station AN0381. Beyond the information included in the Integrated Report, additional water quality data gathered from these monitoring stations is available through the USGS, the NJDEP, and the Stony Brook-Millstone Watershed Association.

Fish Consumption

Certain fish may contain toxic chemicals, such as PCB's, dioxins, or mercury, which accumulate in bottom sediments and aquatic life, including fish tissue. Chemical contaminants, such as dioxin and PCB's, are classified by the U.S. EPA as probable cancer-causing substances in humans. Elevated levels of mercury can pose health risks to the human nervous system. Infants, children, pregnant women, nursing mothers, and women of childbearing age are considered to be at higher risk from contaminants in fish than other members of the general public. Since 1982, the NJDEP has been catching fish at numerous sampling stations throughout the state and testing for contaminant levels. It then adopts advisories to guide residents on safe consumption practices.

The consumption advisories for fish caught in freshwater in the state are listed in **Table 7**. There are no additional fish consumption advisories for Rocky Brook. There are regular recreational fishing activities in Peddie Lake and Rocky Brook, including turtle fishing. More details on preparation and consumption of fish are found at the advisory website: www.state.nj.us/dep/dsr/njmainfish.htm

Peddie Lake

Photo by DVRPC

Table 7: Fish Consumption Advisories, 2010

Species	General Population	High-Risk Individuals
	Eat No More Than:	Eat No More Than:
Statewide Freshwater Advisories		
Trout (Brown, Brook, Rainbow)	One Meal Per Week	One Meal Per Week
Largemouth Bass		One Meal Per Month
Smallmouth Bass		
Chain Pickerel		
Yellow Bullhead	No Restrictions	
Brown Bullhead		
Sunfish		One Meal Per Week

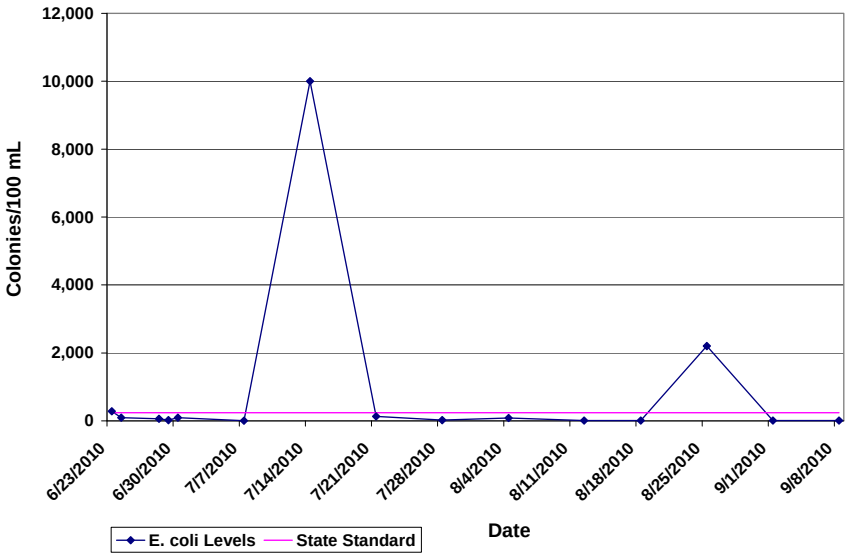
Source: NJDEP, 2010

Stony Brook-Millstone Watershed Association Monitoring

The Stony Brook-Millstone Watershed Association has conducted water-quality testing of Peddie Lake for the last few years at Watershed Association's expense using trained volunteers. The samples are then analyzed by NJ Analytical Laboratories. Testing for E. coli is done four times per year, but in the last two years testing has occurred weekly during the summer months. The Watershed Association tests the following parameters monthly: dissolved oxygen, nitrates, phosphorous, turbidity, and temperature.

E. coli testing was done to assist the borough's weekly Friday night swims in the summer and prior to the Hightstown Triathlon in September. Bacteria levels are greatest after heavy rain events when polluted stormwater drains into the lake. **Figure 9** shows the testing results of E. coli concentrations from samples taken between June 23 and September 8 of 2010. The state standard is a geometric mean of 126 colonies per 100 milliliters of water measured over the course of 30 days. The single sample maximum is 235 colonies per 100 milliliters. The concentration of E. coli spiked to 10,000 colonies per 100 milliliters of water on July 14, which followed two days (July 13 and 14) of heavy rains that were preceded by a few days of very dry weather. The sample taken on August 25 also followed rain, which occurred between August 22 and 24.

Figure 9: Peddie Lake E. Coli Bacteria Levels

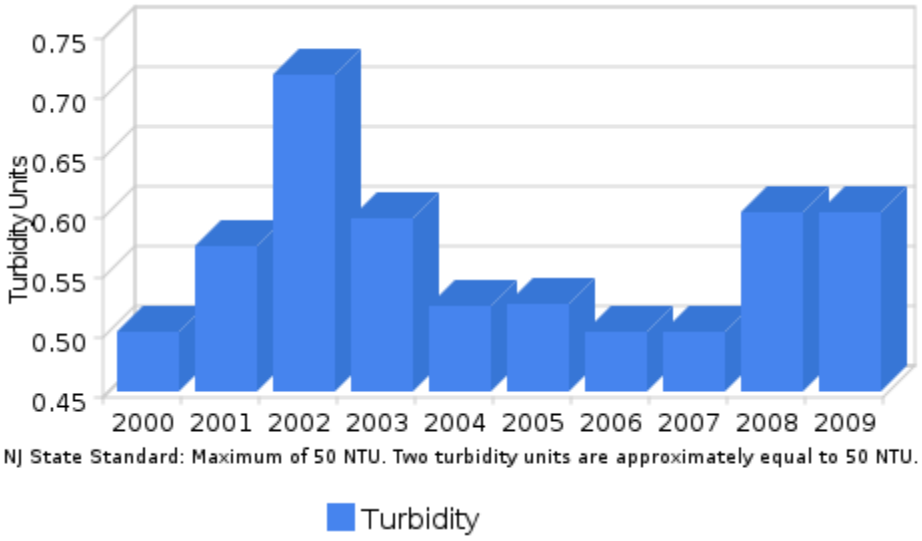


Source: Stony Brook-Millstone Watershed Association, 2011

The Watershed Association has monitored for a variety of other parameters at Peddie Lake in addition to E. coli, including temperature, nitrate, phosphate, pH, turbidity, and dissolved oxygen. This monitoring has shown Peddie Lake to be within the state standards for all parameters.

As shown in **Figure 10**, annual average turbidity levels were within the state standards between 2000 and 2009.

Figure 10: Peddie Lake Annual Average Turbidity Levels



Source: Stony Brook-Millstone Watershed Association, 2011

Causes of Water Quality Impairments

Point Sources of Pollution

Point sources of pollution, which come from a single source or "point," such as an industrial pipe discharge, are regulated by NJDEP through the New Jersey Pollution Discharge Elimination System (NJPDES). New Jersey created NJPDES in response to the Federal Clean Water Act of 1972, which mandated that each state develop water quality standards and regulate the amount of pollution entering water bodies. The act classified all water pollution into one of two categories: "point source" pollution coming from a single source, such as an industrial pipe; and "nonpoint source" pollution, which comes from many diffuse sources. Although the Federal Clean Water Act only required states to regulate point sources, New Jersey also regulates nonpoint sources through authority of the NJPDES rules. See **Nonpoint Sources of Pollution**.

The NJDEP, through the Division of Water Quality and the Bureau of Point Source Permitting, administers the NJPDES program. Under NJPDES, any facility discharging over 2,000 gallons per day (gpd) of wastewater directly into surface water or ground water (generally through a septic system) must apply for and obtain a permit for discharging. Rather than creating individually tailored permits for each and every facility, the Division of Water Quality uses scientific standards to create and issue general permits for different categories of dischargers. The NJDEP enforces the terms of the NJPDES permit by visiting discharging facilities and requiring facilities to periodically conduct and submit water quality, biological and toxicological analyses, and thermal impact and cooling water assessments.

There are two active NJPDES permits for point source pollution issued to individual facilities in Hightstown. These are shown in **Table 8**. Both permitted facilities discharge to Rocky Brook. In 2011, there were no reported violations for either of the permitted facilities.

Although the NJPDES program has made much progress in regulating point source discharges, a great number of minor discharges have been allowed without regard to their cumulative impact on surface water quality. Environmental commissioners and municipal clerks receive notice from the NJDEP when anyone applies for a permit to discharge to surface water under the NJPDES. The commissions should examine the application and evaluate the proposal – the need for the permit, the location of the discharge, and the potential negative impacts. They should communicate their findings to the NJDEP, the applicant and the town.

Table 8: NJPDES Permits for Point Source Pollution

Facility Name	Discharge Type	Receiving Water	NJPDES ID	PI #
Hightstown Advanced WTP	MMJ	Rocky Brook	NJ0029475	46439
Hightstown Borough WTP	IMI	Rocky Brook via storm sewer	NJ0003832	46438

Source: NJDEP, 2010

Discharge Type Code	Discharge Type Description
MMJ	Major Discharge to Surface Water Domestic Treatment Works (DTW) – Individual Permit
IMI	Minor Industrial Discharge to Surface Water – Individual Permit

Nonpoint Sources of Pollution

Since the adoption of the federal Clean Water Act and the implementation of the NJPDES program in subsequent years, water pollution from point sources has decreased dramatically. However, as development has continued to spread throughout New Jersey, nonpoint source pollution has increased substantially in recent decades. Nonpoint source pollution, or stormwater runoff, has the largest effect on the water quality and channel health of streams in New Jersey. Development, including tree loss, dramatically increases nonpoint source pollution by increasing the volume and velocity of water and the level of pollutants in the runoff. Increased runoff causes erosion and sediment build-up in streams, carries nutrients from fertilizers and washes toxins, bacterial contamination, road salt, motor oils, and litter into the stream. The sources of polluted stormwater runoff are also the most difficult to identify and remediate because they are diffuse, widespread, and cumulative.

Main Street

Photo by DVRPC

The NJDEP's Stormwater Management Rules focus on reducing and controlling nonpoint sources of water pollution. The NJPDES stormwater program lays out guidance and requirements for management of and education about stormwater at the local level. Municipalities are required to obtain the NJPDES general permit for the stormwater system and its discharges within their borders, which are considered to be owned and

"operated" by the municipality. The general permits address stormwater quality issues related to new development, redevelopment, and existing development by requiring regulated entities to implement Statewide Basic Requirements (SBRs).

See the sections on **Erosion** and **Flooding** in the **Environmental Issues** chapter for additional information.

Impervious Coverage

The volume of stormwater runoff that is carried to a stream impacts the stream channel condition. Increased volume usually results from increased impervious surface within a subwatershed. As an area becomes developed, more stormwater is directed to the streams from neighborhood storm drains, residential and commercial stormwater facilities, and road drainage. In general, scientists have found that levels of impervious cover of 10 percent or more within a subwatershed are directly linked to increased stormwater runoff, enlargement of stream channels, increased stream bank erosion, lower dry weather flows, higher stream temperatures, lower water quality, and declines in aquatic wildlife diversity. When impervious cover reaches 25 to 30 percent, streams can become severely degraded.

As a largely built-out municipality, impervious coverage is relatively high in Hightstown. **Table 9: Impervious Coverage by HUC-14 Subwatersheds** lists the four subwatersheds that Hightstown falls within and their overall impervious percentages. The HUC 14 with the highest percentage of impervious coverage is the Rocky Brook (below Monmouth Co line) (HUC 02030105100050) subwatershed with about 17 percent impervious coverage. Hightstown primarily falls within this subwatershed. With this high percentage of impervious land, there is a high volume of stormwater runoff entering Rocky Brook and Peddie Lake.

Table 9: Impervious Coverage by HUC-14 Subwatersheds

HUC 14 ID	HUC Subwatershed Name	Percent Impervious
02030105100060	Millstone R (Cranbury Bk to Rocky Bk)	10.2%
02030105100030	Millstone R (Rocky Bk to Applegarth Rd)	11.2%
02030105100050	Rocky Brook (below Monmouth Co. line)	17.1%
02030105100120	Bear Brook (above Trenton Road)	16.7%

Source: NJDEP, 2007

Stream Buffers

The stream buffer is the region immediately beyond the banks of a stream that serves to limit the entrance of sediment, pollutants, and nutrients into the stream

itself. Stream buffers can be quite effective at filtering substances washing off the land as the width of the buffer increases. The vegetation of the buffer traps sediment and can actually utilize (uptake) a percentage of the nutrients flowing from lawns and farm fields. When forested, a stream buffer promotes bank stability and serves as a major control of water temperature. The buffer region also serves as a green corridor ─ a greenway ─ for wildlife to move between larger forested habitat areas. Residents can utilize these greenways for recreation with the addition of trails, bikeways, and access points to water for fishing and canoe/kayak launching.

The importance of a healthy, intact buffer zone (also referred to as a "riparian corridor") has been well-documented scientifically over the past 20 years, especially for headwater streams. However, there is less agreement and much continuing research on the appropriate minimum width of a buffer. In the literature on this issue, a recommended minimum buffer width of 100 feet is most common, with differing activities permitted in each of three zones within the buffer. Buffers of up to 300 feet are recommended for wildlife corridors and potential passive recreational use, such as walking trails.

The banks of Rocky Brook in Hightstown are largely wooded, although the buffer area is very narrow in some places. North of Bank Street, the riparian area of Rocky Brook is highly vegetated with a mixture of wetlands and upland forest. However, the riparian area through the center of the borough between Bank Street and Main Street is confined and bordered by parking lots, sidewalks, streets, and other impervious surfaces which accelerate runoff into the stream. The stream in this area is largely channelized with stone walls. The Hightstown Water Treatment Plant and the Hightstown Advanced Wastewater Treatment Plant both border Rocky Brook. The Water Quality Management Planning Rules require a minimum 50-foot natural buffer for all waterways in New Jersey for new development (N.J.A.C. 7:15-5.25(g)).

Groundwater

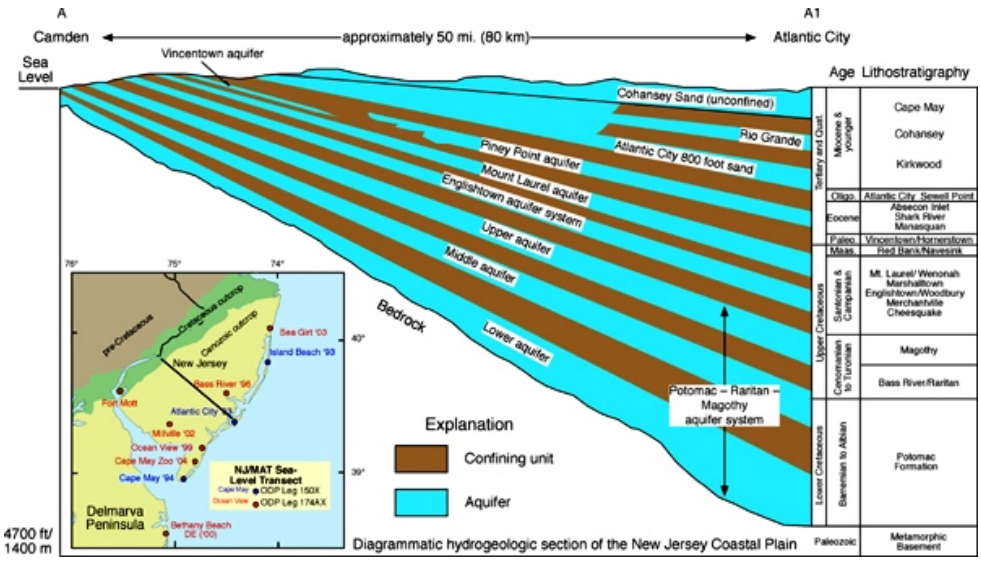
The geology of the New Jersey Coastal Plain can be visualized as a tilted layer cake, with its "layers," or strata, formed of gravels, sands, silts, and clays. The saturated gravel and sand layers, with their large pore spaces, are the aquifers from which water is drawn. The silt and clay layers, which impede the movement of water, are called confining beds.

Coastal Plain aquifers are not horizontal layers, but tilt toward the southeast, getting deeper as they cross the state toward the Atlantic Ocean. This is depicted in **Figure 11**. Because of this tilting, each aquifer emerges on the land surface in a sequential manner. An outcrop is the area where the aquifer emerges on the land surface. The deepest strata emerge on the surface near the Delaware River. Confining units also outcrop. Also known as an aquitard, a confining unit is an impenetrable layer of fine, compact clay that divides one aquifer from another.

Preventing contamination of the land in outcrop areas is extremely important in order to maintain a safe drinking supply.

As shown in **Map 10: Geologic Outcrops**, Hightstown lies within the outcrop area of the Merchantville/Woodbury confining unit. The Magothy formation outcrops northwest of the borough. These geological units lie on top of the deep and vast Potomac-Raritan-Magothy aquifer system, which is the source of drinking water in Hightstown.

Figure 11: Geology of the Atlantic Coastal Plain



Source: NJGS

The Merchantville Formation is made of green sand-sized grains of the mineral glauconite along with clay and microfossils. The Woodbury Formation lies conformably above the Merchantville. It is a laminated and lignitic silty clay.

Aquifers

The public water supply for Hightstown is drawn from the upper Potomac-Raritan-Magothy aquifer system (PRM). The PRM is the deepest and most abundant aquifer in the Atlantic Coastal Plain. This multiple aquifer is actually a large series of formations that have been combined and described as a single unit because the individual formations–the Potomac group and the Raritan and Magothy formations–are lithologically indistinguishable from one another over large areas of the Coastal Plain. That is, they are composed of materials of like kind and size laid down by both an advancing and retreating sea across southern New Jersey, and by deposits of material that came from the breakdown and erosion of the Appalachian and Catskill mountains beginning in the Cretaceous Period.

Water Supply Wells

Wells that provide drinking water may be either private or public water supply wells. Private water supply wells are those that serve less than 25 people and are not regulated by the EPA or DEP. Public water supply wells, which may be publically or privately owned, are those that serve at least 25 people or 15 service connections for at least 60 days per year. Public water supply wells are further defined as being either community or non-community. A public community water supply well serves 15 or more service connections used by year-round residents or at least 25 year-round residents. Public community water supply wells may serve municipalities, subdivisions, nursing homes, or other areas or institutions.

There are two active public community water supply wells serving Hightstown. Both wells tap the upper Potomac-Raritan-Magothy aquifer. The wells were constructed in the mid-1940s and are located approximately 200 feet below the land surface. They are listed in **Table 10** and shown on **Map 11: Public Water Supply Wells**. A third well recently constructed in Rocky Brook Park is not operational yet.

Table 10: Public Community Water Supply Wells

Public Water System ID (PWSID)	Owner	Well Name	Well Address	Well Date	Depth of Well (feet)	Land Surface Elevation (feet)	Pumping Capacity (gallons per minute)
NJ1104001	Hightstown Boro Water Dept	Well 1	Bank St & Purdy St	1946	205	84	1,200
NJ1104001	Hightstown Boro Water Dept	Well 2	Bank St	1947	199	84	1,000

Source: NJDEP, 2007

Public non-community wells are another part of a public water system. There are two types of public non-community water systems, transient and non-transient. The name refers to the type of populations that utilize them and their frequency of use. A transient non-community water system serves at least 25 people each day, but this population changes each day. These systems are at places such as rest stops, gas stations, and restaurants. A non-transient non-community water system serves at least 25 of the same people daily at a minimum of six months per year at places like schools, factories, and office parks.

There are no public non-community wells in Hightstown, although three are located to the southeast of the borough in East Windsor Township.

As required by federal and state regulations, public water supply wells (both community and non-community) in the state are monitored by NJDEP on a regular basis. The monitoring schedules for the public water supply wells in Hightstown are shown in **Appendix C: Hightstown Water Department**.

Sampling requirements for a water system may change at any time for several reasons, including analytical results, changes in population and/or inventory. It is generally the responsibility of the public water system and its licensed operator to make sure proper monitoring is performed for the entire distribution system and each point of entry for all parameters. Sampling requirements may be confirmed by referring to the Code of Federal Regulations (40 CFR 141) and the New Jersey Safe Drinking Water Act Regulations (N.J.A.C. 7:10).

Well Head Protection Areas

As part of its 1991 Well Head Protection Program Plan, the NJDEP has delineated Well Head Protection Areas (WHPAs) around all community wells. A WHPA is the area from which a well draws its water within a specified time frame (tiers). Pollutants spilled directly on or near the well head will enter the water source within that time frame. Once delineated, these areas become a priority for efforts to prevent and clean up groundwater contamination. Other components of the Well Head Protection Plan include implementing best management practices to protect groundwater, land use planning, and education to promote public awareness of groundwater resources.

Delineating a Well Head Protection Area (WHPA)

A WHPA consists of three tiers, each based on the time of travel to the well:
Tier 1 = two years
Tier 2 = five years
Tier 3 = twelve years

Calculation of the tier boundaries is based on findings of how long specific contaminants can survive in groundwater, how much time would be required for specific remedies to be undertaken, and on the likelihood of natural dilution over distance.

Once WHPAs are delineated, potential pollution sources may be managed by landowners or municipalities, in relation to the tier locations. Protection of land and restrictions on activities within well head zones (relating to uses that generate contaminants, and to the storage, disposal, or handling of hazardous materials) are important for maintaining the quality of water within those zones.

The radius of the WHPA depends on a number of factors related to the well and the underlying hydrogeology. The thicker and more porous the aquifer and the slower the pumping rate of the well, the smaller the radius is of the WHPA. The WHPAs in Hightstown, shown on **Map 11: Public Water Supply Wells**, are relatively large due to the unconfined nature of PRM aquifer they draw from, which are less protected from contamination than confined aquifers. Hightstown does not currently have a well head protection ordinance.

Air Quality

Air quality is one of the most difficult environmental resources to measure because its sources are diffuse and regional in nature. Common sources of air pollution include industry, cars, trucks, buses, fires, and dust. For example, the burning of coal in Ohio, Michigan, and western Pennsylvania to generate electricity sends pollutants such as sulfur, nitrogen, and particulate matter all the way to the East Coast. Locally produced sources of air pollution include daily roadway traffic and industrial facilities.

Increasing public awareness regarding air pollution led to the passage of a number of state and federal laws, including the original Clean Air Act of 1963 and a much stronger Clean Air Act of 1970 (CAA). In 1990, the CAA was amended and expanded by Congress to include a market approach to reducing air pollution by allowing certain companies to buy and sell emission "allowances," or "credits." The 1990 CAA also required transportation projects receiving federal funding to be in conformity with state air quality goals. The 1990 CAA also revised the way that air toxins are regulated, increasing the number of regulated toxic air pollutants from 7 to 187.

In 1970, the U.S. EPA was formed to enforce the CAA. In New Jersey, the EPA allowed the NJDEP to enforce the CAA because the state agency developed more stringent air standards and created a State

Criteria Pollutants

Ground level ozone (O_3) is formed when volatile organic compounds (VOCs) and nitrogen oxides react with sunlight and heat. It is produced more in the summer months and is the primary constituent of smog. Ground level ozone is a pulmonary irritant, which, even in low levels, can be dangerous to sensitive populations such as people with asthma or emphysema, and the elderly. It can also affect plant growth and is responsible for hundreds of millions of dollars in lost crop production.

Particulate matter (PM), or particle pollution, is made up of dust, ash, smoke, and other small particles formed from the burning or crushing of materials such as wood, rocks, and oil. When ingested, particulate matter can lodge deep in the lungs and can contribute to serious respiratory illnesses such as asthma or lung disease. Particulate matter also creates haze, reduces visibility, and covers buildings in dirty soot.

Carbon monoxide (CO) is a colorless, odorless gas that is formed when carbon fuel is not burned completely. It is a component of motor vehicle exhaust; therefore, higher levels of CO generally occur in areas with heavy traffic congestion. The highest levels of CO typically occur during the colder months when air pollution becomes trapped near the ground beneath a layer of rising warm air.

Nitrogen oxides (NOx) are a group of highly reactive gases that contain nitrogen and oxygen in varying amounts. Motor vehicles, electric utilities, and homes and businesses that burn fuels emit nitrogen oxides; they can also be found naturally. Nitrogen oxides are primary components in ground-level ozone (smog), acid precipitation, and other toxic chemicals. Acid precipitation can cause lung ailments in humans, property damage, harm to aquatic life, and can cause other environmental and human health problems.

Sulfur dioxide (SO_2) is released into the atmosphere when fuel containing sulfur, such as coal and oil, is burned, and when gasoline is refined from oil. Sulfur dioxide dissolves in water vapor to form acid precipitation.

Lead (Pb) is a pollutant that was historically released by cars and trucks burning leaded fuel, but metals processing plants and trash incinerators are the major source of emissions today. Lead tends to be a localized air pollutant, found in urban or high traffic areas, and is deposited in soil and water, harming fish and wildlife.

Implementation Plan (see NJAC 7:27). The CAA identified six criteria pollutants–ozone, particulate matter, sulfur dioxide, nitrogen oxides, carbon monoxide, and lead–which are destructive to human health and the built and natural environment (see explanation of Criteria Pollutants in blue box). The EPA sets National Ambient Air Quality Standards (NAAQS) for these pollutants based on human health effects, as well as environmental and property damage.

Perritt Laboratories

Photo by David Zaiser

Between 1970 and 2007, total emissions of the six criteria air pollutants decreased by more than 50%. The industrial sector reduced its toxic air emissions by 70% during this time period. Stricter emissions standards in the auto industry have made cars 90% “cleaner” since 1970. Cars also pollute less because refineries are required to produce cleaner fuels; leaded gasoline was completely banned in 1996.

Air Quality Monitoring

The NJDEP Bureau of Air Monitoring maintains a network of 41 monitoring stations across the state and is proposing the establishment of two new sites. Most of the monitoring stations are clustered in the New York metropolitan area. Each station monitors at least one of 23 different parameters, including many air pollutants as well as wind speed, wind direction, solar radiation, or other parameters. Several of these parameters–carbon monoxide, nitrogen oxides, ozone, sulfur dioxide, smoke shade, particulate matter, and various meteorological data–are measured continuously and data is available instantaneously. As enabled by the CAA, the EPA has set NAAQS for the six criteria pollutants: particulate matter, sulfur dioxide, carbon monoxide, nitrogen dioxide, ozone, and lead. There are two kinds of NAAQS: the primary standard is based on human health effects, while the secondary standard is based on environmental and property damage.

There are four air monitoring stations in Mercer County: Trenton, Ewing, Rider University, and Washington Crossing. However, these stations measure at the “Neighborhood” scale representative of 1 to 10 kilometers, which is not representative of Hightstown. However, there is an air monitoring station in the Colliers Mills Wildlife Management Area that measures at a scale that is representative of Hightstown. The Colliers Mills station only measures ozone, which it analyzes based on ultraviolet technology.

The amount of ozone has decreased greatly in New Jersey since the 1980s, and one-hour concentrations have not exceeded 0.200 parts per million (ppm) since 1988. The assessment of ground-level ozone (O_3) is based on a one-hour concentration and an eight-hour concentration. The one-hour standard is a concentration of 0.12 ppm for primary effects and 0.08 ppm for secondary

effects. The eight-hour standard is a concentration of 0.075 ppm for both primary and secondary effects.

In 2009, the Colliers Mills station recorded the highest levels of ozone than any other station in the state. The highest one-hour concentration was 0.109 ppm, recorded on August 17. This did not exceed the one-hour standard of 0.12 ppm. However, the eight-hour standard was exceeded by 8 of the 14 statewide stations measuring ozone. At the Colliers Mills station, the highest eight-hour concentration in 2009 was 0.085 ppm, also recorded on August 17.

Association Park

Photo by DVRPC

Mercer County is one of the 120 counties in the country (13 of which were in New Jersey) that were rated by the EPA in 2009 as nonattainment counties for fine particulate matter ($PM_{2.5}$). As a major transportation corridor, Hightstown has a high volume of motor vehicle traffic traveling through the center of the borough to access the New Jersey Turnpike, which contributes to air pollution.

Air Quality Index

The Air Quality Index (AQI) is an index for reporting air quality on a daily basis. The EPA created the AQI to indicate a region's air quality by measuring levels of five of the six criteria pollutants (excluding lead). The AQI is focused on the potential human health hazards experienced by breathing unhealthy air. Scores for the AQI range from 0 to 500 and are divided into six color-coded categories, as shown in **Figure 12: Air Quality Index (AQI)** below. The higher the AQI value, the greater the level of air pollution and associated health concerns.

The daily score is based on the highest individual pollutant score reported. For example, if ozone scored 150 and particulate matter scored 100, the daily AQI would be 150, which is considered "Unhealthy for Sensitive Groups." The index is also used to measure overall air quality by counting the number of days per year when the AQI of each metropolitan region exceeds 100. An AQI value of 100 generally corresponds to the national air quality standard for the pollutant, which is the level the EPA has set to protect public health.

New Jersey is divided into nine regions, which report their respective AQI. Mercer County is in Region 5: Central Delaware Valley. The monitoring stations for Region 5 are located in Burlington Township, Ewing Township, and Rider University. In 2009, Region 5 reported 319 good (green) and 46 moderate (yellow) days.

Figure 12: Air Quality Index (AQI)

Numerical Air Quality Index (AQI) Rating	Descriptive Rating: Levels of Health Concern	AQI Color Code
0 to 50	Good	Green
51 to 100	Moderate	Yellow
101 to 150	Unhealthy for Sensitive Groups	Orange
151 to 200	Unhealthy	Red
201 to 300	Very Unhealthy	Purple
301 to 500	Hazardous	Maroon

Source: NJDEP

CHAPTER 5

Biological Resources

When a community protects wildlife and habitat, it is also protecting biodiversity, which is important for the health and productivity of the ecosystem and its inhabitants, including humans. Biodiversity refers to the variety of genetic material within a species population, the variety of species (plants, animals, microorganisms) within a community, and the variety of natural communities within a given region. Biodiversity facilitates adaptation and evolution, improving a species' chance of survival as the environment changes. A diversity of plant and animal species is also necessary to maintain healthy human environments, working landscapes, and productive ecosystems. Lower organisms, many not well-known, contribute to nutrient cycling, decomposition of organic matter, soil rehabilitation, pest and disease regulation, pollination, and water filtering. Once biodiversity declines, it is extremely difficult for an ecosystem to recover or replace species.

Peddie Lake

Photo by Barbara Jones

Natural Vegetation

A region's vegetation is dependent upon many factors, the most important of which are climate and soils. The vegetation types in Hightstown have been tabulated and mapped by NJDEP's 2007 land cover analysis. This data, based on infrared aerial photography, is the most recent available. The designation of a particular land cover as a vegetation type is based on definitions provided by the Anderson Land Use Classification System, created by the U.S. Geologic Survey. See **Map 12: Natural Vegetation (2007)**. As seen in **Table 11**, less than four percent of Hightstown is made up of natural vegetation. The borough has a natural greenway along Rocky Brook that provides habitat and passive recreational opportunities for residents. The greenway extends from each of the parks throughout the Borough. The most natural corridors are in Rocky Brook Park, along Morrison Street, and west of Wyckoff Mills Condominium Complex.

Table 11: Hightstown Natural Vegetation

Vegetation Type	Area (Acres)	Percent of Hightstown
Deciduous Forest (10-50% Crown Closure)	2.19	0.3%
Deciduous Forest (>50% Crown Closure)	15.90	2.0%
Deciduous Scrub/Shrub Wetlands	3.13	0.4%
Deciduous Wooded Wetlands	6.92	0.9%
Streams and Canals	2.58	0.3%
Total	**30.72**	**3.8%**
Total Hightstown Area	**807.51**	**100.0%**

Source: NJDEP, 2007

Wetlands

Wetlands are a critical ecological resource, supporting both terrestrial and aquatic animals and boasting biological productivity far greater than that found on dry land. Wetlands play a vital role in maintaining water quality by naturally filtering surface and ground waters. The ecological importance of wetlands, however, has not always been appreciated. For over three centuries, people drained, dredged, filled, and leveled wetlands to make room for development and agriculture. Although the pace of wetland destruction has slowed markedly in the past three decades, human activities have destroyed approximately 115 million of the original 221 million acres of wetlands in the United States since the beginning of European settlement.

As shown in **Map 12: Natural Vegetation**, natural wetlands cover just 10 acres in Hightstown, or less than two percent of the total size of the borough. Deciduous scrub/shrub wetlands cover over three acres, and deciduous wooded wetlands cover about seven acres. Natural wetlands are located in areas at Rocky Brook Park, to the west of Wyckoff Mills and Cranbury Station Road, and at the junction of Timber Run and Peddie Lake.

Rocky Brook

Photo by DVRPC

Deciduous scrub/shrub wetlands are generally composed of young, medium-height, primarily deciduous woody plants. Scrub/shrub wetlands are usually in early successional stages and will later become shrub-dominated wetlands or

those dominated by canopy species. Scrub/shrub wetlands support species like red maple, ash, and sweetgum, and are typically dominated by shrub species like silky dogwood, buttonbush, winterberry, swamp rose, elderberry, southern arrowhead, and hazel alder. Deciduous wooded wetland (sometimes referred to as wetland forests or hardwood swamps) support mixed hardwoods that flourish in lowlands, such as American sycamore, river birch, white ash, swamp white oak, green ash, and sweetgum. Deciduous wooded wetlands provide important habitat for a wide variety of mammals, birds, reptiles, and amphibians.

Wetlands are protected through enforcement of the buffer requirements of the New Jersey Freshwater Wetlands Protection Act.

Upland Forests

Upland areas are those locations without water at or near the soil surface. Upland forests are located on drainage divides, terraces, and slopes where water is not the controlling factor and where drainage is sufficient so that soils do not become saturated for extended periods of time. Nearly all old growth forests in New Jersey were harvested for lumber during colonial times.

Deciduous upland forest covers over 18 acres in Hightstown. As shown in **Map 12: Natural Vegetation**, deciduous upland forest is found in small patches across the borough. Most of this (about 16 acres) is forest with over 50 percent crown closure, meaning there is a dense tree canopy. The composition of deciduous upland forests is typically composed of mixed oaks such as black, red, chestnut, scarlet, white, and willow. Other hardwoods that are present include American beech and sweetgum. Results from a 2010 Street Tree Inventory are available in **Appendix A**.

Landscape Project Priority Habitats

The Landscape Project, developed by the Endangered and Nongame Species Program of the NJDEP Division of Fish & Wildlife, documents the value of various types of habitats within New Jersey. It categorizes these habitats into one of five groups according to their importance (five being the highest). Categories three through five include habitats throughout the state that possess two exceptional conditions: (1) a documented occurrence of one or more species on either the federal or the state threatened and endangered species lists, and (2) a sufficient amount of habitat type to sustain these species. These habitats are collectively known as “critical habitat.” Categories one and two include habitats that either have a documented occurrence of a Species of Special Concern[2] in New Jersey, or are deemed suitable for species on the state or federal

[2]A Species of Special Concern is a formal definition; it indicates a species that may be under consideration for being listed as threatened due to documented population decline or habitat loss.

threatened and endangered species lists, but for which there are no documented occurrences or sightings. These habitats are labeled “suitable habitats.”

Approximately seven percent (54 acres) of Hightstown has been identified by the Landscape Project as suitable habitat for threatened or endangered species, as listed in **Table 12**. There are no areas identified as critical habitat. The Landscape Project areas in Hightstown provide suitable habitat for the great blue heron. The area surrounding Rocky Brook has also been identified as habitat for the bald eagle and wood turtle. See **Map 13: Landscape Project Priority Habitat (2007)**. The bald eagle, great blue heron, and the wood turtle have all been documented in Hightstown.

Table 12: Landscape Project Habitats

Landscape Category	Ranking	Acres	Percent of Hightstown
Emergent Wetlands	Suitable	3.63	0.4%
Forested Wetlands	Suitable	16.22	2.0%
Upland Forest	Suitable	34.31	4.2%
Total Landscape Project		**54.15**	**6.7%**
Total Hightstown Area		**807.51**	**100.0%**

Source: NJDEP, 2007

Animal Communities

Although no comprehensive inventory of the different animal species within Hightstown exists, there are records of sightings, biological studies of range, and assessments of endangered and threatened species status. Using federal, state, and other scientific sources, it is possible to identify and describe known and possible animal communities of Hightstown. These are included in **Appendix B: Animals in Hightstown**.

Invertebrates

Invertebrates are the basis of a healthy environment and are part of every food chain, either as food for amphibians and fish or as a part of nutrient cycling systems that create and maintain fertile soils. Invertebrates consist of insects (beetles, butterflies, moths, dragonflies, ants, termites, bees, wasps, flies, and others), arachnids (spiders, ticks, and mites), crustaceans (crayfish and microscopic copepods), mollusks (mussels, clams, snails, and slugs), and worms.

Macroinvertebrates are invertebrates that are visible to the naked eye but smaller than 50 millimeters. Benthic (bottom dwelling) macroinvertebrate communities

provide a basis for ecological monitoring and are relatively simple to collect from shallow stream bottoms. These communities consist largely of the juvenile stages of many insects, such as dragonflies and mayflies, as well as mollusks, crustaceans, and worms. Monitoring for diverse assemblages of macroinvertebrates reveals the effect of pollutants over a longer period of time, as compared to chemical monitoring which measures water quality at one moment in time. The AMNET surveys streams for macroinvertebrate communities, which indicate certain levels of water quality, discussed in the section on **Surface Water Quality**.

There are nine endangered invertebrate species (two beetle species, four butterfly species, and three mussel species) and eight threatened invertebrate species (three butterfly species and five mussel species) in New Jersey. Of those species on the New Jersey Endangered and Threatened List, one, the dwarf wedge mussel, is listed as endangered under the Federal Endangered Species Act. There are no threatened or endangered invertebrates known to live in Hightstown.

Vertebrates

Vertebrates are less numerous than invertebrates, but their larger size makes them much more visible, and thus better studied and recorded. Fish species are fairly well documented, as are mammals.

Mammals

Mammals appear to be abundant because they tend to be larger and live in habitats also ideal for human development. There are 90 mammal species in New Jersey, of which nine are listed as endangered and none are listed as threatened by the state. Some common mammals found in Hightstown are likely to include the opossum, big brown bat, little brown bat, Eastern cottontail, Eastern chipmunk, gray squirrel, white-footed mouse, raccoon, striped skunk, and white-tailed deer. There are no threatened or endangered mammals found in Hightstown.

A “bibbed” mallard in Rocky Brook

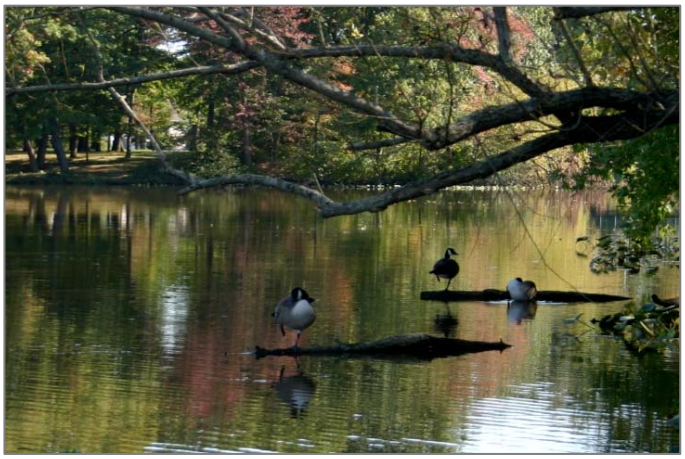
Photo by DVRPC

Birds

New Jersey has between 350 and 500 species of birds, which is an exceptional number given the state’s small size. New Jersey is an important location for migratory birds heading south for the winter. Not only is the state an important “rest stop” for birds migrating to warmer climates in Central and

South America, but also the New Jersey Atlantic Coast and the Delaware Bay are major parts of the Eastern Flyway (established migratory air route) in North America.

Hightstown is home to a variety of bird species. A complete list of birds that have been identified in Hightstown are listed in **Appendix B: Animals in Hightstown**. Some birds that are very numerous or are common and frequently seen include the mallard, red-tailed hawk, mourning dove, blue jay, American crow, Carolina chickadee, house wren, American robin, European starling, Northern cardinal, Baltimore oriole, house finch, and house sparrow. Ospreys, a threatened species in the state, have been seen in the Hightstown area. Also, night herons and green herons are frequently seen on Peddie Lake.



Canada geese in Peddie Lake

Photo by DVRPC

Another common bird is the Canada goose. The State of New Jersey has a “resident” Canada goose population of approximately 100,000 birds that no longer migrate to more southern locales, and that number may double in the next 5 to 10 years. While geese are a pleasant component of the urban/suburban environment, providing enjoyable wildlife opportunities for the public, they can also cause property and environmental damage. Goose droppings that wash into lakes during storm events can elevate coliform bacteria to unhealthy levels, closing lakes to swimming. Goose droppings limit human use of grassy areas in parks, and because geese can be quite aggressive during the nesting season, they can also injure humans. Management techniques include planting shrubby vegetation around streams, lakes, and ponds to block waterfowl access, discouraging humans from feeding geese, and removing geese eggs and replacing with decoys.

According to the NJDEP Natural Heritage Database, the bald eagle has foraging habitat in Hightstown. Also found in Hightstown is the great blue heron, which has a breeding status as a species of special concern.

The **bald eagle** (*Haliaeetus leucocephalus*) has a breeding status of endangered and a non-breeding status of threatened in New Jersey, although it has been delisted on the federal level. Bald eagles mostly consume fish, and thus often choose to build nests in forested areas near water bodies. Population decline caused by shooting, poisoning, and egg collecting accelerated after the introduction of DDT into the environment. DDT was shown to cause thinning of the eggshells, which would crack under the weight of the incubating adult bird. The bald eagle was listed as an endangered species in New Jersey in 1974, and as endangered in the lower 48 states in 1978. It was removed from the federal endangered list in 2008, but remains on the New Jersey endangered list during

the breeding season. Bald eagle populations in New Jersey have since increased from a single nesting pair in 1970 to a record 94 nesting pairs in 2010. However, there were also a record number of nest failures in 2010 as 39% of nests failed to produce young.

Reptiles and Amphibians

Reptiles and amphibians can be quite elusive when surveys attempt to document them. Some reptiles and amphibians, called herpetological species, are rare because they depend on vernal ponds, as discussed in the **Surface Waters Resources** section. Amphibians, in particular, tend to be very sensitive to environmental changes, offering a visible warning to humans that significant changes are occurring.

New Jersey is home to approximately 80 reptile and amphibian species.

According to the NJDEP Natural Heritage Database, the wood turtle, a threatened species in the state, may be found in Hightstown. See **Appendix B: Animals in Hightstown** for a complete list of reptiles and amphibians that may be found in the borough.

The **wood turtle** (*Clemmys insculpta*) is a threatened species in New Jersey, although not listed federally. Each season a new annulus, or ridge, is formed, giving its shell a distinctive pyramid-shaped appearance. The Wood Turtle occupies a variety of aquatic and terrestrial environments that contain few roads and tend to be at least one-half mile from development. The Wood Turtle prefers remote freshwater waterways for mating, feeding, and hibernation. Remote terrestrial habitats such as open or agricultural fields, thickets, lowland forests, abandoned railroad beds, and pastures are preferred for egg laying, foraging, or basking. The wood turtle was once fairly common in New Jersey, although population decline was noted in the 1970s due to habitat fragmentation and stream degradation. The species was listed as threatened in New Jersey in 1979. Wood turtle sites in the state have been surveyed and monitored by biologists since the 1970s, providing extensive data on the species. Wood turtles have been documented along the Millstone River near Hightstown. As with all endangered species, the collection and possession of wood turtles is prohibited in New Jersey.

Fish

The New Jersey Division of Fish and Wildlife, under the Bureau of Freshwater Fisheries, monitors and actively aids the propagation, protection, and management of the state's freshwater fisheries. The bureau raises several million fish for stocking in suitable water bodies and conducts research and management surveys.

There are about 16 species of fish that are likely to be found on Rocky Brook in or around Hightstown. This includes American eel, golden and spottail shiner, channel catfish, pumpkinseed, largemouth bass, and a number of other fish species. See **Appendix B: Animals in Hightstown**.

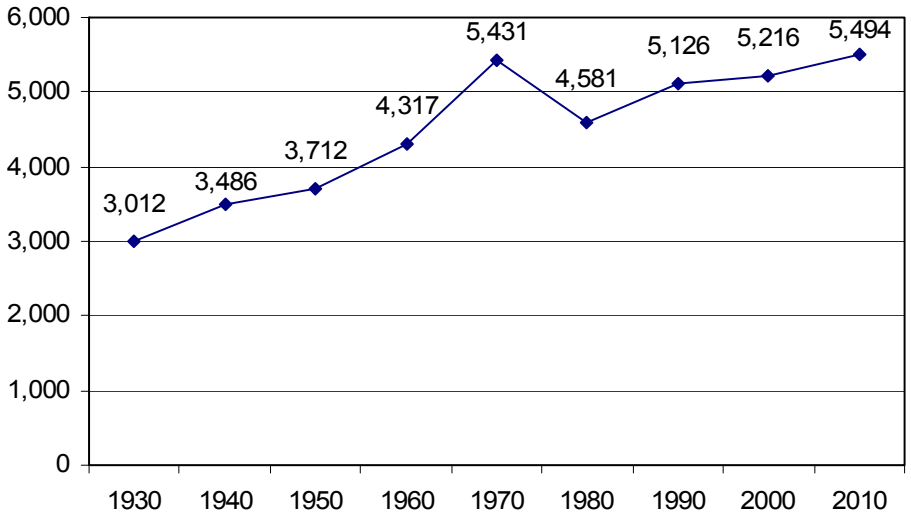
CHAPTER 6

The Built Environment

Population and Housing

In the 2010 U.S. Census, Hightstown had a total population of 5,494. For the first time in 40 years, Hightstown surpassed its population peak of 5,431 reached in the 1970 Census. In 2010, Hightstown had 2,108 housing units, of which 1,976 units (94 percent) were occupied and 132 (six percent) were vacant.

Figure 13: The Population of Hightstown, 1930 - 2010

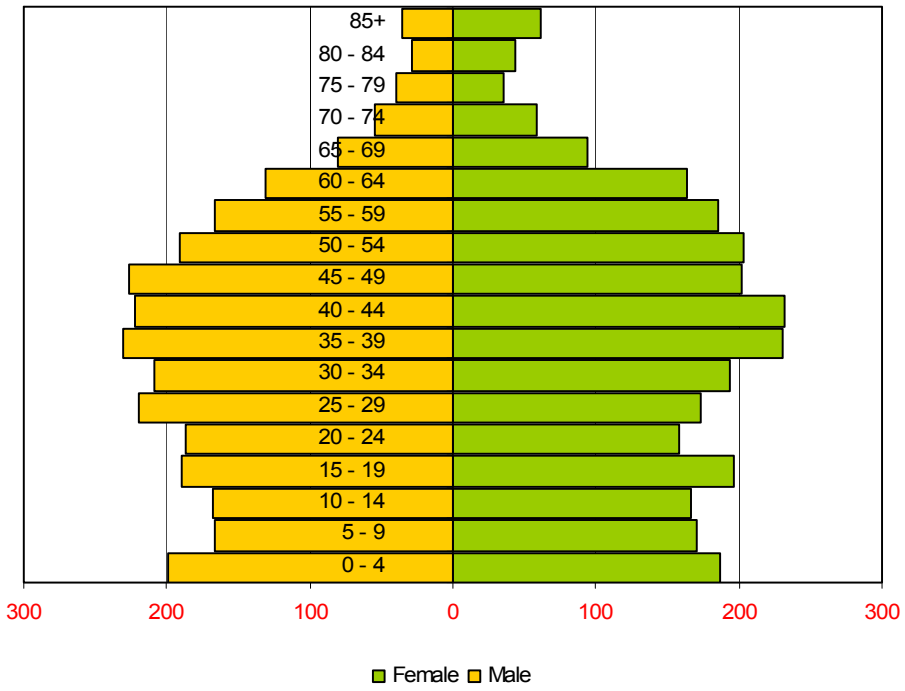


Source: US Census Bureau, 1930-2010

The borough's median age is 36.9, similar to the national average 37.2, but less than the New Jersey average of 39.0. The percentage of residents of Hightstown aged 65 and over was about 9.6 percent in 2010, less than the national average of 13.0 percent and the New Jersey average of 13.5 percent. Approximately 16.9 percent of Hightstown residents are children between the ages of 5 and 18. This represents the age group that is most likely to generate demand for public schools, community facilities, and recreational opportunities.

Based on the 2010 U.S. Census, 56 percent of residents identify as White, 30 percent identify as Hispanic or Latino, eight percent identify as Black or African American, four percent identify as Asian, two percent as multiracial, and less than one percent identifies as some other race or ethnicity.

Figure 14: Hightstown Population by Age and Gender (2010)



Source: US Census Bureau, 2010

Transportation

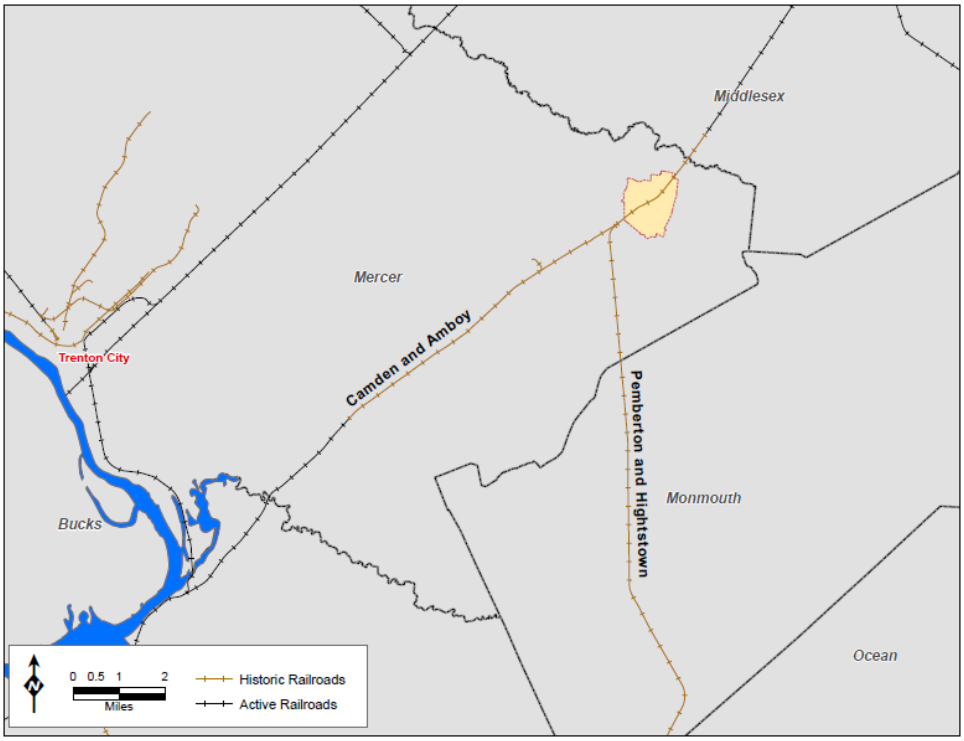
Hightstown is located in a highly accessible part of Mercer County, less than 50 miles from Philadelphia and just 15 miles from Trenton. The borough is located directly off Exit 8 of the New Jersey Turnpike. State Route 33 crosses through Hightstown and connects Trenton to the west with Neptune at the Atlantic Coast.

The Princeton Junction Shuttle provides shuttle bus service between the Princeton Junction NJ Transit Northeast Corridor railroad station and Hightstown/East Windsor. The Route 130 Connection Bus travels from the Trenton Train Station along Route 130, with stops in Hightstown. CoachUSA, operated by the private operator Suburban Transit, provides commuter bus service from Hightstown to destinations in Mercer and Monmouth counties as well as to New York City.

There are three taxi companies that are licensed by Hightstown Borough to provide service to its residents.

As discussed in the **Brief History** chapter, the historic Camden and Amboy Railroad and the Pemberton and Hightstown Railroad once intersected at the Hightstown train station. These railroads ceased operations through Hightstown in the mid-twentieth century and the railroad tracks have long been removed. Portions of the former rail bed were converted into a trail as part of the second phase of the Roger G. Cook Greenway through Hightstown.

Figure 15: Active and Historic Railroads around Hightstown



Source: DVRPC, 2011

Historic Resources

Hightstown has one house and one extensive district that are listed on the National and State Registers of Historic Places. See **Map 14: Historic Resources**.

The **Samuel Sloan House** at 238 South Main Street was built in 1856-7 in the Italianate architectural style. Although Samuel Sloan was a famous Philadelphia-based architect who wrote books on architectural designs and specialized in Italianate design, this house is named for another Samuel Sloan who was a merchant. The house may be based on a design by the architect Sloan, although this is unproven. The merchant Sloan purchased a store in 1855, and then later that year purchased a new store, also on Main Street in Hightstown. This store sold a variety of groceries and goods, including fancy clothing and accessories. In 1856, Sloan purchased a vacant lot on Main Street to build a house for his family. This was the finest house in Hightstown and the first house in the borough

to be built in the Italianate style. However, Sloan was unable to fully pay for the construction of the house, and unpaid contractors filed mechanic's liens against the property. Due to the combination of high construction costs, increased competition from other merchants, and a steep national depression in 1857, Sloan's business collapsed and his house was foreclosed. In 1858, the interior fixtures of Sloan's house were removed, possibly by Sloan himself. The foreclosed house was later sold to a prominent local physician, Dr. Joseph E. McChesney. The Samuel Sloan House was listed in the National Register of Historic Places in 1974.

The **Stockton Street Historic District** begins at the intersection at Main Street and extends westerly along Stockton Street. There are a total of 76 contributing buildings in the district that were built between 1830 and 1915. The district contains the United Methodist Church and a small triangular park with a Civil War memorial monument. The historic district has a mix of representative architectural styles, including Federal, high-style Victorian, ecclesiastic, and turn-of-the-century eclectic. The Borough of Hightstown received federal funding for a streetscape revitalization project in the Stockton Historic District in 2010. The Stockton Street Historic District was listed on the National Register of Historic Places in 2005.

Historic Stockton Street

Photo by DVRPC

In addition to the Samuel Sloan House and the Stockton Street Historic District, there are two other sites in Hightstown that have been given Opinions of Eligibility by the State Historic Preservation Office: the **Camden and Amboy Railroad Main Line Historic District** and the **East Ward Avenue Bridge** over Peddie Lake. The Camden and Amboy Railroad was the first chartered railroad in the state, and only the third in the country. The construction of the railroad, which was completed to Hightstown in 1832, spurred development throughout central New Jersey. The East Ward Avenue Bridge is a two-span bridge and a rare example of a double-intersection Warren truss bridge with

East Ward Avenue Bridge

Photo by DVRPC

hangers. It was fabricated in 1896 by the renowned New Jersey Steel & Iron Company of Trenton and is a late but significant example of the firm's bridge work. Since only a masonry plan survives, the span may have been a proprietary design. It is one of the most significant "through truss" bridge in the county because of its type, marker, and state of preservation. A through truss bridge structure has two side trusses that are connected across the top and bottom. The steel grate deck was installed in 1969 and the asphalt deck was added years later.

These properties and historic districts all meet the New Jersey and National Register criteria for significance in American history, archaeology, architecture, engineering, or culture, and possess integrity of location, design, setting, materials, workmanship, feeling, and association. Other sites may have the potential to be listed as local, state, or national landmarks, but have not been nominated by local citizens or identified by SHPO for such a designation. See **Table 13: Historic Sites of Hightstown** for current listings.

Table 13: Historic Sites of Hightstown

Name	Location	State ID#	Register
State and National Registers of Historic Places			
Samuel Sloan House	238 South Main Street	3257	NR: 9/28/1974 (NR Reference #: 74001168)
			SR: 9/6/1973
Stockton Street Historic District	Stockton Street	4447	NR: 11/25/2005 (NR Reference #: 05001331)
			SR: 5/13/2005
			COE: 5/19/2005
Eligible Sites for State and National Registers of Historic Places			
Camden and Amboy Railroad Main Line Historic District	Camden and Amboy Railroad right-of-way	2970	SHPO Opinion: 6/26/1975
East Ward Avenue Bridge	East Ward Avenue over Peddie Lake	3747	SHPO Opinion: 2/27/2001
Other Historic Sites			
Cook House	234 Morrison Avenue		
Smith House	137 Stockton Street		
Clara Barton House	356 S. Main Street		
Civil War Monument	Rogers Avenue and Stockton Street		
Reed House	200 N. Main Street		

Railroad Sleeper Site	Rogers Avenue and Railroad Avenue
Ely House and Railroad Freight Station	164 N. Main Street
Old Lace Mill	278 Monmouth Street
Ward Farmhouse	319 S. Main Street
Ashton House	172 Stockton Street
Walker House	176 Stockton Street
Redford Job House	384 Stockton Street
Josephine Dawes House	238 S. Main Street
Dr. George Titus House	210 S. Main Street
Octogon House	231 S. Main Street
The Rug Mill	Bank Street
Beekman House	218 S. Main Street
Norton House	161 E. Ward Street
E.C. Taylor House	125 S. Main Street
Mayor Cunningham House	503 S. Main Street
Thomas Applegate House	505 S. Main Street
George Pierson House	409 S. Main Street
Stults House	133 S. Main Street
William Morrison House	523 S. Main Street
Dr. John Barlow House	232 Stockton Street
Cunningham House	236 Stockton Street
Historic House	605 S. Main Street
Joseph Mohr House	556 S. Main Street
Cox-Taylor-Cox House	630 S. Main Street
Carlton Villa Estate	Meadow Lakes Retirement property
Kenneth Applegate House	503 N. Main Street
The Mercer Street School	230 Mercer Street
The Wyckoff Homestead	421 N. Main Street
The Log Cabin	181 E. Ward Street
Davison Wham House	201 East Ward Street

Source: NJ State Historic Preservation Office, 2011; Borough of Hightstown, 1998.

New Jersey municipalities are permitted to identify, designate, and regulate their own historic resources through the adoption of historic preservation ordinances (which are recognized as zoning laws under the New Jersey Municipal Land Use law). Responsibility to maintain the character of the historic properties within the borough is carried out by the **Hightstown Historic Preservation Commission**, which was instrumental in listing the Stockton Street Historic District to the State and National Registers of Historic Places.

The National Park Service and the New Jersey SHPO jointly administer the Certified Local Governments (CLG) program, which provides technical assistance and funding for community-based preservation efforts. In Mercer County, Ewing Township, Hopewell Township, Lawrenceville, and Princeton Township and Borough all participate in the CLG program. To participate, municipalities must maintain an historic preservation commission, survey local historic properties, provide opportunities for public participation in preservation activities, and develop and enforce local preservation laws. If Hightstown were to become a CLG, it would be eligible to draw from a dedicated source of matching federal and state funds for program implementation or rehabilitation work.

The Rug Mill

Photo by DVRPC

There are also federal incentives for individuals, organizations, or firms that own historic properties and are interested in historic preservation. Interested parties can take advantage of the Rehabilitation Investment Tax Credit, a federal tax incentive to encourage the preservation and reuse of older income-producing properties, including offices, apartment buildings, and retail stores.

The **Hightstown East Windsor Historical Society** was formed in 1971. In 1974, the Society purchased the Ely House for its headquarters. The historic Greek revival home dates from 1850. Renovations to the Ely House were performed by Society volunteers, and the house was opened to the public in 1979. The Society archives documents, photos, artifacts, furniture, artwork, and many other items important to the history of Hightstown and East Windsor. The historic freight station (circa 1869) of the Camden and Amboy Railroad was transported from its former location by the Coca Cola (Minute Maid) Summit Street plant to its present location adjoining the Ely House. The freight house was renovated to house the museum and library holdings of the Society. The renovations were completed in 1999 and the station was dedicated as the Sara Hutchinson West Educational Center. An original railroad crossing sign and several stone supports for the railroad are located outside the building. The Society holds regular meetings and hosts a number of educational and community events, including the annual Christmas house tour.

Parks, Recreation, and Open Space

Hightstown has four public parks with over 40 acres of recreational land and facilities, shown on **Map 15: Open Space**.

Dawes Park, located south of Railroad Avenue, contains two basketball courts and a playground. Dawes Park was redesigned in the 1990s through the work of the group Friends of Dawes Park. Association Park (also known as Grant Avenue Park) is a traditional neighborhood square park and contains mature canopy trees. It is the site for summer outdoor concerts and the annual Paws Walk. The Grant Avenue Park Committee is a citizens group dedicated to the park. Rocky Brook Park (also called the Rocky Brook Environmental Resource Area) is located on the eastern banks of Rocky Brook and contains sensitive natural features, including wetlands. It is home to the Borough's community garden. Memorial Park is located on the northern shore of Peddie Lake and is the site of a summer farmer's market and annual fall harvest fair.

Rocky Brook Park

Photo by DVRPC

The only municipal active recreation facilities are the two basketball courts at Dawes Park. However, schools in the borough provide facilities for baseball, softball, football, soccer, golf, and swimming. There are a number of "tot lots," or small playgrounds that are primarily located in the central, western, and northern parts of the borough.

The Roger G. Cook Greenway was established to link together the borough's parks and historical and environmental areas through both existing sidewalks and natural corridors, and to connect these areas with East Windsor.

The Hightstown Parks and Recreation Commission meets monthly and organizes Friday night swims, an annual Triathlon, summer concerts, and other events. The Commission also provides a skating rink in Rocky Brook Park during the winter months and rents paddle boats on Peddie Lake at certain times of the year.

Roger G. Cook Greenway

Photo by DVRPC

Borough Utilities and Services

Drinking Water

Hightstown Water Department (PWSID 1104001) supplies public drinking water to the entire borough. Hightstown Water Department is a publicly owned utility that provides drinking water to approximately 5,400 residents. The source of water is groundwater drawn from two wells in the borough that both tap the Magothy formation Old Bridge Sand member, which is part of the much larger upper Potomac-Raritan-Magothy aquifer system (see **Aquifers**). A third well has been constructed in Rocky Brook Park, but it is not operational yet. The Water Treatment Plant is located on Bank Street in the borough.

The current water supply allocation for the Hightstown Water Department system is 42 million gallons per month (MGM) and 408 million gallons per year (MGY). The current peak water demand is 34.486 MGM and 318.463 MGY, so there is a surplus of available water supply in this system.

The susceptibility ratings, 2011 annual drinking water quality report, and water quality monitoring schedule are available in **Appendix C: Hightstown Water Department**. Additional information on water supply wells is available in the **Water Supply Wells** section. See also **Map 11: Public Water Supply Wells**.

Sewer Service

Hightstown Advanced Wastewater Treatment Plant provides sewer collection service to the borough. The Advanced Wastewater Treatment Plant is located on Oak Lane in Hightstown.

Trash and Recycling

The Hightstown Department of Public Works conducts weekly trash pick-up. Bulk items are picked up by appointment and require a waste disposal sticker. Branches and limbs less than 10” in diameter are chipped curbside by appointment. Yard waste in open containers is collected by appointment. Bagged leaves are also collected. Grass clippings are to be placed in biodegradable compost bags purchased from the borough. Mercer County sponsors Hazardous Waste Cleanup Days, when residents can dispose of used electronics and some other hazardous materials. A private company is used for recycling services. The Borough has a strong law and enforcement procedure for recycling.

Education

The East Windsor Regional School District serves students in Hightstown. The District has four elementary schools: Ethel McKnight, Perry L. Drew, Walter C. Black, and Grace Norton Rogers. Students then attend Melvin H. Kreps Middle School and Hightstown High School.

The Peddie School is a private, co-educational school which has been located in Hightstown for over 150 years.

Peddie School

Photo by DVRPC

CHAPTER 7

Environmental Issues

Known Contaminated Sites

The New Jersey Known Contaminated Sites List includes former factory sites, landfills, locations of current or former leaking underground storage tanks; sites where chemicals or wastes were once routinely discharged; and places where accidents have resulted in spills and pollution. Contamination may have affected soil, groundwater, surface water, or a combination of site conditions. The most dangerous sites, from a human health standpoint, can be listed on the National Priorities List (NPL), under the federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLA is commonly referred to as "Superfund" because sites on the NPL are eligible for federal and state clean-up funds. Other sites may be remediated by state clean-up funds (via the New Jersey Spill Compensation and Control Act). The majority of the sites are remediated by the responsible parties as required pursuant to state and federal regulations. Responsible parties may be current or former owners or users of the site.

There are 16 active Known Contaminated Sites within Hightstown as of March 12, 2012. Four of these are private homes, most likely with underground storage tanks. The 12 non-residential sites are listed in **Table 14: Known Contaminated Sites in Hightstown**. These are active sites with confirmed contamination of the soil, groundwater, and/or surface water. Additionally, there one Pending Site and 25 non-residential Closed Sites in the borough. An active site has one or more active cases with confirmed contamination, and may have one or more pending or closed cases. A Pending Site has one or more cases with confirmed contamination, no active cases, and may include closed cases. Closed Sites are those with remediated contamination and have no active or pending cases. See **Table 15: Pending Known Contaminated Sites in** and **Table 16: Closed Known Contaminated Sites in Hightstown**. Non-residential sites are shown on **Map 16: Known Contaminated Sites (2009)**. Exact addresses of private homes have been removed to protect resident privacy. Updated lists of Known Contaminated Sites are available at the NJDEP Site Remediation Program website.

Table 14: Known Contaminated Sites in Hightstown

Name	Address	PI Number
Agway Energy Products	Maxwell Ave	G000005013
Central Shop Maintenance Area	New Jersey Turnpike MM 67.6 S	013180
Coca Cola Foods-Citrus Plant	480 Mercer St	003594
Getty 95297	308 Mercer St	010901
Gulf Service Station 2927 (Former)	315 Mercer St	005864
Hightstown Oil Company	Broad St & Monmouth St	G000000851
Hightstown Petroleum Corp	Rt 130 & Stockton St	014811
Lucas Electric Company Inc	401 415 Mercer St	009977
McGraw-Hill Inc	148 Princeton Rd	002292
Philips Lighting Co	Bank St	012196
Sunoco 0004-9932	180 Mercer St	016412
The Peddie School	S Main St & E Ward St	015892

Source: NJDEP, 2012

Table 15: Pending Known Contaminated Sites in Hightstown

Site ID	PI Number	PI Name	Address
6416	004416	City Auto Collision Inc	164 Mercer St

Source: NJDEP, 2012

Table 16: Closed Known Contaminated Sites in Hightstown

Site ID	PI Number	PI Name	Address
444005	558269	X Dutch Neck Rd	Dutch Neck Rd
73768	G000035829	X Hutchinson St	Hutchinson St
72130	G000023119	X Hutchinson St	Hutchinson St
72537	G000025352	X Manlove Ave	Manlove Ave
87126	G000060720	X Maxwell Ave	Maxwell Ave
88323	G000062238	X S Main St	S Main St
74234	G000038097	X South St	South St
73092	G000030221	X South St	South St
69910	G000031480	X Stockton St	Stockton St

Site ID	PI Number	PI Name	Address
73739	G000035702	X Summit St	Summit St
30779	G000003606	Agway Incorporated	633 Rt 33
46738	9740	Air Products & Chemicals Inc	140 William St
76198	G000002323	Cunningham Pharmacy	100 Main St
163654	214446	DM Properties Inc	576 N Main St
67251	G000011542	Energy Alternatives Incorporated	395 Mercer St
42171	2135	Gordon & Wilson Co	135 149 W Ward St
18120	17011	Hightstown Housing Authority	131 Rogers Ave
50270	34084	Hightstown Maintenance Yard	Maxwell Ave
57536	32867	LJ Herman's Second Hand Shop	929 Rt 130
22315	19563	Nebbia Chevrolet	449 Rt 130
12834	13179	NJTP Interchange 8 Toll Plaza	New Jersey Tpke MM 67.6 S
378419	469180	Shangle and Hunt Lumber	133 Broad St
196525	258007	Step Back in Time Antique Shop	132 Franklin St
6407	15892	The Peddie School	S Main St & E Ward St
16679	12248	Walter C Black School	371 Stockton St

Source: NJDEP, 2012

There are four hazardous waste sites in Mercer County that are currently listed on the NPL, more commonly referred to as Superfund sites. These sites pose a major human health hazard and are in need of federal funds for clean-up. None of these sites are located in Hightstown. The four sites in Mercer County are located in Trenton, Lawrenceville, Hamilton, and Princeton Junction.

Underground Storage Tanks

As of December 2011, there are seven active and compliant sites in Hightstown with regulated underground storage tanks that contain hazardous substances, pursuant to N.J.A.C. 7:14B et seq. They are listed in **Table 17: Active and Compliant Underground Storage Tanks**. A hazardous material may be motor fuel, petroleum products, toxic pollutants, or other hazardous wastes or substances. If there is a known release to soil and/or groundwater, a site will also

be listed on **Table 14: Known Contaminated Sites in Hightstown**. There may also be private residences in Hightstown that still have underground storage tanks, used primarily to hold home heating oil. As these tanks age and rust, they often begin to leak, which becomes a serious threat to the groundwater below them. Those private residences are not publicly listed by NJDEP unless they pose a human health hazard. Underground storage tanks are not required to be removed, although removal may reduce any resulting environmental liabilities.

Table 17: Active and Compliant Underground Storage Tanks

Facility ID	Facility Name	Street Address	Expiration Date
13180	Central Shop Maintenance Area	NJ Tpke MM 67.6	3/31/2013
4416	City Auto Collision Inc	164 Mercer St	3/31/2013
13810	Hightstown AWWTP	174 Oak Ln	3/31/2013
14811	Hightstown Petroleum Corp	423 Rt 130 N	3/31/2013
9977	Lucas Electric Company Inc	415 Mercer St	3/31/2013
2292	McGraw-Hill Inc	148 Princeton Hightstown Rd	3/31/2013
31378	Shil Corp	315 Mercer St	3/31/2013

Source: NJDEP, 2011

Erosion

Soil erosion is one of the most important, yet least understood, environmental problems. Geologic, or “background,” erosion occurs at approximately the same rate as soil formation, leading to neither a net loss nor a net gain of soil. Background erosion is an important process; erosion from rock is carried and deposited by wind and water. In areas with vegetative cover, the rock mixes with decomposed vegetation and creates more nutrient-rich soil.

Erosion caused by human activity has greatly increased the amount, and the rate, of soils lost (accelerated erosion). Unfortunately, human activity cannot significantly contribute to soil formation, a process that takes place over thousands of years. Human-caused erosion is a serious environmental problem across the world. In the United States, the most significant impacts are the loss of prime-agricultural soils (on-site erosion), pollution of stream and rivers (off-site erosion), and increased flooding due to stream siltation.

Construction on or near steep slopes greatly increases the incidence of soil erosion. The loss of tree cover and plant material on steep slopes is especially

damaging. Where steep slopes adjoin streams, erosion may contaminate the water and endanger wildlife habitat. In road building, there are numerous means for managing roadside erosion during and after construction, ranging from the highly technical (polyester and steel) to the simple (compost and tree plantings). Most state departments of transportation have best management practices to alleviate and manage roadside erosion, to protect the environment, and ensure the future safety of the road itself.

At the time of publication, Hightstown is currently looking into the possible impact that construction of the New Jersey Turnpike has had on local water quality. The NJ Turnpike Authority is constructing an expansion and relocation of Interchange 8. Upon completion, the interchange will directly connect traffic to Route 133, thereby bypassing downtown Hightstown. This is expected to provide a noticeable reduction in the amount of traffic traveling through the borough. The improved traffic situation is a direct result of a much larger interchange and additional travel lanes on the main line Turnpike. The larger interchange and additional travel lanes will add a significant amount of new impervious cover. The construction of the new facilities is expected to be complete sometime in 2013.

During this construction, it has appeared that the Peddie Lake has experienced increased levels of silt and turbidity. From observation by the municipal engineer, it appears that Peddie Lake is experiencing higher levels of turbidity for longer duration after each rainfall than was the case prior to the start of construction. It has not presently been confirmed that this is a result of the construction by the NJ Turnpike Authority. However, Borough officials have initiated talks with the NJ Turnpike Authority and the NJ Department of Transportation to investigate the causes and solutions for the apparent silting and turbidity.

Flooding

Flooding at Memorial Park, August 2011

Photo by David Zaiser

Hightstown has experienced major flooding events on a number of occasions, mostly notably in 1915, 1934, and 2011.

The major flooding that occurred in the late summer of 2011 in the wake of Hurricane Irene caused widespread damage in the downtown area. The Hightstown Borough Council voted unanimously to declare an emergency after flooding inundated Borough Hall, the police department, the firehouse, the water treatment plant, and several downtown homes and businesses. The parapet on the Route 33 Bridge at Rocky Brook collapsed as a result of the flood water. The dam wall did not collapse

and at no time was integrity of the dam wall in jeopardy. The water treatment plant was flooded with 13 feet of water, causing a boil water advisory to be issued.

Borough personnel worked before, during, and after the storm to minimize the damage caused by the rising water level. Borough personnel assured that the dam gates were working properly and confirmed that the gates were completely open, allowing for full flow through the dam. Borough personnel remained at the dam throughout the duration of the storm.

Flooding on Main Street, August 2011

Photo by David Zaiser

Radon

Radon is a radioactive gas that comes from the natural decay of uranium found in nearly all soils. It is invisible, odorless, and tasteless. It moves up through the ground to the air above, and into all types of homes through cracks and other holes in foundations. A build-up of radon-contaminated air within a home can pose a long-term health hazard to residents, specifically for lung cancer. The only method of detection is to conduct a test of the air within a home. Fortunately, radon testing is inexpensive. All radon test results conducted in the state are reported to NJDEP by certified companies, which perform the tests or manufacture the test kits. This data is used to classify municipalities into a three-tier system, which identifies the potential for homes with indoor radiation problems.

NJDEP classifies municipalities into three categories according to the potential for indoor radon problems: high (Tier 1), moderate (Tier 2), and low (Tier 3). Hightstown is classified as a Tier 2 municipality, indicating a moderate risk of high radon levels in homes. There is no evidence that radon is an issue in the borough. The average indoor radon level in the United States is about 1.3 picoCuries per liter (pCi/L). At the level of 4 pCi/L, NJDEP recommends a homeowner consider steps to reduce long-term exposure to radon gas. If radon levels are high in a home, NJDEP suggests that the homeowner take the following actions: (1) prevent radon from entering the house by repairing cracks and insulation; and (2) dilute radon concentrations currently in the house by installing a radon extraction system and/or frequently ventilating indoor air.

NJDEP provides information on testing, mitigation, radon's health effects, and additional information on their website at www.njradon.org. Free information packets are available upon request. They can also be reached for radon-related

questions by phone at (800) 648-0394. All companies conducting radon testing and mitigation are certified by NJDEP and are listed on their website.

CHAPTER 8

Sources of Information

Brief History

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Appendices

- **Map 15: Open Space**
- **Map 16: Known Contaminated Sites (2009)**

APPENDIX A

Plant Species in Hightstown

Street Tree Inventory

Code	Species	Common Name	Number of Trees Inventoried
AH	Aesculus hippocastanum	Horse-chestnut	9
AL	Acer palmatum	Japanese Maple	1
AM	Acer saccharum	Sugar Maple	4
AP	Acer platanoides	Norway Maple	90
AR	Acer rubrum	Red Maple	16
AS	Acer saccharinum	Silver Maple	11
BA	Betula alleghaniensis	Yellow Birch	1
CC	Cercis Canadensis	Eastern Redbud	3
CK	Cornus kousa	Kousa Dogwood	6
FA	Fraxinus americana	White Ash	11
FG	Fagus grandifolia	American Beech	3
FP	Fraxinus pennsylvanica	Green Ash	5
FS	Fagus sylvatica	European Beech	9
GB	Ginkgo biloba	Ginkgo	4
GT	Gleditsia triacanthos var. inermis	Honey Locust	17
JV	Juniperus virginiana	Red Cedar, Eastern Juniper	1
LS	Liquidambar styraciflua	American Sweetgum	4
MA	Magnolia x	Magnolia	1
PA	Platanus x acerifolia	London Plane	6
PC	Pyrus calleryana	Callery Pear	123
PM	Pseudotsuga menziesii	Douglas Fir	2
PR	Pinus resinosa	Red Pine	4

Code	Species	Common Name	Number of Trees Inventoried
PS	Pinus Strobus	Eastern White Pine	5
QA	Quercus alba	White Oak	2
QP	Quercus palustris	Pin Oak	16
QR	Quercus rubra	Northern Red Oak	25
SB	Salix babylonica	Babylon Willow	1
TC	Tilia cordata	Small-Leaved Lime	6
TD	Tsuga canadensis	Eastern Hemlock	1
UA	Ulmus americana	American Elm	14
ZS	Zelkova serrata	Japanese Zelkova	33
uk	Unknown	Unknown	21

Source: Hightstown Environmental Commission, 2010

Rare Plant Species and Ecological Communities Presently Recorded in the NJ Natural Heritage Database

Scientific Name	Common Name	Federal Status	State Status	Regional Status	G Rank	S Rank
County: **Mercer**						
Terrestrial Community - Other Classification						
Floodplain forest	Floodplain Forest				G4	S3?
Freshwater tidal marsh complex	Freshwater Tidal Marsh Complex				G4?	S3?
Vascular Plant						
Agastache nepetoides	Yellow Giant-hyssop			HL	G5	S2
Agastache scrophulariifolia	Purple Giant-hyssop			HL	G4	S2
Agrimonia microcarpa	Small-fruit Grooveburr			HL	G5	S2
Alopecurus aequalis var. aequalis	Short-awn Meadow-foxtail			HL	G5TNR	S2
Aplectrum hyemale	Puttyroot		E	LP, HL	G5	S1
Asclepias rubra	Red Milkweed			LP, HL	G4G5	S2
Asclepias variegata	White Milkweed			HL	G5	S2
Aster radula	Low Rough Aster		E	LP, HL	G5	S1
Bidens bidentoides	Estuary Burr-marigold			HL	G3	S2
Cacalia atriplicifolia	Pale Indian Plantain		E	LP, HL	G4G5	S1
Calamagrostis pickeringii	Pickering's Reed Grass		E	LP, HL	G4	S1
Callitriche palustris	Marsh Water-starwort			HL	G5	S2
Calystegia spithamaea	Erect Bindweed		E	LP, HL	G4G5T4T5	S1
Carex barrattii	Barratt's Sedge			LP	G4	S4
Carex frankii	Frank's Sedge			HL	G5	S3
Carex haydenii	Cloud Sedge		E	LP, HL	G5	S1
Carex hitchcockiana	Hitchcock's Sedge			HL	G5	S2
Carex jamesii	James' Sedge		E	LP, HL	G5	S1

County: **Mercer**

Carex willdenowii var. willdenowii	Willdenow's Sedge			HL	G5T5	S2
Castilleja coccinea	Scarlet Indian-paintbrush			HL	G5	S2
Cercis canadensis	Redbud		E	LP, HL	G5T5	S1
Crataegus calpodendron	Pear Hawthorn		E	LP, HL	G5	S1
Crataegus chrysocarpa var. chrysocarpa	Fireberry Hawthorn			HL	G5TNR	S1
Cuscuta cephalanthi	Buttonbush Dodder		E	LP, HL	G5	S1
Cuscuta polygonorum	Smartweed Dodder			HL	G5	S2
Cynoglossum virginianum var. virginianum	Wild Comfrey			HL	G5T5	S2
Cyperus lancastriensis	Lancaster Flat Sedge		E	LP, HL	G5	S1
Cystopteris protrusa	Lowland Fragile Fern			HL	G5	S2
Dicentra canadensis	Squirrel-corn		E	LP, HL	G5	S1
Ellisia nyctelea	Aunt Lucy		E	LP, HL	G5	S1
Eragrostis frankii	Frank's Love Grass			HL	G5	S2
Eriocaulon parkeri	Parker's Pipewort			HL	G3	S2
Eriophorum gracile	Slender Cotton-grass		E	LP, HL	G5TNR	SH
Euphorbia corollata	Flowering Spurge			HL	G5	S2
Geum vernum	Spring Avens			HL	G5	S2
Hasteola suaveolens	Sweet-scent Indian-plantain			HL	G3	SX.1
Helonias bullata	Swamp-pink	LT	E	LP, HL	G3	S3
Heteranthera multiflora	Bouquet Mud-plantain			HL	G4	S2
Hybanthus concolor	Green Violet		E	LP, HL	G5	S1
Jeffersonia diphylla	Twinleaf		E	LP, HL	G5	S1
Limosella subulata	Awl-leaf Mudwort		E	LP, HL	G4G5	S1
Melanthium virginicum	Virginia Bunchflower		E	LP, HL	G5	S1
Mimulus alatus	Winged Monkey-flower			HL	G5	S3

County: **Mercer**

Nuphar microphyllum	Small Yellow Pond-lily	E	LP, HL	G5T4T5	SH
Obolaria virginica	Virginia Pennywort		HL	G5	S2
Penstemon laevigatus	Smooth Beardtongue	E	LP, HL	G5	S1
Phlox pilosa	Downy Phlox	E	LP, HL	G5T5	SH
Platanthera peramoena	Purple Fringeless Orchid	E	LP, HL	G5	S1
Potamogeton vaginatus	Sheathed Pondweed		HL	G5	SH
Ptelea trifoliata	Wafer-ash	E	LP, HL	G5T5	S1
Pycnanthemum clinopodioides	Basil Mountain-mint	E	LP, HL	G2	S1
Ranunculus ambigens	Water-plantain Spearwort		HL	G4	S2
Ranunculus pusillus var. pusillus	Low Spearwort		HL	G5T4?	S2
Ranunculus reptans	Creeping Spearwort	E	LP, HL	G5T5	SH
Rhynchospora globularis	Coarse Grass-like Beaked-rush	E	LP, HL	G5?	S1
Rhynchospora pallida	Pale Beaked-rush		HL	G3	S3
Sagittaria subulata	Awl-leaf Arrowhead		HL	G4	S2
Scirpus longii	Long's Woolgrass	E	LP, HL	G2	S2
Scutellaria nervosa	Veined Skullcap		HL	G5	S2
Stachys palustris var. homotricha	Hairy Hedge-nettle	E	LP, HL	G5TNR	SH
Thaspium trifoliatum var. trifoliatum	Purple Meadow-parsnip		HL	G5T5	S3
Tradescantia ohiensis	Ohio Spiderwort		HL	G5	S2
Verbena simplex	Narrow-leaf Vervain	E	LP, HL	G5	S1
Wolffiella floridana	Sword Bogmat	E	LP, HL	G5	S1
Zigadenus leimanthoides	Death-camus	E	LP, HL	G4Q	S1

Animals in Hightstown

Mammals

Common Name	Scientific Name	State Status
Opossum	*Didelphis marsupialis*	Stable
Eastern cottontail	*Sylvilagus floridanus*	Stable
Eastern chipmunk	*Tamias striatus*	Stable
Woodchuck	*Marmota monax*	Stable
Eastern gray squirrel	*Sciurus carolinensis*	Stable
White-footed mouse	*Peromyscus leucopus*	Stable
Muskrat	*Ondatra zibethicus*	Stable
Red fox	*Vulpes vulpes*	Stable
Raccoon	*Procyon lotor*	Stable
White-tailed deer	*Odocoileus virginianus*	Decreasing

Source: Amy S. Greene Environmental Consultants, Inc., 1997; Hightstown Environmental Commission, 2012

Reptiles and Amphibians

Common Name	Scientific Name	Status
Turtles		
Common snapping turtle	*Chelydra serpentina*	Stable
Common musk turtle (stinkpot)	*Sternotherus odoratus*	Stable
Eastern mud turtle	*Kinosternon subrubrum subrubrum*	Undetermined
Spotted turtle	*Clemmys guttata*	Undetermined
Bog turtle	*Clemmys muhlenbergii*	Endangered

Common Name	Scientific Name	Status
Wood turtle	*Clemmys insculpta*	Threatened
Eastern box turtle	*Terrapene carolina carolina*	Stable
Red-eared slider	*Trachemys scripta elegans*	Introduced
Redbelly turtle	*Pseudemys rubriventris*	Undetermined
Eastern painted turtle	*Chrysemys picta picta*	Stable
Lizards		
Five-lined skink	*Eumeces fasciatus*	Undetermined
Snakes		
Black rat snake	*Elaphe obsoleta obsoleta*	Undetermined
Eastern garter snake	*Thamnophis sirtalis sirtalis*	Stable
Eastern hognose snake	*Heterodon platyrhinos*	Decreasing
Eastern milk snake	*Lampropeltis triangulum triangulum*	Stable
Eastern ribbon snake	*Thamnophis sauritus sauritus*	Stable
Eastern smooth earth snake	*Virginia valeriae valeriae*	Undetermined
Eastern worm snake	*Carphophis amoenus amoenus*	Undetermined
Northern black racer	*Coluber constrictor constrictor*	Undetermined
Northern brown snake	*Storeria dekayi dekayi*	Stable
Northern redbelly snake	*Storeria occipitomaculata occipitomaculata*	Stable
Northern ringneck snake	*Diadophis punctatus edwardsii*	Stable
Northern scarlet snake	*Cemophora coccinea copei*	Undetermined
Northern water snake	*Nerodia sipedon sipedon*	Stable
Salamanders		
Four-toed salamander	*Hemidactylium scutatum*	Decreasing
Long-tailed salamander	*Eurycea longicauda longicauda*	Threatened
Marbled salamander	*Ambystoma opacum*	Special Concern
Northern dusky salamander	*Desmognathus fuscus fuscus*	Stable
Northern red salamander	*Pseudotriton ruber ruber*	Decreasing
Northern slimy salamander	*Plethodon glutinosus*	Stable
Northern two-lined	*Eurycea bislineata*	Stable

Common Name	Scientific Name	Status
salamander		
Redback salamander	*Plethodon cinereus*	Stable
Red-spotted newt	*Notophthalmus viridescens viridescens*	Stable
Spotted salamander	*Ambystoma maculatum*	Decreasing
Frogs and Toads		
Eastern spadefoot (toad)	*Scaphiopus holbrookii holbrookii*	Decreasing
American toad	*Bufo americanus*	Stable
Fowler's toad	*Bufo woodhousii fowleri*	Special Concern
Northern cricket frog	*Acris crepitans crepitans*	Undetermined
Northern gray treefrog	*Hyla versicolor*	Stable
Northern spring peeper	*Pseudacris crucifer crucifer*	Stable
Bullfrog	*Rana catesbeiana*	Stable
Green frog	*Rana clamitans melanota*	Stable
Wood frog	*Rana sylvatica*	Stable
Southern leopard frog	*Rana utricularia*	Stable
Pickerel frog	*Rana palustris*	Stable

Source: NJDEP, 2001

Birds

Common Name	Scientific Name	State Status
Canada goose	*Branta canadensis*	Increasing
Mallard	*Anas platyrhynchos*	Increasing
Turkey vulture	*Cathartes aura*	Increasing
Red-tailed hawk	*Buteo jamaicensis*	Increasing
Laughing gull	*Larus atricilla*	Stable
Mourning dove	*Zenaida macroura*	Stable
Chimney swift	*Chaetura pelagica*	Regional Priority
Belted kingfisher	*Ceryle alcyon*	Stable
Red-bellied woodpecker	*Melanerpes carolinus*	Increasing
Downy woodpecker	*Picoides pubescens*	Stable

Common Name	Scientific Name	State Status
Northern flicker	*Colaptes auratus*	Regional Priority
Northern rough-winged swallow	*Stelgidopteryx serripennis*	Stable
Blue jay	*Cyanocitta cristata*	Decreasing
American crow	*Corvus brachyrhynchos*	Stable
Carolina chickadee	*Parus carolinensis*	Stable
Tufted titmouse	*Parus bicolor*	Increasing
House wren	*troglogytes aedon*	Stable
American robin	*Turdus migratorius*	Stable
Gray catbird	*Dumetella carolinensis*	Regional Priority
Northern mockingbird	*Mimus polyglottos*	Decreasing
European starling	*Sturnus vulgaris*	Introduced
Yellow-rumped warbler	*Dendroica coronata*	Increasing
Common yellowthroat	*Geothlypis trichas*	Decreasing
Northern cardinal	*Cardinalis cardinalis*	Increasing
Song sparrow	*Melospiza melodia*	Decreasing
Red-winged blackbird	*Agelaius phoeniceus*	Stable
Common grackle	*Quiscalus quiscula*	Decreasing
Baltimore oriole	*Icterus galbula*	Regional Priority
House finch	*Carpodacus mexicanus*	Stable
American goldfinch	*Carduelis tristis*	Increasing
House sparrow	*Passer domesticus*	Introduced

Sources: Amy S. Greene Environmental Consultants, Inc., 1997; Hightstown Environmental Commission, 2012

Fish

Common Name	Scientific Name	Historical Presence
Freshwater Eels		
American eel	*Anguilla rostrata*	Native
Carps and Minnows		
Golden shiner	*Notemigonus crysoleucas*	Native
Spottail shiner	*Notropis hudsonius*	Native
Fallfish	*Semotilus corporalis*	Native
Suckers		
Creek chubsucker	*Erimyzon oblongus*	Native
North American Catfishes		
Brown bullhead	*Ameiurus nebulosus*	Native
Channel catfish	*Ictalurus punctatus*	Introduced
Tadpole madtom	*Noturus gyrinus*	Native
Pikes		
Chain pickerel	*Esox niger*	Native
Pirate Perches		
Pirate perch	*Aphredoderus sayanus*	Native
Sunfishes		
Pumpkinseed	*Lepomis gibbosus*	Native
Bluegill	*Lepomis macrochirus*	Introduced
Largemouth bass	*Micropterus salmoides*	Introduced
Black crappie	*Pomoxis nigromaculatus*	Introduced
Perches		
Tessellated darter	*Etheostoma olmstedi*	Native
Yellow perch	*Perca flavescens*	Native

Source: Arndt, Rudolf G. "Annotated Checklist and Distribution of New Jersey Freshwater Fishes, with Comments on Abundance." *The Bulletin [of the] New Jersey Academy of Science*, V. 49, No. 1, Spring, 2004.

Rare Wildlife

Common Name	Scientific Name	State Status	G Rank	S Rank
Bald eagle (foraging)	*Haliaeetus leucocephalus*	E/T	G4	S1B, S1N
Great blue heron	*Ardea herodias*	SC/S	G5	S3B, S4N
Wood turtle	*Glyptemys insculpta*	T	G4	S2

Source: NJDEP Natural Heritage Database, 2009

State Status	
E	Endangered: A species whose prospects for survival within the state are in immediate danger due to one or many factors, such as a loss of habitat, over exploitation, predation, competition, disease. An endangered species requires immediate assistance or extinction will probably follow.
T	Threatened: A species that may become endangered if conditions surrounding the species begin to or continue to deteriorate.
SC	Special Concern: A species that warrants special attention because of some evidence of decline, inherent vulnerability to environmental deterioration, or habitat modification that would result in their becoming a Threatened species. This category would also be applied to species that meet the foregoing criteria and for which there is little understanding of their current population status in the state.
S	Stable: A species whose population is not undergoing any long-term increase/decrease within its natural cycle.
Status for animals separated by a slash (/) indicates a dual status. First status refers to the state breeding population, and the second status refers to the migratory or winter population.	

Global (G Rank) and State (S Rank) Element Rank	
G1	Critically imperiled globally because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.
G2	Imperiled globally because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.
G3	Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g., a single western state, a physiographic region in the East) or because of other factors making it vulnerable to extinction throughout its range; the number of occurrences are in the range of 21 to 100.
G4	Apparently secure globally, although it may be quite rare in parts of its range, especially at the periphery.

G5	Demonstrably secure globally, although it may be quite rare in parts of its range, especially at the periphery.
T	The status of infraspecific taxa (subspecies or varieties) are indicated by a “T-rank” following the species global rank.
S1	Critically imperiled in New Jersey because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres). Elements so ranked are often restricted to very specialized conditions or habitats and/or restricted to an extremely small geographical area of the state. Also included are elements that were formerly more abundant, but because of habitat destruction or some other critical factor of its biology, they have been demonstrably reduced in abundance. In essence, these are elements for which, even with intensive searching, sizable additional occurrences are unlikely to be discovered.
S2	Imperiled in New Jersey because of rarity (6 to 20 occurrences). Historically, many of these elements may have been more frequent but are now known from very few extant occurrences, primarily because of habitat destruction. Diligent searching may yield additional occurrences.
S3	Rare in state with 21 to 100 occurrences (plant species and ecological communities in this category have only 21 to 50 occurrences). Includes elements that are widely distributed in the state but with small populations/acreage or elements with restricted distribution, but locally abundant. Not yet imperiled in state but may soon be if current trends continue. Searching often yields additional occurrences.
S4	Apparently secure in state, with many occurrences.
S5	Demonstrably secure in state and essentially ineradicable under present conditions.
B	Refers to the breeding population of the element in the state.
N	Refers to the non-breeding population of the element in the state.
NR	Species has not yet been ranked.
Note: To express uncertainty, the most likely rank is assigned and a question mark added (e.g., G2?). A range is indicated by combining two ranks (e.g., G1G2, S1S3).	

CAUTIONS AND RESTRICTIONS ON NATURAL HERITAGE DATA

The quantity and quality of data collected by the Natural Heritage Program is dependent on the research and observations of many individuals and organizations. Not all of this information is the result of comprehensive or site-specific field surveys. Some natural areas in New Jersey have never been thoroughly surveyed. As a result, new locations for plant and animal species are continuously added to the database. Since data acquisition is a dynamic, ongoing process, the Natural Heritage Program cannot provide a definitive statement on the presence, absence, or condition of biological elements in any part of New Jersey. Information supplied by the Natural Heritage Program summarizes existing data known to the program at the time of the request regarding the biological elements or locations in question. They should never be regarded as final statements on the elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. The attached data is provided as one source of information to assist others in the preservation of natural diversity.

This office cannot provide a letter of interpretation or a statement addressing the classification of wetlands as defined by the Freshwater Wetlands Act. Requests for such determination should be sent to the DEP Land Use Regulation Program, P.O. Box 401, Trenton, NJ 08625-0401.

The Landscape Project was developed by the Division of Fish & Wildlife, Endangered and Nongame Species Program to map critical habitat for rare animal species. Some of the rare species data in the Landscape Project is in the Natural Heritage Database, while other records were obtained from other sources. Natural Heritage Database response letters will list all species (if any) found during a search of the Landscape Project. However, any reports that are included with the response letter will only reference specific records if they are in the Natural Heritage Database. This office cannot answer any inquiries about the Landscape Project. All questions should be directed to the DEP Division of Fish and Wildlife, Endangered and Nongame Species Program, P.O. Box 400, Trenton, NJ 08625-0400.

This cautions and restrictions notice must be included whenever information provided by the Natural Heritage Database is published.

NJ Department of Environmental Protection
Division of Parks and Forestry
Natural Lands Management

Hightstown Water Department

Hightstown Water Department is a public community water system consisting of two wells that draw from the upper Potomac-Raritan-Magothy aquifer system. The Water Department also purchases water from the East Windsor Municipal Utilities Authority, which also sources its drinking water from the upper Potomac-Raritan-Magothy aquifer system.

Susceptibility Ratings for Source Water

The table below illustrates the susceptibility ratings for the seven contaminant categories (and radon) for the source water drawn by the two wells of the Hightstown Water Department. The wells are rated high (H), medium (M), or low (L) for each contaminant category. The contaminant categories are defined below.

If a system is rated highly susceptible for a contaminant category, it does not mean a customer is or will be consuming contaminated drinking water. The rating reflects the potential for contamination of source water, not the existence of contamination.

Pathogens	Nutrients	Pesticides	Volatile Organic Compounds	Inorganics	Radio-nuclides	Radon	Disinfection Byproduct Precursors
M	H	M	H	H	H	M	M

Source: NJDEP, 2009

PWS ID# NJ1104001

Annual Drinking Water Quality Report

Hightstown Water Department

For the Year 2011, results from the Year 2010

We are pleased to present to you this year's Annual Drinking Water Quality Report. This report is designed to inform you about the quality water and services we deliver to you every day. Our constant goal is to provide you with a safe and dependable supply of drinking water.

Our water source is two wells. Our wells draw their water from the Potomac- Raritan- Magothy Aquifer System. The New Jersey Department of Environmental Protection (NJDEP) has completed and issued the Source Water Assessment Report and Summary for this public water system, which is available at WWW.state.nj.us/dep/swap or by contacting NJDEP's Bureau of Safe Drinking Water at (609) 292-5550. You may also contact your public water system to obtain information regarding your water system's Source Water Assessment. This water system's source water susceptibility ratings and a list of potential contaminant sources is attached. We have a source water protection plan available for review from our office.

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbiological contaminants are available from the Safe Drinking Water Hotline (800-426-4791).

TEST RESULTS

Contaminant	Violation Y/N	Level Detected	Units of Measurement	MCLG	MCL	Likely Source of Contamination
Radioactive Contaminants						
Gross Alpha Test results Yr. 2006	N	Range = 2.6 – 2.9 Average = 2.7	pCi/l	0	15	Erosion of natural deposits
Radium 228 Test results Yr. 2006	N	Range = 0.02 – 0.9 Average = 0.36	pCi/l	0	5	Erosion of natural deposits
Inorganic Contaminants						
Barium Test results Yr. 2008	N	0.04	ppm	2	2	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits
Copper Test results Yr. 2008	N	0.12 No samples exceeded the action level	Ppm	1.3	AL=1.3	Corrosion of household plumbing systems; erosion of natural deposits
Fluoride Test results Yr. 2008	N	1.1	Ppm	4	4	Erosion of natural deposits; water additive which promotes strong teeth; discharge from fertilizer and aluminum factories
Lead Test results Yr. 2008	N	< 2 No samples exceeded the action level	ppb	0	AL=15	Corrosion of household plumbing systems, erosion of natural deposits
Volatile Organic Contaminants / Disinfection Byproducts						
Total Xylenes Test results Yr. 2010	N	Range = ND - 1 Average = ND	ppb	N/A	1000	Discharge from petroleum; discharge from chemical factories
TTHM Total Trihalomethanes Test results Yr. 2010	N	Average = 8	ppb	N/A	80	By-product of drinking water disinfection
HAA5s Haloacetic Acids Test results Yr. 2010	N	Average = 1	ppb	N/A	60	By-product of drinking water disinfection

Regulated Disinfectants	Level Detected	MRDL	MRDLG
Chlorine Test results Yr. 2010	Average = 0.2 – 0.3	4.0 ppm	4.0 ppm

As part of our water quality monitoring program, hundreds of quality tests are performed on our water each year. We test for over eighty individual contaminants, and perform additional daily monitoring at our water treatment facility, and throughout the water distribution system. The table lists only the contaminants, which were detected in the water for the monitoring period of January 1st to December 31st, 2010. The state allows us to monitor for some contaminants less than once per year because the concentrations of these contaminants do not change frequently. Some of our data, though representative, are more than one year old.

Annual Drinking Water Quality Monitoring Schedule

Monitoring Schedule for HIGHTSTOWN WATER DEPARTMENT (NJ1104001)			
Routine Total Coliform Bacteria Schedules			
Schedule Start Date	Schedule End Date	Required Months to Sample In	Sampling Requirements
01/01/1991	Continuous	1/1--12/31	6 Routine Sample(s)/Month

Contaminant Group Schedules

Sample Point ID	Analyte Group	Schedule Start Date	Schedule End Date	Required Months to Sample In	Required Year to Sample In	Sampling Requirements
	TOTAL THM-HAA5	01/01/2004	Continuous		2011	Disinfection Byproducts (Stage 1) 1 MAX RESIDENCE TIME SAMPLE(S) COLLECTED ANNUALLY BETWEEN 7/1--9/30 (SAMPLE POINT ID: DBPMAX)
DS	LEAD AND COPPER	01/01/2000	Continuous	6/1--9/30	2011	20 Sample(s)/Every 3 years
TP001004	INORGANICS	01/01/2002	Continuous	1/1-12/31	2012	1 Sample(s)/Every 3 years
TP001004	RADIOLOGICALS	01/01/2008	Continuous	1/1-12/31	2012	1 Sample(s)/6 year period
TP001004	SECONDARY	01/01/2002	Continuous	1/1-12/31	2012	1 Sample(s)/Every 3 years
TP001004	VOCS FEDERAL	01/01/2003	Continuous	1/1-12/31	2011	1 Sample(s)/Quarter
TP001004	VOCS STATE	01/01/2003	Continuous	1/1-12/31	2011	1 Sample(s)/Quarter

Individual Contaminant Schedules

Sample Point ID	Analyte Name	Schedule Start Date	Schedule End Date	Required Months to Sample In	Required Year to Sample In	Sampling Requirements
TP001004	NITRATE	01/01/2002	Continuous	1/1-12/31	2011	1 Routine Sample(s)/Year

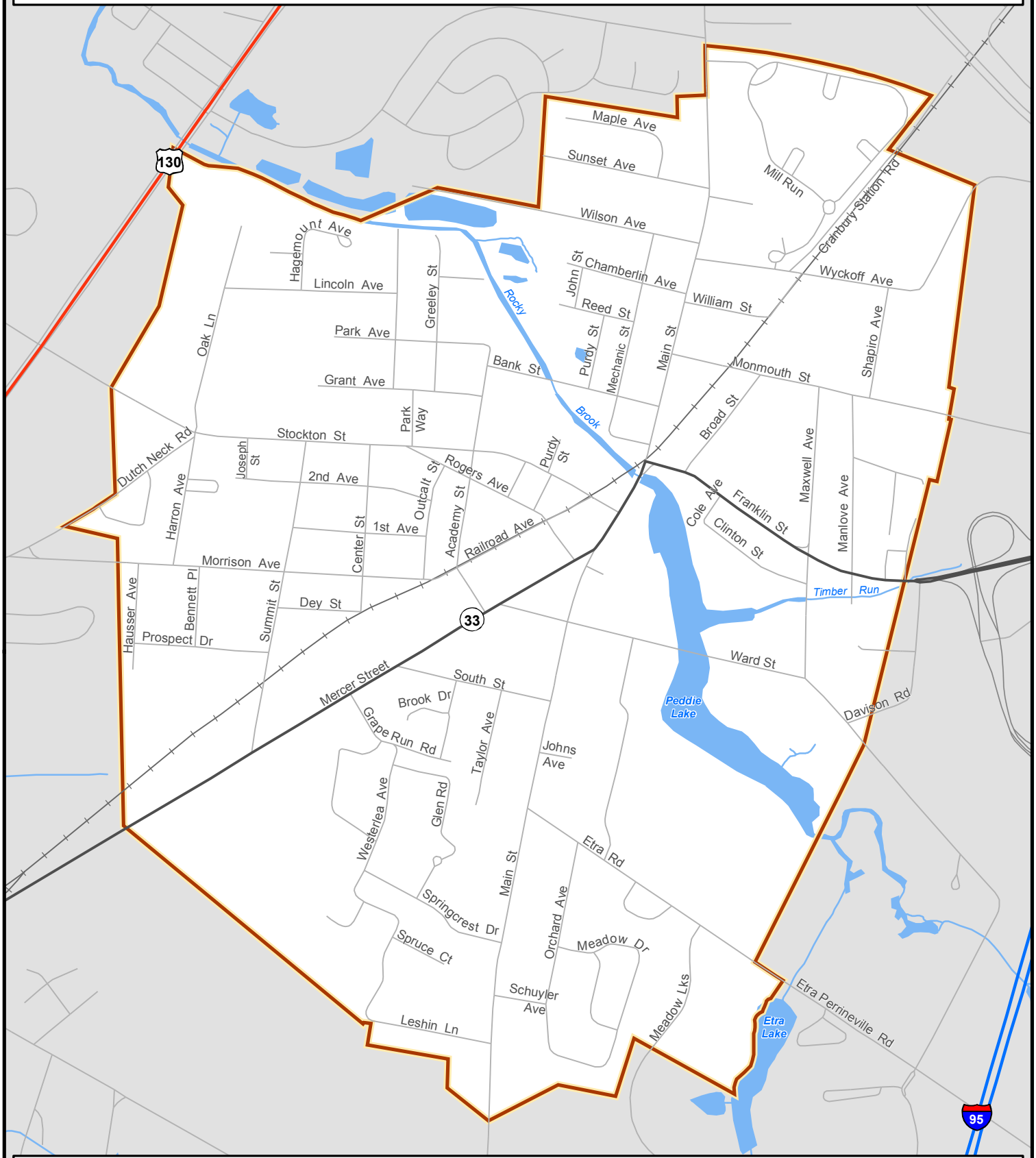
Printed: Thu Sep 22 13:07:48 EDT 2011

APPENDIX D

Maps

Hightstown Borough

Map 1: Borough of Hightstown



0 0.125 0.25
Miles

DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

Borough Boundary

Surface Water

Historic Railroad

Source : NJDEP, NJDOT, DVRPC, TANA.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

Hightstown Borough

Map 2: Aerial Photo (2007)

0 0.125 0.25

Miles

N

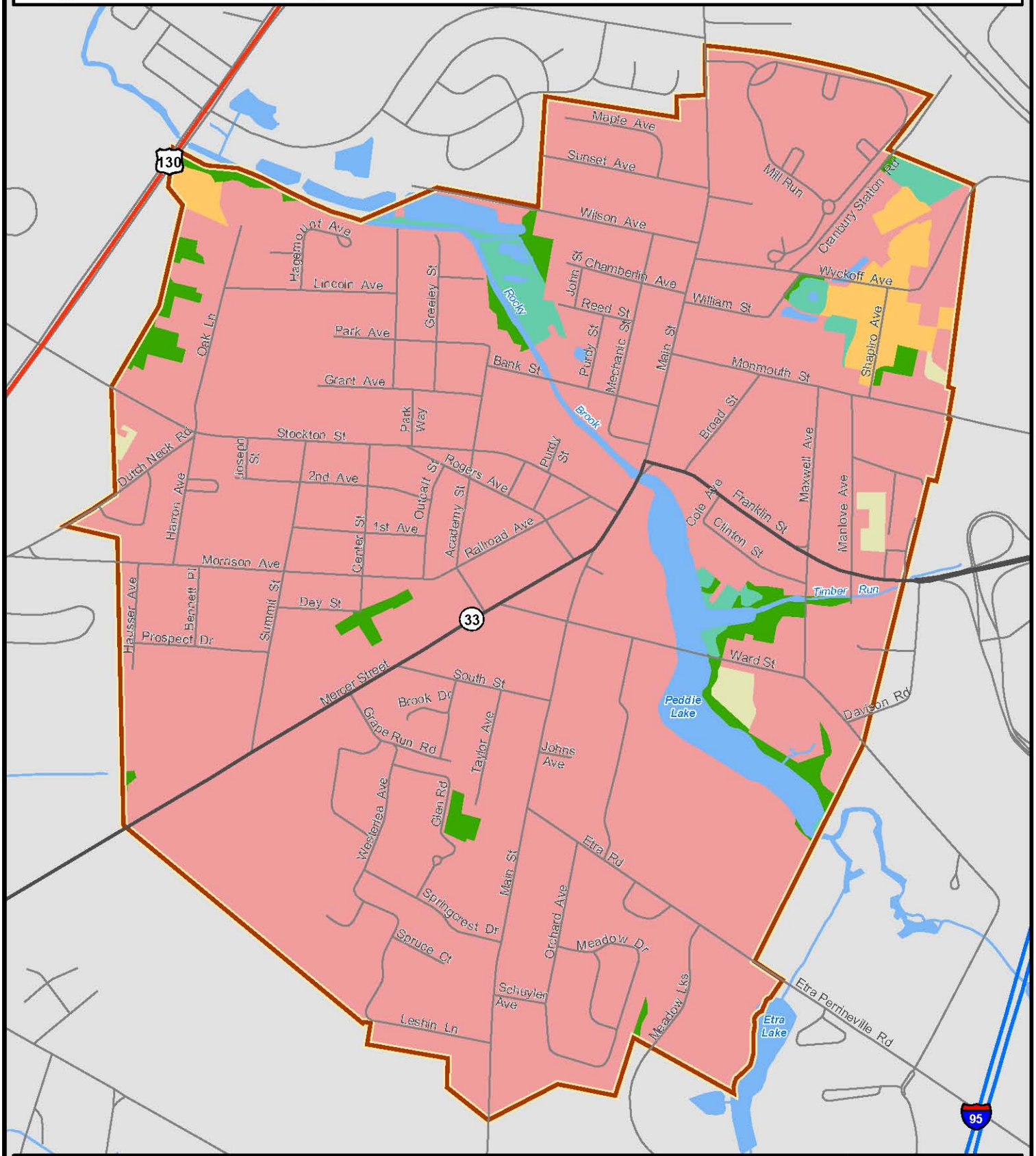
DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

Borough Boundary

Source : NJOIT, DVRPC, TANA. This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

Hightstown Borough

Map 3: NJDEP Land Cover (2007)



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Miles

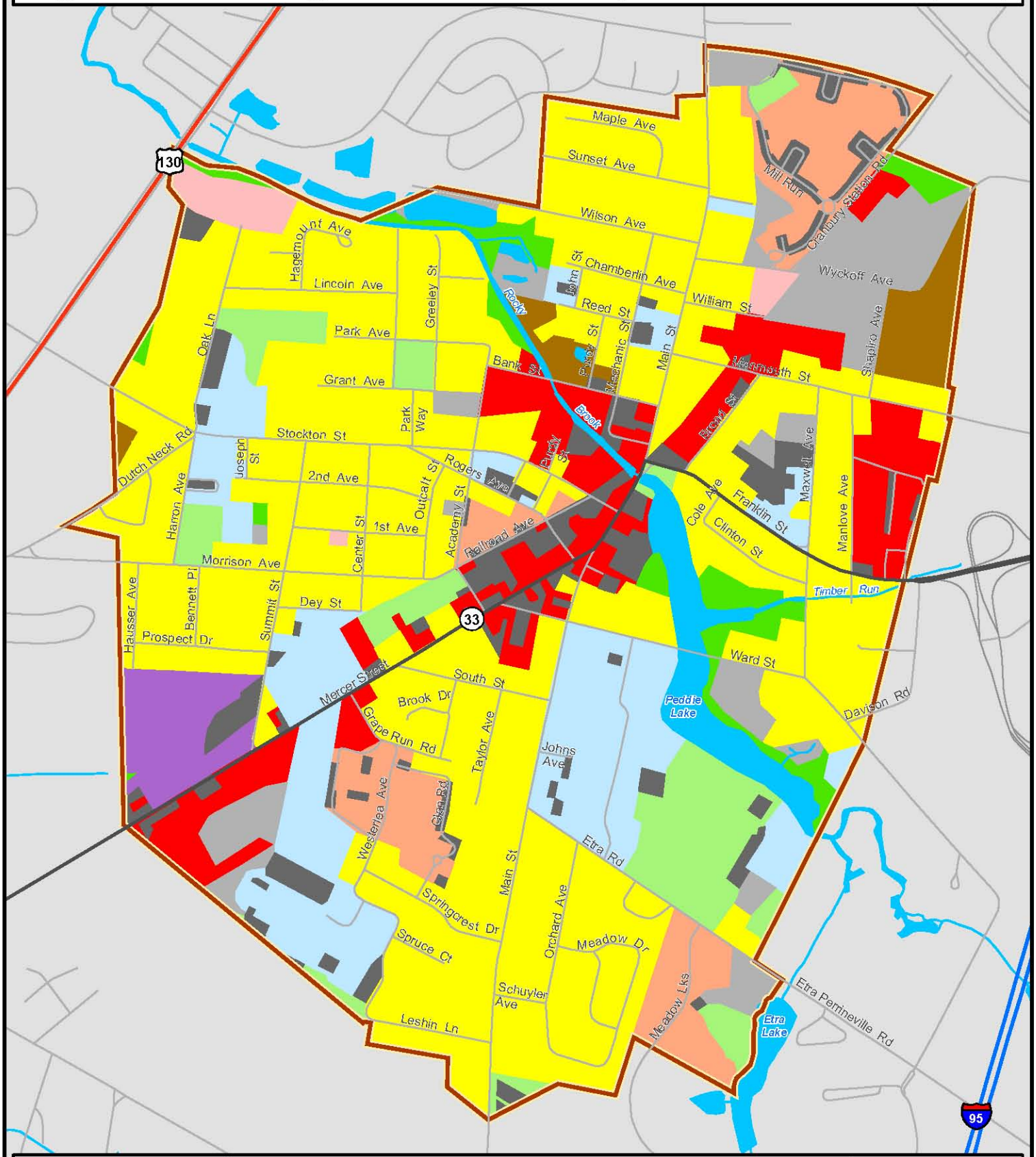
DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

- Agriculture
- Barren Land
- Forest
- Developed
- Water
- Wetlands

Source : NJDEP, NJDOT, DVRPC, TANA.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

Hightstown Borough

Map 4: DVRPC Land Use (2005)



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Miles

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DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

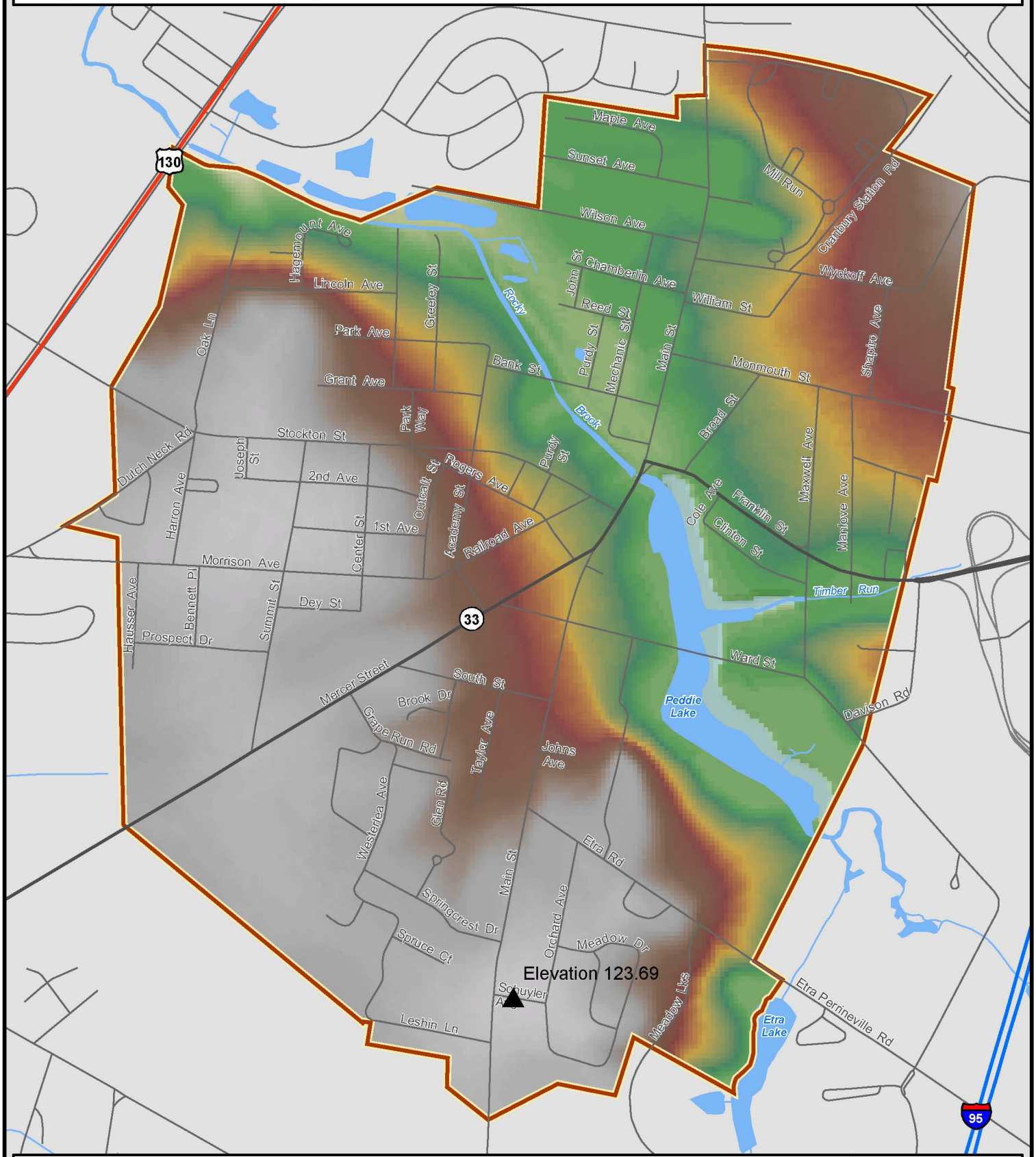
Land Use Type

- Agriculture
- Commercial
- Community
- Heavy Manufacturing
- Multi-Family
- Transportation and Parking
- Recreation
- Single Family
- Utility
- Vacant
- Water
- Wooded

Source : NJDEP, NJDOT, DVRPC, TANA.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

Hightstown Borough

Map 5: Elevation



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Miles

DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

Value

High : 123.686

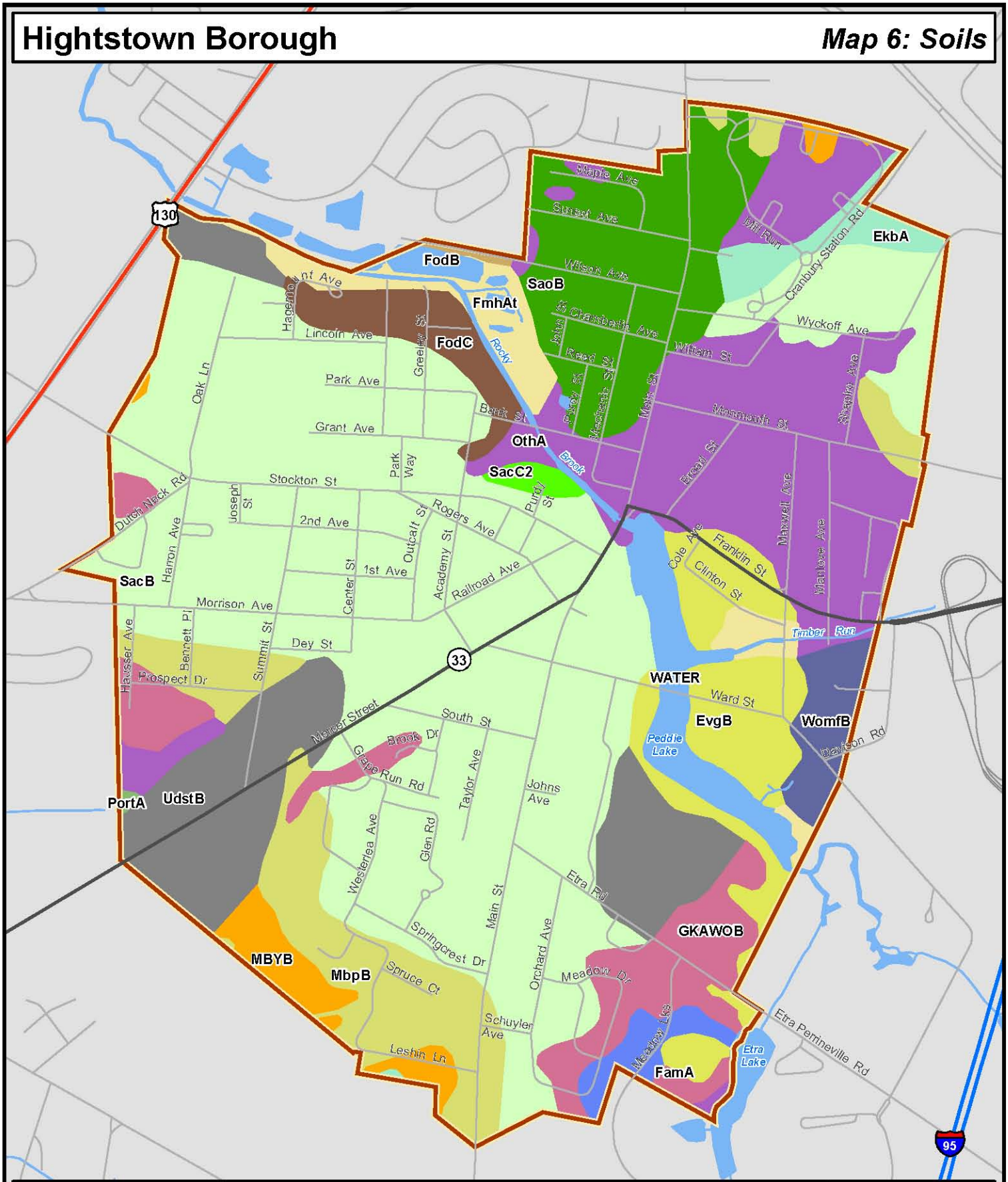
Low : 91.8624

Source : NJDEP, NJDOT, DVRPC, TANA.

This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

Hightstown Borough

Map 6: Soils



Soil Family

- Elkton
- Evesboro
- Fallsington
- Fluvaquents
- Fort Mott
- Fort Mott
- Glassboro and Woodstown
- Mattapex and Bertie
- Matapeake
- Othello
- Portsmouth
- Sassafras
- Sassafras, eroded
- Sassafras-Woodstown
- Udorthents
- Water
- Woodstown-Fallsington

0 0.125 0.25

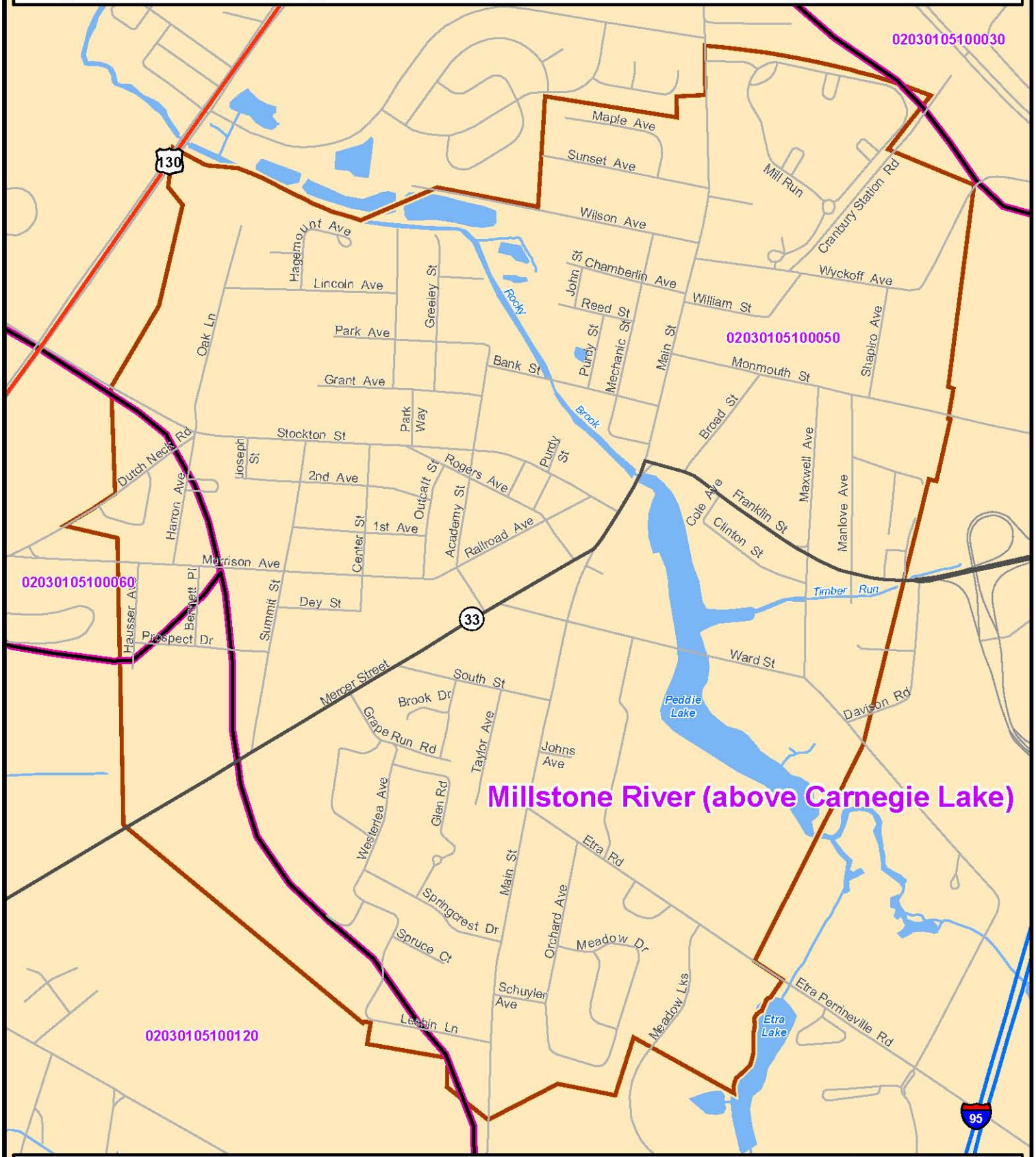
Miles

DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

Source : NJDEP, NJDOT, DVRPC, TANA.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

Hightstown Borough

Map 7: Watersheds



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Miles

DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

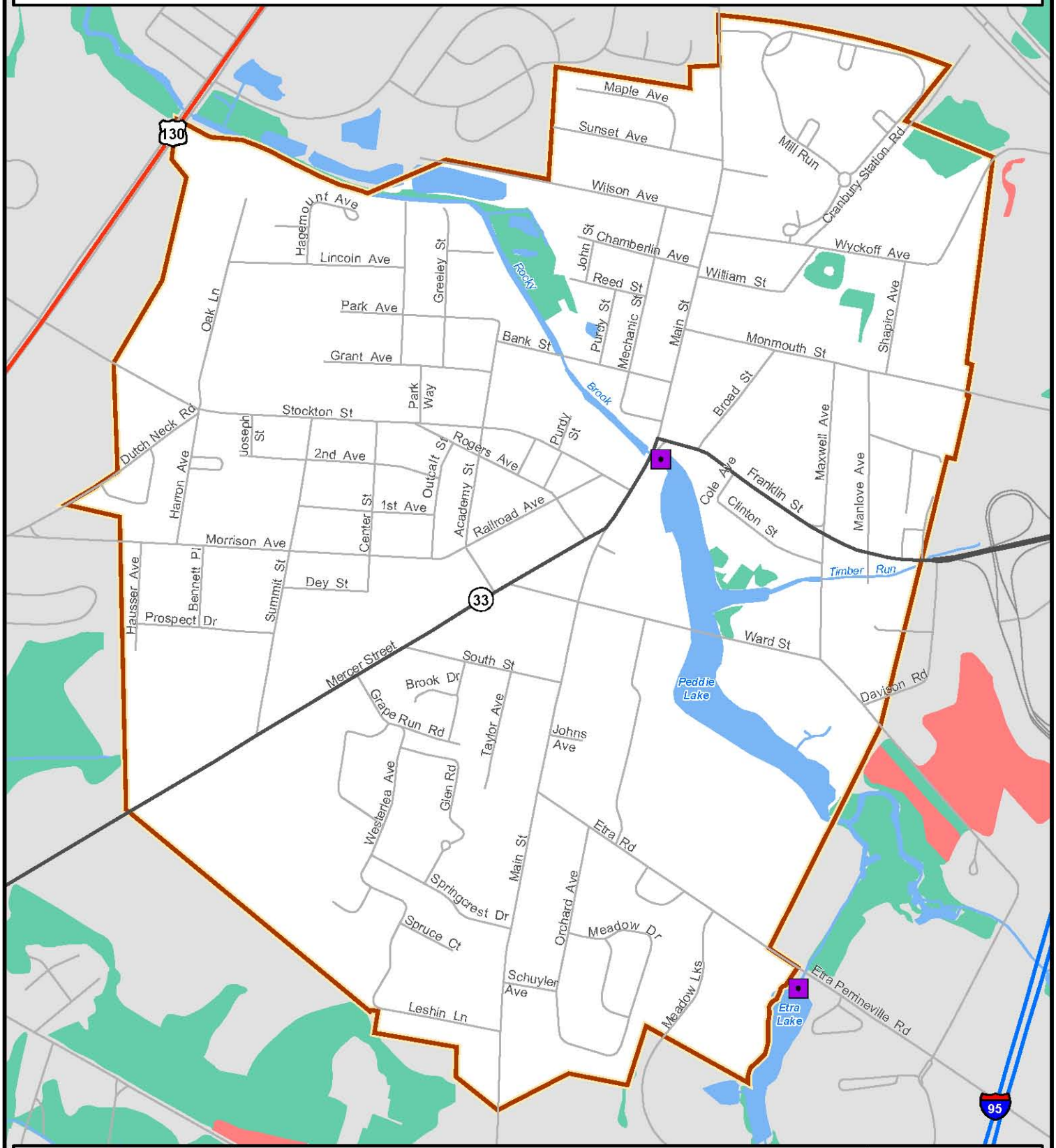
HUC 14 Subwatershed

Millstone River (above Carnegie Lake) Subwatershed

Source : NJDEP, NJDOT, DVRPC, TANA.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

Hightstown Borough

Map 8: Surface Water, Wetlands, and Dams



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Miles

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DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

Dam

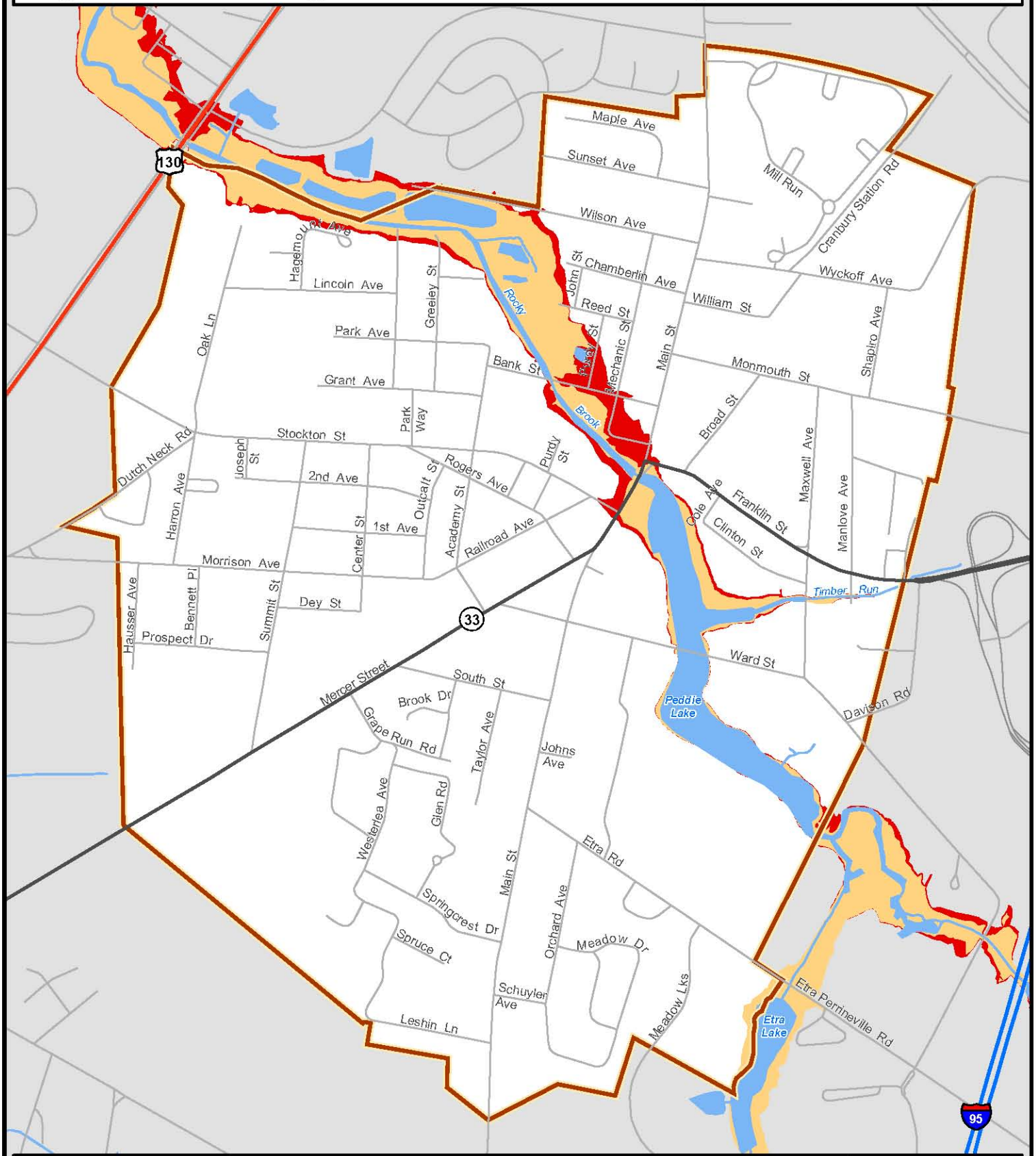
Agricultural Wetlands

Wetlands

Source : NJDEP, NJDOT, DVRPC, TANA.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

Hightstown Borough

Map 9: Floodplains (2008)



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Miles

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DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

Flood Zone

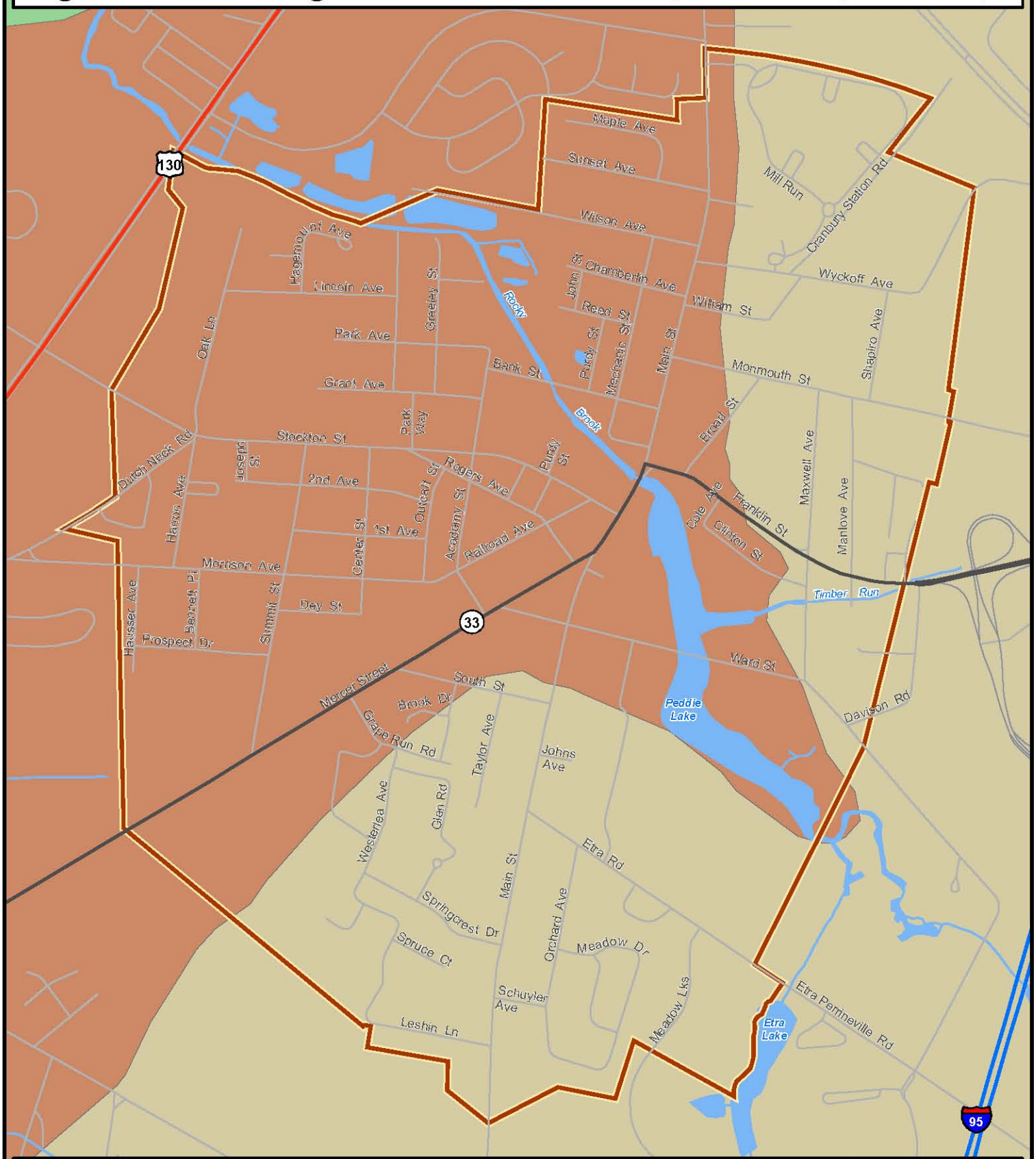
100 year

500 year

Source : NJDEP, NJDOT, FEMA, DVRPC, TANA.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

Hightstown Borough

Map 10: Geologic Outcrops



0 0.125 0.25
Miles

DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

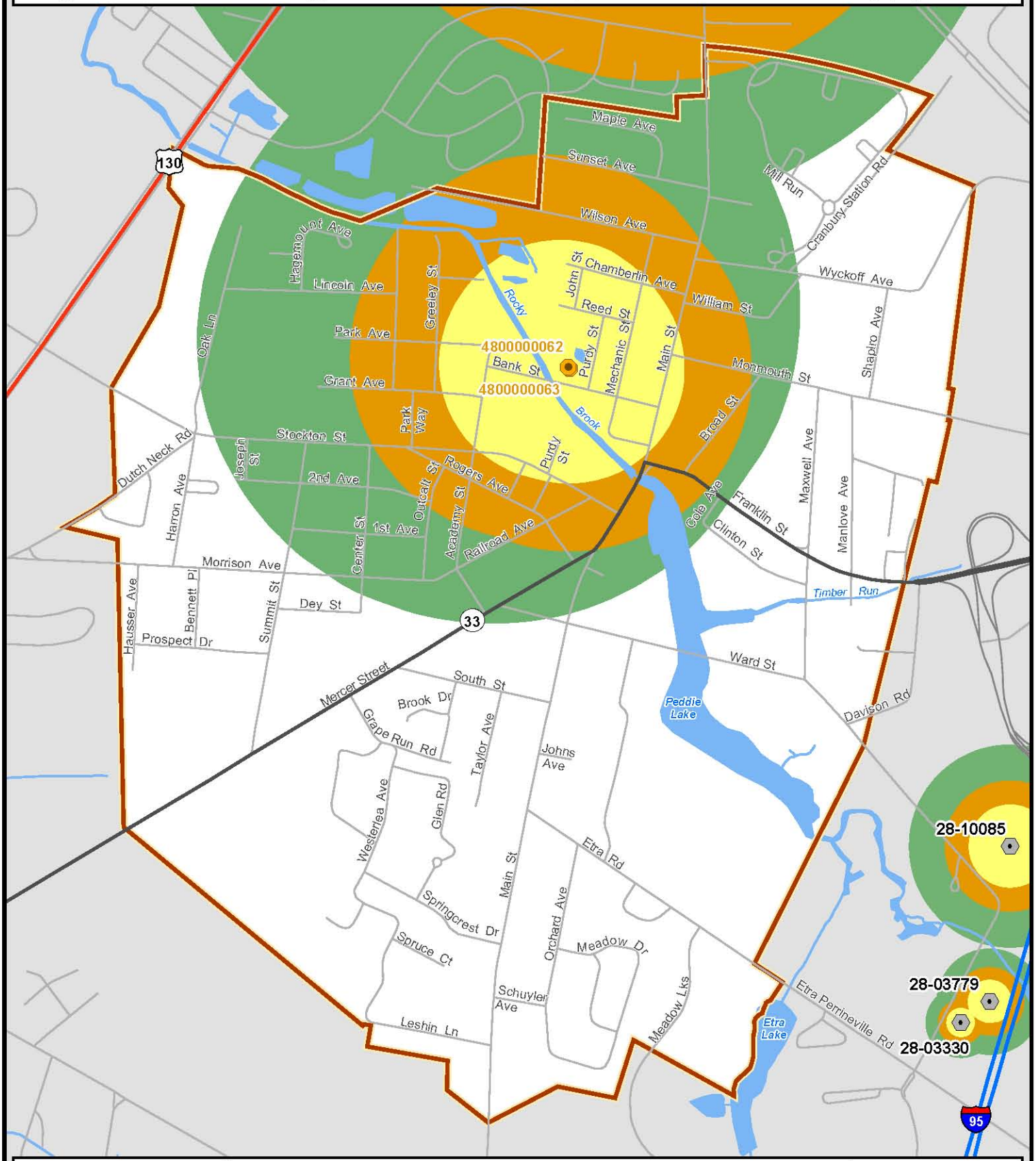
Outcrop Formations

- Magothy Formation
- Merchantville Formation
- Woodbury Formation

Source : NJDEP, NJDOT, DVRPC, TANA.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

Hightstown Borough

Map 11: Public Water Supply Wells



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Miles

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Wellhead Protection Areas

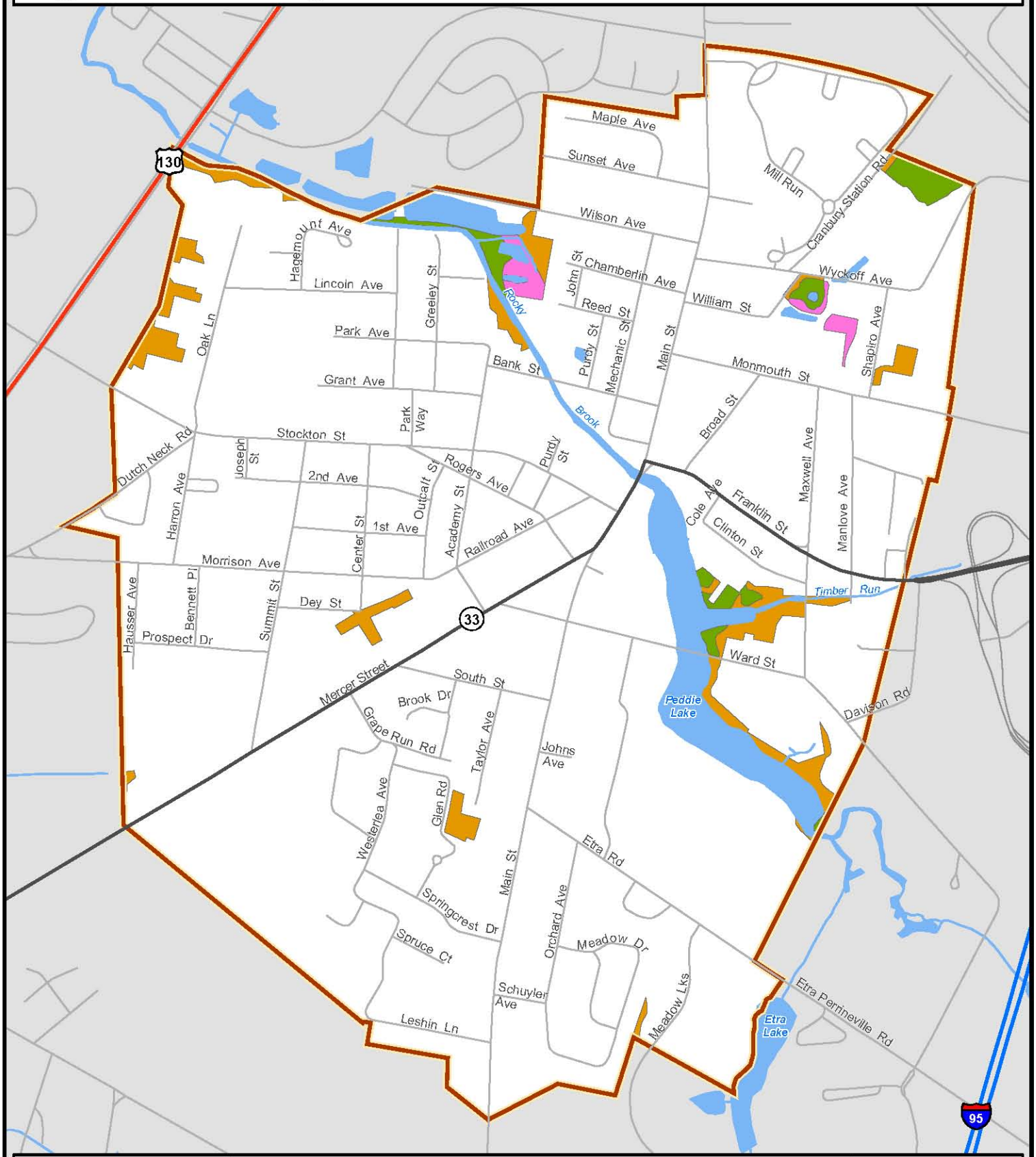
- 2 - year time of travel
- 5 - year time of travel
- 12 - year time of travel

- Public Non-Community Well
- Public Community Well

Source : NJDEP, NJDOT, NJGS, DVRPC, TANA. This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

Hightstown Borough

Map 12: Natural Vegetation (2007)



0 0.125 0.25
Miles

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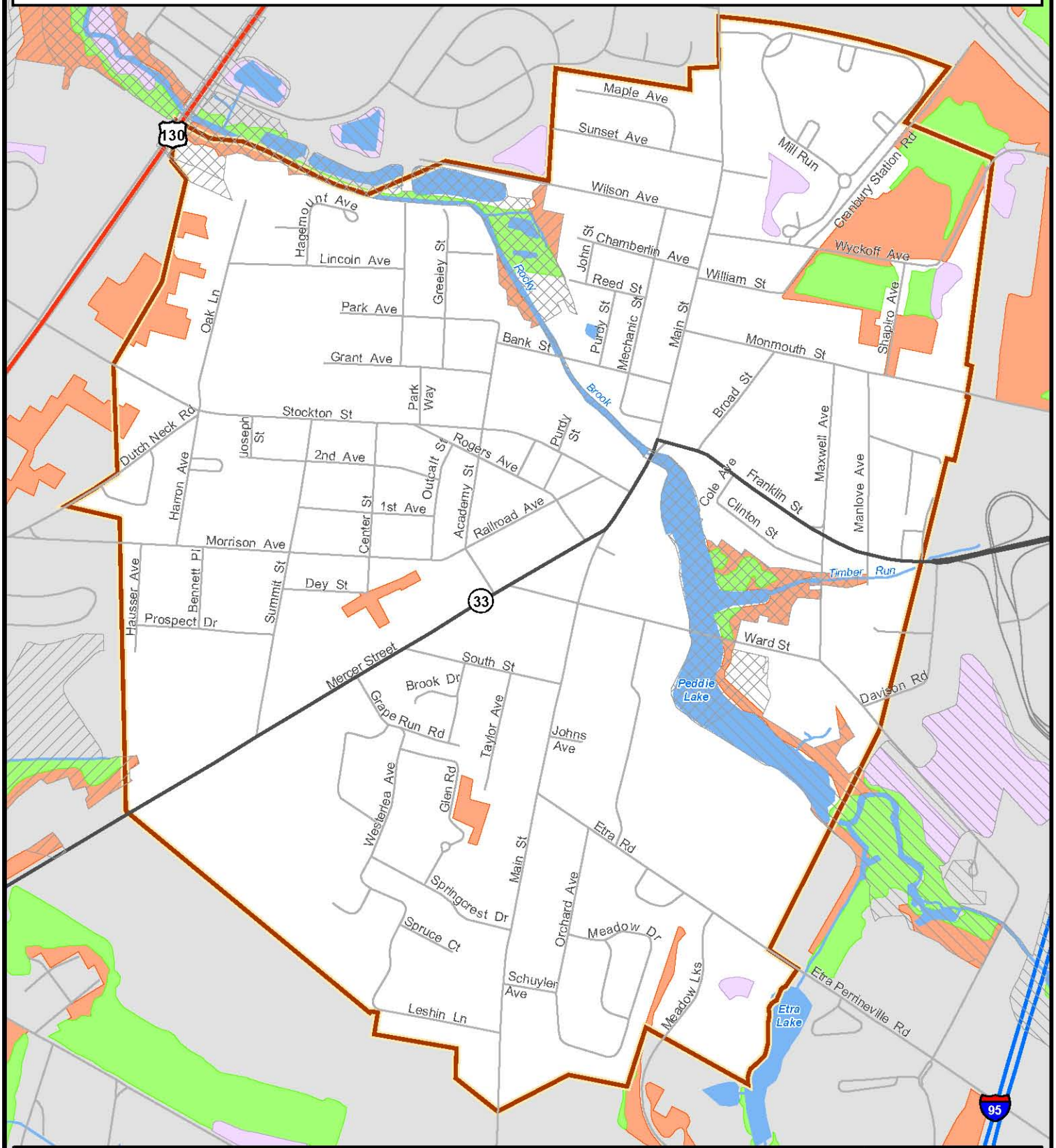
- Upland Forest - Deciduous
- Water
- Wetlands - Scrub/Shrub
- Wetlands - Wooded - Deciduous

Source : NJDEP, NJDOT, DVRPC, TANA.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

Hightstown Borough

Map 13: Landscape Project Priority Habitats (2007)



0 0.125 0.25
Miles

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Emergent Wetland
- Suitable Habitat

Forested Wetland
- Suitable Habitat

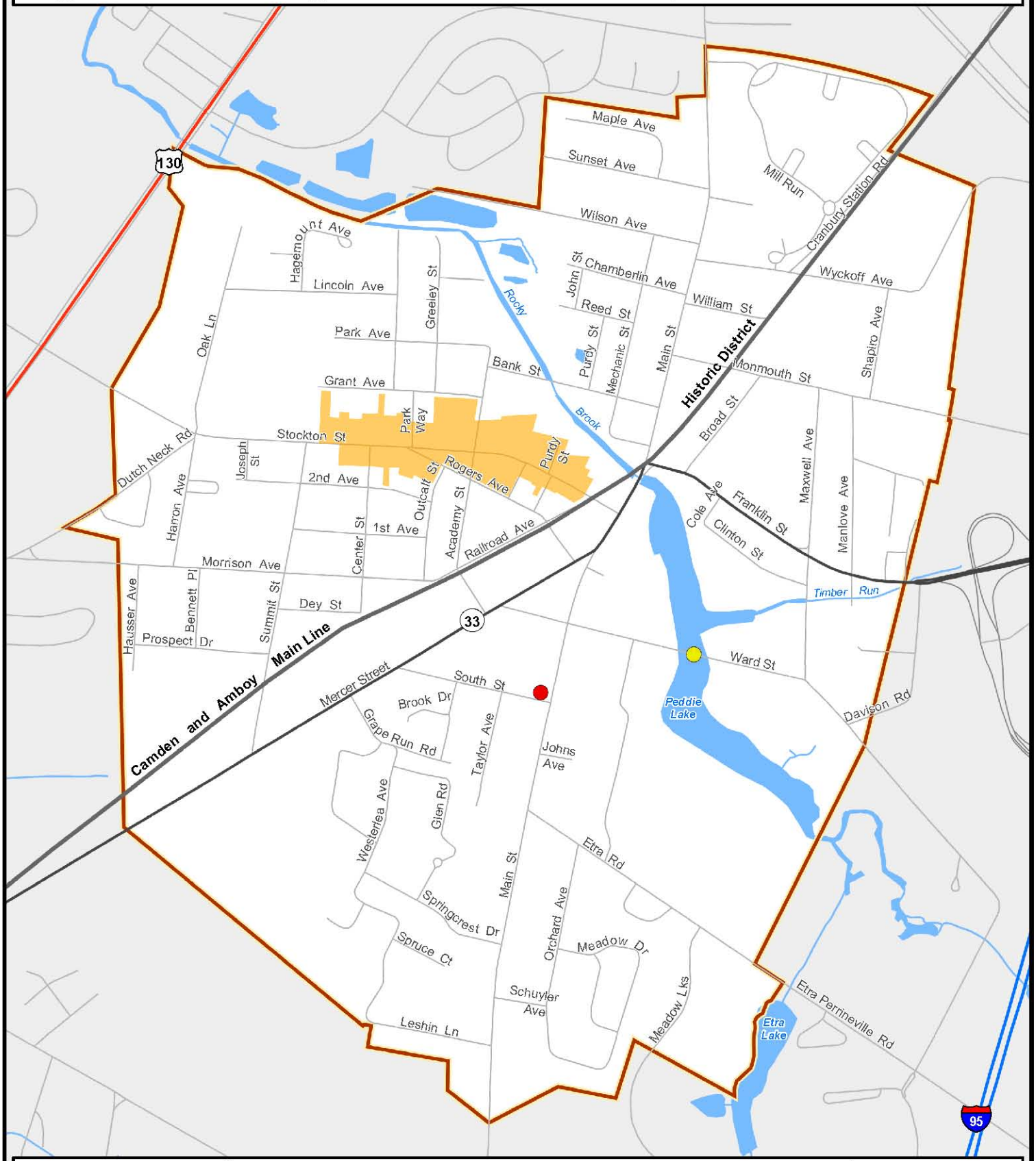
Upland Forest
- Suitable Habitat

- Bald Eagle Foraging
- Wood Turtle

Source : NJDEP, NJDOT, DVRPC, TANA.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

Hightstown Borough

Map 14: Historic Resources



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Miles

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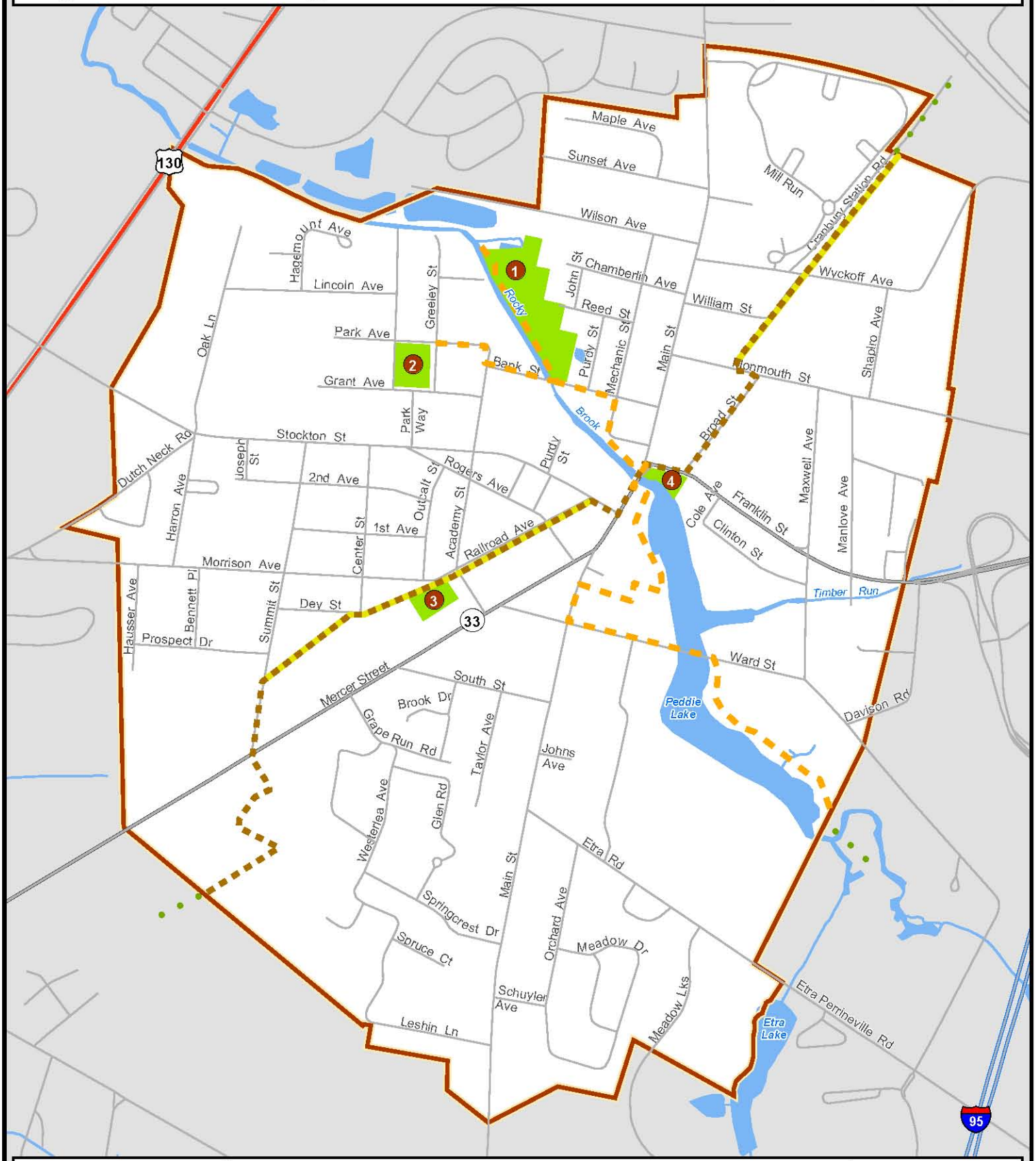
- East Ward Avenue Bridge
- Samuel Sloan House (State and National Registers)
- Stockton Street Historic District (State and National Registers)

Source : NJDEP, NJDOT, DVRPC, TANA.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

Hightstown Borough

Map 15: Open Space



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Miles

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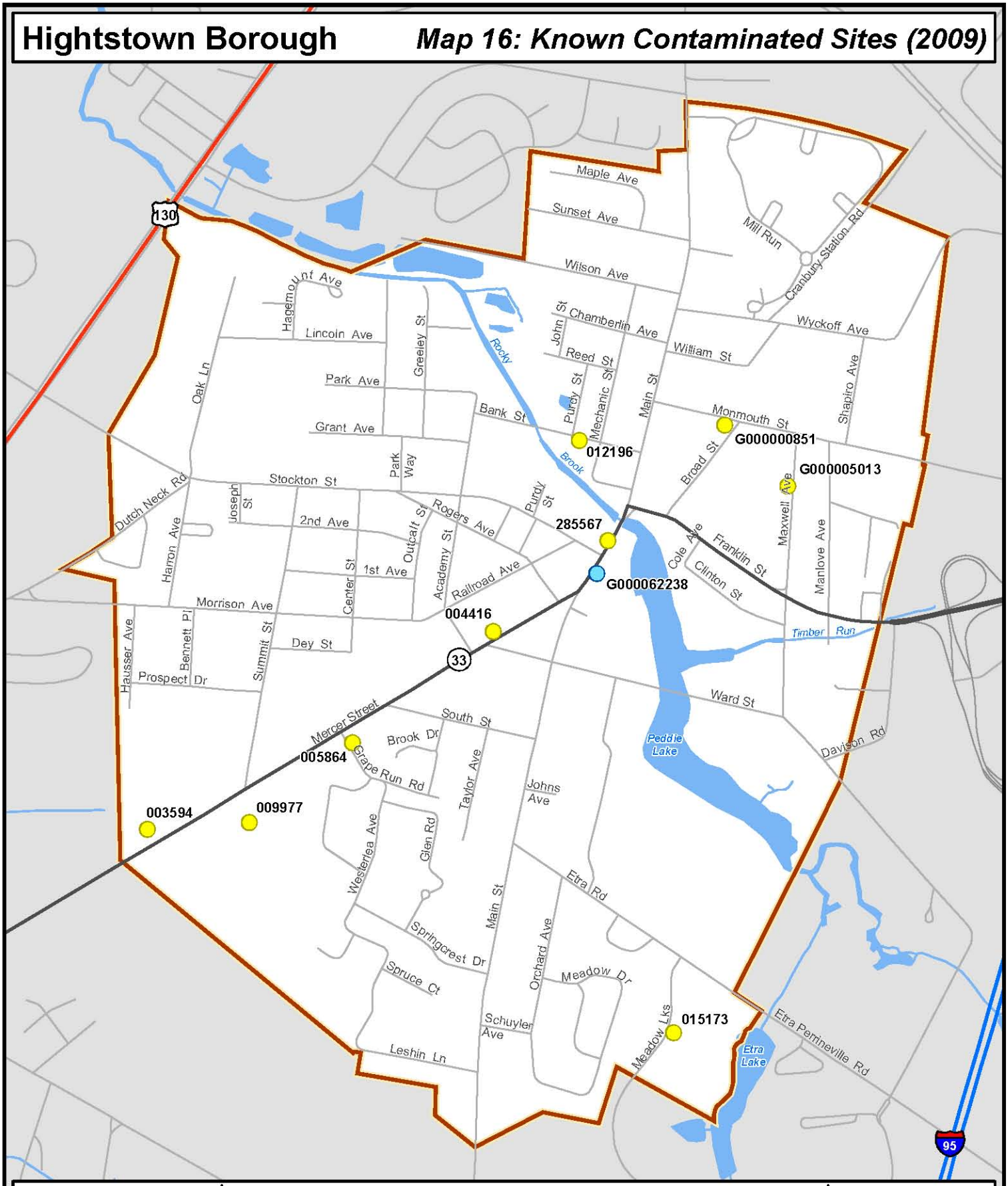
- Greenway Phase I
- Greenway Phase II
- East Windsor Green Link
- RR ROW Abandoned
- Park
  - (1) Rocky Brook Park
  - (2) Association Park (Grant Ave. Park)
  - (3) Dawes Park
  - (4) Memorial Park

Source : NJDEP, NJDOT, DVRPC, TANA.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

Hightstown Borough

Map 16: Known Contaminated Sites (2009)



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Miles

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DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

Remedial Level

- C1: No Formal Design - Source Known or Identified-Potential GW Contamination
- C2: Formal Design - Known Source or Release with GW Contamination

Source : NJDEP, NJDOT, DVRPC, TANA.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

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Publication Number:	12051
Date Published:	April 2012
Geographic Area Covered:	Borough of Hightstown, Mercer County, New Jersey

Key Words

Air quality, aquifers, biodiversity, biological resources, built environment, climate, conservation, development, endangered species, environmental issues, environmental resource inventory, erosion, floodplains, forests, grasslands, groundwater, habitat, Hightstown, land preservation, Landscape Project, master planning, Mercer County, natural resources, New Jersey, open space, population, Rocky Brook, soils, steep slopes, topography, U.S. Census, vernal pools, water quality, watersheds, wetlands.

Abstract

This publication documents the natural and community resources of the Borough of Hightstown, Mercer County, New Jersey. The natural resource information includes descriptions, tables, and maps of: land use; soils; drinking water, aquifers, and wells; surface waters, including watersheds, streams, lakes, wetlands, and floodplains; impacts on water resources and surface water quality; impervious coverage; vegetation, including wetlands, forests, and grasslands; animal communities; threatened and endangered species; Natural Heritage Priority Sites; Landscape Project Priority Habitats; and known contaminated sites. Community resources that are briefly described include population, transportation, borough utilities and services, historic sites and buildings, and protected open space. A short history of the community is also included.

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