Borough of Chatham

BOROUGH OF CHATHAM
54 FAIRMOUNT AVENUE
CHATHAM, NJ 07928

Planning Board Regular Meeting
Meeting date: Wednesday, June 19, 2024
Meeting Time: 7:30 PM

PLANNING BOARD MEETING AGENDA

STATEMENT RE: ADEQUATE NOTICE OF MEETING

Pursuant to the requirements of the Open Public Meetings Act, N.J.S.A. 10:4-6 et. seq., adequate notice of this meeting has been provided and published in the Daily Record on January 11, 2024 and copies of this agenda were posted on the Municipal Bulletin Board on the main floor of the Municipal Building and filed with the Commission Secretary and the Borough Clerk also on January 11, 2024.

ROLL CALL

Mayor Carolyn Dempsey
Borough Administrator Stephen Williams
Council Member Justin Strickland
Thomas Belding
Matthew Wagner
Curt Dawson
Susan W. Favate
William Heap
Susan Robertson
Gregory Xikes, 1st Alternate
Jonathan Wilcox, 2nd Alternate
Vincent Loughlin, Board Attorney

ADOPTING OF MEETING MINUTES

RESOLUTION # PB 2024-16

BE IT RESOLVED, by the Planning Board of the Borough of Chatham that the minutes from June 5, 2024 meeting is approved as prepared and shall be filed as a permanent record in the Borough Clerk's Office.

DISCUSSION ITEM(S)

- Amendments needed to Land use Code

PUBLIC HEARING

Public hearing to consider adoption of the ERI report as an amendment to the Chatham Borough Master Plan.

RESOLUTIONS

RESOLUTION #PB 24-17 APPROVING AND ADOPTING ENVIRONMENTAL RESOURCE INVENTORY REPORT DATED MAY 31, 2024 TO BECOME PART OF THE MASTER PLAN FOR THE BOROUGH OF CHATHAM

Resolution #PB 24-17

NEW BUSINESS

ADJOURNMENT

BOROUGH OF CHATHAM

ENVIRONMENTAL RESOURCE INVENTORY

May 2024

May 31, 2024

ENVIRONMENTAL RESOURCE INVENTORY

PREPARED BY

THE LAND CONSERVANCY OF NEW JERSEY

19 Boonton Avenue
Boonton, NJ 07005
PH: (973) 541-1010
tlc-nj.org

The Land Conservancy of New Jersey
David Epstein, President
Barbara Heskins Davis, PP, AICP, Vice President, Programs
Kenneth Fung, Senior GIS Manager
Allie Vaccaro and Tanvi Sule, Planning Fellows

This original document was appropriately signed and sealed in accordance with Chapter 41, Title 13 of the State Board of Professional Planners.

Barbara Heskins Davis, PP, AICP - NJ Professional Planner
(License No. 5926)

Date: May 31, 2024

ACKNOWLEDGMENTS

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The Land Conservancy of New Jersey completed this report in partnership with the Borough of Chatham's Environmental Commission.

Commission members reviewed and compiled several sections of the report and our office acknowledges their efforts in updating the Inventory.

Mayor and Council
Carolyn Dempsey, Mayor
Brian Hargrove
Katherine Hay
Karen Koronkiewicz
Jocelyn Mathiasen
Justin Strickland
Irene Treloar

Boards and Staff:
Susan Favate, Chair, Planning Board
Stephen W. Williams, Borough Administrator

Environmental Commission
Susan Robertson, Chair
Patricia Soteropoulos, Vice Chair
Lisa Allocco
James Cashel
Nicholas Eck
James McQueen
Allison Slater
Christine Steinberg
Joseph Treloar
Katherine Hay, Council Liaison
Liz Holler, Secretary

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Cover Photo: Chatham Gazebo (Credit: Tom Salvas)
Executive Summary: Passaic River in Fall (Credit: Curtis Kentner)

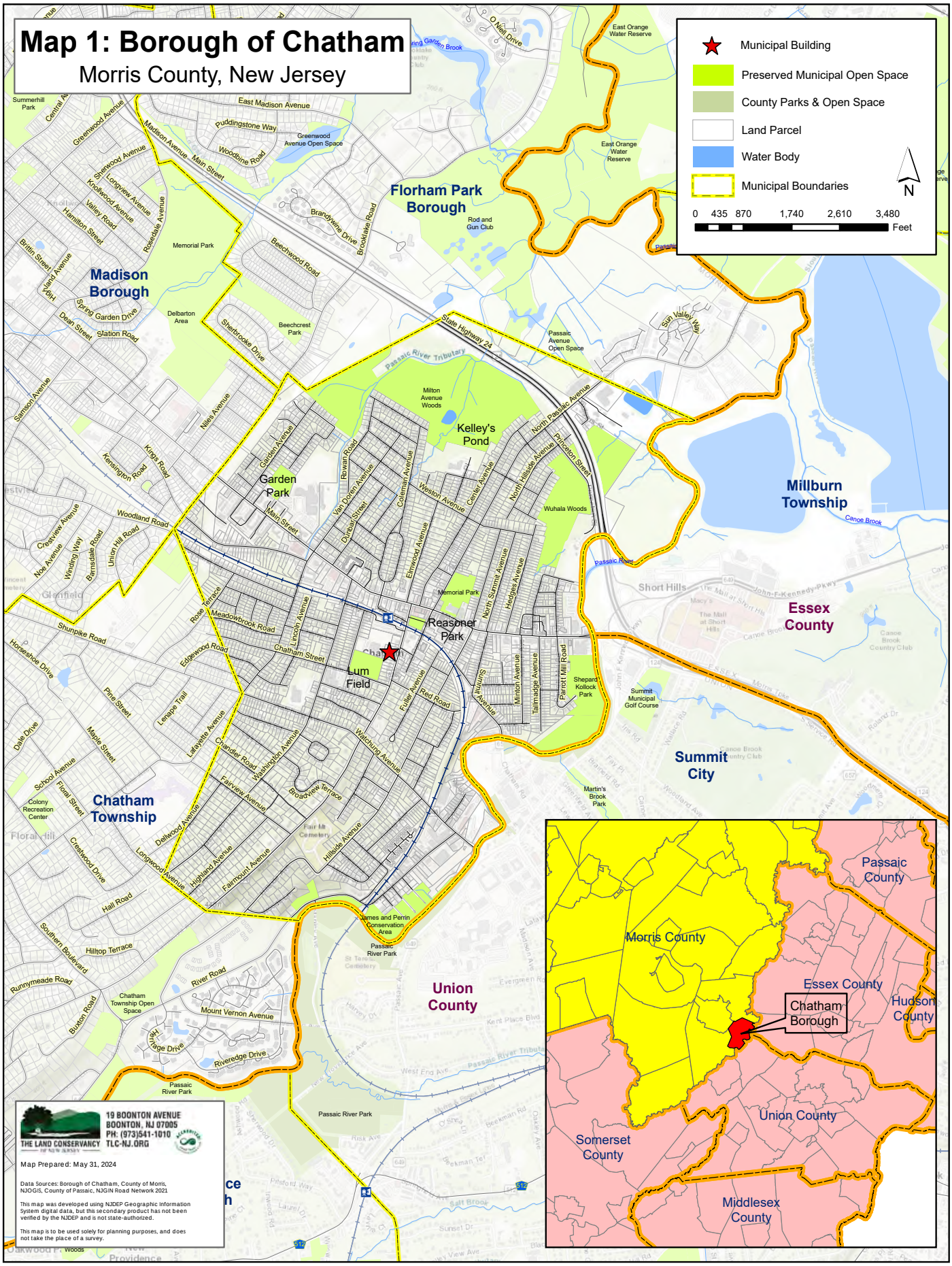
Executive Summary

Located in eastern Morris County along the Passaic River, Chatham Borough is approximately 2.4 square miles in area (**Map 1**). The Borough is committed to protecting its natural and cultural resources. It has received silver certification through the Sustainable Jersey program, recognizing its efforts to promote and maintain a resilient environment for its residents.

The Chatham Borough Natural Resources Inventory was last updated in 2012. It was reviewed and incorporated as a part of the Master Plan in 2016. The Environmental Commission began reviewing and discussing updating this inventory in 2019. This year, the Borough completed the update to the report.

Priorities for the Borough include the protection of its drinking water supplies, which are part of the Buried Valley Aquifer system. In addition, the wetlands and the riparian corridors of the Passaic River which form the backdrop of the municipality, frame its landscape and provide both unique habitat for wildlife and flora, and offer storm water storage during severe weather events. To protect the quality of the water, and the integrity of the wetlands, the Borough has taken steps to educate residents in lawn care and pest control activities to protect and preserve these unique resources.

Comprehensive knowledge of natural resources allows municipal officials and citizens to make informed decisions as they protect the character of the Borough and work to create a sustainable community within its landscape. This ERI is based on available data from federal and state sources, as well as municipal resources.


Map 1: Borough of Chatham
Morris County, New Jersey
Municipal Building
Preserved Municipal Open Space
County Parks & Open Space
Land Parcel
Water Body
Municipal Boundaries
N
0 435 870 1,740 2,610 3,480
Feet
Florham Park Borough
Madison Borough
Chatham Township
Millburn Township
Summit City
Essex County
Union County
Kelley's Pond
Garden Park
Reasoner Park
Lum Field
Memorial Park
Milton Avenue Woods
Wuhala Woods
Passaic Avenue Open Space
Greenwood Avenue Open Space
Chatham Township Open Space
James and Perrin Conservation Area
Passaic River Park
Rod and Gun Club
Colony Recreation Center
Summit Municipal Golf Course
Shepard Kollock Park
Martin's Brook Park
Passaic River Tributary
Canoe Brook
Short Hills
East Madison Avenue
Main Street
Meadowbrook Road
Chatham Street
Shunpike Road
Woodland Road
State Highway 24
Passaic County
Morris County
Essex County
Chatham Borough
Hudson County
Union County
Somerset County
Middlesex County
19 BOONTON AVENUE
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PH: (973)541-1010
TLC-NJ.ORG
THE LAND CONSERVANCY OF NEW JERSEY
Map Prepared: May 31, 2024
Data Sources: Borough of Chatham, County of Morris, NJOGIS, County of Passaic, NJGIN Road Network 2021
This map was developed using NJDEP Geographic Information System digital data, but this secondary product has not been verified by the NJDEP and is not state-authorized.
This map is to be used solely for planning purposes, and does not take the place of a survey.

Overview

Borough History[1]

Approximately 20,000 years ago, as the Wisconsin Glacier retreated northward, it formed Lake Passaic in the contours of the Watchung Mountains. The area now known as Chatham was submerged under this lake, about 160 feet deep. At that time, the only part of future Chatham visible above water was an elongated island created by the peak of the hill on Fairmount Avenue, identified as Long Hill. The lake eventually emptied into the ocean when the glacier melted near Little Falls, and the Passaic River began its meandering course through the wetlands.

In terms of human settlement, the region saw its first inhabitants about 6,000-7,000 years ago with the arrival of the Lenni Lenape Indians ("Original People"), believed to have migrated from Canada and possibly Siberia, seeking milder climates. The Minsi, a subgroup of the Lenni Lenape, lived in the northern parts of New Jersey, including what is now Chatham.

Early each summer, the Lenape would travel to the coast to harvest clams and oysters. Their route from the northwest took them along the Passaic River through the Short Hills and onward to the New Jersey coastline. This path was later named the Minisink Trail, which traces through current Main Street in Chatham.

The Lenape crossed the Passaic River at a shallow section east of Chatham, a spot they named “the Crossing of the Fishawack in the Valley of the Great Watchung.” The terms “Fishawack” and “Passaic” reflect the settlers' attempts to replicate the name they heard from the Indians. A historic kiosk entitled “Crossing of the Fishawack” at the site provides details of the lifestyle of the Lenape.

In 1680, Sir George Carteret acquired land that encompasses today’s Chatham from the Minsi for the equivalent of $55. By 1721, a prosperous Philadelphia merchant named John Budd held a significant amount of this land. He sold parcels of it in 1728 to John and Daniel Day, marking the Days as the first settlers on the west bank of the Passaic. John Day erected a bridge over the river at a site now near the modern Route 124 bridge. This bridge initiated the formation of a small community known as “Day’s Bridge,” which developed on both sides of the river.

John Day founded a tavern that quickly gained popularity among those traveling through the area. To the south of a bridge nearby, several mills sprouted up, turning the village into a hub for the surrounding rural community. Locals gathered to trade, mill grain, process lumber, and seek essential services like blacksmithing for horse shoeing, alongside attending church.

By 1750, the settlement around Day’s Bridge spanned roughly three-quarters of a mile along the river. Notable early residents included Samuel Lum, Nathaniel Bonnell, and David Vanderpoel, who had settled before the Revolutionary War and significantly influenced the early development of what became known as Chatham.

The name "Chatham" was officially adopted on November 19, 1773, as documented in the New York Journal or Advertiser, to honor Sir William Pitt, the Earl of Chatham, a British leader admired for his support of the American colonies against oppressive taxation. The name reflected the small, cottage-filled village existing at the start of the Revolutionary War.

During the war, Chatham's citizens were active revolutionaries, setting up committees for oversight and communication, and erecting a liberty pole in the village center. This was a visible symbol that the people of the village supported the fight for freedom from Great Britain and became a key meeting place. It was here that the village gathered to hear news of the war and where they heard the first reading of the Declaration of Independence.

The town was strategically important, acting as a buffer zone between British forces and General George Washington's troops. It also played a role in deceptive military strategies, including Washington's feint towards Yorktown that culminated in a crucial American victory. A kiosk marking the 1781 site of the Continental Army Bread Ovens provides details on one such strategy.

Post-war, Chatham resumed its peaceful endeavors. The 1801 establishment of the Morris Turnpike facilitated regional trade, although locals often preferred alternative routes to avoid tolls; hence the name of the local road Shunpike Road. The arrival of the Morris and Essex Railroad in 1837 spurred further growth, transforming Chatham into both a summer resort and commuter town.

The railroad also boosted local industries like brick-making and rose-growing, the latter flourishing under Louis M. Noe in the late 19th century. At Garden Park on Chatham Main Street, a historical kiosk with an old photograph marks the site of 11 greenhouses for roses owned by the Ruzicka family.

Meanwhile, George Shepard Page significantly impacted the industrial landscape by converting old mills for his businesses and promoting infrastructure developments. An information board along the Historic River Trail contains a photo and details of the mills at their former location. Further on the Trail the abutments from the Morris County Traction Company Bridge can be seen. The MCT trolleys commenced service in 1903, and by 1914, Chatham was a destination on the trolley system running between Dover and Union.

By the late 19th century, Chatham had evolved into a desirable residential area, known for its healthy air and pleasant environment, and was attracting tourists to the Fairview Hotel and Grandma Kelley's Boarding House on Main Street.

The local governance adapted with the times, transitioning from township to borough status to better manage public utilities and services. Chatham Borough continues to operate under a borough form of government, featuring a Borough Council composed of six members. Each council member is elected at-large and serves a term of three years. The mayor is elected independently for a four-year term. The Borough's first public utility, the water department, was established in February 1898, followed by the creation of an electric department in 1901, which was later sold to Jersey Central Power and Light.

Throughout these changes, Chatham's community and economy flourished, reflecting both the challenges and progress of its times.[2]

The Borough Today

Borough Operations

The Borough Administrator oversees all municipal departments, coordinates the day-to-day operations of the community, and carries out the policies as set by the elected Borough council. Acting as the principal liaison between council members, Borough departments and the public, the Borough Administrator oversees a broad spectrum of Borough functions, including Community Services, Engineering, Zoning, Emergency Management, Finance, Public Works, Police, and Fire. The Borough contracts for professional services from a planner, an engineer, and attorneys, amongst others.

The Borough Clerk serves as secretary to the governing body, secretary to the municipal corporation, administers all elections, and is the custodian of all minutes, ordinances, resolutions, contracts, deeds, and archival records of the municipality.

Some of the Borough's services such as the Municipal Court, sewer and water treatment (known as the Joint Meeting), sanitation, the school district, the library, recreation services, board of health, some planning and building functions, are joint services with Madison and/or Chatham Township.

During the global Covid-19 pandemic crisis of 2020-21, the Council and municipal officials instituted measures designed to inform and support its residents, educators, healthcare providers, and business-owners. Recent Proclamations issued by the Borough Council reflect its commitment to recognizing national and regional concerns. These include support for National Autism Acceptance Month, Domestic Violence Awareness, National Hispanic Heritage Month, Black History Month, Pride Month, Arbor Day, and Suicide Awareness, amongst many others. Additionally, recent Resolutions adopt a Sustainable Land Use Pledge and confirm the Borough's Open Streets Policy, adopt Safe Routes to School and an anti-idling policy, and support working with Drew University to conserve the Drew Forest. All significant public holidays, commemorative days, and religious holidays are recognized in the Borough's calendar of events and at Council meetings.

Community Events

The Borough offers a variety of annual community events and activities that foster local engagement and entertainment. Traditionally, Chatham Borough hosts several key events throughout the year:

Fishawack Festival: A traditional festival held annually in June. It typically includes a day of crafts, food vendors, live music, an outdoor pub, and activities for children, celebrating the heritage and community spirit of Chatham.

Fourth of July Parade and Fireworks: This event usually features a parade through the Borough with floats, bands, and community groups participating. A community firework display follows at dusk.

Farmers Market: Running from June through November, the Chatham

Borough Farmers Market offers local produce, crafts, and goods.

Sustainability Fair: An event to promote environmental awareness and sustainable living practices within the community. In recent years, it has featured an electric vehicle EXPO, introducing visitors to electric cars, bicycles, trucks, motorcycles, and experimental cars built by local university students.

Chatham Turkey Trot: A charitable 5K run and fun run held on Thanksgiving morning, benefiting the Chatham Township Volunteer Fire Department and other local causes.

Small Fry Fishing Derby at Kelley's Pond: Chatham Borough Volunteer Fire Department offers a fishing derby for residents under 15.

Friends of the Library Book Sale: An annual week-long book sale offers 30,000 books and games, raising funds for the Library.

Concert Series at the Gazebo: Typically held during the summer months, these free concerts offer a variety of musical performances.

NJ Local Government Day: The Borough hosts an Open House for residents and local students to tour Borough Hall and ask questions about local government.

Holiday Events: They include Trick or Treat at downtown stores, Painted Pumpkin Walk, Diwali and Menorah lighting, and a visit by Santa Claus at Christmas.

Throughout the year, Borough residents enjoy activities and programs catering to all interests. One may join an interfaith dinner or a seniors walking group, pick up lunch at the Farmer's Market, visit an art show by the Art League, or enjoy entertainment by the Community Band or Community Players.

The downtown streets and Library are beautified by floral plantings and decorations by the Town & Country Garden Club, together with rotating seasonal displays coordinated by the Community Services Department and the DPW.

The Borough Environmental Commission partners with the Great Swamp Watershed Association to offer an annual native plant sale and a town-wide Yard Sale designed to keep items out of the landfill. The Senior Center hosts a bi-annual garden tour. The Kiwanis host two annual community dinners. The local scouts and other local organizations undertake projects all year, culminating in the selling of luminary kits in December so that the streets of Chatham are lit by candlelight every Christmas Eve.

Beekeepers manage the community hives east of River Road and gardeners plant a wide range of fruits, vegetables, and flowers at the Community Gardens on Woodland Road. The joint Library of the Chathams offers book clubs, mahjong, dungeons and dragons, a seed library, film shows, presentations by visiting experts, art exhibitions, conversational language opportunities, children's activities, and a new Teen Center.

Community Involvement

Chatham Borough has a rich heritage of community involvement, with numerous residents dedicating their time and expertise through volunteering. This spirit of civic duty is integral to the functioning of various essential services in the community.

Each year, residents serve on the Chatham Emergency Squad, the Chatham Borough Volunteer Fire Department, and numerous boards, commissions, and committees that contribute to the municipality's welfare. The current Boards and Commissions are:

Board of Health: Oversees public health issues within the Borough.

Board of Trustees of the Library: Manages library services and planning.

Environmental Commission: Focuses on environmental protection and sustainability.

Historic Preservation Commission: Works to preserve and protect the Borough's historical sites.

Planning Board: Deals with land use planning and development.

Shade Tree Commission: Manages and advocates for the Borough's tree canopy.

Tri-Town Cares: A joint effort by Chatham Borough, Chatham Township, and Madison to connect residents with mental health support.

Zoning Board of Adjustment: Handles appeals and variances regarding zoning laws.

In addition to the formal Boards and Commissions, there are many Advisory Committees focusing on different aspects of town activities, including:

Affordable Housing Advisory Committee: Addresses issues and policies concerning affordable housing.

Economic Development Advisory Committee: Aims to improve the Borough's economic health.

Chatham Joint Community Garden Advisory Committee: Encourages community gardening efforts.

Chatham Joint Recreation Advisory Committee: Promotes and organizes recreational activities.

Communications & Technology Advisory Committee: Enhances technology and communication within the Borough.

Farmers' Market Advisory Committee: Supports the operation of the local farmers' market.

Historic Riverside Trail Advisory Committee: Oversees the maintenance and use of the local historic trail.

Mayors' Wellness Advisory Committee: Promotes health and wellness initiatives.

Municipal Alliance Committee of the Chathams: Focuses on preventing drug abuse and addiction.

Municipal Pool Advisory Committee: Manages the community pool and related activities.

MyChathamNJ Advisory Committee: Helps improve municipal communication and engagement.

Open Space & Historic Preservation Trust Advisory Committee: Focuses on preserving open spaces and historical sites.

Project Community Pride: The community-based agency is staffed by licensed therapists who offer clinical services to families in Chatham, Florham Park, and Madison.

Public Arts Council (Advisory Committee): Encourages and manages public art installations.

Recreation Advisory Committee: Plans and oversees recreational programs and facilities.

Senior Citizens Advisory Committee: Addresses the needs and services for the senior community.

Stanley Hall Advisory Committee: Works on development of Stanley Church into a community arts center.

Traffic and Pedestrian Safety Advisory Committee: Works on improving road safety for all users.

9/11 Memorial Advisory Committee: Maintains the 9/11 memorial and plans related events.

In January 2022, Chatham Borough created a new **Diversity, Equity, and Inclusion Advisory Committee**. Its stated purpose is to promote appreciation of the growing diversity in Chatham through community events, and to serve as a liaison between various cultural, ethnic, and social groups, on the one hand, and the Borough, on the other. The Committee hosts events such as Martin Luther King Day of Service (along with the Chatham Interfaith Council), culinary exchanges, and a Cultural and Diversity Celebration festival (in conjunction with Madison and Chatham Township). A recent survey at the library found at least 26 different native tongues are represented jointly in the Borough and the Township.

Athletics/Exercise

Sporting opportunities abound with the Recreation Department offering a full four-season roster of programs in partnership with Chatham Township. In addition to the common field/court sports, Chatham residents may golf, ice-skate, ski, snowboard, wrestle, cheer-lead, play pickleball, and take tennis lessons through the Recreation Department. Activities for students with special needs, adults, and seniors are also offered. In addition, Club and Travel programs exist to provide athletic opportunities for all levels. The Borough's parks and playgrounds variously offer playground equipment, sports fields, a community pool, tennis, pickleball, basketball, hiking trails, a boat launch for kayaking and canoeing, fishing, and an off-leash dog park.

Schools

Since 1986, Chatham has shared its school district with Chatham Township and the school district is known as the School District of the Chathams. The district consists of four elementary schools, one middle school, and one high school. Milton Avenue School, Southern Boulevard School, and Washington Avenue School (all three offer Grades K-3), Lafayette School (Grades 4-5), and Chatham Middle School (Grades 6-8) all lead to Chatham High School (Grades 9-12). There are also 14 early childhood daycares in the Chathams. In 2023/24 school year, Chatham High School offered 65+ student clubs and activities, 35 athletic teams across three seasons, and an award-winning music, theatre, and arts program. Chatham High School is currently ranked 21st in New Jersey and 424th nationally among public high schools, according to the U.S. News & World Report.[3]

Businesses

There are approximately 325 businesses registered in Chatham Borough, comprising restaurants and retail, insurance, taxation, financial, legal and other professional services, IT, healthcare, educational, real estate, and community organizations, automotive, construction, landscape, and home design. The Chatham Chamber of Commerce runs an "Experience Chatham Series" including The Taste of Chatham, Small Business Saturday, Thursday Nights in the Borough, Ladies Night, Sounds of Summer Music series, and a Health & Wellness EXPO. In 2024, commuter parking levels at Railroad Plaza exceeded those of 2018 for the first time since the global pandemic, indicating a return to work in New York City for many residents.

Churches

There are four churches in Chatham Borough; Chatham United Methodist Church, St. Paul's Episcopal, Saint Patrick's and Ogden Memorial Presbyterian.

Recent Community updates:

Garden Park off Main Street saw the installation of three refurbished tennis/pickleball courts in 2021, and two resurfaced basketball courts in 2022. The courts were officially named after long-time Chatham basketball coach and volunteer Phil Perrone, with a monument erected in his honor. They will henceforth be known as the "Coach Phil Perrone Basketball Courts". Other recent improvements to Garden Park include a paved walking pathway, a respite area, and several Chatham historic kiosks providing information on the area's historic significance. In 2023, the Borough, in partnership with the Town & Country Garden Club, Dirt Diva Gardens, and the Environmental Commission installed a large shade canopy, and the landscaping was transformed into a native plant pollinator demonstration garden.

The Senior Center of the Chathams re-opened following the pandemic and located at the Township Municipal Building offers a comprehensive array of programs designed specifically to preserve the independence of its participants and facilitate connection. The staff are committed to providing enrichment, support, information, and referral services for Chatham's older residents. The Center's mission is to "protect and preserve the independence and dignity of a growing, aging population." Its programs and services are designed to improve both physical and mental well-being, thereby allowing senior residents to continue as valuable assets to the Chatham community.

Chatham Community Food Distribution: The Chatham weekly food drive was first conceived in 2020 at a Mayor's Roundtable session to address the growing incidence of food insecurity by residents confronting financial difficulty during the pandemic. The Chatham United Methodist Church hosts a weekly one-hour food distribution program, as well as maintaining 24/7 pantry on the Church grounds.[4]

Chatham Today

Top Left Photo: Fishawack Festival (Credit: Glenn Clark); Top Middle: Farmers Market (Tom Salvas); Top Right: Chatham Borough Volunteer Fire Department (ChathamBorough.org); Middle Left: July 4th (Tom Salvas); Middle Right: Hula Hoop Girl (Artsology); Bottom Left: Chatham EMS (TAP Chatham); Bottom Middle: Stanley Center (Tom Salvas); Bottom Right: Pool (ChathamBorough.org)

Photo: Shop Chatham (Credit: Chatham Patch)

Chapter 1.

Geology & Topography

Physiographic Provinces

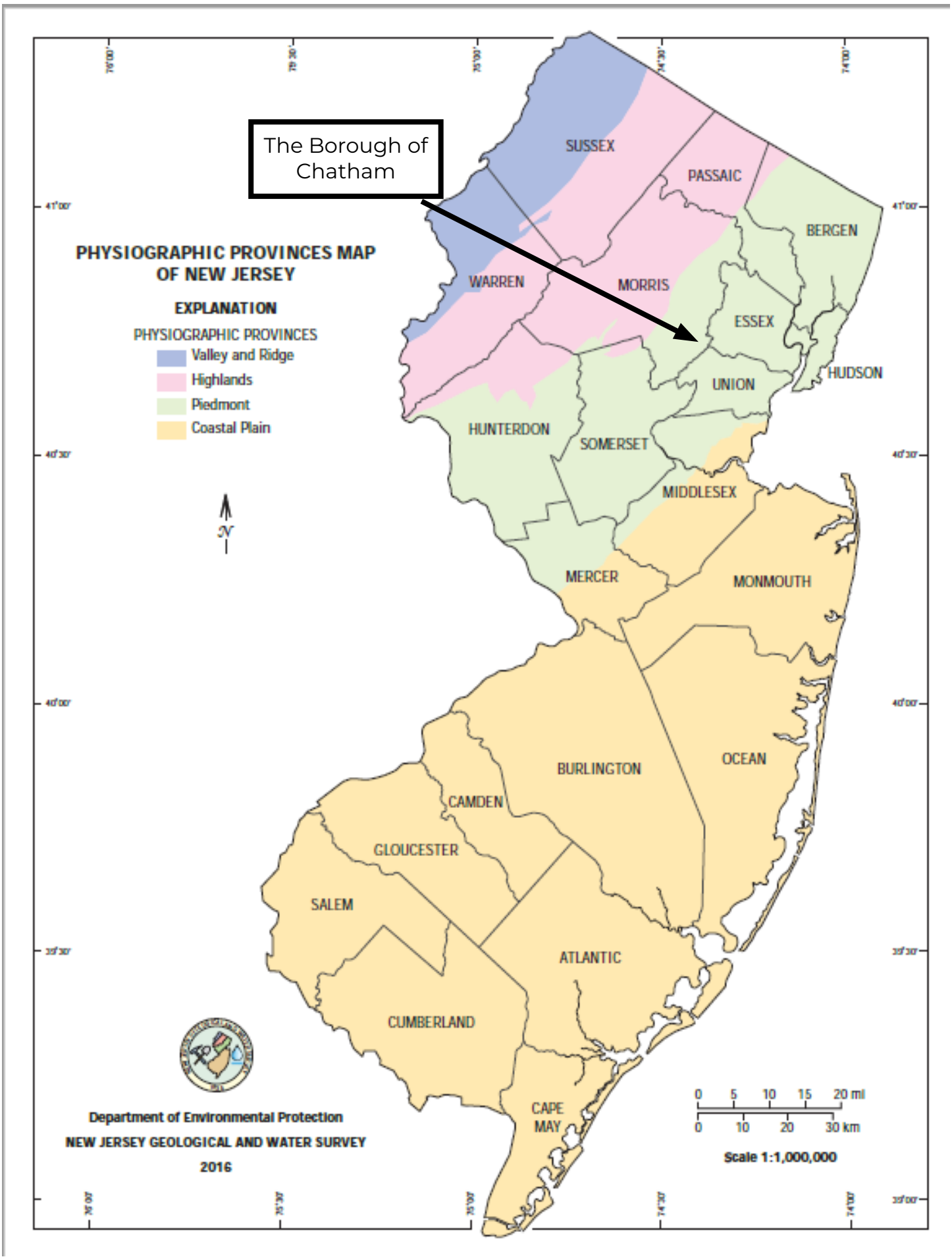
New Jersey's landscape is divided into four distinctive regions, each characterized by unique geologic processes and landforms, known as physiographic provinces.

Physiographic provinces classify landscapes based on terrain texture, rock type, geologic structure, and history. These attributes play an important role in determining the natural resources of an area. In New Jersey, beginning in the northwest and proceeding to the southeast, these provinces are identified as the Valley and Ridge, Highlands, Piedmont, and Coastal Plain Provinces. The Borough of Chatham lies entirely within the Piedmont Province (**Figure 1**).

The Piedmont Province covers 1,600 square miles, which is roughly 20% of the state. The Piedmont Province's surface is generally low rolling hills marked with sudden, steep ridges, which extend across the state and includes the Palisades in the east.

According to the New Jersey Department of Environmental Protection (NJDEP) New Jersey Geological and Water Survey (NJGS), the Piedmont is mostly underlain with slightly folded and faulted sedimentary rocks of Triassic and Jurassic age (240 to 140 million years old) and igneous rocks of Jurassic age.[5]

Figure 1. Physiographic Provinces of New Jersey *(Source: NJGS)*[119]



Bedrock Geology

The geology of the Borough can be classified into two layers: bedrock geology, which is consolidated, underlying rock that extends deep into earth's crust; and surficial geology, the unconsolidated sedimentary materials overlaying bedrock formations that is the parent material for soils. According to the NJGS, the properties of these layers determine the physical extent of aquifers and the chemical quality of water they yield. They also control how groundwater recharges and moves through the aquifers, how contaminants seep into and move through soil and groundwater, and where natural hazards like radon, sinkholes, and seismic instability may occur.[6]

These properties establish where geologic resources such as sand, gravel, peat, clay, quarry rock, and mineral ores are located. Geologic properties also determine the suitability of an area for the use of septic systems, the management of stormwater and surface runoff, and the stability of foundations for buildings, bridges, tunnels, and other structures.

The Borough of Chatham is located in the Newark Basin, formed during the breakup of the supercontinent Pangaea in the Mesozoic era. The Borough's underlying geology is almost half (47%) Hook Mt. Basalt with the remaining comprised of the Towaco (40%) and Boonton Formations (13%) (**Table 1**, **Figure 2,** and **Map 2**).

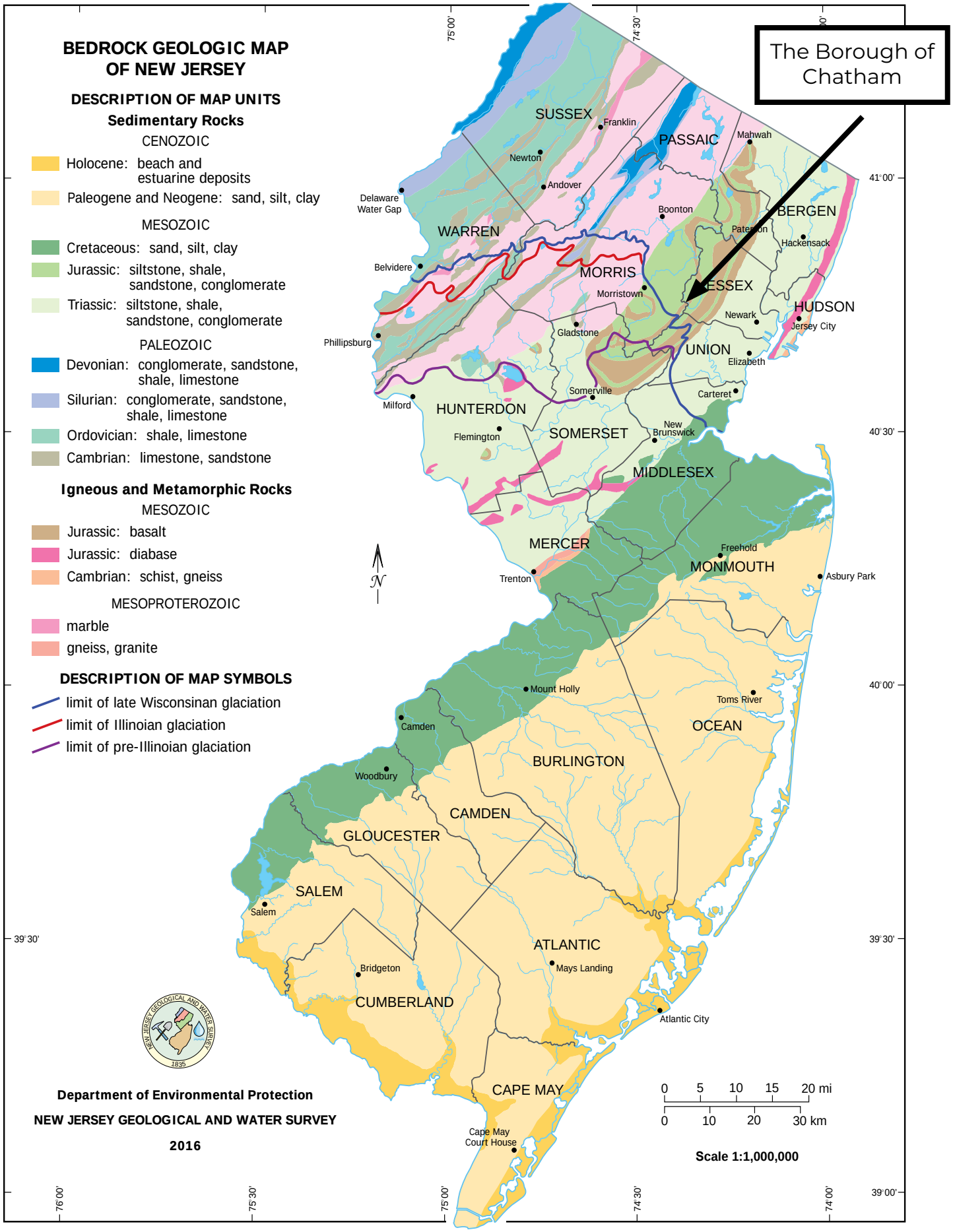
The Towaco Formation makes up the eastern portion of the Borough while the Boonton Formation is located in the northwestern area. The middle of the Borough is comprised of the Hook Mt. Basalt.

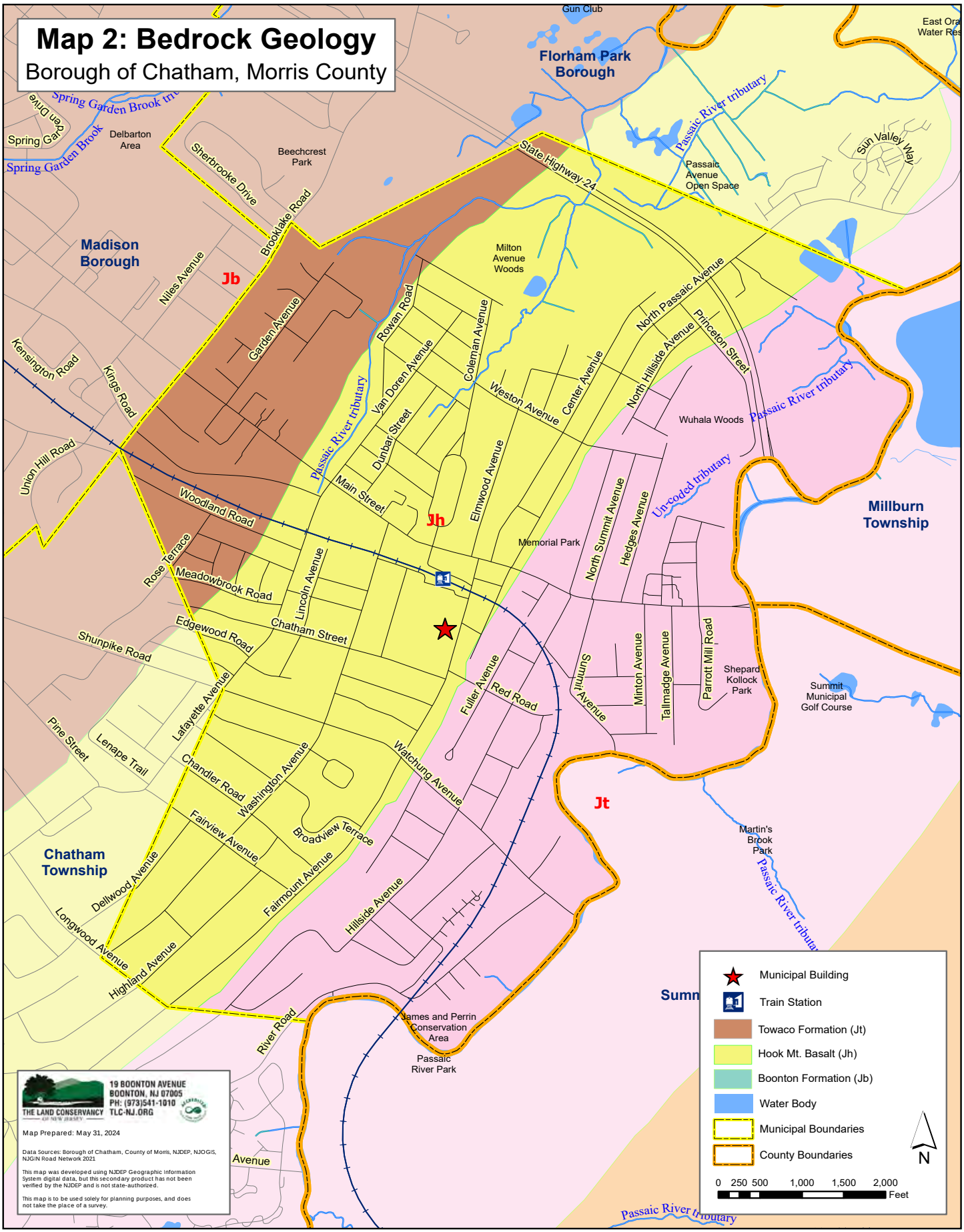
Table 1. Bedrock Geology of the Borough Chatham

Abbrev.	Name	Lithology	Acres	Percent
Jh	Hook Mt. Basalt	basalt, fine- to coarse-grained	714	47%
Jt	Towaco Formation	sandstone, siltstone, silty mudstone, fine- to medium-grained; less abundant calcareous siltstone and mudstone	603	40%
Jb	Boonton Formation	sandstone, siltstone, and mudstone, fine-grained; minor dolomitic siltstone and shale	209	13%
		Total **:**	1,526	100%

Source: Bedrock Geology (NJGS)
Note: The data for the tables in the ERI was derived using ArcGIS mapping. The source is referenced in the table and on the accompanying maps in this report. Accessing the data is via the New Jersey Geographic Information Network (NJGIN) Open Data portal (njogis-newjersey.opendata.arcgis.com).

Figure 2. Bedrock Geology of New Jersey *(Source: NJGS)*[120]




Map 2: Bedrock Geology
Borough of Chatham, Morris County
Florham Park Borough
Madison Borough
Chatham Township
Millburn Township
Jb
Jh
Jt
Gun Club
East Ora
Water Res
Spring Garden Brook tru
Spring Garden Brook
Delbarton Area
Beechcrest Park
Sherbrooke Drive
Brooklake Road
State Highway 24
Passaic River tributary
Passaic Avenue Open Space
Sun Valley Way
Milton Avenue Woods
Niles Avenue
Garden Avenue
Kensington Road
Kings Road
Union Hill Road
Rowan Road
Van Doren Avenue
Coleman Avenue
Dunbar Street
Weston Avenue
Center Avenue
North Passaic Avenue
North Hillside Avenue
Princeton Street
Wuhala Woods
Un-coded tributary
Main Street
Elmwood Avenue
Woodland Road
Memorial Park
North Summit Avenue
Hedges Avenue
Rose Terrace
Meadowbrook Road
Lincoln Avenue
Chatham Street
Edgewood Road
Shunpike Road
Fuller Avenue
Red Road
Sunnyn Avenue
Minton Avenue
Tallmadge Avenue
Parrott Mill Road
Shepard Kollock Park
Summit Municipal Golf Course
Pine Street
Lenape Trail
Lafayette Avenue
Chandler Road
Washington Avenue
Watchung Avenue
Broadview Terrace
Fairview Avenue
Fairmount Avenue
Dellwood Avenue
Longwood Avenue
Highland Avenue
Hillside Avenue
Martin's Brook Park
River Road
James and Perrin Conservation Area
Passaic River Park
Municipal Building
Train Station
Towaco Formation (Jt)
Hook Mt. Basalt (Jh)
Boonton Formation (Jb)
Water Body
Municipal Boundaries
County Boundaries
N
0 250 500 1,000 1,500 2,000
Feet
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THE LAND CONSERVANCY OF NEW JERSEY
Map Prepared: May 31, 2024
Data Sources: Borough of Chatham, County of Morris, NJDEP, NJOGIS, NJGIN Road Network 2021
This map was developed using NJDEP Geographic Information System digital data, but this secondary product has not been verified by the NJDEP and is not state-authorized.
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Surficial Geology

Glacial movement physically shaped the Borough of Chatham's topography. When passing through a landscape, glaciers picked up debris carving their path and sheering down ridges and cliffs. Glacial deposits were a mixture of sand, silt, clay, and boulders that created a hummocky topography with stony low-relief ridges.

Glacial deposition also affected surface water bodies and drainage patterns, as well as smaller formations in the Great Swamp. These unconsolidated materials overlaying bedrock formations is the surficial geology.[7] The resulting deposits are sediments laid down by rivers, glaciers, ocean currents and waves, wind, and movement of soil and rocks on hill slopes. Alluvium, estuarine, and other post-glacial deposits are the most recent deposits and overlie glacial sediments. **Table 2** and **Map 3** detail the surficial geology of the Borough of Chatham.

Almost half of the Borough (47%, or 723 acres) is covered in Rahway Till (Qwtr), with 27% Late Wisconsinan Terminal Moraine Deposits, Rahway Till (Qwmtr), 13% Late Wisconsinan Glacial Lake-Bottom Deposits (Qwlb), 8% Alluvium (Qal), 4% Late Wisconsinan Glacial Delta Deposits (Qwde), and <1% Weathered Basalt (Qwb).

Topography

The Borough of Chatham contains rolling hills which vary from approximately 500 feet MSL (mean sea level) to the south near Fairmount Avenue to about 180 feet MSL near the wooded areas in the north in the Milton Avenue Woods and Wuhala Woods. The elevation gradually changes with the highest areas in the south of the Borough and the lowest areas in the north (**Map 4**).

Steep Slopes

Consideration of the slope of the land is important to reduce the risk of natural hazards such as flooding and landslides, and to minimize the impact of human activity on natural resources such as soils, vegetation, and water systems.[8]

Alteration of the slope may cause slope instability, flooding, erosion, degradation of surface water, or drainage problems. Improper grading often alters surface water flow and may cause flooding for the site and nearby property owners. Excessive grading may also alter groundwater level, which can cause the slow death of trees and ground cover, and in turn destroy wildlife habitats.

The Highlands Council Defines slopes as[9]:

- Severely Constrained Slopes: Slopes of 20% or greater and lands within riparian areas with slopes of 10% and greater.

- Moderately Constrained Slopes: All non-riparian areas having a slope of 15% to less than 20% which are forested.

The southern region of the Borough have slopes which are 15% or greater (**Figure 3**).[10] These steep slopes can hinder building construction and development, as well as contribute to erosion, runoff, and environmental degradation. The Borough's municipal code addresses steep slope issues for building development.[11]

Figure 3. Steep slopes in southern region of the Borough of Chatham *(as noted on orange highlights, this is an excerpt of* **Map 4** *which is on the following pages.)*

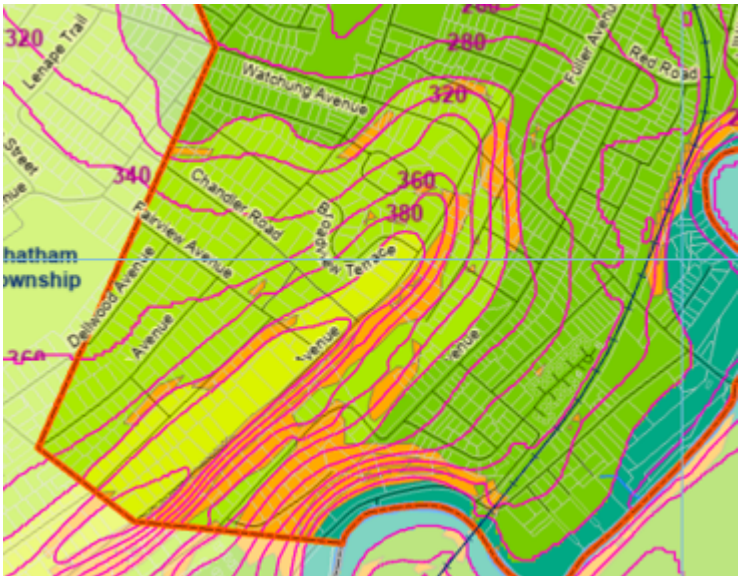
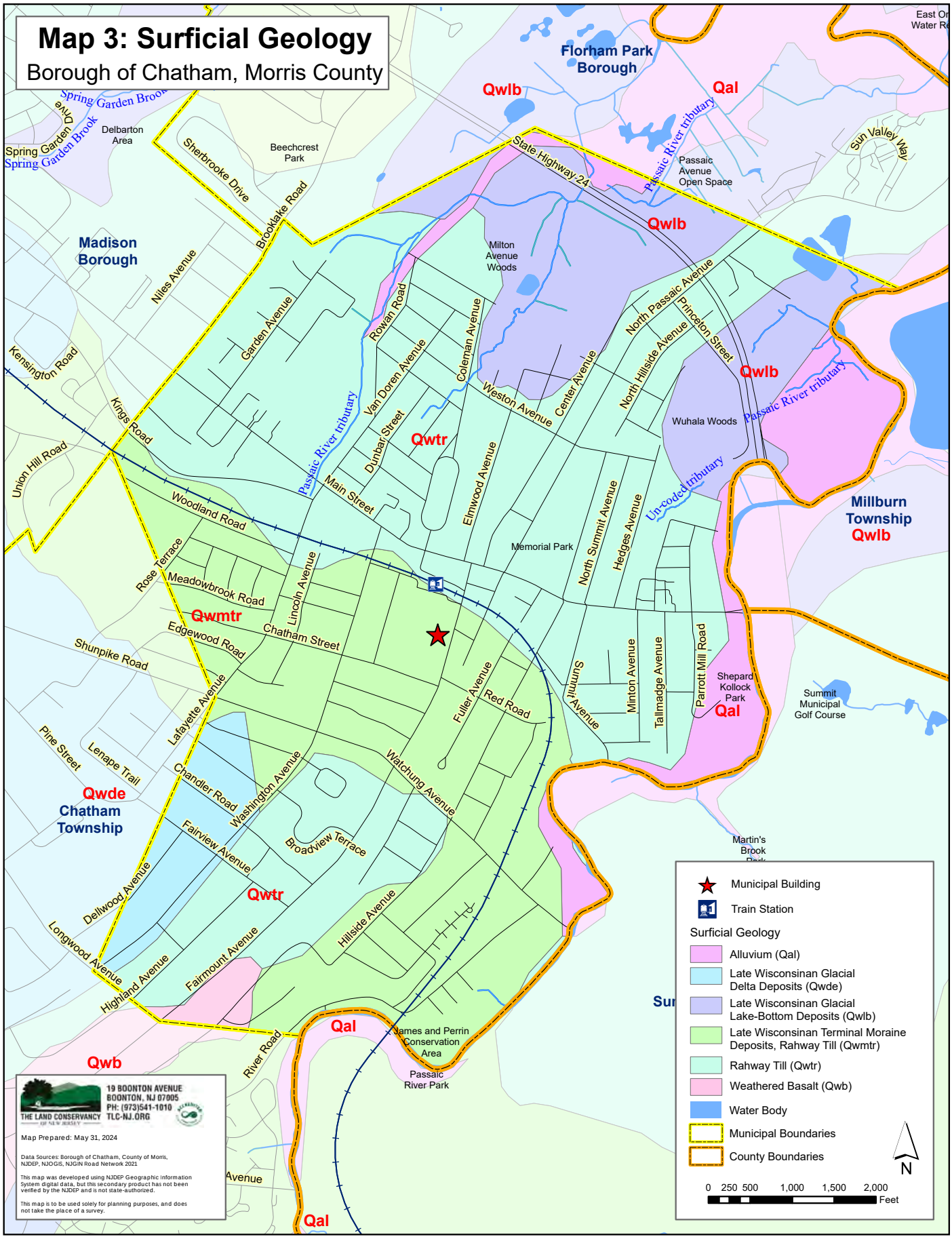


Table 2. Surficial Geology

Name	Description	Geologic Age	Acres	% of Borough of Chatham
Rahway Till (Qwtr)	Clayey silt to sandy silt with some to many pebbles and cobbles and few boulders; reddish brown, reddish yellow, yellowish brown, brown. As much as 100 feet thick, generally less than 40 feet thick.	Late Pleistocene and late Wisconsinan	723	47%
Late Wisconsinan Terminal Moraine Deposits, Rahway Till (Qwmtr)	Rahway Till as in unit Qwtr forming morainic ridges and knolls. As much as 200 feet thick.	Late Pleistocene and late Wisconsinan	412	27%
Late Wisconsinan Glacial Lake-Bottom Deposits (Qwlb)	Sand, pebble-to-cobble gravel, few to some boulders, minor silt; yellowish brown to reddish brown. As much as 150 feet thick.	Late Pleistocene and late Wisconsinan	205	13%
Alluvium (Qal)	Sand, silt, pebble-to-cobble gravel, minor clay; dark brown, brown, reddish-brown, gray; moderately to well sorted, stratified to massive.	Holocene and late Pleistocene	115	8%
Late Wisconsinan Glacial Delta Deposits (Qwde)	Sand, pebble-to-cobble gravel, minor silt; yellowish brown, reddish brown, light gray. As much as 150 feet thick.	Late Pleistocene and late Wisconsinan	56	4%
Weathered Basalt (Qwb)	Clayey silt with basalt fragments; reddish yellow to brown. As much as 10 feet thick.	Pleistocene	14	1%
		Total	1,525	100%
Source: NJDEP, U.S. Soil Survey				


Map 3: Surficial Geology
Borough of Chatham, Morris County
Florham Park Borough
Madison Borough
Millburn Township
Chatham Township
Qwlb
Qal
Qwtr
Qwmtr
Qwde
Qwb
Delbarton Area
Beechcrest Park
Passaic Avenue Open Space
Milton Avenue Woods
Wuhala Woods
Memorial Park
Shepard Kollock Park
Summit Municipal Golf Course
James and Perrin Conservation Area
Passaic River Park
Martin's Brook
Passaic River tributary
Un-coded tributary
Spring Garden Brook
Sherbrooke Drive
Brooklake Road
State Highway 24
Sun Valley Way
Niles Avenue
Garden Avenue
Rowan Road
Coleman Avenue
North Passaic Avenue
Princeton Street
North Hillside Avenue
Center Avenue
Weston Avenue
Van Doren Avenue
Dunbar Street
Main Street
Elmwood Avenue
Kensington Road
Kings Road
Union Hill Road
Woodland Road
Rose Terrace
Meadowbrook Road
Lincoln Avenue
Chatham Street
Edgewood Road
Shunpike Road
Lafayette Avenue
Pine Street
Lenape Trail
Chandler Road
Washington Avenue
Fairview Avenue
Broadview Terrace
Dellwood Avenue
Longwood Avenue
Highland Avenue
Fairmount Avenue
Hillside Avenue
Watchung Avenue
Fuller Avenue
Red Road
Summit Avenue
Minton Avenue
Tallmadge Avenue
Parrott Mill Road
North Summit Avenue
Hedges Avenue
River Road
Municipal Building
Train Station
Surficial Geology
Alluvium (Qal)
Late Wisconsinan Glacial Delta Deposits (Qwde)
Late Wisconsinan Glacial Lake-Bottom Deposits (Qwlb)
Late Wisconsinan Terminal Moraine Deposits, Rahway Till (Qwmtr)
Rahway Till (Qwtr)
Weathered Basalt (Qwb)
Water Body
Municipal Boundaries
County Boundaries
N
0 250 500 1,000 1,500 2,000
Feet
19 BOONTON AVENUE
BOONTON, NJ 07005
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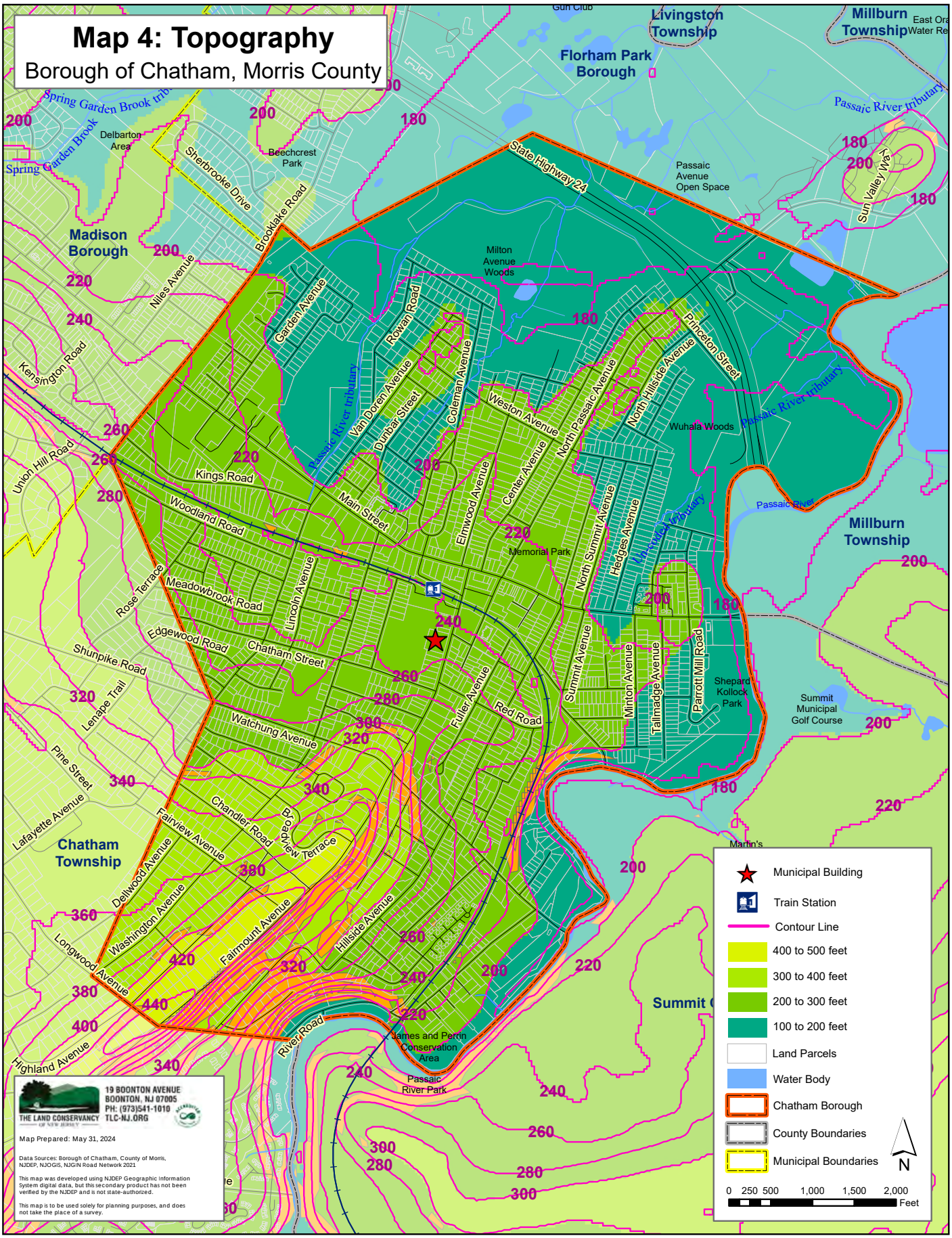
Map 4: Topography
Borough of Chatham, Morris County
Livingston Township
Millburn Township
Florham Park Borough
Madison Borough
Chatham Township
Millburn Township
Summit
Spring Garden Brook
Passaic River tributary
Passaic River
Delbarton Area
Beechcrest Park
Sherbrooke Drive
Brooklake Road
State Highway 24
Passaic Avenue Open Space
Sun Valley Way
Milton Avenue Woods
Wuhala Woods
Memorial Park
Shepard Kollock Park
Summit Municipal Golf Course
James and Perrin Conservation Area
Passaic River Park
Niles Avenue
Garden Avenue
Rowan Road
Van Doren Avenue
Dunbar Street
Coleman Avenue
Princeton Street
North Hillside Avenue
Weston Avenue
North Passaic Avenue
Center Avenue
Elmwood Avenue
Main Street
Kings Road
Woodland Road
Kensington Road
Union Hill Road
Rose Terrace
Meadowbrook Road
Lincoln Avenue
Edgewood Road
Chatham Street
Shunpike Road
Lenape Trail
Pine Street
Lafayette Avenue
Watchung Avenue
Fuller Avenue
Red Road
Summit Avenue
Minton Avenue
Tallmadge Avenue
Parrott Mill Road
Hedges Avenue
North Summit Avenue
Chandler Road
Fairview Avenue
Boonton Avenue
Terrace
Dellwood Avenue
Washington Avenue
Fairmount Avenue
Hillside Avenue
Longwood Avenue
Highland Avenue
River Road
Municipal Building
Train Station
Contour Line
400 to 500 feet
300 to 400 feet
200 to 300 feet
100 to 200 feet
Land Parcels
Water Body
Chatham Borough
County Boundaries
Municipal Boundaries
N
0 250 500 1,000 1,500 2,000
Feet
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Photo: Historic River Trail (Credit: Susan Robertson)

Chapter 2.

Soils

Soils Overview

Soil is the unconsolidated mineral or organic matter on the surface of the earth that has been subjected to and shows the effects of genetic and environmental factors (including climate) of micro-and macro-organisms acting on parent material over a period of time. The Natural Resources Conservation Service (NRCS) Soil Survey identifies and maps over 20,000 different types in the United States.[12] Most are given names from the local area where they were first mapped, and these named soils are referred to as soil series. Soil forming factors include:

Parent Material: Some soils weather directly from the underlying rocks. The residual soils have the same general chemistry as the original rocks.

Climate: Temperature and moisture can cause different patterns of weathering and leaching. The intensity, timing, and amount of rain also influences soil formation.

Topography: The slope and aspect (direction the physical slopes face) affect the temperature and moisture content of the soil.

Biological Factors: Plants, animals, micro-organisms, and humans affect soil formation. Native vegetation depends on biology, topography, and climate factors, as well as soil factors (density, chemistry, depth, temperature, and moisture).

Time: Soil formation is continuous, always altering according to climate, landscape position, and biological activity.

Soil Classifications

Soils are named and classified on the basis of physical and chemical properties in their layers (horizons).[13] Soil taxonomy uses the color, texture, structure, and other properties of the surface two meters deep to key the soil into a classification system to help the public use soil information.

The United States Department of Agriculture (USDA) defines 12 major soil texture classifications (clay, sandy clay, silty clay, clay loam, silty clay loam, sandy clay loam, loam, silt loam, silt, sandy loam, loamy sand, and sand). Soil textures are classified by the fractions of sand, silt, and clay in soil (**Figure 4 and Figure 5**). Classifications are typically named for the primary constituent particle size or the most abundant particle sizes.[14]

Figure 4. Soil Texture Pyramid *(Source: USDA)*[121]

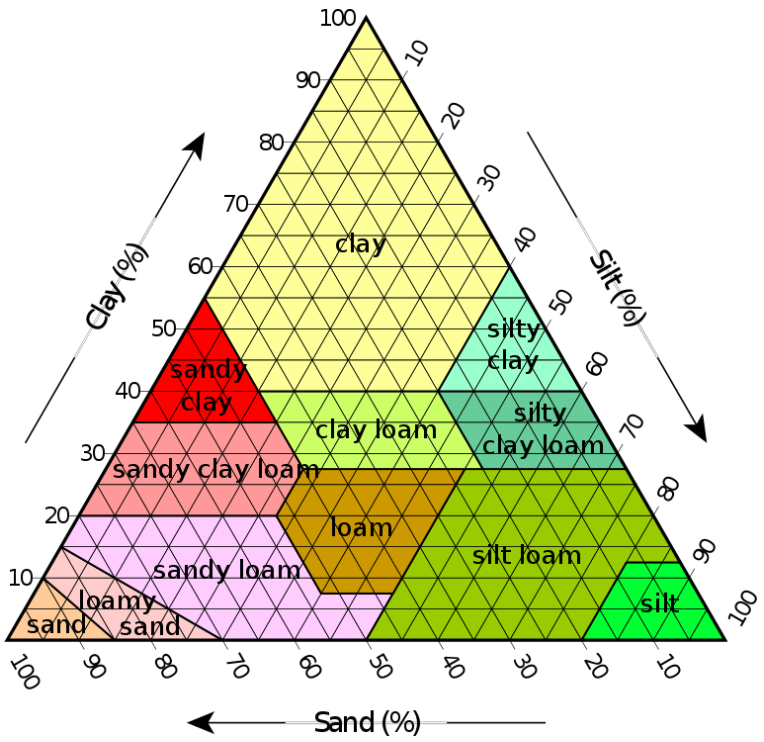
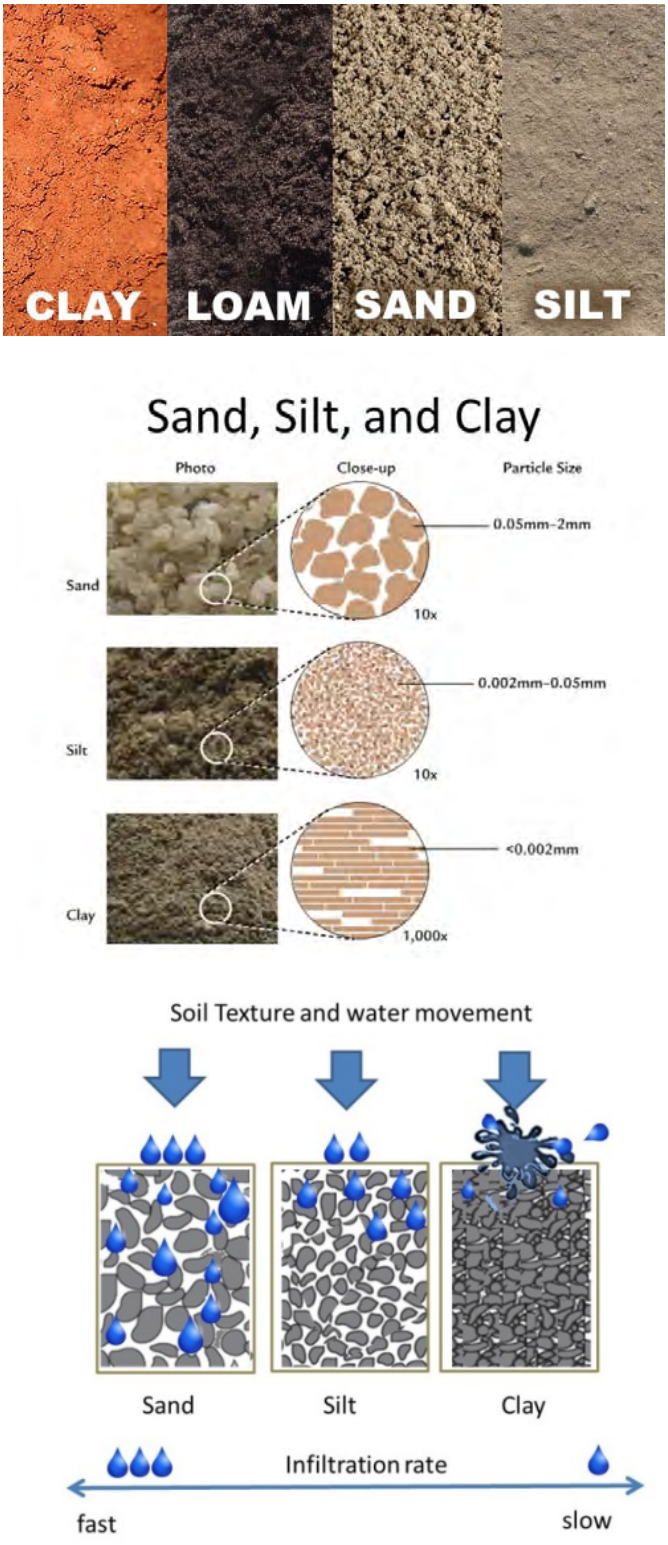


Figure 5. Soil Types (top), Soil Size (middle) and Soil Texture (bottom)
(Source: Noble Research Institute)[122]



Soils of the Borough of Chatham

The official Soil Survey for Morris County is maintained by the NRCS.[15] The acreage of each series in Chatham Borough is shown in **Table 3** and their location on **Map 5**.

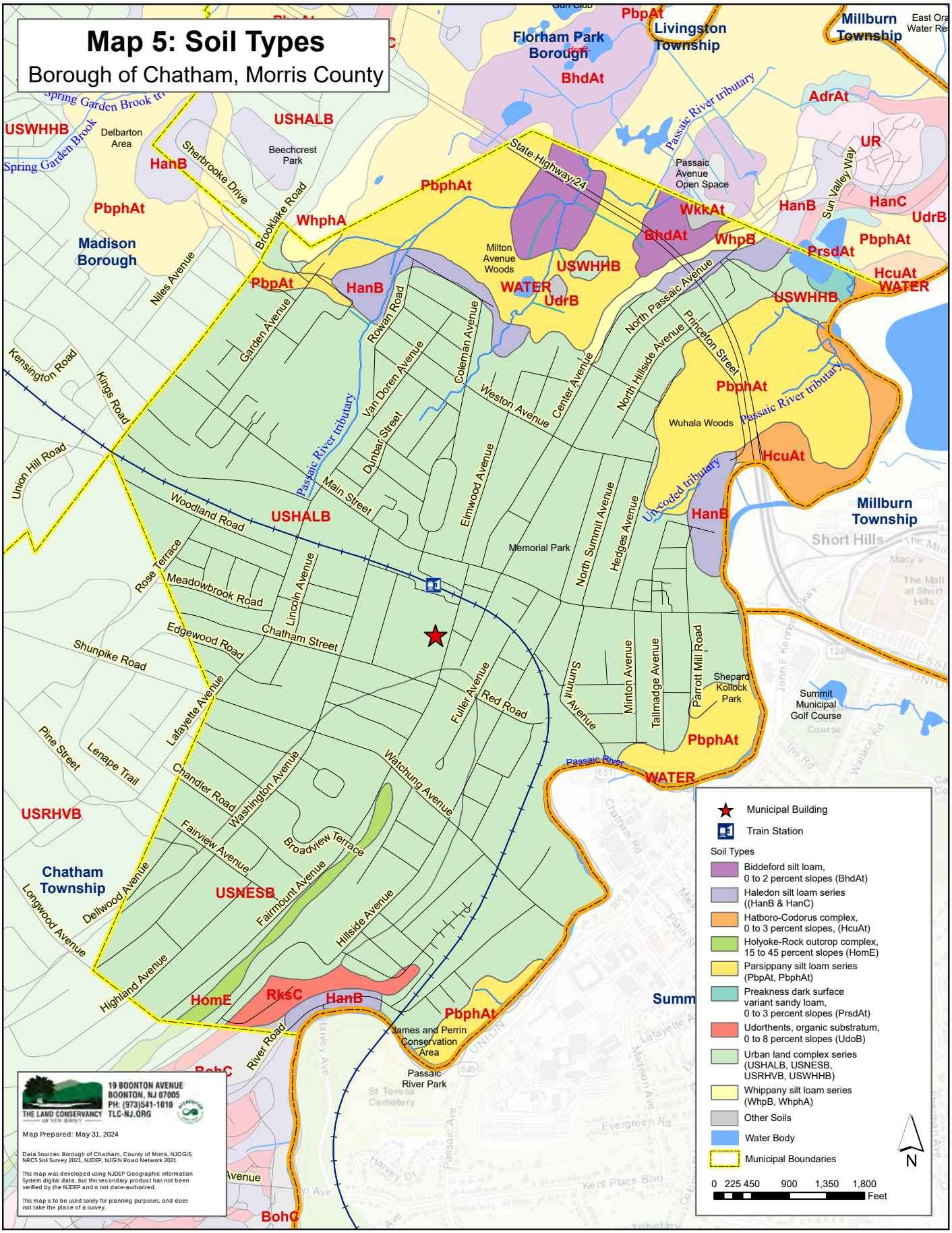
The soils maps and tables in the ERI are based on the data from the NRCS Soil Survey. The NRCS plots soils by map units based on the characteristics of the dominant soils within that unit. The map unit names identify the soils by their soil series classification(s). Each map unit name has an associated abbreviation that offers a shorthand version of the naming/classification system. This abbreviation system identifies the soil types by steepness, stoniness, and frequency of flooding as follows:

- The first three letters of the abbreviation name of the soil or complex. For example, Pbp is Parsippany Silt Loam and Han is Haledon Silt Loam.
- Capital letters at the end of the abbreviation indicate the slope "A" being less steep and "E" being steeper. An example is the Haledon Silt Loam series (HanB and HanC).
- The smaller "t" at the end of an abbreviation indicates frequently flooded. An example is Biddeford Silt Loam, BhdAt.

Each map unit is categorized by the NRCS Soil Survey as one of four types: consociations, complexes, associations, and undifferentiated groups. The Borough's soils are typed as either consociation or complexes:

Table 3. Soils of Borough of Chatham

Soil Series	Acres	% Borough	
Major Series			
Whippany-Urban Land Complex (USHALB, USNESB, USRHVB, & USWHHB)	1,127	75%	**1,435 acres**
Parsippany Silt Loam (PbpAt & PbphAt)	226	15%	
Haledon Silt Loam (HanB & HanC)	46	3%	
Biddeford Silt Loam (BhdAt)	36	2.5%	
Minor Series			
Hatboro-Codorus Complex (HcuAt)	25	2%	**64 acres**
Riverhead Gravelly Sandy Loam (RksC)	14	1%	
Whippany Silt Loam (WhphA)	13	1%	
Holyoke-Rock Outcrop Complex (HomE)	12	1%	
Other Series (10 acres or less)			
Preakness Dark Surface Variant Sandy Loam, Willette Muck, Udorthents & Boonton Moderately Well Drained Gravelly Loam (PrsdAt, WkkAt, UdrB & BohC)	8	0.5%	**8 acres**
Total (with water)	**1,507**	**100%**	
Source: NRCS Soil Survey			


Map 5: Soil Types
Borough of Chatham, Morris County
Florham Park Borough
Livingston Township
Millburn Township
Madison Borough
Chatham Township
Short Hills
Delbarton Area
Beechcrest Park
Milton Avenue Woods
Passaic Avenue Open Space
Wuhala Woods
Memorial Park
Summit Municipal Golf Course
Shepard Kollock Park
James and Perrin Conservation Area
Passaic River Park
St Teresa Cemetery
Spring Garden Brook
Passaic River tributary
Un-coded tributary
Passaic River
State Highway 24
Sherbrooke Drive
Brooklake Road
Niles Avenue
Garden Avenue
Rowan Road
Coleman Avenue
Van Doren Avenue
Dunbar Street
Elmwood Avenue
Weston Avenue
Center Avenue
North Passaic Avenue
North Hillside Avenue
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Sun Valley Way
Kensington Road
Kings Road
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Fairview Avenue
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Dellwood Avenue
Longwood Avenue
Fairmount Avenue
Hillside Avenue
Highland Avenue
River Road
Fuller Avenue
Red Road
Watchung Avenue
Summit Avenue
Minton Avenue
Tallmadge Avenue
Parrott Mill Road
North Summit Avenue
Hedges Avenue
Lafayette Avenue
Iris Rd
Wallace Rd
Evergreen Rd
Kent Place Blvd
Harvey Dr
Madison Ave
Passaic Ave
Lafayette Ave
Plain St
Chatham Rd
USWHHB
USHALB
USRHVB
USNESB
HanB
PbphAt
PbpAt
WhphA
BhdAt
WkkA
WhpB
UdrB
WATER
AdrAt
UR
HanC
UdrB
PrsdAt
HcuAt
HomE
RksC
BohC
Municipal Building
Train Station
Soil Types
Biddeford silt loam, 0 to 2 percent slopes (BhdAt)
Haledon silt loam series ((HanB & HanC)
Hatboro-Codorus complex, 0 to 3 percent slopes, (HcuAt)
Holyoke-Rock outcrop complex, 15 to 45 percent slopes (HomE)
Parsippany silt loam series (PbpAt, PbphAt)
Preakness dark surface variant sandy loam, 0 to 3 percent slopes (PrsdAt)
Udorthents, organic substratum, 0 to 8 percent slopes (UdoB)
Urban land complex series (USHALB, USNESB, USRHVB, USWHHB)
Whippany silt loam series (WhpB, WhphA)
Other Soils
Water Body
Municipal Boundaries
0 225 450 900 1,350 1,800
Feet
N
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- Consociations (Cn) are named for the dominant soil. In a consociation, delineated areas use a single name from the dominant component in the map unit. Dissimilar components are minor in extent. Examples are Parsippany and Haledon loam consociations.

- Complexes (Cx) consist of two or more dissimilar components that occur in a regularly repeating pattern. The total amount of other dissimilar components is minor in extent. Many of the complexes in the Borough of Chatham combine consociations with Urban land, such as the Whippany-Urban Land Complex.

Major Soil Series

Soils with similar profiles are a soil series. The most prevalent soil series in the Borough of Chatham are:

- Whippany-Urban Land Complex
- Parsippany Silt Loam
- Haledon Silt Loam
- Biddeford Silt Loam

Together, they account for 95% (1,435 acres) of the total land area.

Water is not considered a soil series and is excluded. Urban land is also typically excluded, but some of this land type in the Borough is intermixed with other soil series, as such, all urban land soil series has been included.

Whippany Series

The Whippany series consists of very deep, somewhat poorly drained soils formed in silty and clayey sediments. Whippany soils are on slight elevations on terraces or gently sloping peripheral areas within large topographic basins. Slope ranges from 0% to 3%. The underlying bedrock is shale, basalt, and/or granite. The Whippany series includes the soils from the Whippany-Urban Complex series (USWHHB, USRHVB, USNESB, and USHALB) and the Whippany Silt Loam (WhphA).

Characteristics include:

- Drainage and Permeability: Whippany soils are somewhat poorly drained. Saturated hydraulic conductivity ranges from moderately low or moderately high. Runoff is negligible to very high.

- Use and Vegetation: Whippany soils are found within urban development. Trees in wooded areas include maple, sweet gum, pin oak, elm, and swamp white oak

The Whippany series and the Whippany Loam series comprise 75% of Chatham, totaling 1,134 acres. The Whippany series (1,127 acres) is found throughout the Borough's urban and suburban areas including Memorial Park and a strip of the Whippany Loam series (13 acres) is found east of Milton Avenue Woods.

Parsippany Series

The Parsippany series consists of deep, poorly drained soils formed in silty and clayey sediments composed mostly of weathered basalt, shale, and granite. Slope ranges from 0% to 8%. The Parsippany series includes soils from the Parsippany Silt Loam C (PbpAt & PbphAt).

Characteristics include:

- Drainage and Permeability: Parsippany soils are poorly drained.

Runoff is negligible to high. Saturated hydraulic conductivity is moderately low to high in the surface horizons and low to moderately high in the subsoil and low to high in the substratum. The water level is at or near the surface throughout the winter and early spring and following periods of heavy rainfall.

- Use and Vegetation: Most Parsippany soils are in woodland. Originally swamp, white oak, elm, ash, and swamp maple grew on these soils. They are found in the wooded areas of the James and Perrin Conservation Area, Shepard Kollock Park, Wuhala Woods, and Milton Avenue Woods.

The Parsippany series comprise 15% of the Borough (226 acres).

Haledon Series

The Haledon series consists of very deep, somewhat poorly drained soils formed in glacial till and found in low positions on undulating uplands. The soils developed in coarse textured glacial till composed primarily of basalt, red sandstone, and shale, and granitic gneiss with lesser amounts of quartzite and gray sandstone and shale. They are found at the base of steeper sloping uplands and in shallow drainageways. Slope ranges from 0% to 15%. The Haledon series includes the soils from the Haledon Silt Loam (HanB and HanC).

Characteristics include:

- Drainage and Saturated Hydraulic Conductivity: Haledon soils are somewhat poorly drained. Surface runoff is medium to very high. Saturated hydraulic conductivity is moderately high or high above the fragipan and very slow or slow in the fragipan and densic materials.

- Use and Vegetation: Most areas are wooded or in idle fields. Much of this soil is used for housing or urban development at the edges of wooded areas such as the Minisink Swim and Tennis Club south of Wuhala Woods and Milton Avenue School with its surrounding housing complexes south of Milton Avenue Woods. Vegetation is largely forest dominated by oak and maple with some birch and ash.

Haledon Silt Loam soils comprise 3% of the Borough, totaling 46 acres.

Biddeford Series

The Biddeford series consists of very deep, very poorly drained soils formed in glaciolacustrine or glaciomarine deposits on coastal lowlands and in river valleys. Slope ranges from 0% to 3%. The underlying soil is fine textured glaciolacustrine or glaciomarine deposits. The Biddeford series includes the soils from the Biddeford Silt Loam (BhdAt).

Characteristics include:

- Drainage and Permeability: Biddeford soils are very poorly drained. Saturated hydraulic conductivity is high or moderately high in the organic surface layer, commonly moderately high in the A or Eg horizon, but the range includes moderately low, and moderately low or low in the subsoil and substratum. The soil is intermittently ponded.

- Use and Vegetation: Biddeford soils are mostly woodland and most remaining areas are used for

urban development. Trees make up large pockets of the Milton Avenue Woods. Common tree species include northern white cedar, red spruce, black spruce, balsam fir, and red maple. Willows, alders, cattails, reed canary grass, and sedges are common in non-wooded areas.

The Biddeford series comprise 2.5% of the Borough, totaling 36 acres.

Minor and Other Soil Series

Hatboro-Codorus Series

The Hatboro-Codorus series consists of very deep and poorly drained soils formed in alluvium derived from metamorphic and crystalline rock and are on flood plains. They formed in alluvial materials containing medium to large quantities of mica derived from schist, gneiss, phyllite, and other metamorphic rocks. Slope ranges from 0% to 3%. The Hatboro-Corodus series includes the soils from the Hatboro-Corodus Complex (HcuAt).

Characteristics include:

- Drainage and Permeability: The Hatboro-Codorus series is moderately well drained and poorly drained. Surface runoff is low. Saturated hydraulic conductivity is moderately high.

- Use and Vegetation: Approximately 60% of Hatboro-Codorus soils are pasture, 25% are woodlands and the remaining are a mixture of cropland and mixed hardwoods.

Hatboro-Codorus soils comprise less than 2% of the Borough, totaling 25 acres and are located in eastern edges of Wuhala Woods.

Riverhead Series

The Riverhead series consists of very deep, well drained soils formed in glacial outwash deposits derived primarily from granitic materials. They are often found on outwash plains, valley trains, beaches, and water-sorted moraines, with slopes ranging from 0% to 50%. The Riverhead series includes the soils from the Riverhead Gravelly Sandy Loam (RksC).

Characteristics include:

- Drainage and Saturated Hydraulic Conductivity: Riverhead soils are well drained, due to high sand content. The potential for surface runoff is low to medium. Saturated hydraulic conductivity is high in the solum and very high in the substratum.

- Use and Vegetation: Most of these soils have been cleared for residential development. Native vegetation is black, white, and red oaks, American beech, and sugar maple.

Riverhead soils comprise less than 1% of the Borough of Chatham, totaling 14 acres, located in the southern section of the town.

Holyoke-Rock Series

The Holyoke-Rock series consists of shallow, well-drained and somewhat excessively drained soils formed in a thin mantle of till derived mainly from basalt and red sandstone, conglomerate, and shale. They are nearly level to very steep soils on bedrock controlled ridges and hills. The slope ranges from 0% to 60%. The Holyoke-Rock series includes the soils from the Holyoke-Rock Outcrop complex (HomE).

Characteristics include:

- Drainage and Saturated Hydraulic Conductivity: Holyoke-Rock soils are well-drained and somewhat excessively drained. Surface runoff is medium to very rapid. Saturated hydraulic conductivity is moderately high to very high.

- Use and Vegetation: Mostly forested. Small cleared areas are used for orchards, cultivated crops, hay, or pasture. In the Borough this land is used for community development. Common trees are red, white, black, and chestnut oak, hickory, red maple, red cedar, hemlock, white pine, and gray and black birch.

Holyoke-Rock soils comprise less than 1% of the Borough of Chatham, totaling 12 acres and located along Fairmount Avenue in the lower portion of town.

Preakness Series

The Preakness series consists of very deep, poorly, and very poorly drained soils on broad, nearly level outwash plains, or in narrow swales that dissect outwash terraces. Slope ranges from 0% to 3%. The Preakness series includes the soils from the Preakness Dark Surface Variant Sandy Loam (PrsdAt)

Characteristics include:

- Drainage and Saturated Hydraulic Conductivity: Preakness soils are poorly or very poorly drained. Runoff is negligible or low. Saturated hydraulic conductivity is moderately high or high in the surface and subsoil and high to very high in the substratum. The water table is at or near the surface from late autumn through winter and spring. The soils are often ponded in winter and during periods of high rainfall because of their low topographic position. In many places adjacent to streams, Preakness soils flood frequently for brief periods in late winter and early spring. They flood more extensively but less often following severe storms of low frequency in August through October.

- Use and Vegetation: Many areas of these soils are idle or are drained and urban developments. Native vegetation is red maple, elm, willow, and ash with some sedge and other hydrophytic species.

The Preakness series, totaling 3 acres, or less than 1% of the Borough, can be found in the northeastern line of the Borough around the Centercourt Athletic Club of Chatham.

Willette Series

The Willette series consists of very deep, very poorly drained soils formed in organic materials 41 to 130 cm thick overlying clayey deposits. These soils are in depressions on lake plains, ground moraines, and end moraines. The slope ranges from 0% to 2%. The Willette series includes the soils from the Willette Muck (WkkAt).

Characteristics include:

- Drainage and Permeability: The Willette series is very poorly drained. The potential for surface runoff is negligible. Saturated hydraulic conductivity is high in the organic materials and moderately low in the clayey material. Permeability is rapid in the organic layers and slow in the clayey material. Depth to the top of a seasonal high water

table ranges from 46 cm above the surface to 46 cm below the surface between November and May in normal years.

- Use and Vegetation: The greater part of this soil is in natural vegetation of alder, quaking aspen, willow, dogwood, American elm, white ash, red maple, and a few conifers. A few acres are drained and used for pasture and truck crops.

Willette soils comprise less than 0.1% of the Borough, totaling 2 acres.

Boonton Series

The Boonton series consists of deep or very deep moderately well and well drained soils formed in glacial till composed mostly of red to brown shale, sandstone, basalt, and some granitic gneiss on gently sloping to very steep uplands. They are moderately deep to a fragipan (a dense, hard subsoil forming a restrictive feature). Slope is usually smooth and regular and gradient ranges from 0% to 50%. The Boonton series includes soils from Boonton Moderately Well Drained Gravelly Loam (BohC).

Characteristics include:

- Drainage and Saturated Hydraulic Conductivity: Moderately well and well drained. Runoff is slow to rapid. Saturated hydraulic conductivity is moderately low to high in the mineral soil above the fragipan, low or very low in the fragipan, and low to high below the fragipan. There is a perched water table (a water table that is above the normal water table and separated from it by a dry, or unsaturated, zone) at a depth of 46 to 91 cm from November to May of most years.
- Use and Vegetation: Most Boonton soils are in areas that have become highly urbanized. Undeveloped sites are wooded or idle fields. Wooded areas have oaks, red maple, white ash, hickory, gray birch, and dogwood.

The Boonton series comprise less than 1% of the Borough (1 acre).

Water

Water covers 17 acres, making up the remaining 0.1% of the Borough's total area.

Soil Characteristics

Hydric Soils

According to the NRCS, a hydric soil is a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part. Hydric soils are an important element of wetland areas and naturally support wetland vegetation. If a soil is classified as hydric, federal, and state wetlands regulations may restrict land use.

The NRCS Soil Survey for the Borough of Chatham indicates the following soils with hydric components:

- BhdAt - Biddeford Silt Loam, frequently flooded, is a hydric soil, and represents 2% of the consociation. Landform: Lake Terraces.
- HcuAt - Hatboro-Codorus Complex, frequently flooded, is a hydric soil and represents less than 2% of this consociation. Landform: Floodplains.

- PbpAt – Parsippany Silt Loam, frequently flooded, is a hydric soil and represents less than 1% of this consociation. Landform: Lake Terraces.

- PbphAt – Parsippany Silt Loam, frequently flooded, is a hydric soil and represents 14% of this consociation. Landform: Outwash Plains.

- PrsdAt – Preakness Dark Surface Variant Sandy Loam, frequently flooded, is a hydric soil and represents less than 1% of this consociation. Landform: Outwash Plains, Outwash Terraces.

- USHALB – Urban Land-Haledon Complex is a hydric soil and represents less than 58% of this consociation. Landform: Depressions.

- USWHHB – Urban Land-Whippany, occasionally flooded complex, is a hydric soil and represents less than 1% of this consociation. Landform: Floodplains.

- WhpB – Whippany Silt Loam, frequently flooded, is a hydric soil and represents less than 1% of this consociation. Landform: Floodplains.

- WhphA – Whippany Silt Loam, frequently flooded, is a hydric soil and represents less than 1% of this consociation. Landform: Depressions, Floodplains, and Drainage ways.

- WkkAt – Willette Muck, frequently flooded, is a hydric soil and represents 2% of this consociation. Landform: Floodplains.

Soils with hydric components total 1,202 acres, or 79% of the Borough of Chatham's total area.

Erodibility

Soils can be categorized by their susceptibility to erosion, the natural process by which wind, moving water, ice, and gravitational forces cause soil and particulate materials to be displaced. While erosion of exposed bedrock occurs over an extended time scale, soil erosion can occur more acutely with more immediate consequences. The consistency of the soil is one factor determining its erodibility potential, with dense, compact, clayey soils being less susceptible and looser loamy soils, with varying levels of clay and sand, being more susceptible (see **Figure 5**).

A measure of this susceptibility is the K-factor. The K-factor looks at the soil texture and composition as well as the permeability to determine a number between 0.02 (less susceptible) and 0.69 (more susceptible) that demonstrates the erosion potential of a soil.

According to the NRCS, Erosion Hazard for Road/Trail Soils measures the soil loss from unsurfaced roads and trails.[16] The soils in the Borough of Chatham (outside of water and urban land) are rated as moderate in this category. For the Borough's four main soil units, K values are around 0.32, representing a moderate risk of erosion.

Topographic Protection (Wind)

According to the NRCS, the soils of the Borough are subject to erosion by wind. Wind erosion most often affects soil on bare lands, where sheer force

of wind detaches particles protruding from the soil surface.

Limitations for Use

Other characteristics of soil that determine suitability for development, include:

- Its capacity to support foundations without corrosion.
- Limits for septic systems.
- Hydrological characteristics such as tendency towards ponding and flooding.
- Shallow water table or potential for frost heave.

According to the NRCS Soil Survey, differences in soil properties can occur within short distances.[17] Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high-water table makes soil poorly suited to basements or underground installations.

The details for soils in Borough of Chatham are included in **Table 4**. Limitations for use include the following characteristics:

Depth to restrictive layer is the vertical distance from the soil surface to the upper boundary of the restrictive layer. The restrictive layer is a nearly continuous layer that significantly impedes the movement of water and air through the soil or otherwise provides an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. Shallow soils can limit plant growth. In the Borough of Chatham, the major soil series have a depth to restrictive layer greater than 200 cm except for Haledon series which has a depth to restrictive layer greater than 7 cm.

Drainage refers to the relative wetness of the soil under natural conditions as it pertains to wetness due to a water table. Drainage classes refer to the frequency and duration of wet periods under conditions similar to those under which the soil developed. Drainage classes in Borough of Chatham range from somewhat poorly drained to very poorly drained.

Depth to water table indicates a range of expected depth to a saturated zone in the soil. The rating of the soil series in the Borough is greater than 45 cm in the Whippany series, greater than 15 cm for the Parsippany series, 26 cm in the Haledon series, and 0 cm in the Biddeford series.

Available water capacity is the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in centimeters (cm) of water per centimeter of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants and in the design and management of irrigation systems. The known soils in the Borough of Chatham have a capacity 0.51 cm.

Flooding is the temporary inundation of an area caused by overflowing streams or by runoff from adjacent slopes. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water

Table 4. Soil Limitations				
	Major Soil Series in Borough of Chatham			
	Whippany-Urban Land Complex	*Parsippany Silt Loam Consociations*	*Haledon Silt Loam Consociations*	*Biddeford Silt Loam Consociations*
Depth to Restrictive Feature (cm)	>200	>200	>7	>200
Drainage	Somewhat poorly drained	Poorly drained	Somewhat poorly drained	Very poorly drained
Depth to Water Table (cm)	46	>15	26	0
Available Water Capacity (cm)	0.51	0.51	0.51	0.51
Flooding	None	Frequent	None	Frequent
Frost Action Potential	Moderate	High	Moderate	High
Ponding	None	Frequent	None	Frequent
Risk of Corrosion Steel	Moderate	High	High	Moderate
Risk of Corrosion Concrete	Moderate	Moderate	Moderate to High	Low
Septic Absorption	Very Limited	Very Limited	Very Limited	Very limited
Source: NRCS Soil Survey[123]				

standing in swamps and marshes is considered ponding rather than flooding. The Parsippany series and Biddeford series frequently flood and Whippany series and Haledon series never flood.

Potential for frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Silty and highly structured, clayey soils that have a high-water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures. The Whippany series and Haledon series have a moderate frost action potential while the Parsippany and Biddeford series have a high frost action potential.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. Ponding in Borough of Chatham was ranked as frequent for both Parsippany series and Biddeford series. Whippany and Haledon are ranked none.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. The corrosion of steel in the Borough's soils is rated as high for the Parsippany series and Haledon series and rated as moderate for the Whippany and Biddeford series. The corrosion of concrete in the Borough's soils is rated as moderate or moderate to high for all soils except for Biddeford which was rated as low.

Septic limitations refer to effectiveness of a soil type to manage a septic tank absorption field. The ratings are based on the soil properties that affect absorption of the effluent, construction and maintenance of the system, and public health. Within the Borough of Chatham, all soils are classified as "very limited". The "very limited" classification indicates that the soil has at least one feature that is unfavorable for such use, with the expectation of poor performance and high maintenance.

Soil Limitations for Building Site Development

The Borough of Chatham has certain soils that are rated by the NRCS as having no limits on their ability to support dwellings and small commercial buildings. For the purpose of these ratings, dwellings are defined as single-family houses of three stories or less and small commercial buildings are structures that are fewer than three stories high and do not have basements. The ratings for dwellings are based on the soil properties that affect excavation and construction costs.

The properties that affect the load-supporting capacity include:

- Depth to a water table.
- Ponding and flooding.
- Subsidence.
- Linear extensibility (shrink-swell potential).
- Compressibility.

Properties that affect excavation and construction costs are depth to a water table, ponding and flooding, slope, depth to bedrock or cemented pan, hardness of bedrock or cemented pan, and the amount and size of rock fragments.

In the Borough:[18]

- 84% (1,279 acres) of the Borough is "very limited," which indicates that the soil has one or more features that are unfavorable for dwellings with basements.

- 15% (231 acres) of the Borough is not limited, meaning the soil has conditions that is favorable for basement dwellings.

- 0.2% (14 acres) is somewhat limited, which indicates that the limitations can be overcome or minimized by planning, design, or installation.

Limitations - Recreational Use

The NRCS Soil Survey also provides general recommendations with the capacity of the soil to support recreational use. This includes camping, hiking, picnicking, and playgrounds (**Table 5**). In the Borough, the soils in this category range from limited to somewhat limited.

For the municipality, the Recreation Department manages the fields and parks to sustain soil health and playing capacity, regardless of the mapped limitation by the NRCS.

Table 5. Soil Limitations for Recreational Use

	Camp Area	Picnic Area	Playground	Paths and Trails
Whippany-Urban Land Complex	Somewhat to Very Limited	Very Limited	Very Limited	Very Limited
Parsippany Silt Loam Consociations	Very Limited	Very Limited	Very Limited	Very Limited
Haledon Silt Loam Consociations	Very Limited	Somewhat to Very Limited	Very Limited	Very Limited
Biddeford Silt Loam Consociations	Very Limited	Very Limited	Very Limited	Very Limited

Source: NRCS Soil Survey[124]

Photo: 9/11 Memorial (Credit: ChathamBorough.org)

Chapter 3.

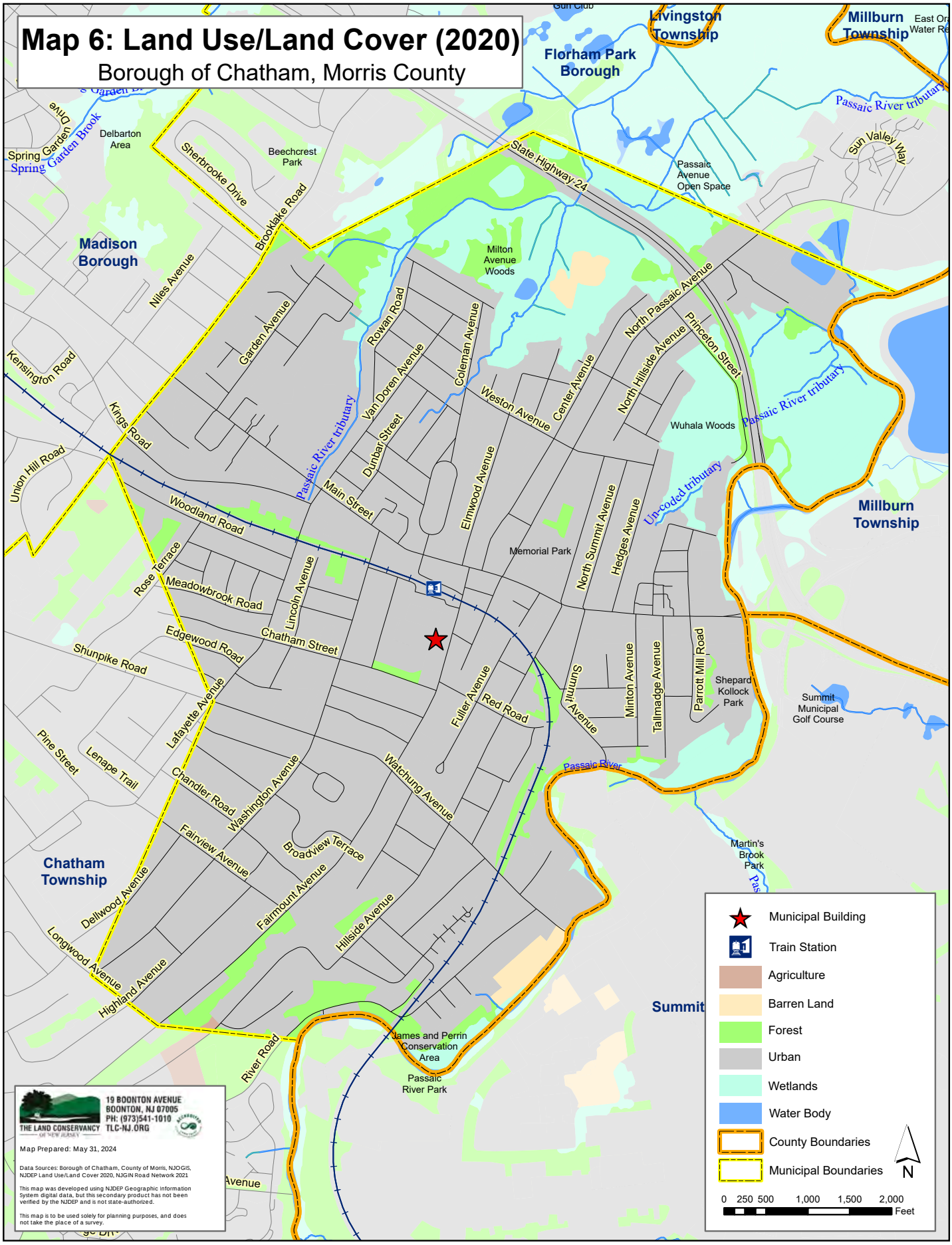
Land Use / Land Cover

The NJDEP maps land use and land cover using digital orthophotography (known as Land Use/Land Cover or LU/LC data).[19] Areas are delineated using color infrared images. Nearly all of the Borough of Chatham is designated by the NJDEP as urban. Per the Anderson Land Use Classification System, upon which the NJDEP categorizes land cover:

Urban land is characterized by intensive land use where the landscape has been altered by human activities. Urban categories can include residential; commercial and service; industrial; transportation, communication, and commercial complexes; mixed urban or built-up; other urban or build-up and recreational.[20]

Table 6 presents a breakdown of the six different land use types found within the Borough and includes a comparison of the land use/land cover in 1995 and 2020, along with percent change between the years. **Map 6** documents current land use.

Urban land classifications compose nearly 78% of the Borough, indicating a high amount of commercial and residential development. Of the urban land category, 2% (32 acres) is high density or multiple residential dwelling. Single unit, medium-to-low residential density is 54% (817 acres) of total urban land (**Figure 6**). Smaller areas of urban land use include utilities and infrastructure, athletic fields, industrial uses, and recreational land.

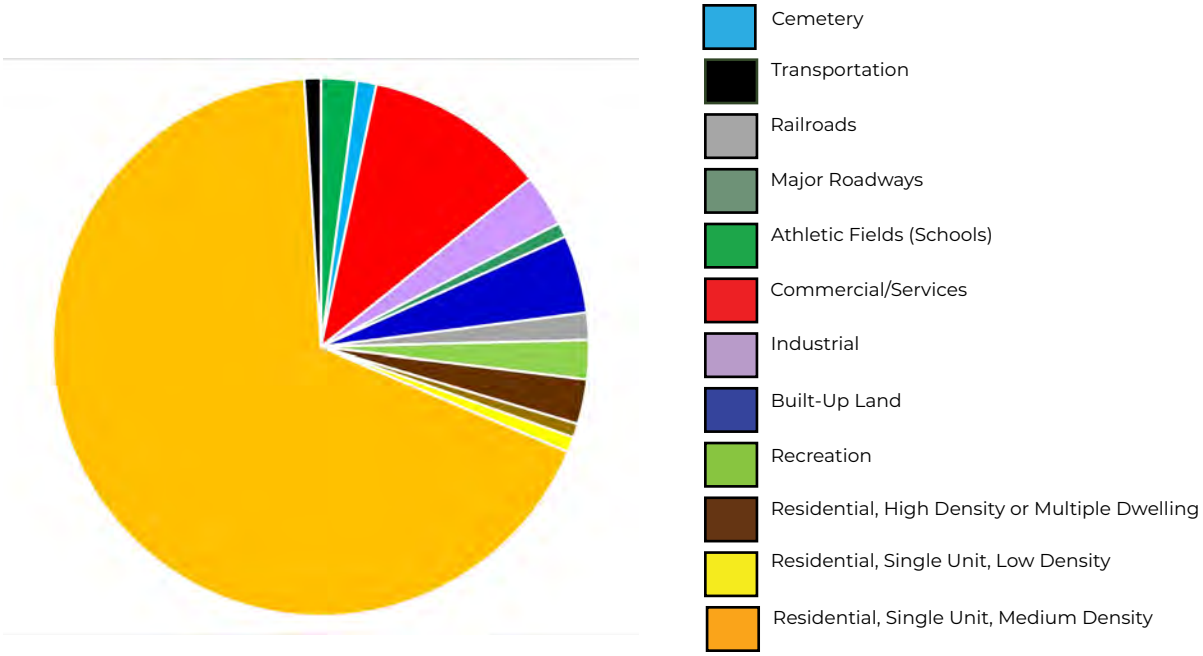

Map 6: Land Use/Land Cover (2020)
Borough of Chatham, Morris County
Livingston Township
Millburn Township
Florham Park Borough
Madison Borough
Chatham Township
Summit
Delbarton Area
Beechcrest Park
Passaic Avenue Open Space
Milton Avenue Woods
Wuhala Woods
Memorial Park
Shepard Kollock Park
Summit Municipal Golf Course
James and Perrin Conservation Area
Passaic River Park
Martin's Brook Park
Passaic River tributary
Un-coded tributary
Passaic River
State Highway 24
Sherbrooke Drive
Brooklake Road
Niles Avenue
Garden Avenue
Rowan Road
Coleman Avenue
Van Doren Avenue
Dunbar Street
Weston Avenue
Center Avenue
North Hillside Avenue
North Passaic Avenue
Princeton Street
Elmwood Avenue
North Summit Avenue
Hedges Avenue
Minton Avenue
Tallmadge Avenue
Parrott Mill Road
Sunmit Avenue
Fuller Avenue
Red Road
Watchung Avenue
Washington Avenue
Broadview Terrace
Fairmount Avenue
Hillside Avenue
Fairview Avenue
Chandler Road
Lenape Trail
Pine Street
Lafayette Avenue
Dellwood Avenue
Longwood Avenue
Highland Avenue
River Road
Kensington Road
Kings Road
Union Hill Road
Woodland Road
Main Street
Rose Terrace
Meadowbrook Road
Lincoln Avenue
Edgewood Road
Chatham Street
Shunpike Road
Sun Valley Way
Municipal Building
Train Station
Agriculture
Barren Land
Forest
Urban
Wetlands
Water Body
County Boundaries
Municipal Boundaries
N
0 250 500 1,000 1,500 2,000
Feet
19 BOONTON AVENUE
BOONTON, NJ 07005
PH: (973)541-1010
TLC-NJ.ORG
THE LAND CONSERVANCY OF NEW JERSEY
Map Prepared: May 31, 2024
Data Sources: Borough of Chatham, County of Morris, NJOGIS, NJDEP Land Use/Land Cover 2020, NJGIN Road Network 2021
This map was developed using NJDEP Geographic Information System digital data, but this secondary product has not been verified by the NJDEP and is not state-authorized.
This map is to be used solely for planning purposes, and does not take the place of a survey.

Over the past 25 years, the Borough has lost 8% of its forest cover (8 acres), with a corresponding increase in barren land. The NJDEP defines the land cover types as follows:

Table 6. Land Use/Land Cover, 1995 to 2020			
Type	Acres		% Change 1995-2020
	1995	2020	
Agriculture	0.8	0.53	-34%
Barren	7	12.76	82%
Forest	98.5	90.49	-8%
Urban	1,190.3	1,191.67	0.1%
Water	17.1	17.34	1%
Wetlands	218.6	212	-2%
Source: Land Use Land Cover 1995-2020, NJDEP			

- Agriculture – Lands used for the production of food and fiber, and the structures associated with this production.
- Barren Land – The sub-categories of barren land that are identified in the Borough include altered lands and transitional areas.
- Forest – Lands covered by woody vegetation other than wetlands.
- Water – Areas that are periodically water covered.
- Wetlands – Areas that are inundated or saturated by surface or ground waters at a frequency and duration sufficient to support vegetation adapted for life in saturated soil conditions.
- Urban Land – Urban land is characterized by intensive land use where the landscape has been altered by human activities. Urban land categories are shown in **Figure 6**.

Figure 6. Urban Land Classifications in Borough of Chatham
(*Source: NJDEP Land Use/Land Cover, 2020*)[125]



The Built Environment[21]

Historic Sites

The Borough of Chatham was settled in 1715 and several structures are over 250 years old. The Chatham Historic Preservation Commission (HPC), established in 1989, aims to recognize and preserve the Borough's historic structures as an essential element of its character and identity. In so doing, the HPC seeks to enhance the reputation of Chatham Borough as a place of beauty and architectural value. The HPC reviews project applications within the Borough's two historic districts and maintains the Architectural Design Guidelines.[22]

The HPC also presents a "Flag Award", first introduced in the 1980s, to recognize an exemplary restoration of a Borough residential or commercial structure.

The Borough's Historical Society, which celebrates its 100th anniversary in 2024, aims to educate and archive historical information concerning the Borough, its buildings, and its inhabitants. Many of these artifacts are available for viewing by the public at the Library of the Chathams. In 2024, the town's residents recreated a photograph of residents at the railroad station from 1930.

The NJDEP Historic Preservation Office (HPO) defines Historic Districts as areas that possess a significant concentration, linkage, or continuity of buildings, sites, structures, or objects united historically or aesthetically by plan or physical development. Historic Districts include National Historic Landmarks; areas on the New Jersey Register of Historic Places or National Register of Historic Places; areas determined eligible for inclusion in those registers; districts designated as Local Historic Districts by a local government; or areas that have been identified through a cultural resource survey or other documentation on file at the HPO.

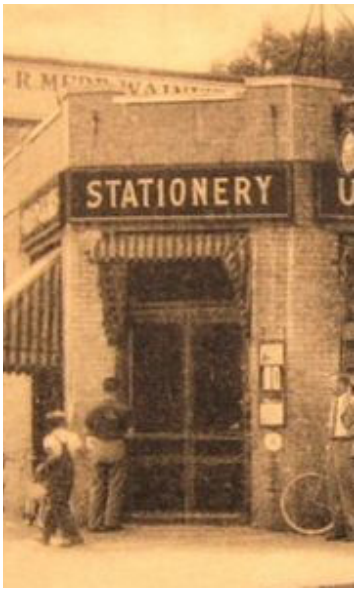
Within Chatham Borough, there are two historic districts of special interest (**Figure 7**). One is designated by the state and is known as the **East Main Street Historic District** and the other has a local designation of **Main Street Historic District**. There is one entry on the National Register of Historic Places, which passes through the Borough and that is the Old Main Delaware, Lackawanna, and Western Railroad. This is the NJ Transit Morristown Line which is recognized for its historical significance from Hudson, Hoboken City to Warren, Washington Township, and then along Warren Railroad to the Delaware River.

Chatham Borough, with its rich history and preserved charm, offers several sites of special interest that reflect its heritage and the broader history of New Jersey. Those identified by the NJDEP Historic Preservation Office (State Historic Preservation Office or SHOP) are included in (**Table 7**).

Site descriptions of locally significant structures

Visiting these sites provides a deep dive into both the natural and cultural history of Chatham Borough, making them special points of interest for both residents and visitors alike.

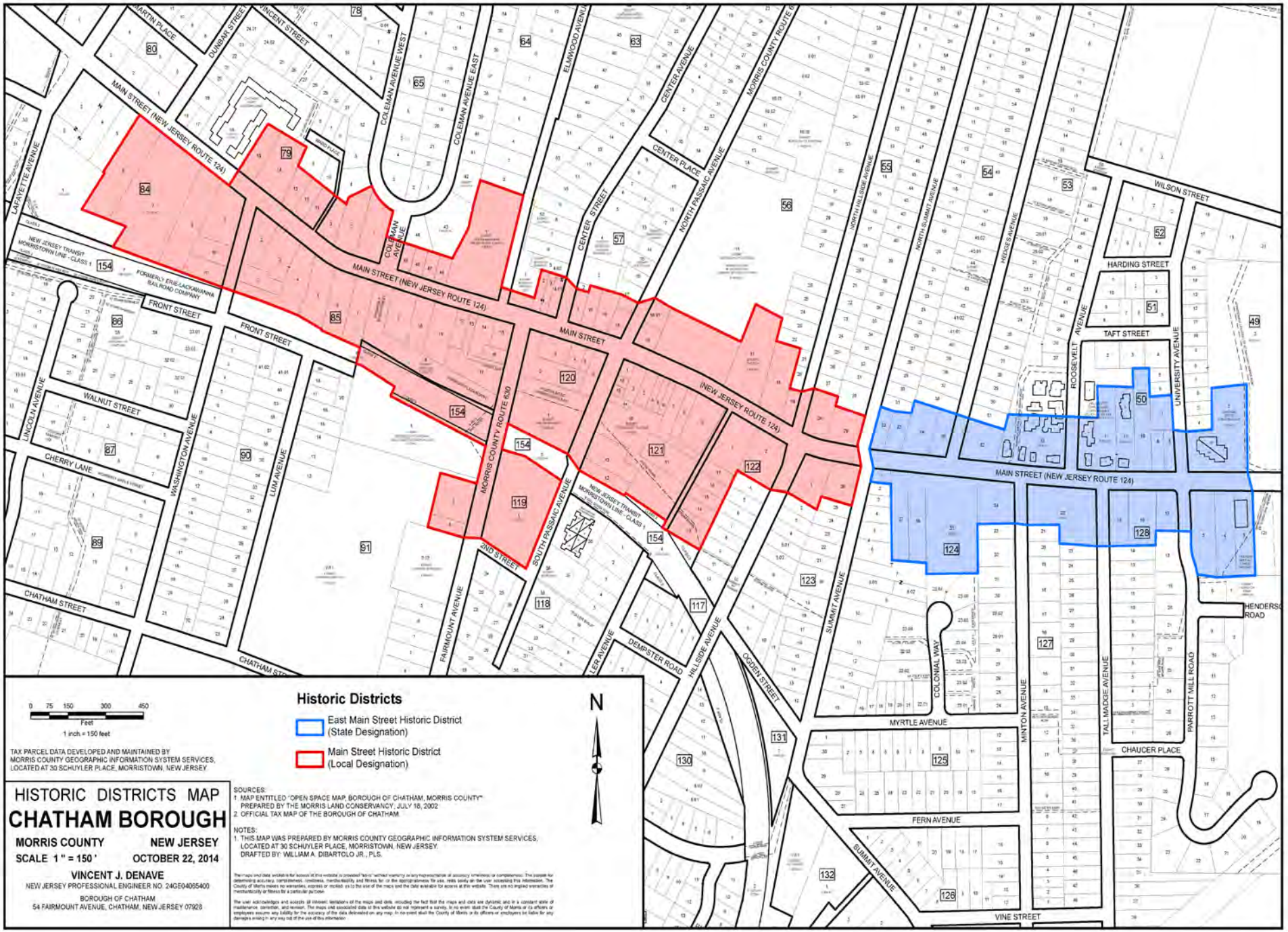
Table 7. Historic Sites in the Borough of Chatham			
Site Name	Address	Designation	Entity
David S. Bower House	427 Main Street (demolished c.1987)	NJDEP ID# 2094 NR: 11/30/1982 Ref: 82001045 SR: 9/30/1982	Federal & State
Chatham Historic District	Main Street: Parrot Mill and Tallmadge roads; Summit, Hedges, Hillside, and University Avenues	NJDEP ID# 2095 SR: 9/6/1973 SHPO Opinion: 2/9/1998	State
Chatham Railroad Station	NJ Transit Morristown Line, Milepost 23.3 at Front Street	NJDEP ID# 325 SHPO Opinion: 3/25/1998	State
Dusenberry House/ Presbyterian Parsonage	186 Main Street	NR: 11/1/1979 Ref: 79001515 SR: 5/9/1979	Federal & State
	10 Garden Place	NJDEP ID# 3598 SHPO Opinion 11/20/1981	State
Lafayette Avenue Bridge	NJ Transit Morristown Line, Milepost 23.85 over Lafayette Avenue	NJDEP ID# 235 SHPO Opinion: 1/20/1999	State
Old Main Delaware, Lackawanna, and Western Railroad Historic District	NJ Transit Morristown Line from Hudson to the Delaware River	NJDEP ID# 3525 SHPO Opinion: 6/7/2004	State
Old Saint Patrick's Church	41 Oliver Street	NJDEP ID# 5424 COE: 3/25/2015	State
Source: NJDEP HPO[126]			



Chatham Past

Top Left Photo: Chatham Mills; Top Middle Photo: Greenhouses; Top Right Photo: Old Fire Station; Middle Left: Vintage Main Street; Middle Right: Telegraph Office; Bottom Left Photo: Orchard; Bottom Middle: Football 1914; Bottom Right: Shops (Credit: Chatham Borough Historical Society)

Figure 7. Historic District in Borough of Chatham (*Source: Borough of Chatham*)[127]



Fishawack Crossing: A historical area named after the original Lenni Lenape name for the Passaic River. This area was crucial as a crossing point and has significant historical relevance.

Shepard Kollock Park: In this general location, Shepard Kollock had his printing presses where he printed the New Jersey Journal from 1779 to 1783; a newspaper favorable to the colonial cause.

Chatham Historic District: Although not officially designated as a historic district by national standards, Chatham has several older neighborhoods with well-preserved homes and buildings that offer a glimpse into the area's past architectural styles and suburban development.

7 University Avenue This house was moved there from Main Street. During revolutionary times, Dr. Peter Smith, the village physician, lived there.

Parrott Mill Inn, 47 Main Street built in 1790s, this was a grist mill (the last one in town) run by George Parrott and then the Utility Laundry. In 1970, it became the Stoneleigh Motel and from 1986, the Parrott Mill Inn. It is now a daycare center.

The Jacob Morrell House, 63 Main Street currently occupied by a restaurant, is the only pre-revolutionary building remaining on Main Street. It is generally believed that General George Washington had his headquarters here for a few days in August 1781. He wrote 17 published letters in Chatham preparing for the march to Yorktown, which ended the war. Jacob Morrell, whose general store was adjacent to his house, was probably Chatham's wealthiest resident at this time.

64 Main Street In 1833 this was the site of the Village Presbyterian Church. In 1907 when the new church was built the front half of the building was moved forward toward the street and remodeled as a residence with a barn behind.

Capt. William Day House, 70 Main Street Built in 1870, this was the homestead of William Day and his wife, Nancy Bonnell. The property remained a 100-acre farm into the 20th century and was used as a residence until the late 1990s. At the right side of the house stands the beehive oven.

76 Main Street, currently a kitchen showroom, was built around 1796. The Vanderpoel, Day, and Crane families ware known to have lived here at varying times. The house was remodeled in the Victorian era when gingerbread woodwork and the porch were added. In 1880, an addition to house the office of Dr. George Swaim was added.

The Dusenberry House, 186 Main Street is the only Chatham building listed on both the New Jersey and National register of Historic Places. It was built as the manse for the Reverend Joseph Meeker Ogden of the Presbyterian Church in 1848. It was enlarged in 1912.

Library of The Chathams: Originally built with funds from Andrew Carnegie, the library serves as a cultural hub for the community, hosting numerous educational and cultural events throughout the year.

Memorial Park and 9/11 memorial Adjacent to the Library, this area is dedicated to all Chatham soldiers who died defending the country. A memorial for the 13 townspeople lost at the World Trade Center on September 11, 2001, is adjacent to Memorial Park.

The Chatham Academy, 36-38 Summit Avenue built in 1806, was the second schoolhouse in Chatham. It originally stood on the site of St. Paul's Church but was rolled to Summit Ave on logs where it is now a two-family residence, compete with school bell above the front porch.

Chatham Borough Fire Department Museum: This museum features artifacts and exhibits related to the history of firefighting in Chatham, including historical firefighting equipment and memorabilia.

Chatham Train Station: An operational train station that serves as a key component of the community's daily commute and a symbol of its longstanding connection to regional transit. The station building itself, reflecting early 20th-century architecture, adds a historical charm to the Borough.

Turnpike Hitching Post, 560 Main Street on the west side of Garden Avenue stands the last remaining hitching stone along the old Turnpike. In 1804, Main Street, then known as the Morris and Essex Turnpike, was a toll road. To avoid paying the toll local farmers used part of what is now Watchung Avenue instead and it was called "shunning the pike." Today, that part of the road is called Shunpike Road.

The Paul Day House, 24 Kings Road and **The Nathaniel Bonnell House, 34 Watchung Avenue**, now privately owned, survive from colonial times.

Mary Redding Homestead, 12 Edgehill Avenue, privately owned, circa 1760.

Old St. Pat's Church: Saint Patrick Church originated as a mission church and was raised to parish status on January 15, 1887. Many early inhabitants of the church were refugees from the 19th century potato famine in Ireland who found work in the small community of Chatham. Saint Patrick School was established prior to the church in 1872.

Stanley Center: The former Stanley Congregational Church was officially donated to the Borough in 2020 and has been repaired and an advisory committee of residents is developing a strategy for repurposing it as a community arts center.

Fair Mount Cemetery established in 1859, this is one of the older cemeteries in the area. Fair Mount Cemetery contains graves of local families and notable figures, offering insights into the community's history.

Parks and Recreation

The Borough has the following recreation areas:

Shepard Kollock Park, located off Parrott Mill Road, offers a covered picnic shelter, an all-purpose field, baseball and softball diamonds, a boat launch, a playground, a walking trail, and an off-leash dog fenced dog area.

Memorial Park, located on North Passaic Avenue, offers a playground, softball diamonds, an all-purpose field, basketball, picnic tables, and a swimming pool.

Memorial Park Pool, located on North Passaic Avenue, is open to Chatham residents and area non-residents. The pool opens Memorial Day and closes Labor Day.

Lum Field, located off Lum Avenue, offers baseball and softball diamonds, an all-purpose field, a netted lacrosse practice area, an enclosed lacrosse practice wall, and a small-sided soccer practice field.

Garden Park, located off Main Street adjacent to the Chatham Middle School, offers tennis practice boards, tennis/pickleball courts, basketball, a playground, a walking path, and a respite area.

Stanley Park, located on River Road adjacent to the Passaic River, offers a small picnic area.

In addition to the above parks, Chatham owns additional public lands as follows:

Wuhala Woods, 86.6 acres.

Milton Avenue Woods (behind Milton Avenue School), 7 acres.

Conservation land behind Milton Avenue School, 87 acres.

Conservation land off of Tallmadge Avenue, 11.4 acres.

Conservation area off of Perrin, Bonnell and St. James Streets, 12.6 acres.

Chatham Borough and Chatham Township jointly purchased 6.5 acres of land lying on the borders of the town and adjacent to the high school football field (Cougar Field) to establish a new park, currently referred to as Woodland Park.

Development Constraints

In Chatham, the development of homes, commercial facilities and infrastructure is limited by several types of environmental features, such as steep slopes, flood hazard areas, wetlands, and poorly draining soils.

There are also regulations governing development in and around these and other environmental features, such as state rules with respect to the development of wetlands (Freshwater Wetlands Protection Act, N.J.A.C. 7:7A), flood hazard areas (Flood Hazard Area Control Act Rules, N.J.A.C. 7:13), habitat (New Jersey Endangered Species Conservation Act), and other state and federal laws and regulations. From a development perspective, these features and regulations are sometimes referred to as “constraints”.

In addition to the above constraints, the Borough’s Planning Board and Zoning Board of Adjustment have important roles. The New Jersey Municipal Land Use Law (MLUL) states that a planning board may exercise its powers in regard to, among other things, the municipality’s master plan and environmental considerations. Chatham’s Master Plan sets forth the Borough’s broad objectives with respect to its land use, zoning and housing, historic preservation,

recreation and conservation. To achieve these broad objectives, the Planning Board writes and updates regulations for the Borough Council to adopt or amend. These regulations make up the town's Land Development Regulations, also referred to as the Land Development Ordinance (LDO). The Planning Board stays aware of environmental concerns through its members who serve on the Environmental Commission and the Open Space Advisory Committee.

The Zoning Board of Adjustment's powers are more specific and different from that of the Planning Board. The Zoning Board of Adjustment is a "quasi-judicial" body and its principal duty is to hear and decide on requests for interpretations of the Borough's zoning and LDOs.

The purpose for the Borough's planning and zoning is to maintain a balance between the particular needs and intentions of the property owner and the general welfare and character of the community. Sometimes, development may be prohibited. Other times, development may occur, but it can be subject to permitting, reviews, and special design considerations.

These constraints ensure that the ecosystem services for the community (for example, beneficial floodplains, groundwater, aesthetic value, or greenway access) are protected and not degraded.

Photo: Garden Club (Credit: Tom Salvas)

Chapter 4.

Vegetation

Forest Types

Forested areas represent 6% of the Borough's land cover (90 acres). These wooded areas are commonly found near municipal parks, riparian corridors, residential backyards, and undeveloped parcels.

According to the 2020 LU/LC data, 83% of the forest cover in the Borough is deciduous forest (77 acres).[23] Of this, 66 acres have >50% crown closure, and 11 acres have 10-50% crown closure. Only 17% of the total forest cover is mixed forest (15 acres) (**Table 8**).

Table 8. Forested Land Classifications

Classification	Acres	% of Forested Area
Deciduous Forest (>50% Crown Closure)	66	71%
Deciduous Forest (10-50% Crown Closure)	11	12%
Mixed Deciduous/Coniferous Brush/Shrubland	15	17%
Total:	92	100%

Source: Land Use /Land Cover 2020, NJDEP[128]

Forested lands in the Borough of Chatham include the following classifications:

Deciduous: This category includes forested lands that contain deciduous tree species, which lose their leaves at the end of the growing season. These trees remain leafless throughout the winter and sprout new leaves the following spring. The average height of the stand is at least 20 feet. A forest stand must have at least 75% canopy coverage from deciduous trees species to be placed in this category.

Deciduous Forest, >50% Crown Closure: This category contains deciduous stands with crown closure greater than 50%. Crown closure is the percentage of forest area occupied by the vertical projections of tree crowns. Crown closure percentages provide a reasonable estimate of stand density. Most of the deciduous forests in New Jersey are in this category.

Deciduous Forest, 10-50% Crown Closure: This category contains deciduous forest stands that have crown closure greater than 10% but less than 50%.

Mixed Forest: When neither coniferous nor deciduous trees represent 75% or more of the forested area, it is classified as Mixed Forest. This category is further broken down according to which type is 50% or greater in prevalence and the extent of crown closure. There are no acres of mixed forest with greater than >50% of coniferous trees.

Mixed Deciduous/Coniferous Brush/ Shrubland: This category contains natural forested areas with species less than 20 feet in height. An area must have greater than 25% brush covered with a mixture of deciduous and coniferous species and less than 75% in one type to be placed in this category. There are 15 acres of natural forested areas less than 20 feet high with a mixture of coniferous and deciduous trees.

Typical Plant Habitats

The State of New Jersey's varied topography accounts for no less than 12 distinct major plant habitats. Of these 12 habitats, two are represented in Chatham:

- North Jersey floodplains: Relatively flat areas with wet conditions much of the time as a result of periodic inundation and generally poor drainage.
- North Jersey uplands: Higher lands, often with slopes and valleys, with good, but not excessive drainage.

Floodplain forests contain a rich diversity of plant growth:

- Trees: In the more poorly drained locations, typical trees include ash, pin oak, swamp white oak, silver maple, red maple, elm, and black gum. In the better drained outer floodplain, these may be joined by willow, river birch, sycamore, and box elder.
- Shrubs: Most common shrubs are spicebush, arrowwood viburnum, and witch hazel.
- Vines: Where the forest has been opened either by cutting or fallen trees, vines grow rampantly. These include poison ivy, Virginia creeper, Japanese honeysuckle, bittersweet, and wild grape.
- Groundcover: A great variety of herbaceous plants will be found,

such as spring wildflowers (skunk cabbage, mayapples, jack-in-the-pulpit, spring beauties, dogtooth violets, etc.), ferns, sedges, and mosses.

In the upland habitats, three forest types may typically be found: mixed oak, sugar maple-mixed hardwoods, and hemlock-mixed hardwoods. Temperature, exposure, type of underlying rock formation, and human interference may have a bearing on these distinctions.[24]

Tree Protection Ordinances

The Borough's code has two Chapters, 257 and 314 for tree protection. Chapter 257, Tree Protection and Preservation, was adopted by the Mayor and Council in 2018 by Ordinance Number 18-06.[25] Its purpose is to preserve trees within the Borough while recognizing the right of property owners to use their property and the need to respond to emergencies.

The Shade Tree Commission legislation (Chapter 314) was adopted in 1966 and later amended in 2005 by Ordinance Number STC 05-01.[26] The chapter provide a general definition of trees and their protection.

Invasive Species

Trees in the Borough have been affected by two invasive insects, the emerald ash borer, *Agrilus planipennis*, (EAB) and the Spotted Lanternfly *(Lycorma delicatula)*. The EAB afflicts ash trees, burrowing beneath the bark, disrupting its absorption of

As of 2022, the NJDEP now requires municipalities to pass tree removal and replacement ordinances to help reduce runoff from pollution, and soil erosion, improve rainwater filtration into the soil, and protect the environment, public health, safety, and welfare. Municipalities are encouraged to replace invasive tree species with native tree species.[129] Below are links to help identify native trees for the Borough of Chatham.

- Lists of trees native to New Jersey counties can be found on the Native Plant Society of New Jersey website.[130]
- A list of invasive trees that should not be planted can be found on the New Jersey Invasive Species Strike Team website.[131]
- The cooperative extension for your county can provide additional helpful information.[132]
- Keystone plants are native plants critical to the food web and necessary for many wildlife species to complete their life cycle. Without keystone plants in the landscape, butterflies, native bees, and birds will not thrive. 96% of terrestrial birds rely on insects supported by keystone plants. The National Wildlife Federation has identified the keystone plants for eastern temperate forest regions, which includes Chatham Borough.[133]

water, and eventually causing its death.[27,28] The Spotted Lanternfly nymphs and adults suck sap from the stems and leaves of trees, weakening the trees and killing them.

The NJ Department of Agriculture (NJDA) promotes an integrated pest management approach, using aerial spray treatments on residential and recreational areas with the non-chemical insecticide *Bacillus thuringiensis* when natural controls are unable to keep the pest population in check.[29]

Local Conservation Areas

Within Chatham Borough are several public parks which are maintained as local conservation areas. The largest of these include Wuhala Woods (89 acres located on either side of Route 24) and the 93-acre woods known as Brookside Grove behind the Milton Avenue School.

In addition to these is the James and Perrin Conservation Area along the Passaic River in the southern section of the municipality (**Figure 8**). These lands are forested wetlands with their own unique vegetation and wildlife habitat. They contain the largest contiguous wetlands in the Borough within the floodplain of the Passaic River. Over the years, the Environmental Commission has studied ways to control invasive plant species at Wuhala Woods and Milton Avenue Woods to improve the health of the forest and restoration of the native plant species.[30, 31]

Local Trees and Plants

The varied geologic processes that have taken place in New Jersey have resulted in a diverse and complex landscape which provides for a variety of plant habitats.

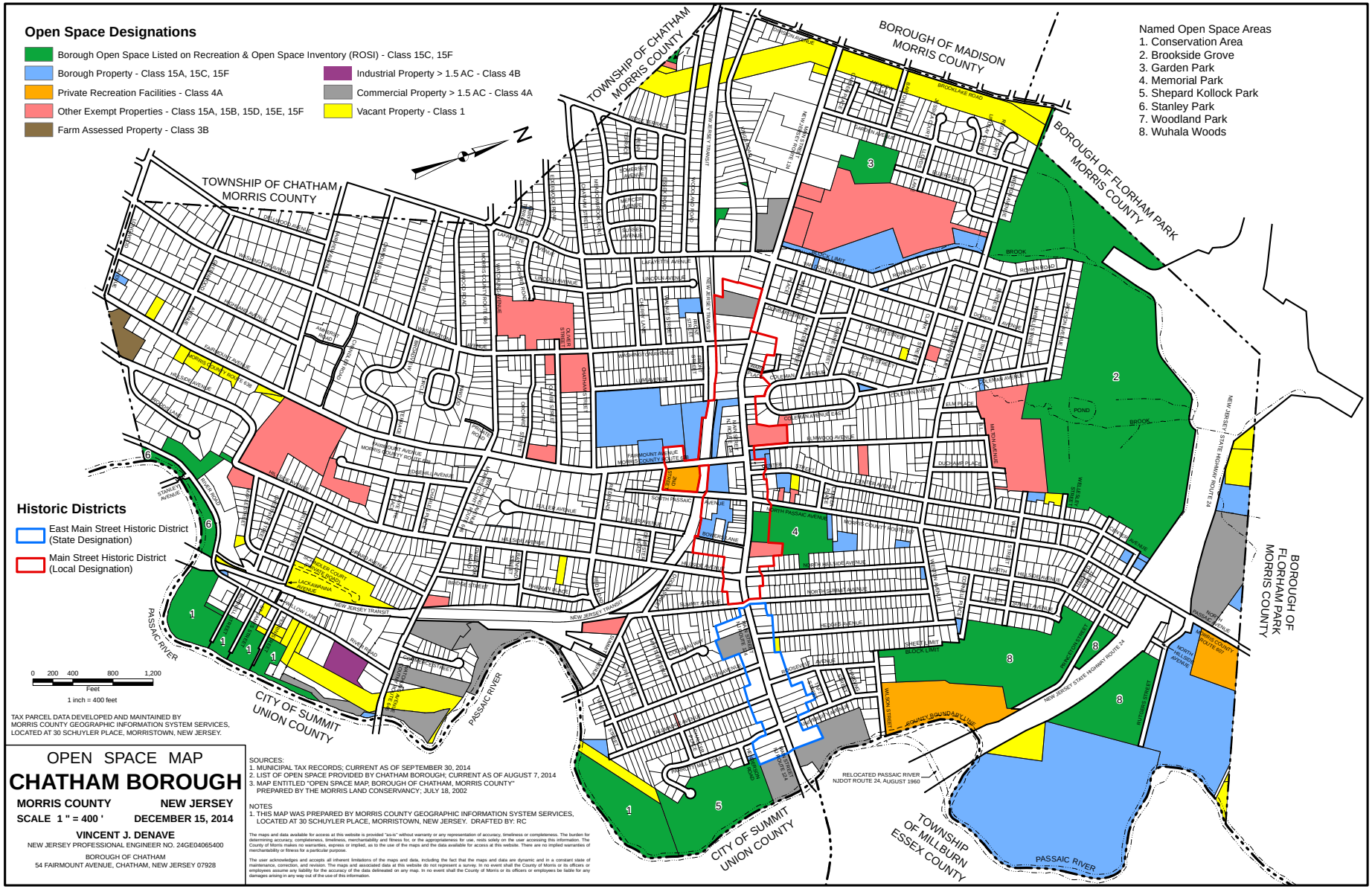
Chatham's upland woods are of the mixed oak type. Ample evidence of this is found in the number of large oaks growing throughout the community. In a typical mixed oak forest, red, white, and block oak dominate. Also to be found are scarlet and chestnut oak, hickories, red and sugar maple, ash (though ash trees are disappearing due to attack from the Emerald Ash Borer), beech, elm, black cherry, and tulip trees. Understory trees include dogwood (the dominant species), sassafras, hop hornbeam, and ironwood.

The Chatham Borough Shade Tree Commission periodically publishes a list of recommended tree species for Chatham Borough.[32] As of the date of preparation for this ERI, the list includes the following native trees, Canada Red Cherry, Jersey Belle Silverbell, Shadblow, Yellowwood, English Oak, Green Pillar Pin Oak, Swamp White Oak, and Lindens. It also includes non-natives selected to avoid monocultures developing which are suitable for lining the Borough's pathways, and green verges, without too much spread or falling debris.

Typical shrubs in Chatham Borough include spice bush, viburnums, witch hazel, red and gray dogwood, and, in some instances, heath shrubs, including blueberries. The vines are much the same as in the floodplain woods, as are the herbaceous plants, with the addition of some species preferring better drainage.

Figure 8. Open Space Map for the Borough of Chatham (2014)

(Source: Borough of Chatham)[134]



With respect to trees and plants, for several years the Chatham Environmental Commission has been promoting the use of native plants and low water planting in its site reviews for new construction, and the Environmental Commission is an enthusiastic partner in the annual native plant sale organized by the Great Swamp Water Association. Additionally, the EC regularly hosts workshops, webinars, and presenters from organizations such as the Native Plant Society of New Jersey at its annual Sustainability Fair.

There are four public areas in the Borough where native plants can be seen: The Memorial Park Demonstration Rain Garden (alongside the Community Pool), The Memorial Park Veterans Memorial Garden (on the approach to the Library), The Garden Park Pollinator Garden (on grounds of Chatham Middle School), and the Native Plant Demonstration Garden on the Historic River Trail (accessed from Shepard Kollock Park). Pollinator and wildflower gardens have also been installed at the local schools.

In April 2024, the Borough's Environmental Commission led a team of volunteers and DPW members on "Celebrate Trails Day" removing invasive plant species from a section of the Historic River Trail at Shepard Kollock Park and replacing them with native plants. The Commission identified rampant growth and proliferation of the following non-native species:

- Amur honeysuckle
- English Ivy
- Fortune's Spindle
- Japanese Knotweed
- Jetbead
- Lesser Celandine
- Multiflora Rose
- Wood Forget Me Not

In the next several years, prior to the update of this ERI, the Environmental Commission expects that the impact of climate change will continue the northward shift of plant hardiness zones. According to data from the National Oceanic and Atmospheric Administration, these hardiness zones have moved northward over the past four decades and will likely continue to shift northward. The northward shift means that in the coming decade residents will probably be able to grow trees, shrubs and plants that historically were seen in more southern regions.

Recommended Landscape Practices

Chatham's vegetation has a tremendously positive impact on the character of our community. Lovely or striking vegetation, planned and natural, enhances the appeal of our streets, parks and walking trails. Seasonal changes of color further enhance the landscape in both built-up and open-space areas.

Vegetation also mitigates some unavoidable discomforts of life. For example, it has a moderating effect on climate. In summer, wooded areas act as natural air conditioners, often resulting in temperatures approximately ten degrees lower than those in the city. Air currents spread the benefits of these lower temperatures to surrounding neighborhoods. In wintertime, these same areas form a protective windbreak; if evergreens are present, they can reduce wind velocity by as much as half, thus reducing the wind chill factor substantially.

Cleaner air is another benefit provided by generous amounts of greenery, as trees and shrubs filter out large amounts of dust and pollution. A further benefit is noise reduction. Woodland is a valuable buffer between highways and homes.

For new construction, major renovations, and large landscape projects, the Borough strongly encourages the development of a comprehensive sustainable landscape plan that takes into consideration soils, water, vegetation, material selection, human health and well-being, safety, existing/historic facilities and cultural landscapes, construction and maintenance. The use of native plants is strongly encouraged.

The recommended landscape practices set forth below describe goals and strategies to achieve sustainable outcomes rather than specifying prescriptive solutions and technology. They are intended to inspire flexibility, innovation, and environmental awareness, and apply equally to new construction, major and renovations, and alterations to existing landscapes.

- **Do no harm:** Avoid changes to sites that will degrade the natural environment. Promote reuse and improvement of sites with previous disturbance or degradation.

- **Minimize risk:** Mitigate risk to human and environmental health. Examine a full range of alternatives—including no action.

- **Design with nature and culture:** Create and implement designs that are in harmony with economic, environmental, and cultural conditions at local and regional levels. By way of example, preserve wetlands and areas with permeable soils to the maximum extent, for use in storm infiltration and groundwater recharge.

- **Use a decision-making hierarchy of preservation, conservation, and regeneration:** Maximize and mimic the benefits of the surrounding ecosystem by preserving existing environmental features, conserving resources in a sustainable manner, and regenerating lost or damaged ecosystems.

- **Use a systems thinking approach:** Understand and value the relationships in the ecosystem. Focus on sustaining the ecosystem and strive to re-establish the integral and essential relationship between regenerative systems (natural processes) and human activity.

- **Foster environmental stewardship:** In all aspects of site development, foster an ethic of environmental stewardship with the understanding that healthy ecosystems improve the quality of life for present and future generations.

The Benefits of Native Plants

- Native plants thrive in our local climate and soil and have natural defenses against diseases, insects, and pests.
- They need less water, fertilizer, and pesticides.
- They provide food, shelter and nesting sites for birds, moths, and butterflies.
- Native plants hold the soil in place, increase water infiltration, and filter pollutants from our water.

Photo: Garden Park (Credit: Susan Robertson)

Chapter 5.

Wildlife

The Borough of Chatham is a community with an abundance of wildlife. Its proximity to the Great Swamp National Wildlife Refuge and the forested riparian lands of the Passaic River support critical habitat for numerous threatened and endangered species.

Threatened & Endangered Species and Critical Habitat

NJDEP Landscape Project. The NJDEP Landscape Project Version 3.3 ranks patches of habitat using a numeric system (0 through 5) for the purpose of identifying habitat which may be suitable for threatened and endangered species.[33] A third of the Borough supports habitat for threatened and endangered species. Habitat Rank 3 through 5 are considered environmentally significant by the NJDEP:

Rank 5: Species-specific patches containing one or more occurrences of wildlife listed as endangered and threatened pursuant to the Federal Endangered Species Act of 1973.

Rank 4: Species-specific patches with one or more occurrences of state endangered species.

Rank 3: Species-specific patches containing one or more occurrences of state threatened species.

Rank 2: Species-specific patches containing one or more occurrences of species considered to be species of special concern.

Rank 1: Species-specific patches that meet habitat-specific suitability requirements such as minimum size criteria for endangered, threatened, or priority wildlife species, but that

do not intersect with any confirmed occurrences of such species.

Rank 0: Species-specific patches that do not contain any species occurrences and do not meet any habitat-specific suitability requirements.

520 acres in Chatham Borough are identified as supporting habitat for rare wildlife species (**Table 9** and **Map 7**). Indiana bat, a state and federally endangered species (Rank 5, 326 acres) are found in the large forested areas of the Borough. Suitable habitat can be found in Brookside Grove (Milton Avenue Woods), Wuhala Woods, Shepard Kollock Park, and the James and Perrin Conservation Area. Patches can also be found along the forested corridor surrounding NJ Transit rail line.

Habitat suitable for wood turtle, a state threatened species (Rank 3) are found in the large forested areas of the Borough in the same areas as Rank 5 (thus not marked on **Map 7** as separate from Rank 5).

Two species of special concern, the great blue heron and the Eastern box turtle are also found in the forested wetlands along the Passaic River. Their habitat also overlaps with the Indiana bat.

NJDEP Natural Heritage Program. The NJDEP Natural Heritage Program (NHP) records and tracks comprehensive information about rare species and ecological communities located at specific sites throughout the state. The NHP reports that rare species (and their habitat) have been recorded in and within half a mile of the Borough (**Appendix**).[34]

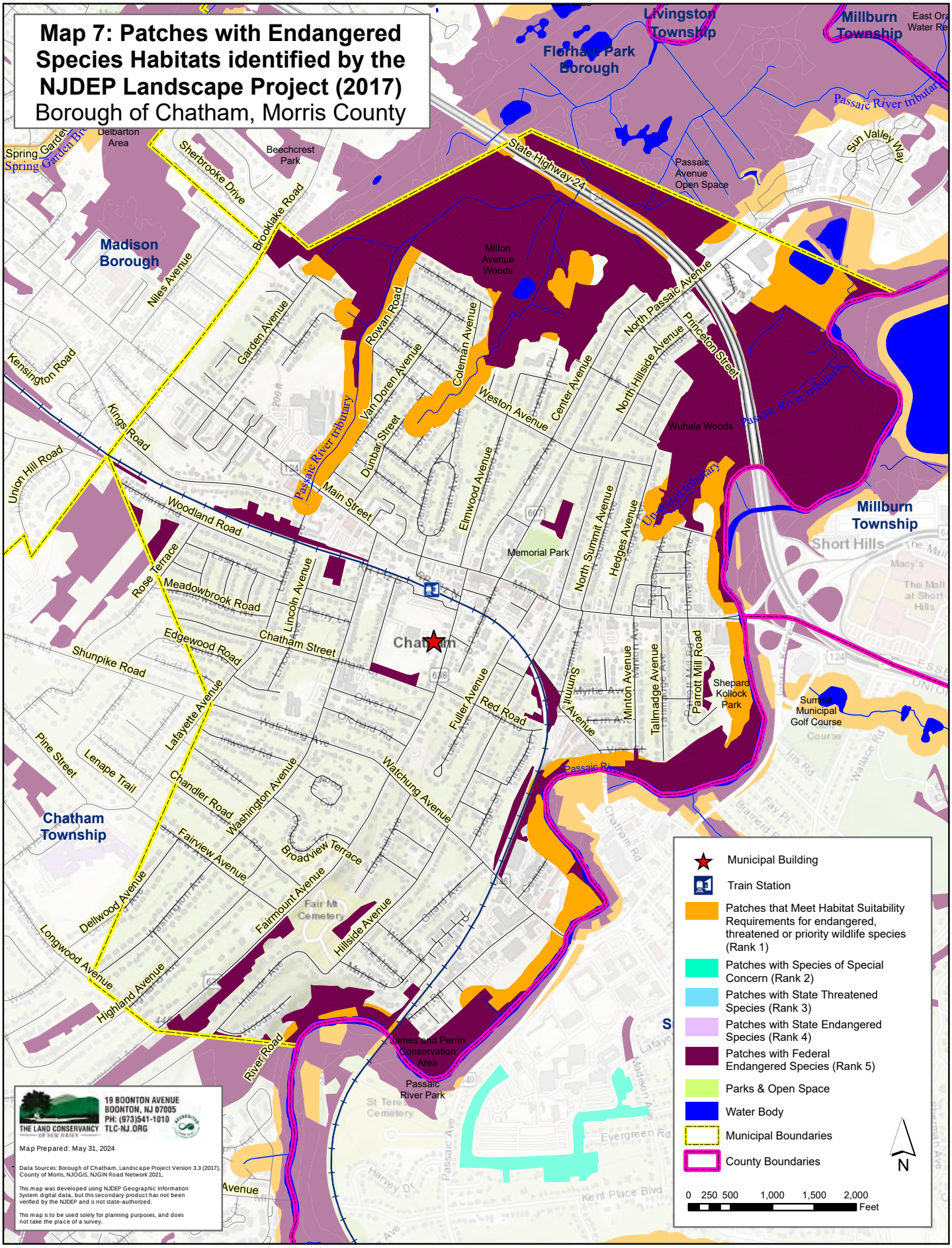
These reports include foraging habitats, breeding sightings, maternity colonies, roost sites, and individual sightings. Much of this is due to the Borough's proximity to the unique habitat afforded by the Great Swamp National Wildlife Refuge.

According to the NHP data in the Borough the following rare species have a global classification:

G1: There are no G1 species in or around the Borough.

Table 9. Rare Species Identified by the NJDEP Landscape Project in the Borough of Chatham

Species Rank	Common Name	Scientific Name	Acres
Rank 5 (State and Federally Endangered)	Indiana Bat	*Myotis sodalis*	326
Rank 3 (State Threatened)	Wood Turtle	*Glyptemys insculpta*	7
Rank 2 (Species of Special Concern)	Great Blue Heron	*Ardea herodias*	165
	Eastern Box Turtle	*Terrapene carolina carolina*	22
		Total	**520**
Source: NJDEP, Landscape Project			


Map 7: Patches with Endangered Species Habitats identified by the NJDEP Landscape Project (2017)
Borough of Chatham, Morris County
Livingston Township
Millburn Township
Florham Park Borough
Madison Borough
Chatham Township
Millburn Township
Short Hills
Passaic River tributary
Passaic River tributary
Passaic River tributary
Unnamed tributary
State Highway 24
Sherbrooke Drive
Brooklake Road
Beechcrest Park
Passaic Avenue Open Space
Sun Valley Way
Milton Avenue Woods
Niles Avenue
Garden Avenue
Rowan Road
Coleman Avenue
North Passaic Avenue
Princeton Street
North Hillside Avenue
Kensington Road
Kings Road
Van Doren Avenue
Dunbar Street
Weston Avenue
Center Avenue
Wuhala Woods
Union Hill Road
Woodland Road
Main Street
Elmwood Avenue
Memorial Park
North Summit Avenue
Hedges Avenue
Rose Terrace
Meadowbrook Road
Lincoln Avenue
Chatham Street
Edgewood Road
Shunpike Road
Fuller Avenue
Red Road
Summit Avenue
Minton Avenue
Tallmadge Avenue
Parrott Mill Road
Shepard Kollock Park
Summit Municipal Golf Course
Lafayette Avenue
Pine Street
Lenape Trail
Chandler Road
Washington Avenue
Watchung Avenue
Fairview Avenue
Broadview Terrace
Dellwood Avenue
Fairmount Avenue
Fair Mt Cemetery
Hillside Avenue
Longwood Avenue
Highland Avenue
River Road
James and Perrin Conservation Area
Passaic River Park
St Teresa Cemetery
Municipal Building
Train Station
Patches that Meet Habitat Suitability Requirements for endangered, threatened or priority wildlife species (Rank 1)
Patches with Species of Special Concern (Rank 2)
Patches with State Threatened Species (Rank 3)
Patches with State Endangered Species (Rank 4)
Patches with Federal Endangered Species (Rank 5)
Parks & Open Space
Water Body
Municipal Boundaries
County Boundaries
N
0 250 500 1,000 1,500 2,000
Feet
THE LAND CONSERVANCY OF NEW JERSEY
19 BOONTON AVENUE
BOONTON, NJ 07005
PH: (973)541-1010
TLC-NJ.ORG
Map Prepared: May 31, 2024
Data Sources: Borough of Chatham, Landscape Project Version 3.3 (2017), County of Morris, NJOGIS, NJGIN Road Network 2021,
This map was developed using NJDEP Geographic Information System digital data, but this secondary product has not been verified by the NJDEP and is not state-authorized.
This map is to be used solely for planning purposes, and does not take the place of a survey.

G2: One species is classified as G2, the Indiana bat. They are imperiled either due to their rarity, or because they are highly susceptible to extinction.

G3: One species, the wood turtle, carry a G3 status, indicating they are either exceptionally rare and confined to specific areas.

G4: Wood thrush has a G4 rank, as it is secure globally; although it may be quite rare in parts of its range, especially at the periphery.

G5: Great blue heron, eastern box turtle, long dash, bald eagle, cooper's hawk, and red-shouldered hawk are G5. They are demonstrably secure globally; although it may be quite rare in parts of its range, especially at the periphery.

At the State level:

S1: The Indiana bat is classified as critically imperiled due to their extreme rarity. Breeding sites (S1B) for bald eagles and red-shouldered hawk have been noted around the Borough.

S2: The wood turtle and bald eagle are considered endangered due to their rarity.

S3: The eastern box turtle, long dash, and red-shouldered hawk are classified as not yet imperiled in state but may soon be if current trends continue. Breeding sites (S3B) for the cooper's hawk, great blue heron, and wood thrush all have been noted around the Borough.

S4: Great blue heron, cooper's hawk, and wood thrush are species that are secure in state, with many occurrences.

Since 2006, bat populations have declined nationally after the first documented case of white-nose syndrome.[35] White-nose syndrome is an invasive fungal disease affecting hibernating bats. The fungus grows on the bats skin, disrupting hibernation and eventually leading to dehydration, starvation, and death. White-nose syndrome has been confirmed in Morris County bat colonies.[36]

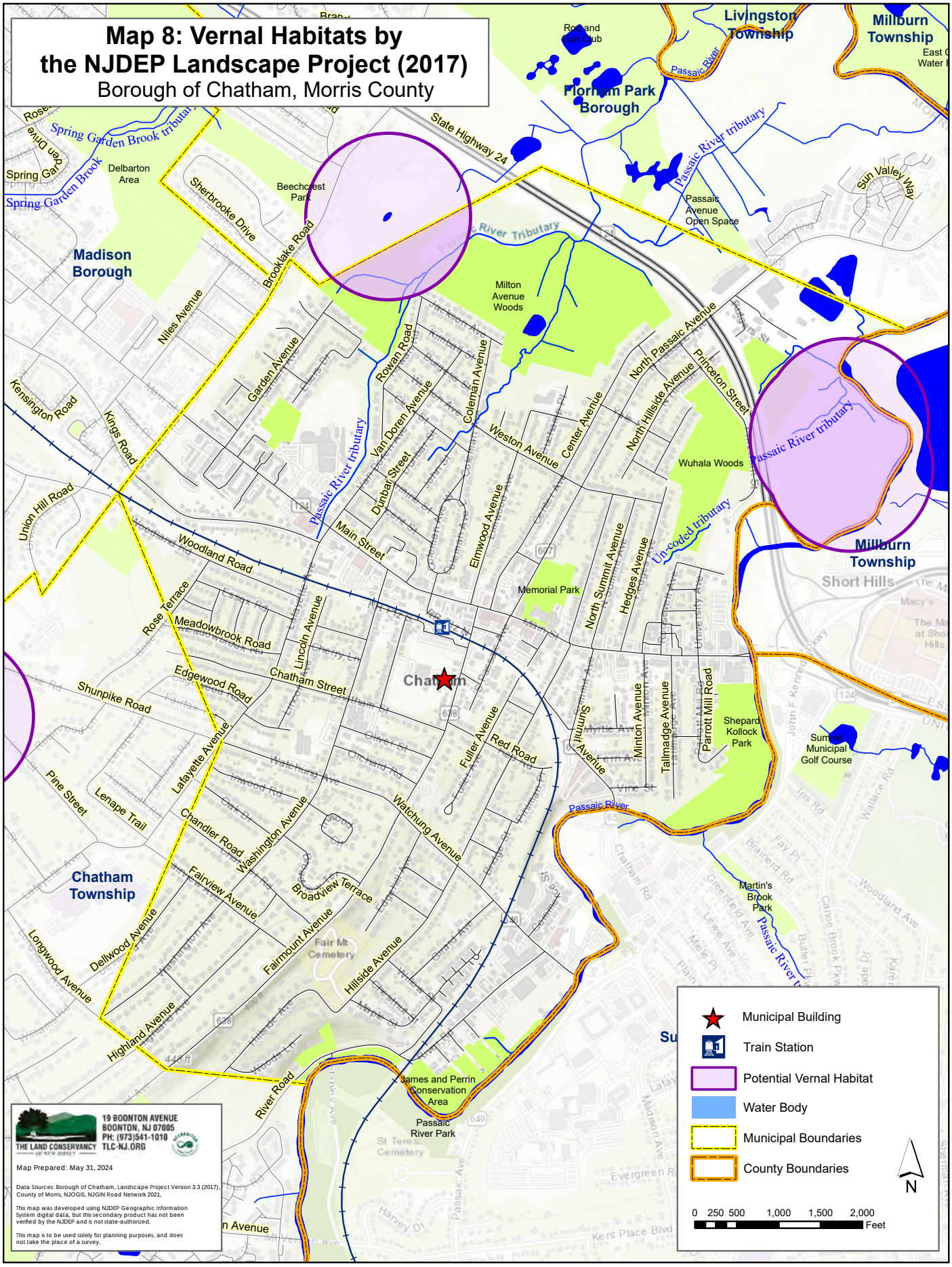
Vernal Habitat

Vernal habitats, also known as vernal pools, are natural wetland depressions that fill with water during the rainy season in the fall and remain ponded until the warmer weather in early summer causes them to dry out.[37]

Vernal pools provide habitat for a wide variety of amphibians, reptiles, invertebrates, and many species of wetland vegetation, but cannot support a fish population because of their brief dry period. Certain wildlife species, referred to as obligate vernal pool breeders, have evolved with reliance upon these fish-free breeding sites and cannot successfully produce elsewhere.

Wetland areas featuring a confined basin depression exhibiting the hydrologic and biological criteria established above are said to meet certification requirements and may be referred to as certified vernal habitats. The NJDEP's Landscape Project divides its mapping of vernal habitats into two categories:

Potential vernal habitat areas are areas identified as possibly containing a vernal pool that meets the criteria of a vernal habitat pursuant to N.J.A.C. 7:7A-1.4. These sites include sites that have been field inspected and have been found to meet the physical


Map 8: Vernal Habitats by the NJDEP Landscape Project (2017)
Borough of Chatham, Morris County
Livingston Township
Millburn Township
Florham Park Borough
Madison Borough
Chatham Township
Millburn Township
Short Hills
Passaic River
Passaic River tributary
Spring Garden Brook
Spring Garden Brook tributary
Un-coded tributary
State Highway 24
Delbarton Area
Beechcrest Park
Passaic Avenue Open Space
Milton Avenue Woods
Wuhala Woods
Memorial Park
Shepard Kollock Park
Summit Municipal Golf Course
Martin's Brook Park
James and Perrin Conservation Area
Passaic River Park
Fair Mt Cemetery
St Teresa Cemetery
Sherbrooke Drive
Brooklake Road
Niles Avenue
Kensington Road
Kings Road
Union Hill Road
Woodland Road
Rose Terrace
Meadowbrook Road
Edgewood Road
Shunpike Road
Pine Street
Lenape Trail
Lafayette Avenue
Chandler Road
Washington Avenue
Watchung Avenue
Fairview Avenue
Broadview Terrace
Dellwood Avenue
Longwood Avenue
Highland Avenue
Fairmount Avenue
Hillside Avenue
River Road
Garden Avenue
Rowan Road
Van Doren Avenue
Coleman Avenue
Dunbar Street
Weston Avenue
Center Avenue
Elmwood Avenue
Main Street
North Passaic Avenue
North Hillside Avenue
Princeton Street
North Summit Avenue
Hedges Avenue
Minton Avenue
Tallmadge Avenue
Parrott Mill Road
Fuller Avenue
Red Road
Lincoln Avenue
Chatham Street
Sun Valley Way
Rockland Gun Club
Chatham
Municipal Building
Train Station
Potential Vernal Habitat
Water Body
Municipal Boundaries
County Boundaries
N
0 250 500 1,000 1,500 2,000
Feet
THE LAND CONSERVANCY OF NEW JERSEY
19 BOONTON AVENUE
BOONTON, NJ 07005
PH: (973)541-1010
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Map Prepared: May 31, 2024
Data Sources: Borough of Chatham, Landscape Project Version 3.3 (2017), County of Morris, NJOGIS, NJGIN Road Network 2021,
This map was developed using NJDEP Geographic Information System digital data, but this secondary product has not been verified by the NJDEP and is not state-authorized.
This map is to be used solely for planning purposes, and does not take the place of a survey.

characteristics of a vernal habitat, but for which biological criteria have not yet been measured, as well as sites that have not been checked by NJDEP staff.

Vernal habitat areas are areas that contain pools that have been field-verified by the NJDEP and have been determined to meet both physical and biological characteristics of a vernal habitat in accordance with N.J.A.C. 7:7A-1.4. The Freshwater Wetlands Protection Act Rules (N.J.A.C. 7:7A) protects vernal habitats as wetland areas requiring a 50-foot buffer, or a 150-foot buffer if the pool supports a state threatened or endangered species.

Map 8 shows 300-meter radius circles around the estimated centers of potential vernal habitats. The 300-meter buffer is used to account for the varying sizes of individual pools, the likely presence of adjacent wetland areas and – significantly – the adjacent dispersal habitats typically utilized by many resident amphibian species. There are two potential vernal habitat areas in the Borough of Chatham. Both are on the borders of the Borough. One is around the Passaic River Tributary on northeastern border near Millburn Township and the other is on the northwestern border near Brooklake Road next to State Highway 24.

The NJDEP's Natural Heritage Program also collects data on vernal habitat areas in New Jersey. They have identified two vernal habitat areas and four potential vernal habitat areas in the municipality (**Appendix**).

The NJDEP defines a vernal habitat in the Freshwater Wetlands Protection Act Rules (N.J.A.C. 7:7A-1.4) as a wetland that meets all of the following criteria:

- The wetland must consist of or contain a confined basin or depression without a permanently flowing outlet.
- The pool must feature evidence of breeding by at least one obligate vernal habitat species. (These species are identified in N.J.A.C. 7:7A)
- The area must maintain ponded water for at least two continuous months between March and September of a normal rainfall year.
- The area must remain free of fish populations throughout the year, or it must dry up at some time during a normal rainfall year.

Photo: Passaic River Snow (Credit: Tom Salvas)

Chapter 6.

Hydrology

What is Hydrology?

According to the U.S. Geological Survey (USGS), hydrology is "the science that encompasses the occurrence, distribution, movement and properties of the waters of the earth and their relationship with the environment within each phase of the hydrologic cycle. The water cycle, or hydrologic cycle, is a continuous process by which water is purified by evaporation and transported from the earth's surface (including the oceans) to the atmosphere and back to the land and oceans."[38] The water cycle and the movement of water forms the basis of the science of hydrology.

Aquifer Recharge

An aquifer is an underground formation of permeable rock or unconsolidated materials that can yield significant quantities of water to wells or springs.[39] The rate of recharge is not the same for all aquifers, and that must be considered when pumping water from a well. Pumping too much water too fast draws down the water in the aquifer and eventually causes a well to yield less water or run dry.

Aquifers are typically equated to the type of geologic formation in which they exist. Aquifers in New Jersey are classified as either bedrock or surficial. Bedrock aquifers consist of rock formations while surficial aquifers are formed from unconsolidated materials such as sand or gravel or glacial sediment. Bedrock aquifers in the Piedmont contain water in fractures within the rock while surficial aquifers contain water primarily in the spaces between sand and gravel particles.[40]

The Borough of Chatham is underlain by the Brunswick Aquifer (Rank C) and Basalt (Rank D) (**Map 9**). Aquifers in New Jersey are ranked on their ability to yield groundwater to high-capacity wells. These wells include water-supply, irrigation, and industrial-supply wells sited and tested for maximum yield. The five aquifer ranks values are based on a statistical analysis of median yields and measured in gallons per minute (gpm):

- Aquifer Rank A: >500 gpm
- Aquifer Rank B: 250 to 500 gpm
- Aquifer Rank C: 100 to 250 gpm
- Aquifer Rank D: 25 to 100 gpm
- Aquifer Rank E: <25 gpm

The Brunswick Aquifer is located in the northwestern and the eastern half of the Borough. It is composed of the stone, siltstone and shale of the Passaic, Towaco, Teltville, and Boonton Formations. The New Jersey Geological and Water Survey (NJGS) identifies the Brunswick Aquifer as a fractured-rock aquifer of the Newark Basin, part of the Piedmont Physiographic Province, which yields between 100 to 250 gallons per minute (gpm).[41] Their description states:

- Groundwater is stored and transmitted in fractures.
- Water is normally fresh, slightly alkaline, non-corrosive and hard.
- Calcium-bicarbonate type waters dominate.
- Subordinate calcium-sulfate waters are associated with high total dissolved solids.

Basalt (Rank D) cuts through the middle of the Borough with a strip going from north to south. It is composed of hard, dense, and highly fractured igneous rocks. Groundwater is stored and transmitted in fractures. The water is fresh, slightly to highly alkaline, moderately hard and of the calcium-bicarbonate type. According to the NJGS, this region yields between 25 and 100 gpm.

Surficial aquifers in New Jersey are those water-bearing formations which are both greater than 50 feet thick and are significantly different, hydrogeologically, than the underlying aquifer. New Jersey law requires well casing of no less than 50 feet. Surficial aquifers are most prevalent in northern New Jersey where bedrock consists of consolidated fractured bedrock overlain by thick sequences of unconsolidated glacial sediments.

The Borough falls under Buried Valley Aquifer system of the Central Passaic River Basin.[42] The Buried Valley Aquifer is a sole source aquifer (**Figure 9)**. A sole source aquifer is a federal designation meaning that the aquifer is the only source of drinking water for the people of the area. In this case, the aquifer includes much of southeastern Morris County. The well-fractured sedimentary units of shale and sandstone and the extensive wetlands of the region provide for a clean water supply.

Groundwater recharge is a critical factor in the quality of the Buried Valley Aquifer. **Table 10** summarizes aquifer recharge rankings for New Jersey and groundwater rankings for Morris County. **Map 10** shows the distribution of rankings for the Borough.

Table 10 summarizes aquifer recharge rankings for New Jersey and groundwater rankings for Morris County. 86% of the Borough is ranked as either D/C, D/D or W/W (**Table 11**). These have a low well yield and infiltration rate. 7% of the Borough is ranked A/C and A/D, with a higher yield.

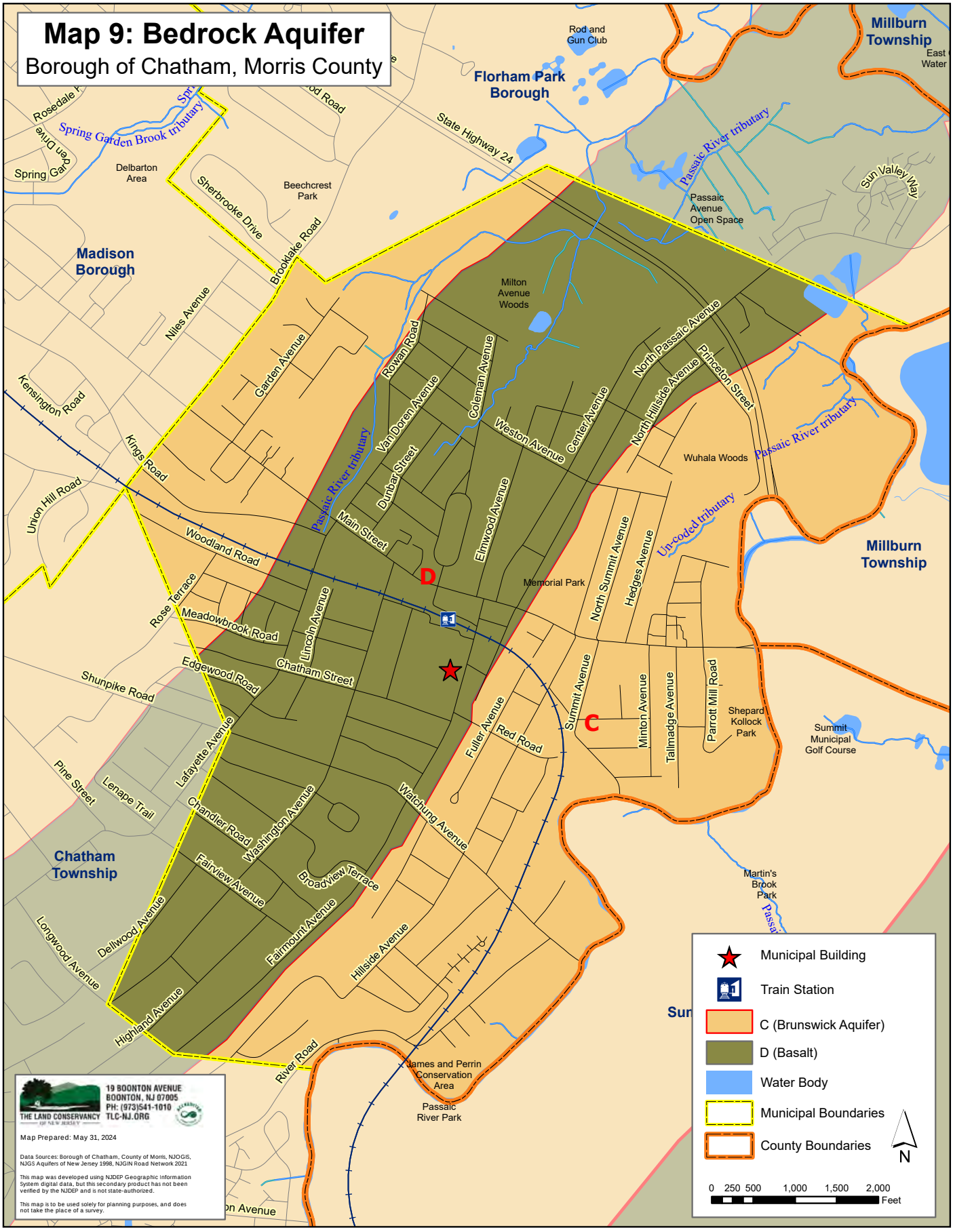
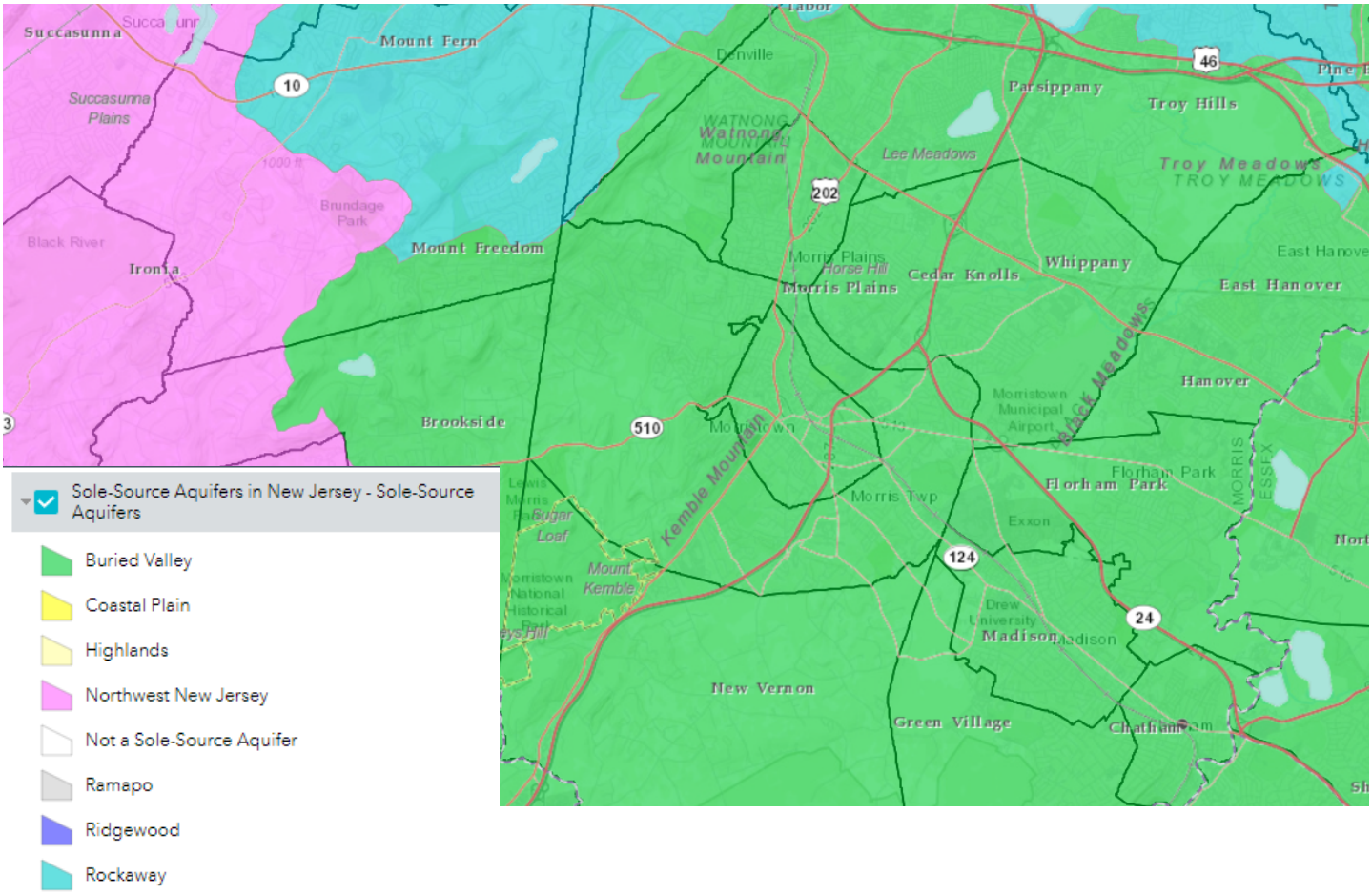

Map 9: Bedrock Aquifer
Borough of Chatham, Morris County
Florham Park Borough
Millburn Township
Madison Borough
Chatham Township
Rod and Gun Club
State Highway 24
Spring Garden Brook tributary
Passaic River tributary
Delbarton Area
Beechcrest Park
Sherbrooke Drive
Brooklake Road
Passaic Avenue Open Space
Sun Valley Way
Milton Avenue Woods
Niles Avenue
Garden Avenue
Rowan Road
Coleman Avenue
North Passaic Avenue
Princeton Street
North Hillside Avenue
Center Avenue
Weston Avenue
Van Doren Avenue
Dunbar Street
Kensington Road
Kings Road
Union Hill Road
Woodland Road
Main Street
Elmwood Avenue
Wuhala Woods
Un-coded tributary
Memorial Park
North Summit Avenue
Hedges Avenue
Rose Terrace
Meadowbrook Road
Lincoln Avenue
Chatham Street
Edgewood Road
Shunpike Road
Summit Avenue
Minton Avenue
Tallmadge Avenue
Parrott Mill Road
Shepard Kollock Park
Summit Municipal Golf Course
Fuller Avenue
Red Road
Lafayette Avenue
Pine Street
Lenape Trail
Chandler Road
Washington Avenue
Watchung Avenue
Fairview Avenue
Broadview Terrace
Dellwood Avenue
Longwood Avenue
Fairmount Avenue
Hillside Avenue
Highland Avenue
River Road
Martin's Brook Park
James and Perrin Conservation Area
Passaic River Park
D
C
Municipal Building
Train Station
C (Brunswick Aquifer)
D (Basalt)
Water Body
Municipal Boundaries
County Boundaries
N
0 250 500 1,000 1,500 2,000
Feet
THE LAND CONSERVANCY OF NEW JERSEY
19 BOONTON AVENUE
BOONTON, NJ 07005
PH: (973)541-1010
TLC-NJ.ORG
Map Prepared: May 31, 2024
Data Sources: Borough of Chatham, County of Morris, NJOGIS, NJGS Aquifers of New Jersey 1998, NJGIN Road Network 2021
This map was developed using NJDEP Geographic Information System digital data, but this secondary product has not been verified by the NJDEP and is not state-authorized.
This map is to be used solely for planning purposes, and does not take the place of a survey.

Figure 9. Sole-Source Aquifers in New Jersey *(Source: NJGS)*[135]



The Drew Forest is comprised of 53 intact acres with mature trees and glacial ponds on Drew University's 168-acre campus in Madison. The Forest is the subject of a local campaign to preserve it as open space. An environmental review commissioned by the local campaign details the Drew Forest's importance as a recharge zone for the Buried Valley Aquifer, a sole-source aquifer for Madison and Chatham Borough residents, and additional towns. It documents its irreplaceable large trees, wetlands, open space waters, and explains its role as "identified habitat" for the federally endangered Indiana bat. As of the date of this ERI, attempts to raise funds for a conservation sale to permanently protect the Forest have resulted in the allocation by Morris County of $5,000,000 from its Open Space Trust Fund. Local federal officials (Congresswoman Mikie Sherrill and Senator Cory Booker) are also working to secure federal funds to support a conservation sale.

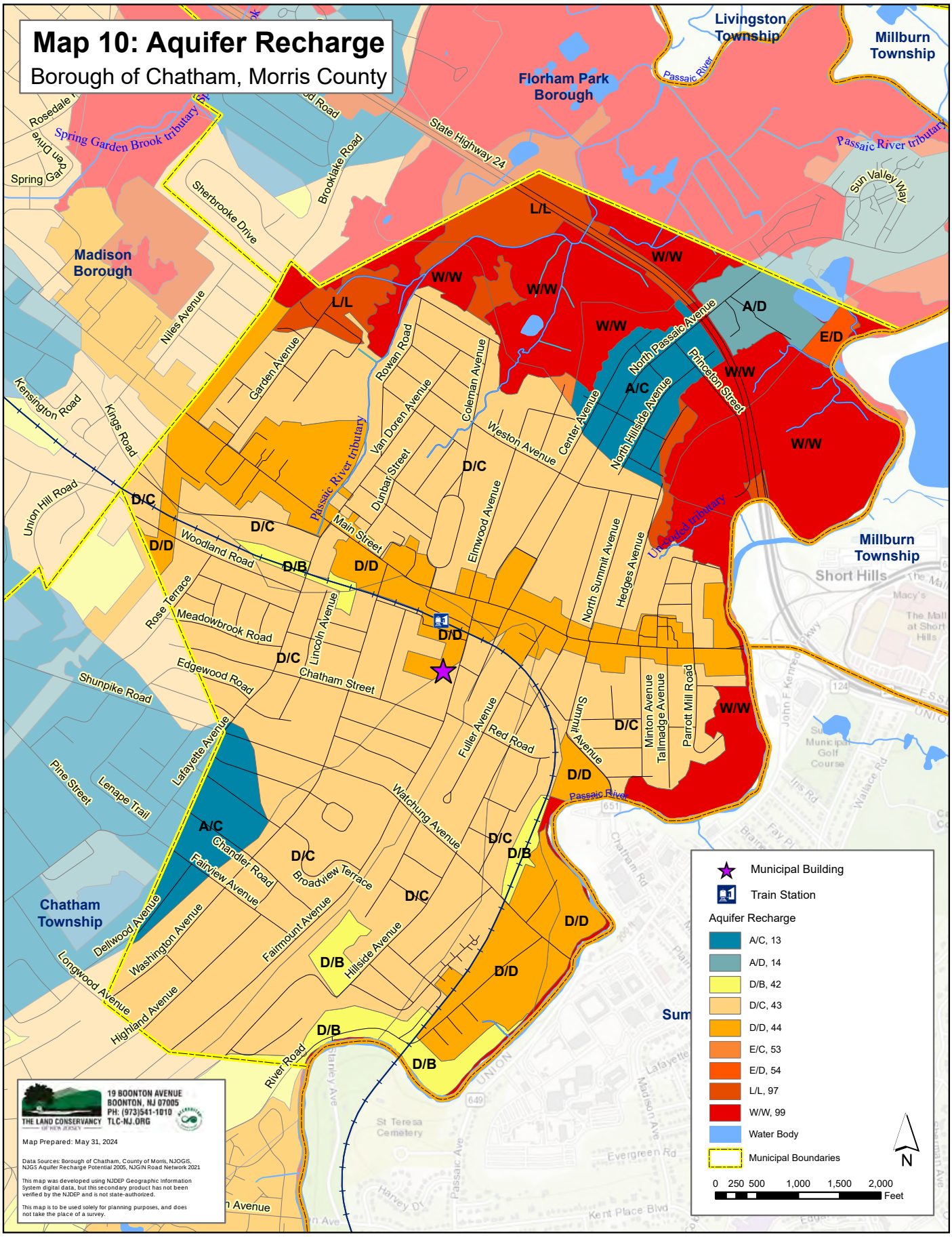

Map 10: Aquifer Recharge
Borough of Chatham, Morris County
Livingston Township
Millburn Township
Florham Park Borough
Madison Borough
Chatham Township
Short Hills
Passaic River
Passaic River tributary
Spring Garden Brook tributary
State Highway 24
Rosedale
Spring Garden Drive
Sherbrooke Drive
Brooklake Road
Sun Valley Way
Niles Avenue
Kensington Road
Kings Road
Union Hill Road
Garden Avenue
Rowan Road
Coleman Avenue
Van Doren Avenue
Dunbar Street
Weston Avenue
Center Avenue
North Passaic Avenue
North Hillside Avenue
Princeton Street
Elmwood Avenue
North Summit Avenue
Hedges Avenue
Main Street
Woodland Road
Meadowbrook Road
Rose Terrace
Lincoln Avenue
Chatham Street
Edgewood Road
Shunpike Road
Lafayette Avenue
Pine Street
Lenape Trail
Fuller Avenue
Red Road
Summit Avenue
Minton Avenue
Tallmadge Avenue
Parrott Mill Road
Watchung Avenue
Chandler Road
Fairview Avenue
Broadview Terrace
Dellwood Avenue
Washington Avenue
Longwood Avenue
Highland Avenue
Fairmount Avenue
Hillside Avenue
River Road
L/L
W/W
A/D
E/D
A/C
D/C
D/D
D/B
Municipal Building
Train Station
Aquifer Recharge
A/C, 13
A/D, 14
D/B, 42
D/C, 43
D/D, 44
E/C, 53
E/D, 54
L/L, 97
W/W, 99
Water Body
Municipal Boundaries
0 250 500 1,000 1,500 2,000
Feet
N
19 BOONTON AVENUE
BOONTON, NJ 07005
PH: (973)541-1010
TLC-NJ.ORG
THE LAND CONSERVANCY OF NEW JERSEY
Map Prepared: May 31, 2024
Data Sources: Borough of Chatham, County of Morris, NJOGIS, NJGS Aquifer Recharge Potential 2005, NJGIN Road Network 2021
This map was developed using NJDEP Geographic Information System digital data, but this secondary product has not been verified by the NJDEP and is not state-authorized.
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Table 10. Statewide Well Yield Rankings and Morris County Groundwater Rankings			
Aquifer Rank	**Median Well Yield (Gallons/Minute)**	**Groundwater Rank**	**Avg. Annual Infiltration (In/Yr)**
A	>500	A	20-23
B	>250-500	B	15-19
C	>100-250	C	10-14
D	25-100	D	1-9
E	<25	E	0
There are also hydric soils (L/L), wetlands and open water (W/W) and instances where no recharge is calculated (X/X).			
Source: NJDEP NJGS. Aquifer-Recharge Potential for Morris County, New Jersey[136]			

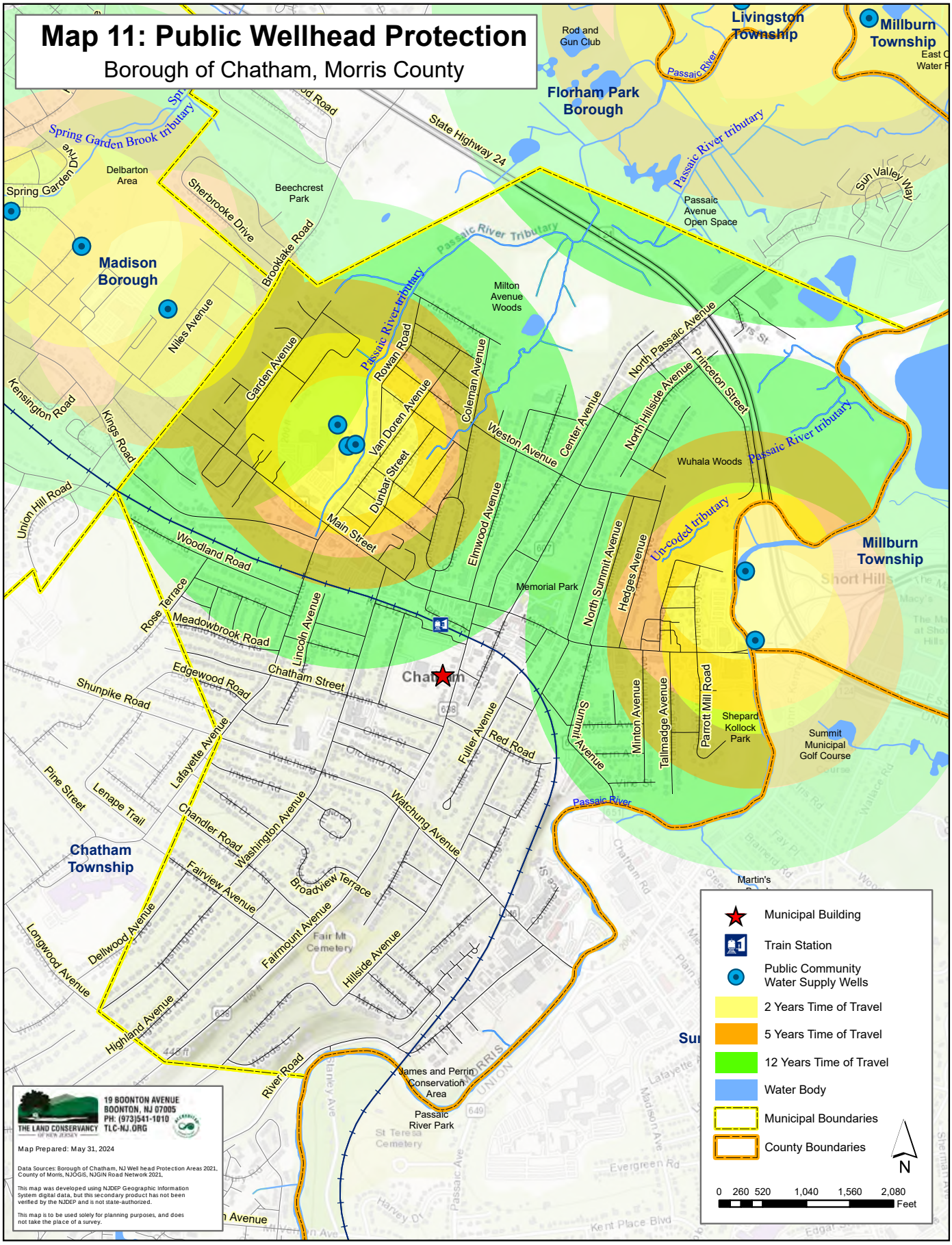
Table 11. Aquifer Potential Recharge Rankings in Chatham Borough			
Alpha Rank	Numeric Rank	Acres	Percent
A/C	13	81	5%
A/D	14	24	2%
D/B	42	45	3%
D/C	43	823	54%
D/D	44	210	14%
E/C	53	1	0%
E/D	54	6	0%
L/L	97	60	4%
W/W	98	267	18%
Source: NJDEP NJGS			
*D/C, D/D, & W/W (highlighted in gray in **Table 11**) total 86% of the Borough.*			

Public Water Supply and Wellhead Protection

The NJDEP maps Wellhead Protection Areas (WPAs) for public community and non-community wells. The delineations for these wells are two, five, and 12-year tiers. Each tier represents the horizontal extent of groundwater captured by a well pumping at a specific rate over those periods of time.

Based on NJDEP data, there are three public community water supply wells located within the Borough of Chatham (**Map 11**). All are within are in the northwest corner of the Borough near the Passaic River tributary and Van Doren Avenue.

There are also a number of public wellheads located immediately outside the Borough. Three are located northwest of the Borough in Madison Borough and two are located


Map 11: Public Wellhead Protection
Borough of Chatham, Morris County
Florham Park Borough
Livingston Township
Millburn Township
Madison Borough
Chatham Township
Millburn Township
Rod and Gun Club
Passaic River
Spring Garden Brook tributary
State Highway 24
Passaic River tributary
Delbarton Area
Spring Garden Drive
Sherbrooke Drive
Beechcrest Park
Brooklake Road
Sun Valley Way
Passaic Avenue Open Space
Passaic River Tributary
Milton Avenue Woods
Niles Avenue
Garden Avenue
Rowan Road
Coleman Avenue
North Passaic Avenue
Princeton Street
North Hillside Avenue
Center Avenue
Weston Avenue
Van Doren Avenue
Dunbar Street
Kensington Road
Kings Road
Union Hill Road
Main Street
Elmwood Avenue
Wuhala Woods
Un-coded tributary
Woodland Road
Memorial Park
North Summit Avenue
Hedges Avenue
Rose Terrace
Meadowbrook Road
Lincoln Avenue
Chatham Street
Edgewood Road
Shunpike Road
Fuller Avenue
Red Road
Summit Avenue
Minton Avenue
Tallmadge Avenue
Parrott Mill Road
Shepard Kollock Park
Summit Municipal Golf Course
Lafayette Avenue
Pine Street
Lenape Trail
Chandler Road
Washington Avenue
Watchung Avenue
Fairview Avenue
Broadview Terrace
Dellwood Avenue
Longwood Avenue
Fairmount Avenue
Fair Mt Cemetery
Hillside Avenue
Highland Avenue
River Road
James and Perrin Conservation Area
Passaic River Park
St Teresa Cemetery
Martin's
Municipal Building
Train Station
Public Community Water Supply Wells
2 Years Time of Travel
5 Years Time of Travel
12 Years Time of Travel
Water Body
Municipal Boundaries
County Boundaries
N
0 260 520 1,040 1,560 2,080
Feet
THE LAND CONSERVANCY OF NEW JERSEY
19 BOONTON AVENUE
BOONTON, NJ 07005
PH: (973)541-1010
TLC-NJ.ORG
Map Prepared: May 31, 2024
Data Sources: Borough of Chatham, NJ Well head Protection Areas 2021, County of Morris, NJOGIS, NJGIN Road Network 2021,
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northeast on the edge of the Borough in Millburn Township.

The Borough provides water directly to residents.[43] According to the **2022 Healthy Community Planning** report, the Borough fell in the lowest range of maximum contaminant levels and treatment techniques violations as well as action levels exceedances.[44]

The 1986 Federal Safe Drinking Water Act Amendments (Section 1428, P/L. 93-523, 42 USC 300 et. seq) directed all states to develop a Well Head Protection Program (WHPP) Plan for both public community (CWS) and public non-community (NCWS) water supply wells. A component of the WHPP is the delineating of Well Head Protection Areas. This delineation is the first step in defining the sources of water to a public water supply to prevent and clean up groundwater contamination.[137]

Drinking Water[45]

The Borough of Chatham's drinking water system serves the population of 9,226 with over 3,000 connections delivering about 420 million gallons per year. Daily per capita water consumption in Chatham is 125 gallons per day, which is only slightly higher than the national average of 122 gallons per day.

The system is comprised of three drinking water wells with pumps, a treatment facility (hypochlorination), a sampling station, three standpipes and many miles of pipe. The wells, which are over 150 feet deep, draw groundwater from the Buried Valley Aquifer system of the Central Passaic River Basin. The Borough's wells are located at the Public Works Complex, near the Chatham Middle School. The standpipes each hold 500k gallons of water for a total of 1.5 million gallons. The main purpose of the standpipes is to maintain water pressure in the system and for emergency firefighting use.

To determine the susceptibility of water sources to contamination, source water assessments are periodically performed. The New Jersey Department of Environmental Protection (NJDEP) has completed and issued the Source Water Assessment Report and Summary for Chatham's public water system. Further information on the Source Water Assessment Program can be obtained from NJDEP's source water assessment or by contacting NJDEP's Bureau of Safe Drinking Water.

The Borough of Chatham Water Department also routinely samples and tests for over 80 possible contaminants in the water supply according to Federal and State laws. Sampling results can be found in the Water Department's annual drinking water quality reports. The most recent report found zero violations of the existing water quality regulations.

The Federal Well Head Protection Program established in 1986 required the Borough to delineate Well Head Protection Areas which is a step towards preventing and cleaning up groundwater contamination.

The Passaic Valley Ground Water Protection Committee has developed a source water/wellhead protection planning document and an educational groundwater protection video, which are available at the Library

of the Chathams. They provide more information such as potential sources of contamination and means to protect our water resources.

Borough residents can do the following to protect our drinking water quality:

- Dispose of household hazardous waste properly. Look for periodic hazardous waste collections in Morris County. Call the Morris County Municipal Utilities Authority for more information.

- Adopt environmentally friendly lawn-care practices, such as keeping grass cut high and choosing disease-resistant grasses to reduce the need for lawn chemicals.

- Keep streets free of litter and pet waste that can contaminate storm water runoff.

- Conserve water as much as possible so as to avoid depletion of the aquifers.

Lastly, lead in drinking water is also a concern for the public. Lead is rarely found in the Borough's source of drinking water but rather enters tap water through corrosion, or wearing away, of materials containing lead in the water distribution system and household plumbing materials. These materials include lead-based solder used to join copper pipes, brass, and chrome-brass faucets, and in some cases, service lines made of or lined with lead. Although most lead exposure occurs from inhaling dust or from contaminated soil, or when children eat paint chips, the U.S. Environmental Protection Agency (USEPA) estimates that 10 to 20% of human exposure to lead may come from lead in drinking water.

Lead can cause serious health problems if too much enters your body from drinking water or other sources. It can cause damage to the brain and kidneys and can interfere with the production of red blood cells that carry oxygen to all parts of your body. The greatest risk of lead exposure is to infants, young children, and pregnant women. Scientists have linked the effects of lead on the brain with lowered IQ in children. Adults with kidney problems and high blood pressure can be affected by low levels of lead more than healthy adults.

Steps you can take to reduce lead exposure include:

- **Run the cold water to flush out lead**. Let the water run from the tap for about thirty seconds before using it for drinking or cooking any time the water in the faucet has gone unused for more than six hours. The longer the water resides in plumbing the more lead it may contain.

- **Use cold, flushed water for cooking and preparing baby formula**. Because lead from lead-containing plumbing materials and pipes can dissolve into hot water more easily than cold water, never drink, cook, or prepare beverages including baby formula using hot water from the tap. Alternatively, you can use bottled or filtered water for drinking and preparing baby formula.

- **Do not boil water to remove lead**. Boiling water will not reduce lead; however, it is still safe to wash dishes and do laundry. Lead will not soak into dishware or most clothes.

- **Determine if you have interior lead plumbing or solder**. If your home was constructed prior to 1987, it is important to determine

if interior lead solder or lead pipes are present. You can check yourself, hire a licensed plumber, or check with your landlord.

- **Replace plumbing fixtures and service lines containing lead**. Replace brass faucets, fittings, and valves that do not meet the current definition of “lead free”.

- **Test your water for lead**. Please call the Water Department to find out how to get your water tested for lead. Testing is essential because you cannot see, taste, or smell lead in drinking water.

To reduce the potential risks from lead in drinking water, New Jersey enacted the Lead Service Line Replacement Law in July 2021 (P.L. 2021, Ch. 183) that requires drinking water systems to inventory service lines, notify residents of the potential presence of lead in their service lines, and plan for the replacement of all lead service lines within 10 years. To comply with this obligation, the Borough's Department of Public Works is compiling an inventory of all water lines servicing homes in the Borough. This inventory is the first step in a 10-year project to identify and replace lines comprised of lead or galvanized materials.

Wastewater

Wastewater collection and treatment for Chatham Borough is the responsibility of the Madison-Chatham Joint Meeting.

The Madison-Chatham Joint Meeting treatment plant, located on approximately 17 acres between Chatham and Florham Park, serves the 25,000 residents of the Boroughs of Madison and Chatham, and a small portion of Chatham Township. All of Madison’s wastewater is collected and treated by the Madison-Chatham Joint Meeting. The Madison-Chatham Joint Meeting was established as a small primary treatment plant in 1910 and has expanded and upgraded several times over the years, with a number of major upgrades.

The Madison-Chatham Joint Meeting plant is now an advanced treatment plant with a design capacity of 3.5 million gallons per day (MGD) with an average daily flow of 2.299 MGD in 2023.

The wastewater treatment plant works in multiple stages. In the first two (Primary and Secondary) stages, the solid and liquid wastes are separated, bacteria neutralize the impurities in the solids, and the water is given initial aeration. In the tertiary treatment, the aim is to increase the final quality of the water so that it can be returned to the environment.

The stages of treatment include:

- **Screening:** A simple process that removes large materials such as wood, rocks and other items.

- **Pumping:** Our treatment plant is located on low ground, so much of the wastewater travels via gravity to the plant. Once in the plant and depending on the topography, most treatment plants have pumps to move the wastewater from one treatment area to another.

- **Aerating:** Bubbling oxygen through the sewage helps release some of the dissolved gases from the water into the air. It also helps larger 'grit' such as sand, coffee grounds, etc. to settle out.

- **Sedimentation:** Sludge settles out of the wastewater and is pumped

out of the sedimentation tank and then processed in a large 'digester' tank.

- **Removing scum:** As the sludge settles to the bottom, lighter items such as grease, oils, plastics, and soap float to the top. Slow-moving rakes skim the material off the surface. Thickened scum is pumped into the digesters with the sludge.

- **Final treatment and discharge:** Finally, the wastewater is treated, often with filtration and/or chlorine to remove bacteria, odors, and other items. The water is now clean and discharged into the environment.

The Joint Meeting was required by NJDEP to upgrade the plant to Level 4 effluent water quality. In 1990, the treatment plant received $16.2 million in improvements, funded by low interest loans to the Boroughs by the New Jersey Wastewater Trust Program. The new plant additions improve the effluent by remove ammonia levels from 30 milligrams per liter to less than 2 milligrams per liter and by dechlorinating the effluent to less than 0.1 milligram chlorine per liter of water. The expanded facility removes 955 of the conventional impurities in the water prior to discharging the clear effluent (treated wastewater) into the Passaic River. The new sludge handling facilities thicken the activated sludge prior to conveyance to the digesters and dewater the digested sludge prior to disposal in the landfill.

In addition to treating the wastewater, the Joint Meeting sewage plant also processes the residual solid-waste material. These solids are placed in a 'digester' or large holding tank for many days. This tank acts like a stomach and using bacteria digests the solid material in a process known as anaerobic digestion. Digesting the material reduces the volume and odor and produces Methane Gas. The sewage treatment plant uses 'duel fuel' diesel engines, which run on both natural gas and methane gas that is recaptured in the plant's digester. The finished solid material is then sent to a disposal facility.

Photo: Drew Forest (Credit: Friends of Drew Forest)

Chapter 7.

Wetlands, Riparian Areas, and Flood Zones

Wetlands

Wetlands filter chemicals, pollutants, and sediment from water; provide protection from flooding through storage of stormwater; offer critical habitat for wildlife; and are sites for recreation and tourism. The NJDEP (N.J.A.C. 7:7A) defines a freshwater wetland as,

"an area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation; provided, however, that the Department, in designating a wetland, shall use the three-parameter approach (that is, hydrology, soils, and vegetation) enumerated in the 1989 Federal Manual."

NJDEP has adopted the 1989 manual as the technical basis for identifying and delineating wetlands.[46] The NJDEP regulates virtually all activities in a wetland, including removing vegetation filling, and placing obstructions. Depending on the environmental value of a wetland, there may also be a transition area, or buffer, around the wetland that will require a waiver issued by the NJDEP for any activity within that zone. A wetland containing endangered species habitat would require a 150-foot wide transition area, whereas a small wetland in a ditch might not require any transition area at all.

Most freshwater wetlands require a 50-foot transition area. Wetlands in New Jersey are classified into three different values: exceptional resource value, ordinary resource value, or intermediate resource value. The criteria for these classifications are described below.

Exceptional Resource Value Wetland

- Discharges into FW-1 water and FW-2 trout producing waters and their tributaries;
- Is a present habitat for threatened or endangered species; or
- Is a documented habitat for threatened or endangered species, and remains suitable for breeding, resting, or feeding by the species during the normal period these species would use the habitat.

Ordinary Resource Value Wetland

A freshwater wetland which does not exhibit any of the characteristics of an Exceptional Resource Value Wetland, and which is one of the following:

- An isolated wetland (as defined at N.J.A.C. 7:7A-1.4) smaller than 5,000 square feet, with the following uses covering more than 50% of the area within 50 feet of the wetland boundary: lawns, maintained landscaping, impervious surfaces, active railroad right-of-way, and graveled or stoned parking/storage area and roads. In calculating the area covered by a use, NJDEP will only consider a use that was legally existing in that location prior to July 1, 1988, or was permitted under this chapter since that date.
- A drainage ditch.
- A swale.
- A detention facility that was uplands at the time it was created regardless of the wetland resource classification of the wetlands under these rules, or classification of the body of water, as FW-1 or FW-2 trout production, to which it discharges.

Intermediate Resource Value Wetland

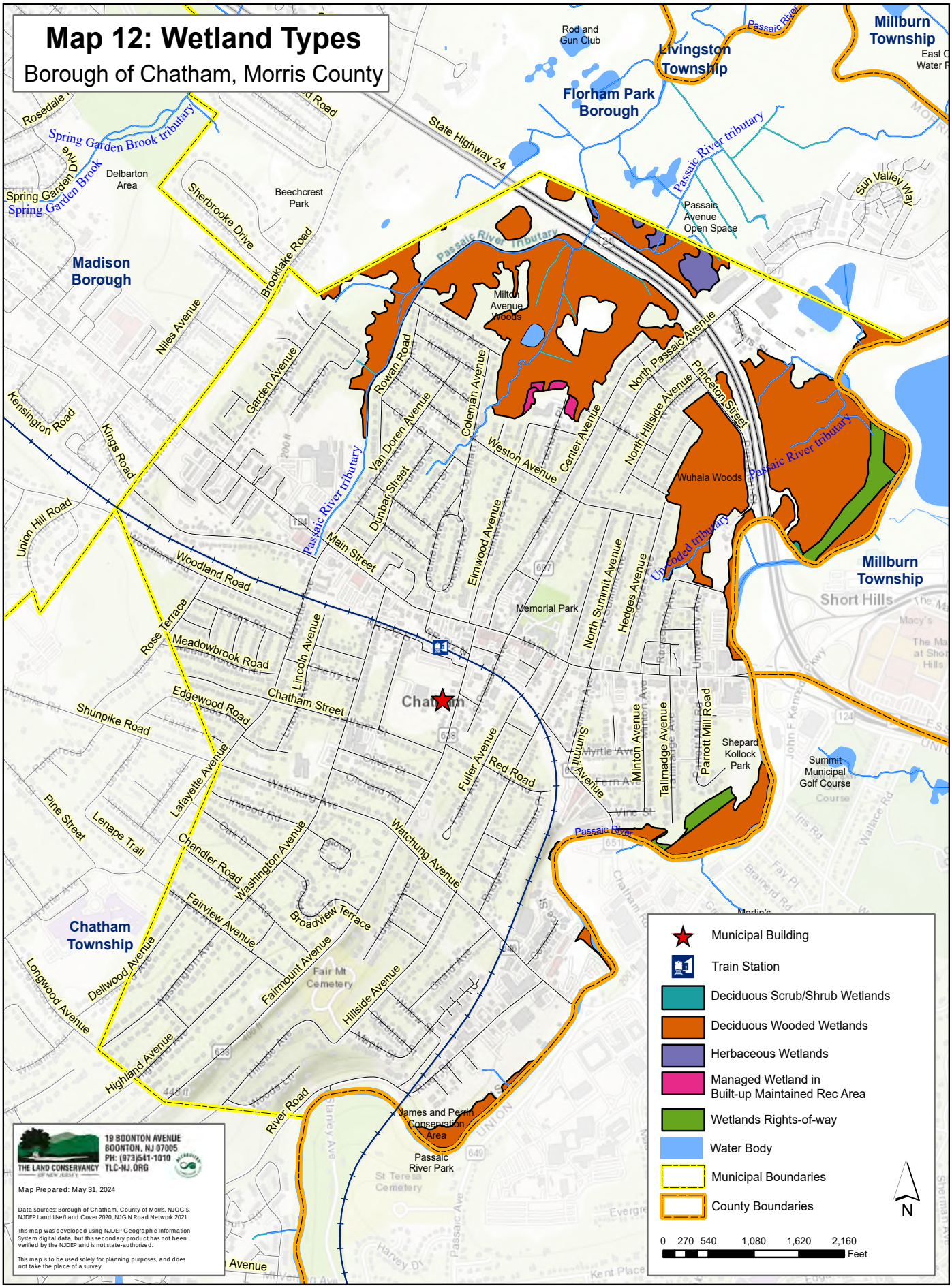
- A freshwater wetland of intermediate resource value is any wetland not defined as exceptional or ordinary.

According to the NJDEP 2020 Land Use/Land Cover data, wetlands make up 14% of land cover in the Borough of Chatham (**Map 12**). The Borough contains 212 acres of wetlands, 194 acres of which are classified as deciduous wooded wetlands. These areas are largely concentrated in the northern areas of the Borough around the woods behind the Milton Avenue School and Wuhala Woods. There are also patches on the east border of the Borough along the Passaic River at Shepard Kollock Park and the James and Perrin Conservation Area.

Wetland mapping from NJDEP is approximate, and unmapped wetlands may exist within the Borough of Chatham and would still be subject to NJDEP regulations. Wetlands require a professional delineation before a regulated activity can occur in or around them.

Riparian Zones

The lands immediately along waterways serve critical roles in the mitigation of downstream flooding and maintenance of healthy stream ecology. Development within these lands can cause environmental damage and expose people to flood


Map 12: Wetland Types
Borough of Chatham, Morris County
Rod and Gun Club
Livingston Township
Millburn Township
Florham Park Borough
Passaic River
Passaic River tributary
State Highway 24
Rosedale
Spring Garden Brook tributary
Spring Garden Drive
Spring Garden Brook
Delbarton Area
Beechcrest Park
Sherbrooke Drive
Brookdale Road
Sun Valley Way
Passaic Avenue Open Space
Madison Borough
Passaic River Tributary
Milton Avenue Woods
Niles Avenue
Garden Avenue
Rowan Road
Coleman Avenue
North Passaic Avenue
Princeton Street
North Hillside Avenue
Kensington Road
Kings Road
Van Doren Avenue
Weston Avenue
Center Avenue
Wuhala Woods
Passaic River tributary
Union Hill Road
Dunbar Street
Main Street
Elmwood Avenue
Uncoded tributary
Woodland Road
Memorial Park
North Summit Avenue
Hedges Avenue
Millburn Township
Short Hills
Rose Terrace
Meadowbrook Road
Lincoln Avenue
Chatham Street
Edgewood Road
Shunpike Road
Fuller Avenue
Red Road
Summit Avenue
Minton Avenue
Tallmadge Avenue
Parrott Mill Road
Shepard Kollock Park
Summit Municipal Golf Course
Lafayette Avenue
Pine Street
Lenape Trail
Chandler Road
Washington Avenue
Watchung Avenue
Passaic River
Fairview Avenue
Broadview Terrace
Chatham Township
Dellwood Avenue
Longwood Avenue
Fairmount Avenue
Fair Mt Cemetery
Hillside Avenue
Highland Avenue
River Road
James and Perrin Conservation Area
Passaic River Park
St Teresa Cemetery
Municipal Building
Train Station
Deciduous Scrub/Shrub Wetlands
Deciduous Wooded Wetlands
Herbaceous Wetlands
Managed Wetland in Built-up Maintained Rec Area
Wetlands Rights-of-way
Water Body
Municipal Boundaries
County Boundaries
N
0 270 540 1,080 1,620 2,160
Feet
THE LAND CONSERVANCY OF NEW JERSEY
19 BOONTON AVENUE
BOONTON, NJ 07005
PH: (973)541-1010
TLC-NJ.ORG
Map Prepared: May 31, 2024
Data Sources: Borough of Chatham, County of Morris, NJOGIS, NJDEP Land Use/Land Cover 2020, NJGIN Road Network 2021
This map was developed using NJDEP Geographic Information System digital data, but this secondary product has not been verified by the NJDEP and is not state-authorized.
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risk. Because of their importance, these lands are subject to regulation from multiple different authorities. Riparian zones and flood zones are overlapping regulated areas by the NJDEP and other agencies.

A **riparian zone** comprises the land and vegetation within and adjacent to surface waters regulated by NJDEP. As a baseline, riparian zones include all such lands within 50 feet of any NJDEP regulated waters. Riparian zones are expanded to 150 feet around the following waters:

- Any trout production water and all upstream waters.
- Any trout maintenance water and all upstream waters within one mile of a trout maintenance water.
- Waters which flow through an area of habitat for threatened or endangered species, and waters within one mile of such habitat.

The widest riparian zone buffer, 300 feet, is applied to Category One waters and all upstream waters within the same watershed. These definitions also include tributaries, and buffers are measured from the top of the waterway's banks. Riparian areas in the Borough of Chatham are found around major waterways of Passaic River and tributaries to the Passaic River.[47]

The full rules governing delineation and regulation of flood hazard areas are included in Title 7, Chapter 13 of the New Jersey Administrative Code, available on NJDEP's website.

Flood Zones

Federal, state, and municipal governments oversee areas prone to flooding through various acts, laws, and ordinances. The intent is to minimize property damage and negative ecological effects by limiting development and protecting positive environmental influences in areas subject to frequent flooding.

At the federal level, the USGS maps flood prone areas and the Federal Emergency Management Agency (FEMA) evaluates and maps Special Flood Hazard Areas (SFHAs) that can be used in participating communities to determine flood insurance rates.[48] On the state level, the NJDEP delineates Flood Hazard Areas along streams and regulates activities within these areas.[49] In recent years, FEMA and the state have coordinated to integrate NJDEP flood hazard area parameters into FEMA updates. Municipal code may set standards that are stricter than either the state or FEMA.

There are different methods of delineating SFHAs and Flood Hazard Areas, but the two terms are intended to mean the same thing. These areas include all lands which would be underwater in a 100-year flood, meaning a flood level which is expected to only occur every 100 years. These areas have a 1% chance each year of being completely flooded. Estimates for 100-year floods do include a small margin of safety to factor in potential increased flow due to upstream development. SFHAs are delineated and regulated for waterways with a drainage area of 50 acres are greater.

SFHAs as delineated by FEMA are used, along with other flood zones, to create official Flood Insurance Rate Mapping (FIRM) that can be used in participating

communities, to determine flood insurance rates.[50] Communities can choose to participate in the National Flood Insurance Program (NFIP), which requires mandatory flood insurance in areas mapped as SFHAs. In addition to the SFHAs, NFIP mapping also delineates 500-year flood zones and various sublevels within the 100-year zone.

29 acres are located within the 500-year flood zone (0.2% chance of an annual flood, also known as the Shaded Zone X) and 174 acres are located within the 100-year flood zone (1% chance of an annual flood, also known as Zones A and AE) (**Map 13**). These areas are located within the floodplain and floodway of the Passaic River.

NJDEP Regulations

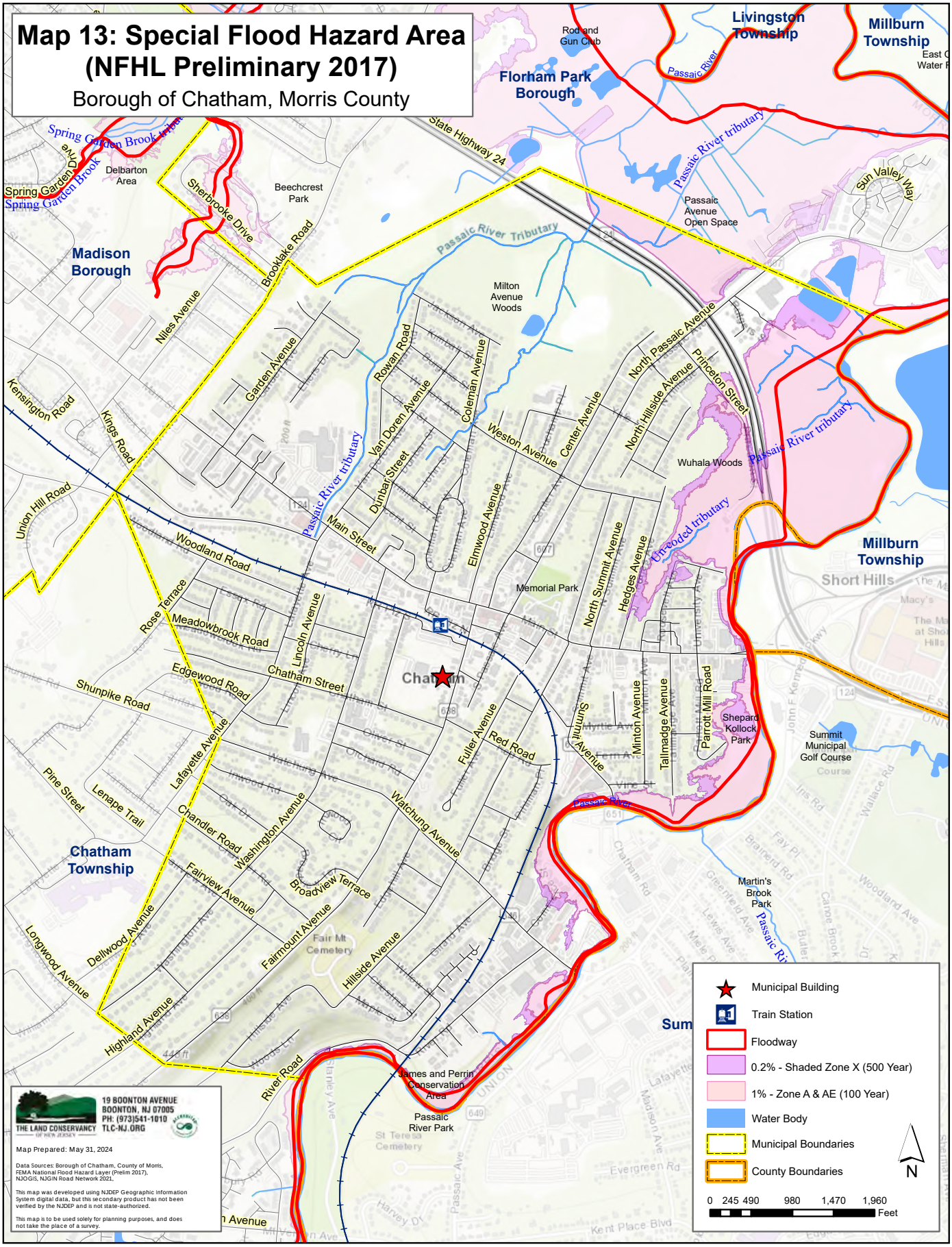
NJDEP regulates floodprone areas through the NJ Flood Hazard Area Control Act, N.J.A.C. 7:13, amended on October 5, 2021.[51] The Act recognizes the importance of not only avoiding building in unsafe places, but also preserving vegetation that is considered essential for maintaining bank stability and water quality. The rules set standards for development in flood hazard areas and land adjacent to surface water to mitigate the adverse impacts of flooding.

The appropriate permit must be obtained in order to engage in any activity in a regulated area. There are also area specific standards, depending on whether or not the area includes a channel, floodway, flood fringe, fishery resource, threatened and endangered species, or acid producing soils. More specific regulations depend on what portion of the flood hazard area a piece of land falls in, and whether it is a riparian zone.

Inland Flood Protection Rule

On July 17, 2023, the NJDEP's Inland Flood Protection Rule (IFPR) took effect.[52,53] This rule updates existing stormwater management guidelines by mandating that groundwater recharge standards and best management practices align with projected precipitation totals specific to each county, which are expected to be enhanced and likely higher (see **Chapter 10 Climate Change**). The IFPR also limits the use of alternative and more flexible methods that often result in a lower estimate of the potential runoff. In the coming years, the implementation of the IFPR could result in the need for more stormwater controls, such as larger retention areas, which has the potential to reduce the developable area of sites in Chatham. By expanding the flood hazard areas, these standards increase the amount of land where NJDEP has the authority to regulate development.

The rules expand the Flood Hazard Area to include all lands up to two feet higher than current 100-year flood areas in NJDEP maps, and three feet higher than current 100-year flood areas in FEMA maps.[54] The new rule also requires that all new major developments address stormwater runoff using an updated NJDEP data set for peak flow rates of streams and rivers.[55] This new data accounts for recent changes in the region's precipitation patterns since the data was last updated in 1999. The NJDEP has created an online Flood Indicator Tool which provides information about potential flood risk on or near a property of interest. It does not show precise NJDEP standards, calculate actual risk, or demarcate a zone where NJDEP regulations apply. It is intended only as a reference.[56]


Map 13: Special Flood Hazard Area
(NFHL Preliminary 2017)
Borough of Chatham, Morris County
Florham Park Borough
Livingston Township
Millburn Township
Madison Borough
Chatham Township
Millburn Township
Short Hills
Rockland Gun Club
Passaic River
Passaic River tributary
State Highway 24
Spring Garden Brook tributary
Spring Garden Brook
Delbarton Area
Beechcrest Park
Sherbrooke Drive
Brooklake Road
Passaic River Tributary
Passaic Avenue Open Space
Sun Valley Way
Milton Avenue Woods
Niles Avenue
Garden Avenue
Rowan Road
Coleman Avenue
North Passaic Avenue
Princeton Street
North Hillside Avenue
Center Avenue
Weston Avenue
Van Doren Avenue
Dunbar Street
Elmwood Avenue
Kensington Road
Kings Road
Union Hill Road
Woodland Road
Main Street
Wuhala Woods
Uncoded tributary
Memorial Park
North Summit Avenue
Hedges Avenue
Rose Terrace
Meadowbrook Road
Lincoln Avenue
Edgewood Road
Chatham Street
Shunpike Road
Fuller Avenue
Red Road
Summit Avenue
Minton Avenue
Tallmadge Avenue
Parrott Mill Road
Shepard Kollock Park
Summit Municipal Golf Course
Lafayette Avenue
Pine Street
Lenape Trail
Chandler Road
Washington Avenue
Watchung Avenue
Fairview Avenue
Broadview Terrace
Dellwood Avenue
Longwood Avenue
Fairmount Avenue
Hillside Avenue
Fair Mt Cemetery
Highland Avenue
River Road
James and Perrin Conservation Area
Passaic River Park
St Teresa Cemetery
Martin's Brook Park
Municipal Building
Train Station
Floodway
0.2% - Shaded Zone X (500 Year)
1% - Zone A & AE (100 Year)
Water Body
Municipal Boundaries
County Boundaries
N
0 245 490 980 1,470 1,960
Feet
19 BOONTON AVENUE
BOONTON, NJ 07005
PH: (973)541-1010
TLC-NJ.ORG
THE LAND CONSERVANCY OF NEW JERSEY
Map Prepared: May 31, 2024
Data Sources: Borough of Chatham, County of Morris, FEMA National Flood Hazard Layer (Prelim 2017), NJOGIS, NJGIN Road Network 2021.
This map was developed using NJDEP Geographic Information System digital data, but this secondary product has not been verified by the NJDEP and is not state-authorized.
This map is to be used solely for planning purposes, and does not take the place of a survey.

Flood Disclosure

On July 3, 2023, Bill S3110/A4783, also known as the Flood Disclosure Bill, became law.[57] This new legislation, which takes effect in the Fall of 2023, adds a new tool for home buyers and renters across the state. The law requires that landlords and home sellers disclose flood risk to prospective tenants or buyers.[58] This includes the property's history of flooding and its location in a FEMA-designated (100-year or 500-year) Flood Hazard Area. Additionally, the law requires landlords to notify tenants of the availability of insurance for renters through the National Flood Insurance Program.

Borough Planning

The Borough of Chatham has taken steps to address the adverse effects of flooding, as summarized by the following list of planning documents and ordinances:

2001 Flood Damage Prevention Ordinance No. 165-23: The ordinance outlines regulations to promote the public health, safety and general welfare and to minimize public and private losses due to flood conditions in specific flood hazard areas through the establishment of comprehensive regulations for management of flood hazard areas.[59]

2016 Master Plan Reexamination & Update Report: Some of the goals in the report outline developing new stormwater regulations to be consistent with Morris County's regulations and protect natural resources from flooding.[60]

2021 Stormwater Management and Control Ordinance No. 165: The ordinance outlines regulations to control flooding, groundwater recharge, and reduce pollution using management measures, including green infrastructure, through the establishment of comprehensive regulations.[61]

2023 Stormwater Pollution Prevention Plan: This plan outlines steps the Borough of Chatham has taken to decrease stormwater pollution through updating ordinances, education, and outreach with residents.[62]

2023 Stormwater Ordinance 24-09: This ordinance amends and supplements Chapter 165, Article XIV "Stormwater Management and Control," of the Borough's code to adopt the Simplified Model Ordinance developed by the New Jersey Department of Environmental Protection. The goal of the ordinance is to minimize pollution caused by stormwater, thereby restoring, enhancing, and maintaining the integrity of the state's waters.[63]

Stormwater Management[64]

Stormwater resulting from rain and snow is an important source of fresh water that feeds the Borough's lakes, streams, and the Passaic River, and recharges the underground aquifers. Maintaining the quality of the stormwater run-off protects our drinking water supply and preserves streams and lakes as a wildlife habitat and for recreation.

Proper stormwater management (i) reduces water pollution, (ii) decreases the potential for flooding, (iii) replenishes drinking water sources, and (iv) protects wildlife habitat.

How the residents use land directly affects the way stormwater flows. Under undisturbed conditions, over

half of precipitation infiltrates the soil and a much smaller amount runs off the surface. Natural vegetation acts like a sponge and a filter, slowing the flow and allowing the stormwater to clean itself as it soaks into the soils.

Roads, pavement and buildings (otherwise known as impervious surfaces) reduce the area where stormwater can soak into the soils to replenish the water supply. This means less water recharges underground aquifers, which can negatively impact the water supply by making the aquifers unable to keep up with the amount of water that the drinking water wells pump out.

Impervious surfaces also adversely affect the Passaic River. Stormwater runoff can pick up contaminants such as litter, pesticides, fertilizer, pet wastes, petroleum products, and road salts. The increased volume of runoff from impervious surfaces washes more of these pollutants into water bodies. This can negatively affect fish and wildlife, and degrade recreational areas.

Less water infiltration means more water flowing on the surface. Roadways and storm sewers act to channel stormwater, speeding its flow. So much water flowing more quickly results in greater and more frequent flooding and erosion.

Flooding in the Borough is typically caused by the Passaic River as a result of heavy rain events. The Borough has two areas which parallel the Passaic River which flood during these events. The first is south of the Route 124 bridge on the west side of the Passaic River. Approximately 500 feet of the Passaic River floods the eastern part of Shepard Kollock Park. The second location is north of the Route 124 Bridge. These are the only two locations in Chatham Borough that floods due to the Passaic River. Neither of these two locations contain residential housing.

Residents can reduce the amount of stormwater that runs off their properties by

- Directing gutter downspouts away from pavement or to a rain barrel;
- Reducing the amount of pavement (impervious surface);
- Planting groundcover;
- Planting trees and maintaining existing ones;
- Creating gardens and no mow areas, and
- Watering lawns sparingly and only if necessary.

Residents can help reduce pollution in runoff by:

- Avoiding use of pesticides and fertilizers or using them sparingly;
- Composting leaves and grass clippings;
- Taking hazardous substances to a proper disposal repository;
- Monitoring vehicles for fluid leaks;
- Scooping up pet waste, and
- Preventing objects or fluids from draining into stormwater grates or inlets.

Stormwater management is important, and collectively these actions can make a positive difference.

Photo Fishing Derby (Credit: TAP Chatham)

Chapter 8.

Water Quality

Watersheds

A watershed is a topographic area within which surface water runoff drains into a specific point on a stream or to a water body such as a lake.[65] A watershed-based approach to natural resource management is considered by state and national agencies to be the most appropriate unit for managing complex environmental problems.

The NJDEP has divided the state into Watershed Management Areas (WMAs) composed of multiple watersheds and sub-watersheds. The Borough is located in the Central Passaic River Basin, WMA06, Upper Passaic, Whippany, and Rockaway.

The USGS has mapped and identified watersheds using a hierarchical numbering system. This identifies watersheds by a hydrological unit code (HUC) that includes up to 14 digits for the smallest watersheds. There are three HUC14 watersheds for the Borough:

- Black Brook (Great Swamp National Wildlife Refuge)
- Passaic River Upper (Snyder Avenue)
- Passaic River Upper (Columbia Road)

The Upper Passaic River Watershed is the most extensive of Morris County's major river basins. Sustaining riverine, open water, and wetland habitat for wildlife, the Passaic River provides drinking water, fishing, and recreational opportunities to the region and to the Borough. These benefits are occasionally offset by the Passaic's flooding of low lying areas,

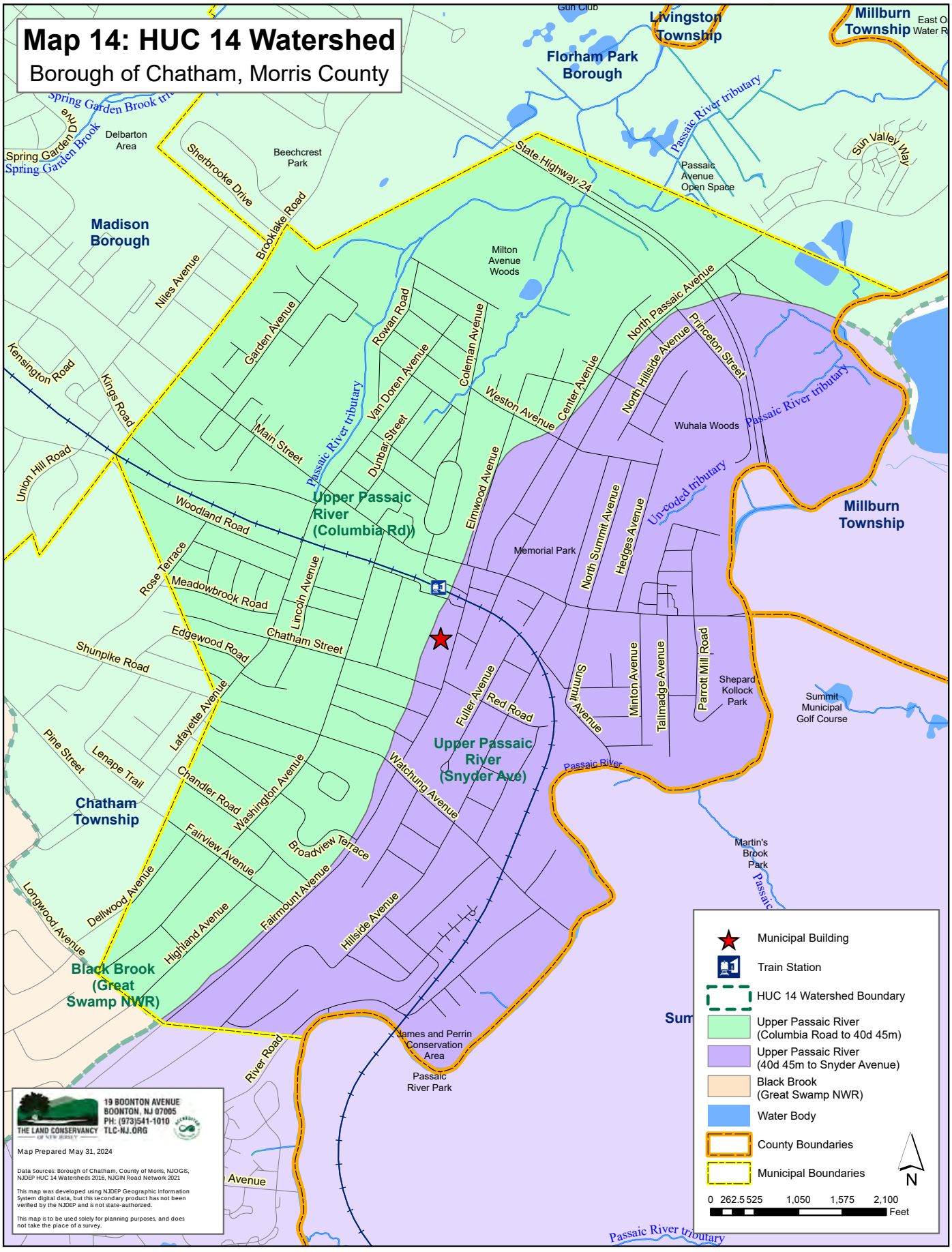

Map 14: HUC 14 Watershed
Borough of Chatham, Morris County
Livingston Township
Millburn Township
Florham Park Borough
Madison Borough
Chatham Township
Millburn Township
Black Brook (Great Swamp NWR)
Upper Passaic River (Columbia Rd)
Upper Passaic River (Snyder Ave)
Passaic River tributary
Passaic River
Un-coded tributary
Spring Garden Brook
Delbarton Area
Beechcrest Park
Sherbrooke Drive
Brooklake Road
State Highway 24
Passaic Avenue Open Space
Sun Valley Way
Milton Avenue Woods
Niles Avenue
Garden Avenue
Rowan Road
Coleman Avenue
North Passaic Avenue
Princeton Street
North Hillside Avenue
Center Avenue
Weston Avenue
Van Doren Avenue
Dunbar Street
Main Street
Kensington Road
Kings Road
Union Hill Road
Woodland Road
Elmwood Avenue
Wuhala Woods
Memorial Park
North Summit Avenue
Hedges Avenue
Rose Terrace
Meadowbrook Road
Lincoln Avenue
Chatham Street
Edgewood Road
Shunpike Road
Lafayette Avenue
Pine Street
Lenape Trail
Chandler Road
Washington Avenue
Fairview Avenue
Broadview Terrace
Fuller Avenue
Red Road
Summit Avenue
Minton Avenue
Tallmadge Avenue
Parrott Mill Road
Shepard Kollock Park
Summit Municipal Golf Course
Watchung Avenue
Martin's Brook Park
Dellwood Avenue
Longwood Avenue
Highland Avenue
Fairmount Avenue
Hillside Avenue
James and Perrin Conservation Area
Passaic River Park
River Road
Municipal Building
Train Station
HUC 14 Watershed Boundary
Upper Passaic River (Columbia Road to 40d 45m)
Upper Passaic River (40d 45m to Snyder Avenue)
Black Brook (Great Swamp NWR)
Water Body
County Boundaries
Municipal Boundaries
N
0 262.5 525 1,050 1,575 2,100
Feet
19 BOONTON AVENUE
BOONTON, NJ 07005
PH: (973)541-1010
TLC-NJ.ORG
THE LAND CONSERVANCY OF NEW JERSEY
Map Prepared May 31, 2024
Data Sources: Borough of Chatham, County of Morris, NJOGIS, NJDEP HUC 14 Watersheds 2016, NJGIN Road Network 2021
This map was developed using NJDEP Geographic Information System digital data, but this secondary product has not been verified by the NJDEP and is not state-authorized.
This map is to be used solely for planning purposes, and does not take the place of a survey.

Table 13. HUC14 Watersheds, Borough of Chatham					
WMA	**WMA Name**	**Watershed Name**	**Sub-Watersheds Name**	**Acres**	**Percent**
06	Upper Passaic, Whippany, and Rockaway	Passaic River Upper (above Pine Brook Branch)	Black Brook (Great Swamp National Wildlife Refuge)	0.13	-
			Passaic River Upper (Snyder Avenue)	710	47%
			Passaic River Upper (Columbia Road)	814	53%
			Total	**1525**	**100%**
Source: NJDEP HUC14 Watershed Tabular Data[139]					

which has been exacerbated by infill and development.[66]

Only a small corner (less than 1%) of the Borough is within the Black Brook watershed. The HUC14 watersheds of the Upper Passaic River are split fairly evenly east to west in the Borough (**Map 14** and **Table 13**)

Surface Water

Surface water is water that collects on the ground or in a stream, river, lake, wetland, or ocean. This includes Passaic River and its tributaries, and an uncoded tributary in the Borough (**Table 12** and **Map 15**).

Water Quality Standards

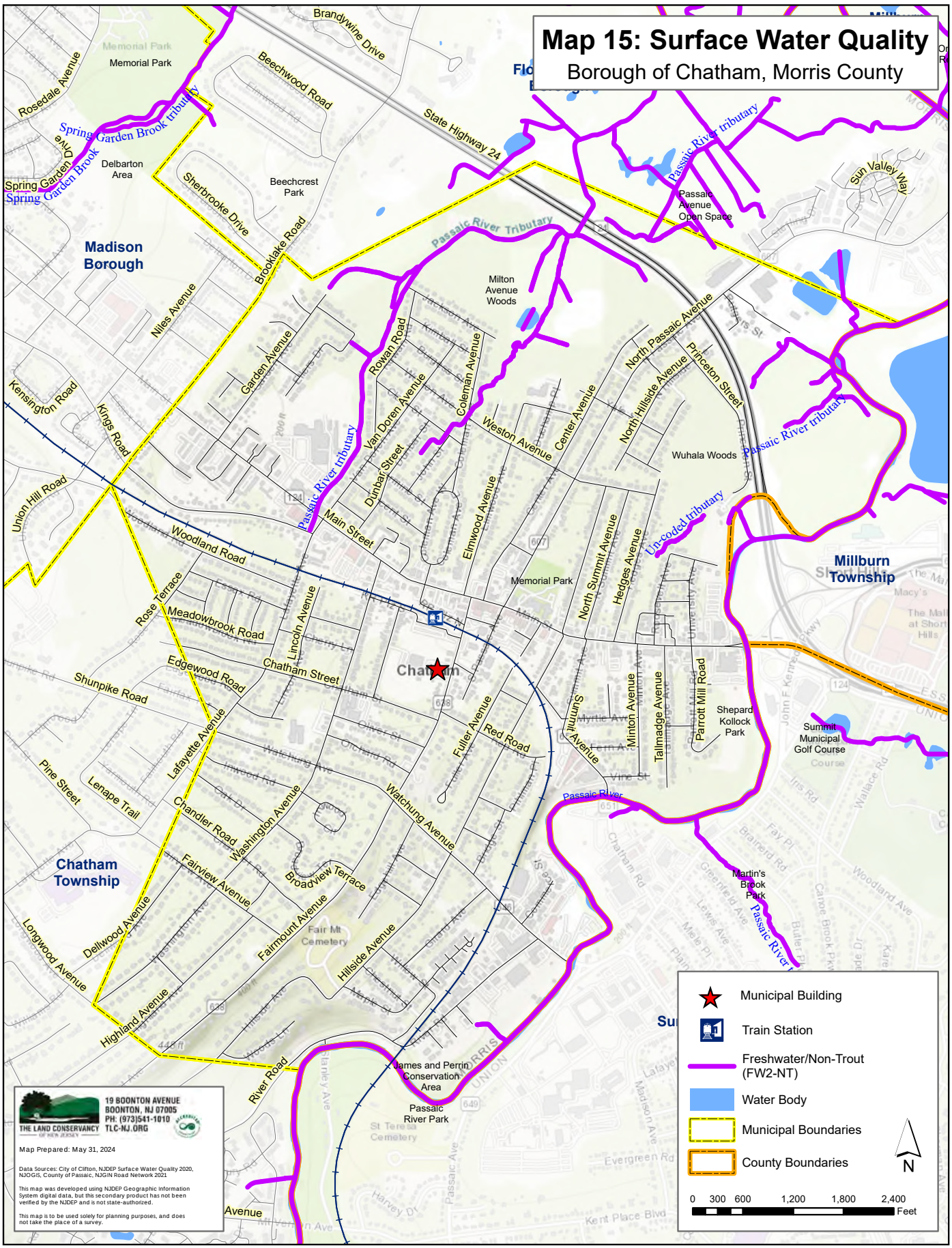
NJ's Surface Water Quality Standards (SWQS) (N.J.A.C. 7:9) classify Fresh Water 1 (FW1) as the highest level of classification, which is defined as:

".. those fresh waters, as designated in N.J.A.C. 7:9B-1.15(j), that are to be maintained in their natural state of quality (set aside for posterity) and not subjected to any man-made wastewater discharges or increases in runoff from anthropogenic activities. These waters are set aside for posterity because of their clarity, color, scenic setting, other characteristic of aesthetic value, unique ecological significance, exceptional recreational significance, exceptional water supply significance or exceptional fisheries resource(s)."[67]

The general classification for other freshwater is Fresh Water 2 (FW2).

The presence of trout in a stream means that the waters are relatively free of chemicals or biological contaminants and is used to further define designated uses. A stream can be classified as:

Table 12. Streams		
Stream	**Miles**	**Percent**
Passaic River	3.03	43%
Passaic River unnamed tributary (UNT)	3.87	55%
Uncoded Tributary	0.20	3%
Total:	**7.09**	**100%**
Source: NJDEP Surface Water Quality Data[138]		


Map 15: Surface Water Quality
Borough of Chatham, Morris County
Madison Borough
Chatham Township
Millburn Township
Chatham
Memorial Park
Delbarton Area
Beechcrest Park
Milton Avenue Woods
Passaic Avenue Open Space
Wuhala Woods
Shepard Kollock Park
Summit Municipal Golf Course
Martin's Brook Park
James and Perrin Conservation Area
Passaic River Park
Fair Mt Cemetery
St Teresa Cemetery
Spring Garden Brook
Spring Garden Brook tributary
Passaic River Tributary
Passaic River tributary
Un-coded tributary
Passaic River
State Highway 24
Brandywine Drive
Beechwood Road
Rosedale Avenue
Sherbrooke Drive
Brooklake Road
Niles Avenue
Garden Avenue
Rowan Road
Coleman Avenue
Van Doren Avenue
Dunbar Street
Weston Avenue
Center Avenue
North Passaic Avenue
Princeton Street
North Hillside Avenue
Sun Valley Way
Kensington Road
Kings Road
Union Hill Road
Woodland Road
Main Street
Elmwood Avenue
Rose Terrace
Meadowbrook Road
Lincoln Avenue
Edgewood Road
Chatham Street
Shunpike Road
Lafayette Avenue
Pine Street
Lenape Trail
Chandler Road
Washington Avenue
Watchung Avenue
Fuller Avenue
Red Road
Summit Avenue
North Summit Avenue
Hedges Avenue
Minton Avenue
Tallmadge Avenue
Parrott Mill Road
Fairview Avenue
Broadview Terrace
Fairmount Avenue
Hillside Avenue
Dellwood Avenue
Longwood Avenue
Highland Avenue
River Road
Municipal Building
Train Station
Freshwater/Non-Trout (FW2-NT)
Water Body
Municipal Boundaries
County Boundaries
N
0 300 600 1,200 1,800 2,400
Feet
19 BOONTON AVENUE
BOONTON, NJ 07005
PH: (973)541-1010
TLC-NJ.ORG
THE LAND CONSERVANCY OF NEW JERSEY
Map Prepared: May 31, 2024
Data Sources: City of Clifton, NJDEP Surface Water Quality 2020, NJOGIS, County of Passaic, NJGIN Road Network 2021
This map was developed using NJDEP Geographic Information System digital data, but this secondary product has not been verified by the NJDEP and is not state-authorized.
This map is to be used solely for planning purposes, and does not take the place of a survey.

Trout Production (TP) waters are designated for use by trout spawning or nursery purposes during their first summer.

Trout Maintenance (TM) waters support trout throughout the year.

Non-Trout waters (NT) do not support trout, either because of their physical nature or due to biological or chemical characteristics (SWQS, N.J.A.C.7:9B).

The surface waters of the Borough are classified as FW2 and Non-Trout (FW2-NT).[68]

Surface water quality is affected by point sources and non-point sources of pollution as well as erosion and sedimentation.[69] Point sources are any discernible, confined, and discrete fissure, container, or concentrated animal feeding operation from which pollutants are or may be discharged. This includes discharges from sewage treatment plants and factories, stormwater runoff, illegal dumping, and malfunctioning underground storage tanks and septic tanks.

In contrast to point source pollution, non-point source pollution comes from many different sources. As rainfall or snowmelt moves over and through the ground, it picks up and carries natural and human-made pollutants (such as fertilizers, herbicides, and motor oil) and deposits them into surface and groundwater. The effects of pollutants on specific waterways can vary but eventually all are manifested into negative outcomes for drinking water supplies, recreation, fisheries, and wildlife.

One of these effects is eutrophication, which, in freshwater systems, is the addition of substances, either human-made or natural, to a water body affecting the productivity of that body of water. Nitrates and phosphates promote excessive algae growth. These 'blooms' can have negative effects on the ecosystem. This can include clouding of the water which limits sunlight penetration and stops the growth of plants deeper in the water. Additionally, the excess nutrient availability (eutrophication) from the decomposition of dead phytoplankton can cause depleted levels of dissolved oxygen (anoxia).

Water quality can also be negatively affected by sedimentation, which is the transportation and deposition of eroded materials. A primary cause of sedimentation is development near streams and on steep slopes that reduce vegetative cover and results in exposed soil. The eroded soil can then be transported to surface waters where it could contaminate and increase the turbidity of the water, effectively blocking sunlight to plant species and negatively affecting the health of the aquatic ecosystem.

In 2024, the Environmental Commission joined a national community science project and recorded winter chloride readings at the Passaic River from the boat launch at Shepard Kollock Park to identify salt runoff into the river following snow removal activity. The average chloride recorded between February and March 2024 was 146.4 ppm, with a high of 283 ppm following the removal of three inches of snow.[70]

Borough Hall (Credit: ChathamBorough.org)

Chapter 9.

Climate & Air

Prevailing Air Currents

Atmospheric circulation over North America is dominated by prevailing westerly winds which move air from west to east in a broad, undulating flow. New Jersey's weather is substantially influenced by the north-south movement of these westerly currents, and the variation in their strength throughout the year. This variation results in the state being influenced by wet, dry, hot, and cold air streams changing from day to day.

The Office of the New Jersey State Climatologist (ONJSC) divides New Jersey into five distinct climate zones, each of which experiences distinct variations in the daily weather due to differences in geology, distance from the Atlantic Ocean, and prevailing atmospheric flow patterns.[71] The Borough of Chatham falls in the North climate zone, which stretches along the Appalachian Uplands. This zone is typically colder than other zones due to the small mountains that are up to 1,800 feet in elevation.

Temperature & Precipitation

The National Oceanic and Atmospheric Administration (NOAA) divides New Jersey into three climate divisions.[72] The Borough falls in the Division 1 (Northern) of New Jersey, which encompasses the Counties of Bergen, Morris, Somerset, Essex, Hudson, Passaic, Sussex, Union, Warren, and Hunterdon (**Figure 10**).

The ONJSC gathers temperature and precipitation data from monitoring stations throughout the state, with some site records dating back to the 1890s and many sites with more than 50 years of continuous data.[73] This

data is used to calculate averages at the division and county level. Statistics are also available for individual monitoring stations, with the stations closest to the Borough of Chatham being the Canoe Brook, Essex Fells, and Caldwell Essex County Airport stations. ONJSC monitoring stations track a variety of climate factors, namely temperature, precipitation, snowfall, and heating and cooling degree days. Not all stations track the same climate factors.

Data from the OSNJC show an upward trend in average temperature for Division 1 over the last 20 years (**Figure 11**). This is reflected in a decrease in heating degree days (**Figure 12**) and an increase in cooling degree days (**Figure 13**).[74]

Figure 14 shows a slight downward trend in precipitation over the last 20 years in Division 1, although precipitation during these years

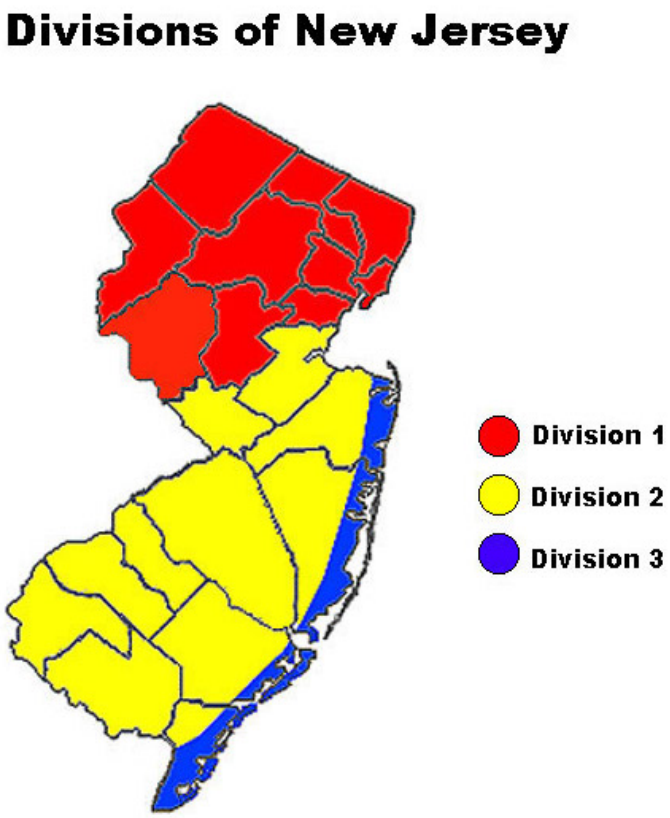


Figure 10. Climate Divisions of New Jersey[140]

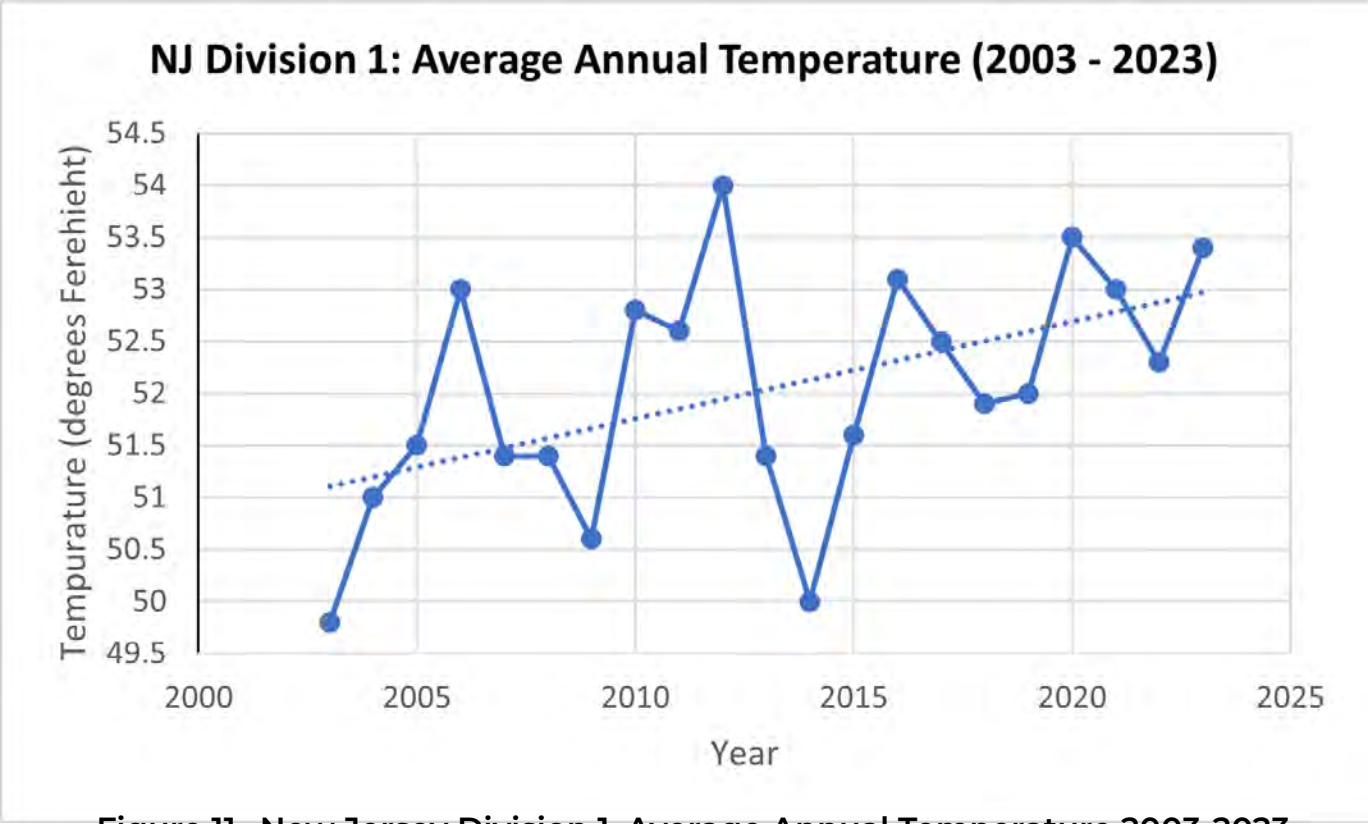


Figure 11. New Jersey Division 1, Average Annual Temperature 2003-2023

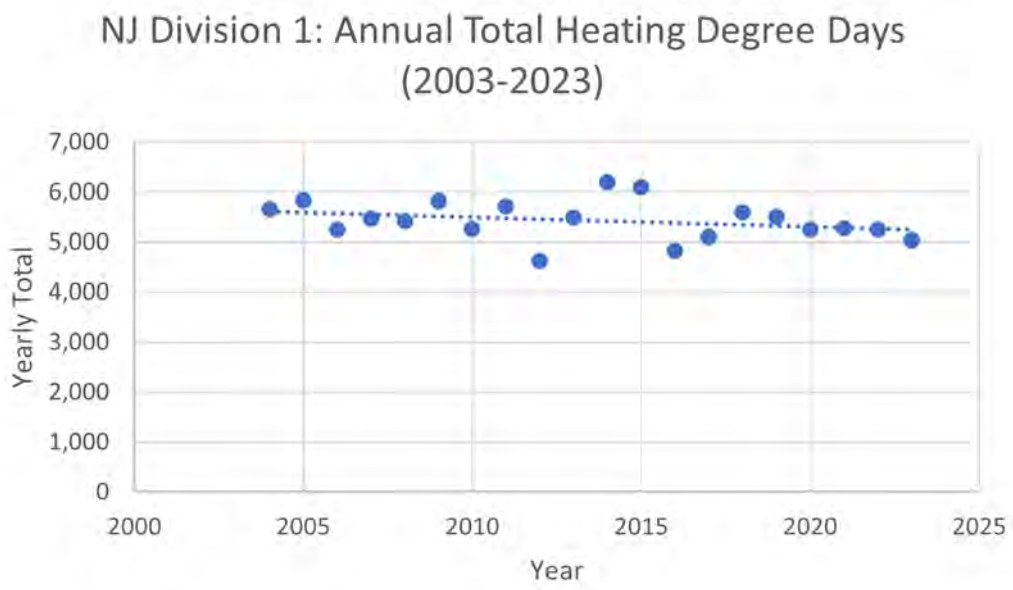


Figure 12. NJ Division 1, Annual Total Heating Degree Days 2003-2023

remains higher than the average from the previous century.[75]

In Morris County, between 1895 and 2023, the average annual temperature has risen from 47.4°F to 52.8°F (**Figure 15**). The average temperature is 49.4°F for Division 1.

Annual precipitation in Morris County has also risen gradually over the same time period, from 39.6 inches to 57.2 (**Figure 16**). Precipitation has also shown more extremes in recent years. In 2011, Hurricane Irene contributed to an all-time record of 70.2 inches of precipitation in one year. The average annual precipitation in the County is 49.9 inches, higher than the average of 47.1 inches for northern New Jersey.

Heating and cooling degree days measure the extent to which outside temperatures required energy use to maintain a comfortable indoor temperature of 65°F in a given year. For example, a 20° day in January has 45 heating degrees. The heating degrees for each day of a year are added up to calculate the number of heating degree days for that year.

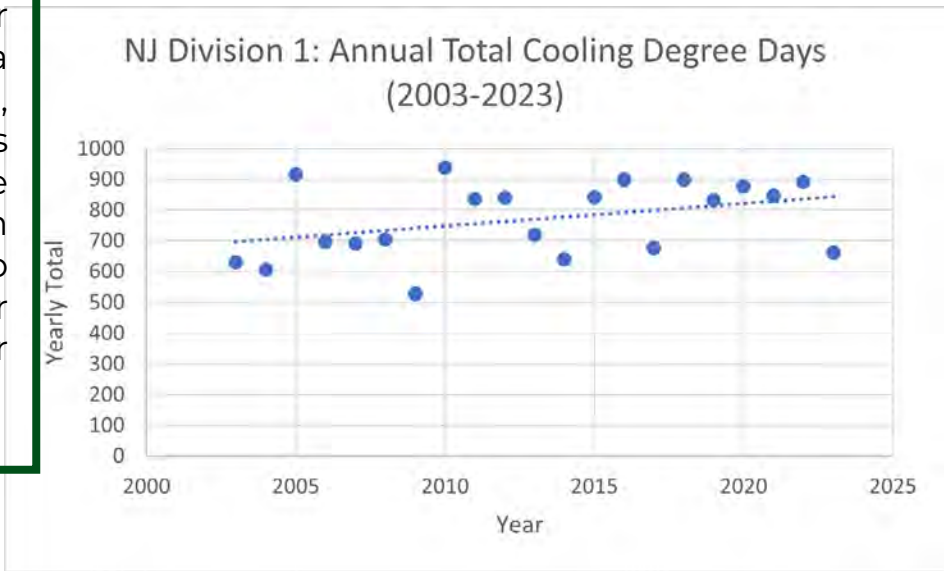


Figure 13. NJ Division 1, Annual Total Cooling Degree Days 2003-2023

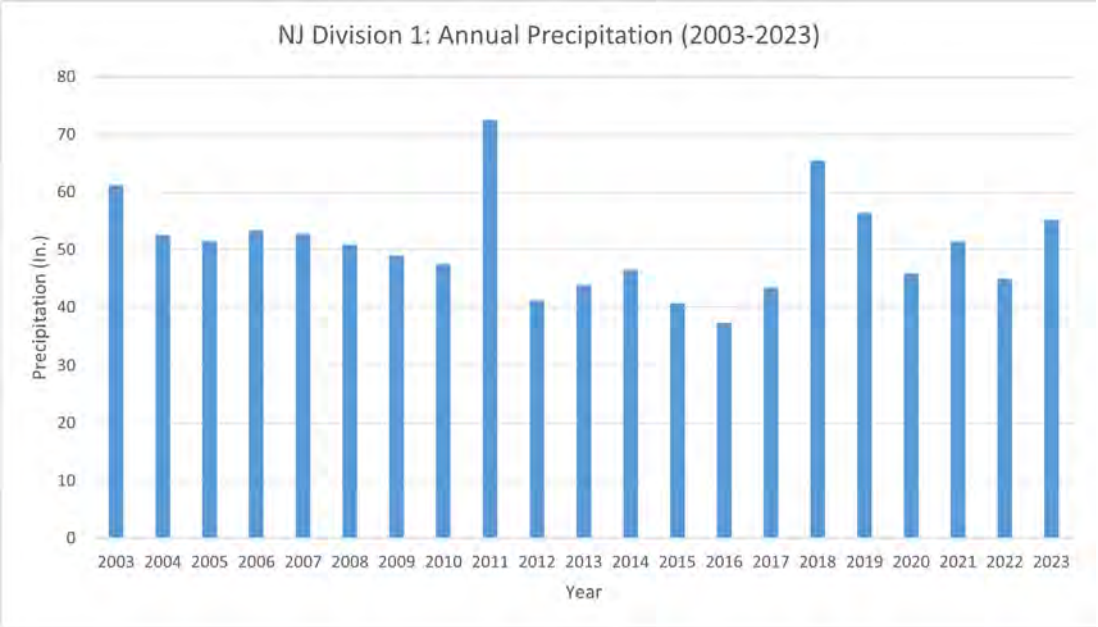


Figure 14. NJ Division 1, Annual Total Precipitation 2003-2023

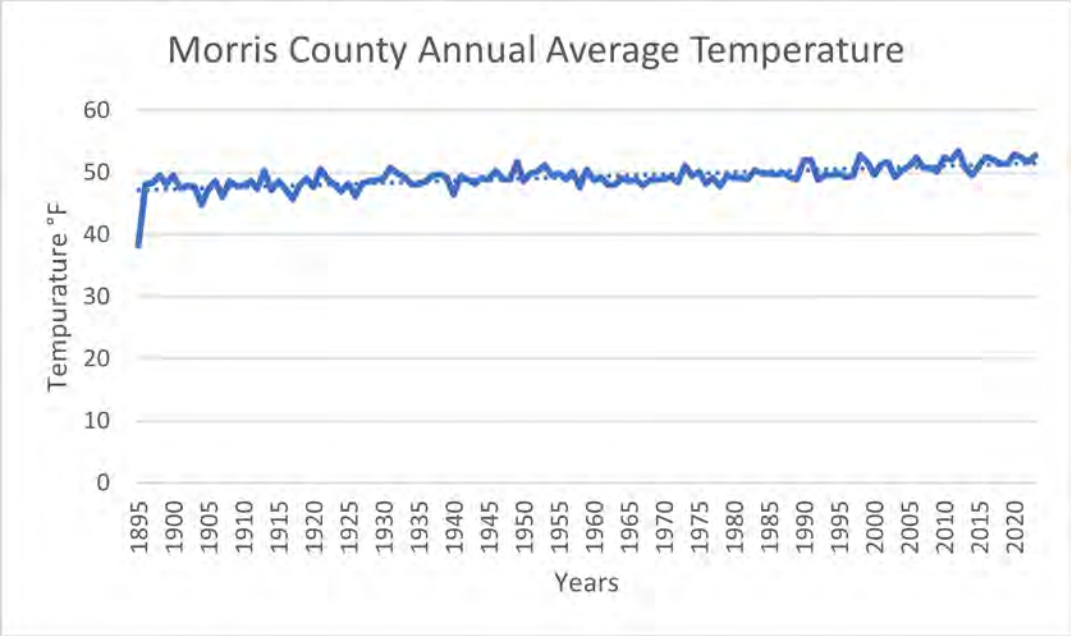


Figure 15. Morris County Annual Average Temperature, 1895-2023

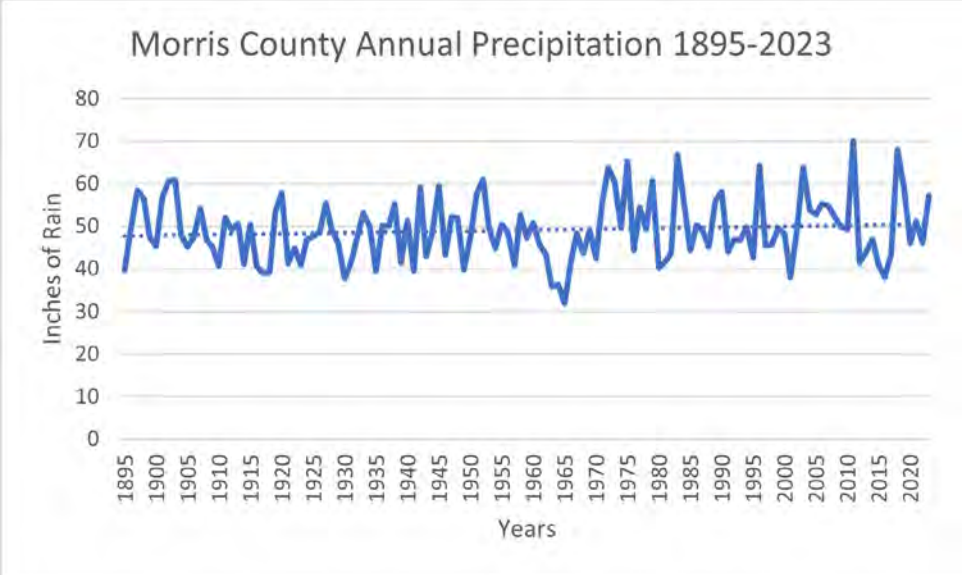


Figure 16. Morris County Annual Precipitation, 1895-2023

The station with a snowfall dataset closest to the Borough of Chatham is the Canoe Brook station in Short Hills. Its records, spanning 1954 to the present, show a minimum annual snowfall of 7.8 inches in 1972 and a maximum of 74.8 inches in 1960 (**Figure 17**).[76]

Canoe Brook station also records temperature and precipitation. For that station, all-time records for temperature and precipitation extremes are shown in **Table 14**.[77] Data is available from 1970 to 2023 for temperature and from 1974 to 2023 for precipitation. Monthly records indicate the year in which the highest measurement for a given month was taken. The daily high temperatures in May 2015 were, for example, higher than the daily highs for any other May since record-keeping began in 1970. Years since 2010 are highlighted. The data show that out of 12 months in the year:

Six months have experienced their hottest average daily highs since 2010.

One month has experienced its hottest average daily low since 2010.

Nine months have experienced their hottest average temperature since 2010.

One month has experienced its highest amount of precipitation since 2010.

Figure 17. Canoe Brook Station, Annual Total Snowfall, 1954-2022

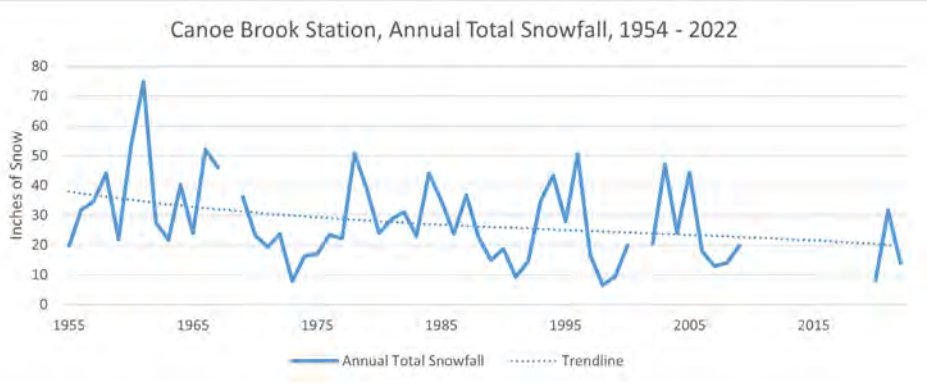


Table 14. Year in Which All-Time Monthly Records Were Recorded, Canoe Brook

Month	Temperature (1970 - 2023)			Highest Total Rainfall (1974 - 2023)
	Highest Average Daily High	Highest Average Daily Low	Highest Monthly Average	
January	2006	1977	2023	1979
February	2002	1978	1998	2008
March	2012	2015	2012	2010
April	2010	1975	2017	2007
May	2011	1971	2015	1984
June	2010	1980	2011	2003
July	1999	2009	2022	1975
August	2022	2008	2022	1978
September	2005	1976	2015	1999
October	2007	1987	2007	2005
November	2001	1976	2006	1985
December	2015	1989	2015	1983

Source: Office of the New Jersey State Climatologist[141]

Note: Highlighting indicates years since 2010

More records have been set in recent years for average daily lows than average daily highs, meaning that nights are warming faster than days.

This data shows that in recent years the region is getting hotter, with higher annual temperatures, more precipitation, greater precipitation fluctuations, record-high monthly average temperatures, and decreasing snowfall.

Drought

The Borough of Chatham is a generally water-rich environment with frequent and substantial precipitation, and annual rainfall in the region is increasing. While annual precipitation totals have increased, however, the distribution of precipitation has changed. Large storms, such as Hurricane Irene, are occurring more frequently and dropping more rainfall when they come. At the same time, droughts are occurring more frequently.

Table 15 shows the historical droughts recorded in **Morris County's Hazard Mitigation Plan**, along with their peak severity according to the U.S. Drought Monitor. Severity of droughts is classified as 1 (Moderate Drought), 2 (Severe Drought), 3 (Extreme Drought), or 4 (Exceptional Drought). Some droughts, such as those having to do with longer-term issues like low reservoir levels and water shortages, are identified by Morris County's Hazard Mitigation Plan but not noted as occurring in Morris County by the U.S. Drought Monitor.

Table 15. Historical Droughts Impacting Morris County, 1965 - 2023

Date of Drought	Severity (1 to 4)
August 1965 to August 1967	1 - water shortage
October 1980 to May 1983	1 - water shortage
August 2015 to January 2016	1
September 2015	1
May 2015 to June 2015	1 - reservoir levels low; water shortage
August 2015 to January 2016	1 - reservoir levels low
April 2016 to April 2017	1 - reservoir levels low
October 2017	2 - reservoir levels low
August - September 2022	1

Source: US Drought Monitor, Morris County Hazard Mitigation Plan[142, 143]

Extreme Phenomena

Tropical Cyclones

NOAA defines tropical cyclones as rotating, organized systems of clouds and thunderstorms that originate over tropical or subtropical waters.[78] Tropical cyclones tend to bypass New Jersey due to its protective location slightly inland of coastal outcrops to the north and south. When they do affect New Jersey, they affect coastal areas, although a few have traveled inland.

Hurricane Irene's heavy rains caused damage to roads and bridges as rivers overflowed their banks, while

Hurricane Sandy's (2012) high winds resulted in many downed trees across the region. In recent years, Tropical Storm Isaias (2020) and Hurricane Ida (2021) caused power outages and damage in the Borough of Chatham.[79, 80]

Notable Tropical Cyclones:

Hurricane Floyd: September 1999

Hurricane Irene: August 2011

Hurricane Sandy: October 2012

Tropical Storm Isaias: July 2020

Hurricane Ida: August 2021

Landslides

The New Jersey Geological Survey (NJGS) collects data on landslides in New Jersey. Landslides are defined as geologic hazards in areas with steep to moderate slopes or geologic units prone to failure. No landslides have occurred in the Borough of Chatham.[81]

Earthquakes

On March 29, 2024 a magnitude 4.8 earthquake struck the Northeast, with its epicenter located at Whitehouse Station, 30 miles from the Borough. This was the strongest earthquake to hit New Jersey since 2011.[82] The NJDEP records all observed earthquakes in New Jersey, with 216 as of April 2023. They occur more frequently along the fault lines in north-central New Jersey than in other parts of the state. New Jersey earthquakes are typically minor in nature, causing no damage. Prior to the April 2024 earthquake, there had been no recorded earthquakes in the Borough of Chatham.[83]

Air Quality

Air quality in New Jersey is carefully monitored by the NJDEP's Division of Air Quality (DAQ) through 30 air monitoring stations across the state, to ensure that air quality levels meet the national standards set by the federal Clean Air Act as well as various state laws and regulations.[84] The local air monitoring stations help the NJDEP assess:

- The population's exposure.
- Impact of major pollution sources.
- Measure background levels.
- Extent of pollutant transport.
- Measure secondary impacts in rural areas.

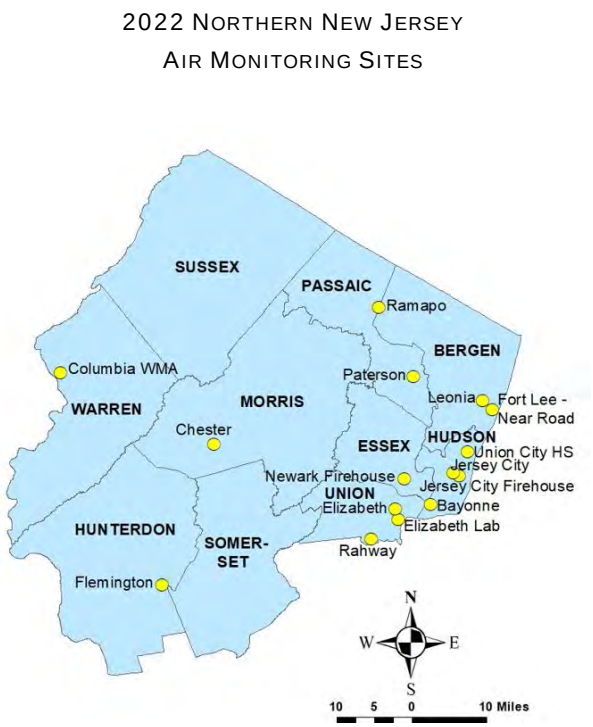
The levels recorded for many pollutants vary greatly from season to season and even from day to day depending on weather conditions and traffic patterns.

National Clean Air Standards

In 1970, the federal government passed the Clean Air Act, which set air quality standards to be met throughout the country. The Act was amended in 1990, with focus on four areas of pollution.[85] This included acid rain, urban air pollution, toxic air emissions, and stratospheric ozone depletion.

The amendment also introduced a permit program and strengthened enforcement. Under the Act, it is the responsibility of the USEPA to set National Ambient Air Quality Standards (NAAQS) for six common pollutants (ozone, carbon monoxide, sulfur dioxide, nitrogen dioxide,

Figure 18. NJDEP Northern NJ Air Monitoring Sites
(Source NJDEP)[144]



Under the Clean Air Act, U.S. EPA is responsible to set National Ambient Air Quality Standards (NAAQS) for six common pollutants such as ozone, carbon monoxide, sulfur dioxide, nitrogen dioxide, fine particulates, and lead.

fine particulates, and lead) and the responsibility of each state to develop State Implementation Plans (SIPs) to attain and maintain these standards. In New Jersey, that role is assigned to the DAQ.

Regional/Local Statistics

The State uses the air quality data from its air monitoring network to determine which areas comply with NAAQS as well as overall trends in air pollution levels. The NJDEP produces yearly reports known as the New Jersey Air Quality Reports and provides real-time reporting through its Air Quality Index website.[86] Each monitoring site measures a limited set of pollutants; no one site tracks them all. **Figure 18** illustrates the location of the air monitoring stations in northern New Jersey.

The Air Quality Index (AQI) rates air quality based on the NAAQS, on a scale from 0 to 500 (**Figure 19**).[87] AQI pollutants include ozone, particulate matter, carbon monoxide, sulfur dioxide, and nitrogen dioxide. A score of 50 to 100 is considered a moderate level of concern, with an AQI of 100 indexed to the NAAQS for each pollutant.

The number of days with AQI values over 100 in recent years has been: 19 in 2018, 14 in 2019, 6 in 2020, and 15 in 2021. The number of exceedance days in 2020 was the lowest in recent years, due to decreased traffic in response to the Covid-19 pandemic and related closures of businesses, offices, schools, and other destinations. At the New Jersey Clean Air Council's annual public hearing in March 2022, data was presented to show that Covid-19 measures most strongly affected ozone, nitrogen dioxide, and particulate matter.[88] In 2021, however, air pollutant levels returned to pre-pandemic levels.

Figure 19. NJDEP Air Quality Index Guide

Air Quality Index Levels and Associated Health Impacts

AQI Level of Health Concern	Numerical Value	Meaning	Color Code
Good	0 to 50	Air quality is considered satisfactory, and air pollution poses little or no risk.	Green
Moderate	51 to 100	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.	Yellow
Unhealthy for Sensitive Groups	101 to 150	Members of sensitive groups may experience health effects. The general public is not likely to be affected.	Orange
Unhealthy	151 to 200	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects.	Red
Very Unhealthy	201 to 300	Health warnings of emergency conditions. The entire population is more likely to be affected.	Purple
Hazardous	301 to 500	Health alert: everyone may experience more serious health effects.	Maroon

Criteria Pollutants

The six pollutants for which standards have been set by the EPA - ozone, sulfur dioxide, carbon monoxide, nitrogen dioxide, particulate matter, and lead, are known as criteria pollutants and are the main pollutants regulated by air quality standards in the U.S.

Since 1997, annual concentrations of all criteria pollutants in New Jersey have decreased.[89] Air quality has improved significantly over the last fifty years since the advent of environmental regulation in 1970. New Jersey has attained NAAQS levels of lead, carbon monoxide, sulfur dioxide, and nitrogen dioxide for many years. There are still periodic exceedances of the NAAQS for ozone and fine particulates.

In 2022, New Jersey exceeded an AQI of 100 on nine days. Seven of these days were considered unhealthy for sensitive groups and two was considered unhealthy overall.[145]

Ozone, O_3

Ozone (O_3) is a gas consisting of three oxygen atoms. It occurs naturally in Earth's upper atmosphere, where it offers protection from harmful ultraviolet rays and has been the subject of successful environmental efforts to maintain its presence.[90] However, when found at ground level, ozone can have serious adverse health effects.

The ozone monitoring stations in New Jersey closest to the Borough of Chatham are the Bayonne station followed by the Chester station, and then the Rutgers University station. Given the similarities in development patterns and amount of through-traffic, the Borough of Chatham falls within the levels reported within the

Chester station. The Chester station reported 1-hour concentrations up to 0.078 ppm and 8-hour concentrations up to 0.065 ppm. In 2022, Chester did not exceed the NAAQS on any days.

Statewide, New Jersey is classified as a "marginal" ozone non-attainment area for NAAQS. A state is considered to be in non-attainment for ozone in a given year if at any monitoring stations, the three-year average of the fourth-highest daily maximum 8-hour average concentration exceeds 0.070 parts per million (ppm). The Leonia station, at 0.071 ppm, is the only New Jersey station to exceed this standard. The State of New Jersey's standard of 0.12 ppm 1-hour concentration has not been exceeded since 2018. However, the 8-hour average concentration exceeded the NAAQS of 0.070 ppm at some stations on eight days in 2022, causing the AQI on those days to reach the "Unhealthy for Sensitive Groups" range. In 2022, the Monmouth University Station was the primary contributor to AQI on 142 days of the year. In 2023, there were 17 NAAQS exceedance days with 15 considered "Unhealthy for Sensitive Groups" and two as "Unhealthy Days".[91]

The effort to lower ozone concentrations has focused on reducing emissions of VOCs, but further improvements will require reductions in both VOCs and NO_x. New Jersey falls within the US EPA's Ozone Transport Region, where local ozone is particularly impacted by the regional transport of ozone-forming NO_x.[92] Continued interstate cooperation may be required to achieve further reductions in New Jersey's ozone levels. Data collection in Newark Firehouse, the closest station to the Borough, is incomplete due to a temporary shutdown from September to December 2022.

Ground-level ozone is formed through a chemical reaction involving nitrogen oxides (NO_x), volatile organic compounds (VOCs), and the presence of heat and sunlight.

Sulfur Dioxide, SO_2

Sulfur Dioxide (SO_2) is a heavy, colorless gas with a suffocating odor that easily dissolves in water to form sulfuric acid, or acid rain. SO_2 gases can be formed when fuels containing sulfur are burned, or when gasoline is extracted from crude oil. Most of the sulfur dioxide released into the air comes from the combustion of fossil fuels in power plants and industrial processes, and it is particularly associated with the burning of coal.

SO_2 can be harmful to people (primarily children, the elderly, and asthmatics) and the environment. It also reacts with other gases and particulates in the air to form sulfates, which have their own harmful effects. Sulfates are the primary cause of reduced visibility. SO_2 can also react with other substances in the atmosphere to form acid rain, which damages forests, crops, water, and buildings.[93]

New Jersey has been in sulfur dioxide NAAQS attainment since 2015. Regulations requiring the use of low sulfur fuels in New Jersey have been effective in lowering SO_2 concentrations.

A state is considered in attainment for sulfur dioxide in a given year if at any monitoring stations, the three-year average of the 99th-percentile one-hour daily maximum concentration exceeds 75 ppb.

The State of New Jersey has more stringent requirements which have also been met in 2022.

The last year an exceedance of the national SO_2 standards was recorded in the state was 2013-2014.[94] The activities of a coal-fired power plant in Portland, Pennsylvania are believed to be the reason for this exceedance, and New Jersey has not been near exceedance any year since the power plant's closure in 2014.

As the northeastern United States has phased out the use of coal, the regional average concentration of SO_2 has decreased by 90% since 2000 and been well in attainment of the NAAQS standard for over 10 years.

Carbon Monoxide, CO

Carbon monoxide (CO) is a colorless, odorless, poisonous gas formed when carbon in fuels is not burned completely. The primary sources of CO emissions in New Jersey are on-road and off-road vehicles, with boilers, incinerators, and forest fires also contributing. Outdoor CO levels can reach dangerous levels in cases of a weather inversion, where a layer of air becomes trapped at the earth's surface, allowing pollutants to build up without the usual circulation.

Carbon monoxide reduces the oxygen-carrying capacity of blood and therefore slows the flow of oxygen to critical parts of the body. CO does not occur in outdoor air at the lethal concentrations which can be recorded in indoor air. However, even at the lower concentrations which occur in outdoor air, exposure to CO can result in headaches and nausea. CO can be more damaging for individuals with cardiovascular disease, reducing ability to exercise and causing chest pain.[95]

The CO monitoring stations in New Jersey closest to the Borough of Chatham are Elizabeth Lab, Elizabeth, and Jersey City. At these stations, all concentrations were well below the national and state standards, though the highest values of any monitoring site in the state were recorded at Jersey City. Data collection in Newark Firehouse is incomplete due to a temporary shutdown from September to December 2022.

90% of New Jersey's CO comes from internal combustion engines.

Nitrogen Dioxide, NO_2

Nitrogen dioxide (NO_2) is a reddish-brown, highly reactive gas that is formed in the air through the oxidation of nitric oxide (NO). When it reacts with other chemicals, it can form ozone, particulate matter, and other pollutant compounds. NO_2 is generally used as an indicator for the group of gases known as nitrogen oxides (NO_x), which are emitted from the combustion of fossil fuels in vehicles, power plants, home heating and cooking, and industrial processes. NO_x is primarily released by motor vehicles, so concentrations in the air tend to peak during and immediately after the morning and evening rush hour.

NO_2 can aggravate or cause respiratory illness, and prolonged exposure can permanently damage the lungs. NO and NO_2 can irritate the eyes, nose, throat, and lungs and cause nausea and tiredness. The environmental effects of NO_x can include:[96]

- Acidification of freshwater bodies.
- Eutrophication of coastal waters.
- Increases in levels of toxins harmful to fish and other aquatic life.

New Jersey began routinely monitoring NO_2 in 1966. The last year in which annual average NO_2 concentration exceeded standards was 1974, and it has not exceeded the 1-hour NAAQS since their implementation in 2010. Since 1975, NO_2 concentrations in New Jersey have fallen steadily to around 40 ppb. Neither the statewide nor the individual station averages have exceeded the NAAQS of 53 ppb annual average and 100 ppb 1-hour average. In 2022, The Fort Lee Near Road, Elizabeth Lab, and Bayonne stations had the highest 1-hour concentrations, but were never in excess of the NAAQS.

Oxides of nitrogen continue to be of concern because of their role in the formation of other pollutants, particularly ozone and fine particles.

Because NO_2 generally originates in internal combustion vehicles, it may be of particular concern in parts of the Borough close to major roadways such as State Highway 24 and Main Street.

Nitrogen oxides also cause decreased visibility and react in the air to form both ozone and particulate matter.

Particulate Matter

Particulate air pollution consists of any artificial or natural particles suspended in the air.[97] These particles can affect the environment.

- **Total Suspended Particulates** (TSPs) is the total of all particulates, of whatever size.
- **Inhalable Particulate Matter** are less than 10 micrometers in diameter (PM_{10}) and can be inhaled into and accumulate in the respiratory system.
- **Fine Particulate Matter** are less than 2.5 micrometers ($PM_{2.5}$), and are believed to pose the greatest health risk, penetrating deep into a person's lungs, heart, and even bloodstream to exacerbate heart and lung diseases and cause heart attacks. PM_{10} is considered less dangerous but can irritate the eyes, nose, and throat.

In June of 2023, due to the Canadian wildfires, New Jersey was declared Code Red for AQI. Smoke caused the worst air quality in New Jersey in at least 43 years. There were nine NAAQS Exceedance Days with four being "Unhealthy for Sensitive Groups, four Unhealthy Days, and one "Very Unhealthy Day".[98] The NJDEP declared an Air Quality Action Day for Particulate Matter on June 7, 2023.[99]

Whereas in 2022, all areas of New Jersey were in attainment of the national standard of 150.0 micrograms [one-millionth of a gram] per cubic meter air ($\mu g/m^3$) for Inhalable Particulates, PM_{10}. The closest PM_{10} monitoring station to the Borough of Chatham is the Elizabeth Lab station, where the highest 24-hour

concentration recorded was 24.9 µg/m^3, well in attainment.

All of the sites in New Jersey met the annual standard of 12.0 µg/m^3 for Fine Particulates, $PM_{2.5}$. However, the Brigantine station exceeded the 35.0 µg/m^3 24-hour standard on June 20, 2022. This exceedance can be attributed to wildfire smoke from the Mullica River Fire in the Wharton State Forest. Data collection in Newark Firehouse is incomplete due to a temporary shutdown from September to December 2022.

The U.S. EPA announced on February 7, 2024 that the annual particulate matter standard is being lowered from 12 µg/m3 to 9 µg/m3.136 Each state is expected to submit a plan of action to meet the more stringent standards. Focus will be on Overburdened Communities. On average these areas are subject to higher levels of particulate matter in the air.[146]

Lead

Lead is a hazard to the health of humans and the environment, whether in the air, in paint, in water, or in soils.[100] Though action standards are still defined for lead exposure, there is consensus that no level of lead exposure can be considered safe. Lead has its main impact on the nervous system, particularly in children. Exposure to lead is linked with learning disabilities, mood issues, and lowered IQ. In adults, it can also affect the cardiovascular system and is considered a probable human carcinogen. Lead from the air or water may also accumulate in soils and sediments.

Before the 1970s, lead was a common air pollutant due to its use as an additive in gasoline. New Jersey no longer has any significant industrial sources of lead, but small airplanes continue to use leaded gasoline and are estimated to release over four tons of lead annually into New Jersey's skies as of 2017. In 2008, the NAAQS level was set at 0.15 µg/m3 for a rolling 3-month average. As of 2022, there are 21 areas nationwide that are in non-attainment. The closest location is in Berks County, Pennsylvania.

Since 2012, there has been one lead monitoring station in New Jersey, at the Newark Firehouse. The measurements taken in 2021 ranged between 0.001 and 0.003 µg/m3, well below the NAAQS level. This site is currently closed.

Nationwide, since 1980, phase-out of leaded gasoline has led to a 99% decrease in the average lead air concentration.

Air Toxics

Additional air pollutants that may cause adverse health effects but are not criteria pollutants are referred to as **Hazardous Air Pollutants (HAPs**) or air toxics.[101] Almost 200 air toxics have been identified on the list of HAPs maintained by the EPA.[102] The source of air toxics varies by pollutant, but in New Jersey, the majority of all air toxics are produced by internal combustion engines, with non-point sources accounting for most of the

rest and heavy industry accounting for only a small portion. Non-point sources include emissions from buildings, pesticide use, consumer products, and various small-scale industrial processes. In 2019, Morris County released more air toxics coming from non-point sources in comparison to other sources of air toxics emissions [103]

The EPA has developed health benchmarks for HAPs, representing the concentration generally considered safe to breathe on a daily basis. NJDEP calculates a Risk Ratio by dividing annual average concentrations of each HAP by its health benchmark. Risk ratios greater than one indicate that a given pollutant may be of concern.

NJDEP Air Monitoring Stations closest to the Borough of Chatham are at Chester and the Elizabeth stations. Chester's station is considered a baseline. Given that most air toxics come from internal combustion (such as car engines and lawnmowers), the Borough of Chatham may fall between the concentrations observed at Chester and Elizabeth. Chester and Elizabeth exceeded health benchmarks for nine different air toxics **(Table 16**).

The NJDEP also monitors certain toxic metals and elements, most of which fall well below their health benchmark at all stations. However, the Elizabeth station recorded cadmium levels above the health benchmark, and both Elizabeth and Chester recorded chromium levels above the health benchmark.

The two chemicals with the highest risk ratios reported at the Elizabeth site are acrolein and formaldehyde. Acrolein is a colorless or yellowish liquid that is used to make tear gas, drugs, and plastics.[104] It is irritating to the eyes, skin, and lungs if inhaled. It is to be handled with extreme caution. Formaldehyde is a colorless gas with a strong odor that is sold commercially in a methanol and water solution.[105] It is used in making resins, textiles, and as an intermediate in the synthesis of other chemicals. It is also used as a disinfectant, fertilizer, fungicide, and embalming solution. It is a known carcinogen. Both chemicals are listed on the NJ Department of Health's Hazardous Substance List.

In New Jersey, the majority of all air toxics are produced by internal combustion engines, with non-point sources accounting for the most. Non-point pollution is pollution caused by everyday activities such as changing motor oil or gasoline where contaminants are deposited into the land and are washed off into nearby waterways.[147]

Radon

Radon is an invisible and odorless radioactive gas resulting from the breakdown of naturally-occurring uranium in soil and rock.[106] As opposed to all other air pollutants, radon is primarily a concern for indoor air quality it builds up in the home as it seeps out of bedrock and through any crack or opening in a home's foundation. Radon releases radioactive energy, causing lung damage and lung cancer.

NJDEP estimates of radon risk based on real occurrences of radon

Table 16. 2022 Air Toxics Above Their Health Benchmark			
Pollutant	Health Benchmark (µg/m³)	Annual Mean Risk Ratios	
		Chester	Elizabeth
Acetaldehyde	0.45	2.1	3.1
Acrolein	0.02	41.8	43.4
Benzene	0.13	2.3	5.4
1,3-Butadiene	0.033	0.4	1.7
Carbon Tetrachloride	0.17	2.8	2.6
Chloroform	0.043	2.2	3.1
Chloromethane	0.56	1.8	2.5
1,2-Dichloroethane	0.0017	1.5	1.5
Formaldehyde	0.077	24.3	30.5
Source: 2022 New Jersey Air Quality Report[148]			

contamination. Based on this standard, the NJDEP has included the Borough of Chatham in the moderate risk category.[107] This means that within the municipality, at least 25 homes were tested, with 5-24% of these homes having radon readings greater than or equal to 4.0 pCi/L (picocuries per liter).

EPA recommends action in homes with a radon level of 4 pCi/L or more, but also notes that there are no safe levels of radon, and action may be appropriate above 2 pCi/L. As residents better insulate and seal their homes to reduce energy usage, they may cause elevated levels of radon to accumulate. Although testing for radon is only required at the time a home is sold, improving the structure's insulation or doing foundation work, may change the radon level in a home.[108]

In the United States, radon is the second main cause of lung cancer and kills at least 15,000 people per year.

Noise and Odors

Noise

The Noise Control Act of 1971 authorizes NJDEP to regulate noise from stationary industrial commercial properties and railroads in New Jersey.[109]

Other sources of excess noise are regulated as a public health nuisance enforced by a local public health agency, or as a disorderly persons offence enforced by police. Noises are defined as a public health nuisance when they are unreasonably or unnecessarily loud.[110] State regulations are applicable to noises above 50 decibels from the hours of 10:00 pm to 7:00 am and 65 decibels during the day, though individual municipalities are permitted to adopt more stringent ordinances.

Through their Environmental Health Division, Morris County regulates noise pollution through noise complaints from commercial, industrial, and public or community facilities. Persistent noise complaints are investigated by the Morris County Department of Health and violators are issued citations under NJAC 7:29-1.2(c).[111] This citation states that noise exceeding 65 decibels between 7:00 am and 10:00 pm or 50 decibels after 10:00 pm are considered violations.

The Borough of Chatham's code, Chapter 184: Noise, adopted in 2005, regulates sound originating from sources within the Borough. It corresponds with state and county regulations with no noises above 50 decibels from 10:00 pm to 7:00 am and 65 decibels during the day.[112] Chapter 208 of the code permits the use of construction and power equipment only during the following hours: weekdays 8:00 am to 7:00 pm; weekends and holidays: 9:00 am to 7:00 pm.[113]

Odors

The NJDEP classifies odor as air pollution when it is severe enough to unreasonably interfere with the enjoyment of life or property.[114] In many cases, odor pollution is an indicator of chemicals described above, which are regulated separately by the NJDEP. However, there is also a procedure for odor issues, based on complaints and inspection by an NJDEP official. Fines range from $150 to $1,400 for a first offense. The US Center for Disease Control notes that the best strategy for addressing odor issues is prevention zoning, time of day operating restrictions, filtering, and emission control. [115]

Through their Environmental Health Division, Morris County regulates air pollution through complaints related to smoke, dust, and odors. Persistent odor complaints are investigated by the Morris County Department of Health and violators are issued citations under NJAC 7:27.[116]

The Borough of Chatham's code, Chapter 287 section 6 prohibits public health nuisances including odors. Obnoxious trades, which may be attended with unhealthful odors and be potentially detrimental to health, are prohibited.[117]

Meteorology and Pollution

Pollution levels are affected by meteorological attributes like wind speed and direction, temperature, and solar radiation.[118]

Meteorology is an important factor in the levels of ozone in particular, as it is largely a secondary pollutant created from the chemical reaction of other pollutants in the presence of heat and sunshine.

Other pollutants, such as particulate matter and sulfur dioxide, can reach elevated levels across the state due to downwind sources such as coal-fired power plants in midwestern states and wildfires in the West and Canada. Nitrogen dioxide, on the other hand, is a localized problem occurring where there is heavy traffic and other use of internal combustion.

Climate patterns and statistics in the area around the Borough which affect pollution levels. Of particular note is the effect of dominant westerly winds, which carry weather patterns and pollution from west of the state over and across New Jersey. These westerly winds migrate substantially from north to south, bringing different levels of pollution from different areas outside the state from day to day and causing substantial variation within the state.

Photo: Flooding (Credit: Tom Salvas)

Chapter 10.

Climate Change

Climate Change

Climate Change refers to the effects humans have on earth's climate as a result of activities which emit greenhouse gases. Greenhouse gases (GHGs) are defined by the NJDEP as atmospheric gases that slow the rate at which heat radiates into space. In a stable climate, sunshine heats the earth and that heat is then radiated back into space. Because GHGs do not block the sunshine, but prevent its heat from going back into space, they have a warming effect on the atmosphere much like the glass roof of a greenhouse. Most GHGs occur naturally in earth's atmosphere, but human activity can cause an increase in the concentration of GHGs in the atmosphere, thereby holding more of the sun's heat in and warming the planet. This has a complex effect on the earth's climate, which can already be observed.

According to the NJDEP's **2020 Scientific Report on Climate Change**, the state's annual average temperature has increased by 3.5°F since 1895.[149] According to Rutgers University's New Jersey Climate Change Resource Center, average annual precipitation has also increased by more than three inches since 1900, with greater volatility from year to year.[150] As noted by the same research center in its **2021 New Jersey State of the Climate Report**, this increased and more intense precipitation along with sea level rise have increased the frequency and length of coastal floods.[151] The recent storms, increasing temperatures, and particular effect on nighttime temperatures reflect how climate change has affected the Borough of Chatham.

Climate Change can affect the health of humans. According to the United States Center for Disease Control's (CDC) **Climate Effects on Health Resources**, the predicted effects of climate warming on human health include heat stress and increased air pollution in summer, along with higher spread of disease due to increased temperatures in winter.[152] These effects will vary based on location; for example, residents of more urbanized areas are at more risk for heat stress. As noted in the CDC's **2020 Preparing for the Regional Health Impacts of Climate Change in the United States report**, climate-related disruptions to the water cycle will likely result in more intense rain events and more frequent periods of drought, causing disruptions to the food supply.[153]

New Jersey is already experiencing the effects of climate change.

Summers are growing longer and hotter, while winters are getting shorter and warmer.

The CDC also notes that the Northeastern United States, with a high concentration of polluted sites along historically industrial waterways, is particularly vulnerable to chemical contamination when there is flooding. With a concentration of industrial activity and other sources of pollution in the Northeast, including non-point sources, hot days can result in dangerous air quality due to the formation of Ozone and the accumulation of pollutants.

Of the 11 hottest summers in New Jersey since 1895, all 11 have occurred since 1999. Nine have occurred since 2005.[178]

Climate change will also have an impact on ecosystem health in the region. According to NJDEP's **2020 Environmental Trends - Climate Change report**, predicted ecosystem repercussions of increased temperatures include loss of critical habitat; further stress on already threatened and endangered species; impacts on the water supply, agriculture, and fisheries; and an increase in fires, pests, disease pathogens, and invasive weed species.[154]

The USDA's Forest Service has modeled the impact that climate change will have on forests and trees of the Mid-Atlantic region, which spans 60 million acres across New Jersey, Pennsylvania, Delaware, and most of New York and Maryland.[155] The Forest Service predicts increased temperatures and precipitation, along with drought risk. Other predicted impacts include an increased risk of wildfire, changing conditions for tree regeneration and recruitment, increased suitability for southern species, decreased suitability for northern species, and increased damage from invasive plants, pests, and pathogens.

Wildfires

Wildfires are worsening across the United States. Heat-trapping pollution is warming and affecting weather conditions and increasing

the risks of wildfires. The NJDEP listed all of North Jersey as "very high" risk for wildfires. The report **Wildfire Weather: Analyzing the 50-year shift across America**, focused on three weather conditions key to fire weather such as relative humidity, temperature, and wind.[156] The report highlights the increasing risk of fire weather days.

In the summer of 2023, the State of New Jersey faced the effects of wildfires from Canada, which resulted in the air quality being the worst in 43 years.[157] There were 14 major wildfires in New Jersey, making 2023 the busiest fire season in more than a decade.[158]

Carbon Storage

Forests remove, or sequester, substantial amounts of carbon from the atmosphere. Known as carbon sinks, they store carbon long-term. Even without management for carbon, forests in the United States are currently estimated to offset about 15% of annual U.S. carbon emissions. This is in addition to any local climate benefits they may provide, as discussed in Chapter 9. The impact of forest carbon sequestration is dependent on the fate of a forest.

The Nature Conservancy has estimated the amount of carbon currently stored in forests as of 2010 and projected sequestration between 2010 and 2050 under a no-disturbance scenario.[159] Actual carbon sequestered may be higher or lower depending on management practices or the success of forest preservation.

The Borough of Chatham's forests are estimated to hold 23,681 metric tons (mt) of carbon as of 2010, and are projected to sequester an additional 2,767 mt of carbon between 2010 and 2050, depending on management practices or the success of forest preservation.

Urban Heat Island Effect

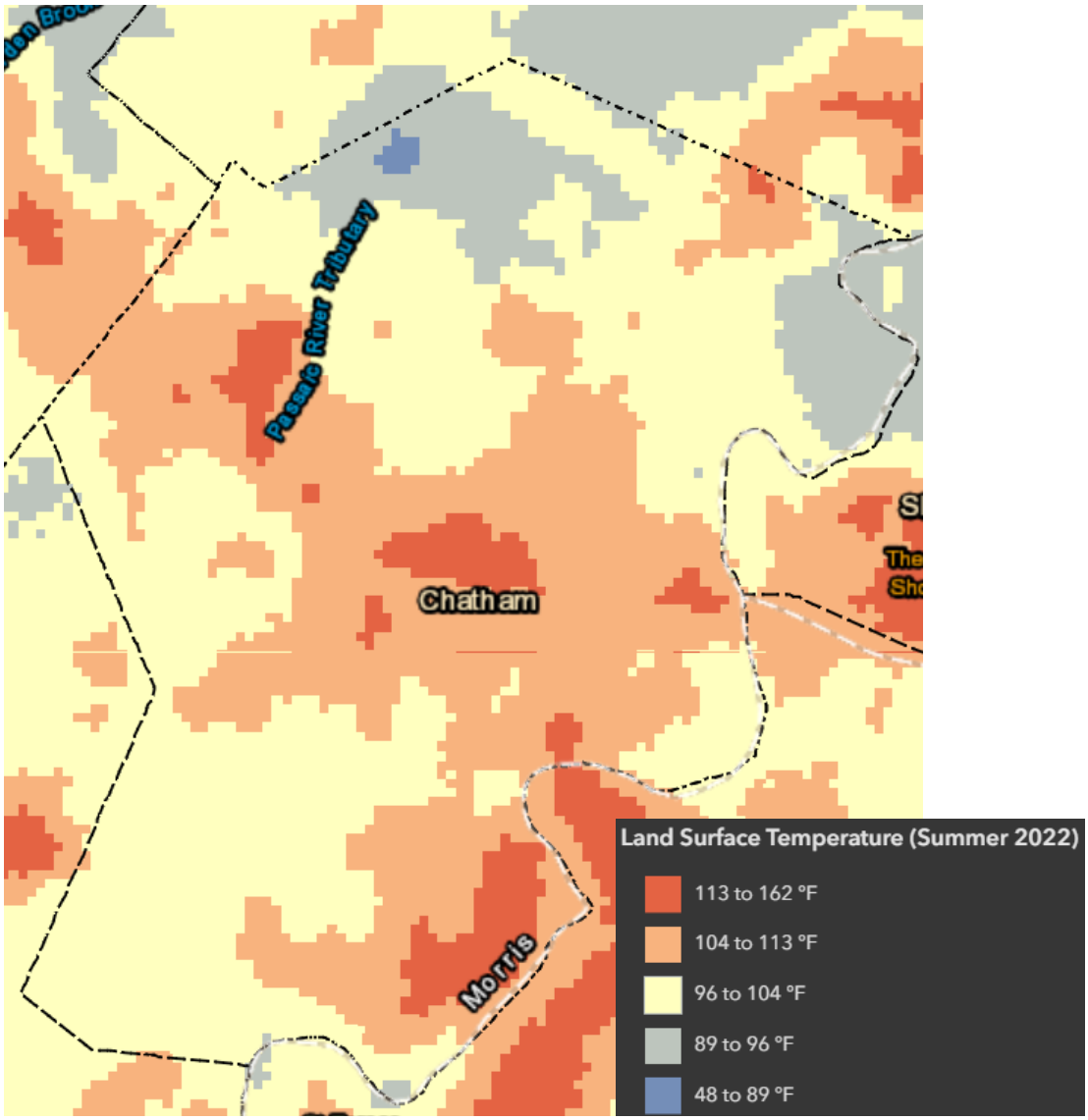
A heat island is a localized area which experiences higher temperatures than surrounding areas due to development.[160] Often referred to as the urban heat island affect, this phenomenon also affects both urban and suburban areas. Heat islands are caused by modification to the natural environment, such as buildings, roads, and other infrastructure. These features generally absorb more heat from the sun than natural ground cover would, in part due to their darker color.

In addition, areas without trees do not benefit from the cooling effect of plants through a process known as evapotranspiration. Buildings and other structures may also block wind which would otherwise circulate cooler air. Waste heat from cars, air-conditioners, buildings, and industry is also concentrated in developed areas. The effect can be reduced through strategies such as:

- Lighter-color roofs
- Reduced paved surface
- Increased tree cover.

NJDEP has released data on the heat island effect throughout New Jersey **(Figure 20)**. The darkest orange shades indicate a strong effect, while the light yellow indicates a less strong effect. The largest urban heat island cluster in the urban centers with one in the middle of town surrounding Main Street and one in the northwest around Chatham Middle School. Another is located

Figure 20. Urban Heat Island Effect Map *(Source: NJDEP)*[179]



in the southwest of the Borough surrounding River Road. These areas are defined by dense commercial and corporate structures, with residential development. Dark roofs on commercial buildings register with an especially strong effect. Much of the residential development in the Borough is orange indicating a medium effect.

Plant Hardiness Zones

Plant hardiness zones provide a general indication of the extent of overwintering stress experienced by plants and are based on the average annual extreme minimum temperatures.[161] Hardiness zones are used by horticulturists to evaluate the cold hardiness of plants. The USDA breaks the geography into zones by 10°F (5.56 °C) increments of annual extreme minimum temperature. North America is divided into 11 separate planting zones; each growing zone is 10°F warmer (or colder) in an average winter than the adjacent zone.

Currently, the Borough of Chatham is in the Plant Hardiness Zones of 7a

which is 0 to 5°F. In 2012, Chatham was classified as Zone 6b, which is -5°F to 0.

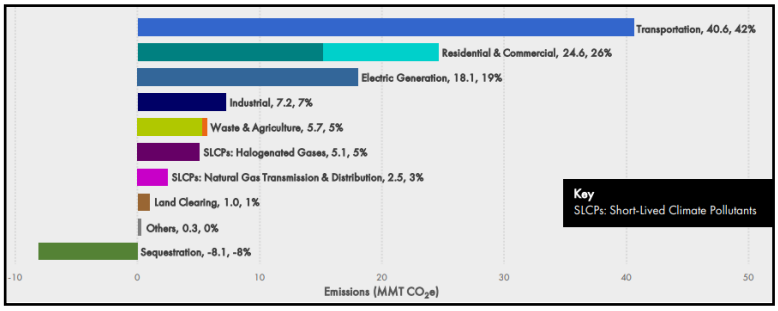
Climate Mitigation: Reducing Greenhouse Gas Emissions

The primary driver of climate change is the ongoing emission of GHGs into earth's atmosphere, primarily due to the extraction and combustion of fossil fuels. Reducing the continued emission of GHGs is the first and most direct step to mitigating climate change.[162]

Acknowledging the need to reduce GHG emissions to avoid the most damaging effects of climate change, the NJ Legislature enacted the Global Warming Response Act (GWRA) in 2007 and updated it in 2019. This law requires a reduction of GHG emissions by 80% below 2006 levels by 2050. An intermediate reduction requirement of 20% by 2020 was achieved. The 2019 updates to the GWRA require that the NJDEP collaborate with other state agencies and to share recommendations for reducing emissions, and the NJDEP's **2020 Global Warming Response Act 80 x 50 Report (80 x 50 Report)** describes progress to date and strategies for reaching the required emissions reductions (**Figure 21**).[163]

The 2050 goal is calculated as 24.1 million metric tons of CO_2 equivalent (MMT CO_2e) per year, and 2018 emissions were estimated as 97.0 MMT CO_2e in the **80 x 50 Report**. A breakdown of emissions sources is not available on the municipal level. However, carbon emissions per capita are generally highest in areas with car-dependent infrastructure and large homes.

Figure 21. 80X50 Report-NJ GHG Emissions Inventory for 2018 *(MMT CO2e and Percentage)*[180]



The **80 x 50 Report** attributes the state's success in meeting the 2020 emission reduction requirement to market and other forces which caused a transition from coal-fired power plants to power plants powered by natural gas, and notes that the remaining emission reduction will require a "seismic shift." The report recommends achieving the 2050 goal through transitioning the electric grid to:

- 100% renewable energy
- Electrifying 100% of light-duty vehicles
- Electrifying 90% of building and water heating.

There are other complementary strategies, such as increasing ridership on mass transit.

Legislation, agency reports, and executive orders relating to climate change continue to be produced. The **Energy Master Plan: Pathway to 2050** was released in 2019, outlining strategies to transition New Jersey's electrical grid to 100% renewable by 2050.[164] In 2020, Governor Murphy signed Executive Order 100: **Protecting Against Climate Threats (PACT)**, which authorizes the NJDEP to make regulatory reforms to pursue the state's climate goal.[165]

By Resolution 22-110, Chatham Borough Council recognized the urgent need to address climate change through the reduction of greenhouse gas emissions into the atmosphere; and supported state efforts to reduce greenhouse gases by 2050 to 20% or less than the amount released in 2006. The Environmental Commission and the Green Team are tasked with providing recommendations to mitigate the impact of climate change to the Mayor and Council.[166]

The NJDEP has released the 2020 New Jersey Scientific Report on Climate Change, 2021 Statewide Climate Change Resilience Strategy and 2022 Human Health Addendum. The Resilience Action Plans was based on the **2021 Strategy Policy** framework and research of the 2020 and 2022 reports. New Jersey's **Resilience Action Plan** covers specific climate threats to the state. The first plan to be released will be on extreme heat (in the Spring of 2024). A prelude to the plan release can be found here.

Additionally, Heat Hub NJ, a one-stop digital resource for all things related to extreme heat, provides information on effects of extreme heat on individuals, communities, and the environment, along with real-time weather alerts, surveys, and quizzes. Furthermore, through participation in the Cooling Center Survey, individuals can contribute to the assessment and improvement of the facilities.

Resilience: Living in a Changed Climate

There are currently no proven strategies to remove the excess GHGs which have built up in the atmosphere over the course of the industrial age, or to counter their effects on earth's climate. Unless experimental methods become feasible at a very large scale, earth's climate will continue to change even if all greenhouse gas emissions cease immediately. Along with action to reduce the scale of climate change, New Jersey is taking action to adapt to a changing climate.

Many of the actions already discussed also have climate resilience components. For example, PACT authorizes the NJDEP to not only pursue the state's climate goal, but also to incorporate climate predictions into the agency's permitting process for construction and new development.

There is an ongoing effort to plan for climate resilience at the statewide level. In 2019, Governor Murphy signed Executive Order 89, creating the Interagency Council on Climate Resilience (ICCR).[167] The ICCR spans seventeen agencies working together to maintain New Jersey's economic, environmental, and natural resources. Executive Order 89 also created the New Jersey Climate and Flood Resilience Program (CFRP), responsible for releasing the state's first **Climate Resilience Strategy report** in 2021.[168]

One component of the ICCR's work is the production of subject-specific **Resilience Action Plans**. The plan

for extreme heat is scheduled for release in the fall of 2023, and more information about the process and public engagement opportunities is available here.

The Resilience Action Plan and all other resilience work in the state is guided by the six main goals identified in the Climate Resilience Strategy, available here:

- Build resilient and healthy communities
- Strengthen the resilience of New Jersey's ecosystems
- Promote coordinated governance
- Invest in information and increase public understanding
- Promote climate informed investments and innovative financing
- Coastal resilience

Clean Energy Initiatives

Renters, homeowners, and businesses in New Jersey can take advantage of various state rebate programs onenergy-saving measures through their local utility.[169] PSE&G offers resources for energy-saving practices, as well as a dedicated online marketplace for energy-saving items ranging from efficient water fixtures to smart home items.[170] Rebates are automatically included in purchases from PSE&G's online store at this website. There are also an increasing number of public electric vehicle charging stations in and around the Borough of Chatham.

In 2023, the Borough Council adopted an initiative aimed at helping residents save money and improve energy efficiency in their homes by identifying, with the assistance of a local contractor, opportunities through the energy efficiency incentive programs of PSE&G and JCP&L.

With respect to solar power, the increased use of solar power has the potential to improve environmental quality by reducing carbon emissions and air pollution, and to also reduce demand on our existing electric grid. The use of solar power is growing in New Jersey, and currently represents approximately 7% of the state's energy use.

In 2023, the Boroughs of Chatham and Madison each adopted resolutions approving a contract award by the Madison-Chatham Joint Meeting for a third party to develop, install, own, and operate a 983 kW dc solar array on the Joint Meeting premises.

Later in 2023, the River Road Redevelopment Agreement was amended to allow the Redeveloper to make a Community Solar Payment to the Borough of $125,000. As of the date of this ERI, Borough officials are evaluating the feasibility of using the Community Solar Payment to add photovoltaics at one or more of the Borough's buildings with the aim of saving future municipal energy costs.[171]

Sustainable Jersey

Sustainable Jersey is a nonprofit organization that certifies actions taken by municipalities in New Jersey to reduce waste, cut greenhouse gas emissions,andimproveenvironmental equity. The organization provides the tools, training, and incentives needed for municipalities to achieve sustainability actions. The certification program allows participating municipalities to score points based

on their sustainability achievements and gain Bronze, Silver, or Gold status. Of the 564 Municipalities in New Jersey, 466 are registered with Sustainable Jersey.[172]

Chatham Borough is a Sustainable Jersey Certified community since 2010 (Bronze), and continues at the Silver Certification Level through 2012, 2015- 2018, 2018-2021, 2021-2024. Also, recipients in 2012, 2015, and 2018 of the Champion Award (Medium Municipality), and Collaboration Awards with Chatham Township 2009 and in 2018 adding Madison, expanding a regional approach to certification and sustainability. In the 2024-2027 certification cycle, retention of Silver Certification is anticipated. The Borough is also working towards a Gold Star in Health.[173]

Energy Use and Transportation[174]

New Jersey's 2019 **Energy Master Plan**[175], its most recent Plan, outlines strategies to reach the aspirational goal of 100% clean energy by 2050.

The Plan defines 100% clean energy as 100% carbon-neutral electricity generation and maximum electrification of the transportation and building sectors, which are significant carbon emission producing sectors in the State. The 2019 **Energy Master Plan** outlines the following seven strategies:

Strategy 1: Reducing energy consumption and emissions from the Transportation Sector, including encouraging electric vehicle adoption, electrifying transportation systems, and leveraging technology to reduce emissions and vehicle miles traveled (VMT).

Strategy 2: Accelerating deployment of renewable energy by developing offshore wind, community solar, a solar incentive program, and other initiatives.

Strategy 3: Maximizing energy efficiency and conservation, reducing demand, improving energy efficiency programs, adopting new clean energy and energy efficiency financing mechanisms, and strengthening building codes and appliance standards.

Strategy 4: Reducing energy consumption and emissions from the Building Sector through decarbonization and electrification of new and existing buildings, the expansion of statewide net zero carbon homes incentive programs, the development of EV-ready building codes, and the establishment of a long-term building decarbonization roadmap.

Strategy 5: Decarbonizing and modernizing New Jersey's Energy System through planning and establishment of Integrated Distribution Plans, investing in grid technology to enable increased communication, better rate design, and reducing reliance on natural gas.

Strategy 6: Supporting community energy planning in underserved communities through incentivizing local clean power generation and prioritizing clean transportation options.

Strategy 7: Investing in developing clean energy knowledge, services, and products that can be exported to other regions around the country and around the world, thereby driving investments and growing jobs, and creating clean energy industry

clusters and bringing energy research and development to the state.

To support the strategies identified in the 2019 Energy Master Plan, the State Department of Environmental Protection (DEP) has been directed to adopt regulatory reforms to reduce emissions and adapt to climate change, as follows:

- Establishing a greenhouse gas monitoring and reporting program to identify all significant sources of greenhouse gas emissions, including carbon dioxide and short-lived climate pollutants, and monitor the progress of emission reductions to reach the target of 80% below 2006 emission levels by 2050;

- Adopting new regulations under the Air Pollution Control Act establishing criteria to reduce carbon dioxide emissions and short-lived climate pollutants; and,

- Reforming environmental land use regulations to incorporate climate change considerations into permitting decisions, which will allow better planning and building resilient communities by avoiding flood-prone areas, reestablishing chronically inundated wetlands, revegetating riparian areas, and encouraging green building and green infrastructure.

New Jersey's location, on the coast and in an ozone transport region, is vulnerable to the impacts of climate change, from rising seas that threaten our coastline to high concentrations of ground level ozone that impairs respiratory and cardiovascular function, especially for people with asthma. The regulations in place, and those referenced above, are intended to ensure that DEP-permitted projects throughout New Jersey prioritize reducing greenhouse gas and other climate pollutant emissions and lessening climate impacts.

Where Does NJ Currently Get Its Energy?

Natural gas and nuclear energy together have fueled more than 90% of the New Jersey's total electricity generation in every year since 2011.

In 2022, natural gas accounted for about 49% of New Jersey's total electricity generation and nuclear power provided almost 42%.

In 2022, New Jersey was the nation's 10th-largest producer of electricity from solar energy and ranked fifth in small-scale solar power generation. Overall, solar energy accounted for nearly 7% of New Jersey's total in-state electricity generation in 2022.

Currently, about 73% of New Jersey households rely on natural gas as their primary heating fuel, 16% use electricity for space heating, and about 9% use petroleum products. The rest use other fuels, including wood and solar energy.

New Jersey is the 13th-largest petroleum-consuming state but is the 10th-smallest in per capita petroleum use.

Available Data On Chatham's Energy Use

For Chatham's Energy Use see **Table 17** . The Borough is engaged in a many activities and initiatives intended to educate the public on the positive environmental benefits from energy conservation, to track and periodically audit municipal energy usage, to

Table 17. Energy Use				
	Electricity		Natural Gas	
Year	Residential (kWh)	Commercial/ Industrial (kWh)	Residential (therms)	Commercial/ Industrial (therms)
2018	29,966,032	24,324,336	3,707,067	1,537,628
2019	29,148,560	23,386,624	3,477,288	1,445,846
2020	30,055,784	20,112,724	3,240,315	1,225,329
2021	31,045,990	18,802,296	3,412,470	1,246,395
Note: 1 therm is 29.3 kWh.				
Source: NJDEP, New Jersey Municipal Energy Use[181]				

reduce energy consumption, and to increase energy efficiency. These activities and initiatives are intended to produce the results sought in the NJ 2019 Energy Master Plan.

Transportation

In New Jersey, the transportation sector accounts for 37% of the state's net greenhouse gas emissions, making it the largest emissions source in the state. Mobile sources, mainly cars and trucks burning gasoline and emitting CO2 as they move people and goods around the state, are also the largest cause of ozone precursors in New Jersey, responsible for 71% of the state's nitrogen oxides (NOx) emissions, as well as particulate matter. Ground level ozone, also called smog, can cause permanent lung damage.

On an individual residential level, one of the potential avenues for mitigating climate change through the reduction of carbon emissions is to reduce the amount that people need to drive, a strategy that—unlike simply electrifying the vehicle fleet—would also pay other dividends. Less driving would result in less traffic congestion, fewer tax dollars spent on building and maintaining roads, and fewer hours logged behind the wheel for New Jersey's drivers.

To reduce vehicle miles traveled (VMT), we need to acknowledge the factors that cause people to drive in the first place, and one significant factor is relationship between land development and transportation. Decisions about where to locate homes, offices, stores, schools, and other public spaces in relation to each other have effects on travel behavior. The farther apart we build different types of destinations, the more vehicular travel will be required to access them. Conversely, when destinations are closer together, car trips get shorter, and some trips can be taken without needing a car at all, whether by non-motorized means or by public transportation, which functions much more efficiently when major destinations are clustered within walking distance of stations.[176, 177]

Photo: Wildfire Smoke (Credit: Dennis Symons)

Chapter 11.

Known Contaminated Sites

Soil and groundwater contamination are tracked by the state and federal governments at varying degrees of contamination.[182] This includes the following type of sites and locations:

- **Brownfields**: extensive or long-term remediation, point source facilities that require continuous monitoring,
- **Community Right to Know Programs**: point source sites that require ongoing, continuous monitoring; and
- **Known Contaminated Sites**: Point source occurrences are specific and limited.[183]

Sites that have been confirmed as contaminated and are undergoing remedial investigation, cleanup, or awaiting assignment of a Licensed Site Remediation Specialist (LSRP) include private residences, active/abandoned manufacturing commercial properties, and gas stations.[184] The list does not include sites that have been successfully remediated.

There are 14 active known contaminated sites in the Borough of Chatham, all of which are non-homeowner sites.

Brownfields

A brownfield is any former or current commercial or industrial site, currently vacant or underutilized and

on which there has been, or there is suspected to have been, a discharge of a contaminant. The State of New Jersey encourages municipalities and counties to redevelop their brownfields as part of Smart Growth initiatives.[185] According to NJDEP's NJ-GeoWeb website, no brownfield sites were identified within in the Borough of Chatham.[186]

As of 2021, the NJDEP Site Remediation Program maintains a list of 14,461 sites with 11,205 of those sites listed as active cases managed by a New Jersey Licensed Site Remediation Professional (LSRP).[193]

Community Right to Know

The Community Right to Know (CRTK) program is responsible for collecting and disseminating data on hazardous substances produced, stored, or used at companies in New Jersey.[187] Companies or organizations storing certain hazardous substances in levels above specific threshold amounts are required by state and federal law to file annual reports.

The Release and Pollution Prevention Report (RPPR) is used to collect information for the NJDEP Community Right to Know and Pollution Prevention programs. The Emergency Planning Community Right-to-Know Act (EPCRA) is a federal regulation that establishes requirements regarding emergency planning and CRTK reporting on hazardous toxic chemicals to increase public knowledge and information about chemical uses.

There were six active sites in the Borough of Chatham for the year 2023 that met the threshold for the State CRTK with one being EPCRA only **(Table 18).**

Known Contaminated Sites

The Known Contaminated Sites (KCS) List for New Jersey includes those sites and properties within the state where contamination of soil or groundwater has been confirmed at levels equal to or greater than applicable standards. KCS may include:

Active Sites are those with confirmed contamination that have one or

Table 18. Community Right to Know Sites

PI Number	Physical Address	Status
00000022728	111 Main Street	CRTK/RPPR
00000046815	29 River Road	EPCRA ONLY
00000076674	183 Main Street	CRTK/RPPR
00000079337	383 Main Street Suite 202	CRTK/RPPR
48829400000	360 Main Street	CRTK/RPPR
74432500000	116 Summit Avenue	CRTK/RPPR

Source: NJDEP Data Miner[192]

more active cases and any number of pending and/or closed cases;

Pending Sites are those with one or more pending cases, no active cases, and any number of closed cases; and

Closed Sites are those with only closed cases and no active or pending cases.

The KCS list was produced in response to the Brownfield and Contaminated Site Remediation Act (N.J.S.A. 58:10-23.16-17) which required the preparation of a list of sites affected by hazardous substances. It also satisfied obligations under the New Jersey New Residential Construction Off-Site Conditions Disclosure Act (N.J.S.A. 46:3C1 et seq.). Sites included can undergo a wide variety of remedial activities, ranging from relatively simple cut and scrape cleanups to highly complex cleanups. The sites with complex contamination issues can have several sources of contamination, which can affect both soil and groundwater at the same time.

The Site Remediation Reform Act, N.J.S.A. 58:10C-1 et seq. (SRRA), enacted in 2009, has helped to speed up the remediation process. Active sites are rated with B, C1, C2, C3, or D depending on the type of severity of the contamination:

B: Remedial level associated with emergency response, simple removal activities of contaminants usually no impact to soil or groundwater.

C1: Remedial levels are associated with simple sites one or two contaminates localized to soil and the immediate spill or discharge area.

C2: Remedial levels are associated with more complicated contaminant discharges such as multiple site spills and discharges, or more than one contaminant, with both soil and groundwater impacted or threatened.

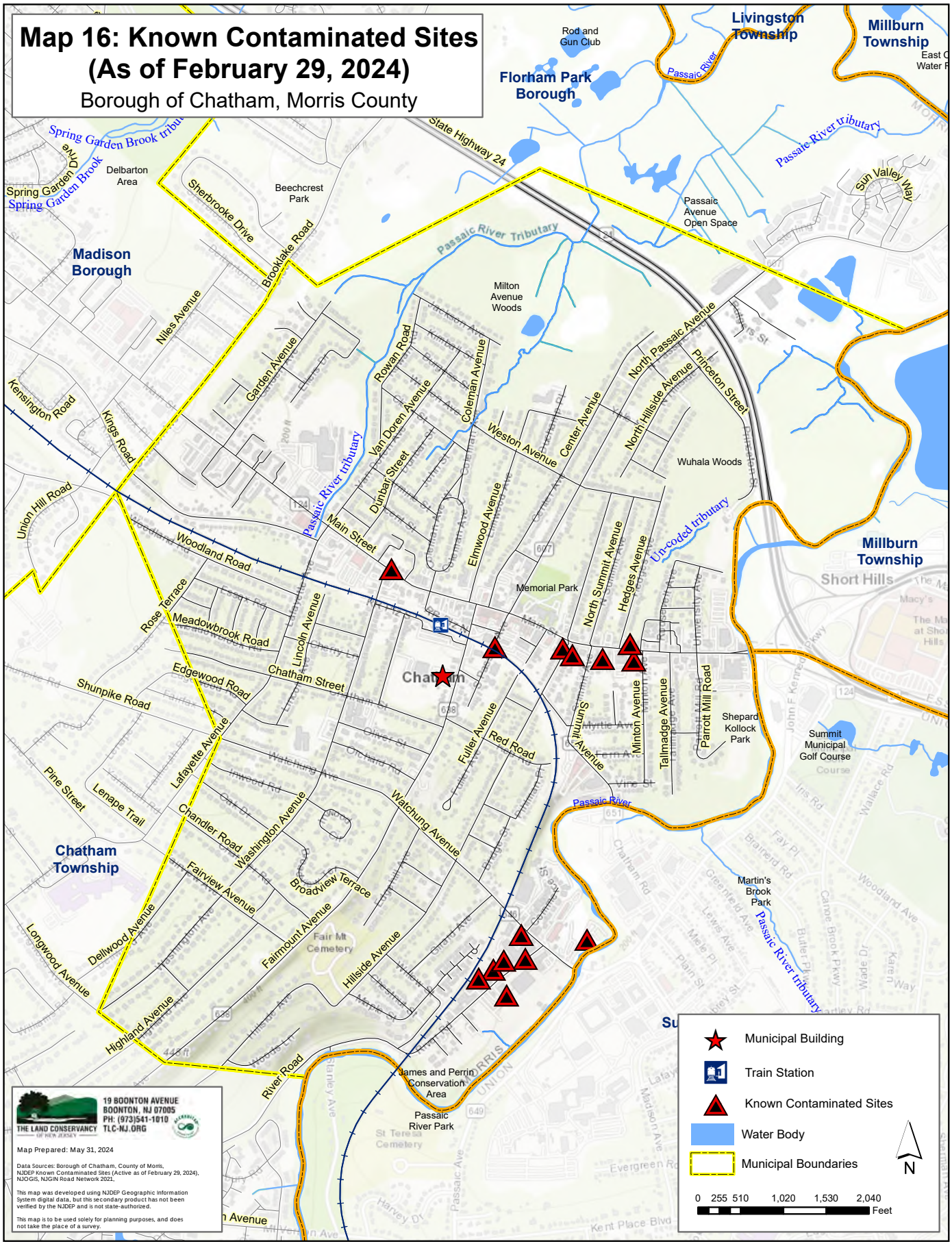
C3: Remedial levels are associated with highly complex and threatening sites. These sites can have multiple contaminants, some at high concentrations with unknown sources continuing to impact soils, groundwater and possibly surface waters and potable water resources. These sites are dangerous for direct contact with contaminated soils.

D: Same conditions as C3, except that D levels are also usually designated Federal Superfund Sites.

Sites with documented groundwater contamination may also contain a Classification Exception Area (CEA), defined by NJDEP as "an area within which one or more constituent standards and designated uses are suspended."[188] A CEA is an institutional control prohibiting the use of groundwater for a defined period of time. **Table 19** identifies the KCS within the Borough, noting the status (active, pending, or closed) and whether the site is a homeowner property. **Table 20** and **Map 16** identifies and locates the 14 active sites with confirmed contamination located within the Borough, noting the CEA status and remedial level.

Table 19. Known Contaminated Sites				
Category	**Status**			**Total**
	Active	**Pending**	**Closed**	
Homeowner	0	-	109	109
Non-Homeowner	14	-	91	105
Total	14	-	200	214
Source: NJDEP Data Miner[194]				

Table 20. Active Sites with Confirmed Contamination (Non-Homeowners)				
Site ID	**PI Number**	**Address**	**CEA Status**	**Remedial Level**
3953	008600	185 Main Street	Ongoing	C2
3967	004747	111 Main Street & Minton	Ongoing	C2
3968	006230	118 Main Street	Ongoing	C2
3969	025600	360 Main Street	Ongoing	N/A
13620	007108	12 River Road	N/A	C2
18057	020296	169 Main Street	Ongoing	N/A
21728	477086	29 33 S Passaic Avenue	N/A	N/A
22529	014673	27 Wachung Avenue	N/A	C1
26864	G000001643	16 River Road	N/A	C2
38813	009532	29 River Road	Lifted	C2
42252	002342	143 Main Street	N/A	N/A
43400	005585	22 River Road	N/A	C2
47208	012580	4 Wachung Avenue	Ongoing	N/A
184583	711329	34A River Road	Ongoing	C2
Source: NJGIN Open Data. KCSL (Non-Homeowners)				


Map 16: Known Contaminated Sites
(As of February 29, 2024)
Borough of Chatham, Morris County
Florham Park Borough
Livingston Township
Millburn Township
Madison Borough
Chatham Township
Millburn Township
Short Hills
Rod and Gun Club
Passaic River
Passaic River tributary
State Highway 24
Spring Garden Brook tribu
Spring Garden Brook
Delbarton Area
Beechcrest Park
Sherbrooke Drive
Brooklake Road
Passaic Avenue Open Space
Sun Valley Way
Passaic River Tributary
Milton Avenue Woods
Niles Avenue
Kensington Road
Kings Road
Union Hill Road
Garden Avenue
Rowan Road
Coleman Avenue
Van Doren Avenue
Dunbar Street
Passaic River tributary
Main Street
Weston Avenue
Center Avenue
North Passaic Avenue
North Hillside Avenue
Princeton Street
Wuhala Woods
Elmwood Avenue
Un-coded tributary
Woodland Road
Memorial Park
North Summit Avenue
Hedges Avenue
Rose Terrace
Meadowbrook Road
Lincoln Avenue
Edgewood Road
Chatham Street
Shunpike Road
Fuller Avenue
Red Road
Summit Avenue
Minton Avenue
Tallmadge Avenue
Parrott Mill Road
Shepard Kollock Park
Summit Municipal Golf Course
Pine Street
Lenape Trail
Lafayette Avenue
Chandler Road
Washington Avenue
Watchung Avenue
Passaic River
Fairview Avenue
Broadview Terrace
Martin's Brook Park
Passaic River tributary
Dellwood Avenue
Longwood Avenue
Fairmount Avenue
Fair Mt Cemetery
Hillside Avenue
Highland Avenue
River Road
James and Perrin Conservation Area
Passaic River Park
St Teresa Cemetery
Municipal Building
Train Station
Known Contaminated Sites
Water Body
Municipal Boundaries
N
0 255 510 1,020 1,530 2,040
Feet
19 BOONTON AVENUE
BOONTON, NJ 07005
PH: (973)541-1010
TLC-NJ.ORG
THE LAND CONSERVANCY OF NEW JERSEY
Map Prepared: May 31, 2024
Data Sources: Borough of Chatham, County of Morris, NJDEP Known Contaminated Sites (Active as of February 29, 2024), NJOGIS, NJGIN Road Network 2021.
This map was developed using NJDEP Geographic Information System digital data, but this secondary product has not been verified by the NJDEP and is not state-authorized.
This map is to be used solely for planning purposes, and does not take the place of a survey.

PFAS

Per- and polyfluoroalkyl substances, commonly referred to as **PFAS**, are synthetic chemicals that have been globally utilized in industry and consumer products since the 1940s.[189] They have found application in the production of nonstick cookware, water-repellent clothing, stain-resistant fabrics and carpets, certain cosmetics, types of firefighting foams, as well as items designed to resist grease, water, and oil.

The most extensively researched PFAS compounds include perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS). Additionally, perfluorohexane sulfonic acid (PFHxS) and perfluorononanoic acid (PFNA) have also received considerable attention. In the United States, the production and use of PFOA and PFOS have been phased out.

Throughout their production and utilization, PFAS have the capacity to migrate into the soil, water, and air. The majority of PFAS, including PFOA and PFOS, exhibit a remarkable resistance to breaking down, thus persisting in the environment. Given their widespread use and enduring presence in the environment, PFAS are detectable in the bloodstreams of both humans and animals across the globe. Additionally, they are present at trace levels in various food products and within the environment. Certain PFAS compounds can accumulate in living organisms with repeated exposure over time.

Numerous scientific studies have been conducted to examine the effects of PFAS exposure on health. While establishing direct causation between substances and health conditions in humans can be challenging, these studies have suggested potential links between environmental PFAS exposure and adverse health effects in both humans and animals.

The **Groundwater Quality Standards** (GWQS) establish classes of groundwater according to the hydrogeologic characteristics of the groundwater resource and the designated use(s) to be maintained, restored, and enhanced within each classification area. Designated uses include maintenance of special ecological resources, provision of and conversion to potable water (drinking water), agricultural and industrial water supply, and other reasonable uses.[190]

On March 14, 2023, the U.S. EPA announced the proposed **National Primary Drinking Water Regulation** (NPDWR) concerning six PFAS compounds, which include perfluorooctanoic acid (PFOA), perfluorooctane sulfonic acid (PFOS), and perfluorononanoic acid (PFNA).[191]

The NJDEP Drinking WaterWatch offers insights into PFAS contamination in both public and private water systems.[195] The most recent testing conducted for 2023 indicates compliance with the NJDEP Maximum Contaminant Levels (MCLs). This signifies that the PFAS concentrations in the public water system for the Borough of Chatham fall below the established thresholds for contamination.[196, 197]

Photo: Volunteers (Credit: Chatham Borough Facebook)

Conclusion

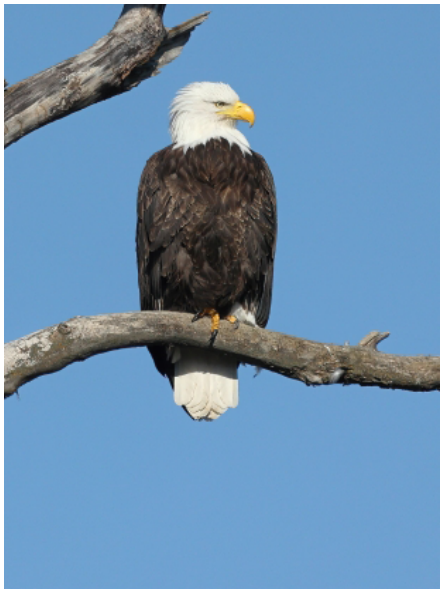
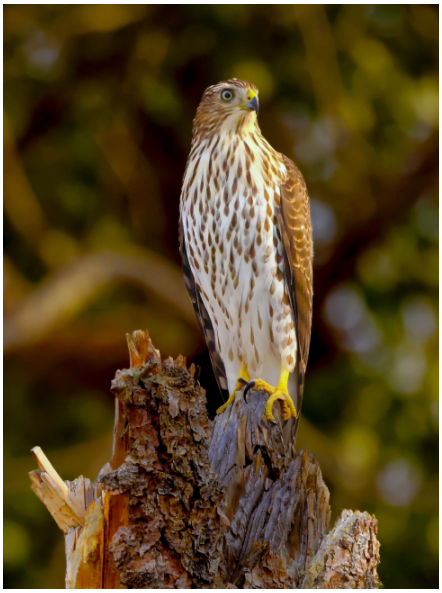
The history of the area around Chatham Borough is similar to most of New Jersey. It grew from a forested area along a river plentiful with food and drinking water, populated by the Lenni Lenape, to a colonial settlement of European farmers and tradespeople, to a suburban community with significant residential and commercial development.

Over the last two to three centuries, the Borough has grown from a rural farming, milling, and rose-growing community to a largely residential one, known for its excellent schools, well managed municipal facilities, and charming historic downtown. A train and bus service facilitate commuter options for work and travel.

In 2024, Borough residents have easy access to arts and cultural attractions, restaurants and shops, sporting venues and the shoreline. Being close to parks, forests, mountains, rivers, lakes, and the coastline ensures that outdoor activities abound in the area. The early Lenape and European settlers who migrated to Chatham Borough found the area surrounding the banks of the Passaic River to be a good place to live, and many generations later, people are still finding that to be true.

Appendix

112 Rare Wildlife Species and Plant Species from the NJDEP Natural Heritage Program

Top Left Photo: Bald Eagle (Credit: Kathy Bolam, USFWS); Top Middle: Coopers Hawk (Lane Wintermute, USFWS); Top Right: Red-shouldered Hawk (Brima Battle, USFWS); Middle Left: Wood Thrush (Fernando Burgalin); Middle Right: Great Blue Heron (Ernesto Gomez, USFWS); Bottom Left: Eastern Box Turtle (Mark McKnight); Bottom Right: Long Dash Moth (Judy Gallagher)

State of New Jersey
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE PARKS, FORESTS & HISTORIC SITES
OFFICE OF NATURAL LANDS MANAGEMENT
501 East State Street
P.O. Box 420, Mail Code 501-04
Trenton, New Jersey 08625-0420
Tel. (609) 984-1339 * Fax (609) 984-1427
https://www.nj.gov/dep/parksandforests/natural/index.html

PHILIP D. MURPHY
Governor

TAHESHA L. WAY
Lt. Governor

SHAWN M. LaTOURETTE
Commissioner

January 3, 2024
(revised April 15, 2024)

Jim Cashel
Chatham Borough
54 Fairmount Avenue
Chatham, NJ 07928

Re: Chatham Environmental Resource Inventory: 2023
(revised April 15, 2024)
Chatham Borough, Morris County

Dear Jim Cashel:

Thank you for your data request regarding rare species information for the above referenced project site.

Searches of the Natural Heritage Database and the Landscape Project (Version 3.3) are based on a representation of the boundaries of your project site in our Geographic Information System (GIS). We make every effort to accurately transfer your project bounds from the map(s) submitted with the Natural Heritage Data Request Form into our GIS. We do not typically verify that your project bounds are accurate, or check them against other sources.

We have checked the Landscape Project habitat mapping and the Biotics Database for occurrences of any rare wildlife species or wildlife habitat on the referenced site. The Natural Heritage Database was searched for occurrences of rare plant species or ecological communities that may be on the project site. Please refer to Table 1 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented on site. A detailed report is provided for each category coded as 'Yes' in Table 1.

We have also checked the Landscape Project habitat mapping and Biotics Database for occurrences of rare wildlife species or wildlife habitat in the immediate vicinity (within ¼ mile) of the referenced site. Additionally, the Natural Heritage Database was checked for occurrences of rare plant species or ecological communities within ¼ mile of the site. Please refer to Table 2 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented within the immediate vicinity of the site. Detailed reports are provided for all categories coded as 'Yes' in Table 2. These reports may include species that have also been documented on the project site.

The Natural Heritage Program reviews its data periodically to identify priority sites for natural diversity in the State. Included as priority sites are some of the State's best habitats for rare and endangered species and ecological communities. Please refer to Tables 1 and 2 (attached) to determine if any priority sites are located on or in the immediate vicinity of the site.

A list of rare plant species and ecological communities that have been documented from the county (or counties), referenced above, can be downloaded from https://nj.gov/dep/parksandforests/natural/heritage/database.html. If suitable habitat is present at the project site, the species in that list have potential to be present.

Status and rank codes used in the tables and lists are defined in EXPLANATION OF CODES USED IN NATURAL HERITAGE REPORTS, which can be downloaded from https://nj.gov/dep/parksandforests/natural/docs/nhpcodes_2010.pdf.

NHP File No. 24-4007464-29459

Beginning May 9, 2017, the Natural Heritage Program reports for wildlife species will utilize data from Landscape Project Version 3.3. If you have questions concerning the wildlife records or wildlife species mentioned in this response, we recommend that you visit the interactive web application at the following URL, https://njdep.maps.arcgis.com/apps/webappviewer/index.html?id=0e6a44098c524ed99bf739953cb4d4c7, or contact the Division of Fish and Wildlife, Endangered and Nongame Species Program at (609) 292-9400.

For additional information regarding any Federally listed plant or animal species, please contact the U.S. Fish & Wildlife Service, New Jersey Field Office at http://www.fws.gov/northeast/njfieldoffice/endangered/consultation.html.

Information supplied by the Natural Heritage Program summarizes existing data known to the program at the time of the request regarding the biological elements (species and/or ecological communities) or their locations. They should never be regarded as final statements on the elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments.

Thank you for consulting the Natural Heritage Program. The attached invoice details the payment due for processing this data request. Feel free to contact us again regarding any future data requests.

Sincerely,

Robert J. Cartica
Administrator

c: NHP File No. 24-4007464-29459

NHP File No. 24-4007464-29459

Table 1: On Site Data Request Search Results (6 Possible Reports) (revised April 15, 2024)

Report Name	Included	Number of Pages
1. Possibly on Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites On Site	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat on the Project Site Based on Search of Landscape Project 3.3	Yes	1 page(s) included
5. Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species On the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	Yes	1 page(s) included

Rare Wildlife Species or Wildlife Habitat on the Project Site Based on Search of Landscape Project 3.3 Species Based Patches (revised April 15, 2024)

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Great Blue Heron	Ardea herodias	Foraging	2	NA	Special Concern	G5	S3B,S4N
Mammalia								
	Indiana Bat	Myotis sodalis	Active Season Sighting	5	Federally Listed Endangered	State Endangered	G2	S1
Reptilia								
	Eastern Box Turtle	Terrapene carolina carolina	Occupied Habitat	2	NA	Special Concern	G5T5	S3
	Wood Turtle	Glyptemys insculpta	Occupied Habitat	3	NA	State Threatened	G3	S2

Vernal Pool Habitat on the Project Site Based on Search of Landscape Project 3.3 (revised April 15, 2024)

Vernal Pool Habitat Type	Vernal Pool Habitat ID
Potential vernal habitat area	1978
Potential vernal habitat area	1982

Total number of records: 2

Other Animal Species
On the Project Site Based on
Additional Species Tracked by
Endangered and Nongame Species Program
(revised April 15, 2024)

Scientific Name	Common Name	Federal Protection Status	State Protection Status	Grank	Srank
Invertebrate Animals					
Polites mystic	Long Dash			G5	S3?

Total number of records: 1

Table 2: Vicinity Data Request Search Results (6 possible reports) (revised April 15, 2024)

Report Name	Included	Number of Pages
1. Immediate Vicinity of the Project Site Based on Search of Natural Heritage Database: Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database	No	0 pages included
2. Natural Heritage Priority Sites within the Immediate Vicinity	No	0 pages included
3. Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches	Yes	1 page(s) included
4. Vernal Pool Habitat In the Immediate Vicinity of Project Site Based on Search of Landscape Project 3.3	Yes	1 page(s) included
5. Rare Wildlife Species or Wildlife Habitat In the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Stream Habitat File	No	0 pages included
6. Other Animal Species In the Immediate Vicinity of the Project Site Based on Additional Species Tracked by Endangered and Nongame Species Program	Yes	1 page(s) included

Rare Wildlife Species or Wildlife Habitat Within the Immediate Vicinity of the Project Site Based on Search of Landscape Project 3.3 Species Based Patches (revised April 15, 2024)

Class	Common Name	Scientific Name	Feature Type	Rank	Federal Protection Status	State Protection Status	Grank	Srank
Aves								
	Bald Eagle	Haliaeetus leucocephalus	Foraging	4	NA	State Endangered	G5	S1B,S2N
	Cooper's Hawk	Accipiter cooperii	Breeding Sighting	2	NA	Special Concern	G5	S3B,S4N
	Great Blue Heron	Ardea herodias	Foraging	2	NA	Special Concern	G5	S3B,S4N
	Red-shouldered Hawk	Buteo lineatus	Nest	4	NA	State Endangered	G5	S1B,S3N
	Wood Thrush	Hylocichla mustelina	Breeding Sighting	2	NA	Special Concern	G4	S3B,S4N
Mammalia								
	Indiana Bat	Myotis sodalis	Active Season Sighting	5	Federally Listed Endangered	State Endangered	G2	S1
Reptilia								
	Eastern Box Turtle	Terrapene carolina carolina	Occupied Habitat	2	NA	Special Concern	G5T5	S3
	Wood Turtle	Glyptemys insculpta	Occupied Habitat	3	NA	State Threatened	G3	S2

References

Executive Summary

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2 Information for the History Section was gathered from the Borough's website (https://www.chathamborough.org/) website and supplemented by materials provided by the Curator of the Chatham Borough Historical Society. https://www.chathamnjhistoricalsociety.org/.
3 U.S. News & World Report. https://usnews.com/education/best-high-schools.
4 Information for this Chatham Today Section was gathered from the Borough's website (https://www.chathamborough.org/) website, together with the Joint Recreation Department (https://chathamrecreation.org/), Chatham High School website (www.chatham-nj.org), the Library of the Chathams (https://chathamlibrary.org/), Chatham Chamber of Commerce (https://www.chathamnjchamber.org/), and supplemented by the annual Mayor's Letter, and materials provided by Community Services.

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MEMORIALIZING RESOLUTION OF THE CHATHAM BOROUGH PLANNING BOARD

RESOLUTION #PB 24-17 APPROVING AND ADOPTING ENVIRONMENTAL RESOURCE INVENTORY REPORT DATED MAY 31, 2024 TO BECOME PART OF THE MASTER PLAN FOR THE BOROUGH OF CHATHAM

HEARING: JUNE 19, 2024
MEMORIALIZED: JUNE 19, 2024

WHEREAS, the Planning Board for the Borough of Chatham having received for the consideration and further action of this Board an Environmental Resource Inventory Report dated May 31, 2024 as prepared by the Land Conservancy of New Jersey, Barbara Heskins Davis, PP, AICP, NJ Professional Planner, proposed to become part of the Master Plan for the Borough; and

WHEREAS, the Planning Board having given and provided notice concerning the hearing before the Planning Board to consider the Environmental Resource Inventory Report as proposed to become part of the Master Plan for the Borough of Chatham, pursuant to the requirements of N.J.S.A. 40:55D-13; and

WHEREAS, at a regularly scheduled meeting of the Planning Board for the Borough of Chatham on June 19, 2024, this matter was heard and considered before a quorum of the Planning Board, and an opportunity was afforded to members of the public and/or interested persons or parties to ask questions and/or to be heard regarding the Environmental Resource Inventory Report dated May 31, 2024 now being submitted to the Board herein, and to further offer or submit statements and/or other responses regarding the proposed amendment to the Master Plan for this report, and a verbatim record of these proceedings was maintained; and

WHEREAS, at the time of this hearing the Board Planning Consultant, Kendra A. Lelie, reviewed with the Board the entire report which had been prepared and submitted to the Board in this hearing. In addition to review and discussion with the Board, the Board Planning Consultant also outlined for the Board how this report now being considered would continue to advance and be in accordance with the Master Plan for the Borough of Chatham; and

WHEREAS, following the Board's questions and discussion with Ms. Lelie, the Board offered the opportunity to members of the public or interested persons or parties to discuss or submit statements as to the proposed Environmental Resource Inventory Report dated May 31, 2024 to become part of the Master Plan; and

WHEREAS, the Planning Board for the Borough of Chatham following the consideration of the Environmental Resource Inventory Report dated May 31, 2024 proposed to become part of the Master Plan for the Borough of Chatham, and having conducted the required public hearing regarding same, having now determined that the Environmental Resource Inventory Report dated May 31, 2024 as attached to this resolution should now be accepted and adopted by this Planning Board, as the Planning Board having further determined it contains the required elements in the Municipal Land Use Law, N.J.S.A. 40:55D-28, for inclusion in the Master Plan. The Planning Board having further determined that the Environmental Resource Inventory Report dated May 31, 2024 is consistent with good planning and would serve the general welfare and be in the best interest of the Borough of Chatham to now be adopted and approved.

NOW, THEREFORE, BE IT RESOLVED by the Planning Board for the Borough of Chatham that the Environmental Resource Inventory Report dated May 31, 2024, prepared by The Land Conservancy of New Jersey, Barbara Heskins Davis, PP, AICP, NJ Professional Planner, which has been further discussed and considered by this Planning Board during this hearing, **BE AND HEREBY IS ORDERED ADOPTED AND APPROVED** pursuant to N.J.S.A. 40:55D-28 to now become part of the Master Plan for the Borough of Chatham as now determined and confirmed herein by this Planning Board.

The undersigned Secretary of the Borough of Chatham Planning Board hereby certifies that this within Resolution and Memorialization was adopted by the Planning Board for the Borough of Chatham pursuant to N.J.S.A. 40:55D-10(g) at its meeting of June 19, 2024.

BOROUGH OF CHATHAM PLANNING BOARD

BY: _____
STEPHEN WILLIAMS, Board Secretary

VOTE ON RESOLUTION

On motion of:

Seconded by:

The vote on the Resolution was as follows:

AYES:

NAYS:

ABSENT:

Adopted and Approved
June 19, 2024
BOROUGH OF CHATHAM PLANNING BOARD

_____
Stephen Williams, Board Secretary

Dated: June 19, 2024
Prepared by: Vincent K. Loughlin, Esq.