ENVIRONMENTAL RESOURCE INVENTORY

ERI

MARCH 2011

For the Township of:

DEPTFORD

Gloucester County, New Jersey

by:

DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

with:

The Environmental Commission of Deptford Township

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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.

DVRPC is funded by a variety of funding sources including federal grants from the U.S. Department of Transportation's Federal Highway Administration (FHWA) and Federal Transit Administration (FTA), the Pennsylvania and New Jersey departments of transportation, as well as by DVRPC's state and local member governments. The authors, however, are solely responsible for the findings and conclusions herein, which may not represent the official views or policies of the funding agencies.

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The Township of Deptford

Deptford Township Council:

Mayor Paul Medany
Deputy Mayor Tom Hufnell
Frank DiMarco
Phil Schocklin
Joe Scott
William Lamb
Wayne Love

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

Deptford Township Environmental Commission:

Mark Getsinger, Chairman
Robert Escheman, Vice Chairman
Don Evans
Jean Mills
Joan Tracy
Denise Rose, Township Manager
Donna Lee, Secretary

Special thanks to Michael Hogan for use of his photographs throughout.

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Executive Summary

Deptford Township is a municipality of over 30,000 people, covering 17.5 square miles in northern Gloucester County. Deptford was the landing site for the first manned balloon flight in America in 1793, and was for many years a center for pig farming. Since the end of World War II, Deptford has experienced significant suburban growth and has become a regional shopping destination. However, the township still contains several active farms as well as many natural areas of high ecological value, including forests, wetlands, grassland, and streams.

Deptford Township lies within the Inner Coastal Plain. Deptford historically contained a high proportion of fertile sandy and loamy soils well suited for agriculture. Today, fewer than half of the soils in the township are still suitable for agriculture, primarily due to soil disturbance caused by development and the township's several landfills.

There are over 23 miles of streams within Deptford, most of which (19 miles) are headwater streams. Portions of the Big Timber Creek and Almonesson Creek within Deptford experience tidal flows from the Delaware River. There are also 75 acres of lakes and ponds, including Almonesson Lake, Stewart Lake, Marlton Lake, and several smaller waterbodies.

There are portions of two watersheds and nine subwatersheds located within Deptford Township. In 2008, all of these subwatersheds were impaired for one or more designated uses. The most common pollutants within Deptford's streams were PCBs and mercury; other impairment-causing pollutants include phosphorous, pH, arsenic, *E. coli,* chlordane, and DDX. Most water quality impairment in Deptford is the result of non-point source runoff, though waste runoff from Deptford's hog farms has also been implicated in fish kills.

All of Deptford has been approved for sewer service and is served by public drinking water. Deptford's water comes from the Potomac-Raritan-Magothy aquifer system, which is currently under threat of declining water levels and saltwater intrusion due to heavy usage.

Despite widespread urban development, nearly forty percent of Deptford contains natural vegetation, and an additional six percent is agricultural land, which can provide suitable grassland habitat for many animals. Twenty percent of the township is covered with upland forest, and eleven percent of the township contains wetlands.

Many threatened, endangered, and other rare species are located in Deptford Township, including the coastal plain milk snake, Cooper's hawk, eastern box turtle, great blue

heron, and red-shouldered hawk. Preserving the natural habitats of these species within Deptford Township can help protect them from complete extinction. A number of rare plants have also been identified in Deptford Township, including puttyroot, swamp-pink, and broad-leaf ironweed.

Deptford Township has one historic site—the Benjamin Clark House—listed on both the New Jersey and National Registers of Historic Places, in addition to other locally important historic sites. Deptford also contains important conservation areas such as a New Jersey Audubon Society Important Birding Area, a Wildlife Management Area, and a Natural Heritage Priority Site. Protecting these and other natural areas in the township can help preserve imperiled plant and animal species, laying the foundation for a more biodiverse and sustainable future.

Deptford has a number of unique environmental concerns as well. It is home to three closed landfills, which must be monitored to ensure that leachate does not contaminate the surrounding soils and water supply. These sites also produce landfill gas, which contains the potent greenhouse gas methane, as well as volatile organic compounds (VOCs) and other toxins. Deptford also has several dams that require monitoring, and some of its soils contain high levels of arsenic due to either natural geology or historic pesticide use.

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 and its quality of life. 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 township's natural resources, presented in a form that is useful to a broad audience. The inventory reflects a particular moment in time, and it is assumed that it will be updated as new data becomes available.

Although Deptford Township is a highly developed municipality, it still retains many natural areas with great ecological integrity. As development pressure continues to increase in and around Deptford, documentation of its natural resources will become a necessity. Special measures to protect and enhance the natural environment become even more important when faced with the pressures of increased population and development. Deptford's water, wetlands, forests, and grasslands provide significant high-quality habitat for a wide variety of plants and animals. These areas are critically important in maintaining the health and vitality of the township. Detailed documentation of these resources will help Deptford's citizens to balance the pressures of growth with conservation, maintaining and shaping the community's unique identity while protecting its rich historic fabric and critical natural environment.

Sources

Several documents and reports were utilized in preparing the *Environmental Resource Inventory (ERI) for Deptford Township*. These reports and a number of reference works are listed at the end of this document.

The maps and data relating to natural resources are 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 New Jersey Division of Fish and Wildlife, reports by the U.S. Geologic Service and New Jersey Geologic Service, and mapping data compiled and prepared by the Delaware Valley Regional Planning Commission (DVRPC). Information from these sources that is specific to Deptford Township has been included whenever it was

available. Information from other reports about specific sites has also been incorporated, along with data provided by township and county staffs. The Environmental Resource Inventory has been reviewed and corrected by members of the Environmental Commission and other township officials.

Somewhat lengthy introductions to some topics, especially surface water monitoring and groundwater, have been included in the ERI to give readers background on these complex topics. Hopefully, that will also assist the Environmental Commission and other township officials to obtain 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 land that would become Deptford Township. By the time of European arrivals, these Native Americans called themselves the Lenni Lenape. Later, they were called the “Delaware” by Europeans. The Lenni Lenape inhabited much of southern New Jersey and their settlements were usually located along stream banks. They farmed, maintained orchards, fished, and hunted. The Lenni Lenape valued the area for its abundance of fish and game, and utilized the regional creeks extensively for transportation.

Deptford Township was first explored by the Dutch in 1623, and was later settled by the Swedes and Finns before ultimately coming under British control. Deptford Township was originally known as Bethlehem and, later, Deerford. The name Deptford derived from a small seaport in England by the same name. The creation of the township was recorded on June 1, 1695, and it was one of Gloucester County’s five original townships. Originally, the township comprised 106 square miles and included land in present-day Woodbury, West Deptford, Westville, National Park, Wenonah, Woodbury Heights, Washington Township, and Monroe Township.

In its early history, Deptford Township remained rural, heavily forested, and sparsely populated. Some of the first residential and commercial development was concentrated near Almonesson Lake, Clements Bridge, and around the Woodbury-to-Glassboro corridor.

In 1793, Deptford Township was the site of a significant historic event by being the landing location of the first successful hot air balloon flight in America. The Frenchman Jean-Pierre Blanchard launched his balloon in Philadelphia, carrying a well-wishing letter written by George Washington. After traveling 14 miles east, Blanchard touched down in Deptford, in an area now known as Blanchard’s Landing.

The first school in the township, called the Deptford School, was constructed in 1774 on Delaware Street in present-day Woodbury. Originally a one-story building, a second-story addition was built in 1820 with funds bequeathed by James Cooper. This school was established by the Quaker Society of Friends, although it was open to students of all religious groups. A second Quaker school was built around 1812 and was located on the hill near the Friends’ Meeting House on North Broad Street in present-day Woodbury. The Woodbury Academy was constructed in 1791 near the corner of Broad and Centre Streets, with a second-story addition built in 1820. Church services of the Presbyterian congregation were held at the Woodbury Academy until 1834. The Academy was

demolished in 1879. Other early schools in historic Deptford Township included the Dutch Town Schoolhouse, Bethel School, and Squankum School.

Westville, once part of Deptford Township, was named after Thomas West, who lived in the area as early as 1775. There was a tavern in Westville during the Revolutionary War, although it was not used as a headquarters for either American or British officers, unlike other area taverns. By 1836, there were just seven houses in Westville. By 1883, the area contained a tavern, two stores, two wheelwrights, two blacksmith shops, the Methodist Episcopal Church, school, post office, railroad station, and a population of nearly 250 people.

The Almonesson area, located near the eastern border of the township, was founded in 1798 by Daniel Lamb. Named for the Almonesson Creek on which the area was built, the name Almonesson derives from an Indian word meaning “Young Fox Place.” Foxes were known to be plentiful in the area during early English settlement. There was a grist mill in this area as early as 1800, which was replaced with a cotton mill by Lamb in 1830. This was the only cotton mill in southern New Jersey. Lamb also constructed a number of worker dwellings in the area for factory employees, after which the area also became known as Lambtown. Almonesson became the major ice producer of the area, producing tons of ice each winter for use in the region. The first school in Almonesson was constructed in 1839, and a post office was established in 1872, when Almonesson became the official name of the hamlet. In the mid- to late-1800s, a number of other establishments were built in Almonesson, including a grist mill, pioneer store, and shops for blacksmiths, wheelwrights, and shoemakers.

The Almonesson Lake Park, built in 1874, was a popular lake amusement park located on the site of the original grist mill. In 1894, a trolley was constructed that brought visitors to the recreational park and lake, which became a weekend and summer retreat for many Philadelphians. The park later contained a bandstand, ballroom, carousel, bowling alley, and a roller skating rink popular through the 1960s. Swimming and canoeing were popular activities in Almonesson Lake, later named Sunset Beach, until the 1960s, when high levels of pollution in the lake prevented recreational contact.

Photo: Michael Hogan

Almonesson Creek

Other early settlements were Jericho and New Sharon, which were both founded in 1847. New Sharon was originally known as Horsehead and Monongahela. New Sharon would become the center of the pig farming industry in Deptford. Deptford was once well known for its many pig farms, which received garbage from Philadelphia and the

surrounding region to feed the pigs. Jericho was settled by John Dorsey and later developed by Benjamin Briggs. The first school and church in Jericho were built in 1877.

The area of Wenonah was laid out in 1871 and was situated on the main line of the West Jersey Railroad and bounded by the Mantua Creek. A hotel and four cottages were built in 1872, and by 1883 there were about 50 cottages and a population of 300 people. The first public school was built in Wenonah in 1873. The village was incorporated as the Borough of Wenonah in 1883. During the 1870s to 1880s, a pioneer store, a grocery and feed store, a post office, physician's office, and other establishments were built. The Presbyterian Church was built in 1873, and the Methodist Church was built in 1883.

Delsea Drive (Route 47) was laid out in 1870 and spurred a great deal of growth along its corridor, which stretched from the Delaware River to the Atlantic Ocean. Around this time, other development occurred along the railroad, and seasonal houses were built near both Almonesson Lake and Blackwood Terrace.

On March 1, 1871, the Township of West Deptford was formed, leaving Deptford Township with an area of 12,665 acres (19.8 square miles). On February 20, 1878, the boundaries of Deptford Township were altered again as the western border was defined as the line of the West Jersey Railroad.

The Almonesson Fire Company was incorporated in 1911, although it was active before that date, when it was housed in a small building across from the Lake View Inn. The Almonesson Lake Firehouse was demolished in 1948 and replaced with a new building dedicated in 1969. The Union Fire Company was established in 1915. Other local fire departments formed in the twentieth century included the Deptford Fire Department, the Community Volunteer Fire Company, the New Sharon Fire Company, the Oak Valley Fire Company, and the Blackwood Terrace Fire Company. The Deptford Township Police Department began full-time patrols in 1966.

During World War II, an army camp was established in Deptford Township off Tanyard Road at the present-day site of the Lake Tract Elementary School. Soldiers trained daily at the army camp until the end of the war.

By the end of World War II, North Woodbury, Westville Grove, Jericho, New Sharon, Blackwood Terrace, and Almonesson were established locales within Deptford Township. After the war, new communities were constructed, including Woodbury Gardens, Cooper Village, Oak Valley, Country Club Estates, Deptford Terrace, Hammond Heights, Lake Tract, and Woodbury Terrace. Until the 1950s, Deptford Township was largely a rural expanse of farmland and forest. The suburbanization of the 1950s and 1960s brought tens of thousands of residents to Deptford Township who were attracted to the "country living" and highway accessibility of the township. Proximity to the New Jersey Turnpike, Interstate 295, the Atlantic City Expressway, Delsea Drive (Route 47), Route 41, Route 42 (also known as the North-South Freeway), and Route 55 allowed easy transportation access for commuters and commercial development.

The New Jersey Turnpike, built in the early 1960s, physically divided the community of Lake Tract. Many homes in the area were demolished for construction of the turnpike, or were moved to other streets in Lake Tract.

The Deptford Township Library, incorporated in January of 1961, was first housed in the municipal hall. The Almonesson School served as extra storage and sorting space for the library. Later that year, the library was moved to the Almonesson Church building, which was moved to a new location across the street to allow for the construction of a new church building. The library was located in the old church until 1981, when it moved to the new township community center. The library building was renovated and a 3,000 square foot expansion was completed in 1998.

The Gloucester County College broke ground in 1970 at its campus located on Tanyard Road in Deptford Township. The college has expanded greatly over the past forty years and currently educates over 6,000 students annually.

A public swimming pool was constructed in 1970 in an area off Delsea Drive. Fasola Park, containing a pool, playgrounds, and ball fields, later served as the township's center for active recreation and is the home of the annual Deptford Day community event. In 1974, the Deptford Mall was opened with 57 stores, spurring much commercial development in the surrounding area. The municipal building was constructed in 1978, next to its previous building on Cooper Street.

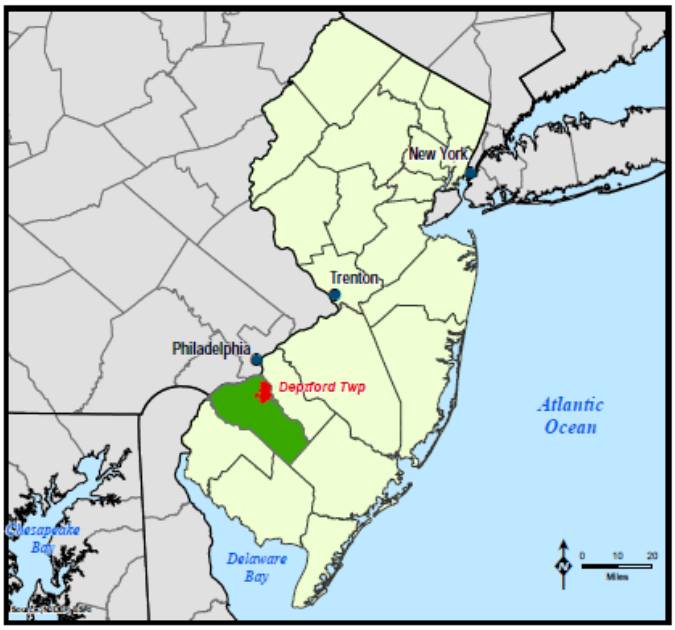
The history of Deptford reflects the history of the country, growing from a forest populated by Native Americans, to a colonial settlement of European farmers and tradesmen, to a suburban community with enormous residential and commercial development.

CHAPTER 3

Location, Size, and Land Use

Deptford, an incorporated township, is located in the northern part of Gloucester County, New Jersey. The township is bounded by ten municipalities in two counties. Bordering municipalities in Gloucester County include Westville Borough to the north; West Deptford Township, Woodbury Heights Borough, and the City of Woodbury to the west; Wenonah Borough and Mantua Township to the southwest; and Washington Township to the southeast. Camden County municipalities that border Deptford include Gloucester Township and Runnemede Borough to the east and Bellmawr Township to the north. Additionally, several waterways create natural borders around Deptford. The Big Timber Creek forms the eastern border of Deptford and divides Camden and Gloucester Counties. The Woodbury Creek forms part of Deptford's western border with the City of Woodbury; Mantua Creek, Bees Branch, and Bull Run all form parts of the township's southern borders. See **Map 1: Places in Deptford Township** and **Map 2: Aerial Photo (2007)**.

Figure 1: Location of Deptford Township



Source: DVRPC, 2010

The U.S. Census Bureau estimates that Deptford Township had a population of 30,632 in 2008, an increase of 14 percent from its 2000 population of 26,841. Deptford Township occupies 11,228 acres, or 17.5 square miles, on the Coastal Plain of New Jersey. Deptford's land use reflect its natural setting, agricultural past, and the successive waves of residential and commercial development that have occurred since the end of World War II. While portions of the township remain forested or in agricultural use (especially in the southern area), much of the township is now dedicated to suburban single-family housing dating from the 1950s to the present. This development is located across most areas of the township, and some of the major residential neighborhoods in Deptford include Almonesson and Blackwood Terrace in the east, Gardenville in the center, Westville Grove in the north, and Oak Valley in the west. See **Map 1: Places In Deptford Township**.

In addition, the township is home to a sizable concentration of commercial development centered on the Deptford Mall. This development arose, in part, because of Deptford's

proximity to Philadelphia and accessibility to several major roadways. There are three limited-access divided highways that pass through the township: State Routes 42 and 55, and the New Jersey Turnpike, which cuts across the northern portion of Deptford but does not have an exit within township limits. Some other major roadways include State Route 41 (Hurffville Rd.), State Route 47 (Delsea Drive), State Route 45 (North Broad St. and Mantua Pike), County Rt. 621 (Almonesson Rd.), and County Route 706 (Cooper St.). The largest land classification in the township is developed land, which includes residential, commercial, industrial, transportation, and civic land uses. Over half of all land in Deptford Township is developed land, followed by forest, wetlands, agriculture, barren land, and water.

Before European settlement, as much as 90 percent of the township was covered by a mostly mixed deciduous hardwood forest consisting of oak, birch, ash, beech, walnut, and maple trees. Today, forest remains the township's second-most-common land use, covering about 25 percent of the township's area. Additionally, as of 2007, 5.7 percent of the township's land remains dedicated to agricultural uses. The few remaining agricultural areas in Deptford are primarily either nursery crops or pig farms.

Approximately 10.7 percent of Deptford's total land area consists of wetlands, and an additional 1.6 percent is classified as open water. Most wetlands in Deptford have a natural deciduous forest cover, but also include areas with herbaceous and scrub/shrub cover, as well as modified wetlands that have been altered by human activity, such as wetlands which are in agricultural production. While Deptford's wetlands are all freshwater, a portion of them in the northern section of the township (nearest to the Delaware River) do experience tidal effects.

A final 3.6 percent of Deptford's land was classified by NJDEP in 2007 as barren land, characterized by thin soil, sand, or rocks and a lack of vegetative cover. The largest portion of barren land in the township can be found near the intersection of Route 55 and Delsea Drive in the south of the township, and is the site of the old Kinsleys Landfill, which was closed and capped off in 1987. Most of the remaining barren land (as of 2007) is situated on areas of new and in-progress development, such as a recent multi-family residential complex north of Clements Bridge Road and just west of Route 55; much of this area has been converted to urban land over the past few years. Continuing development in Deptford has led to an increase in urban land beyond that shown in the 2007 data. For a more up-to-date picture of Township land use patterns, see **Map 2: Aerial Photo (2007)**.

The NJDEP categories are depicted on **Map 3: NJDEP Land Cover (2007)**. In addition, DVRPC collects its own land use data based on analysis of aerial photography. The categories in use by the two agencies are not entirely equal, as DVRPC differentiates between different forms of urban development, but makes no distinction between wetland and upland forest areas. However, a comparison can still be instructive, as **Map 4: DVRPC Land Use (2005)** clearly shows the completion of new development north of Clements Bridge Road.

Table 1 shows Deptford's land use/land cover grouped into general categories. **Table 2** breaks down the 2007 general land use/land cover categories into detailed land cover categories.

The categories in both tables are based on data collected from the New Jersey Department of Environmental Protection's (NJDEP's) 2007 color infrared digital imagery, as shown on **Map 3: NJDEP Land Cover (2007)**.

Table 1: General Land Use/Land Cover Classes (2007)

General Land Use / Land Cover Class	Area (Acres)	Percent
Agriculture	644.80	5.74%
Barren Land	401.03	3.57%
Forest	2,802.82	24.96%
Urban	5,994.64	53.39%
Water	179.76	1.60%
Wetlands	1,205.43	10.74%
TOTAL	11,228.47	100.00%

Source: NJDEP, 2007

Table 2: Detailed Land Use/Land Cover (2007)

Detailed Land Use / Land Cover Class	Area (Acres)	General Land Use
Agricultural Wetlands (Modified)	46.58	Wetlands
Altered Lands	229.14	Barren Land
Artificial Lakes	75.14	Water
Athletic Fields (Schools)	144.70	Urban
Bridge Over Water	1.74	Water
Cemetery	12.90	Urban
Commercial/Services	750.43	Urban
Confined Feeding Operations	37.85	Agriculture
Coniferous Brush/Shrubland	55.25	Forest
Coniferous Forest (>50% Crown Closure)	132.41	Forest
Coniferous Scrub/Shrub Wetlands	14.17	Wetlands
Cropland and Pastureland	402.76	Agriculture
Deciduous Brush/Shrubland	186.78	Forest
Deciduous Forest (10-50% Crown Closure)	219.73	Forest
Deciduous Forest (>50% Crown Closure)	1,491.38	Forest

Detailed Land Use / Land Cover Class	Area (Acres)	General Land Use
Deciduous Scrub/Shrub Wetlands	68.64	Wetlands
Deciduous Wooded Wetlands	778.18	Wetlands
Disturbed Wetlands (Modified)	24.58	Wetlands
Extractive Mining	21.71	Barren Land
Former Agricultural Wetland (Becoming Shrubby, Not Built-Up)	11.61	Wetlands
Freshwater Tidal Marshes	157.08	Wetlands
Herbaceous Wetlands	10.36	Wetlands
Industrial	215.66	Urban
Major Roadway	210.94	Urban
Managed Wetland in Built-Up Maintained Rec Area	1.47	Wetlands
Managed Wetland in Maintained Lawn Greenspace	8.71	Wetlands
Mixed Deciduous/Coniferous Brush/Shrubland	263.37	Forest
Mixed Forest (>50% Coniferous with 10-50% Crown Closure)	14.95	Forest
Mixed Forest (>50% Coniferous with >50% Crown Closure)	59.65	Forest
Mixed Forest (>50% Deciduous with 10–50% Crown Closure)	23.50	Forest
Mixed Forest (>50% Deciduous with >50% Crown Closure)	149.95	Forest
Mixed Scrub/Shrub Wetlands (Coniferous Dom.)	5.02	Wetlands
Mixed Scrub/Shrub Wetlands (Deciduous Dom.)	37.69	Wetlands
Mixed Urban or Built-Up Land	2.80	Urban
Natural Lakes	0.63	Water
Old Field (<25% Brush Covered)	180.62	Forest
Orchards/Vineyards/Nurseries/Horticultural Areas	128.12	Agriculture
Other Agriculture	76.07	Agriculture
Other Urban or Built-Up Land	466.83	Urban
Phragmites Dominate Coastal Wetlands	11.13	Wetlands
Phragmites Dominate Interior Wetlands	26.31	Wetlands
Phragmites Dominate Old Field	25.22	Forest
Phragmites Dominate Urban Area	2.96	Urban
Railroads	8.60	Urban
Recreational Land	228.62	Urban
Residential, High Density or Multiple Dwelling	313.95	Urban

Detailed Land Use / Land Cover Class	Area (Acres)	General Land Use
Residential, Rural, Single Unit	426.72	Urban
Residential, Single Unit, Low Density	663.05	Urban
Residential, Single Unit, Medium Density	2,409.85	Urban
Stormwater Basin	65.18	Urban
Streams and Canals	3.40	Water
Tidal Rivers, Inland Bays, and Other Tidal Waters	98.85	Water
Transitional Areas	147.39	Barren Land
Transportation/Communication/Utilities	48.58	Urban
Undifferentiated Barren Lands	2.78	Barren Land
Upland Rights-of-Way Developed	20.10	Urban
Upland Rights-of-Way Undeveloped	2.75	Urban
TOTAL	**11,228.47**	

Source: NJDEP, 2007

CHAPTER 4

Natural Resources

Physiography

Physiography is the study of a location in relation to its underlying geology. New Jersey is characterized by four physiographic provinces. These provinces include the Ridge and Valley Province, the Highlands Province, the Piedmont Plateau Province, and the Coastal Plain Province. The Coastal Plain Province is further subdivided into the Inner Coastal Plain and the Outer Coastal Plain. The terrain of the four provinces is very diverse, with the rocky terrain of the northern provinces at one extreme and the sands of the coast at the other. Deptford is located almost entirely within the Inner Coastal Plain, but the southern edge of the township crosses into the Outer Coastal Plain, the southernmost province of New Jersey's geology.

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. 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, and the topography of the area is mostly flat and low-lying.

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 Period, 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. However, the drop in soil fertility is not sudden, but occurs as a gradual change eastward toward the sandier soils of the Pine Barrens and the Atlantic Coast. The small, relatively undeveloped portion of Deptford within the Outer Coastal Plain continues to contain several soils of high agricultural value.

In the general vicinity of the dividing line between the two segments of the Coastal Plain is a belt of low hills, which runs northeast and southwest through the southern half of New Jersey. These hills are the youngest of the Cretaceous formations and are largely made up of sand and marl formations. The hills taper to fairly low elevations in Gloucester County but are visible in the Mullica Hill area. The Inner Coastal Plain lies to the west of this band of hilly formations and the Outer Coastal Plain lies to the east.

Topography and Surface Landscapes

Deptford Township's position in northern Gloucester County has given it a varied, largely upland character with a gently rolling landscape. The valleys of Big Timber Creek, Woodbury Creek, Mantua Creek, and their tributaries bisect the upland areas, and are home to wetlands, most of which are either wooded or are tidal marsh areas. All of Deptford's surface waters flow into the Delaware River, which itself exhibits tidal characteristics as far north as Trenton. Several waterways, including the Big Timber and Almonesson Creeks, have their head of tide within Deptford. While wetland areas are found throughout the township, they are mostly concentrated in the northern portion.

The upland areas of Deptford are characterized by rich soils that once supported extensive beech-oak forests. Today, Deptford's upland forests are dominated by beech, oak, maple, and birch trees, though some areas currently support coniferous vegetation. Many of these soils also supported extensive agriculture; whereas some fields remain in the southern portion of the township, the majority of the township's upland areas are now converted to urban uses.

The highest elevation in the township is found on the southern border of the township along Blackwood-Barnsboro Rd. (County Route 603) at roughly 162 feet above sea level. The lowest elevation, which is less than 2 feet above sea level, is found along the Big Timber Creek at the extreme northern edge of the township. Deptford's topography is shown on **Map 5: Elevation**.

Steep Slopes

Only a small percentage of Deptford Township has slopes over 10 percent (the percent of vertical rise to horizontal distance). However, the steepest slopes are very steep indeed—up to 40 percent in some cases. The vast majority of Deptford's steep slopes are found along or near the waterways of the township, particularly near the Big Timber Creek on the eastern border of the township. Many of these slopes still remain well vegetated. However, residential properties and commercial developments frequently extend to the edge of the riparian plateau, and some steep slope areas have also been developed. Of particular concern are the large parking lots and commercial centers (including the Deptford Mall) near the junction of State Routes 42 and 55, which are built on land immediately adjacent to slopes that exceed a 10-percent grade.

In general, development of steep slope areas is inadvisable because it can result in soil instability, erosion, sedimentation of the stream below, increased stormwater runoff, and flooding. This causes habitat destruction and potential damage to property. Erosion on steep slopes is especially prevalent where excessive tree removal has taken place. In instances where development is or may be encroaching upon steep slope areas, it is important that natural buffers and other stormwater best management practices are used to separate the slope from development and to prevent runoff from eroding the slope.

Photo: Michael Hogan

Steep slopes on the preserved Andaloro Farm

Where steep slopes remain forested, some very old trees may be found. In addition, certain rare herbaceous plants can sometimes be found on forested steep slopes having Marlton soils, because of plant adaptation to the glauconitic nature of such soils. No detailed inventory of these sites exists at present, although some of the endangered plant records from the state's Natural Heritage Database are from these habitats (see section on **Natural Heritage Database)**. An in-depth assessment of Deptford's forested steep slopes may merit a special study. In the Deptford Mall area, there are some steep slopes adjacent to parking lots, roadways, and buildings that may be greatly affected by stormwater runoff. Steep slopes in other areas may be affected by runoff from adjoining fields and lawns or developed land. However, some areas may have well-vegetated forested steep slopes. The steep slopes in Deptford Township are depicted on **Map 6: Steep Slopes**.

Soils

Knowledge of local soils is fundamental to understanding a place's environment. A region's soil defines what vegetation can survive, influencing agricultural uses. Soil properties also affect the location and feasibility of wells, septic facilities, and basements, often determining development potential in certain areas. Soil is also a nonrenewable natural resource that cannot be replenished on the human time scale. In addition, soils most suitable for agricultural purposes are also often among the most desirable for development.

Many soils within Deptford are highly suitable for agricultural use, with the best Prime Farmland soils occurring in the southern half of the township. However, suburban development has led to the transformation of many native soil series into urban soils and related complexes, which are no longer suitable for agriculture. Deptford Township soils consist of 22 series types (assuming urban soil complexes are counted as part of the parent soil series) and 55 variations within those series as identified by the U.S.

Department of Agriculture's Natural Resources Conservation Service (NRCS). These are listed in **Table 4: Soils** and shown on **Map 7: Soils.**

Soil Quality Classification

State and national agricultural agencies classify farmland soils into several categories: Prime Farmland soils, Soils of Statewide Importance, and Unique Farmland soils. Although Deptford contains areas with each of these agricultural soils, over half of all land in the township is not considered appropriate for agricultural uses, primarily due to soil disturbance caused by urban development. See **Table 3: Agricultural Quality of Soils** for the acreage in each soil category and **Map 8: Agricultural Quality of Soils**. Although Deptford contains large areas of highly arable soils, pig farming is the primary agriculture currently in the township. There is also a large nursery and a number of agricultural fields in the southern portion of the township that benefit from the prime farmland soils in that region.

Prime Farmland Soils

Even within a township as highly developed as Deptford, 3,124 acres (27.9 percent of all township land) are made up of Prime Farmland (P-1) soils. Prime Farmland soils have the best combination of physical and chemical characteristics (including but not limited to soil horizon, pH, and soil temperature) for producing food, feed, forage, fiber, and oilseed crops. They sustain high yields of crops when managed with correct farming methods. Prime Farmland soils are not excessively erodible or saturated with water for long periods of time and do not flood frequently. Land does not have to be farmed in order to be classified as Prime Farmland, but it does have to be available for such use. Thus, urban or developed land does not qualify as Prime Farmland. Prime Farmland soils are located throughout Deptford Township, with the largest areas located in the southern portion of the Township.

Soils of Statewide Importance

Almost 16 percent (1,770 acres) of Deptford's soils are classified as Soils of Statewide Importance (S-1). These soils are close in quality to Prime Farmland and can sustain high yields of crops when correctly managed with favorable conditions. Under such favorable conditions, these yields may be as high as Prime Farmland yields. Criteria for establishing Soils of Statewide Importance are determined by state agencies. Soils of Statewide Importance are also located throughout the township.

Unique Farmland Soils

Unique Farmland soils are located on 434 acres (3.9 percent) in the township. Certain soil qualities, locations, growing seasons, and moisture supplies allow Unique Farmland to support specialized crops when properly managed. The USDA outlines specific Unique Farmland criteria that support a particular food or fiber crop, including temperature,

humidity, air drainage, elevation, aspect, or proximity to market. In order for lands to be classified as Unique Farmland, the land must also be used for a specific high-value food or fiber and have an adequate moisture supply for that crop. In Deptford Township, Unique Farmland soils are located alongside streams in wetlands areas.

Soils Not Rated

Over half (5,884 acres, or 51.1 percent) of the soils in Deptford have not been rated for agricultural use by NRCS and are labeled "NR." While some soils series in New Jersey have not been assigned a capability class by NRCS, all of the Not Rated soils within Deptford are explicitly considered unsuitable for farming. Natural constraints of these soils include water saturation, soil composition, or slope. While some of Deptford's NR soils are unsuitable due to steep slope or frequent flooding, the vast majority consist of soils that have been modified by development and other human activity.

Table 3: Agricultural Quality of Soils

Designation	Type	Acres	Percent
P-1	Prime Farmland Soils	3,123.84	27.86%
S-1	Soils of Statewide Importance	1,769.93	15.79%
U-1	Unique Farmland Soils	433.91	3.87%
NR	Not Rated for Agricultural Use *(wet soils, pits, steep slopes, disturbed land, etc.)*	5,883.59	50.55%
Water	Water	216.23	1.93%
Total		**11,211.27**	**100.00%**

Source: NRCS, 2004

Hydric Soils

Deptford Township contains 4,154 acres (37 percent) of soils that are considered hydric soils. Hydric soils, as defined by the National Technical Committee of Hydric Soils, are those that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in their subsurface, and they support the development of hydrophytic vegetation. When drained, hydric soils may be classified as important farmland. Some hydric soil series have phases that are not hydric depending on water table, flooding, and ponding characteristics. Hydric soils have unique properties and they are an important element to 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 laws regarding wetland preservation. More detailed descriptions of Deptford's wetland areas are found in this section under **Wetlands** and **Agricultural Wetlands**, and within the **Biological Resources** section under **Wetlands**.

Soil Series

Several soil series appear more frequently in Deptford than others, and are briefly described as follows according to the Gloucester County Soil Survey and NRCS soil database. See **Table 4: Soils** for detailed information. As half of the land in Deptford is developed, many of the soil series are found as complexes with Urban Land.

Urban Land

Urban Land soils underlay land that is mostly developed and covered with impervious surfaces such as buildings, parking lots, or roadways. The land may be used for residential, commercial, industrial, or transportation purposes. Typically, 70 percent or more of the original soil horizon has been destroyed in these areas. There are moderate limitations for woodland growth or wildlife habitat, and severe limitations for agricultural suitability. Urban land is very impermeable and low in fertility where the original soil has been removed. However, where the original soil has been moved from one area to another, the soil has moderate but slow permeability due to compaction of the soil during construction. In Deptford, Urban Land is found mainly in the vicinity of the Deptford Mall, where impervious surface coverage approaches 100 percent, meaning that stormwater is unable to infiltrate through the surface and recharge groundwater resources. In areas of medium- and low-density residential development, the native soil series have been altered and exist as various soil complexes with Urban Land.

Within Deptford Township, 798 acres (7.12 percent) is classified as pure Urban Land. The amount of soil that is complexed with Urban Land is much higher, totaling 3,291 acres (29.4 percent). In total, 36.5 percent of Deptford's soils contain Urban Land. This number is lower than the total amount of developed land within Deptford because some developed land is given other soil classifications.

Freehold Series (including complexes with Urban Land)

The Freehold series is by far the most common soil in Deptford; 5,128 acres (45.7 percent) of the township contain some amount of Freehold soils. Freehold soils were formed from sandy marine deposits containing glauconite. Found in many coastal plain soils, glauconite is a maritime mineral that enhances soil fertility. These soils are well drained and gently sloping, except around streambeds, where they may reach steep slopes of up to 40 percent. These soils are suitable for agricultural production and have low to moderate natural fertility. Different variations of Freehold soils will support upland forests of oak and poplar, which provide high-quality wildlife habitat. These soils are well suited to various seasonal crops because variations of Freehold soils warm at different times of the year. Freehold sandy loams are classified as Prime Farmland soils, and generally pose few constraints to development except on steep slopes near streambeds. Freehold soils predominate in the more low-lying northern and central portions of Deptford.

Within Deptford Township, 2,304 acres (20.6 percent) of the Freehold soils are in a complex with Urban Land. These areas are found throughout the township, especially in the Oak Valley and Gardenville Center neighborhoods, and are the most common urban soil type within Deptford.

Collington Series (including complex with Urban Land)

There are 1,096 acres (9.8 percent) soils in the Collington series in Deptford Township. About one third of these soils are in a complex with Urban Land. The Collington series soils are well-drained loamy soils that contain fair amounts of clay, especially in the subsoil. The Collington series occurs in high topographic positions and has slopes of as much as 10 percent. Collington soils have high organic matter content and a moderately high natural fertility. They are well suited for agricultural usage, especially the growth of fruits, vegetables, corn, small grains, soybeans, hay, and pasture. The natural vegetation that occurs in Collington soils is hardwood forest consisting of red oak, yellow poplar, hickory, ash, and beech, with viburnums in the underbrush. Collington soils are generally Prime Farmland and are moderately well suited for development. In Deptford, Collington soils are scattered through the township and are the third most common soil series, after Freehold and Urban Land.

Fallsington Series (including complex with Urban Land)

There are 860 acres (7.7 percent) of soils in the Fallsington series. Much of this is typical Fallsington soil, while 221 acres are complexed with urban land. Fallsington soils are poorly drained fine loams, with slow to moderate permeability. They occur in flats and depressions with slopes less than 5 percent, and are formed from loamy marine and old alluvial sediments. This hydric soil of Statewide Importance is often used for cultivating truck crops and small grains, and native vegetation includes wetland forest species such as oaks, maples, sweetgum, and pond pine. These soils possess serious constraints to development due to their high water table. In Deptford, Fallsington soils are found mainly in the northern portion of the township.

Photo: Michael Hogan

Big Timber Creek

Fluvaquents

Within Deptford Township, 401 acres (3.6 percent) of the soils are in the Fluvaquents series. These soils are found alongside streams and rivers in floodplain areas, and are formed from geologically recent (Holocene era) alluvial deposits. They are normally deep and very poorly drained, with nearly level slopes from 0 to 3 percent. Their permeability is slow and runoff is slow to nonexistent, with many Fluvaquents exhibiting ponding. Because they are recently formed and frequently flooded,

they have not developed a differentiated soil profile and, in addition, are unsuitable for both agriculture and development. Fluvaquents support deciduous and coniferous forest, in addition to other wetlands vegetation.

Mannington-Nanticoke Complex (including Udorthents)

Deptford Township contains 304 acres (2.7 percent) of soils in the Mannington-Nanticoke complex. The Mannington-Nanticoke soil complex is formed by silty and loamy alluvial sediments underlain by a sequence of organic and mineral layers. This series is found in wetland areas located in the coastal plains of New Jersey. Until 1995, this soil series was mapped as tidal marsh/freshwater marsh miscellaneous land type. Since the Mannington-Nanticoke series is a wetland soil, it is very poorly drained. This series is not used for agricultural purposes and supports mainly a wetland wildlife habitat. The most common vegetation includes arrow arum, sweet flag, spatterdock, and pickerelweed. This soil series is found along the freshwater tidal wetlands of the Big Timber and Almonesson Creeks; the portion along Almonesson is pure Mannington-Nanticoke, while the soils along the Big Timber are also complexed with Udorthents, which are described in further detail below.

Marlton Series (including complex with Urban Land)

There are 867 acres (7.7 percent) of soils in the Marlton series in Deptford Township. Much of this is composed of typical Marlton sandy loams, with 289 acres that are complexed with urban land. This series consists of nearly level to sloping, moderately well-drained, and well-drained soils which usually occur in high topographic positions. These soils are moderately fertile and high in potassium, though that nutrient is not readily available for plants. From the early nineteenth century into the twentieth century, Marlton soils, and other marl soils rich in potassium and magnesium, were used as a natural fertilizer on lime-deficient soils. Today, marl is used as a water softener. Since Marlton soils have a high content of clay, they occasionally hold large amounts of water during wet seasons, which makes them unsuitable for early and late planting seasons. However, Marlton soils have been used to grow corn, tomatoes, soybeans, hay, and pasture. The native vegetation for the Marlton series is hardwood forest consisting of red, white, and willow oak; hickory; yellow poplar; ash; beech; red cedar; and Virginia pine. In addition, they tend to pose moderate constraints to development due to a relatively high water table and shrink-swell potential. In Deptford, Marlton soils are concentrated in the southeast of the township, in the areas of relatively high elevation.

Udorthents

There are 257 acres (2.3 percent) of soils in Deptford Township classified as Udorthents, with an additional 295 acres (2.7 percent) in complexes with either Mannington-Nanticoke or Urban Land). Typically, this series consists of somewhat poorly drained to very poorly drained soils that have been altered mainly by filling and compaction. However, due to the degree of human influence on this classification of soil, large variance occurs within the category, and on-site investigation is needed to determine the suitability of this soil for any

use. Udorthents typically show up in areas of development and human activity, and are roughly comparable to Urban Land. In Deptford, the largest area of pure Udorthents occurs in the southern portion of the township between Routes 55 and 41, on the site of the old Kinsleys Landfill.

The character of these soils varies widely according to many variables, including land management, land use, vegetation types, and presence of impervious surfaces. Although typically poorly drained, when stormwater best management practices (BMPs) such as rain gardens, bioswales, or tree trenches are employed, and natural vegetation is maintained, areas classified as Udorthents have considerable potential to infiltrate stormwater, improve water quality, reduce flooding, and prevent excessive runoff.

Table 4: Soils

Soil Type	Description	Designation	Acres	% of Total Land Area	Hydric Soil
BEXAS	Berryland and Mullica soils, 0 to 2 percent slopes, occasionally flooded	U-1	28.7626	0.26%	Yes
BumA	Buddtown-Deptford complex, 0 to 2 percent slopes	P-1	39.8691	0.36%	Yes
CoeAs	Colemantown loam, 0 to 2 percent slopes, occasionally flooded	NR	38.0344	0.34%	Yes
CogB	Collington loamy sand, 0 to 5 percent slopes	P-1	159.2596	1.42%	No
CogC	Collington loamy sand, 5 to 10 percent slopes	S-1	34.0332	0.30%	No
CokA	Collington sandy loam, 0 to 2 percent slopes	P-1	107.3266	0.96%	No
CokB	Collington sandy loam, 2 to 5 percent slopes	P-1	334.1165	2.98%	No
CokC	Collington sandy loam, 5 to 10 percent slopes	S-1	86.1523	0.77%	No
CopB	Collington-Urban land complex, 0 to 5 percent slopes	NR	374.7293	3.34%	No
FamA	Fallsington sandy loam, 0 to 2 percent slopes	S-1	528.2694	4.71%	Yes
FapA	Fallsington loam, 0 to 2 percent slopes	S-1	111.0158	0.99%	Yes
FauB	Fallsington-Urban land complex, 0 to 5 percent slopes	NR	220.7723	1.97%	Yes
FmhAt	Fluvaquents, loamy, 0 to 3 percent slopes, frequently flooded	NR	400.7238	3.57%	Yes
FrfB	Freehold loamy sand, 0 to 5 percent slopes	P-1	1069.2428	9.54%	Yes
FrfC	Freehold loamy sand, 5 to 10 percent slopes	S-1	365.1342	3.26%	No
FrkA	Freehold sandy loam, 0 to 2 percent slopes	P-1	302.3131	2.70%	No
FrkB	Freehold sandy loam, 2 to 5 percent slopes	P-1	485.7827	4.33%	Yes
FrkC	Freehold sandy loam, 5 to 10 percent slopes	S-1	126.9409	1.13%	No
FrkD	Freehold sandy loam, 10 to 15 percent slopes	NR	268.4077	2.39%	No
FrkD2	Freehold sandy loam, 10 to 15 percent slopes, eroded	NR	3.9654	0.04%	No
FrkE	Freehold sandy loam, 15 to 25 percent slopes	NR	173.3398	1.55%	No

Soil Type	Description	Designation	Acres	% of Total Land Area	Hydric Soil
FrkF	Freehold sandy loam, 25 to 40 percent slopes	NR	29.5554	0.26%	No
FrrB	Freehold-Urban land complex, 0 to 5 percent slopes	NR	1678.1568	14.97%	No
FrrC	Freehold-Urban land complex, 5 to 10 percent slopes	NR	32.3176	0.29%	No
HbmB	Hammonton loamy sand, 0 to 5 percent slopes	S-1	61.0377	0.54%	Yes
JdrA	Jade Run fine sandy loam, 0 to 2 percent slopes	S-1	7.5110	0.07%	Yes
KeoA	Keyport loam, 0 to 2 percent slopes	P-1	5.2046	0.05%	Yes
KreA	Kresson fine sandy loam, 0 to 2 percent slopes	S-1	35.0645	0.31%	Yes
LenA	Lenni loam, 0 to 2 percent slopes	S-1	96.8517	0.86%	Yes
MakAt	Manahawkin muck, 0 to 2 percent slopes, frequently flooded	U-1	98.0096	0.87%	Yes
MamnAv	Mannington-Nanticoke complex, 0 to 1 percent slopes, very frequently flooded	U-1	43.0292	0.38%	Yes
MamuAv	Mannington-Nanticoke-Udorthents complex, 0 to 1 percent slopes, very frequently flooded	U-1	264.1092	2.36%	Yes
MaoB	Marlton sandy loam, 2 to 5 percent slopes	P-1	423.3098	3.78%	Yes
MaoC	Marlton sandy loam, 5 to 10 percent slopes	S-1	30.7785	0.27%	No
MaoC2	Marlton sandy loam, 5 to 10 percent slopes, eroded	S-1	45.2015	0.40%	No
MaoD	Marlton sandy loam, 10 to 15 percent slopes	NR	12.8080	0.11%	No
MaoD2	Marlton sandy loam, 10 to 15 percent slopes, eroded	NR	66.3841	0.59%	No
MauB	Marlton-Urban land complex, 0 to 5 percent slopes	NR	288.6015	2.57%	No
PHG	Pits, sand and gravel	NR	300.8338	2.68%	No
SabC	Sassafras loamy sand, 5 to 10 percent slopes	S-1	10.8576	0.10%	No
ThfB	Tinton sand, 0 to 5 percent slopes	S-1	231.0802	2.06%	No
UdauB	Udorthents-Urban land complex, 0 to 8 percent slopes	NR	31.3949	0.28%	No
UddB	Udorthents, dredged materials, 0 to 8 percent slopes	NR	8.4272	0.08%	No

Soil Type	Description	Designation	Acres	% of Total Land Area	Hydric Soil
UddcB	Udorthents, dredged coarse materials, 0 to 8 percent slopes	NR	4.7454	0.04%	No
UdrB	Udorthents, refuse substratum, 0 to 8 percent slopes	NR	243.5805	2.17%	No
UR	Urban land	NR	798.1098	7.12%	No
USFREB	Urban land-Freehold complex, 0 to 5 percent slopes	NR	593.1577	5.29%	No
WATER	Water	NR	216.2290	1.93%	No
WeeB	Westphalia fine sandy loam, 2 to 5 percent slopes	P-1	26.5265	0.24%	Yes
WeeD	Westphalia fine sandy loam, 10 to 15 percent slopes	NR	19.3356	0.17%	No
WeeD2	Westphalia fine sandy loam, 10 to 15 percent slopes, eroded	NR	7.6129	0.07%	No
WehB	Westphalia-Urban land complex, 0 to 5 percent slopes	NR	28.2014	0.25%	No
WoeB	Woodstown sandy loam, 2 to 5 percent slopes	P-1	2.9466	0.03%	Yes
WokA	Woodstown-Glassboro complex, 0 to 2 percent slopes	P-1	167.9458	1.50%	Yes
WooB	Woodstown-Urban land complex, 0 to 5 percent slopes	NR	44.1646	0.39%	No
Total			**11,211.27**	**100.00%**	

Source: NRCS, 2006

***Explanation of Designations**

P-1	Prime Farmland Soils
S-1	Soils of Statewide Importance
U-1	Unique Farmland Soils
NR	Not Rated for Agricultural Use *(wet soils, pits, steep slopes, disturbed and developed land, etc.)*
Water	Water

Soil characteristics can severely restrict the use of sites for construction and development. **Table 5** below records the soils and their possible development limitations. Many of the soils in Deptford have limitations due to frequent flooding or ponding, steep slopes, shrink-swell potential, and/or high levels of organic matter content. It is important to note that urban land has not been rated for development potential, since it is already developed. In addition to these building restrictions, soils in Deptford Township are generally unsuitable for on-site disposal for septic systems, which require soils that have a low water table (over five feet below the surface) and high permeability to allow for proper drainage of wastewater. Soils with high water tables (five feet or less from the surface) create a potential for erosion, wet basements, and low permeability, often allowing wastewater to collect near the surface. However, new development utilizing onsite septic is unlikely in Deptford, as virtually the entire township is within Gloucester County's Sewer Service Area. The following table is included here as a general guide and is not intended to eliminate the need for site analysis.

Table 5: Soil Limitations for Development

Soil Type	Description	Acres	Development Capability			
			Building without Basement	Building with Basement	Small Commercial	Specific Limitations
BEXAS	Berryland and Mullica soils, 0 to 2 percent slopes, occasionally flooded	28.7626	C	C	C	1,2,3
BumA	Buddtown-Deptford complex, 0 to 2 percent slopes	39.8691	C	C	C	3
CoeAs	Colemantown loam, 0 to 2 percent slopes, occasionally flooded	38.0344	C	C	C	1,2,3,4
CogB	Collington loamy sand, 0 to 5 percent slopes	159.2596	B	A	B	4
CogC	Collington loamy sand, 5 to 10 percent slopes	34.0332	B	A	B	4,5
CokA	Collington sandy loam, 0 to 2 percent slopes	107.3266	B	A	B	4
CokB	Collington sandy loam, 2 to 5 percent slopes	334.1165	B	A	B	4
CokC	Collington sandy loam, 5 to 10 percent slopes	86.1523	B	A	B	4,5
CopB	Collington-Urban land complex, 0 to 5 percent slopes	374.7293	B*	A*	B*	4
FamA	Fallsington sandy loam, 0 to 2 percent slopes	528.2694	C	C	C	3
FapA	Fallsington loam, 0 to 2 percent slopes	111.0158	C	C	C	3
FauB	Fallsington-Urban land complex, 0 to 5 percent slopes	220.7723	C*	C*	C*	3
FmhAt	Fluvaquents, loamy, 0 to 3 percent slopes, frequently flooded	400.7238	C	C	C	1,2,3
FrfB	Freehold loamy sand, 0 to 5 percent slopes	1069.242	A	A	A	N/A
FrfC	Freehold loamy sand, 5 to 10 percent slopes	365.1342	A	A	B	5
FrkA	Freehold sandy loam, 0 to 2 percent slopes	302.3131	A	A	A	N/A
FrkB	Freehold sandy loam, 2 to 5 percent slopes	485.7827	A	A	A	N/A

Soil Type	Description	Acres	Development Capability			
			Building without Basement	Building with Basement	Small Commercial	Specific Limitations
FrkC	Freehold sandy loam, 5 to 10 percent slopes	126.9409	A	A	B	5
FrkD	Freehold sandy loam, 10 to 15 percent slopes	268.4077	B	B	C	5
FrkD2	Freehold sandy loam, 10 to 15 percent slopes, eroded	3.9654	B	B	C	5
FrkE	Freehold sandy loam, 15 to 25 percent slopes	173.3398	C	C	C	5
FrkF	Freehold sandy loam, 25 to 40 percent slopes	29.5554	C	C	C	5
FrrB	Freehold-Urban land complex, 0 to 5 percent slopes	1678.156	A*	A*	A*	N/A
FrrC	Freehold-Urban land complex, 5 to 10 percent slopes	32.3176	A*	A*	B*	5
HbmB	Hammonton loamy sand, 0 to 5 percent slopes	61.0377	A	B	A	3
JdrA	Jade Run fine sandy loam, 0 to 2 percent slopes	7.5110	C	C	C	3
KeoA	Keyport loam, 0 to 2 percent slopes	5.2046	B	B	B	3,4
KreA	Kresson fine sandy loam, 0 to 2 percent slopes	35.0645	C	C	C	3,4
LenA	Lenni loam, 0 to 2 percent slopes	96.8517	C	C	C	3,4
MakAt	Manahawkin muck, 0 to 2 percent slopes, frequently flooded	98.0096	C	C	C	1,2,3,4,6
MamnAv	Mannington-Nanticoke complex, 0 to 1 percent slopes, very frequently flooded	43.0292	C	C	C	1,2,3
MamuAv	Mannington-Nanticoke-Udorthents complex, 0 to 1 percent slopes, very frequently flooded	264.1092	C	C	C	1,2,3
MaoB	Marlton sandy loam, 2 to 5 percent slopes	423.3098	B	B	B	3,4
MaoC	Marlton sandy loam, 5 to 10 percent slopes	30.7785	B	B	B	3,4
MaoC2	Marlton sandy loam, 5 to 10 percent slopes, eroded	45.2015	B	B	B	3,4,5

Soil Type	Description	Acres	Development Capability			
			Building without Basement	Building with Basement	Small Commercial	Specific Limitations
MaoD	Marlton sandy loam, 10 to 15 percent slopes	12.8080	B	B	C	3,4,5
MaoD2	Marlton sandy loam, 10 to 15 percent slopes, eroded	66.3841	B	B	C	3,4,5
MauB	Marlton-Urban land complex, 0 to 5 percent slopes	288.6015	B*	B*	B*	3,4
PHG	Pits, sand and gravel	300.8338	NR	NR	NR	N/A
SabC	Sassafras loamy sand, 5 to 10 percent slopes	10.8576	A	A	B	5
ThfB	Tinton sand, 0 to 5 percent slopes	231.0802	A	A	A	N/A
UdauB	Udorthents-Urban land complex, 0 to 8 percent slopes	31.3949	A*	A*	A*	N/A
UddB	Udorthents, dredged materials, 0 to 8 percent slopes	8.4272	A	A	A	N/A
UddcB	Udorthents, dredged coarse materials, 0 to 8 percent slopes	4.7454	A	A	A	N/A
UdrB	Udorthents, refuse substratum, 0 to 8 percent slopes	243.5805	A	A	A	N/A
UR	Urban land	798.1098	NR	NR	NR	N/A
USFREB	Urban land-Freehold complex, 0 to 5 percent slopes	593.1577	A*	A*	A*	N/A
WATER	Water	216.2290	NR	NR	NR	N/A
WeeB	Westphalia fine sandy loam, 2 to 5 percent slopes	26.5265	A	A	A	N/A
WeeD	Westphalia fine sandy loam, 10 to 15 percent slopes	19.3356	B	B	C	5
WeeD2	Westphalia fine sandy loam, 10 to 15 percent slopes, eroded	7.6129	B	B	C	5

Soil Type	Description	Acres	Development Capability			
			Building without Basement	Building with Basement	Small Commercial	Specific Limitations
WehB	Westphalia-Urban land complex, 0 to 5 percent slopes	28.2014	A*	A*	A*	N/A
WoeB	Woodstown sandy loam, 2 to 5 percent slopes	2.9466	A	B	A	3
WokA	Woodstown-Glassboro complex, 0 to 2 percent slopes	167.9458	C	C	C	3
WooB	Woodstown-Urban land complex, 0 to 5 percent slopes	44.1646	A*	B*	A*	3

Source: NRCS, 2008

Key to Land Use Implications	
A = Not Limited	Little or no limitation(s) or easily corrected by use of normal equipment and design techniques.
B = Somewhat Limited	Presence of some limitation, which normally can be overcome by careful design and management at somewhat greater cost.
C = Very Limited	Limitations that, normally, cannot be overcome without exceptional, complex, or costly measures.
NR = Not Rated	Limitations are not rated or listed.
* = Urban Complex	This soil complex contains urban land, which has already been developed and is Not Rated for all listed uses.

Key to Specific Limitations	
1	Ponding
2	Flooding
3	Depth to Saturated Zone (i.e., high water table)
4	Shrink-Swell Potential
5	Steep Slope
6	Organic Matter Content

Soil 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 in which rock materials are 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. 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, increased flooding, and pollution of streams and rivers.

Deptford Township has Soil Erosion and Sediment Control Requirements for new subdivisions, land development, utility construction, or site plans. These requirements are intended to reduce erosion and maintain sediments on-site during and after construction by reducing stormwater runoff and maximizing natural drainage techniques. The township requires a Soil Erosion and Sediment Control Plan for these types of projects, with the exception of disturbances less than five thousand square feet, single-family homes not part of a subdivision, or agricultural use approved by the local Soil Conservation District. These municipal requirements complement statewide Stormwater Management Rules related to construction sites. See the **Nonpoint Source Pollution** section for additional information on the statewide requirements.

Climate

Situated midway between the North Pole and the equator, New Jersey is influenced by hot, cold, dry, and humid airstreams that create highly changeable local weather. 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 west and northwest bringing cold, polar air masses from subarctic Canada.

The climate in New Jersey varies within its five regions: North, Central, Southwest, Pine Barrens, and Coastal. Deptford is in the Southwest zone, a region that registers some of the highest average daily and evening temperatures. The maritime influence of the Delaware Bay on New Jersey’s coast is responsible in part for these higher temperatures. In addition, the soils of the Southwest region are less sandy than either the Pine Barrens or Coastal Zones and so retain the day’s warmth into the night, unlike sandier soils that exhibit a strong radiational cooling after sunset. Evening temperatures can be as much as 20 degrees lower in the Pine Barrens than in neighboring climate zones. In contrast, the Coastal Zone bordering the Atlantic Ocean is generally warmer in the autumn and winter, and cooler in the spring and summer (coinciding with ocean water temperatures), than the Southwest Zone. In addition, the Southwest Zone tends to have the lowest precipitation

levels within the state, as it is far enough inland to miss some coastal storms, and its flat terrain and distance from the Great Lakes-St. Lawrence storm track lessens the impact of systems coming from the west and north.

Detailed weather data from a station in Glassboro is available from the Office of the New Jersey State Climatologist, which monitors 61 stations in the state. In July, the hottest month of the year, the Deptford area experiences a mean temperature of 76.1°F, with a normal maximum temperature of 85.7°F. In January, the coldest month, the mean temperature is 31.8°F and the normal minimum temperature is 23.7°F. The normal levels of precipitation range from a low of 2.83 inches in February to a high of 4.42 in August. The Deptford area averages 45.5 inches of precipitation per year.

Growing Seasons

According to the U.S. Department of Agriculture (USDA), Deptford lies on the northern edge of Plant Hardiness Zone 7a, where annual minimum temperatures are typically between 0°F and 5°F. Zone 7a, the warmest USDA Plant Hardiness Zone in New Jersey, covers the southwestern portion of the state and areas along the Atlantic coastline. The USDA continues to use the 1990 plant hardiness zones, although several other groups, including the Arbor Day Foundation, have reclassified areas based on recent 10-year weather trends, which indicate a general rise in temperature. The 2006 Arbor Day Foundation Plant Hardiness Zone Map increased the zone designation for most of New Jersey and classifies Deptford as within Zone 7, which has a minimum temperature between 0°F and 10°F.

Deptford's agricultural growing season is approximately six months, or 180 days, from mid-April to mid-October. This is the period between the last spring frost, normally in mid-April, and the first autumn frost, in mid-October. The frost-free growing season in Deptford is about 60 days longer than in northern New Jersey, where frosts generally end in May and begin in October.

Climate Change

Climatologists estimate that over the course of the twentieth century, average global temperatures have risen by 1 degree Fahrenheit, and are expected to rise between 2.5 to 10.4 degrees by 2100. The Office of the New Jersey State Climatologist has recorded temperatures in the state since 1895, and results have corroborated this general warming trend, making the impacts of climate change an important issue for New Jersey communities.

While continuing warming is expected, estimating the impact of climate change on local weather patterns and precipitation is a complicated process with numerous variables and uncertainties. Generally speaking, climate change is expected to increase weather extremes in the Mid-Atlantic region. Wet periods will become wetter, and dry periods will become drier. Such changes in precipitation patterns, along with continued warming, will impact hydrology, agriculture, and the composition of natural vegetation in Deptford

Township. A wetter, warmer climate will likely lead to the infiltration of Deptford's existing hardwood forests by southern species, such as southern yellow pine. However, the increase in weather extremes could lead to more prolonged and severe periods of drought as well.

The State of New Jersey has undertaken a number of initiatives towards combating climate change. In 2000, the state joined the Regional Greenhouse Gas Initiative (RGGI), a consortium of ten New England and Mid-Atlantic states that have instituted a mandatory CO2 cap-and-trade system for power utilities. The NJ Board of Utilities has also instituted one of the most aggressive Renewable Portfolio Standards in the country. The standards will require power utilities to obtain 20 percent of their power from renewable sources by 2020.

In October 2008, New Jersey released a new Energy Master Plan that calls for dramatic increases in energy efficiency leading to major reductions in energy use by 2020, and establishes a goal of achieving 30 percent of electric power from renewable sources by 2020. In July 2007, New Jersey's Global Warming Response Act (GWRA) was signed into law by Governor Corzine. The GWRA is one of the most aggressive greenhouse gas emissions control laws in the world. It calls for a statewide reduction in greenhouse gas emissions to 1990 levels by 2020, and a reduction to 80 percent below 2006 levels by 2050. Additionally, the GWRA charges the NJDEP with developing recommendations, including additional legislation, to enable the State to meet the established greenhouse gas emission targets.

Initiatives to reduce greenhouse gas emissions have also been occurring at the regional level. In 2007, the Delaware Valley Regional Planning Commission began an effort to ultimately reduce emissions associated with climate change. The first step in this process was the development of a regional greenhouse gas emissions inventory, released in March 2009. In addition to calculating aggregate regional emissions for the nine-county Philadelphia metropolitan area (including Gloucester County), the inventory allocated emissions to each of the region's nine counties and 353 municipalities. The allocation portion of the inventory will enable municipalities to establish a baseline for greenhouse gas reduction efforts undertaken at the municipal level.

Photo: Michael Hogan

Mantua Creek

Air Quality Criteria Pollutants

Ground level ozone (O_3) is formed when volatile organic compounds (VOC) 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 which 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 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, in addition to its historic use in paint. Today, metal processing plants and trash incinerators are the major source of lead emissions. 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.

Air Quality

Air quality is one of the most difficult environmental resources to measure because its sources are diffuse and regional in nature. Sources of air pollution include industry, cars, trucks, and buses, fires, and dust. Air pollutants can travel extremely far from their source. 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 are caused daily by traffic and industrial complexes in New Jersey and the surrounding region.

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 act also revised the way air toxins were regulated, increasing the number of regulated toxic air pollutants from seven to 187.

In 1970, the US EPA was formed to enforce the CAA. In New Jersey, the US EPA allowed NJDEP to enforce the CAA because the state agency developed more stringent air standards and created a State Implementation Plan (see NJAC 7:27). The CAA identified six *criteria* pollutants—ozone, particulate matter, sulfur dioxide, nitrogen oxides, carbon monoxide, and lead—that are destructive to human health and to the built and natural environment. The EPA sets National Ambient Air Quality Standards (NAAQS) for these pollutants. There are two kinds of NAAQ Standards: the primary standard is based on human health effects, while the

secondary standard is based on environmental and property damage.

Between 1970 and 2007, total emissions of the six criteria air pollutants decreased by more than 50 percent. The industrial sector reduced its toxic air emissions by 70 percent during this time period. Stricter emissions standards in the auto industry have made cars 90 percent “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

As of 2009, NJDEP’s Bureau of Air Monitoring maintains a network of 42 continuous monitoring stations across the state, most of which are clustered in the New York metropolitan area. These stations continually monitor some or all of seven parameters—carbon monoxide, nitrogen oxides, ozone, sulfur dioxide, smoke shade, particulate matter, and meteorological data. EPA and, when enabled, NJDEP have set National Ambient Air Quality Standards (NAAQS) for the six criteria pollutants. In addition, 25 manual monitoring stations operate around the state, providing supplemental data to the 43 continuous monitoring stations. There are two kinds of NAAQ Standards: the primary standard is based on human health effects, while the secondary standard is based on environmental and property damage.

The nearest continuous monitoring station to Deptford is located in Clarksboro, several miles west of the township. The Clarksboro station monitors ozone and sulfur dioxide at the “urban” scale, representative of up to 10 to 100 kilometers away, which includes all of Deptford. Another nearby station in Camden City (called Camden Lab) also monitors ozone at the “urban” scale and is representative of Deptford. The Camden Lab station also monitors carbon monoxide, nitrogen oxides, sulfur dioxide, smoke shade, and particulate matter, although these parameters are representative at the “neighborhood” scale, which is not inclusive of Deptford Township and so is not included here.

In addition to the continuous monitoring network, the NJDEP Bureau of Air Monitoring operates a manual air quality monitoring network that measures a greater number of parameters. At these stations, samples are taken that are then analyzed in a laboratory for respirable particulate matter, lead, total suspended particulate matter, atmospheric deposition, ozone precursors, and a number of other contaminants. These stations are located across the state, but are generally concentrated in the New York metropolitan area. The two nearest manual monitoring stations are located in Camden and Gibbstown, although both are representative at the “neighborhood” scale, which is not accurate for Deptford Township.

Recent air quality monitoring data representative of Deptford Township collected at the Clarksboro and Camden Lab stations is described below.

Ground-level Ozone

The amount of ozone has decreased greatly in New Jersey since the 1980s, and one-hour concentrations have not exceeded 0.200 ppm since 1988. For ground-level ozone (O_3), there are two NAAQ standards: (1) a one-hour concentration of 0.12 ppm, and (2) an eight-hour average concentration of 0.08 ppm. For the national standards, these are the same for both primary and secondary effects. New Jersey, however, has tightened the one-hour concentration standard for secondary effects to 0.08 ppm.

In 2006, the Clarksboro station's highest one-hour average was .105 ppm, and Camden Lab had a one-hour maximum of .108 ppm, both under the NAAQ standard of 0.12. However, the Clarksboro and Camden Lab stations both exceeded the eight-hour standard of 0.08 ppm in 2006. Clarksboro's highest eight-hour average was 0.091 ppm, and the station had three days in which the eight-hour standard was exceeded. Camden Lab's highest eight-hour average was 0.100 ppm, and the station had four days in which the standard was exceeded.

Sulfur Dioxide

There are three NAAQS for sulfur dioxide: (1) a yearly average of 0.030 ppm for primary effects; (2) a 24-hour average of 0.140 ppm, which cannot be exceeded more than once a calendar year, also for primary effects; and (3) a 3-hour average of 0.5 ppm, which also cannot be exceeded more than once a calendar year for secondary effects. New Jersey's standards are slightly different in that they use a rolling year unit instead of a calendar year. The yearly average level of sulfur dioxide at the Clarksboro station in 2006 was 0.003 ppm, the maximum 24-hour average was 0.017 ppm, and the maximum 3-hour average was 0.035 ppm—all well within the standards and below state averages.

Air Quality Index

The EPA created the Air Quality Index (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 below in **Figure 3: Air Quality Index (AQI)**. The higher the AQI value, the greater the level of air pollution and associated health concerns.

Figure 3: 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, 2005

The daily score is based on whatever the highest individual pollutant score is reported. For example, if ozone scored 150 and particulate matter scored 100, the daily AQI would be 150—Unhealthy for Sensitive Groups. The index is used to measure overall air quality by counting the number of days per year when the AQI of each region exceeds 100.

New Jersey is subdivided into nine regions that report their respective AQI. Deptford Township is located in Region 8, which covers Camden and Gloucester counties. The monitoring stations for this region are located in Camden, Clarksboro, and Ancora State Hospital. The AQI for Region 8 is based on five pollutants: carbon monoxide, nitrogen dioxide, ozone, particulates, and sulfur dioxide. In 2007 (the most recent year of annual data), Region 8 reported 222 good days, 128 moderate days, 14 days that were unhealthy for sensitive groups, one unhealthy day, and no very unhealthy or hazardous days.

Point Sources of Air Quality Pollution

Under the CAA, the EPA limits the amount of other air pollutants and toxins that are emitted by point sources, such as chemical plants, industrial factories, power plants, and steel mills. The NJDEP Air Quality Permitting Program issues permits for stationary sources of air pollution, such as power plants, oil refineries, dry cleaners, food processing centers, and manufacturing plants, and regulates and monitors their emissions. As of December 2009, there were 60 facilities with active air quality permits in Deptford, listed in the table below. These are shown on **Map 13: Point Sources (2009)**.

Table 6: Facilities with Active Air Quality Permits

Facility Name	Address	PI Number
1396 Delsea Dr Deptford LLC Service Station	11 Delsea Dr	A5581
1396 Delsea Drive Deptford LLC	11 Delsea Dr	55399
5 Points BP Service Station	109 Delsea Dr	A5638

Facility Name	Address	PI Number
Almonesson CITGO Service Station	1496 Hurffville Rd	A5560
Amerada Hess Corp-Hess Station 30294	Route 41	A5605
Bestway Gas Service Station	1400 S Hurffville Rd	A5629
Bill's Auto Repair	1305 Cooper St	A5509
BJs Wholesale Club	1910 Deptford Ctr Rd	A9894
BJs Wholesale Club Inc	1910 Deptford Center Rd	55648
C Abbonizio Contractors Inc	1850 Hurffville Rd	56032
Central Early Childhood	1447 Delsea Dr	56141
Coastal #7650	1070 Mantua Ave	A9511
Deptford CITGO Service Station	1100 Cooper St	A5561
Deptford Cleaners	1406 Clements Bridge Rd	L8929
Deptford Park Apartments	120 Pop Moylan Blvd	55906
Deptford Plating Co	Dein Ave & Rt 41	55083
Deptford Pump Station	6th & Lakeview Ave.	55392
Deptford Twp High School	575 Fox Run Road	H5509
Deptford Twp High School	575 Fox Run Rd	55814
Deptford Twp DPW	1700 Hurffville Rd	55920
Deptford Twp MUA Pump Station #4	Clements Bridge Rd	56047
Deptford Twp MUA Pump Station #9	Tanyard Rd	56042
Deptford Twp MUA Well #1	Princeton Blvd & Haverford Ave	56048
Deptford Twp MUA Well #4	Houston Ave & Cobblestone Ln	56046
Deptford Twp MUA Well #6	Delsea Dr & Southview Dr	56045
Deptford Twp MUA Well #7	Bank Bridge Blvd	56044
Deptford Twp MUA Well #8	Almonesson Rd	56043
Eagle Fleet Repair Co	161 N Hurffville Road	H5543
Former 5 Points CITGO Service Station	109 Delsea Dr	55903
Getty Service Station #56086	1545 Hurffville Rd	A5701
Gloucester County College	1400 Tanyard Rd	55916
Gloucester County Institute of Technology	1360 Tanyard Rd	55237
Gloucester County Special Services School	870 Bank Bridge Rd	55858
Good Intent School	1555 Good Intent Rd	55813
Home Depot Inc #0929	1370 Hurffville Rd	56015
Hutchinson Cabinets	244 Bank Bridge Rd	55874
Innova Health & Rehab @ Deptford	1511 Clements Bridge Rd	56041

Facility Name	Address	PI Number
International Roll Forms Inc	Fairview Ave	55344
Kinsley's Landfill, Inc.	Route 41	55274
Lake Tract School	Izard Dr & Izard Rd	55818
Lowes of Deptford Store #1542	1480 Clements Bridge Rd	56051
Lukoil Service Station #57365	1395 Hurffville Rd	A9518
Mac Sanitary Landfill	Evesham Clements Brg Rd	55833
Macy's Dept Store #66 @ Deptford Mall	Almonesson & Clements Bridge Rd	55228
Martell Farm Site	1327 Caulfield Ave	55869
Monongahela Middle School	Bank Bridge Rd & Tanyard Rd	55815
Municipal Building	1011 Cooper St	55801
Nancy J Elkis Senior Housing	100 Pop Moylan Blvd	55898
NJDOT Deptford Twp Maintenance Facility	Cedar Ave & Rt 41	H8734
Oak Valley Elementary School	College Blvd & University Blvd	55817
Pine Acres School	720 Purdue Ave	55816
Quenzel's Sunoco # 0004-6730	1106 Rt 45	A5621
Sams Club Store #6670	2000 Clements Bridge Rd	A9926
Sears Roebuck & Co Store #1464	300 N Almonesson Ave	55150
Shady Lane School	130 Peach St	55819
Strober-Haddonfield Group Inc	1310 N Delsea Dr	55931
Ultimate Cleaners	1450 Clements Bridge Rd	L5534
USPS Woodbury Deptford Branch Post Office	1265 Hurffville Rd	H8781
Westgrove Industrial Park	1030 Delsea Dr - Bldg 1a	56138

Source: NJDEP, 2009

NJDEP enacted the Emission Statement Rule in 1992 requiring certain sites that have an air quality permit to report specific air contaminants, including carbon monoxide (CO), sulfur dioxide (SO_2), ammonia (NH_3), total suspended particulate matter (TSP), respirable particulate matter (PM_{10} and $PM_{2.5}$), lead (Pb), volatile organic compounds (VOC), nitrogen oxides, and 38 other toxic air pollutants. Deptford currently has one facility that falls under these requirements, the Mac Sanitary Landfill on the corner of Evesham and Clements Bridge Road along the Big Timber Creek.

Surface Water Resources

All of Deptford's land drains to the Delaware River by way of three streams: Big Timber Creek, Woodbury Creek, and Mantua Creek. Within Deptford, there are a number of

tributaries leading to these streams, including Almonesson Creek, Bull Run, and Monongahela Brook.

Watersheds

A watershed is all the land that drains to a particular waterway such as a river, stream, lake, or wetland. A watershed's boundaries are defined by the high points in the terrain, such as hills and ridges. Large watersheds are made up of smaller ones, down to the catchment level of a local site. So, for example, the Delaware River watershed is made up of many smaller watersheds, such as the Big Timber Creek watershed. The Big Timber Creek watershed, in turn, is formed of several subwatersheds, consisting of the land that drains to a major tributary or branch of the river, such as the Almonesson Creek subwatershed. These subwatersheds can be further subdivided into smaller ones, each surrounding the smaller tributaries that flow to the larger channel. Watersheds are natural ecological units, where soil, water, air, plants, and animals interact in a complex relationship.

Each watershed corresponds to a hydrological unit code, or 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 (identified by a 14-digit code). The State of New Jersey has 152 HUC 11 watersheds and over 900 HUC 14 subwatersheds. Land in Deptford Township falls into two HUC 11 watersheds—Mantua Creek and Woodbury/Big Timber/Newton Creeks. Within these large watersheds, there are portions of nine HUC 14 subwatersheds in Deptford Township, three of which are part of the Mantua Creek watershed, and six of which are within the Woodbury/Big Timber/Newton Creek watershed. These are listed in **Table 7: Watersheds and Subwatersheds** and shown on **Map 9: Watersheds.**

Watershed Management Area 18

NJDEP manages natural resources on a watershed basis, and has divided the state into 20 Watershed Management Areas (WMAs). Deptford Township is within WMA 18, the Lower Delaware, which covers the 68 municipalities over 391 square miles in the southwestern portion of the state. This WMA includes the watersheds of the Oldmans Creek, Raccoon Creek, Repaupo Creek, Mantua Creek, Big Timber Creek, Cooper River, Pennsauken Creek, and Pompeston Creek, all of which drain to the Delaware River. WMA 18 is highly industrial and urban along the Delaware River to its north, but its headwaters to the south are more forested and agricultural.

Woodbury/Big Timber/Newton Creeks Watershed

The individual watersheds of the Woodbury, Big Timber, and Newton Creeks have been combined into one HUC 11 watershed, although they function as distinct watersheds. The combined Woodbury/Big Timber/Newton Creek watershed drains an area of 98.94 square miles in Gloucester and Camden counties and includes several separate waterways, all of which drain into the Delaware River. Nearly 69 percent of Deptford drains to the Delaware River via two of the primary streams within this watershed, Woodbury Creek and Big

Timber Creek. This watershed is largely covered with developed land, with some patches of wetland and forest, especially the Big Timber portion.

The **Woodbury Creek** drains 3.3 square miles (19 percent) of Deptford. This stream has its headwaters near the center Deptford Township and travels northwest for five miles to the Delaware River. Most of this watershed is developed, especially in the neighboring built-out municipalities of Woodbury and Woodbury Heights. However, many areas of the creek are surrounded by parks in Woodbury. The headwaters of two of the three branches of the Woodbury Creek are located in Deptford Township, along with other smaller tributaries.

Over 49 percent of Deptford's land, or 8.7 square miles, is drained by the **Big Timber Creek**, which forms the eastern border of Deptford Township with the Camden County municipalities of Bellmawr, Runnemede, and Gloucester Township. The Big Timber Creek splits into a North and South Branch as it borders Deptford, with the North Branch flowing through heavily urbanized areas of Camden County and the South Branch continuing south along Deptford's border.

Mantua Creek Watershed

The Mantua Creek watershed drains 50.9 square miles, entirely within Gloucester County. There are 3,520 acres (31.4 percent) in Deptford that drain to the Delaware by way of Mantua Creek and its tributaries, which include Bees Branch and Monongahela Brook. While this watershed is less developed within Deptford than the Big Timber and Woodbury watersheds and retains the vast majority of Deptford's remaining agricultural land, parts of it have been urbanized, especially in the Oak Valley neighborhood.

Table 7: Watersheds and Subwatersheds

Watershed Name (HUC 11)	Subwatershed Name	Stream Classification	HUC 14	Acreage within Deptford	Percent of Deptford Land
Mantua Creek (02040202130)				**3,520.48**	**31.35%**
	Mantua Creek (below Edwards Run)	FW2-NT/SE2	02040202130060	1.54	0.01%
	Mantua Ck (Edwards Run to Blackwood-Barnsboro Rd)	FW2-NT/SE2	02040202130040	3,400.28	30.28%
	Mantua Creek (Blackwood-Barnsboro Rd to Route 47)	FW2-NT/SE2	02040202130020	118.66	1.06%
Woodbury / Big Timber / Newton Creeks (02040202120)				**7,707.99**	**68.65%**
Woodbury Creek	Woodbury Ck (below Route 45) / Lower Delaware River Valley to Big Timber Creek	FW2-NT/SE2	02040202120110	37.54	0.33%
	Woodbury Creek (above Rt 45)	FW2-NT/SE2	02040202120100	2,102.98	18.73%
Big Timber Creek	Big Timber Creek (below North Branch / South Branch confluence)	FW2-NT	02040202120080	2,145.10	19.10%
	Big Timber Creek South Branch (below Bull Run)	FW2-NT	02040202120050	690.84	6.15%
	Big Timber Creek South Branch (including Bull Run to Lakeland Rd.)	FW2-NT	02040202120040	302.07	2.69%
	Almonesson Creek	FW2-NT	02040202120060	2,429.47	21.64%
Total				**11,228.47**	**100.00%**

Source: NJDEP, 2000

Streams

Deptford Township contains over 23 miles of streams. Of these, over 19 miles are first or second order (headwater) streams. That is, they are the initial sections of stream channels with no contributing tributaries (first order streams), or they are stream channels formed from only one branching section of tributaries above them (second order streams). The headwaters are where a stream is “born” and actually begins to flow.

Table 8: Streams

Stream Order	Miles
First (smallest)	14.50
Second	4.69
Third	0.90
Fourth	3.38
Total	23.47

Source: NJDEP, 2002

Headwaters are of particular importance because they tend to contain a diversity of aquatic species, and their condition affects downstream water quality. They drain only a small area of land, usually no larger than one square mile (640 acres). Because of their small size, they are highly susceptible to impairment by human activities on the land. First and second order streams are narrow and often shallow and are characterized by relatively small base flows. The base flow is the portion of the stream flow that comes from groundwater seepage, not surface water runoff. This makes them subject to greater temperature fluctuations, especially when forested buffers on their banks are removed. They are also easily over-silted by sediment-laden runoff, and their water quality can be rapidly degraded. In addition, first order streams are greatly affected by changes in the local water table because they are fed by groundwater sources. Headwaters are important sites for the aquatic life that is at the base of the food chain, and often serve as spawning or nursery areas for fish.

Photo: Michael Hogan

Big Timber Creek

Deptford’s named streams include Big Timber Creek (including the Main Channel and South Branch of Big Timber Creek), Woodbury Creek, Mantua Creek, Almonesson Creek, Bull Run, Bees Branch, and Monongahela Brook. Almonesson Creek is contained entirely within Deptford and drains to Big Timber Creek. Additionally, Woodbury Creek and Monongahela Brook have their headwaters within the Township. Several streams that flow

through Deptford are monitored by NJDEP for biological life and other parameters. See **Surface Water Quality** for more information on NJDEP's stream monitoring programs.

Tidal flows bring water from the Delaware River into some of Deptford's streams twice a day. The heads of tide for Big Timber Creek and Almonesson Creek both lay within Deptford, and the portion of Mantua Creek bordering the Oak Valley neighborhood is also tidal. Tidal flows both help and hinder maintenance of water quality in affected streams. The flood (incoming) tide carries leaves and nutrients that are beneficial to aquatic organisms, but it also limits the regular flushing out of silt and pollutant-laden waters coming from upstream. Silt deposition within a stream tends to increase during flood tides. Deposition is also a natural function of stream shape, although the presence of barriers can detrimentally increase the quantity of silt (the load) being carried by the stream. See **Map 10: Surface Water, Wetlands, and Vernal Pools**.

Lakes and Ponds

There are 75 acres of artificial ponds and lakes in Deptford, including Almonesson Lake, which is a 19-acre impoundment of the Almonesson Creek between Cooper Street and Good Intent Road. Other lakes in the township include Stewart Lake, Marlton Lake, Wenonah Lake, and Monongahela Lake. Artificial lakes and ponds are formed by damming or as the result of an active or inactive extractive operation, and are often used for irrigation and flood control. See **Map 10: Surface Water, Wetlands, and Vernal Pools**.

Wetlands

Wetlands support unique communities that serve as natural filters and as incubators for many beneficial species. The term "wetland" is applied to areas where the soil is inundated or saturated at a frequency and duration great enough to support vegetation suited for life in saturated soils. The source of water for a wetland can be surface water such as an estuary, river, stream, or lake edge, or groundwater that intersects with a depression in land surface. Under normal conditions, wetlands are those areas that support a prevalence of defined wetland plants on a wetland soil. The U.S. Fish and Wildlife Service designates all large vascular plants as wetland (hydric), non-wetland (non-hydric), or in between (facultative).

Wetland soils, which are also known as *hydric* soils, are areas where the land is saturated for at least seven consecutive days during the growing season. While wetlands almost always require the presence of hydric soils, hydric soils are not always necessarily wetlands. By definition, wetlands require the presence of both wetlands vegetation and hydric soils. In addition, wetlands are classified as either tidal or non-tidal. Tidal wetlands can be either saline or freshwater. There are also special wetland categories to denote saturated areas that do not support naturally occurring wetlands vegetation—typically due to human activities, such as agriculture.

New Jersey protects freshwater (interior) 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," can determine if there are freshwater wetlands on a property. An LOI verifies the presence, absence, or boundaries of freshwater wetlands and transition areas on a site. Activities permitted to occur within wetlands are very limited, and permits are required for most of them. Violations of the wetland regulations will result in penalties determined by NJDEP.

Once it is determined that wetlands are present, the NJDEP determines the value of the wetlands—ordinary, intermediate, or exceptional. Different "buffer" areas, i.e., distance to development, are based on the value of the wetlands. The possible presence of any threatened or endangered species in or near a wetlands area is also an important consideration in determining the buffer width to be applied for development. Municipalities may not establish buffers on wetlands that exceed those required by the state statute. However, the municipality can make certain that those limits are accurate through its review of the wetlands delineation process, and it can also monitor use of the land within the transition area and take action against encroachments.

Photo: Michael Hogan

Almonesson Creek Park

All of Deptford's wetlands are freshwater, and some are tidal. The delineation of wetlands is based on NJDEP's land use/land cover mapping and is shown on **Map 3: NJDEP Land Cover (2007).** Total wetland acreage in the township is 1,205 acres, of which 1,109 acres are non-modified. Most of these wetlands are deciduous wooded wetlands (778 acres), in addition to 137 acres of scrub/shrub wetlands, 10 acres of herbaceous, 26 acres of *Phragmites*-dominated wetlands, and 157 acres of freshwater tidal marsh.

Deptford contains 97 acres of modified wetlands, which are wetlands that have been altered by human activities. Deptford's modified wetlands include agricultural wetlands, former agricultural wetlands, wetlands rights-of-way, disturbed wetlands, and wetlands occurring in maintained green spaces such as lawns, golf courses, and stormwater swales. Modified wetlands differ from non-modified wetlands in that they no longer support the typical natural wetlands vegetation found in analogous unaltered natural areas. However, they do show obvious signs of soil saturation and exist in areas shown to have hydric soils on U.S. Soil Conservation Service soil surveys. A more detailed description of all Deptford's wetland areas is found in the **Biological Resources** section, under **Wetlands**.

Agricultural Wetlands

The largest type of modified wetlands in Deptford Township is agricultural wetlands, totaling 46 acres. These "quasi-wetlands" tend to border natural wetlands or streams and are modified, former wetland areas that are under cultivation. These areas still exhibit evidence of soil saturation in aerial infrared photo surveys, but they do not support natural wetland vegetation. See **Map 10: Surface Water, Wetlands, and Vernal Pools**.

As long as agricultural wetland areas remain in agricultural use, they are exempt from New Jersey's Freshwater Wetlands Rules *N.J.A.C. 7:7A*. However, if an agricultural area is removed from agricultural production for more than five years, any wetlands located within that area lose their exempt status. Also, according to *N.J.A.C. 7:7A-2.8(b)2*, "the exemptions apply only as long as the area is used for the exempted activity." Therefore, if the area is used for anything other than farming, the exemption no longer applies. Additionally, if hydric soils are present, certain activities on drained farmland may be regulated by the state of New Jersey.

The Natural Resources Conservation Service sponsors the Wetlands Reserve Program, a voluntary program that offers landowners an opportunity to receive payments for restoring and protecting wetlands on their property, including agricultural wetlands. Restoring agricultural wetlands requires removing them from agricultural use and restoring them to their natural state. This program provides technical and financial assistance to eligible landowners who can enroll eligible lands through permanent easements, 30-year easements, or restoration cost-share agreements.

Vernal Pools

Vernal pools are confined depressions, either natural or man-made, which hold water for at least two consecutive months out of the year and are devoid of breeding fish populations. Vernal pools come in an array of forms: isolated depressions within upland forests, seasonally flooded meadows, floodplain swamps, abandoned gravel pits or quarries, and even derelict swimming pools. However, no matter what the structure or genesis of the pool is, all vernal pools either dry out completely or draw down to very shallow levels unsuitable for sustaining fish. Most commonly, vernal pools appear following snowmelt and during spring rains, then disappear or are dry during the rest of the year. Vernal pools are critical sites for certain rare species of frogs and salamanders called obligate breeders. The term "obligate breeder" refers to species that can only reproduce in vernal pools, because the pool's impermanence prevents residence by predators, such as fish, that would consume the eggs and young. Vernal pools also provide habitat for amphibians and reptiles that may breed in them but not exclusively (facultative breeders), or may use the pools at some point in their life cycles.

Vernal pools are so intermittent that their existence as wetlands has frequently not been recognized. Consequently, many of them have disappeared from the landscape, or have been substantially damaged. This, in turn, is a principal cause of the decline of their obligate amphibian species.

In an effort to boost the effectiveness of the 1987 wetland protection regulations, which allowed the filling of isolated wetlands up to one acre in size (including vernal pools), the New Jersey Division of Fish and Wildlife began the Vernal Pool Survey project in 2001 to identify, map, and certify vernal pools throughout the state. Once a vernal pool is certified, regulations require that a 75-foot buffer be maintained around the pool. NJDEP's Division of Land Use Regulation oversees this designation and restricts development around vernal pools by denying construction permits. To be certified, vernal pools must: (1) occur in a confined basin depression without a permanently flowing outlet; (2) provide documented habitat for obligate or facultative vernal pool herptile species; (3) maintain ponded water for at least two continuous months between March and September of a normal rainfall year; and (4) be free of fish populations throughout the year, or dry up at some time during a normal rainfall year.

The state has identified 14 possible vernal pools within Deptford Township, shown in **Map 10: Surface Water, Wetlands, and Vernal Pools** and listed in **Appendix C: Potential Vernal Pools in Deptford Township.** Determining the actual number of pools, and certifying pools, requires investigation in the field. Citizens, local governments, and non-profit groups can survey pools and submit documentation to NJDEP to have pools certified. NJDEP's Division of Fish and Wildlife provides detailed guidance on what documentation is needed. Municipalities can provide additional protection for vernal pools by instituting restrictive zoning or negotiating conservation easements on the land surrounding vernal pools.

Floodplains

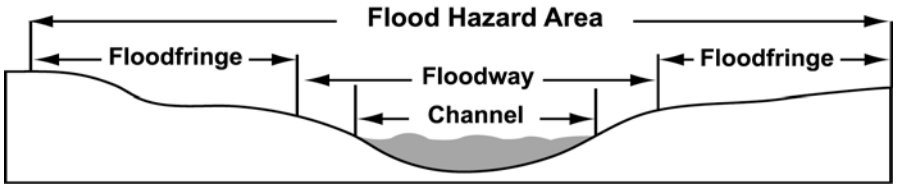
Areas naturally subject to flooding are called floodplains, or flood hazard areas. Floodplains encompass a floodway, which is the portion of a floodplain subject to high velocities of moving water, and the adjacent flood fringe, which helps to hold and carry excess water during overflow of the normal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

Although the terms "flood hazard area" and "100-year floodplain" denote 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. This type of flood is called the "flood hazard area design flood" and it is the flood regulated by NJDEP.

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.

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, *N.J.S.A. 58:16A-50* et seq., and its implementing rules at *N.J.A.C. 7:13*. The New Jersey Department of Environmental Protection adopted a new Flood Hazard Control Act in 2007. In an effort to streamline the existing regulations and further improve water quality in New Jersey's waters, the redrafted Flood Hazard Control Act imposes additional requirements on property owners in the flood management area.

Figure 4: Parts of a Flood Hazard Area



Source: 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 Deptford by using the Federal Emergency Management Agency's (FEMA's) 100-year floodplain maps. These maps, updated in 2010, indicate that 786.5 acres (seven percent) of the township's land area falls within the 100-year floodplain. In addition, 37.9 acres (less than one percent) of the township falls within the 500-year floodplain. Deptford's most extensive floodplain area is located along the banks of the Big Timber Creek and other waterways. Several properties have been developed to the edge of, or within, Deptford's floodplains, especially along the South Branch of Big Timber Creek. See **Map 11: Floodplains (2010)**.

Table 9: Floodplains

Flood Plain	Area (Acres)	% of Deptford in Floodplain
100 Year Floodplain	786.49	7.01%
500 Year Floodplain	37.91	0.34%
Total Floodplain Area	**824.40**	**7.35%**
Total Deptford Area	**11,228.47**	

Source: FEMA, 2010

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 waterbodies 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). Saline estuarine is further broken down into SE1, SE2, and SE3 designations; SE1 waters are generally more saline than SE2 and SE3 waters and are tested for a slightly different set of parameters, including shellfish harvesting. In addition to being classified as FW1 and FW2, fresh waterbodies are classified as trout-producing (TP), trout-maintaining (TM), or non-trout waters (NT). 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*). Each of these classifications may also be subject to different water quality standards.

All streams in Deptford Township are non-trout waters. The Big Timber Creek is a freshwater stream; it is, in fact, the southernmost tributary of the Delaware River on the New Jersey side to be entirely freshwater. Mantua Creek and Woodbury Creek contain both freshwater and saline estuarine portions, although they are likely to be entirely freshwater in Deptford Township. Other unnamed tributaries are classified by the river into which they flow.

Table 10: Water Quality Classifications of Streams

Stream	Classification
Mantua Creek	FW2-NT/SE2
Big Timber Creek	FW2-NT
Woodbury Creek	FW2-NT/SE2

Source: NJDEP, Surface Water Quality Standards, N.J.A.C. 7:9b

According to NJDEP rules, FW2-NT waters must provide for (1) the maintenance, migration, and propagation of the natural and established biota; (2) primary and secondary contact recreation (i.e., swimming and fishing/boating); (3) industrial and agricultural water supply; (4) public potable water supply after conventional filtration and disinfection; and (5) any other reasonable uses.

Photo: Michael Hogan

The Big Timber Creek near Old Pine Farm

The determination of whether or not water quality is sufficient to meet a waterbody's designated use(s) is based on whether the waterbody is within established limits for certain

surface water quality parameters. Some examples of surface water quality parameters include fecal coliform, dissolved oxygen, pH, phosphorous, and toxic substances. NJDEP also evaluates water quality by examining the health of aquatic 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 waterbodies that are not attaining water-quality standards. States must also prioritize the impaired waterbodies on the 303(d) List for Total Maximum Daily Load (TMDL) analyses and identify those high-priority waterbodies for which they anticipate establishing TMDLs in the next two years. See the section on **Total Maximum Daily Loads** on page 59.

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 Deptford Township support trout or shellfish, those designated uses are not applicable. Also, Deptford Township waters are not currently assessed for primary contact recreation. As shown in the table below, all nine subwatersheds that are partially within Deptford Township are impaired (on Sublist 5 or Sublist 4A) for at least one designated use. For aquatic life (general), the most telling parameter of water quality, eight subwatersheds are impaired and one has insufficient data. See **Map 12: Water Quality (2008)**.

Table 11: New Jersey Integrated Water Quality Monitoring and Assessment Report, 2008

Assessment Unit ID	Assessment Unit Name	Aquatic Life (General)	Recreation	Drinking Water Supply	Agri. Water Supply	Indus. Water Supply	Fish Consumption
02040202130060	Mantua Creek (below Edwards Run)	3	3	3	3	3	5
02040202130040	Mantua Ck (Edwards Run to Blackwood-Barnsboro Road)	5	5	2	2	2	5
02040202130020	Mantua Creek (Blackwood-Barnsboro Road to Route 47)	4A	3	3	3	3	3
02040202120110	Woodbury Ck (below Route 45) / Lower Delaware River Valley to Big Timber Creek	5	3	2	2	2	5
02040202120100	Woodbury Creek (above Rt 45)	5	3	2	2	2	5
02040202120080	Big Timber Creek (below North Branch / South Branch confluence)	5	3	3	3	3	5
02040202120050	Big Timber Creek South Branch (below Bull Run)	5	3	2	2	2	5
02040202120040	Big Timber Creek South Branch (including Bull Run to Lakeland Rd.)	4A	4A	5	2	2	5
02040202120060	Almonesson Creek	5	3	2	3	3	5

Source: NJDEP, 2008

Key to Integrated Report Sublists

Sublist	Placement Conditions
Sublist 1	The designated use is assessed and attained AND all other designated uses in the assessment unit area assessed and attained. (Fish consumption use is not factored into this determination based on EPA guidance.)
Sublist 2	The designated use is assessed and attained BUT one or more designated uses in the assessment unit are not attained and/or there is insufficient data to make a determination.
Sublist 3	Insufficient data is available to determine if the designated use is attained.
Sublist 4	The designated use is not attained or is threatened; however, development of a TMDL is not required for one of the following reasons: 4A: A TMDL has been completed for the pollutant causing non-attainment; 4B: Other enforceable pollution control requirements are reasonably expected to result in the conformance with the applicable water quality standard(s) in the near future and the designated use will be attained through these means; or 4C; Non-attainment is caused by something other than a pollutant.
Sublist 5	The designated use is not attained or is threatened by a pollutant or pollutants and a TMDL is required.

As shown in **Table 11** above, an assessment unit may be listed on one or more sublists depending on the results of the assessment (i.e., on Sublist 2 for drinking water, Sublist 3 for aquatic life, etc.). Only if all uses for an individual HUC 14 are assessed and attained can the assessment unit be placed on Sublist 1. In order to determine whether or not an assessment unit supports a designated use, NJDEP identified a suite of parameters that serve as the minimum data set associated with each designated use.

If one or more designated uses are assessed as “non-attainment” (Sublist 5), the pollutant(s) causing the non-attainment status is identified on the “303(d) List of Impaired Waters with Priority Ranking.” When the pollutant causing non-attainment is not known, the pollutant is listed as “pollutant unknown” or “toxic unknown.” The ranking (low, medium, high) refers to the priority given a specific assessment unit when determining the schedule for a TMDL. The priority ranking is determined by the NJDEP and takes into account the severity of the pollution and the uses of the waters as well as any additional relevant factors. **Table 12: New Jersey’s 303(d) List of Impaired Waters** lists the non-attaining assessment units and their pollutants in Deptford Township.

In 2008, all but one of Deptford’s subwatersheds were identified on the 303(d) list—the only exception being Mantua Creek (Blackwood-Barnsboro Rd to Route 47), for which a TMDL for Aquatic Life (General) was completed; there was insufficient data in all other categories for this watershed. Among the subwatersheds listed in the 303(d) list, the most common pollutant was PCBs, which were present in seven subwatersheds. Other common pollutants in Deptford waters include mercury, which affects six of Deptford’s subwatersheds, pH, which affects three watersheds, and phosphorous, which was found in two subwatersheds.

PCBs were used as coolants and lubricants in electrical equipment from the 1940s until 1977, when their manufacture was stopped due to evidence of their harmful effect on the environment. PCBs do not break down quickly in the environment and accumulate in

water, soil, air, and animal life. Exposure to PCBs can cause skin conditions and impair the liver and immune system in humans.

Trace amounts of mercury are found in the human body, although consuming it in large doses can be toxic. The consumption of mercury can affect the immune system, alter genetic and enzyme systems, and damage the nervous system. Mercury bioaccumulates, meaning it accumulates in the body and is not easily broken down. Atmospheric deposition is the main source of mercury in the environment.

Photo: Michael Hogan

Mantua Creek

The pH, or acidity, of waters is very important as it affects most chemical and biological reactions. Acidity is determined by a number of complex interactions and is affected by an area's geology. Water quality impairment due to pH may be caused by acid rain from atmospheric pollutants. With increased acidity, water is more able to carry and dissolve substances.

Phosphorus exists naturally at low levels within the environment, although excess phosphorus can lead to harmful algae blooms, which can produce "dead zones" where no aquatic life can survive. Typical causes of phosphorus pollution include overfertilization of lawns and agricultural areas; runoff from impervious surfaces such as 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.

Arsenic is a toxic metalloid formerly used as a component in pesticides and for treating wood. In addition to industrial pollution, waterbodies can accumulate arsenic from natural sources, as some rocks have naturally high levels of the element. Ingesting or breathing arsenic can cause irritation of the lungs and "corns" or "warts" in the skin. High levels of arsenic exposure are fatal. Arsenic accumulates in the tissues of fish and shellfish, although mostly as a component of the less toxic organic compound arsenobetaine. Arsenic contamination primarily affects a waterbody's attainment level for use as drinking water. See section on **Historic Pesticides** in the Environmental Issues chapter for additional information on arsenic in Deptford Township.

Chlordane is a man-made chemical that was used as a pesticide from 1948 to 1988, when it was banned due to concern over its damage to the environment and human health. Like many other pollutants, chlordane bioaccumulates. In humans, exposure to chlordane can affect the nervous system, digestive system, and liver. Small amounts can cause pain, sickness, and vision problems; large amounts can cause convulsions and death.

DDD and DDE are metabolite equivalents of DDT, the pesticide used extensively in the 1940s and 1950s. DDT was effective in nearly eliminating typhus during World War II and has successfully combated malaria in many parts of the world, although it has been shown to have harmful effects on plant and animal life. Exposure to DDT impairs the nervous and immune systems in animals and is highly toxic, particularly for fish. It also causes eggshell thinning in birds, the primary reason why bald eagles became endangered in the United States.

Fecal coliform are bacteria present in the digestive systems of humans and animals and are an indicator of the presence of fecal material. Domestic sewage overflow, agricultural runoff, or other nonpoint sources of human and animal waste (including those from pets and waterfowl) can cause fecal coliform contamination in waterbodies. Potential health risks for individuals exposed to fecal coliform include ear infections, dysentery, typhoid fever, viral and bacterial gastroenteritis, and hepatitis A.

In addition to the pollutants described above, six Deptford subwatersheds had dioxin delisted from the 2008 303(d) list. In all of these cases, the assessment unit was incorrectly included on a previous 303(d) list, and there is insufficient information to determine whether the waters in question are in compliance. The subwatersheds for which dioxin was removed as a listed pollutant are Mantua Creek (Below Edwards Run); Mantua Ck (Edwards Run to Blackwood-Barnsboro Road); Woodbury Ck (below Route 45)/Lower Delaware River Valley to Big Timber Creek; Big Timber Creek (below NB/SB confluence); Big Timber Creek South Branch (below Bull Run); and Almonesson Creek.

Table 12: New Jersey's 303(d) List of Impaired Waters

Assessment Unit ID	Assessment Unity Name	Parameters	Ranking
02040202130060	Mantua Creek (below Edwards Run)	PCBs	Medium
02040202130040	Mantua Creek (Edwards Run to Blackwood-Barnsboro Road)	Fecal Coliform/E. Coli	Medium
		Mercury	Medium
		PCBs	Medium
		pH	Medium
		Phosphorous	Medium
02040202120110	Woodbury Ck (below Route 45) / Lower Delaware River Valley to Big Timber Creek	PCBs	Medium
		pH	Medium
02040202120100	Woodbury Creek (above Rt 45)	Chlordane	Medium
		DDD	Medium
		DDE	Medium
		DDT	Medium
		Mercury	Medium
		PCBs	Low
		pH	Medium

Assessment Unit ID	Assessment Unity Name	Parameters	Ranking
02040202120080	Big Timber Creek (below North Branch / South Branch confluence)	Cause Unknown	Low
		Mercury	Medium
		PCBs	Medium
02040202120050	Big Timber Creek South Branch (below Bull Run)	Mercury	Medium
		PCBs	Medium
		Phosphorous	Medium
02040202120040	Big Timber Creek South Branch (including Bull Run to Lakeland Rd.)	Arsenic	Medium
		Mercury	Medium
02040202120060	Almonesson Creek	Cause Unknown	Low
		Mercury	Medium
		PCBs	Medium

Source: NJDEP, 2008

Total Maximum Daily Loads

For each impaired waterway (waters on Sublist 5), the state is required by the US EPA to establish a Total Maximum Daily Load (TMDL). A TMDL quantifies the amount of a pollutant a waterbody can assimilate (its loading capacity) without violating water quality standards. A TMDL's purpose is to initiate a management approach or restoration plan based on identifying the sources of a pollutant and determining the percent reductions of the pollutant that must be achieved by each source. These sources can be point sources, such as sewage treatment plants, or non-point sources, such as runoff from various types of residential, commercial, or agricultural lands. A TMDL goes through four stages; it is "proposed" in a report by NJDEP, "established" when NJDEP finalizes their report, "approved" by EPA Region 2, and "adopted" when NJDEP adopts it as an amendment to a water quality management plan.

A TMDL determines the percentage of reduction needed in order for a stream segment to meet the water quality standard. Nonpoint and stormwater point sources are the largest contributors as runoff from various land uses transport fecal coliform from sources such as geese, farms, and domestic pets during rain events into waterbodies. Nonpoint sources also include inputs from "illicit" sources such as failing sewage conveyance systems, sanitary sewer overflows, and failing or inappropriately located septic systems.

Although Deptford Township contains portions of eight subwatersheds with impaired water quality, none of these were ranked as having a high priority for remediation, and so are not listed on the TMDL schedule.

Water Quality Monitoring Networks

Photo: Michael Hogan

Woodbury Creek

New Jersey's Integrated Report is based on the water quality assessments of a number of different monitoring networks. The Ambient Surface Water Quality Monitoring Network (ASWMN) 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. These stations monitor stream flow as well as temperature, dissolved oxygen (DO), pH, carbon dioxide, nitrogen, ammonia, phosphorus, arsenic, and many other parameters.

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 that provide long-term biological data. The program routinely samples and evaluates benthic macroinvertebrate populations 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 are seven AMNET monitoring sites and two ASMN stations in and around Deptford Township, listed below in **Table 13**. Beyond the information included in the Integrated Report, additional water quality data gathered from these monitoring stations is available through the USGS and the NJDEP. The stations are shown on **Map 12: Water Quality (2008)**.

Table 13: Stream Monitoring Network Stations

Station Name	Municipality	AMNET Station	ASMN Station
Woodbury Creek at Rt. 45	Woodbury City	AN0667	
Mantua Creek at Mantua Ave.	Wenonah Boro	AN0672	
Chestnut Branch at Mantua Blvd	Mantua Twp	AN0671	
Almonesson Creek at Clements Bridge Rd	Deptford Twp	AN0665	
Big Timber Creek S. Branch at Almonesson Road	Deptford Twp	AN0659	
Big Timber Creek at Clements Bridge Road	Runnemede Boro	AN0664	
Pines Run at L. Landing Rd	Gloucester Twp	AN0660	
S. Branch Big Timber Creek at Blackwood	Gloucester Twp		1467330
Woodbury Creek At Rt. 45 at Woodbury	Woodbury City		1474730

Source: NJDEP, USGS 2006

Fish Consumption Advisories

Photo: Michael Hogan

Sunfish

Certain fish may contain toxic chemicals, such as PCBs, dioxins, or mercury, which accumulate in water and aquatic life. Chemical contaminants, such as dioxin and PCBs, are classified by the U.S. Environmental Protection Agency 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, NJDEP has been catching fish at numerous sampling stations throughout the state and testing for contaminant levels and adopting advisories to guide residents on safe consumption practices.

The consumption advisories for fish caught in general freshwater in the state are listed in the table below. Within Deptford Township, there are additional fish consumption advisories for four species of fish in Big Timber Creek, which supersede the general advisories.

Table 14: Fish Consumption Advisories

Species	General Population	High-Risk Individuals
	Eat No More Than:	Eat No More Than:
General 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
Big Timber Creek (Gloucester County)		
Channel Catfish	No restrictions	One meal per week
Largemouth Bass		
White Catfish		
Brown Bullhead	No restrictions	

Source: NJDEP, 2009

Other Monitoring

Knowing the actual condition of streams and stream banks, and planning for their improvement, requires more frequent surveying and monitoring that the state can provide. NJDEP primarily monitors main channels in non-tidal areas, and only does biological assessments through AMNET on a five-year cycle. A community may benefit from additional stream surveys and regular monitoring by local organizations. Volunteers with the Mantua Creek Watershed Association have conducted stream monitoring in this watershed, although this organization is no longer active. The South Jersey Land and Water Trust is a nonprofit organization that works to protect land and water resources, and their work includes conducting stream assessments throughout South Jersey.

Potential Causes of Water Quality Impairments

Point Sources

Point sources of discharge, 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 waterbodies. 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 the authority of the NJPDES rules (see **Nonpoint Sources)**.

NJDEP, through the Division of Water Quality and the Bureau of Point Source Permitting, administers the NJPDES program (*N.J.A.C. 7:14A*). Under NJPDES, any facility discharging domestic or industrial wastewater directly into surface water or groundwater (usually through a septic system) must apply for and obtain a permit for discharging. Rather than creating individually tailored permits for every facility, the Division of Water Quality uses scientific standards to create and issue general permits for different categories of dischargers. NJDEP enforces the terms of NJPDES permits by visiting discharging facilities and requiring facilities to periodically conduct water quality, biological and toxicological analyses, and thermal impact and cooling water assessments.

As of December 2009, twelve NJPDES permits for point source discharge were issued to individual facilities in Deptford. These are shown in **Table 15: NJPDES Permits for Point Source Discharges** and on **Map 13: Point Sources (2009)**.

The twelve regulated point sources of water pollution include industrial sites, metal processing, landfills, a petroleum facility, and one concentrated animal feeding operation (CAFO). For more information on the environmental impacts of CAFOs and hog farming in Deptford, see **Other Environmental Issues: Concentrated Agricultural Feeding Operations**.

Although the NJPDES program has made much progress in regulating point source discharges, a great number of minor discharges have been allowed by NJDEP without regard to their cumulative impact on surface water quality. Environmental commissioners and town clerks receive notice from 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 NJDEP, the applicant, and the town.

Table 15: NJPDES Permits for Point Source Discharges

NJPDES Permit Number	PI Number	Facility Name	Facility Address	Effective Start Date	Expiration Date	Discharge Category Code	Discharge Category Description
NJG0141003	155851	Advanced Auto Salvage Inc.	2207 County House Rd	2/1/2005	1/31/2010	SM	Scrap Metal Processing/Auto Recycling (GP)
NJG0162051	279467	Five County Carting Inc.	1251 Hurffville Rd	6/1/2007	5/31/2012	5G2	Basic Industrial Stormwater GP - NJ0088315 (5G2)
NJG0115827	48278	Kinsleys Landfill	Rt 41	6/1/2007	5/31/2012	5G2	Basic Industrial Stormwater GP - NJ0088315 (5G2)
NJG0117048	48375	Lapollos Auto Parts & Glass	1500 Old Broadway	2/1/2005	1/31/2010	SM	Scrap Metal Processing/Auto Recycling (GP)
NJG0103578	47501	Lehigh Gas Corp	Rt 47 South Delsea Dr & Cooper Rd	4/1/2009	12/31/2013	B4B	General Permit GW Petro Prod Cleanup
NJG0116025	48296	Mac Landfill	Clements Bridge Rd	6/1/2007	5/31/2012	5G2	Basic Industrial Stormwater GP - NJ0088315 (5G2)
NJG0164330	286734	New Sharon Iron Works	1742 Delsea Dr	6/1/2007	5/31/2012	5G2	Basic Industrial Stormwater GP - NJ0088315 (5G2)
NJG0109444	47784	R Shisler Farms	697 Fox Run Rd	6/1/2008	5/31/2013	R8	Concentrated Animal Feeding Operation (CAFO) GP
NJG0146536	215926	Superior Industrial Valve Repair Inc.	5 International Ave	6/1/2007	5/31/2012	5G2	Basic Industrial Stormwater GP - NJ0088315 (5G2)
NJG0146994	217226	US Postal Service	1265 Hurffville Rd	6/1/2007	5/31/2012	5G2	Basic Industrial Stormwater GP - NJ0088315 (5G2)

NJPDES Permit Number	PI Number	Facility Name	Facility Address	Effective Start Date	Expiration Date	Discharge Category Code	Discharge Category Description
NJG0166910	295474	Wade Salvage	1663 Hurffville Rd	10/1/2006	1/31/2010	SM	Scrap Metal Processing/Auto Recycling (GP)
NJ0157261	241425	Waste Management of NJ Inc.	1710 Hurffville Rd	4/1/2006	3/31/2011	RF	Stormwater

Source: NJDEP, 2009

Nonpoint Sources

Nonpoint sources of discharge, or stormwater runoff, have the largest effect on the water quality and channel health of streams in Deptford. According to US EPA, about half the pollution in New Jersey's surface water comes from nonpoint sources. Development dramatically increases nonpoint source pollution by increasing the volume of water and the level of pollutants in the runoff. Increased runoff causes erosion and sediment buildup 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. Most nonpoint source pollution in Deptford Township derives from stormwater runoff from impervious surfaces such as streets and highways, parking lots, driveways, and buildings. The waterways in Deptford are affected by stormwater runoff from within the township and from upstream municipalities.

Photo: Michael Hogan

Monongahela Branch

Since the adoption of the federal Clean Water Act and the implementation of NJPDES permits 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. NJDEP's new Stormwater Management Rules focus on reducing and controlling nonpoint sources of water pollution.

The Municipal Stormwater Regulation Program was developed in response to the U.S. Environmental Protection Agency's (USEPA) Phase II rules published in December 1999. The Department issued final stormwater rules on February 2, 2004 and established four

NJPDES general permits: the Tier A Municipal Stormwater General Permit (Tier A Permit for large municipalities); the Tier B Municipal Stormwater General Permit (Tier B Permit for rural municipalities); the Public Complex Stormwater General Permit (Public Complex Permit); and the Highway Agency Stormwater General Permit (Highway Permit). Deptford Township is a Tier A municipality. Public complexes include certain large public colleges, prisons, hospital complexes, and military bases. There is one public complex in Deptford Township, the Gloucester County College. Highway agencies include county, state, interstate, or federal government agencies that operate highways and other thoroughfares. There are no NJDPES permits for highway agencies in Deptford Township. The two NJPDES permits for nonpoint source pollution are listed in the table below.

Table 16: NJPDE Permits for Nonpoint Source Pollution

NJPDES Permit Number	PI Number	Facility Name	Facility Address	Effective Start Date	Expiration Date	Discharge Category Code	Discharge Category Description
NJG0152153	189965	Deptford Twp	1011 Cooper	3/1/2009	2/28/2014	R9	Tier A Municipal Stormwater General Permit
NJG0154326	223832	Gloucester County College	1400 Tanyard Rd	3/1/2009	2/28/2014	R11	Public Complex Stormwater General Permit

Source: NJDEP, 2009

The NJPDES Phase II program lays out guidance and requirements for management of and education about stormwater at the local level. It applies to all towns in New Jersey, all county road departments, and all public institutional facilities on large sites (e.g., hospitals and colleges). Beginning in 2004, municipalities were required to obtain a New Jersey Pollution Discharge Elimination System (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).

Photo: DVRPC

Almonesson Creek Park

Under the 2004 NJPDES permit, a town must meet certain specific requirements in planning, ordinance adoption, education, management of township facilities, and investigation of parts of the stormwater system. These requirements are listed in **Figure 5**. Fulfillment of these Statewide Basic Requirements was scheduled to occur over the course of five years. All of the requirements are intended to reduce the water pollution from stormwater runoff. As of June 2009, NJDEP is in the process of developing a rule proposal package for readopting the Stormwater Management Rules, with certain minor amendments.

Figure 5: Stormwater Requirements for Municipalities

Stormwater Management Statewide Basic Requirements – Tier A Municipalities

1. Control post-construction stormwater management in new development and redevelopment through:
    - Adoption of a stormwater management plan in accordance with N.J.A.C. 7:8.
    - Adoption and implementation of a stormwater control ordinance in accordance with N.J.A.C. 7:8. This ordinance requires retention on site of 100% of preconstruction recharge, and use of low-impact design in stormwater facilities, among other features.
    - Ensuring compliance with Residential Site Improvement Standards for stormwater management. The RSIS has been revised to incorporate the low-impact design and other requirements of the stormwater control ordinance.
    - Ensuring long-term operation and maintenance of Best Management Practices on municipal property.
    - Requiring that new storm drain inlets meet new design standards.
2. Conduct local public education:
    - Distribute educational information (about stormwater requirements, nonpoint source pollution, and stewardship) annually to residents and businesses and conduct a yearly "event" (such as a booth with these messages at a community day).
    - Have all municipal storm drain inlets labeled with some type of "don't dump" message.
    - Distribute information annually regarding fertilizer/pesticide application, storage, disposal, and landscaping alternatives and regarding proper identification, handling, and disposal of wastes including pet waste and litter
    - Adopt specific ordinances to control waste disposal and other nonpoint sources.
3. Control improper disposal of waste through improved yard waste collection and through adoption of ordinances (pet waste, litter, improper dumping, and wildlife feeding).
4. Control solids and floatables through increased street sweeping, retrofitting storm drain inlets during road repairs, and instituting programs for stormwater facility management, for roadside erosion control, and for outfall pipe scouring/erosion.
5. Improve maintenance yard operations, specifically for de-icing material storage, fueling operations, vehicle maintenance, and housekeeping operations.
6. Increase employee training about all of the above.

Source: NJDEP, 2004

Deptford Township adopted a Watershed Based Municipal Stormwater Management Plan in 2006. This document was prepared by Churchill Consulting Engineers, Melvin Kernan, and Adams, Rehmann, & Heggan. This plan includes build-out and pollutant projections for each of Deptford's three watersheds and calls for the Township to amend its land use

ordinances to conform to New Jersey's Stormwater Design and Performance Standards, which encourage Low Impact Developments (LIDs). For developments that cannot conform to LID standards, this plan allows for the adoption of site-specific mitigation plans.

Deptford Township also has a Stormwater Management Ordinance that encourages the use of nonstructural best management practices (BMPs) to the maximum extent practicable. Such BMPs include low-impact, or environmentally sensitive, design, as well as source controls to prevent potential pollutants onsite from coming in contact with stormwater. Where structural BMPs are to be used, the ordinance encourages the use of multiple smaller structures distributed across the site instead of relying on one major stormwater management structure.

Impervious Coverage

The volume of stormwater runoff that is carried to a stream also impacts 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. These factors are directly related to the proportion of a subwatershed covered in impervious surfaces. When impervious cover reaches 25 percent to 30 percent within a subwatershed, streams can become severely degraded. See **Map 14: Impervious Surfaces (2002)**.

Due to the widespread development within Deptford, impervious cover is a major issue within the township. This is especially true in the Deptford Mall area, where impervious coverage is nearly 100 percent in some areas. All of Deptford's subwatersheds exceed the 10 percent threshold for impairment, and the northern two-thirds of the township (comprising most of the Woodbury and Big Timber watersheds) exceed 20 percent cover. The least developed watershed, draining into Mantua Creek, reaches 15 percent cover, while the most developed, along the northern reaches of the Big Timber Creek, exceeds 25 percent cover. See **Table 17: Acreage of Impervious Surface in Subwatersheds**. Note that the percentage of impervious surface by subwatershed applies to the entire subwatershed, not just the area within Deptford.

Table 17: Acreage of Impervious Surface in Subwatersheds

HUC 14	Subwatershed Name	Total Acres	Acres of Impervious Surfaces	Percent Impervious Surface
02040202130060	Mantua Creek (below Edwards Run)	3,939.33	693.01	17.59%
02040202130040	Mantua Creek (Edwards Run to Blackwood-Barnsboro Road)	7,614.88	1,183.45	15.54%
02040202130020	Mantua Creek (Blackwood-Barnsboro Road to Route 47)	5,147.52	947.23	18.40%
02040202120110	Woodbury Ck (below Route 45) / Lower Delaware River Valley to Big Timber Creek	7,029.14	1,548.13	22.02%
02040202120100	Woodbury Creek (above Rt 45)	3,108.48	721.02	23.20%
02040202120080	Big Timber Creek (below North Branch / South Branch confluence)	5,396.91	1,393.62	25.82%
02040202120050	Big Timber Creek South Branch (below Bull Run)	3,135.40	721.01	23.00%
02040202120040	Big Timber Creek South Branch (including Bull Run to Lakeland Rd.)	4,129.88	803.94	19.47%
02040202120060	Almonesson Creek	2,431.52	555.99	22.87%

Source: NJDEP, 2002

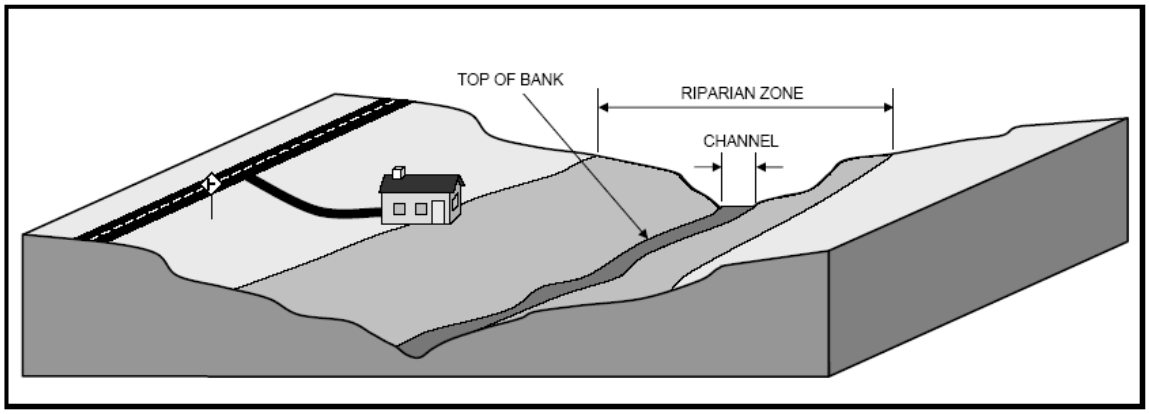
Stream Buffers

The stream buffer, or riparian zone, 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. The riparian zone is comprised of the channel and land within 50, 150, or 300 feet of the channel. Stream buffers are quite effective at filtering substances washing off the land. 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. A depiction of the riparian zone is shown in **Figure 6**.

The importance of a healthy, intact buffer zone has been well documented scientifically over the past 20 years, especially for headwater streams. There is less agreement and much continuing research on the appropriate minimum width of a buffer. In addition to restrictions of development in the floodplain (discussed in the **Floodplains** section), New Jersey state law requires a 25-foot buffer around most streams, although municipalities can establish wider buffers. In 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.

Most of the streams in Deptford Township are bordered by vegetated riparian buffers, although some are very narrow. Streams lacking vegetated buffers include a small tributary in the northwest portion of the township, portions of the Mantua Creek on Deptford's southern border, and the Almonesson Lake. The New Jersey Audubon Society has identified some riparian areas in Deptford Township as Important Birding Areas, shown in **Map 20: Conservation Areas (2007)**, and discussed in the **Animal Communities** section of the **Biological Resources** chapter. Protecting these riparian areas from development and enhancing or maintaining healthy vegetation in the stream corridor can help improve water quality, reduce flooding, and encourage biodiversity. Environmental commissions can encourage the preservation of existing vegetation and replanting of native vegetation along bare stream banks. Use of native vegetation in landscaping minimizes the need for pesticide and fertilizer use, and requires less frequent watering and mowing.

Figure 6: Parts of a Riparian Zone



Source: NJDEP

A stream corridor ordinance, which Deptford Township currently does not have, would help protect the entire stream ecosystem. NJDEP and ANJEC have model stream corridor ordinances that can provide guidance to interested municipalities. The ordinance should require developers to grant conservation easements on stream buffer areas as part of any site plan and subdivision approval. Regular easement inspections should also be established and enforced. Riparian buffer areas may also be acquired by municipalities as part of a recreational park, open space, or greenway plan.

Groundwater

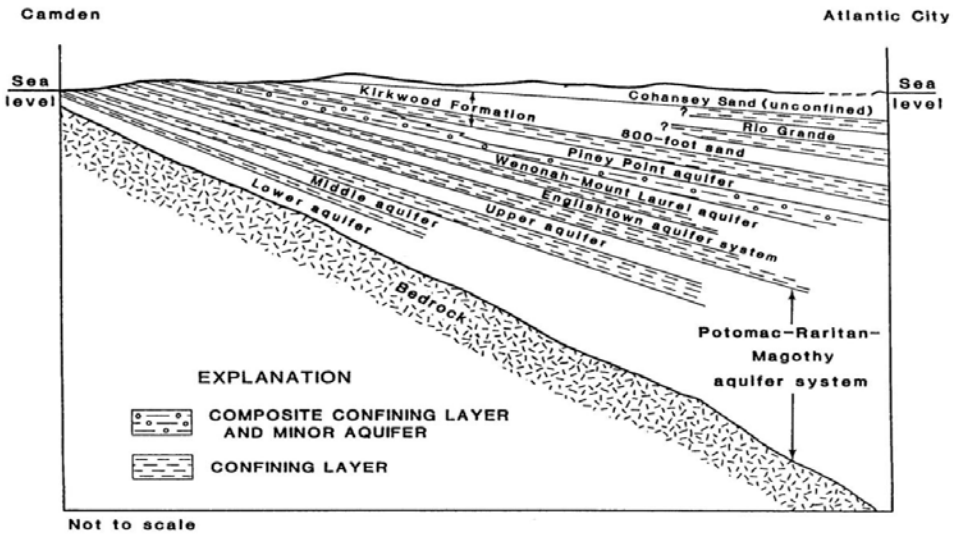
The geology of the New Jersey Coastal Plain can be visualized as a tilted layer cake, with its "layers," or strata, formed of gravels, sands, silts, and clays. The saturated gravel and sand layers, with their large pore spaces, are the aquifers from which water is drawn. The silt and clay layers, which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

A cross-section across southern New Jersey from west to east would show that the aquifers are not horizontal, but tilted toward the southeast, getting deeper as they cross

the state toward the Atlantic Ocean. This cross-section is depicted in **Figure 7**. Because of this tilting, each aquifer emerges on the land surface in a sequential manner. The deepest strata emerge on the surface near the Delaware River. Where each individual layer emerges is called its "outcrop" area. The Potomac–Raritan–Magothy (PRM) formation, the deepest and most abundant aquifer, is a major water source for Inner Coastal Plain communities.

Other smaller aquifers on top of the PRM are the Englishtown, the Wenonah-Mount Laurel, and the Kirkwood-Cohansey. The Kirkwood-Cohansey is a formation composed of two thick layers, the Kirkwood (lower) and the Cohansey (upper) that overlie the older formations. It begins east of the Inner/Outer Coastal Plain divide. Deptford lies mostly within the Inner Coastal Plain, but a small portion of the township is in the Outer Coastal Plain. See **Map 15: Geologic Outcrops**.

Figure 7: Aquifers of Southern New Jersey along a Line from Camden to Atlantic City



Source: USGS

Aquifers and Confining Units

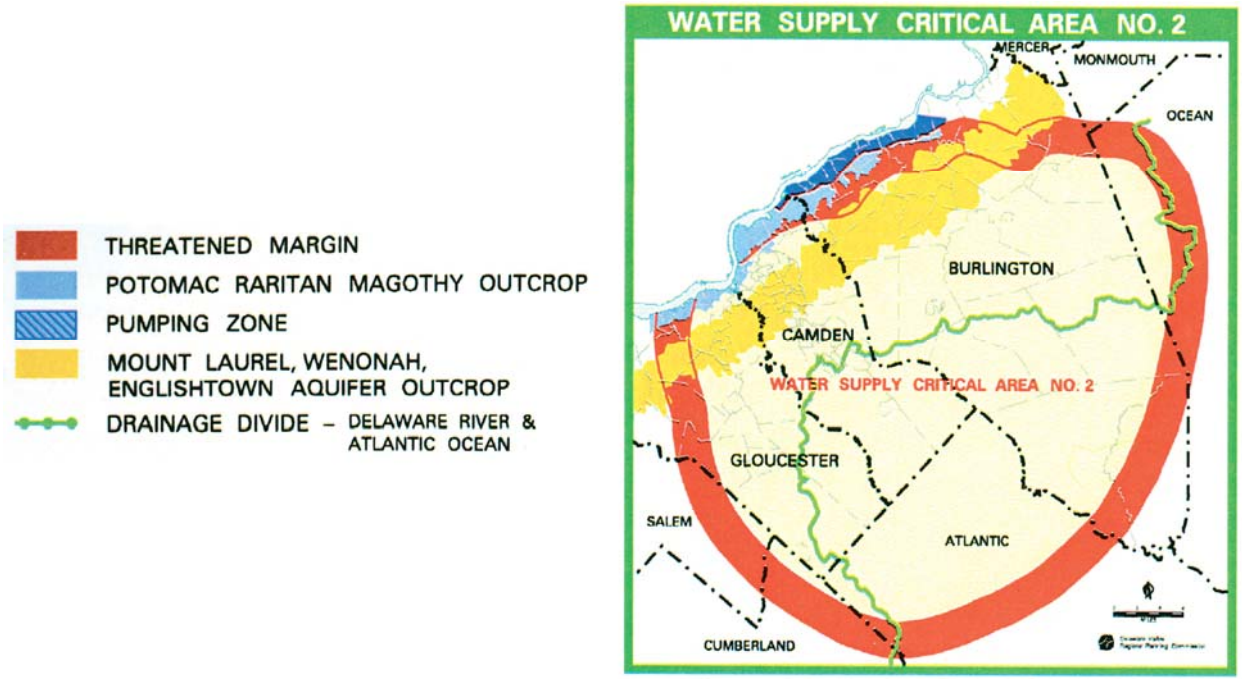
Within Deptford Township, the Englishtown, Mt. Laurel-Wenonah, and Kirkwood-Cohansey aquifers all outcrop, meaning they are exposed at the land surface. In between these aquifers are several outcropping confining units, including the Merchantville-Woodbury, Marshalltown-Wenonah, and the composite Hornerstown-Navesink confining units. Underlying all of these aquifers and confining units is the important Potomac-Raritan-Magothy aquifer system, although that layer outcrops to the north and west of Deptford. However, many deep wells within Deptford draw from the PRM aquifer system.

Potomac-Raritan-Magothy Aquifer System (PRM)

The Potomac-Raritan-Magothy (PRM) is a principal geological formation underlying Deptford Township and the primary source of drinking water for Deptford's public wells. 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 (60 to 150 million years ago).

In the Delaware Valley, three aquifers have been distinguished within the PRM system, designated as lower, middle, and upper, divided by two confining units or layers between the three water-bearing strata. The aquifers themselves are largely made up of sands and gravels, locally interbedded with silt and clay. The lower aquifer sits on the bedrock surface. Confining beds between the aquifers are composed primarily of very fine-grained silt and clay sediments that are less permeable and thus reduce the movement of water between the aquifers. They also help to slow the entry of any contaminants on the surface down into the groundwater.

Figure 8: Water Critical Supply Area No. 2



Source: DVRPC

The PRM is the primary source of drinking water to New Jersey residents from Burlington to Salem counties, as well as to communities in Delaware. Because of such high usage, PRM aquifer water levels have declined. This became so serious that the New Jersey Department of Environmental Protection established Water Supply Critical Area #2 in

1986, shown in **Figure 8**. All water supply companies and authorities within Critical Area #2 were given annual limits on water withdrawals in the PRM. Usage from the PRM was cut back by over 20 percent and no increases in pumping were allowed. Piping of treated Delaware River water filled the gap in much of the region. All of Deptford Township is within the boundary of the Critical Area.

There is increased concern that additional pumping from the aquifer in the borderline areas will necessitate the expansion of the Critical Area boundaries. Thus, water supply companies in Gloucester and Salem counties have and will continue to have difficulty getting approvals from the New Jersey Department of Environmental Protection for any additional water allocations from the PRM.

In Gloucester and Salem counties, use of the lower PRM aquifer for drinking water is limited due to high chloride concentrations (salt water intrusion). This is thought to be very ancient seawater within the lower aquifer, resulting from movement from the southeastern side, which is in contact with ocean water. Whatever the cause, most of the lower aquifer is not usable for drinking supply. There are also problems with salinity levels in the upper and middle PRM aquifers, especially for wells closest to the Delaware River where pumpage has increased the amount of slightly saline water from the river to be drawn into the aquifers. All of Deptford's public water wells draw from the upper and middle layers of the PRM aquifer system.

The PRM does not outcrop in Deptford Township; rather it outcrops under and immediately beside the Delaware River in New Jersey and Pennsylvania. River water actually enters and recharges the upper and middle PRM aquifers. Because an outcrop is the area where the aquifer emerges on the land surface, preventing contamination of the land in outcrop areas is extremely important in order to maintain a safe drinking water supply.

Merchantville-Woodbury Confining Unit

Overlying the upper aquifer of the PRM system, the Merchantville-Woodbury confining bed is the oldest confining unit in the New Jersey Coastal Plain. It is composed of two subunits, both dating from the Late Cretaceous. The younger Woodbury Clay is a thick, massive layer of clayey silt, which overlies the Merchantville Formation, a bed of glauconite. The Merchantville-Woodbury unit is a large, effective confining unit that can reach a thickness of over 450 feet; it is approximately 100 feet in thickness as it outcrops in Deptford along the border with Woodbury and Westville.

Englishtown Aquifer System

The Englishtown Formation, of the Late Cretaceous age (65 to 100 million years ago), outcrops in the Inner Coastal Plain in an irregular band that extends from Raritan Bay to the Delaware River, adjacent to Salem County. Above the Merchantville-Woodbury confining unit, it outcrops in the northern portion of Deptford. Where the Englishtown Formation is exposed, the primary components are fine-to-medium-grained sands. While the Englishtown Formation is a significant water source in Monmouth and Ocean counties,

it is commonly less than 40 feet thick in parts of Burlington, Camden, Gloucester, and Salem counties. It is not a major source of water in Gloucester County due to its small size and greater proportion of fine-grained sediments, resulting in lower yields. More productive aquifers lie above and below it.

Marshalltown-Wenonah Confining Unit

The Marshalltown and Wenonah formations comprise a leaky confining unit separating the Englishtown aquifer and the Mt. Laurel-Wenonah aquifer. The Marshalltown portion is a 10- to 20-foot thick layer of glauconitic silt and sand, while the Wenonah formation is quartz sand which is fine-grained near the Marshalltown formation and gradually becomes coarser-grained in its upper part. As the grain size of the Wenonah unit increases, the formation begins to hold more water, and the upper part of the Wenonah formation becomes part of the Mt. Laurel-Wenonah aquifer. This unit outcrops as a thin band across the north-central portion of Deptford.

Wenonah-Mount Laurel Aquifer

The Wenonah-Mount Laurel aquifer is composed of the Wenonah Formation and the Mount Laurel Sand, both of the Early Cretaceous age (130 to 150 million years ago). It is thickest in Burlington, Camden, Gloucester, and Salem counties, reaching 100 to 120 feet. The Wenonah-Mount Laurel aquifer is affected by withdrawals from the Englishtown aquifer, which lies below it. As a result of Englishtown withdrawals, more Wenonah-Mount Laurel water leaks through the confining layer to the Englishtown aquifer. Reductions in the Potomac-Raritan-Magothy Aquifer System also negatively affect water levels in the Wenonah-Mount Laurel aquifer. The Mount Laurel Sand is the dominant formation within this aquifer, and all the wells that make use of this aquifer are situated on or near the outcrop area for the Mount Laurel Sand. This aquifer outcrops in a wide band across a large portion of Deptford.

Composite Confining Unit

A composite confining unit overlies the Wenonah-Mount Laurel aquifer, outcropping in the southern portion of Deptford Township. The Navesink Formation, Red Bank Sand, Tinton Sand, Hornerstown Sand, the Vincentown Formation, the Manasquan Formation, Shark River Marl, the Piney Point Formation, and the basal clay of the Kirkwood Formation form this unit. These geologic formations, ranging in age from late Cretaceous to early Tertiary (Miocene), are dominated by silty and clayey glauconitic quartz sands. While some formations within this unit can function as local aquifers (Red Bank Sand, Vincentown, and Piney Point formations), in Deptford this unit functions solely as a confining bed, consisting of the Navesink Formation and Hornerstown Sand.

Kirkwood-Cohansey Aquifer System

The Kirkwood-Cohansey aquifer system is one of the largest sources of groundwater in New Jersey. The Kirkwood Formation, along coastal areas, appears as thick clay beds, with interbedded zones of sand and gravel. The Cohansey Sand, also of Miocene age, is coarser-grained than the underlying Kirkwood Formation. It contains minor amounts of pebbly sand and interbedded clay. Some local clay beds within the Cohansey Sand are relatively thick. The surficial nature of the Kirkwood-Cohansey makes it vulnerable to contamination from various land uses. Industrial chemicals, fuel spill runoff, agricultural chemicals used for crop production and residential landscaping, pesticides, and products of septic tank effluent have all been found in water from the aquifer. The Kirkwood-Cohansey is not a major source of water for Deptford, outcropping only in the extreme southeastern edge of the township. However, this aquifer feeds many of Deptford's streams within the Mantua and Big Timber Creek watersheds.

Groundwater Recharge

Recharge of groundwater is an important issue in southern New Jersey because of the dependence on aquifers for drinking water supply and agricultural use. The amount of rainwater that actually enters an aquifer and reaches the saturated zone to become groundwater is a function of many factors, including the nature and structure of the aquifer itself, climatic conditions, the nature of the soil, and the vegetation of an area.

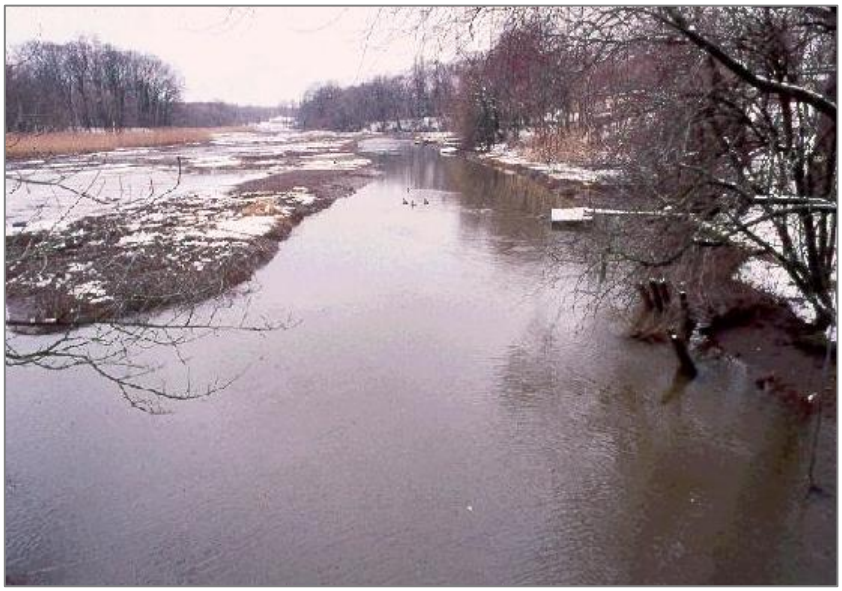


Photo: Michael Hogan

Ladd's Branch

The New Jersey Geological Survey (NJGS) has developed a methodology for evaluating land areas for their ability to transmit water to the subsurface, using precipitation records, soil surveys, and land use/land cover data. NJDEP has used this methodology to map the groundwater recharge potential of land areas throughout the state. Recharge is equivalent to the amount of precipitation per year that *could* reach the water table in an area with a particular combination of soils and land use. It is expressed as inches per year.

It should be noted that the NJGS methodology is limited. The NJGS has stated that this method only evaluates *groundwater recharge potential,* not aquifer recharge, and should be considered accordingly. Groundwater recharge potential is not the same as aquifer recharge, which the NJGS has defined as the recharge rate for those geological formations that yield economically significant quantities of water to wells.

In Deptford Township, about two-thirds of the land (64.7 percent) experience moderate recharge, at a rate of 8 to 11 inches per year. Lands with the highest potential recharge rates (between 11 and 14 inches per year) are scattered throughout the township in undeveloped upland areas, especially those underlain by permeable alluvial sediments such as those found in the Freehold soil series. Over twenty percent of Deptford, however, has no groundwater recharge. These areas are largely located in wetlands areas: Wetlands have a low recharge rate because they are a land area where the groundwater meets the land surface and therefore are already saturated. In addition, urban areas such as the Deptford Mall vicinity experience very low recharge due to impervious surface cover, as do Deptford's three closed landfill sites. Further development in Deptford would likely decrease the rate of possible groundwater recharge, especially in the township's remaining high recharge areas. See **Map 16: Groundwater Recharge (1997)**.

In general, on high recharge lands, large amounts of paving and high impervious cover will have the most detrimental impact, although they are also usually the places that are most suitable for building because they are on well-drained soils. Conversely, these are also regions where the dilution of substances from septic systems, such as nitrates, may require a larger land area because the soils are usually more "porous." For example, minimum average lot sizes of two to four acres are often needed for proper nitrate dilution from septic systems in areas having ten or more inches per year of groundwater recharge.

While the surest way to protect groundwater recharge is to leave land undeveloped, there are ways in which urbanized areas can preserve ground and stormwater standards. Best Management Practices (BMPs), such as tree trenches, bioswales, rain gardens, rain barrels, and porous pavement can be used with great success to capture, treat, and infiltrate precipitation in developed areas from all but the most significant storm events. Also referred to as green infrastructure, these techniques are utilized in more developed communities to manage stormwater and protect drinking water supplies.

Over the last few decades, in spite of increased development, groundwater levels in the majority of observation wells within Deptford Township have actually increased. The level of groundwater is measured by its depth below the surface, so a higher depth indicates a lower level of groundwater. As the water level reading increases, the groundwater level decreases, meaning the depth at which one would find water is increasing below the land surface. With increased water level depth, wells must be drilled deeper to reach sizable and usable quantities of water. As seen in **Table 18: USGS Groundwater Observation Wells**, the water level has risen in eight out of nine wells, indicated by a decreased depth below the surface. These eight wells tap the PRM, which has had pumping restrictions since 1986, as previously discussed in **Potomac-Raritan Magothy Aquifer System (PRM)**. The one observation well where the groundwater level has decreased (indicated by an increased depth below the surface) taps the shallow Mt. Laurel–Wenonah aquifer system, which outcrops across a wide swath in the center of Deptford Township, including the Deptford Mall area.

Table 18: USGS Groundwater Observation Wells

USGS Observation Site	Site Name	Depth of well	Depth of hole	Date of First Observation	Water Level	Date of Last Observation	Water Level	Primary Aquifer
395007075061301	Booster Sta 8	261	310	1/14/1992	101	11/21/2008	84.39	PRM
394957075053001	Deptford Deep Obs	670		6/4/1986	107.42	11/16/2009	78.17	PRM
395115075070601	Deptford PW 4	345		5/1/1971	80	11/21/2008	67	PRM
394843075072801	Deptford PW 6	489	489	8/2/1979	118	11/21/2008	93	PRM
394733075081201	Deptford PW 7	324.42	400	7/29/1985	122.5	11/21/2008	108.13	PRM
394653075063101	Dom 1	359	359	8/30/1984	148	11/20/2008	132	PRM
394718075060401	Dom 2	100	102	9/29/1972	22.5	11/20/2008	28.8	Mt Laurel - Wenonah
395036075084201	Redbank 8	309	315	5/13/1997	63.7	11/19/2008	57.84	PRM
394628075081303	Sewell 2A	307		3/28/1973	63	11/19/2008	62.2	PRM

Source: USGS, 2009

Water Supply Wells

Wells that provide drinking water are categorized as being either private or public water supply wells. Private water supply wells are those that serve fewer than 25 people and are not regulated by the EPA or DEP. On the other hand, public water supply wells, which may be publically or privately owned, are defined as those that serve at least 25 people or 15 service connections for at least 60 days per year. According to the EPA, public water supply wells serve 90 percent of people in the United States with drinking water. 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. Examples of public community wells include municipalities, subdivisions, and nursing homes. Nearly all Deptford residents receive their water from public community wells. The Deptford Municipal Utilities Authority operates seven wells within the township that draw from the upper and middle Potomac-Raritan-Magothy aquifers and serve all areas of the township. The neighboring City of Woodbury operates two wells for their municipal water needs within Deptford's boundaries. These wells both tap the upper PRM aquifer. In addition, water supplied by New Jersey American Water Company is transmitted from the Delran treatment plant to Deptford.

Private Drinking Wells
Private wells, supplying potable water, are not routinely monitored like public community water systems (public water) and public non-community wells. Beginning in 2002, the State of New Jersey, under the Private Well Testing Act, required that well water be tested for contaminants when properties are sold or leased. Prior to 2002, each county health department mandated what parameters were to be tested for real estate transactions.

See **Appendix A: Private Well Testing Act** for more information about private wells and drinking water in Gloucester County.

There are two types of public non-community water systems, transient and non-transient, referring to their frequency of use. A transient non-community water system serves at

least 25 people each day, but the population changes each day. These systems are at places such as rest stops, gas stations, and restaurants. A non-transient water system serves at least 25 of the same people daily at a minimum of six months per year, at places such as schools, factories, and office parks. See **Table 19: Public Community Water Supply Wells** and **Table 20: Public Non-Community Water Supply Wells** below. All public wells in the area are shown on **Map 17: Public Water Supply Wells (2004)**.

Table 19: Public Community Water Supply Wells

Well ID	Well Permit Number	Original Owner	Well Name	Aquifer	Depth to Top of Well Screen (feet)	Depth to Bottom of Well Screen (feet)	Pump Rate
0067271	3102416	Deptford Twp MUA	Well 1	upper PRM aquifer	252	273	1000
0191561	3103462	Deptford Twp MUA	Well 2	upper PRM aquifer	25	281	850
0067422	3105174	Woodbury City Water Dept.	Well 1A	upper PRM aquifer	263	308	1000
0067459	3105513	Deptford Twp MUA	Well 4	middle PRM aquifer	282	361	700
0067562	3113385	Deptford Twp MUA	Well 6	middle PRM aquifer	430	486	1000
0067681	3122504	Deptford Twp MUA	Well 7	upper PRM aquifer	260	320	1000
0067821	3137705	Deptford Twp MUA	Well 8	upper PRM aquifer	198	258	1000
0191577	3150939	Deptford Twp MUA	Well 5	upper PRM aquifer	0	0	0
0068076	3161731	Deptford Twp MUA	Well 5R	middle PRM aquifer	0	0	700
0070506	5100101	Woodbury City Water Dept.	Well 2A	upper PRM aquifer	244	307	1000

Source: NJDEP, 2004

Table 20: Public Non-Community Water Supply Wells

Public Water Supply ID	System Name	Municipality	Well Depth (feet)	Well Type
0802301	Freeway Diner	Deptford	110	Transient
0802303	Little Frankie's Bar and Grill	Deptford	110	Transient
0802304	International Roll Form	Deptford	100	Non-transient
0802305	Ray Angelini, Inc.	Deptford	359	Non-transient

Source: NJDEP, 2004

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 Deptford Township are shown in **Appendix B: 2009 Monitoring Schedule of Public Water Supply Wells**.

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).

Wellhead Protection Areas

Preventing contamination in areas where aquifers intersect the land surface is extremely important in order to maintain a safe drinking water supply. As part of its 1991 Well Head Protection Program Plan, the New Jersey Department of Environmental Protection 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 wellhead 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 Wellhead Protection Area (WHPA)

A WHPA consists of three tiers, each based on 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 to undertake specific remedies, and the likelihood of natural dilution over distance. The tiers are shown as rings around a well, with the groundwater direction of travel factored in to create plume-like shapes.

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 wellhead 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.

All four public non-community wells within Deptford have wellhead protection areas. Two of these wells draw from the Mt. Laurel-Wenonah aquifer, and the other two draw from the Kirkwood-Cohansey aquifer system. See **Map 17: Public Water Supply Wells (2004)**. 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 is, and the slower the pumping rate of the well, the smaller the radius is of the WHPA.

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 particular 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 the chances of survival for individual species, as well as the biological communities they are a part of, as the environment changes. A diversity of plant and animal species is also necessary to maintain healthy human environments, agricultural productivity, and ecosystem health. Lower organisms, many of which are not well known, contribute to nutrient cycling, decomposition of organic matter, soil rehabilitation, pest and disease regulation, pollination, or water filtering. Once biodiversity declines, it is extremely hard for an ecosystem to recover or replace species.

Photo: Michael Hogan

Mountain Laurel

Scientists have discovered and named between 1.5 and 1.8 million plant and animal species in the world. Far more species, possibly ten to twenty times the number of known species, are unknown to science. Alarmingly, this great diversity of species is now diminishing at an unprecedented rate. Researchers generally agree that the extinction rate is now catastrophically high; somewhere between one thousand and ten thousand times the rate before human beings began to exert significant pressure on the environment. Given these trends, and barring significant increases in conservation efforts, approximately one-half of the world's species will be gone by the end of this century.

Despite being over 50 percent developed, Deptford still contains numerous types of natural habitats, all of which are important for maintaining biodiversity. Upland forests, the most abundant type of natural vegetation in Deptford, are found throughout the township and are concentrated in the less-developed south-central area. Wetlands, which support plants that require constantly saturated soils, are also well represented in Deptford. Particularly abundant among these areas are forest wetlands and freshwater tidal marshes, which are mainly found along the Big Timber Creek as it nears the Delaware River. The following sections will identify and describe in more detail the plant and animal communities that inhabit these ecosystems within Deptford.

Natural Vegetation

A region's vegetation is dependent on many factors, the most important of which are climate and soils. The region has a cool, temperate climate with rainfall averaging 46 inches per year (see the **Climate** section for a detailed description of Deptford's variable climate). Most of Deptford's soils are generally well-drained soils, supporting a diversity of trees and some crops. Deptford also has a substantial amount of poorly drained soils that exhibit ponding and hydric characteristics, and which sustain wetland plants. See the **Soils** section for a detailed description of Deptford's soils.

Deptford's natural vegetation types, along with human-influenced types of land cover, 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 **Table 21: Natural Vegetation** and **Map 18: Natural Vegetation (2007)**. For a more complete list of plant species found in Deptford, see **Appendix E: Plants Found at Old Pine Farm** and **Appendix G: Wildflowers (and selected other plants) found in Deptford Township**.

Table 21: Natural Vegetation

Type of Vegetation	Acres	Percentage of Total Land
Brush/Shrubland	505.39	4.50%
Brush/Shrubland - Old field	205.85	1.83%
Tidal Marshes - Freshwater	157.08	1.40%
Upland Forest - Coniferous	132.41	1.18%
Upland Forest - Deciduous	1,711.11	15.24%
Upland Forest - Mixed (Deciduous Dominated)	248.05	2.21%
Wetlands - Coastal (Phragmites Dominated)	11.13	0.10%
Wetlands - Herbaceous	10.36	0.09%
Wetlands - Modified	85.24	0.76%
Wetlands - Phragmites Dominated	26.31	0.23%
Wetlands - Scrub/Shrub	137.13	1.22%
Wetlands - Wooded - Deciduous	778.18	6.93%
Water	179.76	1.60%
Non-natural vegetation (urban, agriculture, barren land, etc.)	7,040.46	62.70%
TOTAL	11,228.47	100%

Source: NJDEP, 2007

Upland Forests

Upland areas are those locations without water at or near the soil surface; nearly two-thirds of Deptford is composed of upland areas, nearly all of which were covered with deciduous forest before human settlement. Nearly all old-growth forests, because of their natural fertility, were cleared for lumber and farmland during colonial times. Most upland areas in Deptford have since been converted to development, and current upland forests are mostly second- or third-growth woodlands. Approximately 18 percent (2,091 acres) of Deptford is composed of upland forests, comprising over half of all natural vegetation. Upland forest is found throughout the township, though it is more common in the south-central areas of the township, which is relatively undeveloped and well drained. Upland forests are the second most abundant land cover type in Deptford after developed land and are the most abundant natural vegetation.

Photo: Michael Hogan

Flowering Dogwood

The vast majority of upland forest in Deptford (1,711 acres) is composed of deciduous forest. The composition of Deptford's upland deciduous forests is largely one of mixed oaks—black, red, and white oaks—joined by other hardwoods such as birch, sycamore, beech, hickory, and locust trees. The understory is dominated by flowering dogwood, black cherry, and sassafras. Vines, such as wild grapes, Virginia creeper, Japanese honeysuckle, and poison ivy, are common. Spicebush, arrowwood, and black haw are common shrubs in moister locations. Some of the most recognizable trees in Deptford's deciduous forests are the black oak, white oak mockernut hickory, sweetgum, American beech, and flowering dogwood.

Coniferous forests occur on 132 acres, or 1.2 percent of Deptford. These forests are mostly made up of successional, or pioneer, plants, such as red cedar, Virginia pine, and pitch pine, which will eventually be overgrown by dominant deciduous trees, such as ash, birch, oak, and hickory. An additional 248 acres of forest consists of mixed hardwoods and conifers and represent an intermediate stage in the natural forest succession.

Wetlands

Wetlands are defined as areas that are inundated or saturated by surface or ground waters at a frequency to support vegetation suited for life in saturated soils (i.e., wetlands vegetation). New Jersey's wetlands are located around numerous interior stream systems, and along coastal rivers and bays. NJDEP, which employs USGS guidelines, classifies wetlands with naturally occurring vegetation into two major categories: (1) *tidal wetlands*,

which are wetlands associated with tidal portions of the Delaware River system and waterways draining into the Atlantic Ocean; and (2) *interior wetlands*, which are wetlands found in non-tidal lowlands associated with waterways, and isolated wetlands surrounded by uplands. While most of Deptford's wetlands are interior, the township also contains tidal wetlands along the banks of Big Timber and Almonesson Creek up to the head of tide. Deptford does not contain any saline marshes, as all of its tidal lands are freshwater. NJDEP also identifies *modified wetlands*, which are former wetland areas that have been altered by human activities such as agriculture or development and no longer support typical natural wetlands vegetation, but which do show signs of soil saturation on aerial infrared surveys.

Wetlands are a critical ecological resource, supporting both terrestrial and aquatic animals and boasting biological productivities far greater than those found on dry land. Wetlands play a vital role in maintaining water quality by cleaning surface and ground waters. The ecological importance of wetlands, however, has not always been appreciated. For over three centuries, people have 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.

Wetlands are the third most common land use classification in Deptford Township, covering 10.7 percent of the township's total land, or 1,205 acres. Nearly all wetlands in Deptford are found in association with the township's waterways, especially the Big Timber, Almonesson, and Woodbury Creeks; these wetlands occur either on stream banks or in larger patches around stream headwaters. Wetlands provide high-quality animal and plant habitat, purify surface and groundwater, and create picturesque landscapes that add immeasurably to the quality of life for area residents.

Photo: Michael Hogan

Wetlands with wild rice in bloom

Most of these wetlands are interior wetlands, comprising 940 acres, or 8.4 percent of the land cover (this number does not include modified wetlands). The remainder consists of tidal wetland areas, which are subdivided into freshwater tidal marshes and *Phragmites*-dominated coastal wetlands, and modified wetlands. Freshwater tidal marshes occupy 157 acres of Deptford (1.4 percent). Wild rice (*Zizania aquatica*) is perhaps the most distinctive of the plants that grow in freshwater tidal marshes. This annual grass can grow to be nine feet tall and is an important food source for migratory waterfowl. It is often found in association with broad-leaved cattail. Other typical plants found in freshwater tidal marshes in New Jersey are pickerelweed, arrow arum, nodding beggar ticks, and spatterdock. Other plants found in freshwater tidal marshes are the pond lily, Japanese knotweed (an invasive plant), and Joaquin sunflower.

Photo: Michael Hogan

The invasive species *Phragmites*

Another plant often found in tidal marshes is the invasive common reed, or *Phragmites*. It pushes into wetland areas from adjoining dryer land, growing through underground shoots that make it difficult to eradicate. As it spreads, it tends to trap silt and gradually to raise the land level, converting the habitat to one that is dryer.

Freshwater, deciduous wooded wetlands are the dominant category of interior wetlands in the township. These wetlands are "palustrine" wetlands (stream-associated, versus "lacustrine" or lake-associated) and are usually covered with deciduous trees or shrubs, although some evergreen trees or shrubs may be present. Shrubs are also the dominant plants where wetlands are recovering from past impacts. See **Map 10: Surface Water, Wetlands, and Vernal Ponds.**

Deptford's deciduous wooded wetlands, which occupy 778 acres (over seven percent of the township), support mixed hardwoods that flourish in lowlands and frequently saturated soils. Typical species found in deciduous wooded wetlands in New Jersey include sweetgum, box elder, pin oak, and swamp white oak. These wetlands are found along many stream banks but are most prevalent along the headwaters of Woodbury Creek and an unnamed tributary of Big Timber Creek in the north of the township. In addition, some wooded wetlands in the Old Pine Farm area (along the South Branch of Big Timber Creek) are dominated by red and Norway maples.

Closely associated with deciduous wooded wetlands are scrub/shrub wetlands, occupying about 137 acres (1.2 percent) of Deptford. Scrub/shrub wetlands often make up transitional areas between deciduous wetland and other land cover types. Typical native species in scrub/shrub wetlands in New Jersey include sweet pepperbush, buttonbush, swamp rose, elderberry, arrowwood viburnum, winterberry, and silky dogwood, with swamp azalea making rare appearances. Multiflora rose is the most common invasive exotic shrub in scrub/shrub wetlands.

Freshwater herbaceous wetlands cover only ten acres, or 0.09 percent of total land. In New Jersey, non-*Phragmites* herbaceous wetlands feature vegetation such as Jack-in-the-pulpit, jewelweed, ferns, rice cutgrass, reed canary grass, pond lily, tearthumb, cordgrass, and cattail. Other common herbaceous wetland plants found in Deptford include the common blue violet, dodder, skunk cabbage, marsh marigold, and turk's cap lily.

Grasslands and Agricultural Lands

Grasslands are considered to be one of the most endangered ecosystems globally. They are threatened by human development, new agricultural technology, grazing, desertification, soil erosion, and invasive species. Grasslands are important because they

provide habitat for specialized species such as grassland birds and shade-intolerant herbaceous plants. Many species of increasingly rare grassland birds require large contiguous patches of grassland for successful breeding and roosting.

Photo: Michael Hogan

Old Pine Farm

NJDEP defines grassland habitat as brushland, shrubland, or old fields that were cleared or disturbed at one time and then abandoned. Following abandonment, old fields are overgrown by perennial herbs and grasses. These pioneer plants remain the dominant species for 3 to 20 years time. Later, woody plants take over. This habitat is visible especially along wood edges, roadsides, and in landscapes where mowing is infrequent and where woody plants are not yet the dominant vegetation. To be sustained, grasslands must be mowed every one or two years. Grasslands are also highly susceptible to invasive species.

According to 2007 NJDEP land cover data, 711 acres, or 6.3 percent of Deptford's land cover, consists of brushland, shrubland, or old fields. Old fields are sections of Deptford's farmland that have become idle and have transitioned to land suitable for grassland and brushland species habitat. Brushland and shrubland are scattered throughout the township. Most brush and scrubland is scattered in small patches, but large patches can be found in Allen Park, the former Mac Landfill site along Big Timber Creek, and in an area adjacent to the township soccer fields off of Cattell Road.

In addition to brushland and old fields, active agricultural cropland and pastureland is considered suitable "grassland" habitat for wildlife. Agricultural cropland and pastureland covered 403 acres, or 3.6 percent of the township's total land area, in 2007.

Rare Plant Species

According to the Natural Heritage Database, a list of documented sightings of threatened and endangered species, there are six rare plant species that have been observed in Deptford Township. However, as seen below in **Table 22**, many of these plant species do not have recorded observations from recent years.

Table 22: Rare Plant Species

Common Name	Scientific Name	Federal Status	State Status	State Rank	Last Observed
Puttyroot	*Aplectrum heymale*	--	Endangered	S1	5/8/1923
Swamp-pink	*Helonias bullata*	Threatened	Endangered	S3	4/12/1925
Lance-leaf Loosestrife	*Lysimachia lanceolata*	--	--	S1	6/26/1920
Wild Kidney Bean	*Phaseolus polystachios var. polystachios*	--	--	S2	7/31/1917
Cranefly Orchid	*Tipularia discolor*	--	--	S3	1/26/2008
Broad-leaf Ironweed	*Vernonia glauca*	--	Endangered	S1	7/21/1999

Source: NJDEP, 2009

State Rank	
S1	Critically Imperiled in New Jersey (>5 occurrences)
S2	Imperiled in New Jersey (6–20 occurrences)
S3	Rare in state (21–100 occurrences)
S4	Apparently secure in state
B	Refers to in-state breeding population
N	Refers to non-breeding population

Landscape Project Priority Habitats

The Landscape Project, developed by the Endangered and Nongame Species Program of the NJDEP Division of Fish and 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 in New Jersey, or are deemed suitable for species on the state or federal threatened and endangered species lists, but for which there are no documented occurrences or sightings. These habitats are labeled “suitable habitats.”

The Landscape Project identifies both critical and suitable habitat in Deptford Township. It is important to preserve both suitable and critical habitats in order to maintain the diversity of species that still exist in the township and to improve the likelihood of survival for endangered and threatened species. See **Map 19: Landscape Project Priority Habitats (2007)** and **Table 23: Landscape Project Priority Habitats.** Landscape Project areas in Deptford Township provide habitat for three rare species—the great blue heron, Cooper's hawk, and milk snake.

Table 23: Landscape Project Priority Habitats

Category	Rank	Area (Acres)	% of Total Habitat	% of All Land
Emergent Wetlands	Suitable Habitat (2)	322.49	7.20%	2.87%
Total Emergent Wetlands		***322.49***	***7.20%***	***2.87%***
Forested Wetlands	Critical Habitat (4)	24.37	0.54%	0.22%
	Critical Habitat (3)	284.02	6.34%	2.53%
	Suitable Habitat (2)	625.92	13.97%	5.57%
Total Forested Wetlands		***934.30***	***20.86%***	***8.32%***
Upland Forest	Critical Habitat (4)	240.44	5.37%	2.14%
	Critical Habitat (3)	237.98	5.31%	2.12%
	Suitable Habitat (2)	2,346.23	52.38%	20.90%
Total Upland Forest		***2,824.66***	***63.06%***	***25.16%***
Grassland	Suitable Habitat (1)	398.10	8.89%	3.55%
Total Grassland		***398.10***	***8.89%***	***3.55%***
Total Habitat		**4,479.55**	**100.00%**	**39.89%**
Total Deptford Land		**11,228.47**		**100.00%**

Source: NJDEP, 2008

Rank	Description
5	Area contains one or more occurrences of at least one wildlife species listed as endangered or threatened on the Federal list of endangered and threatened species.
4	Area contains one or more occurrences of at least one State endangered species.
3	Area contains one or more occurrences of at least one State threatened species.
2	Area contains one or more occurrences of species considered to be species of special concern.
1	Area meets habitat-specific suitability requirements such as minimum size criteria for endangered, threatened or priority wildlife species, but does not intersect with any confirmed occurrences of such species.

Landscape Project Data on Wetland Habitat

The Landscape Project divides wetland habitats into two types—emergent and forested wetlands. Emergent wetlands are marshy areas (both tidal and interior) characterized by low-growing shrubs and herbaceous (nonwoody) plants in standing water. In addition, most modified wetlands, especially agricultural wetlands, are a habitat for similar species and are therefore classified as emergent wetlands. About 2.9 percent (322 acres) of all land in Deptford is identified as emergent wetlands habitat, all of which is ranked as "suitable." Animal species that can be found in emergent wetland habitats include endangered turtles, rare fish, mollusks, crustaceans, and insects. Emergent wetlands are also important habitats for migratory and resident waterfowl as well as passerines, or smaller perching birds.

The Landscape Project designates Deptford's forested wetlands as occupying 8.3 percent (934 acres) of total land in the township, of which 308 acres are ranked as critical. Forested wetland critical habitat is located primarily in the north of the township, along a small, unnamed tributary of the Big Timber Creek; a few isolated patches of critical habitat are also found near the Oak Valley neighborhood. Forested wetlands support many migratory and resident species as well as provide hunting grounds for various owls, hawks, and eagles. Cooper's hawk, a threatened species in New Jersey, may be found in forested wetlands areas in Deptford Township. These areas are also frequently home to various rare amphibians.

Landscape Project Data on Upland Forest Habitat

The Landscape Project ranks 2.2 percent (2,825 acres) of Deptford's total land cover as upland forest habitat, by far the most common habitat type in Deptford. Of this, 478 acres are ranked as "critical" upland forest habitat; this critical habitat is found near the critical forested wetland habitat, as a large patch in the north of the township, and in scattered areas near Oak Valley and Mantua Creek. Suitable upland forest habitat is found across

the township. Upland forest in Deptford is home to the great blue heron, the milk snake (both of which are Species of Special Concern), and the threatened Cooper's hawk.

Landscape Project Data on Grassland-Dependent Species Habitat

Another 398 acres (3.6 percent) of Deptford is classified as "suitable" grassland-species habitat; there are no areas of critical grassland habitat in Deptford. Grassland-dependent species (mostly birds) are the most threatened group of species in New Jersey, primarily because the most common form of habitat used by these species—agricultural fields—is the most threatened habitat in the state due to development pressure, rising land values, and changing agricultural practices. Grassland habitat is found exclusively in the southern portion of the township, which is home to Deptford's few remaining farms.

Photo: Michael Hogan

Butterfly on a Daisy Fleabane

Nearly all of Deptford's agricultural land is designated as suitable grassland-species habitat, whether under cultivation or not, for some of the following reasons: (1) migrating birds cannot visually distinguish cropland from grassland; (2) cropland turns into grassland when it is fallow for one year or more; (3) some crops, such as alfalfa and soybeans, provide suitable nesting habitat for some birds, especially for sparrows; and (4) all or most of the birds on the endangered and threatened lists are area-sensitive, requiring large ranges that include agricultural lands. The Landscape Project includes this land in its assessment because agricultural lands provide important disturbance buffers for rare wildlife species, protecting them from both human activity and predation by domestic animals.

Examples of rare grassland-dependent species that use grassland habitat for nesting or feeding include the vesper sparrow and some species of butterflies and moths. Deptford's designated grasslands may provide habitat for these species and others, such as the grasshopper sparrow and savannah sparrow, that rely on agricultural lands, as well as for reptiles and amphibians that breed in wet areas found in agricultural fields.

Animal Communities

Although no comprehensive inventory of the different animal species within Deptford Township exists, there are records of sightings, biological studies of range, environmental impact assessments, and evaluations of endangered and threatened status. Using federal, state, scientific, and nonprofit sources, it is possible to identify and describe known and possible animals of Deptford. A compilation of animals that may be found in Deptford Township is included in **Appendix F: Vertebrate Animals Observed or**

Probable in Deptford Township. Additionally, an inventory of animals observed at the historic Old Pine Farm is included in **Appendix D: Vertebrate Fauna Found at Old Pine Farm**.

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, 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 freshwater 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 long period of time. The NJDEP Ambient Biomonitoring Network (AMNET) surveys streams for macroinvertebrate communities, which indicate certain levels of water quality, as was discussed in the **Surface Water Quality** section of this document.

There are nine invertebrate species listed as endangered (two beetle species, four butterfly species, and three mussel species) and eight invertebrate species listed as threatened (three butterfly species and five mussel species) in the State of New Jersey. At one time, freshwater mussels were abundant in the streams of Deptford, as well as in the rest of New Jersey, and a major food source for native peoples. Unfortunately, due to destruction of suitable aquatic habitats by dams and pollution, the native mussel population has sharply declined. According to the Natural Heritage Database, no threatened or endangered mussel species still exist in Deptford's waters.

Photo: Michael Hogan

The Muskrat lives in dome-shaped huts in tidal areas

There is no survey data on invertebrates or any threatened or endangered invertebrate species for Deptford Township. However, the wetland areas in the north of the township, as well as the tidal wetlands and riparian areas around Deptford's streams, are likely to have diverse invertebrate communities.

Vertebrates

Vertebrates are less numerous than invertebrates, but their larger size makes them much more visible, and thus better studied and recorded. Mammals and reptiles are fairly well documented, and birds that nest in the

township or use its woods and marshes as stopover points during migration are also known.

Mammals

Mammals are more easily documented than other species because they tend to be larger and live in habitats also ideal for human development. There are over 500 mammal species in New Jersey, nine of which are listed by the state as endangered and none of which are listed as threatened. Six of these listed species are whales, and of the three land-based species, none are known to exist within the borders of Deptford. Some common mammals found in Deptford include muskrats, cottontail rabbits, skunks, field mice, chipmunks, raccoons, gray squirrels, red fox, and white-tailed deer.

Birds

There are between 350 and 500 species of birds in New Jersey, 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 the New Jersey Atlantic Coast and the Delaware Bay are major parts of the Eastern Flyway (established migratory air route) in North America.

Photo: Michael Hogan

Red-tailed Hawk

Common birds found in Deptford include ducks, herons, egrets, swallows, jays, robins, wrens, sparrows, and some hawks. Three species of conservation concern are known to exist in Deptford: the state-endangered red-shouldered hawk, the Cooper's hawk (whose breeding population is threatened), and the great blue heron, whose breeding population is of Special Concern.

Important Bird and Birding Area

The Important Bird Area (IBA) is a global effort by the Audubon Society to identify and conserve areas that are vital to birds and other species. The New Jersey Audubon Society has an expanded initiative called the Important Bird and Birding Area (IBBA) Program that identifies areas that provide essential habitat for sustaining bird populations (Bird Areas) as well as areas that provide exceptional opportunities for bird watching (Birding Areas). The New Jersey IBBA program has identified 122 sites within the state. Three of these are within Gloucester County and one, the **Mantua, Woodbury, and Big Timber Creeks Important Birding Area**, is a 7,340-acre IBA located partially in Deptford Township. See **Map 20: Conservation Areas (2007)** for a depiction of this area.

The Mantua, Woodbury, and Big Timber Creek IBA includes the main channels of each waterway from the Delaware River inland and contains diverse habitats, including tidal wetlands, interior wetlands, and upland forest. It is one of New Jersey's most urbanized IBAs, surrounded on all sides by suburban development; however, portions of this IBA

within Deptford and adjacent municipalities have been preserved as natural habitat. In Deptford, this IBA includes the state-owned Andaloro Wildlife Management Area on Deptford's northern border, the preserved Old Pine Farm Natural Lands Trust, and municipal lands such as Big Timber Creek Park. This area provides breeding and wintering habitat for the state-endangered red-shouldered hawk and is home to an exceptional single-species concentration of the migratory waterfowl northern pintail. Additionally, it is a major wintering site for waterfowl such as mallards and American black ducks. A breeding pair of state-endangered bald eagles is known to live within this IBA as well; however, the bald eagle's nest and foraging area is located exclusively outside Deptford's borders, concentrating on the confluence between Mantua Creek and the Delaware River.

Resident Canada Goose Populations

The State of New Jersey now has a "resident" Canada goose population of approximately 100,000 birds that no longer migrate to more southern locales, and may double in size in the next five to ten 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, polluting surface waters and 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 potentially injure humans.

However, removing geese or preventing them from residing in park areas is a difficult task. Because geese move freely, the most effective management solutions are best conducted at the community level. Like all waterfowl, Canada geese are protected by the Migratory Bird Treaty Act. Therefore, a management program may require the U.S. Department of Agriculture's approval. Management techniques include: planting shrubby vegetation around streams, lakes, and ponds to block waterfowl access, discouraging humans from feeding geese, and using fertility reduction techniques such as egg addling or removal.

Reptiles and Amphibians

Reptiles can be quite elusive when surveys attempt to find and record them. Amphibians of some types, such as bullfrogs, are abundant. Other species are rare because they depend on vernal ponds, as was discussed in the **Vernal Pools** section of this document. Two species of special concern, the eastern box turtle and coastal plain milk snake, are known to reside in Deptford. While no attempted surveys of amphibian species within Deptford are known, another species of special concern, the Fowler's toad, is likely to exist within Deptford as well.

Fish

When European settlers arrived in present-day Gloucester County, they encountered American Indians who regularly fished along the inland streams and gathered shellfish in the Delaware River. Due to the unintended consequences of urban development,

industrial advancement, and mechanized agriculture, the amount and diversity of aquatic life has decreased dramatically throughout most of New Jersey.

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 waterbodies, and conducts research and management surveys. Deptford's freshwater streams contain blue gill, common carp, largemouth bass, striped bass, perch, catfish, pickerel, roach, tiger musky, and the American eel, among other fish species. See **Appendix D: Vertebrate Fauna Found at Old Pine Farm** and **Appendix F: Vertebrate Animals Observed or Probable in Deptford Township**.

Endangered Vertebrates

According to the Natural Heritage Database, a list of documented sightings of threatened and endangered species, a number of rare wildlife species have been sighted in Deptford. Two reptile and three bird species are included on the Natural Heritage Database for Deptford Township, and are listed in **Table 24** below. Brief descriptions of several of these species and their preferred habitat, provided by the New Jersey Division of Fish and Wildlife, follow.

Table 24: Rare Animal Species

Common Name	Scientific Name	State Status	State Rank
Coastal Plain Milk Snake Intergrade	*Lampropeltis triangulum triangulum x Lampropeltis triangulum elapsoides*	Special Concern	S3
Cooper's Hawk	*Accipeter cooperii*	Threatened (breeding) / Stable (non-breeding)	S2B, S4N
Eastern Box Turtle	*Terrapene carolina carolina*	Special Concern	S3
Great Blue Heron	*Ardea Herodias*	Special Concern (breeding) / stable (non-breeding)	S3B, S4N
Red-shouldered Hawk	*Buteo lineatus*	Endangered (breeding) / Threatened (non-breeding)	S1B, S2N

Source: NJDEP Natural Heritage Database, 2009

State Rank	
S1	Critically Imperiled in New Jersey (>5 occurrences)
S2	Imperiled in New Jersey (6–20 occurrences)
S3	Rare in state (21–100 occurrences)
S4	Apparently secure in state
B	Refers to in-state breeding population
N	Refers to non-breeding population

The **Red-shouldered Hawk** (*Buteo lineatus*) is the only endangered animal species in New Jersey that has been observed in Deptford. Its typical habitat is mature wet woods such as hardwood swamps and riparian forests. The red-shouldered hawk typically nests in deciduous trees and, to a lesser extent, coniferous trees in remote and extensive old-growth forests containing standing water. Since red-shouldered hawks require large continuous tracts of old-growth forests and their nests are located far from areas of human habitation, the species is threatened by new development that fragments their habitat. Although once a very common species in the state, the red-shouldered hawk population began declining in the early 1900s due to shooting, egg collection, and placement in captivity. The clearing of forests and the filling of wetlands to make way for development were causes of population decline as early as the 1920s, and this habitat fragmentation accelerated between the 1950s and 1970s. In 1979, the red-shouldered hawk was placed on New Jersey's list of threatened species when an estimated 100 breeding pairs were present in the state. However, continued habitat loss in the 1980s further diminished the species' population, and by 1991, when the species was reclassified as endangered, there were only an estimated 36 breeding pairs.

The **Cooper's Hawk** (*Accipiter cooperii*) is a member of the Accipiter family—woodland hawks that prey on smaller birds—and is especially adapted to fly through dense cover chasing prey. In New Jersey, Cooper's hawks breed in remote wooded wetlands dominated by red maple or black gum. Adjacent upland pine or mixed oak/pine forests usually provide a buffer for nesting hawks. These hawks generally nest in forests composed of trees 30 years or older creating a closed canopy. On average, a hawk will place his or her nest more than a third of a mile away from the nearest human inhabitant. While other raptor species were threatened due to hunting practices and predator elimination, Cooper's hawk populations were not threatened until widespread suburbanization. Additionally, the pesticide DDT impaired many bird species' reproduction and contributed to declining populations from the 1950s to the 1970s. Populations began to recover due to the nationwide ban of DDT in 1972, coupled with the reforestation of old fields throughout New Jersey. The hawk was listed as endangered in 1974 and downgraded to threatened status in 1999 on the state list. The loss of large, contiguous forests remains a threat to this species and warrants the continued protection of Cooper's hawk nesting habitats.

Photo: Michael Hogan

The Great Blue Heron, a Species of Special Concern

The **Great Blue Heron** (*Ardea Herodias*) is the largest heron found in North America. This wading bird can grow up to four feet tall, and is found in a wide variety of aquatic habitats, including freshwater and saltwater marshes, lake edges, streams, and shorelines. The great blue heron feeds on aquatic reptiles, amphibians, and small fish and nests in adjacent woodlands, in colonies of up to five hundred breeding pairs. While the non-breeding population is stable in New Jersey, breeding pairs have been identified as a species of special concern. Additionally, the New Jersey Department of Fish and Wildlife has found that

inland heron habitat (such as Deptford) is difficult to identify and has asked for help identifying nesting sites.

The **Coastal Plain Milk Snake** (*Lampropeltis triangulum triangulum x Lampropeltis triangulum elapsoides*) is an intergrade between two subspecies of milk snake: the eastern milk snake *(Lampropeltis triangulum triangulum)* and the scarlet kingsnake *(Lampropeltis triangulum elapsoides*). Intergrades are animals that share characteristics of two distinct subspecies, occupying an intermediate habitat and exhibiting intermediate morphology. Previously, the coastal plain milk snake was considered to be a separate subspecies, *Lampropeltis triangulum temporalis*. The coloration of the coastal plain milk snake is primarily red to reddish-brown, with periodic black-bordered white bands. The coastal plain milk snake can be found in a diverse range of habitats, including wetlands, forests, and suburban areas, but they generally hide under rotting logs or trash piles and only venture out into the open at night. Milk snakes such as the coastal plain milk snake are frequently captured and removed from their natural habitat to be sold as pets, and this illegal capture is the primary threat facing the coastal plain milk snake in New Jersey.

The **Eastern Box Turtle** (*Terrapene carolina*) is listed as a species of special concern in New Jersey. This small (four- to six-inch) turtle can be found all over the state and lives in many different habitats. They can identified by their tall, domelike shells and coloration, which ranges from spots of yellow, orange, or olive on a dark brown background. Even though eastern box turtles can live in many different habitats, they are mostly terrestrial. However, box turtles enjoy soaking themselves in water or mud during the summer. Continued residential development has limited the habitats available to the Eastern box turtle and reduced their number over the years. The collection of these turtles as pets reduces their breeding potential and may result in their death.

Photo: Michael Hogan

The Eastern Box Turtle, a Species of Special Concern

Natural Heritage Priority Sites

Natural Heritage Priority (NHP) sites are areas designated by the New Jersey Division of Parks and Forestry's Office of Natural Lands Management as exemplary natural communities within the state that are critically important habitat for rare species. Preserving these areas is a top priority for efforts to conserve biological diversity in New Jersey. There are 410 NHP sites in the state of New Jersey, one of which, the Wenonah Ravine, is partially located in Deptford. NHP designations are based on the records of the Natural Heritage Database. Information on particular sites may also be provided by the

Nature Conservancy or by the NJDEP Endangered and Nongame Species Program, and especially through the latter agency's Landscape Project.

The **Wenonah Ravine NHP Site** is a wooded ravine located along a small stretch of Mantua Creek in three communities—Mantua, Wenonah, and Deptford. The site contains the only confirmed occurrence of a state critically imperiled tree species, the pawpaw (*Asimina triloba*). This site's boundaries are limited to the documented population of the plant species and an adjacent buffer. It has a biodiversity rating of B4, meaning the area is of moderate significance because it is a site that contains a state imperiled species. See **Map 20: Conservation Areas (2007)**.

The Natural Heritage Database also lists for Deptford several species of threatened and endangered plants and animals, or rare natural communities that have been found in other parts of the township. There are three rare plants present in Deptford that have state endangered status: puttyroot, broad-leaf ironweed, and swamp-pink, which also has federal threatened status. The Natural Heritage Database's individual records of animals have been incorporated into the Landscape Project, but plant listings are not a basis for modeling.

It is important to note that the Natural Heritage Database lists primarily those sightings that have been submitted to it, along with some ecological community data. It incorporates both historically and recently documented sightings. Areas without sightings may never have been surveyed. Conversely, land use in areas with sightings may have changed considerably over recent years, and the species once found there may be gone. Local surveys to update the database and regular consultation of records before any development is approved are two measures that would help to increase the protection of threatened and endangered species.

Photo: Michael Hogan

Swamp Pink, an endangered plant species

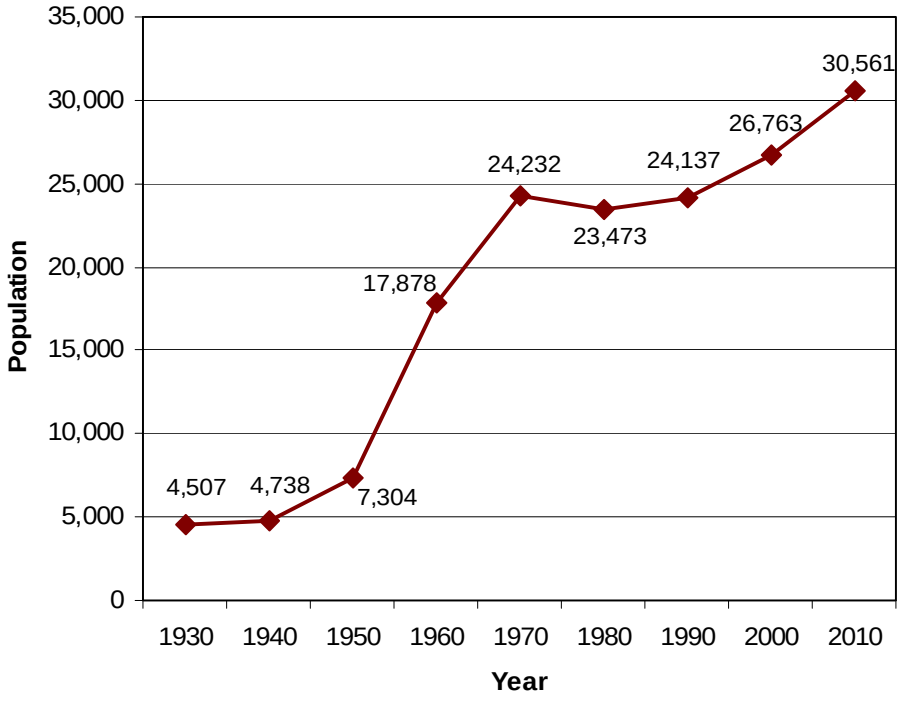
Designation as a Natural Heritage Priority site does not carry any specific requirements or restrictions on the land. Rather, the designation is made because of a site's high biological diversity value. Owners of NHP sites are encouraged to become informed stewards of the property and to consider working with the local community, nonprofit groups, or the state to preserve the land permanently.

The Built Environment

Population

In 2010, Deptford Township had a total population of 30,561 people. This represents a 14 percent increase from the 2000 population of 26,841. Like many municipalities in southern New Jersey, Deptford Township experienced its greatest period of growth mid-century, when its population grew exponentially from over 7,000 in 1950 to over 24,000 in 1970, shown in **Figure 9**. The township population declined slightly during the 1970s, but has increased from 1980 onwards.

Figure 9: Population of Deptford Township, 1930–2010



Source: U.S. Census Bureau, 1930–2010

The population of Deptford Township is somewhat diverse, as shown in the following table.

Table 25: Deptford Township Population by Race

Race*	Population	Percent
White	23,190	75.9%
Black or African American	3,578	11.7%
Hispanic or Latino	1,830	6.0%
Asian	1,350	4.4%
Two or More Races	524	1.7%
American Indian and Alaska Native	44	0.1%
Some Other Race	36	0.1%
Native Hawaiian and Other Pacific Islander	9	0.0%
Total	**30,561**	**100.0%**
*Hispanic or Latino population is of any race. All other population numbers refer to those not identifying as Hispanic or Latino.		

Source: US Census, 2010

There were a total of 12,361 housing units in Deptford Township in 2010, a 16 increase from the 2000 total of 10,647 units. In 2010, 11,689 housing units (95 percent) were occupied and 672 units (five percent) were vacant.

Transportation

Residential and commercial development in Deptford Township has occurred due to its transportation accessibility. A number of highways and other major roads have exits either within or just outside of the township that provide access to Philadelphia, New York, Atlantic City, and other areas of the region. The network of transportation infrastructure within Deptford Township accounts for the township's development and land use patterns. The pollution caused by transportation affects air and surface water quality, discussed in previous sections.

There is an exit for Interstate 295 directly on the border of Deptford Township and West Deptford Township. Interstate 295 provides high-speed access from Delaware to central New Jersey, and its construction spurred southern New Jersey's accelerated population growth throughout the 1950s and 1960s. The New Jersey Turnpike passes through Deptford Township, although the nearest exit, Exit 3, is located approximately one mile east of the township. The New Jersey Turnpike, one of the most heavily used highways in the country, was also constructed beginning in the early 1950s, enabling the postwar suburbanization of the state.

State Route 42, also known as the North-South Freeway, runs through Deptford Township and connects Gloucester County with the Atlantic City Expressway and Interstate 76, which travels to Philadelphia. State Route 55, constructed between 1965 and 1989,

greatly increased accessibility to and from Gloucester County. Deptford Township contains the northern end of Route 55, where it intersects with Route 42.

New Jersey Transit operates two bus lines that have stops in Deptford Township. Bus 408, traveling between Millville and Philadelphia, has a stop at Delsea Drive and Cooper Street. Bus 455, traveling between Cherry Hill and Paulsboro, also has a stop at Delsea Drive and Cooper Street, in addition to a stop at the Deptford Mall. There are no passenger rail lines located within Deptford Township, although the PATCO high-speed line has six stations within ten miles, at Lindenwold, Ashland, Woodcrest, Haddonfield, Westmont, and Collingswood.

The closest major airport is the Philadelphia International Airport, located within a half-hour drive of Deptford Township. Additionally, the Atlantic City International Airport is located approximately 45 miles away. There are also a number of small regional airports in southern New Jersey that are privately owned but available for public use.

Township Utilities and Services

Drinking Water

The Deptford Township Municipal Utilities Authority (DTMUA) provides drinking water to the vast majority of central Deptford Township, as well as the Oak Valley neighborhood. In addition, a small portion of northwest Deptford Township is served by Westville Water Department, and two small areas in eastern Deptford Township are served by the Woodbury Heights Water Utility.

The DTMUA draws its drinking water from seven wells that tap the Potomac-Raritan-Magothy (PRM) aquifer, discussed in **Aquifers and Confining Units**. The wells vary in depth from 261 to 355 feet below the surface. In 2008, all seven wells tested low for amounts of pathogens, nutrients, pesticides volatile organic compounds (VOCs), and radon. All seven wells tested medium for disinfection by-product precursors and inorganics. Four wells tested medium and three wells tested low for radionuclides.

In 2008, the MUA used 979.921 million gallons of water, although it drew just 541.403 million gallons from its wells. The remaining water was purchased from New Jersey American Water, a private company that delivers treated water drawn from the Delaware River. The DTMUA has approximately 10,428 water connections serving over 30,000 residents, with an average of 88 gallons used daily per person in the service area.

Sewer

All developed areas in Deptford Township are approved for sewer service. Sewer service is handled by the Gloucester County Utilities Authority (GCUA). The GCUA is a regional wastewater collection system that serves 16 municipalities in the county and treats over 6.3 billion gallons of wastewater annually. Wastewater is treated at GCUA's facility in

West Deptford, and the treated water is discharged to the Delaware River. The biosolids removed as part of the treatment process are incinerated onsite.

Trash and Recycling

The Deptford Township Department of Public Works (DPW) contracts with a private contractor for weekly trash and single-stream recycling collection. Computer waste, or "e-waste," may be brought to the Deptford Township Public Works Facility for recycling. Kitchen appliances, or "white goods," may also be recycled curbside by notifying the DPW. Household hazardous waste—such as medications and paint—may be dropped off during eight special collection days at designated locations. The DPW will also collect branches and logs from residences. Fall leaves and yard waste are also collected by the DPW during scheduled days during the fall and spring.

Education

The Deptford Township School District, which serves 4,400 students in grades prekindergarten through 12th grade, has one high school, one middle school, four elementary schools, three early childhood centers, and the special-needs New Sharon School. The District renovated and expanded several of its schools and revamped its education system in 2003 so that students in prekindergarten through first grade were taught at one of three Early Childhood Centers, students in second through sixth grade attend one of four elementary schools, seventh and eighth grade students attend Monongahela Middle School on Bankbridge Road, and students in grades 9 through 12 attend Deptford High School on South Fox Run Rd. Two schools—Pine Acres, in the Oak Valley neighborhood and Central Early Childhood Center, on Delsea Drive near the municipal building—are dedicated Early Childhood Centers. Pine Acres also includes a class for second graders and a separate class for learning-disabled students. There are four elementary schools; Shady Lane, on the northern end of Deptford contains an early childhood center and runs from kindergarten to sixth grade, while Good Intent, Lake Tract, and Oak Valley all serve grades two through six. With the exception of Central Early Childhood Center, which was newly built in 2003 on the site of an old elementary school constructed in 1924, all of Deptford's regular schools were built from 1955 to 1964, and have all since undergone renovation and/or expansion.

The township is also home to several small parochial schools, including two K–8 schools, and one K–12 school. The Bethany Baptist Christian School offers academic programs to fewer than two dozen students in all grades. The Seventh Day Adventist-affiliated Delaware Valley Junior Academy, and Catholic Church-affiliated Holy Trinity Regional School, in the Westville Grove neighborhood, both enroll students through grade eight.

The New Sharon School, on 1810 Delsea Drive, is run by the Deptford Township School District for mild to moderately disabled students from ages 5 through 21, and accepts applicants from Gloucester, Salem, and Cumberland Counties. Built in 1924, the New Sharon School is the oldest public school building still in use in Deptford. The Archbishop

Damiano School, part of the Catholic charity St. John of God Community Services, provides education for children ages 3–21 with moderate to severe cognitive disabilities.

Gloucester County runs several schools in Deptford with a countywide reach, all of which are on or near Tanyard Road in the southern portion of Deptford. Bankbridge Development Center, Bankbridge Elementary, and Bankbridge Regional School are all run by the Gloucester County Special Services District, serving special-needs students of all ages from across Gloucester County. In addition, the Gloucester County Special Services District runs an Alternative School for at-risk students on the campus of the Gloucester County Institute of Technology. The Gloucester County Institute of Technology, located on Tanyard Road, is run by the Gloucester County Vocational-Technical School District and educates nearly 800 students from grades 9 through 12.

Deptford is home to one post-secondary institution, Gloucester County College, which has an enrollment of over 6,000 full-time and part-time students. GCC, which offered its first classes in 1968 at Deptford High School and opened its present facility in 1970, offers 54 associate-level degrees and 25 certificate programs.

The township is also home to the Deptford Public Library, found on Ward Drive. The library, which moved into its current location in 1988, is governed by the Deptford Library Board of Trustees, and recently underwent a 3,000-square-foot expansion.

Open Space, Parks and Recreation

Deptford Township is home to a widespread park system that provides a variety of active and passive recreational opportunities for area residents. Active recreation opportunities in the township include activities such as soccer, baseball, volleyball, tennis, and basketball. In addition to sports fields and courts, Deptford contains a number of playgrounds and trails. Passive recreation encompasses most other park activities, including walking, fishing, bird watching, bike riding, and picnicking. Typically, these activities take place in natural settings. In total, Deptford Township contains over 530 acres of municipally owned recreation and open space, over 120 acres of conservation land, and over 240 acres of open space held by homeowners' associations in Deptford Township. See **Table 26: Municipal Parks** and **Map 21: Open Space, Parks, and Recreation (2007)**. The National Recreation and Parks Association recommends 6.25 to 10.5 acres of green space per 1,000 persons, and Deptford far exceeds this standard. With a total of 890 acres of protected green space and a population of 31,451, Deptford has an average of 28 acres per 1,000 persons.

In addition, Deptford Township was once home to one golf course, the Maple Ridge Golf Club, a 122-acre site that straddled Deptford's southern border with Mantua Township. However, this course closed in 2006 and has been vacant since. While the owner of this site had initially drawn up plans to develop the site with more than 100 houses, the current soft real estate market has delayed these plans, and Deptford has begun exploring the possibility of purchasing the land for open space along with Mantua Township.

Deptford's municipally owned parkland is primarily made up of 25 stand-alone parks located across the township, ranging from quarter-acre playgrounds, or "tot lots," to athletic field complexes covering over 100 acres. Some of Deptford's largest municipal parks are the Deptford Township Baseball Complex, Deptford Township Soccer Complex, and Stauffer Field Softball Complex, at 146, 132, and 46 acres each; these active recreation parks provide dedicated space for Deptford's most popular youth sports leagues. The Baseball Complex and Stauffer Field adjoin each other and are also home to the township's newly constructed Recreation Center building, which contains a basketball court, wrestling room, and all-purpose room. Further active recreation space is also provided by several school grounds; Deptford High School, Gloucester County Institute of Technology, and Gloucester County College all boast athletic fields on their grounds.

The most popular park in Deptford year-round is Charles Fasola Park, a 58-acre space in the center of the township off Sycamore Lane, which has facilities for softball and football, in addition to two playgrounds, a picnic pavilion, and a pond with a gazebo and fountain. Deptford Township has proposed to expand Fasola Park, which adjoins the grounds of Deptford High School, in an effort to preserve some of the adjoining wooded land, as well as further integrate its active recreation space with that of Deptford High School.

In addition to Deptford's active recreational facilities, the township also boasts several areas of conservation and passive recreation land, much of which is located along the Big Timber Creek. A 53-acre parcel on Deptford Township's northern border east of Almonesson Road, the **Andaloro Wildlife Management Area** (WMA) is protected by the NJDEP as part of the planned Delaware River Greenway WMA. The Andaloro WMA is managed cooperatively by the South Jersey Land and Water Trust and the NJDEP Division of Fish, Game, and Wildlife. In addition, several parcels downriver from the Andaloro WMA are managed by the New Jersey Natural Lands Trust as part of the Big Timber Creek Preserve. See **Map 20: Conservation Areas (2007)**.

Three of Deptford's larger municipal parks are currently devoted to passive recreation and conservation. The largest of these, Stewart Lake Park, preserves 32 acres of land along Stewart Lake along the border with Woodbury and contains a walking trail along the lake. Access to Stewart Lake Park is through Woodbury. Almonesson Creek Park comprises ten acres of preserved natural land along Almonesson Creek, just north of Almonesson Lake, and adjoins facilities for active recreation. Almonesson Creek Park also contains a nature trail, for which the Deptford Township Environmental Commission has produced a brief guidebook. Another important conservation area is the Oak Valley Nature Preserve located near the intersection of Stanford and Georgetown Avenues. This preserve was owned by the Deptford Municipal Utilities Authority before

Photo: Michael Hogan

Old Pine Farm

being purchased by the township with Gloucester County funding.

The largest contiguous areas of preserved open space in Deptford Township are the 27-acre Timber Creek Park, owned by Deptford Township, and Old Pine Farm, a 32-acre parcel owned by the Old Pine Farm Natural Lands Trust. Both of these areas, preserved with the help of state Green Acres funding in the 1990s, adjoin Big Timber Creek and contain wetland and upland forest habitats. Like Almonesson Creek Park, the Big Timber Creek Park has a trail and interpretive guide. Deptford Township recently completed work on improving parking and the trail system in the Big Timber Creek and Old Pine Farm area. The Old Pine Farm Natural Lands Trust conserves the natural aspects of the area and educates the public about the wildlife and natural habitat located there. See **Appendix D: Vertebrate Fauna Found at Old Pine Farm** and **Appendix E: Plants Found at Old Pine Farm**.

The 2007 Deptford Township Master Plan asserts that Deptford has ample space for active recreation, although it cautions that the number of participants in youth sports programs continues to grow, with 2,500 children taking part in 2006. However, the township has identified a continued need for more preserved open space, with an eventual goal of preserving ten percent of the township's total acreage, or 1,125 acres. The plan identified nine acquisition targets, including three that exceed 100 acres in size. (This list does not include the old Maple Ridge Golf Course, though it does include the expansion of Fasola Park.) These three are: (1) the Friends of Israel site, located on 137 acres adjacent to the Andaloro WMA and Big Timber Creek; (2) Whispering Lakes, 140 acres of undeveloped wooded land with three small lakes in the northeast of the township; and (3) Five Points, an open area in the south of the township adjacent to the old Kinsley landfill. If all nine conservation targets were acquired by Deptford Township, conserved parkland would constitute 13.4 percent of Township land, up from the current eight percent.

Table 26: Municipal Parks

Map #	Name	Address	Use	Area (Acres)
1	Deptford Twp Baseball Complex	50 Montague Lane	Active recreation	146.10
2	Deptford Twp Recreation Center	Montague Lane	Active recreation facility	0.51
3	Stauffer Field Softball Complex	Montague Lane	Athletic Field	46.34
4	Almonesson Park	Almonesson Rd	Athletic Field	15.42
5	Almonesson Creek Park	Almonesson Rd	Open space, passive recreation	9.88
6	Timber Creek Park	Hurffville Rd	Open space, passive recreation	27.52
7	Leadbeater Playground	Pine Ave	Active recreation, playground	0.23
8	Woodbrook Park	Crestview Dr	Playground	2.46
9	Taylor's Field Football Complex	8 Taylor Ln	Athletic Field	8.34
10	Almolind Playground	Elgin St	Active recreation, playground	1.73
11	Fasola Park	Sycamore Ln	Active recreation, playground	58.34
12	Deptford Twp Soccer Complex	Cattell Rd	Active recreation	126.90
13	Larkins Park	Malcolm Ave	Open space, passive recreation	2.60
14	Oak Valley Playground	Muhlenberg Ave	Active recreation, playground	1.54
15	Harvey Playground	Harvey Ave.	Playground	1.12
16	Montclair Ct. Playground	642 Montclair Ct	Active recreation, playground	0.51
17	Oak Valley Little League Complex	579 Princeton Blvd	Athletic Field	21.90
18	Church St. Park	Mail Ave	Active recreation	3.06
19	Allen Park	Mail Ave	Active recreation, playground	17.83
20	Lake Tract Playground	Iszard Rd	Active recreation, playground	0.75
21	Kathleen Maier Playground	Cooper St	Playground	0.91
22	Stewart Lake Park	Cooper St	Open Space	32.20
23	Carson Playground	Carson Ave	Active recreation, playground	4.44
24	Park Ave Playground	Park Ave	Active recreation, playground	0.21
25	Marion Ave Playground	Marion Ave	Active recreation, playground	0.29
Total				**531.13**

Source: Deptford Township, 2007

State Planning Areas and Designated Centers

The New Jersey State Development and Redevelopment Plan (the State Plan) is a policy guide to be used by state, regional, and local agencies to increase the consistency of planning efforts. The State Plan provides a vision for the comprehensive development of the state. Municipal, county, and regional plans will be reviewed by the State Planning

Commission to evaluate consistency with the State Plan. The State Plan was first issued in 2001, and a draft update of the plan was issued in 2008.

The SDRP delineates a number of Planning Areas, each with its own goals, objectives, policies, and strategies. The Planning Area descriptions reflect varying levels of development, infrastructure capacity, and presence of natural resources. Deptford Township has three planning areas: PA-1 Metropolitan Planning Area, PA-2 Suburban Planning Area, and Parks and Natural Areas. The majority of Deptford is part of the Metropolitan Planning Area, while Deptford's southern edge is in the Suburban Planning area, including Gloucester County College, the Kinsley Landfill, and surrounding areas. The Parks and Natural Areas designation was given to the Andaloro WMA and the Big Timber Creek Preserve in the 2001 State Plan, and this was expanded to include a number of other municipal parks in the 2008 draft final plan.

One of the major goals of the SDRP is to promote "center-based development" as a means to curb sprawl, protect the environment, create a sense of place, and provide for mixed-income housing. To that end, the Office of Smart Growth identifies and provides technical assistance for five levels of center-based development, in order of descending size and intensity of use: Urban Centers, Regional Centers, Towns, Villages, and Hamlets. The northeastern half of Deptford is designated a Regional Center, largely in recognition of the large-scale retail found in and around the Deptford Mall. Deptford also borders a number of other centers, including Woodbury, Westville, Glendora, Wenonah, Mantua, and Fairview. See **Map 22: State Planning Areas (2008)** for a depiction of the State Plan planning areas (from the draft 2008 State Plan) and centers in and around Deptford Township.

Historic Resources

Deptford Township has one property listed on both the New Jersey and National Registers of Historic Places: the Benjamin Clark House located on Glassboro Road. The west section of the house is the oldest, and dates from the late eighteenth century. An eastern section was constructed in 1804. The British raided the house several times during the Revolutionary War due to Benjamin Clark's patriotic activities.

There are nine places in the township that have been issued State Historic Preservation Office (SHPO) opinions, meaning they are eligible for inclusion on the State Register of Historic Places. Seven of these places are archaeological sites, the locations of which are not identified in order to protect the integrity of the site.

Deptford Township also contains a number of locally important historic places, including two cemeteries, historic homes, the famous balloon landing site, and two historic districts. Although not listed on state or national registers, these places preserve the rich history and culture of Deptford Township.

The Strangers Burial Ground, dating from the mid-1770s, contains the remains of many individuals who died while passing through the area or who were unaffiliated with local churches. Included among the interred are many Hessians killed in the 1777 Battle of Red

Bank of the Revolutionary War. After the battle, many wounded Hessians were cared for in the old schoolhouse on Delaware Avenue in Woodbury (then part of Deptford Township), and the dead were laid to rest in the Strangers Burial Ground. The cemetery was relocated in 1915 for the construction of a new road, and the remains and gravestones were moved to the Paupers' Burying-Ground. During the excavation, bayonets, shoes, and brass buttons were uncovered. A new street, Lupton Avenue, was constructed on the former burial ground.

The Cattell cemetery was founded by the ancestors of the numerous families of that name. Among the interred is Jonas Cattell, a hunter and woodsman who gained fame during the Revolutionary War for alerting the Americans at Fort Mercer that the Hessians were approaching to attack the fort.

The Nathan Ward House and the Pierce-Jaggard House are both over 200 years old, reflecting Deptford's long history. The Nathan Ward House is a brick house built in 1791 by Nathan and Amy Ward. The Pierce-Jaggard House dates from the late eighteenth century, with a northern addition constructed in 1808.

The Blanchard Landing site, roughly located west of Clement's Bridge Road and south of Big Timber Creek, was where the aerialist Jean Pierre Blanchard landed the first hot air balloon in America on January 9, 1793. Blanchard had departed from Philadelphia less than an hour before landing by the Clement Oak, carrying a letter penned by President George Washington intended to allay the fears of local farmers at the landing site.

Photo: Michael Hogan

Clement Oak

New Sharon and Jericho are two historic communities, although they are not formally designated as historic districts. See **Table 27: Historic Places** and **Map 23: Historic Resources**.

Table 27: Historic Places

Name	Location	State ID#	Register
State and National Registers of Historic Places			
Benjamin Clark House	Glassboro Road	1373	NR: 1/25/1973 (NR Reference #: 73001099) SR: 5/1/1972
Eligible Sites for State and National Registers of Historic Places			
Cooper-Moore House	Off Fox Run Road	1374	SHPO Opinion: 9/14/1982
Sullivan House	750 Cooper Street	3155	SHPO Opinion: 12/6/1991
Prehistoric Site (28-Gl-123)		1372	SHPO Opinion: 9/14/1982
Prehistoric Site (28-Gl-124)		1933	SHPO Opinion: 9/14/1982
Late Woodland Prehistoric Site (28-Gl-252)		1375	SHPO Opinion: 6/24/1992
Delta Prehistoric Site (28-Gl-151)		3152	SHPO Opinion: 9/3/1987
Pretzel Prehistoric Site (28-Gl-152)		3154	SHPO Opinion: 9/3/1987
Archaeological Site (28-Gl-103)		1427	SHPO Opinion: 11/25/1981
J. Hillman Historic Site (28-Gl-153)		3153	SHPO Opinion: 9/3/1987
Other Historic Places			
Pierce-Jaggard House	Hurffville Rd		
Nathan Ward House	Poplar Rd. at NJ Turnpike		
Strangers Burial Ground	Caulfield Ave		
Cattell Cemetery	Evelyn Dr		
Blanchard Landing Site	West of Clement's Bridge Road and south of Big Timber Creek		
New Sharon			
Jericho			

Source: NJDEP, 2009; Deptford Township Environmental Commission, 2009

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). Deptford Township currently does not have a historic preservation commission.

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. As of January 2009, only two municipalities in Gloucester County—Harrison Township and Swedesboro Borough—are CLGs. To participate, municipalities must maintain a historic preservation commission, survey local historic properties, provide opportunities for public participation in preservation activities, and develop and enforce local preservation laws. If Deptford Township were to become a CLG, it would be eligible to draw from an exclusive pool of matching federal and state funds for program implementation or rehabilitation work.

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.

Investing in historic preservation efforts can provide a municipality with important and impressive returns. Private and public efforts to preserve and rehabilitate historic sites create attractive places to live, work, and play and stimulate new investment in older residential and commercial centers. Historic preservation maintains a municipality's character, distinctly separating it from other rural and suburban communities, for both new and established residents.

Photo: Michael Hogan

Mantua Creek

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 are those on the National Priorities List, commonly known as Superfund sites. These are eligible for federal cleanup funds. Other sites are handled by state or individual programs, or through private funds. There are ten NPL sites in Gloucester County, none of which are within Deptford. However, Deptford Township does contain two sites that were the subject of state-led cleanups and have been examined by the EPA. The Martell Property, at 1327 Turkey Hill Road, was given a New Jersey-funded preliminary assessment in 1984, and an EPA-financed assessment in 1997, but was assigned a low priority. In addition, the EPA investigated the Marvin Jonas facility on Bank Bridge Road, which straddles the Mantua Creek between Mantua and Deptford. This facility was inspected in 1984 and was given a low priority by the EPA and a high priority by the state of New Jersey.

As of June 2010, there were 30 active known contaminated sites located within Deptford Township, listed in **Table 28: Known Contaminated Sites**. **Map 24: Known Contaminated Sites (2009)** illustrates the known contaminated sites as of 2009, at which point there were 32 active sites in the township. These are active sites with confirmed contamination of the soil, groundwater, and/or surface water. Active sites are those sites having one or more active cases with any number of pending and closed cases. Among the known contaminated sites in Deptford Township are gas stations, former industrial sites, auto businesses, landfills, school and municipal facilities, and private residences. Addresses of private residences have been removed for confidentiality.

Table 28: Known Contaminated Sites

Name	Address	Home Owner?	Site ID	PI Number	Bureau	Remedial Level	Start Date
1170 1186 1194 Almonesson Road	1170 1186 Almonesson Rd	No	176062	230721	OBR	C3	6/10/2004
1201 North Broad Street	1201 N Broad St	No	424802	531724	UHOT	C1	6/24/2010
Hampshire Drive	Hampshire Dr	Yes	73308	G000033473	BFO-S	C2	5/14/1998
1327 Turkey Hill Road	1327 Caulfield Ave	No	40883	G000005072	BFO-S	C2	1/21/1995
1396 Delsea Dr Deptford LLC	11 Delsea Dr	No	8045	8382	BOMM	C2	7/29/1992
Glassboro Road	Glassboro Rd	Yes	411252	515186	UHOT	C1	1/8/2010
1755 Glassboro Road	1755 Glassboro Rd	No	409720	512953	BFO-S	C1	1/21/2010
8 Mostovlyan Court	8 Mostovalyn Ct	No	123427	162345	BFO-S	C1	9/15/1997
Rygate Drive	Rygate Dr	Yes	165542	217477	BFO-S	C1	12/23/2003
Best Gas & Auto Repairs	1400 Hurffville Rd	No	8055	11710	BUST	C2	2/1/1998
Bill's Auto Repair	1305 Cooper St	No	8061	23839	BUST	C2	9/15/1997
Broadway Garage	1085 Broadway	No	65593	G000030844	BFO-S	C1	7/30/2001
Conifer Village at Deptford	Deptford Ave & Tacoma Blvd	No	195447	484737	BFO-S	C1	12/1/2008
Delsea Service Station	N Delsea Dr & Cooper St	No	8050	7339	BUST	C2	7/30/1992
Deptford Crossing Shopping Center	1800 Clements Bridge Rd	No	214993	280758	BFO-S	C2	2/8/2006
Deptford Twp MUA	1001 Hurffville Rd	No	8057	15389	BUST	C1	3/6/1998
Deptford Twp Municipal Building	1011 Cooper St	No	19138	24539	BUST	C2	7/8/1992
Fasola Park	12 Sycamore Ln	No	365637	451968	BFO-S	B	10/25/2007
Fox Trail Estates	Glassboro Rd & Salena Rd	No	218726	285553	BFO-S	B	4/13/2006
George Lees Auto Service	1348 Glassboro Rd	No	340693	421252	BFO-S	C1	2/15/2007

Name	Address	Home Owner?	Site ID	PI Number	Bureau	Remedial Level	Start Date
Gloucester County College	1400 Tanyard Rd	No	121035	213949	BUST	C1	3/29/2007
Kinsleys Landfill Inc	Hurffville Rd	No	15888	1119	OBR	C3	6/2/1993
Locust Grove Farm	Caulfield Ave	No	74248	G000038150	BFO-S	C1	2/16/2005
Mac Sanitary Landfill Inc	Hurffville Rd & Clements Bridge Rd	No	15831	15472	OBR	C3	1/21/1993
Marvin Jonas Incorporated	Bark Bridge Rd	No	63680	G000002501	BCM	D	7/13/1993
NJ Department of Transportation	Cedar Ave	No	64692	G000022887	BFO-S	C1	4/23/1994
Sears Roebuck & Co	300 Almonesson Ave	No	8038	5328	BOMM	B	12/13/1996
Sharpies Pit	Cattell Rd	No	50030	31165	BFO-S	C3	5/23/2000
Transcontinental Gas Pipeline West Deptford M	1915 Nolte Dr	No	99342	135831	BCM	C3	1/2/2002
Woodbury Fuel & Supply Co	Broadway & Florence Ave	No	42164	2116	BFO-S	C1	4/30/1998

Source: NJDEP, 2010

Lead Agencies and Contact Information

Acronym	Bureau	Telephone Number
BCM	Bureau of Case Management	(609) 633-1455
BFO-S	Bureau of Field Operations – Southern Office	(609) 584-4150
BOMM	Bureau of Operation, Maintenance, and Monitoring	(609) 984-3081
BUST	Bureau of Underground Storage Tanks (Formerly BSCM)	(609) 292-8761
OBR	Office of Brownfield Reuse	(609) 292-1251
UHOT	Unregulated Heating Oil Tank Program	(609) 633-0544

Explanation of Remedial Levels

Remedial Level	Explanation of Site Complexity
A	Emergency Action - Stabilization.
B	A single-phase remedial action with a single contaminant affecting only the soil.
C1	Remediation does not require a formal design. The source of the contamination is known or has been identified. There is a potential for ground water contamination.
C2	Remediation requires a formal design. The source of the contamination is known OR the release has caused ground water contamination.
C3	A multi-phased remediation action. Where the source of the contamination is either unknown or there is an uncontrolled discharge to soil and/or ground water.
D	A multi-phased remediation with multiple sources/releases to multiple media including ground water.
S	Should have a Remedial Level but this field was either Blank or designated as "N/A" in Pre-NJEMS data.

In addition to the 30 active sites, there are four pending sites with confirmed contamination in the township, listed in **Table 29: Pending Known Contaminated Sites**. There are also 79 closed contaminated sites with remediated contamination, listed in **Appendix H: Closed Known Contaminated Sites in Deptford Township**.

Table 29: Pending Known Contaminated Sites

Name	Address	Home Owner?	Site ID	PI Number
Deptford Plating Company Incorporated	Hurffville Rd & Dein Ave	No	8049	G000002055
100 Wilshire Avenue	100 Wilshire Ave	No	64243	G000010062
Cooper Street	Cooper St	No	64612	G000022097
880 Cattell Road	880 Cattell Rd	No	157308	G000060827

Source: NJDEP, 2010

Underground Storage Tanks

There are a number of businesses in Deptford with underground storage tanks commonly used to store fuel oil, or in the case of service stations, gasoline or diesel fuel. Storage tanks installed prior to 1998 may have outdated leak control and corrosion prevention measures and must be continually monitored for emissions. Corrosion and leakage of USTs can become a serious threat to the groundwater and soil surrounding them. These sites are monitored under a program called the Bureau of Underground Storage Tanks (BUST). Sites are registered, receive permits, and are monitored for leaks at regular intervals. As of October 2009, there are 16 active and compliant sites in Deptford Township with regulated underground storage tanks that contain hazardous substances, pursuant to N.J.A.C. 7:14B et seq. They are listed in **Table 30: Underground Storage**

Tanks. If there is a known release to soil and/or groundwater, a site will also be listed on **Table 28: Known Contaminated Sites**. There may also be private residences in Deptford Township with 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.

Table 30: Underground Storage Tanks

PI Number	PI Name	Street Address	Permit Status	Expiration Date
008382	1396 Delsea Dr. Deptford LLC	1396 Delsea Drive	Pending	
010387	56086 Getty	Hurffville Rd. and County House Rd.	Effective	12/31/2009
011710	Best Gas & Auto Repairs	1400 S. Hurffville Rd.	Effective	12/31/2009
023839	Bill's Auto Repair	1305 Cooper Street	Effective	12/31/2009
299577	BJ's Wholesale Club	1910 Deptford Center Rd.	Effective	12/31/2009
254496	Bogey's Trucking and Paving	1779 Delsea Drive	Effective	12/31/2009
000724	Deptford CITGO	1100 Cooper St.	Effective	12/31/2009
033469	Deptford Main Office USPS	1265 Hurffville Rd.	Effective	12/31/2009
006932	Eagle Fleet Repair Co.	1340 Hurffville Rd.	Effective	12/31/2009
213949	Gloucester County College	1400 Tanyard Rd.	Effective	12/31/2009
008795	Hess Station 30294	210 Hurffville Rd. at Rt. 41	Effective	12/31/2009
001168	KSH Enterprises	Cooper Street & Clements Bridge Rd.	Expired	12/31/2003
032297	Lukoil #57364	1395 Hurffville Rd.	Effective	12/31/2009
016411	Quenzel's Sunoco #0004-6730	1106 Mantua Pk.	Effective	12/31/2009
009625	Sam's Club #6670	2000 Clements Bridge Rd.	Effective	12/31/2009
000717	Snras Petro Inc.	Rt. 41 & Good Intent Rd.	Effective	12/31/2009

Source: NJDEP, 2009

Groundwater Contamination

There are three sites within Deptford that have documented groundwater contamination from various sources. These sites are restricted by a Classification Exception Area (CEA) designation, which is a geographically defined area within which the local groundwater resources are known to be contaminated because the water quality does not meet

drinking water and groundwater quality standards for specific contaminants. A CEA can be established for a contaminated site's aquifer if state drinking water quality standards are not or will not be met due to: (1) natural groundwater quality, (2) discharges from a NJPDES permitted site, or (3) pollution caused by human activity, sometimes associated with a pollution remedy conducted under a NJDEP Administrative Consent order, within a contaminated site.

A CEA designation suspends aquifer use in the affected areas until state drinking water standards are met. It is not a groundwater remedy; it is an institutional control established in conjunction with an approved remedy. NJDEP may revise or establish a CEA at any time to more accurately reflect the groundwater conditions using revised data. If possible, NJDEP or the entity responsible for the remediation or monitoring of the site (known as the Responsible Party) estimates the duration the CEA will remain in effect. Often, a responsible party applying for a NJPDES permit or submitting a remediation plan for a contaminated site will also submit a CEA designation application, called a CEA Fact Sheet, detailing the aquifer contamination. See **Table 31: Classification Exception Areas.**

Table 31: Classification Exception Areas

CEA No.	Site ID	Name	Address	Start Date	Duration	Depth (feet)	Type of Contamination	Lead Agency
1443	NJP000886663	Deptford Shopping Center	Rt. 47	6/9/98	Indeterminate	50	Benzene, MBTE, TBA, Toluene, Ethylbenzene, Xylenes	BUST
434	NJD000697474	Sunoco Service Station #4-6730	Effective	1/9/03	2.5 years	50	Benzene, TICs, Xylenes, ethylbenzene	BCSM
1989	NJL800202780	CITGO Gas Station Washington Township	Rt. 47 Blackwood-Barnsboro Rd.	3/30/02	Indeterminate	85	Benzene, MTBE, TBA, Toluene, Xylenes	BUST

Source: NJDEP, 2009

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 (internal alpha particle exposure hazard) 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 for alpha particles in the air within a home. Fortunately, radon testing is inexpensive. All radon test results conducted in the state are reported to DEP 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–high (Tier 1), moderate (Tier 2), or low (Tier 3)—as to the risk of having high radon levels. Deptford is listed as a Tier 1 municipality with high potential of having high radon levels in homes.

The criteria for a Tier 1 municipality designation is that of at least 25 homes tested, 25 percent or more have radon concentrations greater than or equal to 4.0 picocuries per liter in air. This is the level at which homeowners should take immediate action. 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 maintains www.njradon.org as an information source for concerned citizens. Free information packets are available upon request. All companies conducting radon testing and mitigations are certified by NJDEP and listed on their web site.

Other Environmental Concerns

Historic Landfills

Deptford is home to three former landfills: Kinsleys Landfill, Mac Sanitary Landfill, and Fazzio Landfill. Landfills pose a number of potential environmental issues, including groundwater contamination and harmful air emissions. Current EPA landfill regulations (Subtitle D) mandates at least thirty years of post-closure care and monitoring to ensure that the landfill's leachate is properly removed and treated so that it does not leak into its surroundings and contaminate the surrounding soil and groundwater. Leachate is water that has passed through a landfill, both from the decomposition of material in the landfill and as a result of precipitation passing through the waste. Leachate is most likely to enter the environment either due to a faulty liner system or via the "bathtub effect," in which liquid accumulates in the landfill and spills out from the top of the containment system. While current landfill regulations have greatly decreased the probability of landfill failure within the thirty-year post-closure window, it is likely that these systems will remain in danger of leaking and contaminating the outside environment well into the future, beyond the mandated post-closure period.

The other major issue related to conventional landfills is the production of landfill gas, which is formed from the anaerobic decomposition of material within the landfill by bacteria. Landfill gas is composed of roughly 50 percent methane, along with carbon dioxide, volatile organic compounds such as benzene, and other contaminants. Landfill gas is an environmental hazard for several reasons, including an increased risk of landfill fires and noxious odors. Additionally, landfill gas is a major contributor to increased levels of greenhouse gases (GHG) in the atmosphere, as methane is 40 times more potent a GHG than carbon dioxide. While the EPA mandates collection of landfill gas, which is

often burned to produce electricity, no system is able to collect all of the landfill gas produced, leading to “fugitive” emissions.

The largest landfill site in Deptford is Kinsley’s Landfill, situated between Route 41 (Hurffville Road) and Route 55 in the southern portion of the township. This 122-acre landfill reached permitted capacity on February 6, 1987. Currently the landfill is maintained by Transtech Industries, Inc., which performs the required post-closure environmental maintenance of the site and captures the escaping landfill gas (primarily methane) for electricity generation. In addition to normal landfill waste, Kinsley’s Landfill accepted incinerator ash from Philadelphia for many years, until 1984. While the EPA has ruled that the ash produced from incineration is safe for municipal solid waste landfilling, many groups have raised concerns about elevated levels of dioxins and heavy metals within the ash, especially from older incineration facilities.

Also entirely within Deptford is the former Mac Sanitary Landfill, on the banks of the Big Timber Creek just north of Route 544 near Route 42 and the commercial Deptford Mall area. The Mac landfill closed in 1977, and Transtech, Inc., handles post-closure activities for this site as well. Due to the age of the Mac landfill, there is no longer enough captured landfill gas to support electricity generation.

The third landfill site is the 26.7-acre Fazzio Landfill, part of a 120-acre site on the eastern bank of the Big Timber Creek. This site is mostly located in Bellmawr Borough, Camden County, although a portion of the site is part of Deptford Township. The site has been inaccessible by land from the rest of Deptford since the U.S. Army Corps of Engineers rerouted an oxbow in the Big Timber Creek at some point after 1930. The entire site (including the Bellmawr portions) housed several landfills, including the Fazzio Landfill, Bell Harbor Incorporated Landfill, and the Bellmawr Borough Sanitary Landfill. Although the landfills were all filled in the 1970s, the site was never properly closed, unlike the Kinsley and Mac sites. Starting in 2006, Bellmawr Development, LLC, began the process of capping and closing the landfill complex under NJDEP supervision. After two years of preliminary investigation and planning, NJDEP approved the Landfill Closure Plan and several other documents related to remediation and redevelopment, signaling that the actual remediation work could begin. This site is intended to be occupied eventually by commercial and possibly hotel facilities.

Dam Maintenance

There are four dams in Deptford Township, shown in **Map 10: Surface Water, Wetlands, and Vernal Pools**. The Westville-Almonesson Dam is located south of Exit 58 of Route 55, the Almonesson Lake Dam is located at Cooper Street and Almonesson Creek, the Wenonah Lake Dam is located at Ogden Station Road and a Mantua Creek tributary, and the Bankbridge Dam is located near Glassboro Road and a Monongahela Brook tributary.

Although the lakes created by these dams provide flood control, recreational opportunities, wildlife habitat, and scenic views, they require consistent monitoring and maintenance. Dam failures can cause catastrophic property damage and loss of life. Within New Jersey, dams that raise the waters of a stream more than five feet are under State jurisdiction and

are regulated under the Safe Dam Act. New Jersey's Dam Safety Program administers the rules and regulations of this act to ensure the safety and integrity of dams in New Jersey.

Photo: Michael Hogan

Almonesson Creek

There are four hazard classifications of dams relating to their potential for property damage and loss of life in case of failure. These four categorizations are: Class I (High-Hazard Potential), Class II (Significant-Hazard Potential), Class III (Low-Hazard Potential), and Class IV (Small-Dam Low-Hazard Potential). These are simplified into the classes high, medium, and low. All four dams in Deptford Township are classified as Class III, or low-hazard. All high- and significant-hazard dams require an Emergency Action Plan (EAP), which much be reviewed by the NJDEP and updated annually. Class I dams must be regularly inspected annually, Class II and III dams are inspected every two years, and Class IV dams are inspected every four years.

Concentrated Agricultural Feeding Operations (CAFOs)

Historically, Deptford was a major center for pig farming, which was concentrated in the Jericho area shown on **Map 1: Places in Deptford Township**. According to farmland assessment records, there were 1,235 heads of swine in Deptford Township in 2006. Although still significant, this represents a small fraction of the 17,958 heads of swine in the township in 1983, and the tens of thousands of pigs found in the township in previous decades. Today, the several pig farms still remaining in Deptford are found in the central and southern portion of the township, along with the township's other remaining agricultural land.

Today, many animal-based agricultural operations such as pig farms are considered Concentrated Agricultural Feeding Operations, or CAFOs. CAFOs are facilities where large numbers of poultry, swine, cattle, or other animal types are confined within a much smaller area than traditional pasture operations. The heavy volume of wastewater and manure produced by CAFOs can pose a significant risk to the surrounding environment, especially streams and rivers. In Deptford, nutrient-rich wastewater from pig farms is suspected of being a contributor to fish kills and decreased water quality in Almonesson Creek.

The concentration of the wastes from these animals increases the potential to impact air, water, and land quality. Wastewater coming from CAFOs can contribute high levels of pollutants, such as nitrogen and phosphorus, organic matter, sediments, pathogens, heavy metals, hormones, and ammonia, to the environment. Contamination from runoff or lagoon leakage can impair water resources and can contribute to illness by exposing

people to wastes and pathogens in their drinking water. In addition, the dust and odors emanating from CAFOs can contribute to respiratory problems in workers and nearby residents. The EPA issued final rules in 2008 that regulate CAFOs in order to protect water resources. These rules encourage zero discharge and require site-specific best management plans to prevent runoff of excess nutrients into our nation's waters. Facilities that fall under the EPA's definition are regulated under the National Pollutant Discharge Elimination System (NPDES) and the Effluent Limitation Guidelines and Standards (ELGs).

Today, there is just one regulated CAFO in Deptford Township. However, other pig farming facilities with the potential to impact water quality still exist in Deptford. According to the EPA, facilities with fewer than 750 animal units are classified as "small CAFOs," and are only regulated if they have been determined to be a significant contributor of pollutants.

Historic Pesticides

New Jersey is one of the first states in the nation to address issues relating to toxic pesticide residuals, such as dichloro-diphenyl-trichloroethane (better known as DDT), arsenic, and lead that remain in the soil from past agricultural operations. In 1996, NJDEP convened a task force to study the extent of the historic pesticide problem in New Jersey and to develop strategies for protecting human health. The task force's findings were issued in an April 1999 report (see *Sources*). The task force examined 18 agricultural sites throughout New Jersey, including one site in Gloucester County.

It is estimated that 5 percent of the state's land area is impacted by residues from arsenic-based pesticides alone. The primary human health concern of residual contamination is the ingestion of contaminated soil. Therefore, small children who may ingest soil are at the greatest health risk. This issue may affect residents of homes and subdivisions built on former cropland and orchards. Homeowners can take precautions such as maintaining grass coverage and washing hands and toys after playing in exposed soil. Some developers may be willing to address this problem by testing and removing the existing topsoil and bringing in clean topsoil before construction commences. In addition, many soils have naturally occurring high levels of arsenic due to their bedrock geology; these soils are presumed to pose similar health risks.

In Deptford, the primary hazard is arsenic contamination from former orchards, which used arsenic-based chemicals as pesticides. Due to these historic orchards, elevated levels of arsenic have been found in the soil at several sites across Deptford. Most notably, a 2008 environmental study for the reconstruction of Fasola Park identified high levels of arsenic in the soils, at least some of which was naturally occurring. A grant helped pay for the cost of designing and implementing a plan to replace the contaminated soil with fresh topsoil.

Environmental Protection

The resources documented in this environmental resource inventory—natural resources, water resources, and biological resources—as well as historic and cultural resources, are key contributors to the character and quality of the Deptford community. Documentation of these resources provides a foundation for their care, protection and enhancement for the benefit of current and future Deptford residents. Accomplishing this task will require further planning and policy-making. Fortunately, local officials and community residents have a wide variety of tools at their disposal for this purpose, including municipal land use tools, natural resource protection ordinances and land preservation techniques.

Photo: Michael Hogan

Japanese Knotweed, an invasive species

Deptford Township has a number of municipal ordinances designed to protect natural resources. The municipal Stormwater Management Ordinance (discussed in the Surface Water Resources section under **Nonpoint Sources of Pollution**) and the municipal Soil Erosion and Sediment Control Requirements (discussed in the Soils section under **Soil Erosion**) are two ways in which Deptford Township protects its natural resources for the benefit of the environment and the health and safety of its residents. Some environmental laws or programs include the New Jersey Freshwater Wetlands Protection Act (see the Surface Water Resources section under **Wetlands**), the New Jersey Flood Hazard Area Control Act (see the Surface Water Resources section under **Floodplains**), the Clean Water Act (see the Surface Water Resources section under **Surface Water Quality**), the New Jersey Pollutant Discharge Elimination System program (see the Surface Water Resources section under **Point Sources of Pollution**), and the NJDEP Air Quality Permitting Program (see the Air Quality section under **Point Sources of Air Quality Pollution**).

Another important municipal ordinance that Deptford Township has is its Tree Protection Ordinance, which encourages the protection of the greatest number of trees throughout the township. The Tree Protection Ordinance recognizes the value of trees not only for controlling problems of flooding, soil erosion, and air and noise pollution, but also for promoting the health, safety, and welfare of citizens and for enhancing the quality of the built environment. Any subdivision or site plan application must include a Tree Protection Management Plan if the site includes ten or more trees, or at least one specimen (greater than 18 inches in diameter) tree. No tree with a diameter greater than eight inches can be removed or cut, with a number of exceptions. Cutting or removal is permitted if any of the following is true: the site is larger than one acre; the tree is part of a nursery, orchard, or Christmas tree farm; removal is in accordance with an approved farm conservation plan;

the tree constitutes an immediate threat to health or safety; the tree is dead or diseased; pruning or removal is needed for line clearance of utility wires; or tree harvesting is completed in accordance with an approved forestry management plan. When a tree is removed, a replacement tree must be planted. One inch of new tree diameter must be replaced for every four inches removed. Criteria for the selection of new trees include the following: species longevity; native species; hardiness; resistance to disease, insects, and pollution; aesthetic values; low maintenance and care; high wildlife values; and other considerations. There are other provisions in the Tree Protection Ordinance to protect trees from mechanical injury, grade change, and excavation.

Ordinances that Deptford Township does not currently have include a Stream Protection Ordinance, a Cluster Zoning Ordinance, and a Floodplain Protection Ordinance.

Photo: DVRPC

Almonesson Creek Park

Perhaps more important than municipal ordinances are the organizations and residents who enforce these protections, and who work to educate residents of Deptford on the need for, and benefits of, environmental resource preservation and restoration. The role of the Deptford Township Environmental Commission is to advise the local governments and explore opportunities for addressing environmental problems. Environmental commissions such as the one in Deptford may work on a variety of issues, including open space preservation, smart growth, wetlands and water resource protection, green infrastructure, recycling and litter, environmental cleanups, wildlife habitat, energy efficiency, and conservation and transportation. Members inform elected officials and the public, serve on committees, research issues, develop educational programs, and advocate for sound environmental policies.

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Appendices

Private Well Testing Act

The Private Well Testing Act (*N.J.S.A. 58:12A-26 et seq.*), passed in 2002 and administered by NJDEP, requires that well water be tested for contaminants when properties served by certain types of drinking water wells are sold or leased. The law does not prohibit the sale of property if the water fails one or more drinking water test standards. Rather, the fundamental goal of the PWTA is to ensure that purchasers and lessees of properties served by private potable wells are fully aware of the quality of the untreated drinking water sources prior to sale or lease. The state law allows the buyer and seller to determine which party will pay for the test, as well as what actions, if any, need to be taken if test results indicate a contaminant is present in the water above an applicable standard. However, individual county health rules may mandate that certain actions are required in order for a real estate transaction to be finalized.

Volatile Organic Compounds

Regulated by NJDEP

Benzene
Carbon Tetrachloride
meta-Dichlorobenzene
ortho-Dichlorobenzene
para-Dichlorobenzene
1, 1-Dichloroethane
1, 2-Dichloroethane
1, 1-Dichloroethylene
cis – 1, 2-Dichloroethylene
trans – 1, 2-Dichloroethylene
1, 2-Dichloropropane
Ethylbenzene
Methyl tertiary butyl ether
Methylene Chloride
Monochlorobenzene
Naphthalene
Styrene
1, 1, 2, 2-Tetrachloroethane
Tetrachloroethylene
Toluene
1, 2, 4-Trichlorobenzene
1, 1, 1-Trichloroethane
1, 2, 2-Trichloroethane
Trichloroethylene
Vinyl Chloride
Xylenes (Total)

The PWTA program requires that water be tested for primary contaminants (health-based) and secondary parameters (aesthetic characteristics). Primary contaminants are contaminants that may cause a potential health risk if consumed on a regular basis above the established maximum contaminant level (MCL). New Jersey regulates 18 primary contaminants, five more than federal EPA requirements. Primary contaminants include bacteriological (fecal coliform and *E. coli*), Volatile Organic Compounds (VOCs), inorganics (arsenic, lead, mercury, and nitrates), and Radiological (radium decay) substances. A certified laboratory must collect a water sample at a point before the water goes through any treatment. This sample represents the condition of the groundwater in the aquifer, which may be different from water out of a kitchen faucet. Property owners may choose to also have the tap water tested to assure that filters or treatments are working effectively.

The PWTA program requires tests for three naturally occurring secondary parameters: pH, iron, and manganese. Secondary drinking water standards address aesthetics such as corrosivity, taste, and color, and testing for these parameters determines if water is suitable for laundering, plumbing, and showering. For example, due to the nature of soils and geology in southern New Jersey, the groundwaters tend to be acidic (pH below 7), while groundwaters in the northern part are neutral (pH = 7) to basic (pH above 7). If the pH is too low (less than 6.5), water has a bitter, metallic taste and causes corrosion of pipes and fixtures. If the pH is too high (greater than 8.5), the water has a slippery feel, it tastes like soda, and deposits can form on plumbing fixtures.

Test results are reported by the lab to the person who requested the testing, to NJDEP, and to the local health authority. Suspicious or unexpected results are neither confirmed nor verified by NJDEP. Local health authorities will investigate suspect results, if necessary.

In February 2004, NJDEP released an online report summarizing the initial well test results reported to the agency during the PWTA program's first six months (September 2002 to March 2003). Results for 5,179 wells are included, which represent approximately 1 percent of private wells used as potable water supplies in New Jersey. The compilation of water test results is organized by county and municipality but does not include the names of specific property owners, their addresses, or well locations, because releasing that information is prohibited by law. About 92 percent of the 5,179 wells passed all the required (health-based) standards, with the exception of lead. Of the 8 percent (417 wells) of wells sampled that exceeded the maximum contaminant level for primary contaminants, the most common reason for failure statewide was nitrates (inorganics), followed by fecal coliform (bacteriological), and VOCs. Nitrates are found in groundwater due to a number of factors, including natural deposits, runoff from fertilizer, leaching from septic tanks, and from sewage pipes.

More wells in northern New Jersey were found to have fecal coliform or *E. coli* bacteria than in southern New Jersey. The northern/southern difference is probably due to the different geology in these regions. Northern New Jersey is characterized by limestone subject to solution cavities, fractured bedrock, or gravel water-bearing zones, while the southern part of the state is composed mainly of coastal plain sand and gravel, which appears to provide better protection of groundwater from fecal contaminants.

For those wells in the counties where mercury testing is required, 14 wells failed for mercury. Nine southern counties, including Camden, Gloucester, Salem and Gloucester, are required to test for mercury, which has been linked to neurological problems.

The test results for Deptford Township, Gloucester County are summarized in the table below. NJDEP's initial report indicates the presence of several drinking water contaminants, including mercury, nitrates, and VOCs. None of these contaminants were present in the one well tested in Deptford Township.

Summary of PWTA Test Results for Deptford and Gloucester County (September 2002–March 2003)

Geographic Area	# Wells Sampled	# Wells over MCL	Fecal/E.coli	Nitrate	Arsenic	Mercury	Any VOC over the MCL
Deptford Twp	1	0	0	0	NR*	0	0
Gloucester Co	288	22	2	11	NR*	3	7

Source: NJDEP, Division of Science, Research, and Technology (DSRT), 2003

*NR – Not required to sample

* MCL – Maximum Contaminant Level, set as the limit of a particular substance allowable to achieve a water quality standard

** VOC – Volatile Organic Compound.

2009 Monitoring Schedule of Public Water Supply Wells

Water Facility	Contaminant	SDWIS Code	Monitoring Frequency	Sampling Instructions
Deptford Township MUA *(Population: 26,000 residential from 1/1 to 12/31)*				
Distribution System (DS)	Total Coliform Bacteria	3100	month	Collect 30 samples / month during 2009
	Iron/Manganese		annual	Collect 1 sample anytime during 2009
	Lead/Copper		triennial	Collect 5 samples between 6/1/11 and 9/30/11
	Total THM-HAA5			Collect during 2009: 7 maximum residence time samples/quarter
Princeton Ave. (TP001001)	Inorganics		triennial	Collect 1 sample anytime in 2011
	Nitrate	1040	annual	Collect 1 sample anytime during 2009
	Radiological Compounds		6 years	Collect 1 sample anytime in 2011
	Secondarys		triennial	Collect 1 sample anytime in 2011
	VOCs		triennial	Collect 1 sample anytime in 2011
Princeton Ave. (TP002003)	Inorganics		triennial	Collect 1 sample anytime in 2011
	Nitrate	1040	annual	Collect 1 sample anytime during 2009
	Radiological Compounds		6 years	Collect 1 sample anytime in 2011
	Secondarys		triennial	Collect 1 sample anytime in 2011
	VOCs		triennial	Collect 1 sample anytime in 2011
Third Ave. (TP003007)	Inorganics		triennial	Collect 1 sample anytime in 2011
	Nitrate	1040	annual	Collect 1 sample anytime during 2009
	Radiological Compounds		triennial	Collect 1 sample anytime in 2011
	Secondarys		triennial	Collect 1 sample anytime in 2011
	VOCs		annual	Collect 1 sample between 4/1 and 6/30 in 2009
Well 9, County House at Indian	Arsenic	1005	Quarter	Collect 1 sample / quarter in 2009
	Inorganics		triennial	Collect 1 sample anytime in 2011

Water Facility	Contaminant	SDWIS Code	Monitoring Frequency	Sampling Instructions
Trail (TP004009)	Nitrate	1040	annual	Collect 1 sample anytime during 2009
	Radiological Compounds		triennial	Collect 1 sample anytime in 2011
	Secondarys		triennial	Collect 1 sample anytime in 2011
	VOCs		annual	Collect 1 sample anytime in 2009
Delsea Drive (TP00012)	Inorganics		triennial	Collect 1 sample anytime in 2011
	Nitrate	1040	annual	Collect 1 sample anytime during 2009
	Radiological Compounds		6 years	Collect 1 sample anytime in 2011
	Secondarys		triennial	Collect 1 sample anytime in 2011
	VOCs		triennial	Collect 1 sample anytime in 2011
Bankbridge Ave. (TP00601)	Inorganics		triennial	Collect 1 sample anytime in 2011
	Nitrate	1040	annual	Collect 1 sample anytime during 2009
	Radiological Compounds		triennial	Collect 1 sample anytime in 2011
	Secondarys		triennial	Collect 1 sample anytime in 2011
	VOCs		triennial	Collect 1 sample anytime in 2011
Well #8 Treatment Plant (TP013038)	Inorganics		triennial	Collect 1 sample anytime in 2011
	Nitrate	1040	annual	Collect 1 sample anytime during 2009
	Radiological Compounds		6 years	Collect 1 sample anytime in 2011
	Secondarys		triennial	Collect 1 sample anytime in 2011
	VOCs		triennial	Collect 1 sample anytime in 2011
Woodbury City Water Dept. *(Population: 11,000 residential from 1/1 to 12/31)*				
Wells #1A, #2A (Sewell) (TP001001)	Inorganics		triennial	Collect 1 sample anytime in 2011
	Nitrate	1040	annual	Collect 1 sample anytime during 2009
	Radiological Compounds		6 years	Collect 1 sample anytime in 2011
	Secondarys		triennial	Collect 1 sample anytime in 2011
	VOCs		quarterly	Collect 1 sample /quarter during 2009
Freeway Diner *(Population: 19 non-transient, 200 transient from 1/1 to 12/31)*				
Distribution System (DS)	Total Coliform Bacteria	3100	quarter	Collect 1 sample / quarter during 2009
Fake Well/Unknown (WL001001)	Nitrate	1040	annual	Collect 1 sample anytime during 2009

Water Facility	Contaminant	SDWIS Code	Monitoring Frequency	Sampling Instructions
International Roll Form *(Population: 40 non-transient from 1/1 to 12/31)*				
Distribution System (DS)	Total Coliform Bacteria	3100	quarter	Collect 1 sample / quarter during 2009
	Lead/Copper		triennial	Collect 5 samples between 6/1/09 and 9/30/09
Treatment Plant (TP001001)	Inorganics		triennial	Collect 1 sample anytime during 2010
	Nitrate	1040	annual	Collect 1 sample anytime during 2009
	VOCs		triennial	Collect 1 sample anytime during 2010

Source: NJDEP, 2009

Note: Two of Deptford's public non-community wells, Little Frankie's Bar and Grill (#080203) and Ray Angelini, Inc. (#080205), are not on the 2009 Monitoring Schedule.

VOCs = Volatile Organic Compounds

Radiological compounds include Gross Alpha, Radium-228, Radium-226 (if necessary), and Uranium (if necessary).

APPENDIX C

Potential Vernal Pools in Deptford Township

	ID Number	Status	X Latitude	Y Longitude	Old ID Number
1	8905	Potential vernal pool	488791.8973	4411436.3871	1377
2	8908	Potential vernal pool	488904.6732	4411203.9849	1378
3	8912	Potential vernal pool	489107.0798	4411284.6830	1379
4	8895	Potential vernal pool	488301.7217	4407750.5019	1374
5	8898	Potential vernal pool	488378.4510	4407730.6581	1375
6	8901	Potential vernal pool	489526.3813	4407598.7718	1376
7	10107	Potential vernal pool	491767.4113	4410571.3406	1665
8	10111	Potential vernal pool	491319.6449	4410115.9164	1666
9	10115	Potential vernal pool	491402.0763	4410674.4890	1667
10	15438	Potential vernal pool	488465.0000	4407061.4999	4117
11	15434	Potential vernal pool	488746.4062	4404338.9999	4113
12	15435	Potential vernal pool	488428.2500	4404077.9999	4114
13	32108	Potential vernal pool	490567.3029	4412132.8378	
14	32109	Potential vernal pool	490591.5884	4412132.6217	

Source: Center for Remote Sensing and Spatial Analysis (CRSSA), 2008

APPENDIX D

Vertebrate Fauna Found at Old Pine Farm

Mammals

Common Name	Scientific Name	Habitat
Chipmunk	*Tamias striatus*	Woodlands
Cotton Tail Rabbit	*Sylvilagus floridanus*	All Habitats
Field Mouse	*Microtus pennsylvanicus*	All Habitats
Gray Squirrel	*Sciurus carolinensis*	Woodlands, Residential Areas
Muskrat	*Ondatra zibethicus*	Wetlands
Opossum	*Carpodacus purpureus*	All Habitats
Raccoon	*Procyon lotor*	All Habitats
White-Tail Deer	*Odocoileus virginianus*	Woodlands

Source: Old Pine Farm Natural Lands Trust, http://www/bigtimbercreek.org, N.D.

Birds

Common Name	Scientific Name	Habitat
Barn Swallow	*Hirundo rustica*	Buildings, Bridges
Belted King Fisher	*Megaceryle alcyon*	Wetlands
Blue Jay	*Cyanocitta cristata*	Woodlands
Cardinal	*Cardinalis cardinalis*	Woodlands, Shrublands
Carolina Chickadee	*Poecile carolinensis*	Woodlands
Catbird	*Dumetella carolinensis*	Edge of Woodlands
Chipping Sparrow	*Spizella passerina*	Woodlands
Common Egret	*Ardea alba*	Open Marsh, Lake Edges
Common Tern	*Sterna hirundo*	Rivers, Lakes, Coast
Crow	*Corvus brachyrhynchos*	All Habitats
Double-Crested Cormorant	*Phalacrocorax auritus*	Rivers, Lakes, Coast

Common Name	Scientific Name	Habitat
Downy Woodpecker	*Picoides pubescens*	Woodlands
English Sparrow	*Passer domesticus*	Open Fields, Developed Areas
Fly Catcher	*Tyrannus tyrannus*	Open Fields
Goldfinch	*Carduelis tristis*	Open Fields
Great Blue Heron	*Ardea herodias*	Open Marsh, Lake Edges
Great Egret	*Ardea alba*	Marshes, Lake Edges
Greater Yellowlegs	*Tringa melanoleuca*	Marshes, Water Edges
Green Heron	*Butorides virescens*	Open Marsh, Lake Edges
Herring Gull	*Larus argentatus*	Water Edges, Landfills
House Finch	*Carpodacus mexicanus*	Open Fields
House Wren	*Troglodytes aedon*	Edge of Woodlands
Junco	Genus *Junco*	Woodlands
Killdeer	*Charadrius vociferus*	Bare Ground, Lake Edges
Laughing Gull	*Leucophaeus atricilla*	Open Water, Parking Lots
Mallard Duck	*Anas platyrhynchos*	Wetlands, Lakes
Marsh Hawk	*Circus cyaneus*	Open Fields, Marshes
Mockingbird	*Mimus polyglottos*	Edge of Woodlands
Mourning Dove	*Zenaida macroura*	All Habitats
Pintail Duck	*Anas acuta*	Marshes
Osprey	*Pandion haliaetus*	Open Water
Red-Bellied Woodpecker	*Melanerpes carolinus*	Woodlands
Red-Tailed Hawk	*Buteo jamaicensis*	All Habitats
Red-Winged Blackbird	*Agelaius phoeniceus*	Open Fields, Marshes
Robin	*Turdus migratorius*	All Habitats
Rock Dove	*Columba livia*	Developed Areas
Starling	*Sturnus vulgaris*	All Habitats
Titmouse	*Baeolophus bicolor*	Woodlands
Turkey Vulture	*Cathartes aura*	All Habitats
Wood Thrush	*Hylocichla mustelina*	Woodlands
Wood Duck	*Aix sponsa*	Forested Wetlands

Source: Old Pine Farm Natural Lands Trust, http://www/bigtimbercreek.org, N.D.

Reptiles

Common Name	Scientific Name	Habitat
Box Turtle	*Terrapene carolina*	Woodlands
Garter Snake	*Thamnophis sirtalis*	All Habitats
Painted Turtle	*Chrysemys picta*	Lakes and Ponds
Red-Bellied Turtle	*Pseudemys rubriventris*	Wetlands
Snapping Turtle	*Chelydra serpentina*	Lakes and Ponds

Source: Old Pine Farm Natural Lands Trust, http://www/bigtimbercreek.org, N.D.

Fish

Common Name	Scientific Name	Habitat
American Eel	*Anguilla rostrata*	Fresh Water
Bluegill	*Lepomis macrochirus*	Fresh Water
Bullhead Catfish	Genus *Ameiurus*	Fresh Water
Carp	*Ctenopharyngodon idella*	Fresh Water
Chain Pickerel	*Esox niger*	Fresh Water
Channel Catfish	*Ictalurus punctatus*	Fresh Water
Large Mouth Bass	*Micropterus salmoides*	Fresh Water
Roach	Genus *Rutilus*	Fresh Water
Striped Bass	*Morone saxatilis*	Fresh Water
Tiger Musky	*Esox masquinongy*	Fresh Water
White Perch	*Morone americana*	Fresh Water
Yellow Perch	*Perca flavescens*	Fresh Water

Source: Old Pine Farm Natural Lands Trust, http://www/bigtimbercreek.org, N.D.

Plants Found at Old Pine Farm

Field and Woodland Plants

Common Name	Scientific Name
Blue Curls	Genus *Trichostema*
Blue Toadflax	*Nuttallanthus canadensis*
Calico Aster	*Symphyotrichum lateriflorum*
Cat Briar	Genus *Smilax*
Common Blue Violet	*Viola sororia*
Cow Vetch	*Vicia cracca*
Crown Vetch	*Securigera varia*
Daisy Fleabane	*Erigeron annuus*
Deptford Pink	*Dianthus armeria*
Dew Berry	*Rubus* sect. *Eubatus*
False Solomon Seal	*Maianthemum racemosum*
Ground Nut	*Apios americana*
Hyssop Leaved Thoroughwort	*Eupatorium hyssopifolium*
Indian Pipe	*Monotropa uniflora*
Kidney Leaved Buttercup	*Ranunculus abortivus*
Little Blue Stem Grass	*Schizachyrium scoparium*
Morning Glory	Family *Convolvulaceae*
Orange Hawkweed	*Pilosella aurantiaca*
Poke Berry	*Phytolacca americana*
Prickly Pear Cactus	Genus *Opuntia*
Queen Anne's Lace	*Daucus carota*
Rabbits Foot Clover	*Trifolium arvense*
Red Clover	*Trifolium pratense*
Smaller Pussy Toes	*Antennaria parvifolia*
Smooth Solomons Seal	*Polygonatum biflorum*
Spotted Wintergreen	*Chimaphila maculata*

Common Name	Scientific Name
Spiderwort	Genus *Tradescantia*
Sweet Goldenrod	*Solidago odora*
Sweet Everlasting	*Pseudognaphalium obtusifolium*
Sweet Pea	*Lathyrus odoratus*
Virginia Creeper	*Parthenocissus quinquefolia*
White Clover	*Trifolium repens*
White Snakeroot	*Ageratina altissima*
Wild Garlic	Genus *Allium*
Yarrow	*Achillea millefolium*

Source: Old Pine Farm Natural Lands Trust, http://www/bigtimbercreek.org, N.D.

Wetland Plants

Common Name	Scientific Name
Arrow-Leaved Tearthumb	*Polygonum sagittatum*
Broad-Leaved Arrowhead	*Sagittaria latifolia*
Cattail	Genus *Typha*
Common Blue Violet	*Viola sororia*
Cow Parsley	*Anthriscus sylvestris*
Dodder	Genus *Dodder*
Fringed Loosestrife	*Lysimachia ciliata*
Green Coneflower	*Rudbeckia laciniata*
Green Amaranth	*Amaranthus viridis*
Jack-In-The-Pulpit	*Arisaema triphyllum*
Marsh Marigold	*Caltha palustris*
Pickerelweed	Genus *Pontederia*
Skunk Cabbage	*Symplocarpus foetidus*
Spatterdock	*Nuphar lutea*
Spotted Touch-Me-Not	*Impatiens capensis*
Swamp Rose	*Rosa palustris*
Tall Meadow Rue	*Thalictrum pubescens*
Turks Cap Lily	*Lilium superbum*
Turtlehead	*Chelone glabra*

Common Name	Scientific Name
Water Hemlock	Genus *Cicuta*
Wild Rice	*Zizania aquatica*

Source: Old Pine Farm Natural Lands Trust, http://www/bigtimbercreek.org, N.D.

Shrubs

Common Name	Scientific Name
Arrowwood	*Viburnum dentatum*
Blackberry	*Rubus* sect. *Rubus*
Cat Briar	Genus *Smilax*
Highbush Blueberry	*Vaccinium corymbosum*
Japanese Honeysuckle	*Lonicera japonica*
Perrywinkle	Genus *Vinca*
Poison Ivy	*Toxicodendron radicans*
Staghorn Sumac	*Staghorn Sumac*
Sweet Pepperbush	*Clethra alnifolia*
Virginia Creeper	*Parthenocissus quinquefolia*
Wild Grape	*Vitis aestivalis*
Winged Sumac	*Rhus copallina*
Winterberry	*Ilex verticillata*

Source: Old Pine Farm Natural Lands Trust, http://www/bigtimbercreek.org, N.D.

Trees (excluding oaks)

Common Name	Scientific Name
Ailanthus	Genus *Ailanthus*
American Cherry	*Prunus serotina*
American Holly	*Ilex opaca*
American Walnut	*Juglans nigra*
Beech	*Fagus grandifola*
Black Gum	*Nyssa sylvatica*
Black Locust	*Robinia pseudoacacia*
Blue Spruce	*Picea pungens*
Flowering Dogwood	*Cornus florida*

Common Name	Scientific Name
Mockernut Hickory	*Carya tomentosa*
Mulberry	*Morus rubra*
Norway Maple	*Acer platanoides*
Red Cedar	*Juniperus virginiana*
Red Maple	*Acer rubrum*
Sassafras	*Sassafras albidum*
Sweet Gum	*Liquidambar styraciflua*
Sycamore	*American sycamore*
Virginia Pine	*Pinus virginiana*

Source: Old Pine Farm Natural Lands Trust, http://www/bigtimbercreek.org, N.D.

Oaks

Common Name	Scientific Name
Blackjack Oak	*Quercus marilandica*
Black Oak	*Quercus velutina*
Chestnut Oak	*Quercus prinus*
Northern Red Oak	*Quercus rubra*
Post Oak	*Quercus stellata*
Scarlet Oak	*Quercus coccinea*
Southern Red Oak	*Quercus falcata*
White Oak	*Quercus alba*

Source: Old Pine Farm Natural Lands Trust, http://www/bigtimbercreek.org, N.D.

APPENDIX F

Vertebrate Animals Observed or Probable in Deptford Township

Mammals

Common Name	Scientific Name	Habitat
Chipmunk	*Tamias striatus*	Woodlands
Cotton Tail Rabbit	*Sylvilagus floridanus*	All Habitats
Field Mouse	*Microtus pennsylvanicus*	All Habitats
Gray Squirrel	*Sciurus carolinensis*	Woodlands, Residential Areas
Muskrat	*Ondatra zibethicus*	Wetlands
Opossum	*Didelphis marsupialis*	All Habitats
Raccoon	*Procyon lotor*	All Habitats
Red Fox	*Vulpes vulpes*	All Habitats
White-Tail Deer	*Odocoileus virginianus*	Woodlands

Source: Old Pine Farm Natural Lands Trust, "An Environmental Tour of the Watersheds of Deptford Township," Michael A. Hogan and the Deptford Township Environmental Commission. N.D.

Birds

Common Name	Scientific Name	Habitat	Notes
Acadian Flycatcher	*Empidonax virescens*	Swampy Woodlands	
Alder Flycatcher	*Empidonax alnorum*	Swampy Woodlands	
American Bittern	*Botaurus lentiginosus*	Marshes	Waterfowl
American Black Duck	*Anas rubripes*	Marsh, Lakes	Waterfowl
American Black Duck / Mallard Hybrid		Marsh, Lakes, Wetlands	Waterfowl
American Crow	*Corvus brachyrhynchos*	All Habitats	
American Kestrel	*Falco sparverius*	Open Fields	

Common Name	Scientific Name	Habitat	Notes
American Redstart	*Setophaga ruticilla*	Woodlands	
American Robin	*Turdus migratorius*	All Habitats	
American Widgeon	*Anas americana*	Open Marsh	Uncommon, Waterfowl
American Woodcock	*Scolopax minor*	Wetland Forests	Uncommon
Bald Eagle	*Haliaeetus leucocephalus*	Forested Water Edges	Uncommon
Baltimore Oriole	*Icterus galbula*	Woodlands	
Bank Swallow	*Riparia riparia*	Existing Cavities	
Barn Owl	*Tyto alba*	Farmland	Uncommon
Barn Swallow	*Hirundo rustica*	Farmland	
Barred Owl	*Strix varia*	Wetland Forests	Uncommon
Belted King Fisher	*Megaceryle alcyon*	Wetlands	
Black Crowned Night Heron	*Nycticorax nycticorax*	Wetlands	Uncommon, Waterfowl
Black Vulture	*Coragyps atratus*	Open Fields	
Black-and-White Warbler	*Mniotilta varia*	Woodlands	
Blue Jay	*Cyanocitta cristata*	Woodlands	
Blue Grosbeak	*Guiraca caerulea*	Woodland Edges, Landfills	
Blue-Gray Gnatcatcher	*Polioptila caerulea*	Forest	
Blue-Winged Warbler	*Vermivora pinus*	Woodlands	
Broad-winged Hawk	*Buteo platypterus*	Woodlands	Uncommon
Brown Creeper	*Certhia americana*	Woodlands	Uncommon
Brown Headed Cowbird	*Molothrus ater*	Open Fields	
Brown Thrasher	*Toxostoma rufum*	Woodlands	
Bufflehead	*Bucephala albeola*	Open Water	Uncommon, Waterfowl
Canada Goose	*Branta canadensis*	Open Water, Fields	
Canvasback	*Aythya valisineria*	Open Marsh	Uncommon, Waterfowl
Carolina Chickadee	*Poecile carolinensis*	Woodlands	
Carolina Wren	*Thryothorus ludovicianus*	Edge of Woodlands	
Cattle Egret	*Bubulcus ibis*	Open Fields, Farms	Uncommon, Waterfowl
Cedar Waxwing	*Bombycilla cedrorum*	Old Fields, Young Woodlands	Uncommon
Chimney Swift	*Chaetura pelagica*	Developed Areas	Uncommon
Chipping Sparrow	*Spizella passerina*	Woodlands	
Cliff Swallow	*Petrochelidon pyrrhonota*	Open Fields, Water Edges	

Common Name	Scientific Name	Habitat	Notes
Common Goldeneye	*Bucephala clangula*	Open Water	Uncommon, Waterfowl
Common Grackle	*Quiscalus quiscula*	All Habitats	
Common Merganser	*Mergus merganser*	Lakes, Rivers	Uncommon, Waterfowl
Common Nighthawk	*Chordeiles minor*	Open Fields, Developed Areas	
Common Tern	*Sterna hirundo*	Rivers, Lakes, Coasts	
Common Yellowthroat	*Geothlypis trichas*	Marshes	
Cooper's Hawk	*Accipiter cooperii*	Edge of Woodlands	Uncommon
Double Crested Cormorant	*Phalacrocorax auritus*	Rivers, Lakes, Coast	Waterfowl
Downy Woodpecker	*Picoides pubescens*	Woodlands	
Eastern Bluebird	*Sialia sialis*	Edge of Woodlands	
Eastern Kingbird	*Tyrannus tyrannus*	Open Fields	
Eastern Meadowlark	*Sturnella magna*	Open Fields, Marshes	
Eastern Phoebe	*Sayornis phoebe*	Edge of Woodlands	
Eastern Screech Owl	*Megascops asio*	Woodlands	
Eastern Towhee	*Pipilo erythrophthalmus*	Woodlands	
Eastern Wood–Pewee	*Contopus virens*	Edge of Woodlands	
European Starling	*Sturnus vulgaris*	All Habitats	
Field Sparrow	*Spizella pusilla*	Old fields	
Fish Crow	*Corvus ossifragus*	Woodlands, Water Edges	
Goldfinch	*Carduelis tristis*	Open Fields	
Grasshopper Sparrow	*Ammodramus savannarum*	Fields, Airport	
Gray Catbird	*Dumetella carolinensis*	Shrublands, Edge of Woodlands	
Great Blue Heron	*Ardea herodias*	Open Marsh, Lake Edges	Waterfowl
Great Crested Flycatcher	*Myiarchus crinitus*	Woodlands	
Great Egret	*Ardea alba*	Marshes, Lake Edges	Uncommon, Waterfowl
Great Horned Owl	*Bubo virginianus*	Woodlands	
Greater Yellowlegs	*Tringa melanoleuca*	Marshes, Water Edges	
Green Heron	*Butorides virescens*	Open Marsh, Lake Edges	Uncommon, Waterfowl
Green-Winged Teal	*Anas carolinensis*	Wetlands	Uncommon, Waterfowl
Hairy Woodpecker	*Picoides villosus*	Woodlands	
Hermit Thrush	*Catharus guttatus*	Woodlands	

Common Name	Scientific Name	Habitat	Notes
Herring Gull	*Larus argentatus*	Water Edges, Landfills	
Hooded Merganser	*Lophodytes cucullatus*	Marshes, Lakes	Uncommon, Waterfowl
Hooded Warbler	*Wilsonia citrine*	Swampy Woodlands	
House Finch	*Carpodacus mexicanus*	Open Areas	
House Sparrow	*Passer domesticus*	Old Fields, Developed Areas	
House Wren	*Troglodytes aedon*	Edge of Woodlands	
Indigo Bunting	*Passerina cyanea*	Open Areas, Edge of Woodlands	Uncommon
Kentucky Warbler	*Oporornis formosus*	Swampy Woodlands	
Killdeer	*Charadrius vociferus*	Bare Ground, Lake Edges	
Laughing Gull	*Leucophaeus atricilla*	Open Water, Parking Lots	
Least Bittern	*Ixobrychus exilis*	Open Marsh, Lake Edges	Uncommon, Waterfowl
Least Flycatcher	*Empidonax minimus*	Edge of Woodlands	
Long-Eared Owl	*Asio otus*	Forest Edges	Uncommon
Mallard Duck	*Anas platyrhynchos*	Wetlands, Lakes	Waterfowl
Marsh Hawk	*Circus cyaneus*	Open Fields, Marshes	
Marsh Wren	*Cistothorus palustris*	Marshes	
Merlin	*Falco columbarius*	Open Fields	
Mockingbird	*Mimus polyglottos*	Edge of Woodlands	
Mourning Dove	*Zenaida macroura*	All Habitats	
Northern Bobwhite	*Colinus virginianus*	Shrublands, Edge of Woodlands	Uncommon
Northern Cardinal	*Cardinalis cardinalis*	Woodlands, Shrublands	
Northern Flicker	*Colaptes auratus*	Wooded Areas	
Northern Goshawk	*Accipiter gentilis*	Woodlands	Uncommon
Northern Harrier	*Circus cyaneus*	Marshes	
Northern Parula	*Parula americana*	Swampy Woodlands	
Northern Pintail	*Anas acuta*	Open Marsh	Uncommon, Waterfowl
Northern Rough-Winged Swallow	*Stelgidopteryx serripennis*	Existing Cavities, Water Edges	
Northern Shoveler	*Anas clypeata*	Marshes, Water Edges	
Orchard Oriole	*Icterus spurius*	Woodlands	Uncommon
Osprey	*Pandion haliaetus*	Open Water	Uncommon
Ovenbird	*Seiurus aurocapillus*	Woodlands	

Common Name	Scientific Name	Habitat	Notes
Pie-Billed Grebe	*Podilymbus podiceps*	Open Water	Uncommon, Waterfowl
Pine Warbler	*Dendroica pinus*	Woodlands	
Prairie Warbler	*Dendroica discolor*	Open Fields, Forest Edges	
Purple Martin	*Progne subis*	Open Fields, Martin Houses	
Red-Bellied Woodpecker	*Melanerpes carolinus*	Woodlands	
Red-Breasted Merganser	*Mergus serrator*	Lakes, Rivers	Uncommon, Waterfowl
Red-Breasted Nuthatch	*Sitta canadensis*	Coniferous Forests	Uncommon
Red-Eyed Vireo	*Vireo olivaceus*	Woodlands	
Red-Headed Woodpecker	*Melanerpes erythrocephalus*	Edge of Woodlands	
Red-Shouldered Hawk	*Buteo lineatus*	Wetland Forests	Uncommon
Red-Tailed Hawk	*Buteo jamaicensis*	All Habitats	
Red-Winged Blackbird	*Agelaius phoeniceus*	Marshes, Old Fields	
Ring-Necked Pheasant	*Phasianus colchicus*	Old Fields, Farms	Uncommon
Rock Dove	*Columba livia*	Developed Areas	
Rough-Legged Hawk	*Buteo lagopus*	Open Fields	Uncommon, Wintering Only
Ruby-Throated Hummingbird	*Archilochus colubris*	Woodlands and Fields	
Scarlet Tanager	*Piranga olivacea*	Woodlands	Uncommon
Sharp-Shinned Hawk	*Accipiter striatus*	Woodlands	
Short-Eared Owl	*Asio flammeus*	Open Fields	Uncommon
Slate-Colored Junco	*Junco hyemalis hyemalis*	Woodlands	Wintering Only
Snowy Egret	*Egretta thula*	Open Marsh, Lake Edges	Uncommon, Waterfowl
Song Sparrow	*Melospiza melodia*	Old Fields, Marshes, Developed Areas	
Spotted Sandpiper	*Actitis macularia*	Open Water	
Swamp Sparrow	*Melospiza georgiana*	Wetlands	
Tree Swallow	*Tachycineta bicolor*	Wetlands	
Tufted Titmouse	*Baeolophus bicolor*	Woodlands	
Turkey Vulture	*Cathartes aura*	All Habitats	
Veery	*Catharus fuscescens*	Woodlands	
Whip-poor-will	*Caprimulgus vociferus*	Woodlands	Uncommon
White Crowned Sparrow	*Zonotrichia leucophrys*	Shrublands	
White Throat Sparrow	*Zonotrichia albicollis*	Woodlands	Wintering Only

Common Name	Scientific Name	Habitat	Notes
White-Breasted Nuthatch	*Sitta carolinensis*	Woodlands	
White-Eyed Vireo	*Vireo griseus*	Woodlands	
Wild Turkey	*Meleagris gallopavo*	Woodlands	
Willow Flycatcer	*Empidonax traillii*	Woodlands, Marshes	
Wood Duck	*Aix sponsa*	Forested Wetlands	Waterfowl
Wood Thrush	*Hylocichla mustelina*	Woodlands	
Worm-Eating Warbler	*Helmitheros vermivorus*	Woodlands	
Yellow Crowned Night Heron	*Nyctanassa violacea*	Open Marsh	Uncommon, Waterfowl
Yellow Shafted Flicker	*Colaptes auratus*	Woodlands	
Yellow Warbler	*Dendroica petechia*	Woodlands, Water Edges	
Yellow-Bellied Sapsucker	*Sphyrapicus varius*	Woodlands	
Yellow-Billed Cuckoo	*Coccyzus americanus*	Woodlands	
Yellow-Breasted Chat	*Icteria virens*	Open Fields, Marsh Edges	

Source: Edward Cleary, Old Pine Farm Natural Lands Trust, 2009, Walsh, Joan, et al. *Birds of New Jersey*, 1999.

Reptiles

Common Name	Scientific Name	Habitat
Box Turtle	*Terrapene carolina*	Woodlands
Garter Snake	*Thamnophis sirtalis*	All Habitats
Milk Snake	*Lampropeltis triangulum*	Woodlands
Painted Turtle	*Chrysemys picta*	Lakes and Ponds
Red-Bellied Turtle	*Pseudemys rubriventris*	Wetlands
Snapping Turtle	*Chelydra serpentina*	Lakes and Ponds

Source: Old Pine Farm Natural Lands Trust, NJ Dept. of Fish and Wildlife Landscape Project, 2009.

Fish

Common Name	Scientific Name
Alewife	*Alosa pseudoharengus*
American brook lamprey	*Lampetra appendix*
American eel	*Anguilla rostrata*
American shad	*Alosa sapidissima*

Common Name	Scientific Name
Banded killfish	*Fundulus diaphanus*
Banded sunfish	*Enneacanthus obesus*
Black crappie	*Pomoxis nigromaculatus*
Blueback herring	*Alosa aestivalis*
Bluegill	*Lepomis macrochirus*
Bluespotted sunfish	*Enneacanthus gloriosus*
Bridle shiner	*Notropis bifrenatus*
Brown bullhead	*Ameiurus nebulosus*
Carps and Minnows	Family *Cyprinidae*
Chain pickerel	*Esox niger*
Channel catfish	*Ictalurus punctatus*
Common carp	*Cyprinus carpio*
Common shiner	*Luxilus cornutus*
Creek chubsucker	*Erimyzon oblongus*
Eastern mudminnow	*Umbra pygmaea*
Eastern silvery minnow	*Hybognathus regius*
Fallfish	*Semotilus corporalis*
Freshwater eels	Family *Anguillidae*
Gizzard shad	*Dorosoma cepedianum*
Golden shiner	*Notemigonus crysoleucas*
Goldfish	*Carassius auratus*
Herrings	Family *Clupeidae*
Ironcolor shiner	*Notropis chalybaeus*
Lampreys	Family *Petromyzontidae*
Largemouth bass	*Micropterus salmoides*
Margined madtom	*Noturus insignis*
Mudminnows	Family *Umbridae*
Mummichog	*Fundulus heteroclitus*
North American Catfishes	Family *Ictaluridae*
Perches	Family *Percidae*
Pikes	Family *Esocidae*
Pirate Perch	*Aphredoderus sayanus*
Pirate Perches	Family *Aphredoderidae*

Common Name	Scientific Name
Pumpkinseed	*Lepomis gibbosus*
Redbreast sunfish	*Lepomis auritus*
Redfin pickerel	*Esox americanus*
Satinfish shiner	*Cyprinela analostana*
Sea lamprey	*Petromyzon marinus*
Spottail shiner	*Notropis hudsonius*
Striped bass	*Morone saxatilis*
Suckers	Family *Catostomidae*
Sunfishes	Family *Centrarchidae*
Swallowtail shiner	*Notropis procne*
Swamp darter	*Etheostoma fusiforme*
Tadpole madtom	*Noturus gyrinus*
Temperate Basses	Family *Moronidae*
Tessellated darter	*Etheostoma olmstedi*
Topminnows	Family *Fundulidae*
White catfish	*Ameiurus catus*
White perch	*Morone americana*
White sucker	*Catostomus commersonnii*
Yellow perch	*Perca flavescens*

Source: Rudolf Arndt. "Annotated Checklist and Distribution of New Jersey Freshwater Fishes, With Comments on Abundance." The Bulletin: New Jersey Academy of Science, Spring 2004.

Wildflowers (and selected other plants) found in Deptford Township

Common Name	Scientific Name	Habitat	Blooms In	Other Notes
Arrowwood	*Viburnum dentatum*	Edge of Streams, Lakes	Late Spring	
Blue Flag	*Iris versicolor*	Edge of Ponds, Streams	June	
Bristle-Spiked Cyperus	*Cyperus strigosus*	Near Wetlands	July	
British Soldier Lichen	*Cladonia cristatella*	Soil, Rocks, Dead Wood	N/A	
Broad Leaved Arrowhead (Duck Potatoes)	*Sagittaria latifolia*	Tidal Wetlands	August	
Canada Mayflower	*Maianthemum canadense*	Forests	May	
Cardinal Flower	*Lobelia cardinalis*	Wetlands, Near Wetlands	Late Summer	
Cinnamon Fern	*Osmunda cinnamomea*	Varied	N/A	
Clematis	Genus *Clematis*	Edge of Woodlands	Late Summer	
Common Blue Violet	*Viola sororia*	Wetland Forests, Stream Banks	April	State Flower
Common Reed	*Phragmites australis*	Wetlands	N/A	can crowd out other native species
Cow Wheat	Genus *Melampyrum*	Upland Forest	July	
Daisy Fleabane	*Erigeron annuus*	Fields, Roadsides	Spring-Fall	
Deptford Pink	*Dianthus armeria*	Fields, Roadsides	Summer	introduced from England
Dodder	*Genus Cuscutta*	Other Plants	Varies	parasitic
Field Milkweed	*Asclepias syriaca*	Fields, Roadsides	Summer	

Common Name	Scientific Name	Habitat	Blooms In	Other Notes
Flowering Dogwood	*Cornus florida*	Forests	Early Spring	
Fringed Loosestrife	*Lysimachia ciliata*	Tidal Wetlands	Midsummer	
Groundnut	*Apios americana*	Wetlands	Late Summer	
Heal All	Genus *Stachys*	Fields, Roadsides	June	
Hyssop-leaved Thoroughwort	*Eupatorium hyssopifolium*	Fields, Roadsides	Midsummer	
Indian Cucumber Root	*Medeola virginiana*	Forests	May to June	
Indian Pipe	*Monotropa uniflora*	Moist Pine and Oak Forests	Summer	saprophytic
Jack-In-The Pulpit	*Arisaema triphyllum*	Wetland Forests	Spring	
Japanese Knotweed	*Fallopia japonica*	Varied	Late Summer	invasive
Joe Pye Weed	Genus *Eutrochium*	Wetlands, Stream Banks	Late Summer	
Nodding Lady's Tresses Orchid	*Spiranthes cernua*	Wetlands	September	
Marsh Mallow	*Althaea officinalis*	Tidal Wetlands	July	
Marsh Marigold	*Caltha palustris*	Wetlands	Early April	
May Apple	*Podophyllum peltatum*	Wetlands, Near Wetlands	May	
Monkey Flower	Genus *Mimulus*	Wetlands	June	introduced
Mountain Laurel	*Kalmia latifolia*	Forests	June	
New York Aster	*Symphyotrichum novi-belgii*	Fields	Late Summer	
New York Ironweed	*Vernonia noveboracensis*	Edge of Fields	Late Summer	
Northern White Violet	*Viola pallens*	Wetlands	April	
Pale Smartweed	*Polygonum lapathifolium*	Lakes, Streams	Summer	
Pickerelweed	Genus *Pontederia*	Lakes, Streams	June	
Pink Azalea (Pinxter Flower)	*Rhododendron periclymenoides*	Wetlands, Stream Banks	June	
Pink Lady's Slipper (Moccasin Flower)	*Cypripedium acaule*	Forests	May	

Common Name	Scientific Name	Habitat	Blooms In	Other Notes
Pointed Blue Eye Grass	*Sisyrinchium montanum*	Wetlands, Edge of Ponds	June	
Purple Loosestrife	*Lythrum salicaria*	Wetlands	Summer	invasive
Pyxie-Cup Lichen	*Cladonia asahinae*	Soil, Rocks, Dead Wood	N/A	
Queen Anne's Lace	*Daucus carota*	Fields, Roadsides	Midsummer	
Rabbits Foot Clover	*Trifolium arvense*	Fields, Roadsides	Summer	
Rattlesnake Orchid	*Goodyera pubescens*	Wetland Forests	July	
Red Clover	*Trifolium pratense*	Fields, Roadsides	Summer	
Seedbox	*Ludwigia alternifolia*	Wetlands	July	
Skunk Cabbage	*Symplocarpus foetidus*	Wetlands	Late Winter	
Smooth Solomon's Seal	*Polygonatum biflorum*	Wetland Forests	May	
Sneezeweed	*Achillea ptarmica*	Wetlands, Stream Banks	Late Summer	
Soft Rush	*Juncus effusus*	Wetlands	July	
Spotted Touch-Me-Not	*Impatiens capensis*	Wetlands, Stream Banks		
Spotted Wintergreen	*Chimaphila maculata*	Upland Forest	June	
Spring Beauty	Genus *Claytonia*	Wetlands, Stream Banks		
Swamp Azalea	*Rhododendron viscosum*	Wetlands, Stream Banks	June	
Swamp Loosestrife	*Lysimachia terrestris*	Edge of Streams, Lakes		
Swamp Milkweed	*Asclepias incarnata*	Wetlands	June	
Swamp Pink	*Helonias bullata*	Sensitive Wetlands	Late March	state-endangered
Swamp Rose	*Rosa palustris*	Wetlands, Stream Banks	Midsummer	
Sweet Pepperbush	*Clethra alnifolia*	Streams, Lakes, Wetlands	July	
Sweet White Clover	*Melilotus albus*	Fields, Roadsides	Summer	invasive
Sweet Yellow Clover	*Melilotus officinalis*	Fields, Roadsides	Summer	

Common Name	Scientific Name	Habitat	Blooms In	Other Notes
Sweetbay Magnolia	*Magnolia virginiana*	Forests	June	
Turtlehead	Genus *Chelone*	Wetlands, Stream Banks	August	
White Clover	*Trifolium repens*	Fields, Roadsides	Summer	
Wild Geranium	*Geranium maculatum*	Forests	May	
Wild Mint	*Mentha arvensis*	Wetlands	July	
Wood Anemone (Wind Flower)	*Anemone quinquefolia*	Edge of Woodlands	Early Spring	
Yellow Flag	*Iris pseudacorus*	Edge of Ponds, Streams	June	introduced from Europe

Source: "An Environmental Tour of the Watersheds of Deptford Township," Michael A. Hogan and the Deptford Township Environmental Commission. N.D.

APPENDIX H

Closed Known Contaminated Sites in Deptford Township

Name	Address	Home Owner?	Site ID	PI Number
Adrossan Court	Adrossan Ct	Yes	174309	228599
Adrossan Court	Adrossan Ct	Yes	380402	474072
Adrossan Court	Adrossan Ct	Yes	192576	252919
Almonesson Center	200 Hurffville Rd	No	73162	G000030958
Almonesson Road	Almonesson Rd	Yes	259049	331833
Andaloro Way	Andaloro Way	Yes	193638	254305
Atlas Court	Atlas Ct	Yes	363565	449247
B.P Gas And Service Station	Delsea Dr & Hurffville Rd	No	52136	18549
Betty Rose Avenue	Betty Rose Ave	Yes	257170	329393
Byrd Drive	Byrd Dr	Yes	192579	252922
C Abbonizio Contractors Inc	1850 Hurffville Rd	No	53800	22367
Chestnut Avenue	822 Chestnut Ave	No	65691	G000031488
Clean Harbors Environmental Services Inc	2301 Pennsylvania Ave	No	25627	280549
County House Road	County House Rd	Yes	380565	474273
Cranford Court	Cranford Ct	Yes	382884	477721
Crestview Drive	144 Crestview Dr	No	71082	G000009857
Crestview Drive	Crestview Dr	Yes	174258	228540
Custom Business Systems Inc	Broadway & N Evergreen Ave	No	19466	298883
Deptford Pump Station	6th Ave & Lakeview Ave	No	8042	23583
Deptford Twp MUA Well-5	Indian Trail	No	48488	19307
Deptford Twp Municipal Building	1011 Cooper St	No	19138	32325
Disstim Corporation	217 Hurffville Rd	No	64378	G000011417
Edward Lawrenson Inc	1770 Hurffville Rd	No	44975	11572

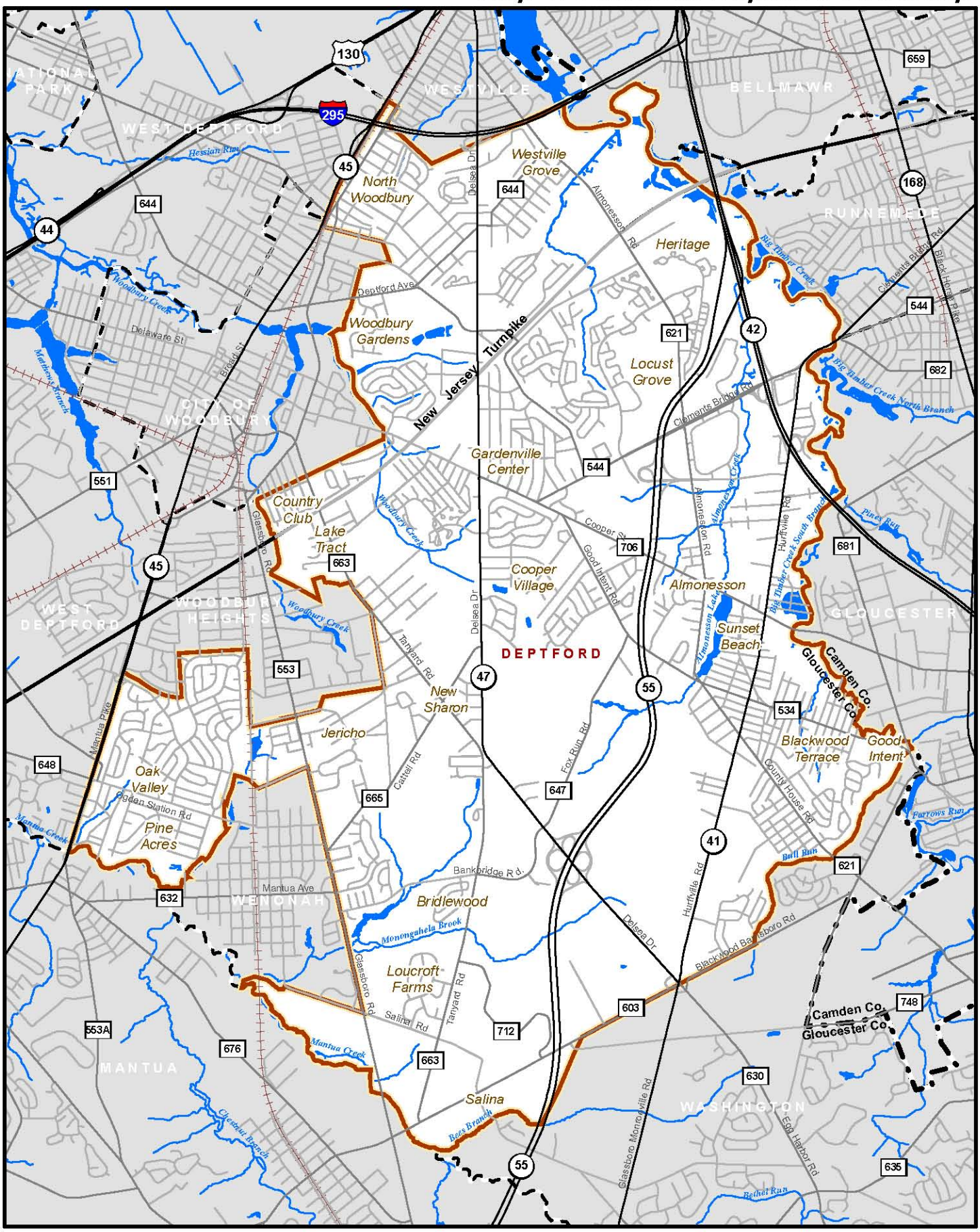
Name	Address	Home Owner?	Site ID	PI Number
Electric Motor Repair Company Inc	217 S Barber Ave	No	76212	G000002482
Ethylene Atlantic Corporation	Hurffville Rd	No	78209	G000026582
Glassboro Road	Glassboro Rd	Yes	415343	520584
Hampshire Court	Hampshire Ct	Yes	185084	243424
Hampshire Dr	Hampshire Dr	Yes	125300	165426
Hampshire Drive	Hampshire Dr	No	403708	505045
Hampshire Drive	Hampshire Dr	No	373473	462786
Hampshire Drive	Hampshire Dr	No	353299	436065
Hampshire Drive	Hampshire Dr	Yes	409265	512303
Hampshire Drive	Hampshire Dr	Yes	228175	298553
Hampshire Drive	Hampshire Dr	Yes	395544	494930
Hampshire Drive	Hampshire Dr	Yes	384051	479260
Hampshire Drive	Hampshire Dr	Yes	146560	193843
Hampshire Drive	Hampshire Dr	Yes	355132	438440
Heritage Dairy Store #1	1110 Delsea Dr	No	391115	488963
Herman Drive	Herman Dr	Yes	215614	281713
Hess Station 30294	1295 Hurffville Rd	No	8043	8795
Highland Avenue	203 Highland Ave	No	87405	G000061063
Howard Avenue	Howard Ave	Yes	394708	493846
James F Messner	1106 Tanyard Rd	No	57471	32701
John Wanamaker	Clements Bridge Rd	No	55180	25339
Leezanne Associates Inc	Delsea Dr	No	52437	19345
Locust Grove Farm	Caulfield Ave	No	74248	G000038150
Lukoil #57364	1395 Hurffville Rd	No	18077	32297
Martys Auto Parts	226 228 Blackwood Barnsboro Rd	No	124050	163891
Mobil Service Station 15-M66	1395 Hurffville Rd	No	18077	31947
Petroplus Inc	409 Delsea Dr	No	44275	9517
Pricketts Ind Tank Cleaning Corp	1940 Harris Dr	No	8052	13283
Red Stone Ridge	Red Stone Ridge	Yes	91583	129506
Redstone Ridge	Redstone Ridge	Yes	372276	461092
Redstone Ridge Drive	101 Redstone Ridge Dr	No	393983	492925
Saint Albans Avenue	104 St Albans Ave	No	74920	G000041625

Name	Address	Home Owner?	Site ID	PI Number
Saint Albans Avenue	St Albans Ave	Yes	125244	165345
Saint John Vianney	2901 Good Intent Rd	No	73716	G000035626
Sam's Club #6670	2000 Clements Bridge Rd	No	343715	9625
Schaeffer Avenue	Schaeffer Ave	Yes	204766	269310
Schurr Truck Sales Inc	Hurffville Rd	No	42088	1920
Sears Roebuck & Co	300 Almonesson Ave	No	8038	5328
Seidel Farms	2056 Delsea Dr	No	144980	240326
Shady Lane	Shady Ln	Yes	164869	216684
Sharpies Pit	Cattell Rd	No	50030	31165
Stonybrook Apartments	801 Cooper St	No	53124	20968
Stoyko Farm	Blackwood Barnsboro Rd	No	94418	133148
Sturbridge Avenue	Sturbridge Ave	Yes	359132	444087
Sturbridge Court	Sturbridge Ct	Yes	126608	167078
Tall Pines Drive	Tall Pines Dr	Yes	342646	423754
Turkey Hill Road	1327 Caulfield Ave	No	40883	G000005072
Twin Cedars Assisted Living	1456 Glassboro Rd	No	130617	173316
Vermont Avenue	Vermont Ave	Yes	198143	260776
Warwick Road	Warwick Rd	Yes	413324	517878
West Jersey Biological Supply Inc	Bark Bridge Rd	No	76860	G000008566
Weststeel Incorporated	Fairview Ave	No	71829	G000014989
Wexford Court	Wexford Ct	Yes	365934	452345
Williams Ave	51 Williams Ave	No	88022	G000061901
Woodbury Lake Road	Woodbury Lake Rd	Yes	122918	161751
Wycombe Ave	103 Wycombe Ave	No	75850	G000060311
Wycombe Court	102 Wycombe Ct	No	74183	G000037796

Source: NJDEP, 2010

Maps

Map 1: Places in Deptford Township



Sources : NJDEP, NJDOT, DVRPC.
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.

Deptford Township

Municipal Boundary

N

0.4 0.2 0 0.4

Miles

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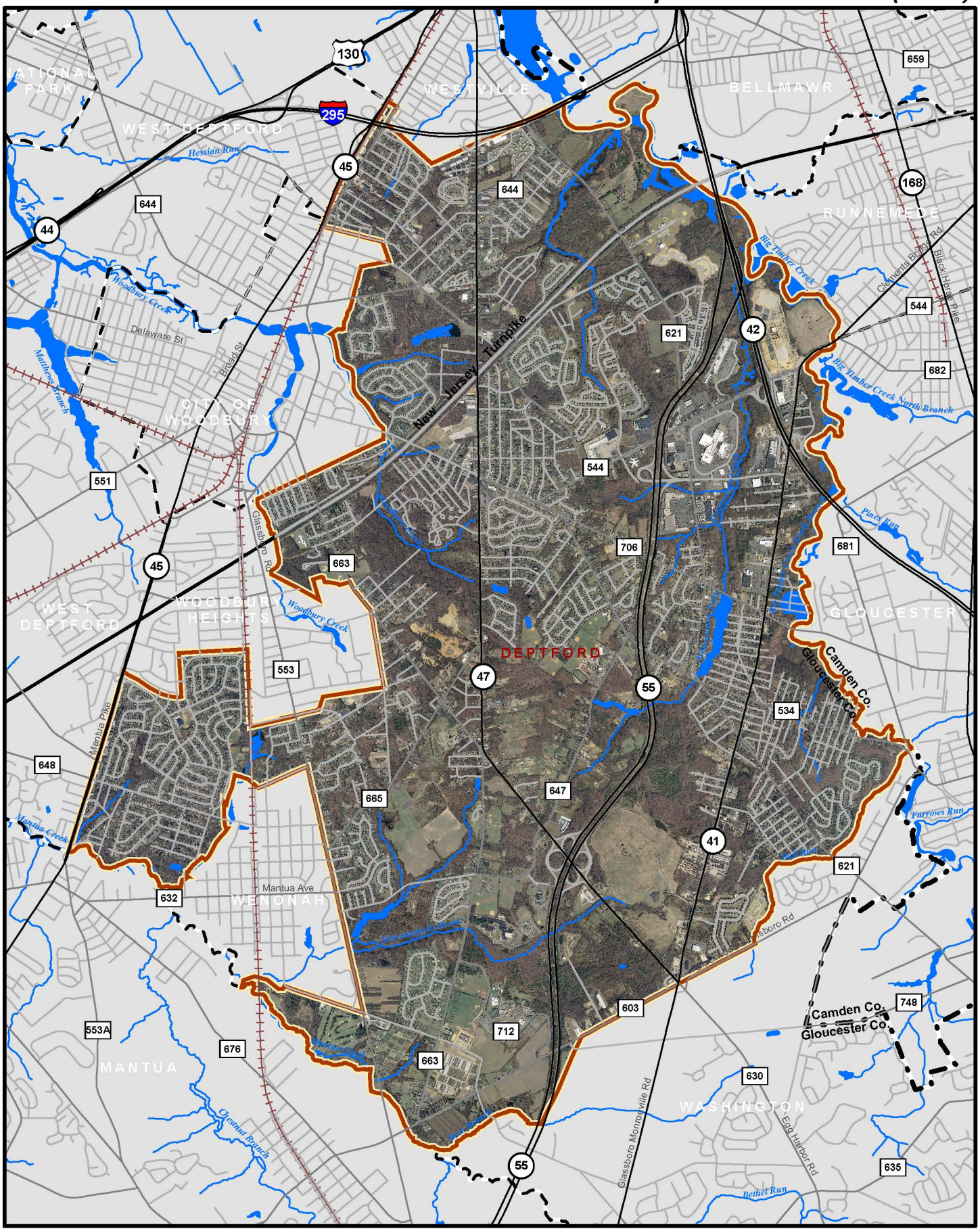
Map 2: Aerial Photo (2007)



Sources : NJDEP, NJDOT, DVRPC.
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Deptford Township

Municipal Boundary

N

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Miles

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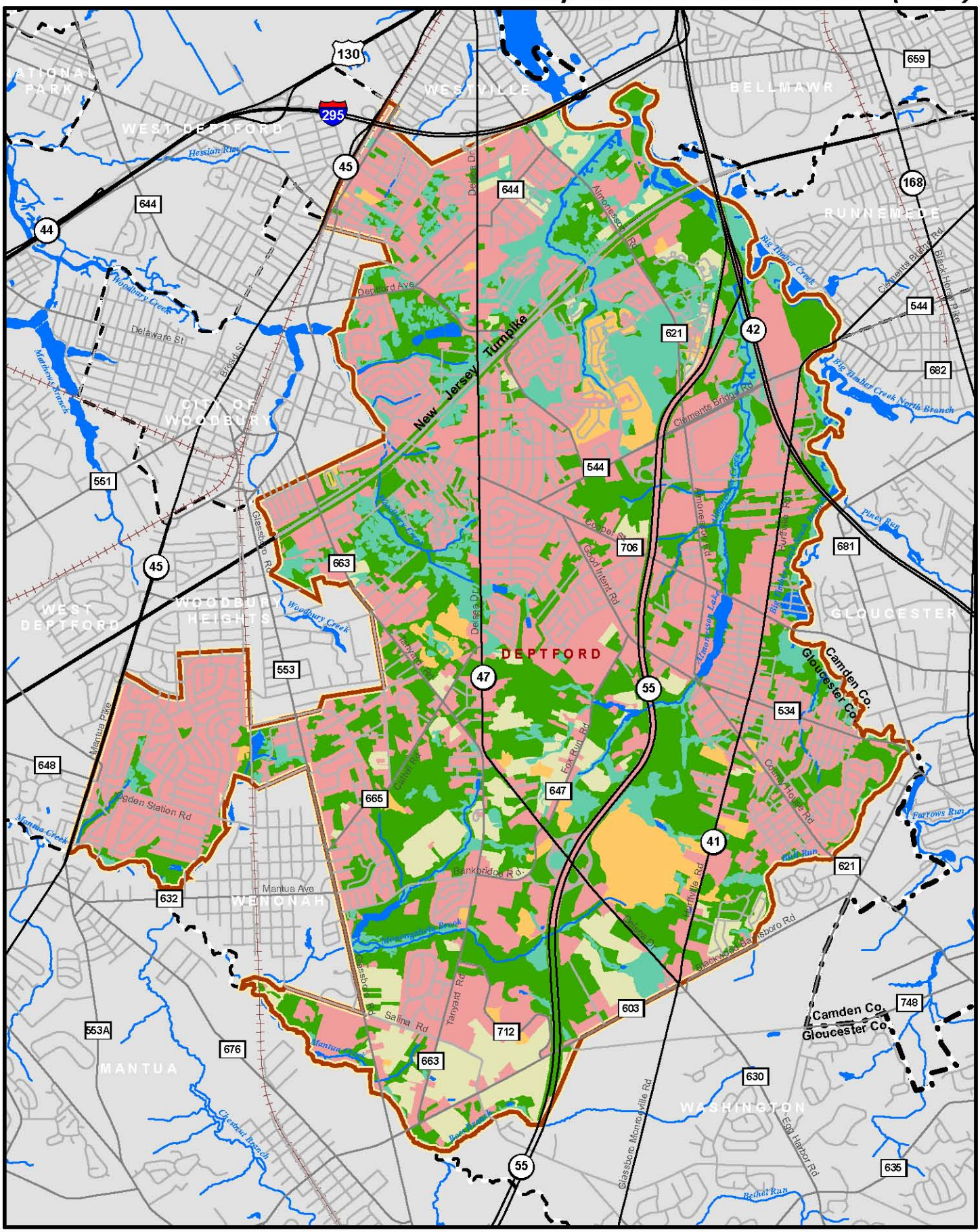
Map 3: NJDEP Land Cover (2007)



Sources : NJDEP, NJDOT, DVRPC.
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.

Land Cover Categories

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

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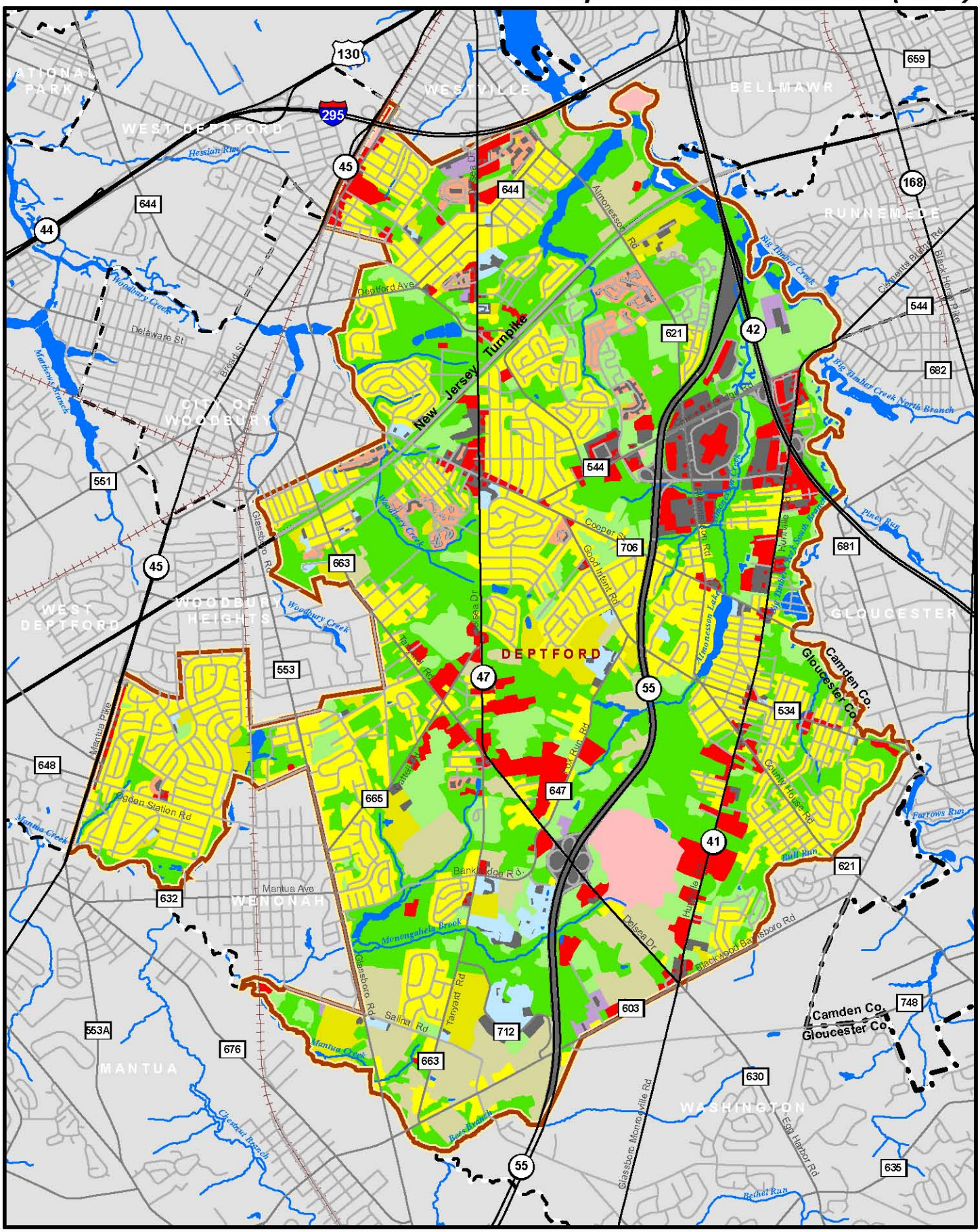
Map 4: DVRPC Land Use (2005)



Sources : NJDEP, NJDOT, DVRPC.
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.

Land Use Type

- Agriculture
- Commercial
- Community
- Light Manufacturing
- Residential: Multi-Family
- Parking & Transportation
- Recreation
- Residential: Single-Family
- Utility
- Vacant
- Water
- Wooded

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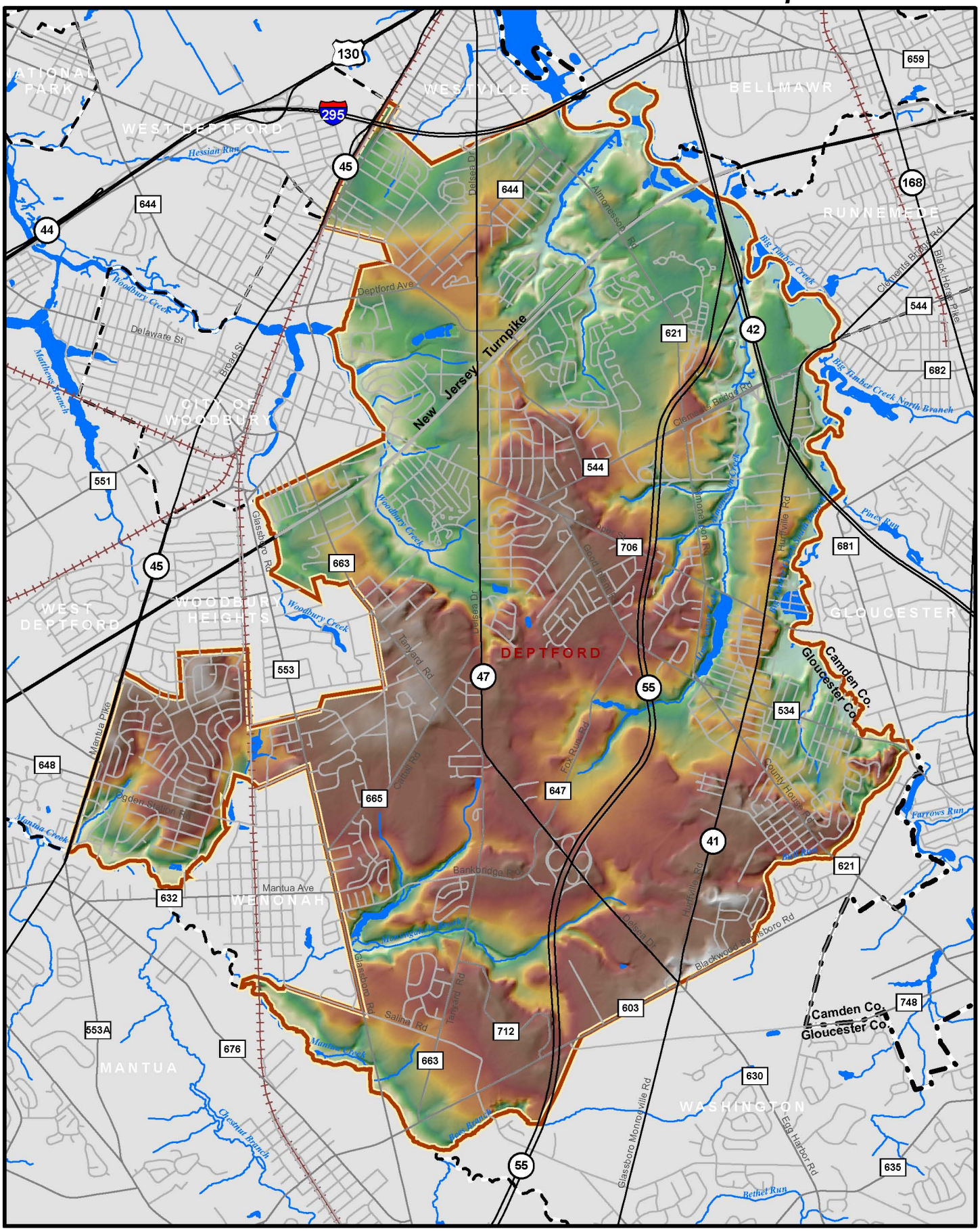
Map 5: Elevation



Sources : NJDEP, NJDOT, DVRPC.
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.

Value (feet above sea level)

High : 124.62

Low : 1.96848

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Miles

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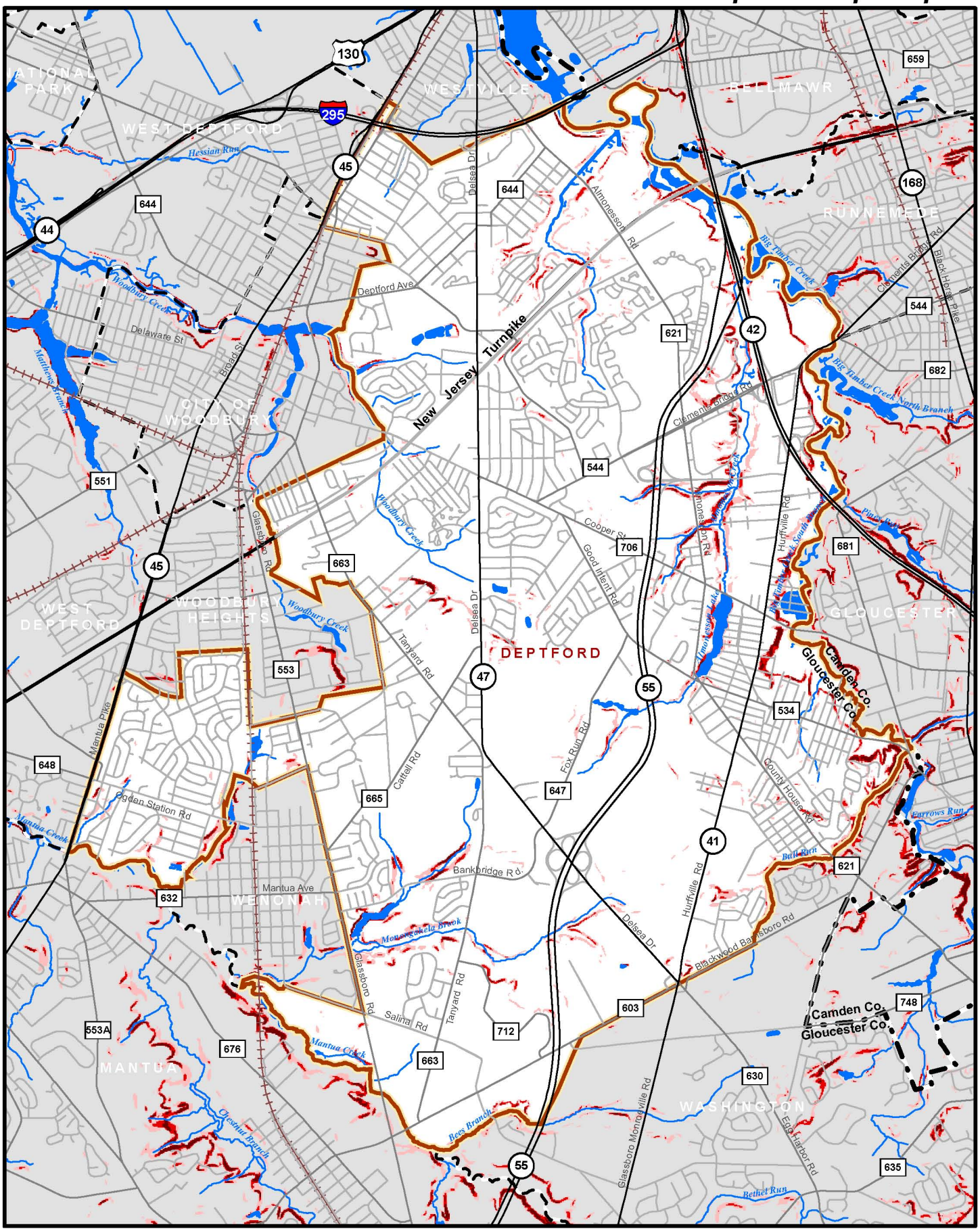
Map 6: Steep Slopes



Sources : NJDEP, NJDOT, DVRPC.
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.

Steep Slopes

- Slope ≤ 10%
- Slope = 10% - 14.99%
- Slope = 15% - 19.99%
- Slope ≥ 20%

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Miles

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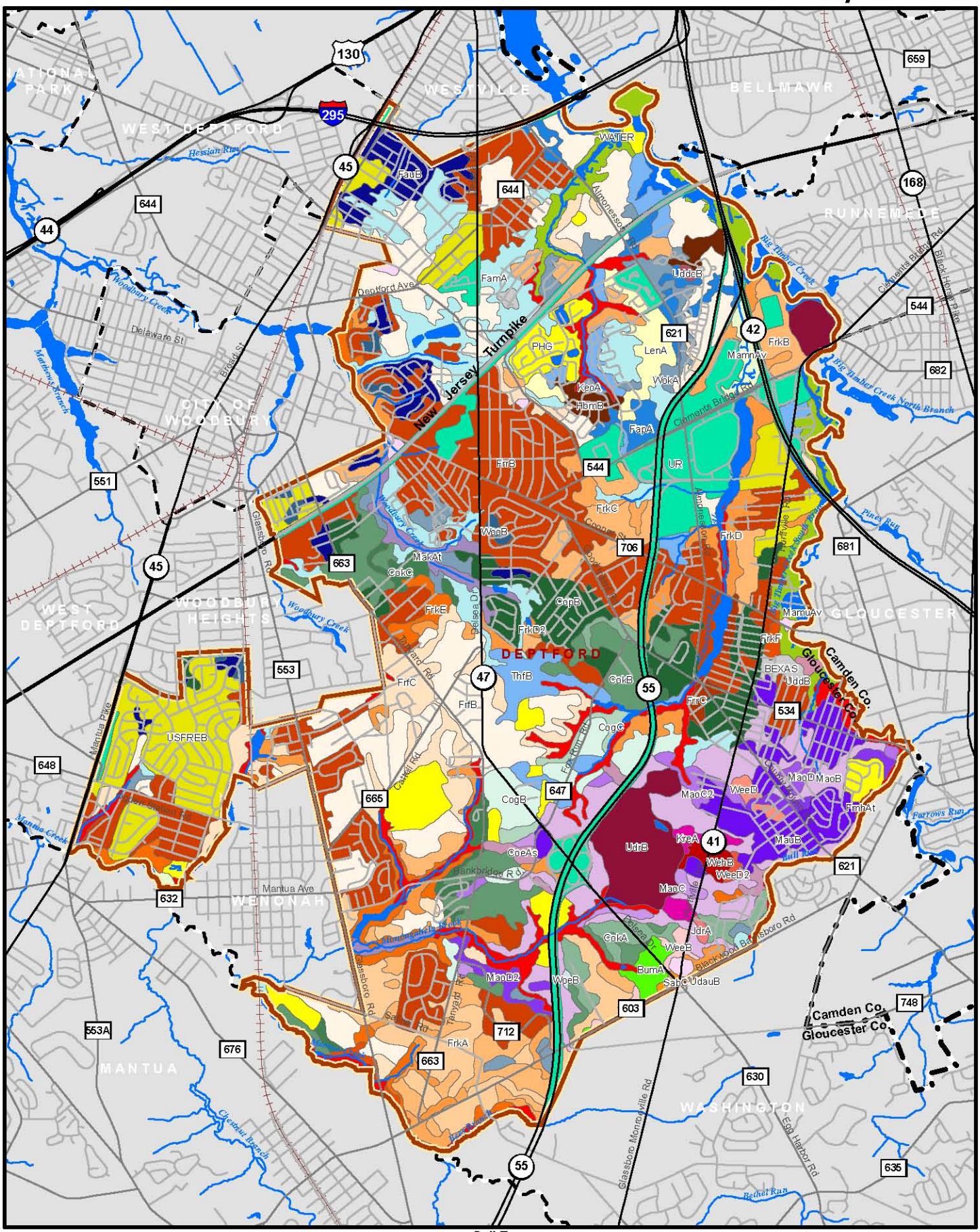
Map 7: Soils



Soil Type

FmhAt	USFREB	SabC	CokC	FrfC	FrkF	MaoC	UddcB	**Woodstown**		
KeoA	CoeAs	WATER	CopB	FrkA	FrnB	MaoC2	UdrB	WbeB		
LenA	KreA	**Collington**	**Fallsington**	FrkB	FrnC	MaoD	**Westphalia**	WokA		
UR	MakAt	CogB	FamA	FrkC	**Mannington-Nanticoke**	MaoD2	WeeB	WboB		
JdrA	BEXAS	CogC	FapA	FrkD	MamnAv	MauB	WeeD			
PHG	ThfB	CokA	FauB	FrkD2	MamuAv	**Udorthents**	WeeD2			
BumA	HbmB	CokB	**Freehold**	FrkE	**Marlton**	UdauB	WehB			
			FrfB		MaoB	UddB				

Sources : NJDEP, NJDOT, DVRPC.
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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Miles

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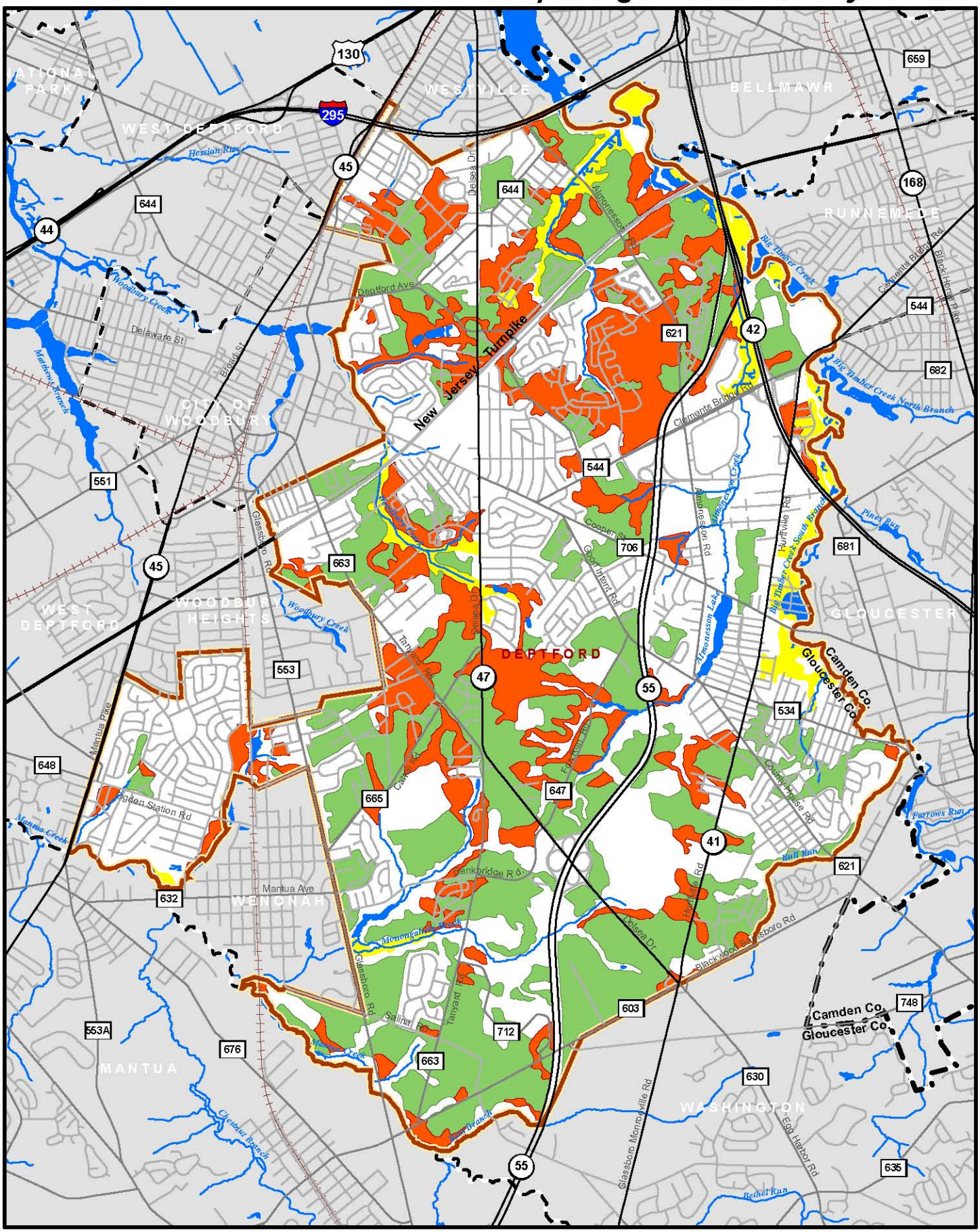
Map 8: Agricultural Quality of Soils



Sources : NJDEP, NJDOT, DVRPC.
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.

Soil Designation

- Prime Farmland
- Farmland of Statewide Importance
- Unique Farmland
- Not Rated for Agricultural Use

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Miles

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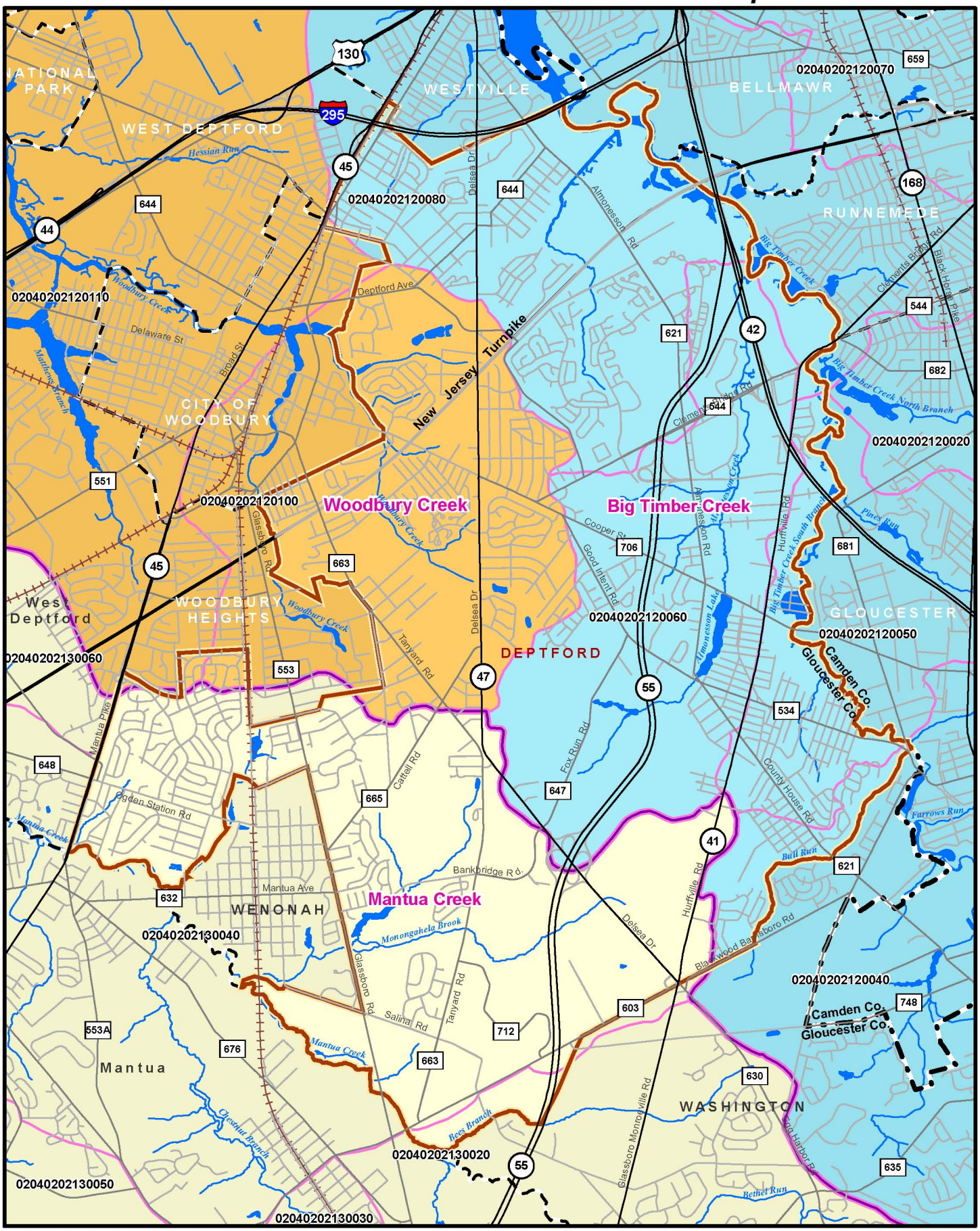
Map 9: Watersheds



Sources : NJDEP, NJDOT, DVRPC.
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.

HUC 11 Watershed

HUC 14 Subwatershed

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Miles

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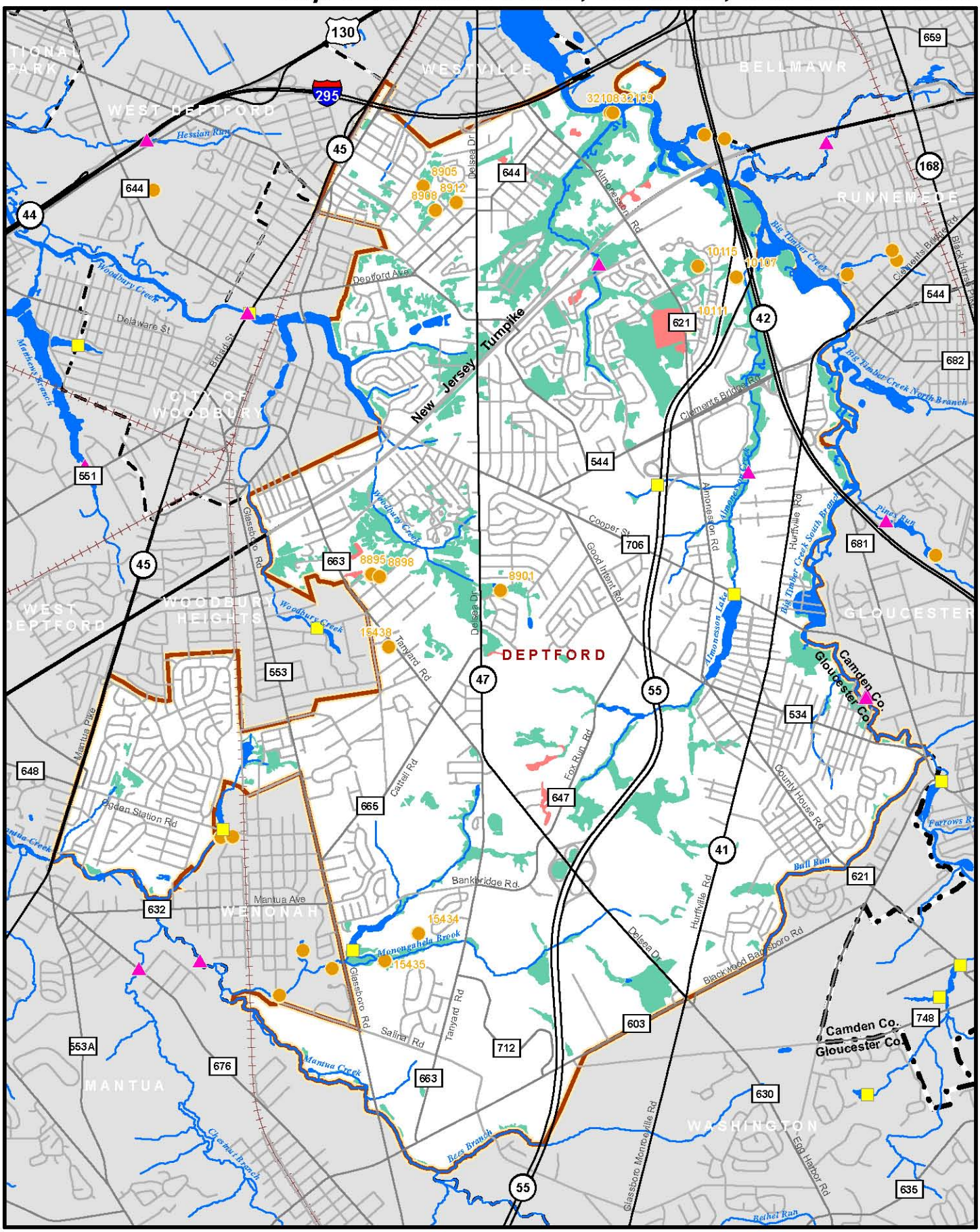
Map 10: Surface Water, Wetlands, and Vernal Pools



Sources : NJDEP, NJDOT, DVRPC.
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.

- Head of Tide
- Dam
- Potential Vernal Pool
- Agricultural Wetlands
- Wetlands

N

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Miles

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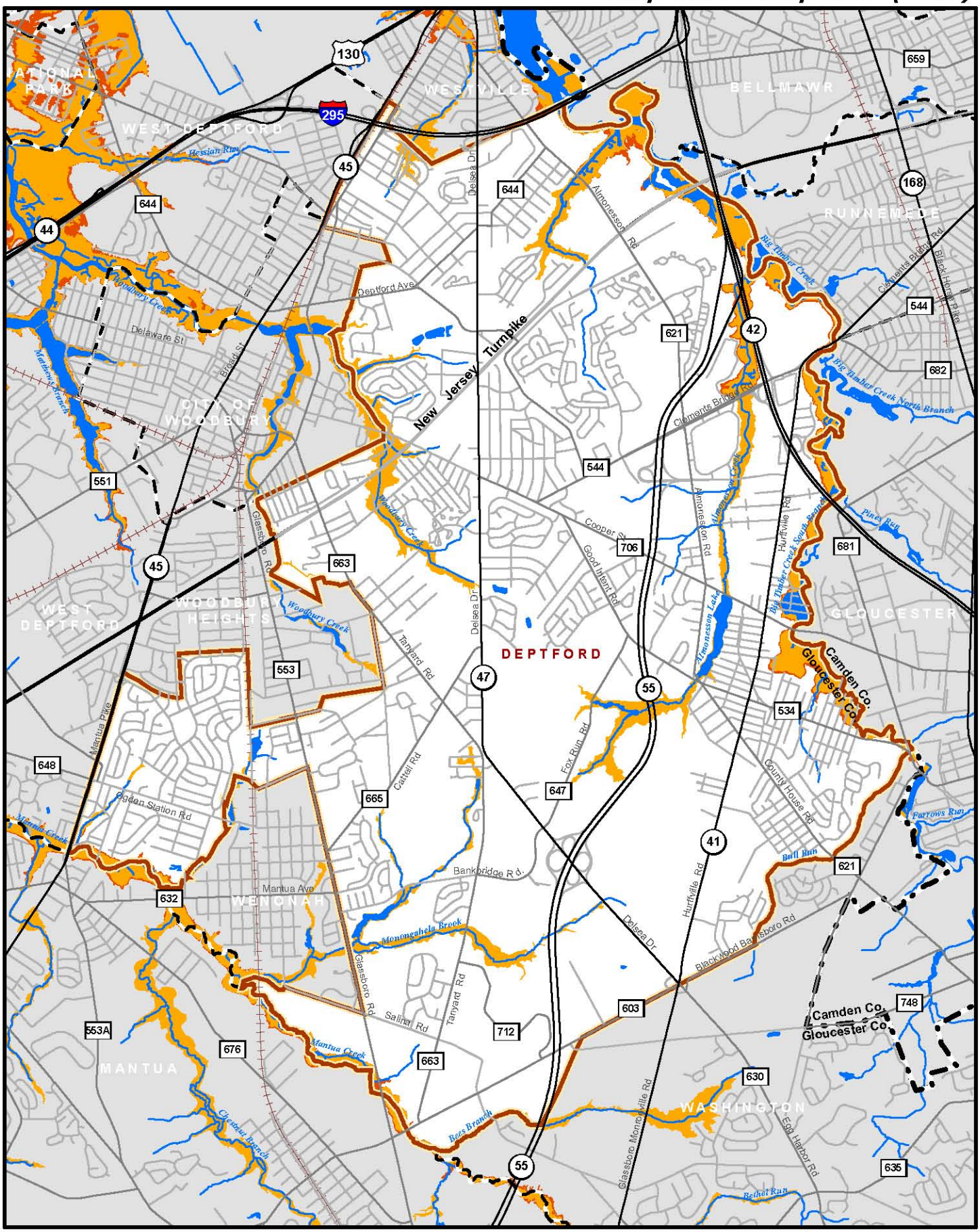
Map 11: Floodplains (2010)



Sources : NJDEP, NJDOT, DVRPC.
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.

Flood Zone

- 100-Year Floodplain
- 500-Year Floodplain

N

0.4 0.2 0 0.4

Miles

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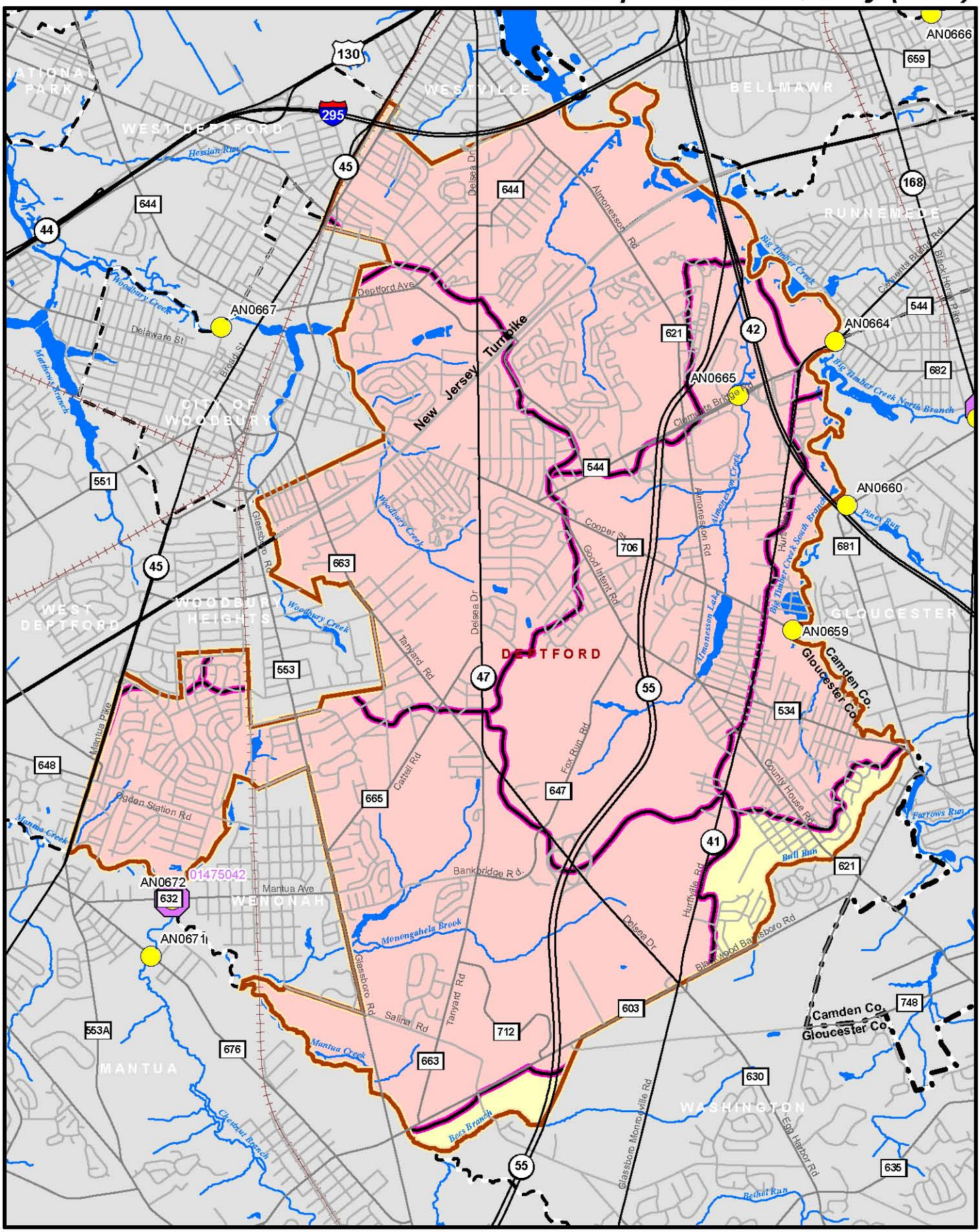
Map 12: Water Quality (2008)



Sources : NJDEP, NJDOT, DVRPC.
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.

- Subwatershed Boundary (HUC 14)
- NJDEP Ambient Biomonitoring Network (AMNET) Sampling Site
- USGS Surface Water Quality Guage (2009)

2008 Integrated Water Quality Report
General Aquatic

- Sublist 4A - Does not attain designated use, but measures have been taken to improve water quality
- Sublist 5 - Does not attain designated use and a TMDL is necessary

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Miles

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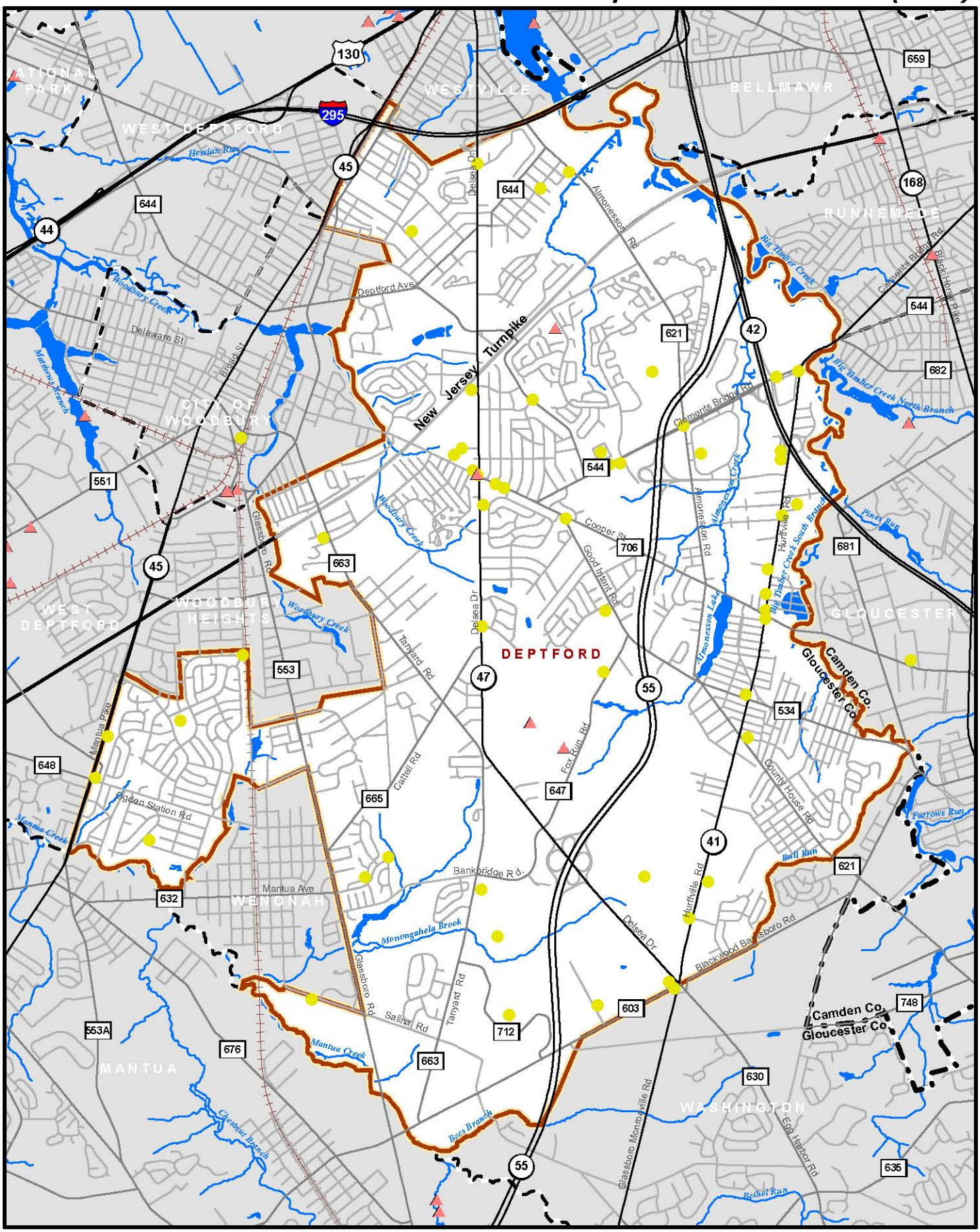
Map 13: Point Sources (2009)



Sources : NJDEP, NJDOT, DVRPC.
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.

- Air Quality Permit Facility
- NJPDES Permit for Discharge to Surface Water (2009)

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Miles

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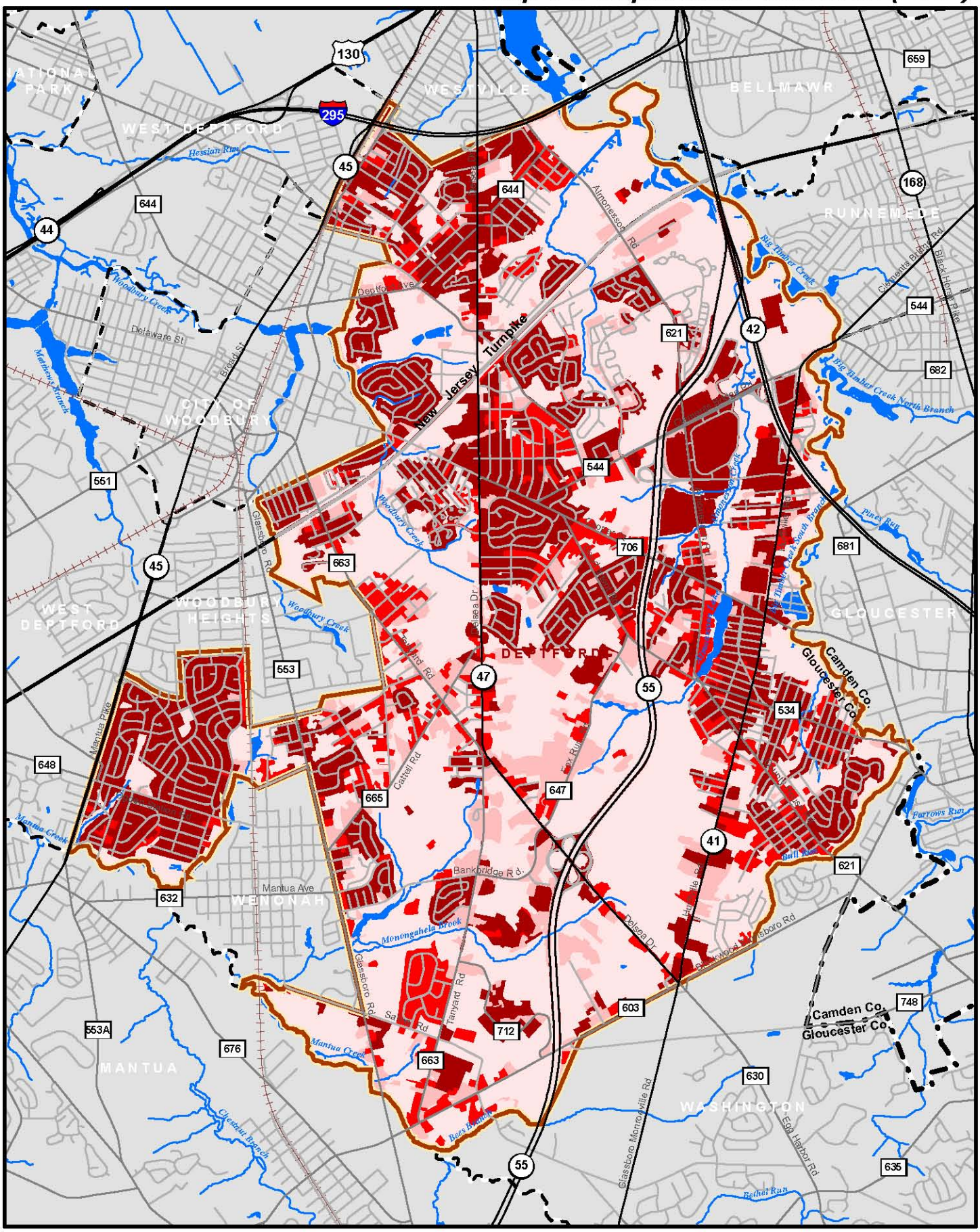
Map 14: Impervious Surfaces (2002)



Sources : NJDEP, NJDOT, DVRPC.
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.

Percent of Impervious Surfaces

- Less than 5%
- 5% - 10%
- 11% - 25%
- Greater than 25%

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Miles

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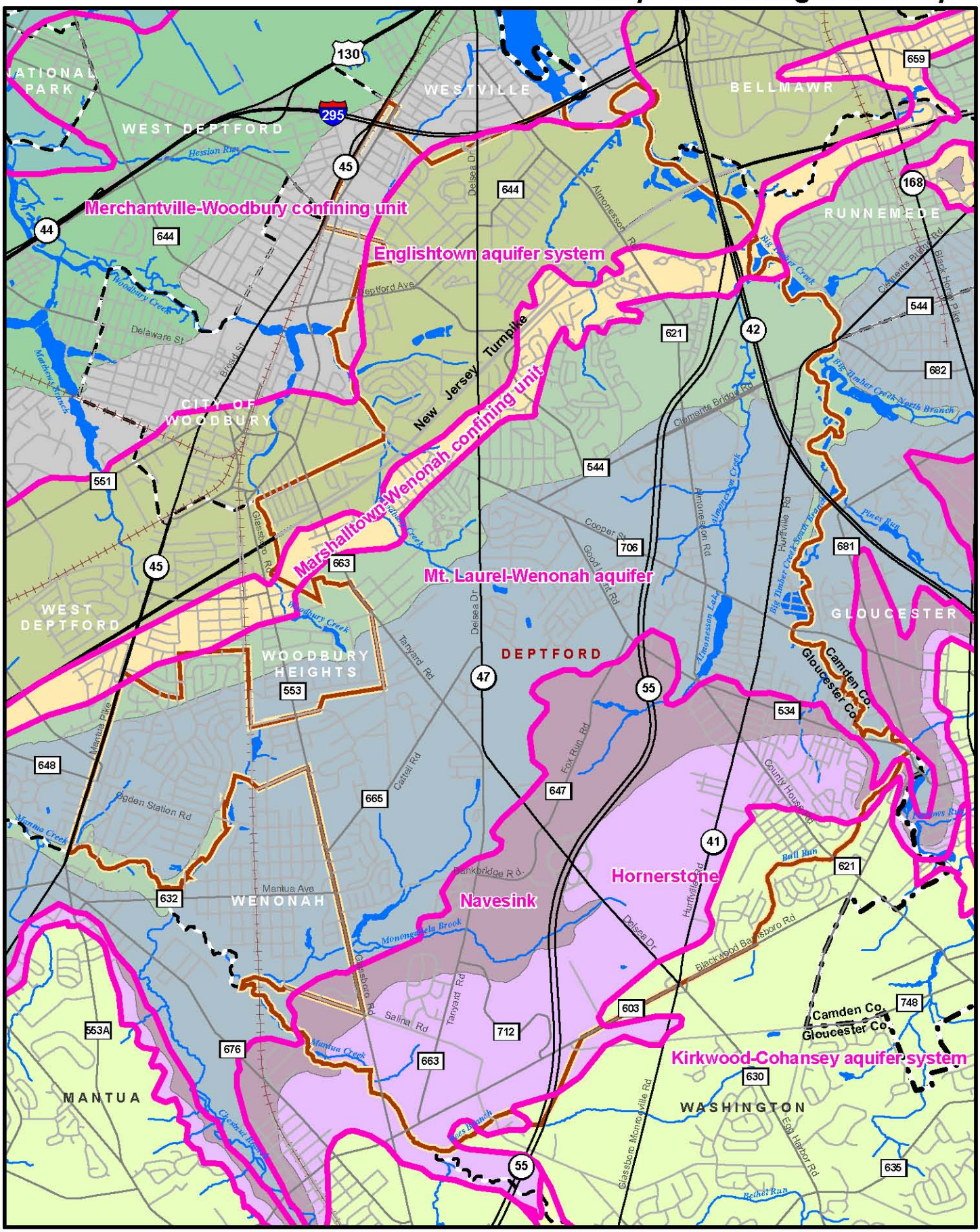
Map 15: Geologic Outcrops



Sources : NJDEP, NJDOT, DVRPC.
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.

Bed Outcrop Formations

- Aquifer
- Englishtown
- Hornerstown
- Lower Member Kirkwood
- Magothy
- Marshalltown
- Merchantville
- Mt. Laurel
- Navesink
- Potomac
- Vincentown
- Wenonah
- Woodbury

N

0.4 0.2 0 0.4

Miles

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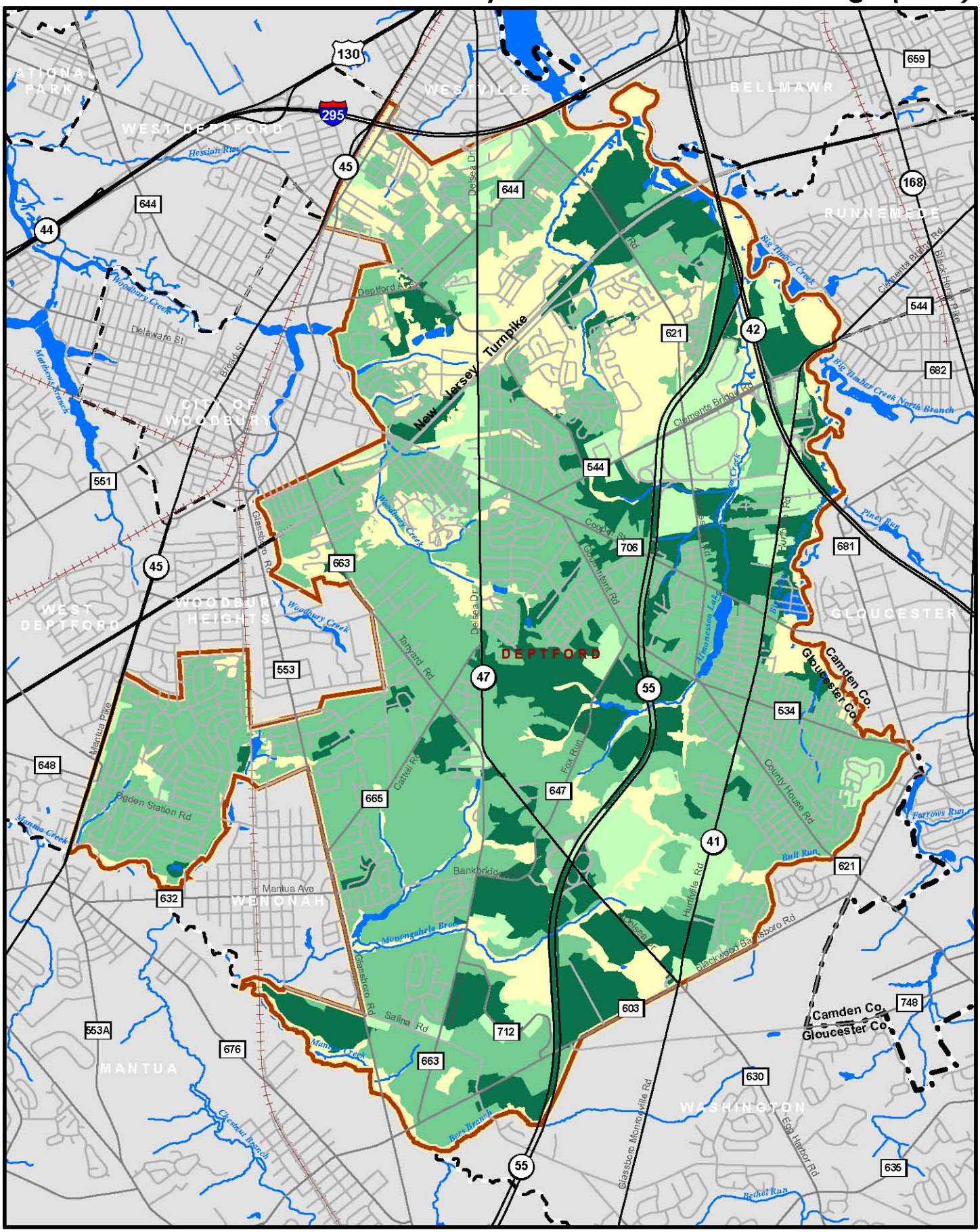
Map 16: Groundwater Recharge (1997)



Sources : NJDEP, NJDOT, DVRPC.
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.

Inches per Year

0 - 1	7 - 10
2 - 6	11 - 18

N

0.4 0.2 0 0.4

Miles

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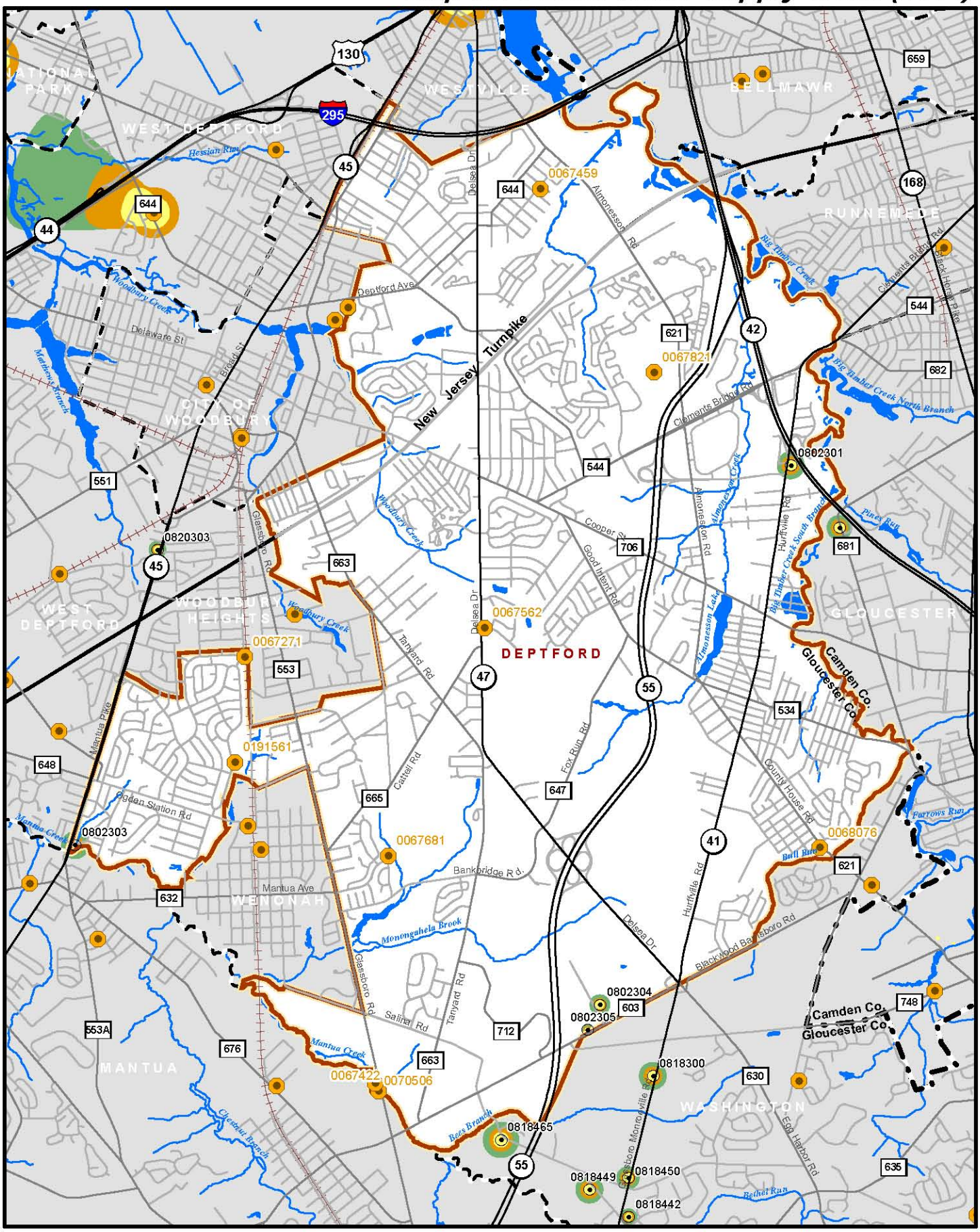
Map 17: Public Water Supply Wells (2004)



Sources : NJDEP, NJDOT, DVRPC.
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.

- Public Non-Community Well
- Public Community Well

Wellhead Protection Areas
Public Community, 2006
Public Non-Community, 2004
- 2-year time of travel
- 5-year time of travel
- 12-year time of travel

N

0.4 0.2 0 0.4
Miles

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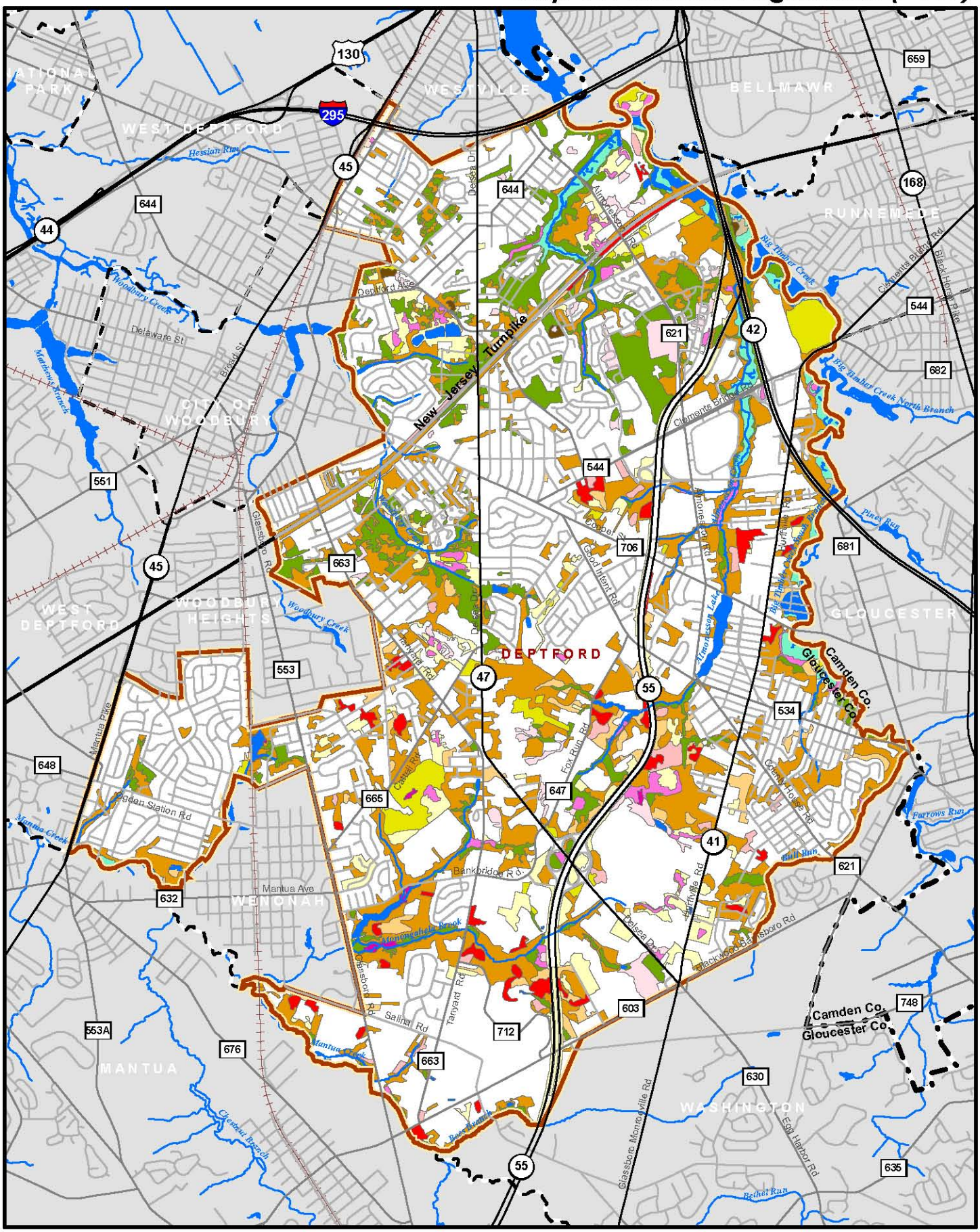
Map 18: Natural Vegetation (2007)



Sources : NJDEP, NJDOT, DVRPC.
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.

Vegetation

- Brush/Shrubland
- Brush/Shrubland - Oldfield
- Upland Forest - Coniferous
- Upland Forest - Mixed (Con. Dom.)
- Upland Forest - Deciduous
- Upland Forest - Mixed (Decid. Dom.)
- Water
- Tidal Waters
- Tidal Marshes - Freshwater
- Wetlands - Modified
- Wetlands - Scrub/Shrub
- Wetlands - Herbaceous
- Wetlands - Coastal (Phragmites Dominated)
- Wetlands - Phragmites Dominated
- Wetlands - Wooded - Deciduous
- All other land cover

N

0.4 0.2 0 0.4
Miles

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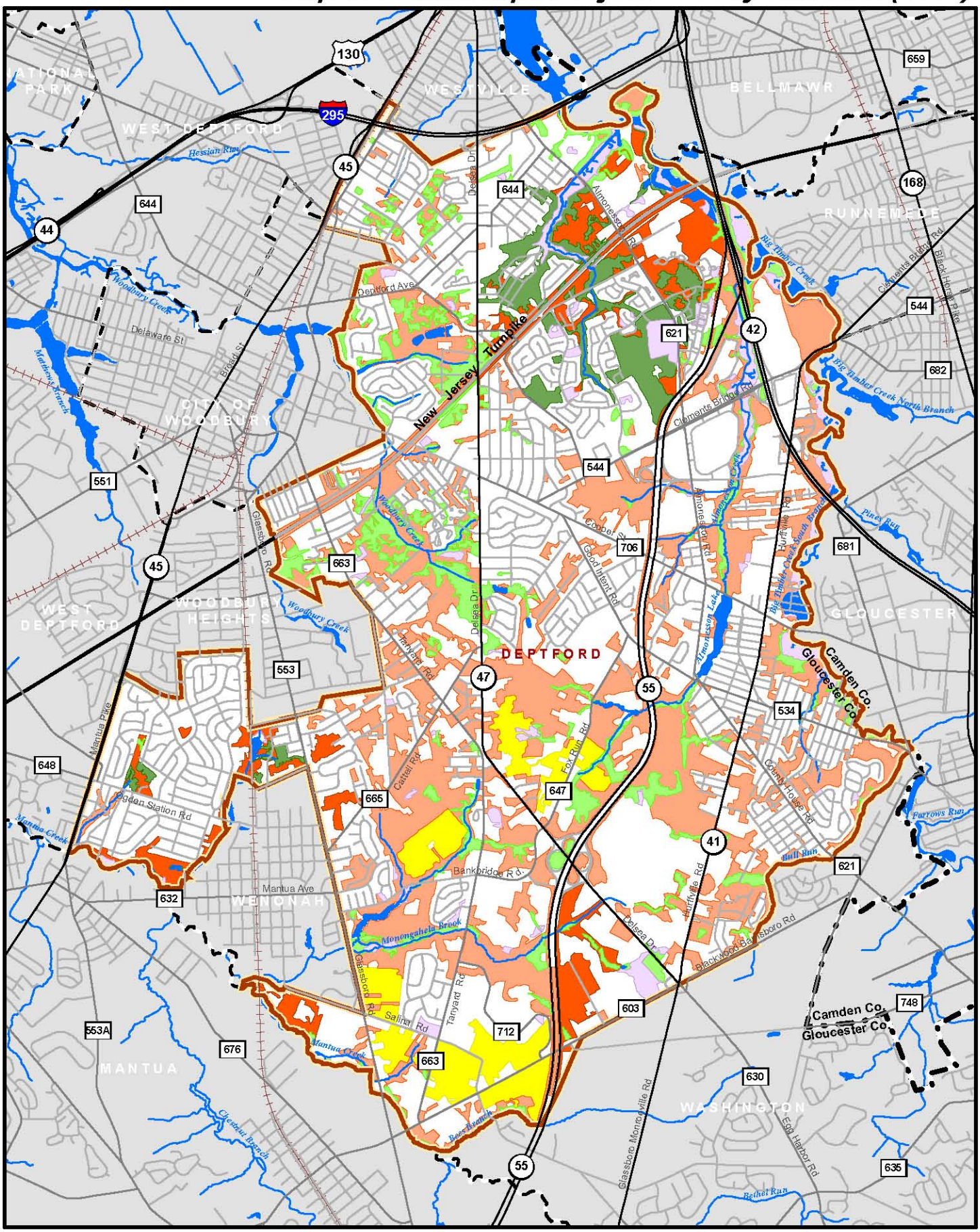
Map 19: Landscape Project Priority Habitats (2007)



Sources : NJDEP, NJDOT, DVRPC.
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.

Conservation Priority Type

Emergent Wetlands	Forested Wetlands	Upland Forest
Suitable Habitat	Critical Habitat	Critical Habitat
	Suitable Habitat	Suitable Habitat

Grasslands
Suitable Habitat

N

0.4 0.2 0 0.4
Miles

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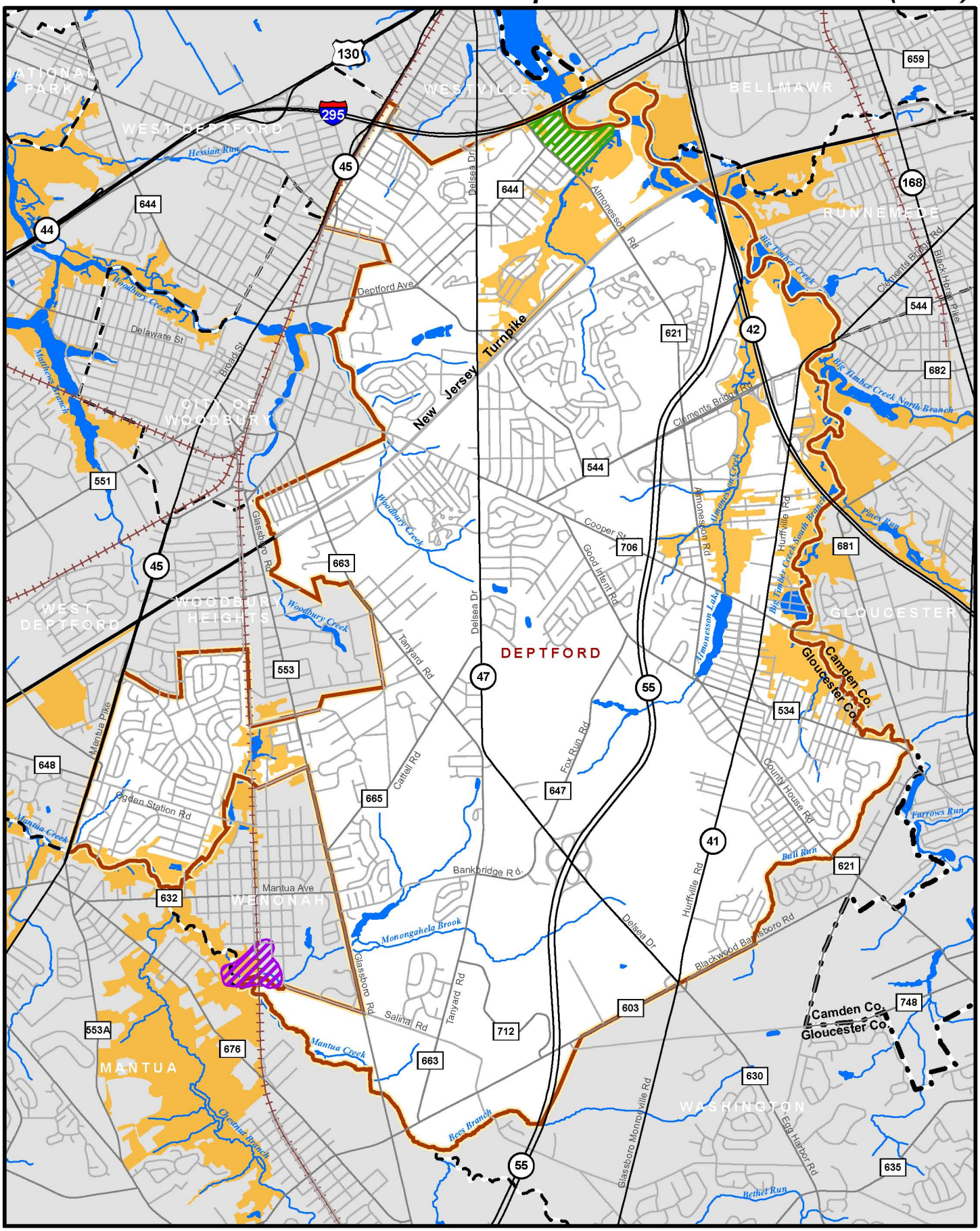
Map 20: Conservation Areas (2007)



Sources : NJDEP, NJDOT, DVRPC, NJ Audubon. 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.

- Andaloro Wildlife Management Area
- Wenonah Ravine Natural Heritage Priority Site
- Mantua, Woodbury, Big Timber Important Birding Area

N

0.4 0.2 0 0.4

Miles

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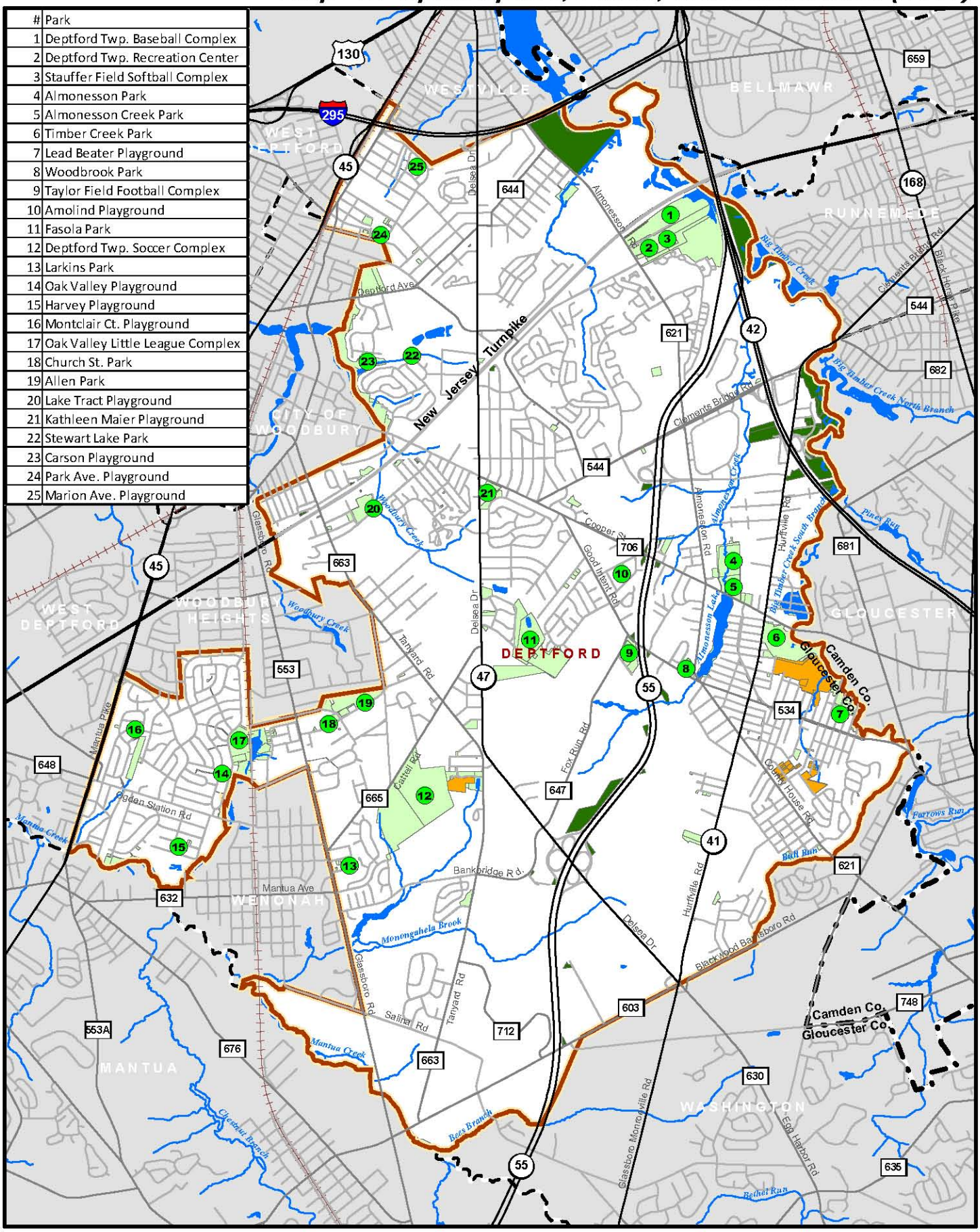
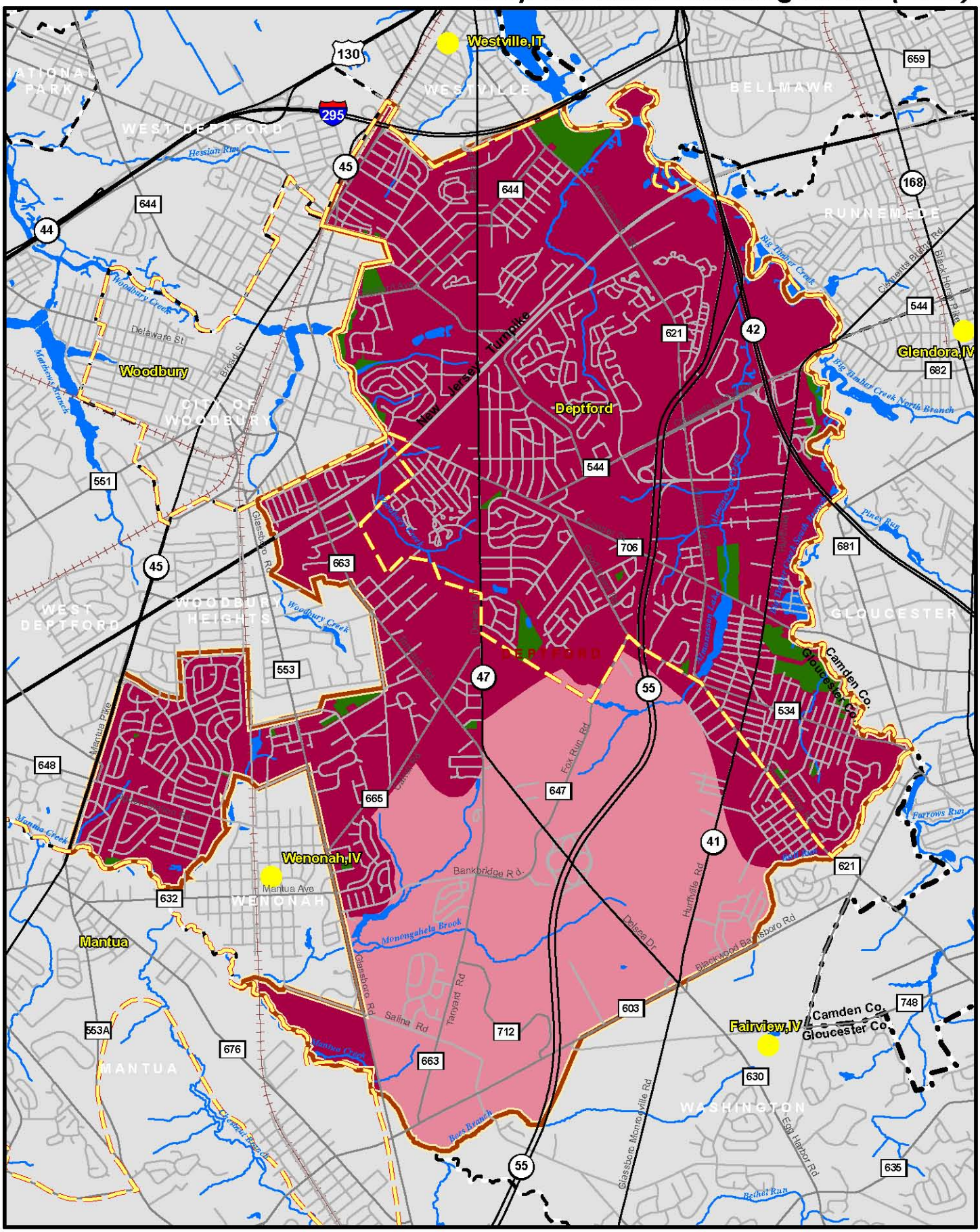
Map 21: Open Space, Parks, and Recreation (2007)

#	Park
1	Deptford Twp. Baseball Complex
2	Deptford Twp. Recreation Center
3	Stauffer Field Softball Complex
4	Almonesson Park
5	Almonesson Creek Park
6	Timber Creek Park
7	Lead Beater Playground
8	Woodbrook Park
9	Taylor Field Football Complex
10	Amolind Playground
11	Fasola Park
12	Deptford Twp. Soccer Complex
13	Larkins Park
14	Oak Valley Playground
15	Harvey Playground
16	Montclair Ct. Playground
17	Oak Valley Little League Complex
18	Church St. Park
19	Allen Park
20	Lake Tract Playground
21	Kathleen Maier Playground
22	Stewart Lake Park
23	Carson Playground
24	Park Ave. Playground
25	Marion Ave. Playground



Map 22: State Planning Areas (2008)



Sources : NJDEP, NJDOT, DVRPC.
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.

Center Boundary
Identified Center

Planning Areas
- Metropolitan
- Suburban
- Rural
- Park or Natural Area
- Water

N

0.4 0.2 0 0.4
Miles

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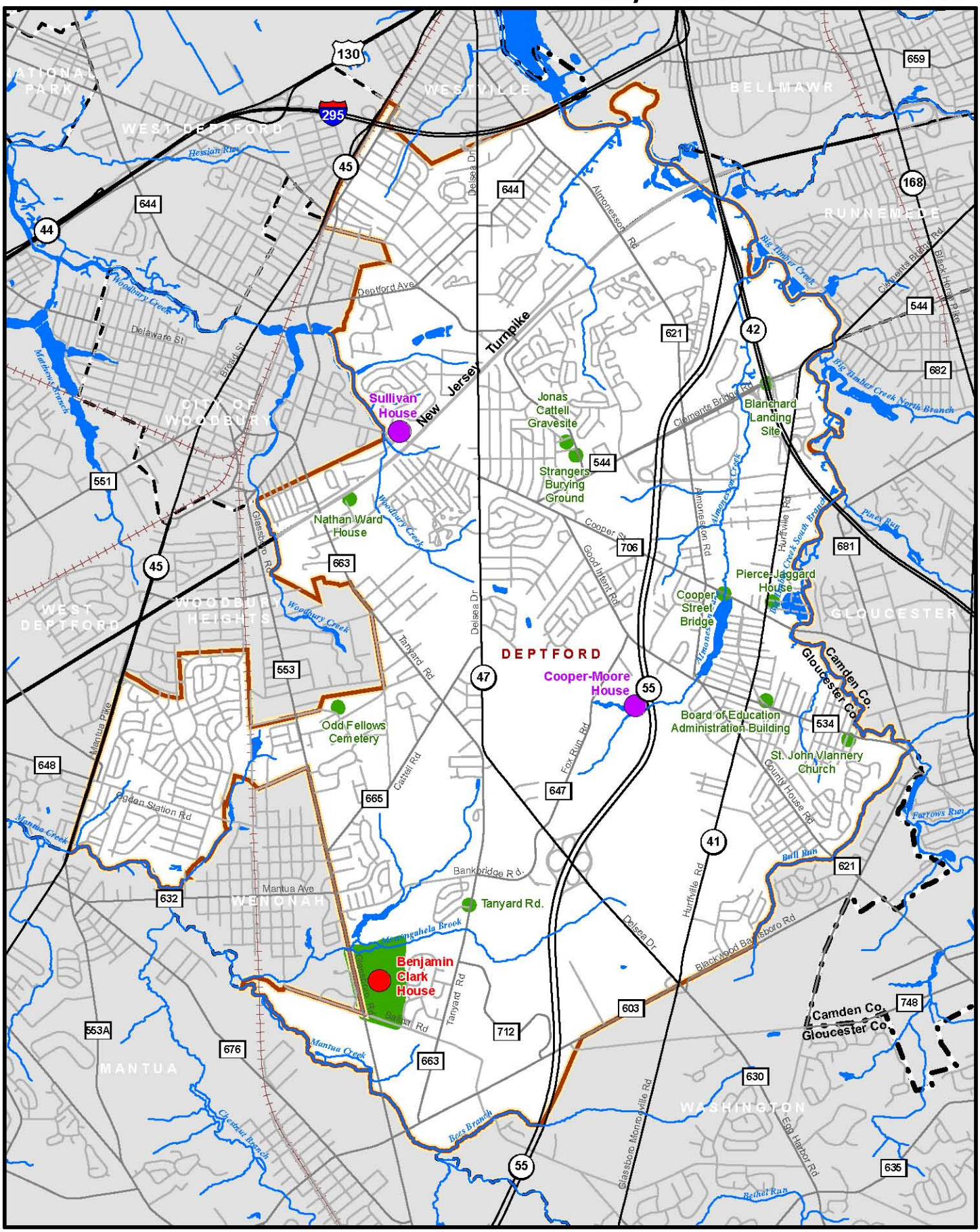
Map 23: Historic Resources



Sources : NJDEP, NJDOT, DVRPC.
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.

- Site on the State & National Registers of Historic Places
- Site eligible for Registers of Historic Places
- Locally Important Historic Site

N

0.4 0.2 0 0.4
Miles

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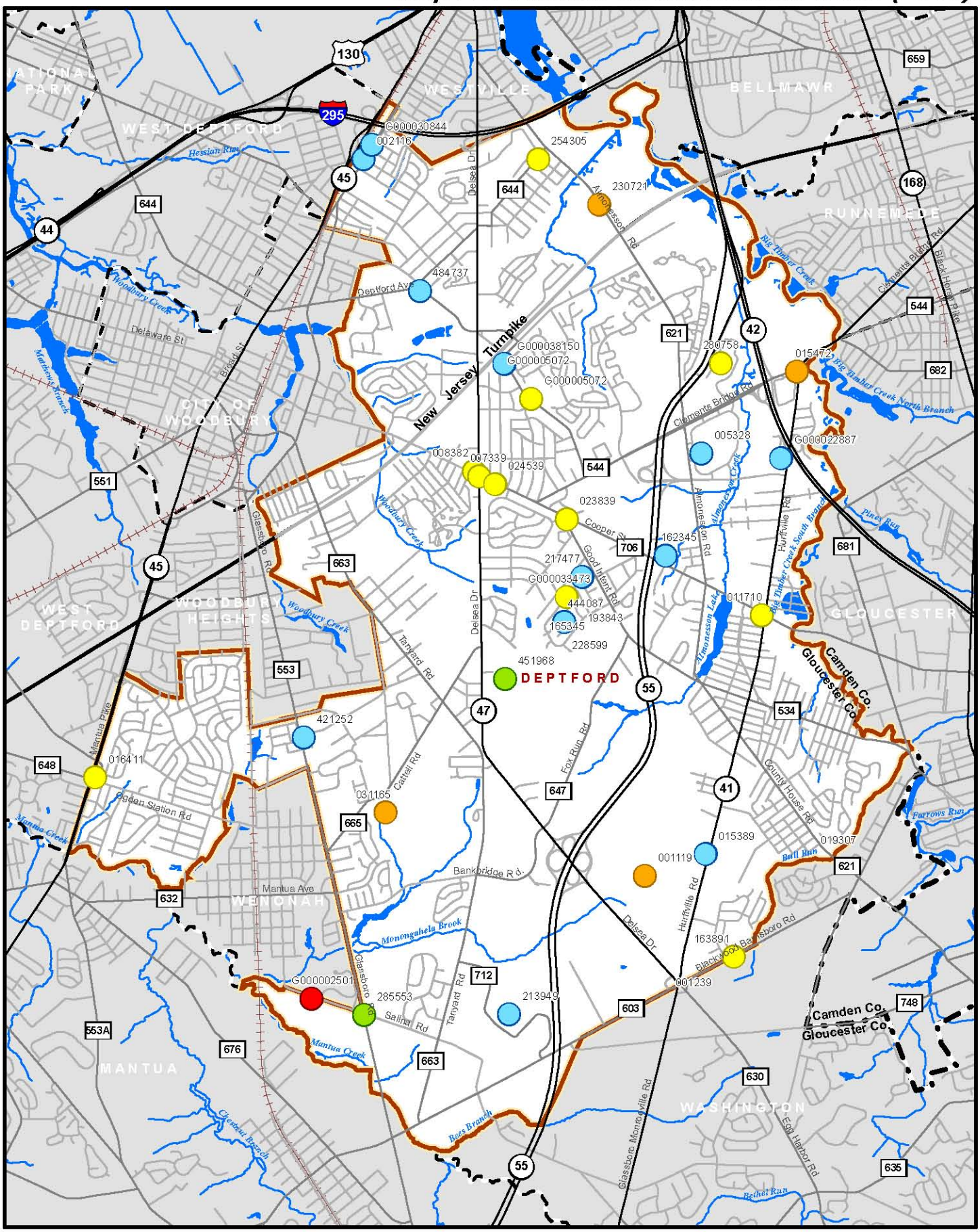
Map 24: Known Contaminated Sites (2009)



Sources : NJDEP, NJDOT, DVRPC.
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- **B:** Single Phase Remedial Action, Single Contamination Affecting Only Soils
- **C1:** No Formal Design, Source Known Potential Groundwater Contamination
- **C2:** Formal Design, Known Source with Groundwater Contamination
- **C3:** Multi-Phased Remedial Action, Unknown or Uncontrolled Discharge to Soil or Groundwater
- **D:** Multi-Phased Remedial Action, Multiple Source/Release to Multi-media Including Groundwater

N

0.4 0.2 0 0.4
Miles

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Abstract Page

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Key Words

Agriculture, air, aquifers, Big Timber Creek, biodiversity, biological resources, built environment, climate, conservation, Gloucester County, development, endangered species, environmental issues, environmental resource inventory, floodplains, forests, grasslands, Deptford Township, groundwater, habitat, land preservation, Landscape Project, Mantua Creek, master planning, natural resources, New Jersey, open space, population, soils, steep slopes, topography, U.S. Census, vernal pools, water quality, watersheds, wetlands.

Abstract

This publication documents the natural and community resources of Deptford Township, Gloucester 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, township utilities and services, historic buildings, and protected open space. A short history of the community is also included.

Staff Contact:

Amy Miller
Environmental Planner
☏ (215) 238-2930
amiller@dvrpc.org

Delaware Valley Regional Planning Commission
190 N. Independence Mall West, 8th Floor
Phone: (215) 592-1800
Fax: (215) 592-9125
Internet: www.dvrpc.org

DELAWARE VALLEY
dvrpc
REGIONAL
PLANNING COMMISSION

190 N Independence Mall West
8th Floor
Philadelphia, PA 19106
215-592-1800
www.dvrpc.org