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INTRODUCTION

The Environmental Resource Inventory (ERI) is an unbiased report of data that describes the current state of the various environmental resources in a community. It is a compilation of text and maps, and forms the baseline documentation that the community can use to evaluate, and possibly revise, planning documents, policy initiatives, and local ordinances to better protect the remaining resources, and when possible, improve the state of the natural environment.

The ERI is not a policy statement or a plan. Rather, it is an objective listing of the resources in the community. It can be used as a tool for Environmental Commissions, Planning Boards and Zoning Boards, as well as by the Township administration and the public at large. The ERI can be adopted as part of Master Plan, or it can be combined with policy statements and programs to create a Conservation Element for the Master Plan. ERIs are often the basis for resource protection ordinances in a community, which are designed to protect the resources inventoried in the ERI. Whether the ERI is an amendment to the Master Plan, a part of a Conservation Element, or a separate reference document, it is always seen as dynamic and revisable as circumstance on the ground evolve and change.

The legal authority for the drafting and adoption of an ERI is the Environmental Commission Enabling Legislation (N.J.S.A. 40:56A), which states, "Power to conduct research into the use and possible use of open land areas of the municipality.... It shall keep an index of the marshlands, swamps, and wetlands.... the proper use of such areas...recommend to the planning board.... plans and programs for a master plan and the development of such areas". Additionally, the Municipal Land Use Law (N.J.S.A 40:55D) requires a Land Use Plan element and states that "Whenever the environmental commission has prepared and submitted to the planning board and to the board of adjustment an index of the natural resources of the municipality, the planning board or the board of adjustment shall make available to the environmental commission an informational copy of every application for development submitted to the board"

It should be noted that all of the information included in this ERI should be considered to be reasonably accurate for planning purposes, but does not replace site-specific investigations for regulatory purposes. It should also be noted that the most up-to-date data sources were used to create this document, however some of the most recent information is based on aerial photography collected by NJDEP in 2002. Other information is based on topographic maps that we last updated prior to that time. Environmental resource information is dynamic and should always be understood to be so.

MUNICIPAL SUMMARY

The Township of South Brunswick is a 41.1 square mile suburban municipality located in southwestern Middlesex County. Since the early 1900's, the town has matured from a tranquil and rustic farming community to a vibrant, diverse and active suburban town. While South Brunswick has been growing rapidly, much of the town's 42 square miles remain undeveloped and there are still significant amounts of wetlands, woodlands and open space within the community. The Township encompasses hamlets: Dayton, Heathcote, Kendall Park, Kingston, and Monmouth Junction. Kingston is the only Village Center that has been officially designated by the New Jersey State Planning Commission in the Township.

Until the 1940's the Township was essentially a rural agricultural community; since that time it has experienced a steady increase in population, industrial activity, and suburban residential development. From 1970 to 1980, the population increased by 21% to over 17,000, a density of 425 people per square mile, and housing units increased by 44%. Between 1980 and 2000, the Township's population more than doubled from 17,127 to 37,734. The median age in 2000 was 35 years. The average household size in the Township was 2.8 persons in 2000, more than the County average of 2.74. Per capita income in the Township was \$32,104 and the median household income was \$78,737.

It is a high growth community located in the New York-Trenton-Philadelphia transportation corridor, midway between New York and Philadelphia, with the New Jersey Turnpike, Route 1, and Route 130 all passing through the Township and the Northeast Corridor train line in a northeast-southwest direction. There are no train stations in the Township.

Portions of the Township north of Route 1 are generally developed, with rural areas remaining to the south and east, particularly east of Route 130. While the Township is zoned for a variety of uses, including commercial, office and industrial development, most of the Township is zoned for residential uses. Most of the Township's commercial zoning is along Route 1 and Route 130. Office and office-research zones are primarily located in the southwestern portion of the Township, adjacent to its boundary with Plainsboro Township.

Historically, the Township has expressed a commitment towards open space and natural resource protection since 1961 when the Township Committee passed a resolution establishing a Recreation Board of Commissioners. In 1972, the Board of Commissioners was abolished and the Township appointed a Recreation Advisory Committee and, for the first time, a full-time recreation director was hired and the Recreation Department was established. In 1975, a

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Cultural Arts Commission was established and a staff position was created within the Recreation Department.

In 1992, the Recreation and Cultural Arts Department and the Social Services Departments merged to form the current Recreation and Community Affairs Department. The Department consists of the following divisions: Human Resources; Parks and Facilities and Recreation and Welfare. The divisions provide functions associated with: cultural affairs; arts and historic resources; public assistance; parks development and administration for a comprehensive recreation program, programs for the disabled and information and referral service that serves all South Brunswick residents.

The commitment for open space and natural resources preservation has been further demonstrated through the Township's 1986 Parks, Recreation and Open Space Plan, its 1981 Environmental Resource Inventory and the establishment of their Open Space Trust Fund.

POPULATION DENSITY

South Brunswick started out as a rural farming community and is now one of the fastest growing communities in Middlesex County. The majority of the population is located between US Route 27 and US Route 1 with another high density area in the center of the Township along Route 522 and the Kingston Lane/Georges Road area.

These areas of higher population density started with large development communities such as Kendall Park (bordered by Route 27, Route 1, New Road, and Beekman Road) and Brunswick Acres (bordered by Route 27, Route 1, Finnigans Lane and Henderson Road). Another area of high density population is in the center of the township bordered by US Route 130, the Northeast Corridor Rail Line, the Conrail Rail Line and Oakey's Brook. Summerfield Estates, one of the newest developments, is split by Route 522 between Georges Road and Route 130. Other tracts of land adjacent to these are also heavily developed and populated. Numerous development communities from only a few homes to several hundred homes have continued to be built in the township.

The majority of these communities have been built as allowed by the township zoning plan. Typically, the highest density allowed is between Route 27 and Route 1. The least populated area of the township is east of Route 130 and south of the Conrail Rail Line. These areas consist of farmland, rural housing developments, parks, wetlands and a major warehouse zone. Many of these areas (other than the warehouse zone) are not intensively developed because city water and sewer are not available.

RAILROADS

South Brunswick Township is divided into East and West portions by the Northeast Corridor Rail Line. Approximately 40% of the township lies west of the rail line and 60% to the East. The Northeast Corridor handles both AMTRACK and New Jersey Transit commuter trains as well as freight. The Northeast Corridor Rail Line consists of four lines to allow for both high-speed express and local trains in both the North and South directions. There are no at grade crossings of the Northeast Corridor Rail Line in the township.

Although the village of Monmouth Junction implies and historic included a rail station, South Brunswick Township has no railway stations at this time. Residents must travel north approximately 5 miles to the Jersey Avenue station (North Brunswick) or approximately 8 miles to the New Brunswick train station. To the South, the Princeton Junction station (West Windsor) is the closest at approximately 7 miles to the south.

A Conrail freight line enters the township from the East and connects with the Northeast Corridor line. There are two rail spurs on this freight line to service industry near this freight line. This freight line has been under consideration for use as a commuter line from Monmouth and Ocean counties. This plan is opposed by South Brunswick Township and neighboring municipalities. There are several at grade crossings for this rail line.

ROADWAYS

Because of South Brunswick Township's location between New York to the North and Philadelphia to the south, as expected the major roadways run primarily north south through the township. These roadways include State Highway 27 along the western border of the township, US Route 1, US Route 130 and the New Jersey Turnpike along the eastern edge of the township.

State Highway 27 or Lincoln Highway is one of the oldest roads in the State. It borders the western edge of the township and on the South Brunswick side there are small shopping stores, strip malls and access to housing developments. US Route 1, or the Straight Highway, is a divided highway that runs northeast to southwest approximately 1-2 miles east of State Highway 27. US Route 1 also has small shopping plazas, auto dealerships, corporate office buildings, hotels littered along its route through the township. Crossing US Route 1 are numerous County and township roads that provide access east-west across the township. US Route 130 curves slightly as it passes north-south through the township. US Route 130 is similar to US Route 1 in nature. It has a median or divider; and stores, automotive dealerships, hotels, and warehouses are located on either side. Because of its proximity to the New Jersey Turnpike and the industrial area of the township, US Route 130 carries more truck traffic than Route 1 or Highway 27. The New Jersey Turnpike is a toll road that passes through the Township in the western portion of South Brunswick. Interchange 8A of the Turnpike is on the very edge of the Township and its major access is from Route 130 via a short stretch of road, State Highway 32. The New Jersey Turnpike is a major limited access highway that connects with northeastern New Jersey and New York to the north and the Pennsylvania Turnpike, Philadelphia and Delaware to the south. Because Interstate 95 was not built as intended in New Jersey, portions of the New Jersey Turnpike, including the portion in South Brunswick is considered Interstate 95.

In addition to these major north – south arteries, South Brunswick has a significant number of County and local roads. The majority of these County Roads run east west connecting with the major north-south roadways. County Route 522 is the largest and newest of these east west roadways. It connects Highway 27 (Promenade Boulevard) with US Route 1 at Stouts Lane and then runs east to Route 130 near Fresh Ponds Road. This 4 lane divided roadway is planned to extend east to the New Jersey Turnpike / County Route 535 (Cranbury Road).

DRINKING WATER SERVICE AREAS

Much of South Brunswick is currently served by public water supply systems owned and operated by the Township, through its Utilities Department. Two major areas, however, are not served by the Township – the Agricultural Development Areas of the southern and northeastern portions of the Township (see [Agricultural Preservation](#)), as it would be inappropriate to provide public water to areas that should not be experiencing dense development. These areas are intended to use on-site wells to address their water supply needs. See www.twp.south-brunswick.nj.us/Utilities_Index.asp for more information.

In general, any area in the Township with significant residential, commercial, business or industrial land uses is currently connected to the water supply system. No general map is available at this time, but the Township intends to develop one soon. However, the map of land use/land cover (see [Current Land Use/Land Cover](#)) provides a good sense of the areas served at this time. The Township operates three wells that draw ground water from the Farrington Aquifer in the eastern side of the township, and receives surface water supplies under contract from the NJ American Water Company-Elizabethtown Division. The Township charges a utility fee for water supply that covers both Township and water purchase costs.

Each year, the Township is required to publish a Consumer Confidence Report that discusses recent drinking water quality testing results. The Township's Water Quality Report can be found at www.twp.south-brunswick.nj.us/Utilities_Reports.asp. In addition, the NJ Department of Environmental Protection, which regulates all public water supply systems to ensure that they meet drinking water quality standards, has prepared a Source Water Assessment Report for South Brunswick's water supply sources. To view the reports, see www.nj.gov/dep/swap/creport.htm. At the bottom of the page, there is a place to select "Middlesex County" and then select "South Brunswick Twp." The report explains that the source water assessment helps each water supply system understand the potential risks of contamination, so that the system can take action either alone or in partnership with municipalities, counties and others to help prevent contamination events.

SEWER SERVICE AREAS

Nearly all of South Brunswick Township has been designated as sewer service area in the Middlesex/Lower Raritan Water Quality Management Plan, which was developed by Middlesex County Planning Board and approved by the NJ Department of Environmental Protection. Two major areas, however, were excluded from the sewer service areas – the Agricultural Development Areas of the southern and northeastern portions of the Township (see [Agricultural Preservation](#)), as it would be inappropriate to provide sewer service to areas that should not be experiencing dense development. These areas are expected to use on-site septic systems to treat wastewater.

Sewer service in South Brunswick is provided by the Township (through the Township Utilities Department), but the Township only owns and operates the collection system. See www.twp.south-brunswick.nj.us/Utilities_Index.asp for more information. The wastewater itself is delivered for treatment to two utility authorities outside of South Brunswick. Part of the township, primarily in the southern western section, contributes flows to the Stony Brook Regional Sewerage Authority treatment plant on River Road in Princeton Township, which discharges to the Millstone River just downstream of Kingston. This facility can treat approximately 13 million gallons per day (MGD). See www.sbrsa.com for more information.

The remaining sewerage areas of the Township flow to the Middlesex County Utility Authority facility in Sayreville, which discharges to the tidal Raritan River and Raritan Bay. This facility is the second largest in New Jersey, and treats approximately 110 MGD from most of Middlesex County. See www.mcua.com for more information.

Both facilities are regulated by the NJDEP to ensure proper quality of discharged effluent. South Brunswick pays the two utility authorities for treatment of wastewater, and bills Township residents and businesses that contribute flows to the sewer system for the combined costs of this service.

OPEN SPACE

Open space benefits include providing areas for recreation and play, protection of wildlife habitats, improving water quality and flood control, and reducing air and noise pollution. There are many reasons to preserve open space but maybe the most important is that once developed, land cannot be returned to its natural state.

South Brunswick has established the preservation of Open Space as a priority in order to preserve community character, provide active and passive recreation and protect environmentally sensitive natural features. The South Brunswick Open Space and Recreation Plan is an integral component of the Township's Master Plan. With the implementation of the 1996 Open Space Trust Fund, along with the support of the State and County, South Brunswick Township has actively pursued the acquisition of land for preservation.

The Township has determined that the priorities of Open Space acquisition are to continue to develop new areas of parkland and to maintain excellence within the existing parks. The Open Space Commission is charged with reviewing lands for recommendation to the Township Council for acquisition. The Recreation Department oversees the development of the parks.

The Parks and Open Space Map indicates the location of open space throughout the Township. There are over 5,700 acres of protected land dedicated in South Brunswick as outlined in the following table:

Preserved Land of South Brunswick Township	
Property	Acres (AC)
Township Open Space	1,523.37
State of New Jersey Open Space	1,287.81
Middlesex County Open Space	1,067.61
Preserved Farm Land	438.95
Private Open Space	1,348.90
Total	5,707.43
Total Township Land	26,240.00

Open Space Parks and Preserved Lands in South Brunswick Township

Jurisdiction = Township (SBT), County (CO.), State of NJ (NJ)

Beech Woods Preserve. 86.3 acres, located off Route 1 and Beekman Road. Includes an amphitheater, picnic areas, trails and a bikepath. (SBT)

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Cook Natural Area. Located in the southeastern portion of the Township these 52 acres is a preserved conservation area with trails. This land is contiguous with Heathcote Park Extension, and the Delaware and Raritan Canal State Park lands. (NJ).

Davidson 's Mill Pond Park. A 400-acre preserve located in the northeast section that includes a lake and a boat ramp. The park is primarily undeveloped, but a portion is used as a county farm. There are trails, bikepaths and fishing. (CO)

Dobin Park A neighborhood park of 20 acres that includes passive and active recreation in the northwest section of the Township. (SBT)

Friendship Park. Located in southern portion of the Township, 20 acres of undeveloped land and conservation area. (SBT)

Harvest Woods Park. A 77.4 -acre parcel in the southern portion of the Township consisting of undeveloped land and conservation area. (SBT)

Heathcote Park. Located in the southwest part of the Township, these 19 acres includes a playground, tennis courts, and baseball/soccer fields. (CO)

Heathcote Park Extension. A parcel of 85 acres of passive open space adjacent to Heathcote Park. The southern boundary runs along the former Conrail/Kingston-Rocky Hill Branch Railroad Line. (CO)

Ireland Brook Park. Approximately 170 acres are in the Township with roughly the same acreage in East Brunswick. This property connects with Davidson's Mill Pond Park, Farrington Lake and Tamarack Golf Course. (CO)

Kendall Woods. 90 acres of passive open space in the western section of the Township. (CO/SBT)

Mapleton Preserve. 53-acre parcel owned jointly by the State and the Township. The Township also owns approximately 70 additional acres from the same area of former Princeton Nurseries, Kingston Site lands adjacent or connecting to the Mapleton Preserve and the Delaware and Raritan Canal State Park. (NJ) (SBT)

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Pigeon Swamp State Park. Located in the northeast corner of the Township, this primarily hardwood forest are approximately 1,054 acres and the largest parcel of protected land in the Township. This preserved land protects environmentally sensitive natural areas, including a portion of the Township's highest aquifer recharge area. (NJ)

Reichler Park. 27 acres adjacent to the Township Municipal Building and Senior Center with a large number of amenities, including playground, baseball fields, bike path, picnic area, and exercise track. (SBT)

Rowland Park. 80 acres of open space at Rowland Road and Broadway that has major recreational facilities including a football stadium and sports fields. (CO/SBT)

South Brunswick Environmental Center. 17 acres located on Old Road off Route 27. Includes meeting rooms and classrooms. (SBT)

Summerfield Park II. A neighborhood park of 35 acres that includes recreational activities and a bike path located in the central part of the Township. (SBT)

Tall Timbers. Located in southern portion of the Township, 23 acres combining recreational activities, picnic areas, and undeveloped woods area. (SBT)

Veterans Park. 15 acres located on Beekman Road of recreational activities, including sports fields, roller hockey rink, and exercise trail. Also includes the award-winning Sensory Garden for the Disabled. (SBT)

Woodlot Park. 153 acres on New Road with extensive recreational facilities, a community center, trails and bike paths. (SBT)

Preserved Spaces/Neighborhood Parks Under 15 Acres	
Location	Acres
Bedford Park, Kendall Park area	2.4
College Park, Kendall Park area	4.5
Dayton Tot Lot, Dayton	0.5
Haven Pond Park, Monmouth Junction	12.8
Kingsley Park, Kendall Park	7.0
Summerfield Park I, Monmouth Junction	6.0
Wetherhill Historic Site, Dayton	3.5

AGRICULTURAL PRESERVATION

South Brunswick historically had extensive agricultural areas. Suburban and industrial development and the changing nature of farming in New Jersey have drastically reduced agricultural acreage in the township. In 2002, only 12.6 percent (3,301 acres) of the township was in agricultural land use, and that percentage has since declined. Some farmland is still owned by the people who farm it; however other parcels are owned by non-farmers (including developers and land speculators) who lease it to farmers so that the owners can retain farmland assessment on the properties, which reduces the assessed value of the property for property tax purposes.

In response to the decline of agricultural operations in South Brunswick and the desire to retain the rural character in some areas, the Township established Agricultural Development Areas (ADA) with funding for the preservation of agricultural lands. Under the Garden State Preservation Trust program, state funding is available for the preservation of agricultural lands in ADAs; Middlesex County provides funding for such purchases as well under its open space program. Further information regarding the overall program is available at the State Agricultural Development Committee Web site, www.state.nj.us/agriculture/sadc/farmpreserve.htm.

In most cases, the land itself remains in private ownership but government acquires development easements that eliminates the residential, commercial or industrial development rights and ensures that the land remains available for agriculture. In a few cases, generally where a farmer does not own the land or the farmer-owner wishes to retire, the agricultural preservation program will acquire the farm outright, and then sell the farm (stripped of the development rights) at auction to another farmer. In both cases, acquisition is from willing sellers. The program does not mandate continued farming. Rather, the land must be maintained so that it is feasible to farm. However, continued farming is generally assured by a landowners desire to retain eligibility for the farmland assessment program.

The South Brunswick ADAs are all located in the eastern and southern sections of the Township. The largest ADA is a somewhat discontinuous area stretching from Ridge Road near Route 522 (including the Von Thun farm, which has been preserved) south to the Cranbury Township border in the Broadway Road area. Six parcels in that ADA have been preserved as of 2006, but the majority of the farmland has not. The other major ADA is in the northeastern section of the Township on both sides of Davidsons Mill Road, just north of Pigeon Swamp Park. As of 2006, none of those parcels has been preserved. In all, as of 2006 there were 439 acres of preserved agricultural lands in the Township, or 13% of the 2002 farm acreage. The Township continues to pursue agricultural preservation of priority parcels.

LAND USE AND LAND COVER

Land Use Distribution

Current land use (based on 2002 aerial photo interpretation by the NJ Department of Environmental Protection) is shown in Figure LU1. Table TLU1 lists the relative areas of each major use.

General Land Uses	Acres	Percent
Agriculture	3301	12.6
Barren land	373	1.4
Forest	4843	18.5
Urban	9991	38.1
Water	398	1.5
Wetlands	7307	27.9

Table LU1

The predominant use now is classified as urban, with 38.1% of the land cover. Urban use here includes residential, office, research, commercial, warehouse and other industrial. Residential areas are concentrated in the western and central areas of the township, with non-residential uses concentrated along Route 1, Route 130 and the warehouse district near Exit 8A of the New Jersey Turnpike. The next major category is wetland, with 27.9% of cover. This includes swamp, grassy wetland and forested wetland. Many of these areas are in the eastern section of the township, in the flatter Coastal Plain area. Agricultural use accounts for 12.6% of the township, most of which is located in the southern and eastern fringes of the township. It should be noted that a substantial proportion of this is not used for regular farming.

The current use pattern is very different from that of 25 years ago, when South Brunswick still had a largely rural character. Development has now occurred to the extent that buildout is complete over much of the township so that land use will change little in the near future. A notable exception is the forest area between Route 1 and the Northeast Corridor rail lines south of Executive Drive. This may be expected to be developed as appropriate for its Office-Research zoning.

A detailed breakdown of the categories of Table TLU1 is shown in Table TLU2.

Detailed Use category	Acres	Percent
Cropland and pastureland	2742	10.5
Orchards/vineyards/nurseries/horticultural areas	434	1.7
Other agriculture	125	0.5
Altered lands	113	0.4
Extractive mining	24	0.1
Transitional areas	216	0.8
Undifferentiated barren lands	20	0.1

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Detailed Use category	Acres	Percent
Coniferous brush/shrubland	68	0.3
Coniferous forest (>50% crown closure)	8	0.0
Coniferous forest (10-50% crown closure)	2	0.0
Deciduous brush/shrubland	239	0.9
Deciduous forest (>50% crown closure)	3318	12.7
Deciduous forest (10-50% crown closure)	249	0.9
Mixed deciduous/coniferous brush/shrubland	418	1.6
Mixed forest (>50% coniferous with >50% crown closure)	18	0.1
Mixed forest (>50% coniferous with 10-50% crown closure)	9	0.0
Mixed forest (>50% deciduous with >50% crown closure)	17	0.1
Mixed forest (>50% deciduous with 10-50% crown closure)	20	0.1
Old field (< 25% brush covered)	475	1.8
Phragmites dominate old field	1	0.0
Athletic fields (schools)	107	0.4
Cemetery	179	0.7
Commercial/services	651	2.5
Industrial	1415	5.4
Industrial/commercial complexes	9	0.0
Major roadway	341	1.3
Mixed residential	2	0.0
Other urban or built-up land	1578	6.0
Recreational land	218	0.8
Residential, high density or multiple dwelling	735	2.8
Residential, rural, single unit	1171	4.5
Residential, single unit, low density	983	3.8
Residential, single unit, medium density	2026	7.7
Stormwater basin	248	0.9
Transportation/communication/utilities	162	0.6
Upland rights-of-way developed	18	0.1
Upland rights-of-way undeveloped	147	0.6
Artificial lakes	326	1.2
Bridge over water	1	0.0
Natural lakes	56	0.2
Streams and canals	16	0.1
Agricultural wetlands (modified)	413	1.6
Cemetery on wetland	36	0.1
Coniferous scrub/shrub wetlands	5	0.0
Deciduous scrub/shrub wetlands	280	1.1
Deciduous wooded wetlands	5918	22.6
Disturbed wetlands (modified)	126	0.5
Former agricultural wetland (becoming shrubby, not built-up)	41	0.2
Herbaceous wetlands	98	0.4
Managed wetland in built-up maintained rec area	23	0.1
Managed wetland in maintained lawn greenspace	113	0.4
Mixed scrub/shrub wetlands (coniferous dom.)	50	0.2

Detailed Use category	Acres	Percent
Mixed scrub/shrub wetlands (deciduous dom.)	73	0.3
Mixed wooded wetlands (coniferous dom.)	2	0.0
Mixed wooded wetlands (deciduous dom.)	1	0.0
Phragmites dominate interior wetlands	3	0.0
Wetland rights-of-way	125	0.5

Table LU2

Land use is controlled to a major extent by zoning ordinances. Zones are shown in Figure LU2. A summary of the categories of zones appears in Table TLU3

Zones	Acres	Percentage
Commercial	2813.82	10.73
Industrial	4732.91	18.05
Public Land	3802.21	14.50
Residential	14744.84	56.25
Mixed use	120.28	0.46

Table LU3

The major environmental effect of zoning is the control of impervious surface. Over most lots in the commercial and industrial zones, the maximum permitted impervious surface is 55%. There is no direct limit on impervious surfaces in residential zones (though setback lines generally provide for some indirect limits) or on public land, which together form 71% of the township. The contention that coverage in residential areas with 1 acre zoning will be fairly low has been challenged recently by the tendency to construct very large houses, either new or as replacements. The effect of impervious coverage will be discussed in a later section.

The effect of wetlands

A second factor controlling land use is wetland. New Jersey DEP regulations do not permit development in wetland or a 50 ft surrounding buffer. As explained in detail in the section on wetland (p.xx), and listed in Table TLU1, wetland covers an unusually large proportion of the township, particularly to the east and south. It is this coverage that prevents the township from total development as a suburban, industrial and office area and helps preserve some natural ecosystems.

It is a fortunate feature of the wetlands that they are distributed in corridors, rather than separate patches, as can be seen in Figure LU1. This is of great advantage to wildlife, much of which relies on such corridor connections to maintain its viability. Connection between these corridors is not ideally complete since they are broken by two bands, one running east-west along the watershed line, and the other running along the Route 1 line. Both of these are or will become fully developed, which will inhibit wildlife migration.

Forested areas

It should be noted that, as presented in Section??, that wetland may be open water, grassland, or forest. The forested region as shown in Figure LU1 would be in fact greater if wetland forest is included. In particular most areas in the Pigeon Swamp State Park region are forested. It is also likely that other wetlands, formerly used for agriculture, will become forested. The value of this for wildlife will depend on the degree of wetness; an assessment of this situation has not been discovered.

Table TLU4 shows the situation in areas of the township in which development has not or is not permitted to occur, if wetland areas are included in the three categories shown. These data are derived from Table TLU2. The total area of forest, brush and scrub, or grassland is fairly high, 43% of the Township.

Vegetated Cover Type	Acres	Percent of total township
Forest - all types	9603	36.6
Brush and scrub - all types	715	2.7
Grassland - all types	999	3.8

Table LU4

There can also be significant forested cover, although it may be far from complete, in developed areas. Preservation of this type of cover is substantially facilitated by various Township tree removal and replacement ordinances which mandate that the number of trees removed during any development must be minimized and that most of those removed be replaced either on site or elsewhere.

Impervious cover

If there is significant impervious coverage, such as blacktop, concrete or roofing, over a land area, environmental degradation can occur. The most evident manifestation of this is in surface water. Here the degradation includes significant increases of:

- channel erosion due to excessive storm runoff,
- water temperature and temperature fluctuation,
- water acidity due to normal rain acidity transfer,
- hydrocarbon and other pollution.

In addition other atmospheric degradation will be produced:

- dust,
- hot air gusts,
- general increase of air temperature fluctuations.

The negative aesthetic impact of large impervious surfaces must also be considered.

A separate issue, which is of increasing importance, is that of aquifer recharge reduction. The current situation in New Jersey is one of rapid depletion of shallow aquifers, which if it continues will lead to long-term unsustainable demands on deep aquifers.

The map of impervious cover is shown in Figure LU3. In the map, the distribution of cover is indicated in two different ways. In the residential zones, the average cover is displayed over fairly wide areas. In contrast, in the office and industrial zones, the buildings and parking lots are mapped individually, with impervious cover of up to 100%.

If, in the areas showing individual buildings, the cover is also averaged over all lots, a lower value is obtained which is more indicative of the environmental effect in the locality. For example, the maximum permitted impervious cover in lots in the I-3 and LI-4 zones is 55%. Usually, the maximum is that which has in fact been constructed. Addition of roadway coverage then gives the average cover over the developed region of these zones at about 60%.

This is a large value. It should be compared with the 10 to 15% cover above which stream degradation effects will occur, in the absence of any recharge arrangements for runoff. (This opinion is given in articles published by the Center for Watershed Protection, www.cwp.org, and The Stormwater Center, www.stormwatercenter.org) In fact there are recharge arrangements in new construction and in some older construction. These arrangements include pervious swales, dry wells and infiltration basins. Nevertheless it is a matter of concern that there is high impervious surface coverage in the two zones mentioned, as well as in others, since these zones are in an area of high aquifer recharge and form the headwaters of streams such as Lawrence Brook. Even where recharge is assured, development with high amounts of impervious cover will generate additional stormwater runoff, affecting streams.

Construction since 2006 now follows the most recent NJ DEP Stormwater Management Rules, N.J.A.C. 7:8, in which one of the main mandates is that construction design should ensure that post-construction recharge is at least equal to pre-construction recharge, and that post-construction runoff rates be less than pre-construction runoff rates by specified amounts. The enforcement of this regulation through the South Brunswick Stormwater Control Ordinance (Article VI) will largely prevent any future increase of the negative environmental impact of impervious surface, at least as far as stormwater effects are involved. It is to be remembered that the effectiveness of structural measures taken to comply with the Ordinance depends on continued maintenance of the structures. However, it should be noted that even compliance with these requirements will result in increased total runoff volumes.

A good estimate of the township-wide average impervious cover is difficult to make. In particular, coverage in residential areas is not controlled by ordinance and an accurate estimate would need to be

made lot by lot. A consideration of zone-by-zone coverage (*South Brunswick Environmental Commission report, May 2002*) has led to an anticipated value possibly as high as 30% on full buildout. In the Heathcote Brook watershed area, which has lower impervious cover than many other areas of the township, a report to be issued by the Stony Brook Millstone Watershed Association (*Characterization and Assessment of the Heathcote Brook, 2007*) gives an estimate of 13% overall impervious cover in 2002. However, it is noted that this watershed falls only 81% in South Brunswick. An additional uncertainty in making an estimate is the non-inclusion of retention and detention basins in impervious cover, even though these are designed to be impervious. Such an inclusion could raise the average estimated cover by 0.9% (from Table TLU2).

WATERSHED MANAGEMENT AREAS, WATERSHEDS AND SUB-WATERSHEDS

A watershed is an area that drains into a common waterway, such as a stream, lake, estuary, wetland, or, ultimately, the ocean. The watershed includes both the waterway itself and the entire land area that drains into it. Geographical features such as hills and slopes separate distinct watershed systems. Watershed Management Areas (WMAs) are the planning units of NJDEP's Division of Watershed Management for categorizing, managing and protecting watersheds throughout the State. South Brunswick Township is divided into two primary WMAs, the Lower Raritan River Drainage (WMA 9) and the Millstone River Drainage (WMA10).

The Lower Raritan River Drainage Watershed Management Area

The Lower Raritan River Drainage WMA, about 352 square miles in area, includes watersheds draining into the lower portion of the Raritan River, South River, and Lawrence Brook. Located in Central New Jersey, mostly in Middlesex, Somerset and Monmouth Counties, the WMA is surrounded by the Upper Passaic to the north, the Arthur Kill and Monmouth Watersheds to the east, the Millstone to the southwest and the North & South Branch to the west.

The Mainstem Raritan River begins at the confluence of the North and South Branches to the Raritan Bay at Perth Amboy and South Amboy. It is 31 miles long and drains parts of Somerset, Union, Middlesex and Monmouth Counties before emptying into the Raritan Bay. The major highways within the Lower Raritan River watershed management area include the NJ Turnpike, US Routes 1 & 9, and Interstate 287. It is a densely populated drainage area, consisting of primarily urban and suburban land uses, with some industrial and commercial centers. There are two low dams in this river, Fieldsville Dam and Calco Dam. The watershed has more than 70 NJPDES permitted dischargers and 29 biological monitoring stations.

The watersheds in Lower Raritan River drainage area are the Mainstem Raritan River, South River, Lawrence Brook, Manalapan River, and Matchaponix Brook watersheds. The major watersheds of this WMA within South Brunswick Township are Lawrence Brook and Manalapan Brook watersheds. Lawrence Brook watershed covers about 25%, and Manalapan Brook watershed covers less than 2% of the Township. The Lawrence Brook flows across South Brunswick in a southwest-northeast diagonal. It includes the Davidson Mill's Pond, Farrington Lake, Mill Pond, and Weston Mill's Pond. This watershed is located in the northern, central and eastern parts of the Township. The Manalapan Brook watershed is located in the eastern part of the Township. The Manalapan Brook is 20 miles long and combines with the Matchaponix Brook to form the South River. The major impoundments include Lake Manalapan.

Each of these watersheds is further divided into sub-watersheds. A sub-watershed is a smaller drainage basin of a local stream that eventually drains to a central point of the larger watershed. The Lawrence

Brook Watershed has five sub-watersheds within South Brunswick Township. These are Ireland Brook, Lawrence Brook (above Deans Pond Dam), Oakeys Brook, Lawrence Brook (Church Lane to Deans Pond), and Great Ditch/Pigeon Swamp. Only a small part of the Manalapan Brook (below Lake Manalapan) sub-watershed lies within South Brunswick.

The Millstone River Drainage Watershed Management Area

The Millstone River Drainage WMA includes watersheds draining from the northern coastal plain of New Jersey, principally the Millstone River and its tributaries. The southwest part of South Brunswick Township lies within the Millstone River watershed, and according to NJDEP GIS data, 43% of the Township is located in the Millstone River watershed.

The Millstone River drains an area of 271 square miles, including parts of Hunterdon, Somerset, Middlesex, Mercer and Monmouth Counties. Major tributaries include Stony Brook, Cranbury Brook, Bear Brook, Ten Mile Run, Beden Brook and Six Mile Run, and the largest impoundment is Carnegie Lake. Land use in the Millstone River watershed is primarily suburban development with scattered agricultural areas, although there is extensive, recent development present in the upstream portion. The population centers in this drainage basin are Princeton Township and Borough, Manville, South Brunswick Township, East and West Windsor Townships, Hightstown and Pennington Boroughs. There are over 40 NJPDES permitted dischargers and 81 biological monitoring sites in the entire WMA. The watersheds within South Brunswick Township, within the Millstone River Management Area include Millstone River (above Carnegie Lake) and Millstone River (below Carnegie Lake).

The sub-watersheds within Millstone River (above Carnegie Lake) include the Six Mile Run (above Middlebush Road), Millstone River (Blackwells Mills to Beden Brook), Heathcote Brook and small parts of Millstone River (Beden Brook to Heathcote Brook) and Millstone River (Heathcote Brook to Harrison Street). The sub-watersheds within Millstone River (below Carnegie Lake) include the Devils Brook, Shallow Brook (tributary of Devils Brook) and Cedar Brook (tributary of Cranbury Brook).

			Area (acres)	Percent Total
Watershed Management Area 9: Raritan River Mainstream, Lawrence Brook, South River, Manalapan Brook, Matchaponix Brook, Green Brook, Middle Brook, D & R Canal (lower part)				
<i>Lawrence Brook Watershed</i>				
Sub-watersheds:	Ireland Brook		4696.7	17.9
	Lawrence Brook (above Deans Pond Dam)		3184.9	12.1
	Oakeys Brook		2258.0	8.6
	Lawrence Brook (Church Lane to Deans Pond)		2109.2	8.0

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	Great Ditch/Pigeon Swamp	801.0	3.1
	Total	13049.8	49.8
<i>Manalapan Brook Watershed</i>			
Sub-watersheds:	Manalapan Brook (below Lake Manalapan)	427.2	1.6
	Total	427.2	1.6
Watershed Management Area 10: Millstone River, Stony Brook, D & R Canal (upper part)			
<i>Millstone River (above Carnegie Lake) Watershed</i>			
Sub-watersheds:	Six Mile Run (above Middlebush Road)	4763.0	18.2
	Millstone River (Blackwells Mills to Beden Brook)	900.4	3.4
	Heathcote Brook	596.9	2.3
	Millstone River (Beden Brook to Heathcote Brook)	66.0	0.3
	Millstone River (Heathcote Brook to Harrison St)	41.5	0.2
	Total	6367.7	24.3
<i>Millstone River (below Carnegie Lake) Watershed</i>			
Sub-watersheds:	Devils Brook	3623.1	13.8
	Shallow Brook (tributary of Devils Brook)	2665.9	10.2
	Cedar Brook (tributary of Cranbury Brook)	80.4	0.3
	Total	6369.5	24.3
Total of all Watersheds		26214	100

Table WMA1

SURFACE WATER

South Brunswick Township has an extensive system of streams, ponds, lakes, and wetlands. These resources provide for:

- Surface water potable supply
- Aquifer recharge for ground water potable supply (in limited circumstances)
- Wildlife habitat
- Recreation areas
- Scenic value and beauty
- Water supplies for agriculture, commerce, and industry

Surface water courses and impoundments within South Brunswick Township drain into the Millstone River, Lawrence Brook and South River; all flow into the Raritan River which discharges into the Atlantic Ocean at Raritan Bay. These surface water bodies can be grouped according to their drainage basins into:

- Shallow Brook and Devils Brook, located in the southern end of South Brunswick, discharge into the Upper Millstone River.
- Heathcote Brook, Carter Brook, Ten Mile Run and Six Mile Run and Carnegie Lake drain into the lower Millstone River.
- Dallenbach Sand Mine Ponds, the Great Ditch, Pigeon Swamp, Upper Lawrence Brook, Terhune Run, Deans Pond, Cow Yard Brook, Davidsons Mill Pond, Oakeys Brook, Farrington Lake and Irelands Brook, feed into the Lawrence Brook.
- A small portion of the Township (part of the Manalapan Brook watershed), located east of and adjacent to the N.J. Turnpike, drains into the South River.

Surface water systems also comprise of any vernal ponds, swamps and/or freshwater wetlands that accompany the stream and water impoundments. In South Brunswick, the Pigeon Swamp is a part of the Pigeon Swamp State Park and function as wildlife areas and flood storage basins.

Surface Water Quality

Surface water quality is determined by seasonal weather conditions and precipitation patterns, the depth, width, and flow rates of streams, soil characteristics, types of vegetation, and impacts of development. Almost all of the streams and surface waters in South Brunswick are classified as FW2-NT waters by the New Jersey Department of Environmental Protection. This is defined as a "general surface water classification applied to those fresh waters that are not designated as

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FW1 or pineland waters". The "NT" or "Non-trout Waters" classification means fresh waters that have not been designated in N.J.A.C. 7:9B-1.15(b) through (h) as trout production or trout maintenance. These waters are generally not suitable for trout because of their physical, chemical, or biological characteristics, but are suitable for a wide variety of other fish species.

A small section of the Great Ditch in Pigeon Swamp is classified as FW2-NT(C1). This additional "C1" or "Category One" designation is defined as being "designated for purposes of implementing the anti-degradation policies set forth at N.J.A.C. 7:9B-1.5(d), for protection from measurable changes in water quality characteristics because of their clarity, color, scenic setting, other characteristics of aesthetic value, exceptional ecological significance, exceptional recreational significance, exceptional water supply significance, or exceptional fisheries resource(s)". This designation requires 300 foot buffers along the stream from major development, classified as 1 acre or more of disturbance or ¼ acre or more of new impervious surface.

The surface waters of South Brunswick are used as drinking water supplies or flow into sources of drinking water for several communities. The Lawrence Brook watershed, which includes Davidson Mill Pond and Farrington Lake, is used as a source of potable water for New Brunswick, Milltown, and part of East Brunswick. The surface waters that flow into the Delaware and Raritan (D&R) Canal and the Millstone Basin are used by New Brunswick and North Brunswick and several central New Jersey communities that are provided water by the NJ American Water Company (Elizabethtown), including South Brunswick, and by Middlesex Water Company, including East Brunswick.

Human effects upon water quality include discharge from point sources and non-point sources and problems resulting from erosion and sedimentation.

Point sources of discharge enter surface waters at specific and identifiable locations, such as industrial wastewater effluent discharge pipes, sewage treatment plant effluent pipes, stormwater runoff pipes, sewage pumping station malfunctions resulting in bypasses, and malfunctioning septic systems flowing or discharging into streams. The presence of legal point sources in South Brunswick Township is discussed in greater detail in "NJ Pollutant Discharge Elimination System" section.

Non-point sources enter in a diffuse manner and are difficult to identify; they include stormwater runoff carrying chemicals from agricultural activities, oils and salts from roads and parking lots, ground water contamination (e.g., from septic systems) moving to surface waters, and leachate from landfill operations.

Erosion is the wearing away of soil or rock by moving water, and sedimentation is the transportation of these eroded materials in suspension and the deposition of these clays, silts, and sands in other areas. Increased development generally reduces the amount of cover vegetation and increases the amount of impervious surface, therefore lessening the infiltration of precipitation and increasing stormwater runoff and potential erosion, sedimentation, and water quality contamination. Erosion and sedimentation also result in suspended sediment that contributes to a decline in water quality by blocking sunlight, reducing photosynthesis, decreasing plant growth, and destroying bottom dwelling species' habitat.

Heathcote Brook Water Quality Assessment

The Stony Brook-Millstone Watershed Association (SBMWA) recently completed an evaluation of water quality in Heathcote Brook. Their draft findings are summarized here and will be available at www.thewatershed.org. The evaluation was based on water quality data gathered from a variety of sources, including fecal coliform and total coliform, water chemistry, and biological monitoring data at multiple sites. In addition, SBMWA performed detailed visual assessments using protocols used by the NJ Department of Environmental Protection (USDA, 1998; USEPA, 1997; USEPA, 1999).

The 2004 and Draft 2006 Integrated Lists, along with SBMWA chemical data, were also consulted to determine water quality based on chemical assessments. The 2004 Integrated List stated that the Heathcote Brook site at Kingston (corresponding to USGS site 01401400, Figure 24) is impaired for fecal coliform (NJDEP, 2004a). The site at Kingston was also listed on the 2004 Integrated List as meeting the water quality standards for phosphorus, temperature, pH, dissolved oxygen, nitrate, dissolved solids, total suspended solids, and unionized ammonia (NJDEP, 2004a). The Draft 2006 Integrated List stated that Heathcote Brook is impaired for fecal coliform and an unknown pollutant (NJDEP, 2006c). The unknown pollutant relates to the designated impairment for aquatic life.

SBMWA's chemical action teams (CATs) monitor one chemical monitoring site in the Heathcote Brook Watershed (Figure 24). Chemical monitoring is conducted every other weekend throughout the year. Volunteers monitor six parameters: dissolved oxygen (DO), pH, nitrate-nitrogen, orthophosphates, water temperature, and turbidity. For this assessment, water quality was determined for all six parameters, but three in particular are important to NPS pollution control: DO, nitrate-nitrogen and orthophosphates. These three are excellent indicators of NPS pollution and eutrophication in waterways.

Water Quality Findings from Other Watersheds

The final 2006 Integrated List (see table below) provides information on a variety of water quality and biological monitoring sites in the Raritan River Basin. NJDEP AMNET (biological monitoring) data are available at <http://www.state.nj.us/dep/wms/bfbm/download/AMNETrnd3Data.pdf>.

Water bodies in and near South Brunswick Township are listed in the table sections below from this NJDEP report. The waters are described for various types of water uses, and the Sublist applicable for each use. Sublist 5 waters are impaired; that is, their quality is in violation of requirements for the designated use. Sublist 4 waters are also impaired, but management measures such as pollution control plans have been formally adopted by NJDEP to address the issues. Sublist 3 waters have insufficient data to determine impairment. Sublist 2 has sufficient information to show non-impairment for that designated use, but other designated uses for the same watershed are in Sublists 3 through 5. Finally, Sublist 1 means that both the specific designated use and all others (except for fish consumption, which often is affected by mercury impairment from air quality sources) are non-impaired. See <http://www.state.nj.us/dep/wms/bwqsa/generalinfo.html> for more information.

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New Jersey's 2006 Integrated List of Waters (From Appendix A-1)

WMA	Assessment Unit ID	Assessment Unit Name	Aquatic Life (general)	Aquatic Life (trout)	Primary Contact Recreation	Secondary Contact Recreation	Drinking Water Supply	Agricultural Water Supply	Industrial Water Supply	Shellfish Harvest	Fish Consumption
10	02030105100140-01	Millstone R (Rt 1 to Cranbury Bk)	Sublist 3	N/A	Sublist 3	Sublist 3	Sublist 5	Sublist 3	Sublist 3	N/A	Sublist 3
10	02030105110010-01	Heathcote Brook	Sublist 5	N/A	Sublist 4A	Sublist 4A	Sublist 2	Sublist 2	Sublist 2	N/A	Sublist 3
10	02030105110020-01	Millstone R (HeathcoteBk to Harrison St)	Sublist 3	N/A	Sublist 3	Sublist 3	Sublist 3	Sublist 3	Sublist 3	N/A	Sublist 3
10	02030105110030-01	Millstone R (Beden Bk to Heathcote Bk)	Sublist 5	N/A	Sublist 5	Sublist 3	Sublist 5	Sublist 3	Sublist 3	N/A	Sublist 3

09	02030105130010-01	Great Ditch / Pigeon Swamp	Sublist 3	N/A	Sublist 3	N/A	Sublist 3				
09	02030105130020-01	Lawrence Brook (above Deans Pond dam)	Sublist 2	N/A	Sublist 3	Sublist 3	Sublist 5	Sublist 3	Sublist 3	N/A	Sublist 3
09	02030105130030-01	Oakeys Brook	Sublist 3	N/A	Sublist 3	N/A	Sublist 3				

WMA	Assessment Unit ID	Assessment Unit Name	Aquatic Life (general)	Aquatic Life (trout)	Primary Contact Recreation	Secondary Contact Recreation	Drinking Water Supply	Agricultural Water Supply	Industrial Water Supply	Shellfish Harvest	Fish Consumption
09	02030105130040-01	Ireland Brook	Sublist 5	N/A	Sublist 5	Sublist 3	Sublist 2	Sublist 2	Sublist 2	N/A	Sublist 3
09	02030105130050-01	Lawrence Bk (Church Lane to Deans Pond)	Sublist 5	N/A	Sublist 3	Sublist 3	Sublist 5	Sublist 3	Sublist 3	N/A	Sublist 3
09	02030105130060-01	Lawrence Bk (Milltown to Church Lane)	Sublist 5	N/A	Sublist 3	Sublist 3	Sublist 2	Sublist 2	Sublist 2	N/A	Sublist 3
09	02030105130070-01	Lawrence Bk (below Milltown/Herberts br)	Sublist 3	N/A	Sublist 3	Sublist 3	Sublist 3	Sublist 3	Sublist 3	N/A	Sublist 5
09	02030105140010-01	Manalapan Brook (above 40d 16m 15s)	Sublist 5	N/A	Sublist 4A	Sublist 4A	Sublist 5	Sublist 2	Sublist 2	N/A	Sublist 3
09	02030105140020-01	Manalapan Bk(incl LkManlpn to 40d16m15s)	Sublist 5	N/A	Sublist 4A	Sublist 4A	Sublist 5	Sublist 2	Sublist 2	N/A	Sublist 3
09	02030105140030-01	Manalapan Brook (below Lake Manalapan)	Sublist 5	N/A	Sublist 4A	Sublist 3	Sublist 5	Sublist 2	Sublist 2	N/A	Sublist 3

SOILS

Knowledge of soil types, characteristics, and their geographic distribution can inform the planning and policy processes and influence the smart growth and development of a community. Data on soil depth, permeability, water table and other physical properties are useful when determining the suitability of soils for foundation construction, location of septic system leaching fields, landscaping, and construction of roads, athletic fields and parks. The soil data in this report are provided by the National Resources Conservation Service of the United States Department of Agriculture, which started conducting national soil samples in 1899 and continues today. Soil classification addresses such issues as depth to ground water, depth to bedrock, and development suitability. The farmland classification prescribed by NRCS identifies map units as prime farmland soils, farmland soils of statewide importance, or farmland soils of local importance. Farmland classification identifies the location and extent of the most suitable soils for producing food, feed, fiber, forage, and oilseed crops. This identification is useful in the management and maintenance of productive agricultural soils.

Prime Farmland Soils

Prime Farmland Soils include all those soils in Land Capability Class I and selected soils from Land Capability Class II. *Class 1* soils have slight limitations that restrict their use. *Class 2* soils have moderate limitations that reduce the choice of plants or require moderate conservation practices. Prime Farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber and oilseed crops and is also available for these uses. It has the soil quality, growing season and moisture supply needed to economically produce sustained high yields of crops when treated and managed according to acceptable farming methods.

The major advantages of prime agricultural soils are their fertility and lack of limitations for crop production purposes. Because of their naturally high fertility and lack of limitations, prime agricultural soils produce superior crop yields on a consistent basis when measured against those soils not rated as prime. Prime Farmlands are not excessively erodible or saturated with water for a long period of time, and they either do not flood frequently or are protected from flooding.

In South Brunswick Township, the following Prime Farmland Soils are found:

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Prime Farmland Soil Description	Area in acres
Birdsboro silt loam, 2 to 6 percent slopes	89
Downer sandy loam, 2 to 5 percent slopes	52
Dunellen moderately well drained variant sandy loam, 0 to 2 percent slopes	72
Hammonton sandy loam, 0 to 2 percent slopes	106
Keyport loam, 0 to 2 percent slopes	179
Keyport loam, 2 to 5 percent slopes	61
Keyport sandy loam, 0 to 2 percent slopes	52
Keyport sandy loam, 2 to 5 percent slopes	36
Keyport silt loam, 0 to 2 percent slopes	203
Keyport silt loam, 2 to 5 percent slopes	27
Matapeake silt loam, 0 to 2 percent slopes	462
Matapeake silt loam, 2 to 5 percent slopes	496
Mattapex silt loam, 0 to 2 percent slopes	590
Mattapex silt loam, 2 to 5 percent slopes	51
Mount Lucas silt loam, 0 to 2 percent slopes	510
Mount Lucas silt loam, 2 to 6 percent slopes	378
Nixon loam, 0 to 2 percent slopes	459
Nixon loam, 2 to 5 percent slopes	446
Nixon moderately well drained variant loam, 0 to 2 percent slopes	391
Nixon moderately well drained variant loam, 2 to 5 percent slopes	232
Penn silt loam, 2 to 6 percent slopes	27
Sassafras gravelly sandy loam, 2 to 5 percent slopes	198
Sassafras loam, 0 to 2 percent slopes	1489
Sassafras loam, 2 to 5 percent slopes	1081
Sassafras sandy loam, 0 to 2 percent slopes	44
Sassafras sandy loam, 2 to 5 percent slopes	1479
Woodstown loam, 0 to 2 percent slopes	2039
Woodstown loam, 2 to 5 percent slopes	381
Woodstown sandy loam, 0 to 2 percent slopes	437
Woodstown sandy loam, 2 to 5 percent slopes	1451
Woodstown sandy loam, clayey substratum, 0 to 2 percent slopes	194
Total Acreage of Prime Farmland Soils	13712
Note: The acres have been rounded off to the nearest whole number.	

Table SO1

Unique Soils

Unique Soils are soils other than prime farmland soils that are used for the production of specific high value food and fiber crops. They have the special combination of soil quality, location, growing season and moisture supply needed to economically produce sustained high quality and/or high yields of a specific crop when treated and managed according to acceptable farming methods. Examples of such crops are citrus, tree nuts, olives, cranberries, fruit and vegetables.

Specific characteristics of unique farmland soils are:

- Is used for a specific high-value food or fiber crop;
- Has a moisture supply that is adequate for the specific crop; the supply is from stored moisture, precipitation or a developed-irrigation system;
- Combines favorable factors of soil quality, growing season, temperature, humidity, air drainage, elevation, aspect or other conditions, such a nearness to market that favor the growth of a specific food or fiber crop.

In South Brunswick Township, the following unique farmland soils for special crops are found:

Unique Farmland Soil Description	Area in acres
Atsion sand, 0 to 2 percent slopes	10
Manahawkin muck, 0 to 2 percent slopes, frequently flooded	270
Total Acreage of Soils of Unique Farmland Soils	280
Note: The acres have been rounded off to the nearest whole number.	

Table SO2

Soils of Statewide Importance

Soils of Statewide Importance include those soils in land capability Class II and III that do not meet the criteria as Prime Farmland Soils. *Class 2* soils have moderate limitations that reduce the choice of plants or require moderate conservation practices and *Class 3* soils have severe limitations that reduce the choice of plants or require special conservation practices, or both. These soils are nearly Prime Farmland Soils and economically produce high yields of crops when treated and managed according to acceptable farming methods. Some may produce yields as high as Prime Farmland if conditions are favorable.

Criteria for defining and delineating this land are to be determined by the appropriate State agency or agencies. In some States, additional farmlands of statewide importance may include tracts of land that have been designated for agriculture by State law.

In South Brunswick Township, the following soils of statewide importance are found:

Statewide Importance Soil Description	Area in acres
Birdsboro silt loam, 6 to 12 percent slopes	2
Chalfont silt loam, 0 to 2 percent slopes	462
Chalfont silt loam, 2 to 6 percent slopes	367
Croton silt loam, 0 to 2 percent slopes	7
Downer loamy sand, 0 to 5 percent slopes	55
Downer loamy sand, 5 to 10 percent slopes	24
Elkton loam, 0 to 2 percent slopes, rarely flooded	143

Statewide Importance Soil Description	Area in acres
Elkton silt loam, 0 to 2 percent slopes	1
Fallsington loam, 0 to 2 percent slopes	2939
Fallsington sandy loam, 0 to 2 percent slopes	79
Hammonton loamy sand, 0 to 5 percent slopes	125
Lansdowne silt loam, 0 to 2 percent slopes	468
Lansdowne silt loam, 2 to 6 percent slopes	79
Mullica sandy loam, 0 to 2 percent slopes, rarely flooded	838
Reaville silt loam, 0 to 2 percent slopes	177
Reaville silt loam, 2 to 6 percent slopes	14
Sassafras gravelly sandy loam, 5 to 10 percent slopes	159
Sassafras sandy loam, 5 to 10 percent slopes	371
Total Acreage of Soils of Statewide Importance	6310
Note: The acres have been rounded off to the nearest whole number.	

Table SO3

Soils of Local Importance

Soils of Local Importance include those soils that are not prime or statewide importance and are used for the production of high value food, fiber or horticultural crops. In some local areas certain farmlands are not identified as having national or statewide importance. Where appropriate, these lands are identified by the local agency or agencies concerned. These may also include tracts of land that have been designated for agriculture by local ordinance.

Local Importance Soil Description	Area in acres
Rowland silt loam, 0 to 2 percent slopes, frequently flooded	158
Total Acreage of Soils of Local Importance	158
Note: The acres have been rounded off to the nearest whole number.	

Table SO4

South Brunswick Township Soils

South Brunswick Township has 81 different soils, *grouped into 40 major types*. The land is generally level to gently sloping with most of the soils being 0 to 8 percent sloped. The most prevalent soils are the Sassafras series located throughout the central area of the Township, accounting for nearly a fifth of the total land. These are deep well-drained soils that are often located on uplands and side slopes. Ranging from 0 to 15 percent, Sassafras soils are suitable for many urban uses. Woodstown series is the second most common soil type in the Township, consisting of 17 percent of the total land. These soils consist of deep, moderately well-drained soils with 0 to 5 percent slopes. They are located on intermediate positions, on terraces and on toe slopes. The third major soil type is

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Fallsington series (13% of total land) that consists of deep, poorly drained soils located in low-lying flats and basins with slopes ranging from 0 to 2 percent. The next three major soil types are the Mount Lucas series (7%), Nixon (6%), and Matapeake series (4%). The remaining series are 3% or less each of the township area. Open surface waters such as lakes and ponds cover about 167 acres (about 1%). The percentages noted below are based on the area of South Brunswick Township as 26,197 acres.

South Brunswick Soil Series	Area in acres	Percent
Sassafras	4871	19
Woodstown	4502	17
Fallsington	3327	13
Mount Lucas	1864	7
Nixon	1528	6
Matapeake	958	4
Mullica	838	3
Chalfont	828	3
Watchung	779	3
Reaville	710	3
Mattapex	641	2
Lansdowne	570	2
Keyport	559	2
Urban	484	2
Humaquepts	384	1
Klinesville-Urban	352	1
Psammments	280	1
Manahawkin	270	1
Hammonton	230	1
Parsippany	192	1
Phalanx	188	1
Lansdowne-Urban	177	1
Udorthents	166	1
Rowland	158	1
Pits, sand and gravel	155	1
Elkton	144	1
Downer	131	<1
Penn	128	<1
Woodstown-Urban	112	<1
Evesboro	102	<1
Birdsboro	91	<1
Klinesville	90	<1
Reaville-Urban	75	<1
Dunellen	72	<1
Mount Lucas-Watchung	19	<1
Nixon-Urban	18	<1
Keyport-Urban	13	<1

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South Brunswick Soil Series	Area in acres	Percent
Atison	10	<1
Sassafras-Urban	7	<1
Croton	7	<1
Total Acres	26197	100
Note: The acres and percentages have been rounded off to the nearest whole number.		

Table SO5

GEOLOGY

The geology of a place is important for several reasons; mainly that the physical and chemical properties of the land determine the quantity and quality of ground water the aquifers yield. They also control how ground water recharges and moves through the aquifers, how contaminants seep into and move through soil and ground water, and where natural hazards like radon, sinkholes and seismic instability may occur. Finally, 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. ¹

South Brunswick Township is located within the Piedmont and Coastal Plain physiographic provinces of New Jersey. In South Brunswick the Fall Line, which divides these two regions, runs in a northeast/southwest direction approximately along Lawrence Brook and the Penn Central Railroad Line; on each side of this line is found a different and distinctive underlying geology.

Piedmont

The Piedmont Province is an area of about 1,600 square miles and makes up approximately one-fifth of the state. It occupies all of Essex, Hudson, and Union Counties, most of Bergen Hunterdon and Somerset, and parts of Mercer, Middlesex, Morris and Passaic. It is mainly underlain by slightly folded and faulted sedimentary rocks of Triassic and Jurassic age (240 to 140 million years old) and igneous rocks of Jurassic age. Highly folded and faulted lower Paleozoic sedimentary rocks along the northwestern margin in the Clinton and the Peapack areas, as well as at several smaller areas are included as part of the Piedmont. In the Trenton and Jersey City areas, along the southern margin of the province, there are small bands of highly metamorphosed rocks ranging in age from Middle Proterozoic to Cambrian that are also included.

Coastal Plain

The Coastal Plain province is 4,677 square miles and covers Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Monmouth, Ocean and Salem Counties and parts of Mercer and Middlesex. It widens towards the southeast and consists of unconsolidated gravel, sand, silt and clay and ranges in age from the upper Lower Cretaceous to the Miocene (90 to 10 million years old). From the Piedmont boundary, the plain is shaped like a trough, extending from the Raritan Bay to Trenton. Near Monmouth Junction, where the trough floor forms a saddle it

¹ *Stanford, S.D. 1998, NJGS Information Circular: "Geologic Mapping in New Jersey". New Jersey Geological Survey, Trenton, NJ*

reaches an elevation of about 80 feet. East of this depression is the drainage divide between the Delaware River and the Atlantic Ocean. The maximum elevation of the Coastal Plain, located at Crawford Hill is 391 feet. The streams that flow northwest to the Delaware have narrow valleys, are shorter and have a steeper gradient than the streams that flow southeast. The Highlands of Navesink at 266 feet above sea level is the highest point directly on the coast.²

The geology of a place can be classified into two layers: the surficial geology, which extends from a few to a few hundred feet in depth; and bedrock geology, which is the underlying rock extending deeper into the Earth's crust. The geology map shows the various types of surficial materials and bedrock formations in South Brunswick Township.

Surficial Geology

Surficial materials are the unconsolidated sediments that overlie bedrock or Coastal Plain formations, and that are the parent material for agronomic soils (capable of supporting farming). In South Brunswick Township, they include stream, wetland, glacial, estuarine, windblown and hill-slope sediments and weathered bedrock material. They are as much as 140 feet thick, but are generally less than 40 feet thick over most of Middlesex County. These materials range from coarse gravel to clay and peat. They affect the movement of ground water from the surface into underlying bedrock and Coastal Plain aquifers, and are aquifers themselves in places. They also provide foundation support for structures, and supply sand and gravel for construction projects.

The surficial materials in South Brunswick Township consist of:

- Alluvium
- Sand and Gravel Colluvium
- Swamp and Marsh Deposits
- Lower Terrace Deposits
- Weathered Coastal Plain Formation
- Weathered Diabase
- Weathered Shale
- Pensauken Formation

Geology Name	Area in acres	Lithological Description
Alluvium	1621.35	Silt, sand, gravel, clay, organic matter (as much as 20 feet thick)

² Dalton, Richard. 2003. NJGS Information Circular: "Physiographic Provinces of New Jersey". New Jersey Geological Survey, Trenton, NJ

Sand and Gravel Colloivium	334.61	Sand, gravel, minor silt (as much as 10 feet thick)
Swamp and Marsh Deposits	1469.84	Peat and organic silt, sand, and clay (as much as 10 feet thick)
Lower Terrace Deposits	136.27	Sand, gravel, minor silt (as much as 40 feet thick)
Weathered Coastal Plain Formation	1038.43	Outcrop areas of sand, silt, and clay Coastal Plain formations. Maybe overlain by thin, patchy sand, gravel, and silt colluvium
Weathered Diabase	2742.12	Sandy silty clay with diabase fragments and some gravel (as much as 15 feet thick. Maybe overlain by thin, patchy colluvium
Weathered Shale	4204.03	Silty clay with shale, mudstone, and sandstone fragments and some gravel (as much as 10 feet thick). May be overlain by thin, patchy colluvium
Pennsauken Formation	14651.38	Sand and gravel (as much as 140 feet thick)
Total	26198.03	

Table GE1

Bedrock Geology

Bedrock formations include sedimentary rocks formed by compaction and cementation of sediments from ancient river, lake and marine deposits; igneous rocks that formed when molten rock cooled and hardened; and lastly, metamorphic rocks formed by intense heating and compressing of sedimentary, igneous and even other metamorphic rocks. The rocks were then deformed by folding and faulting. The bedrock formations, which range in age from 1 billion to 200 million years old, extend to great depths in the Earth's crust.³

The underlying rocks of the Piedmont are of late-Triassic to early-Jurassic Age. These rocks include the Brunswick, Lockatong and Stockton Formations and the Diabase (Traprock) intrusions that resulted from periods of volcanic activity. The geologic strata underlying the Coastal Plain are of late Cretaceous origin and consist of the Raritan and Magothy Formations. The Raritan and Magothy Formations are made of unconsolidated sand, salt and clay, and were deposited 135-65 million years ago. The Raritan and the overlying Magothy have often been regarded as one formation. In some areas the two formations are indistinguishable from each other, or the Magothy simply thins into the Raritan Formation.

Most of the area of the Inner Coastal Plain and some of the Piedmont in South Brunswick is covered by deposits of Pennsauken Formation dating back to the more recent Quaternary Period.

³ Stanford, S.D. 1998, NJGS Information Circular: "Geologic Mapping in New Jersey". New Jersey Geological Survey, Trenton, NJ

Jurassic Diabase: The Diabase is hard, crystalline rock that is very resistant to abrasion and erosion. It appears in rock outcroppings, and is light gray in color when weathered or darker when freshly exposed. The formation is irregularly formed; it follows the course taken by the molten lava as it flowed toward the surface from magma deeper within the earth. The Diabase is volcanic in origin and is found where lava forced its way upwards and cooled beneath the surface.

Lockatong Formation: The Lockatong Formation consists of black shale, hard and massive dark argillite (an intermediate between shale and slate), and sandstone (flagstone). The formation is found between the Stockton and Brunswick Formations, its texture is fine grained and it is highly resistant to erosion. The thickness ranges from 1,500 to 3,750 feet.

Magothy Formation: The Magothy Formation consists of three units. From the top to the bottom are the Cliffwood Beds, the Morgan Beds, and the Amboy Clay. The Cliffwood Beds are light gray clayey-silts and light colored fine-grained sands. The Morgan Beds are inter-fingering dark clays and silts. The Amboy Clay separates the Magothy from the Old Bridge Sand member of the Raritan Formation. In some areas the Amboy stoneware clay was eroded before the Morgan and Cliffwood beds were deposited, thus allowing a direct hydraulic contact with these beds and the Old Bridge aquifer. The total thickness of this formation is approximately 25 feet.

Passaic Formation: The formation consists of inter-bedded sequence of reddish brown, and less often purple or maroon, sandstone, siltstone, shaly siltstone, silty mudstone and mudstone. Reddish-brown sandstone and siltstone are thin- to medium-bedded, planar- to cross-bedded, micaceous and locally mud-cracked and ripple cross-laminated. Shaly siltstone, silty mudstone and mudstone are fine-grained, very thin- to thin-bedded, planar- to ripple cross-laminated, locally fissile, bioturbated, and contain evaporate minerals.

Passaic Formation Gray bed: The gray bed sequences of the Passaic Formation are medium- to fine-grained, thin- to medium-bedded, and planar to cross-bedded siltstone and silty mudstone. Gray to black mudstone, shale and argillite are laminated to thin-bedded, and commonly grade upward into desiccated purple to reddish-brown siltstone to mudstone. Thickness of gray bed sequences ranges from less than 1 foot to approximately 40 feet. Copper mineralization (mainly malachite and lesser azurite) occurs as thin laminae with gray siltstone in some areas.

Raritan Formation: The Raritan Formation is composed of alternating and irregular beds of clay, sand and gravel, representing a wide range of depositional environments from past geologic times. The total thickness of the Raritan in the outcrop is 150 to 400 feet. From top to bottom,

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they are: Old Bridge Sand, South Amboy Clay, Sayreville Sand, Woodbridge Clay, Farrington Sand, and Raritan Clay.

Stockton Formation: The Stockton Formation consists of sandstone, siltstone, arkose conglomerate and mudstone. The color ranges from light sandy color to a dark brown-purple-red. The stone has been used extensively in the past for construction, most notable for the brownstone houses of New York and major historic buildings of central New Jersey. The formation has a maximum thickness of 6,000 feet.

Geology Name	Area in acres	Lithological Description
Jurassic Diabase	2767.42	Diabase, medium- to coarse-grained
Lokatong Formation	2472.77	Dolomitic or silty argillite, mudstone, sandstone, siltstone, and minor silty limestone
Magothy Formation	10070.65	Quartz sand, fine- to coarse-grained, inter-bedded with thin-bedded clay or clay-silt
Passaic Formation	2883.27	Siltstone and shale
Passaic Formation Gray bed	519.51	Sandstone, siltstone and shale
Raritan Formation	5930.21	Clayey silt overlying quartz sand
Stockton Formation	1570.06	Sandstone, mudstone, silty mudstone, argillaceous siltstone, and shale
Total	26213.89	

Table GE2

TOPOGRAPHY

The topography of South Brunswick Township generally consists of gently rolling low hills in the western Piedmont area and lowland flats in the eastern Inner Coastal Plain area. Pennsauken Formation deposits over both of these areas contribute to moderate elevations. Ten Mile Run and Kendall Park are located on the Passaic Formation Gray Bed, and the Sand Hills are on the Diabase outcrops of the Piedmont section of the Township, creating some steeper slopes and higher elevations. The low lying flatlands in the Coastal Plain section include marshes and swamps of the Devil's Brook and Pigeon Swamp areas, as well as Dayton, Monmouth Junction and South Brunswick Terrace neighborhoods.

The highest elevations in the Township occur in the Sand Hills and Little Rocky Hill areas, which reach about 280 feet above sea level. The lowest elevations are found continuing in a westerly direction to Carnegie Lake, where the elevation drops down to 60 feet above sea level. The majority of the Township lies between the 80- and 120-foot contours. All of the Coastal Plain area is below the 120-foot elevation, ranging in height from 60 feet above sea level along Heathcote Brook to an elevation of 100 to 120 feet above sea level near Farrington Lake, Fresh Ponds and the Rhode Hall area.

Steep slopes are those areas with land topology gradient greater than 15 percent. These areas have limited capacity for community development, often accompanied by adverse environmental impacts, due to high construction costs and the potential for soil erosion. According to Soil Conservation Service data few slopes in the Township exceed 15 percent, although some moderately steep slopes of 10 to 15 percent are found in scattered areas.

WETLANDS

Wetlands, land which is either submerged or retains water at ground level for a portion of the year, includes marshes, swamps, and bogs. They cover approximately 7967 acres of land in the Township as identified in the Wetlands map.

Wetland areas provide natural flood control by storing excess water and releasing it to surface waters over time. Wetlands also serve as filtration systems, removing pollutants from the water table and storing them in biomass; and they serve as ground water recharge areas. As the total wetland area decreases and their natural functions decrease over a period of years, the overall quality and quantity of the surface water flow within the watershed is altered. Often, expensive man-made utilities are required to make up for the loss of wetlands.

A community that incorporates growth while maintaining or improving wetlands and wetlands function can achieve lower flood peaks, fewer drought periods, more wildlife and wildlife habitat, and better surface water quality than comparable watersheds with fewer wetlands. Wetlands also provide recreational opportunities for boating, hiking and bird watching.

The NJDEP Land Use Regulation Program manages wetlands permitting in the state, more information, such as that provided below, is available at the programs website: <http://www.state.nj.us/dep/landuse/fww.html>

Freshwater wetlands protection is governed by section 404 of the "Federal Water Pollution Control Act Amendments of 1972" as amended by the Clean Water Act of 1977". The Freshwater Wetlands Protection Act requires NJDEP to regulate virtually all activities proposed in the wetland, including cutting of vegetation, dredging, excavation or removal of soil, drainage or disturbance of the water level, filling or discharge of any materials, driving of pilings, and placing of obstructions. If you want to pursue activities in an area within 150 feet of a wetland, you may be in a transition area (sometimes called a buffer) and you may need a DEP transition area waiver. A transition area is a strip of land bordering the wetlands. The width of the transition area may vary from 150 feet down to nothing, depending on the value of the particular wetland. For example, 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.

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NJDEP has developed a system for the classification of freshwater wetlands based upon criteria, which distinguish among wetlands of exceptional resource value, intermediate resource value, and ordinary resource value.

Freshwater wetlands shall be divided into three classifications based on resource value.

The Department shall consider the resource value classification of a wetland in, among other things, evaluating alternatives to the proposed regulated activity, in determining the size of the transition area, and in determining the amount and/or type of mitigation required.

A freshwater wetland of exceptional resource value, or exceptional resource value wetland, is a freshwater wetland which:

1. Discharges into FW1 or FW2 trout production waters or their tributaries;
2. Is a present habitat for threatened or endangered species; or
3. Is a documented habitat for threatened or endangered species, and which remains suitable for breeding, resting, or feeding by these species during the normal period these species would use the habitat.

The Department identifies present or documented habitat for threatened or endangered species for purposes of determining exceptional resource value using the Landscape Project method, which focuses on habitat areas required to support local populations of threatened or endangered wildlife species.

A freshwater wetland of ordinary resource value, or an ordinary resource value wetland, is a freshwater wetland which does not exhibit any of the characteristics in exceptional resource values, and which is:

1. An isolated wetland, as defined at N.J.A.C. 7:7A-1.4, which:
 - a. Is smaller than 5,000 square feet; and
 - b. Has the uses listed below covering more than 50 percent of the area within 50 feet of the wetland boundary. In calculating the area covered by a use, the Department 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:
 - i. Lawns;
 - ii. Maintained landscaping;
 - iii. Impervious surfaces;

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- iv. Active railroad rights-of-way; and
 - v. Graveled or stoned parking/storage areas and roads;
2. A drainage ditch;
 3. A swale; or
 4. A detention facility created by humans in an area that was upland at the time the facility was created.

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

There are many small activities that can be pursued in a transition area under general permits, like the general permits discussed above, for activities in freshwater wetlands. In addition, in some cases the transition area's shape may be altered to allow an activity, without diminishing its total size. This is called transition area averaging.

Wetlands in many areas extend beyond the floodplain, but the 100-year floodplain areas almost overlap wetland boundaries. The wetlands absorb a significant amount of runoff into the ground during overflow and flooding events. So it is important to protect wetlands to prevent flooding and to provide protection of adjacent developed areas. Another important role of wetlands is to allow recharge of ground water aquifers. The wetlands are composed of hydric soils (soils that are saturated with water) that can be of two types - discharge hydric soils, which release ground water to the land surface, or recharge hydric soils, which allow water to percolate to ground water/aquifer. Sometimes the discharge hydric soils may also function as season dependent recharge systems.

The southern and western parts of South Brunswick Township are dominated by wetlands. These wetlands are found throughout the floodplains of the Shallow Brook, Devil's Brook, Heathcote Brook and their tributaries. Development throughout this area is constrained by the presence of wetlands on most sites. Wetlands also form a major part of the Pigeon Swamp State Park and Great Ditch floodplain. The wetlands found within the northern half of the Township are found primarily along Oakeys Brook and Lawrence Brook and their tributaries. These wetland areas are far more linear in nature and it is likely that significant wetlands areas have already been disturbed by development over the previous century.

Type of Wetlands	Area (in acres)	Percent of total
Deciduous Wooded Wetlands	6223	78

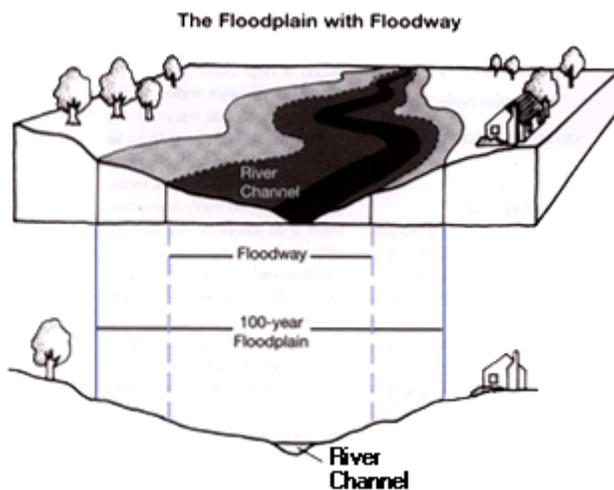
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Agricultural Wetlands (Modified)	701	9
Herbaceous Wetlands	357	4
Deciduous Scrub/Shrub Wetlands	316	4
Disturbed Wetlands (Modified)	169	2
Managed Wetlands (Modified)	134	2
Wetland Rights-Of-Way (Modified)	65	1
Coniferous Wooded Wetlands	1	<1
Mixed Forested Wetlands (Deciduous Dominant)	1	<1
Total wetlands area	7967	100
Note: Areas and percentages rounded to the nearest whole number		

Table WT1

FLOOD PLAINS

Floodplains are a vital part of any river or estuary ecosystem, acting as water filters and wildlife nurseries. They are important for the maintenance of water quality, providing fresh water to wetlands and backwaters while diluting salts and nutrients. Floodplains are major centers of biological life in the river and estuary ecosystem and improve the overall health of the habitat used by many species of birds, fish, and plants. They are important biologically, as they represent areas where many species reproduce and as such are important for breeding and regeneration cycles.



New Jersey regulates construction in the floodplain under the Flood Hazard Area Control Act, N.I.S.A. 58:16A-50 et seq., and its implementing rules at N.J.A.C. 7:13. The NJDEP Land Use Regulation Program manages Stream Encroachment Permitting in the state, more information, such as that provided below, is available at the programs website: <http://www.state.nj.us/dep/landuse/se.html>

The state regulates work in floodplains for two reasons. First, such regulation protects the person who is building from loss of life and property in case of a flood. Flooding causes an estimated \$3 billion of damage in the United States every year. State regulations minimize the damage by ensuring that buildings are placed in safe areas, and are constructed to withstand high water.

The second reason to regulate building in flood plains is to protect other properties along the stream or pond from flood damage. When you build on a flood plain and the waters begin to rise, the buildings on your property displace water thus increasing the height of the rising waters and making the flooding worse everywhere along the banks. In addition, your buildings and pavement

cover the natural ground surface that would have helped soak up the water. Therefore, the more buildings and pavement allowed, the higher the flood waters along that water body will rise, and the worse the flooding problems will get. Even if a building is permissible in the flood plain, regulations are necessary to ensure that it is strongly constructed so that it won't wash away in floodwaters, causing danger and damage downstream.

The flood plain is made up of two parts - the floodway and the flood fringe. The floodway is the inner area where floodwaters are deep and move fast. The floodway always includes the streambed or lakebed where the water normally flows, and usually extends to the top of the bank (if there is a defined bank) and sometimes beyond. The flood fringe is the outer area where floodwaters move more slowly, appearing more still, like a lake or pond.

A building in a floodway will block the water's flow, backing up water and causing flooding upstream to worsen. A building in a flood fringe will prevent floodwaters from spreading out, thus forcing floodwaters downstream faster and increasing downstream flooding.

100-year Floodplain

The 100-year floodplain boundary area has been established by the Federal Emergency Management Administration (FEMA) to denote floodwater impoundment areas. These areas are highly restrictive in order to avoid destruction of flood areas and the destruction of property that has been improperly located and therefore subject to flooding. The 100-year floodplain is known as the Special Flood Hazard Area (SFHA).

According to the FEMA definition, the SFHA is defined as the area that will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year. The 1-percent-annual-chance flood is also referred to as the "base flood." Zone A, Zone AO, Zone AH, Zones A1-A30, Zone AE, Zone 99, Zone AR, Zone AR/AE, Zone AR/AH, Zone AR/AO, Zone AR/A1-A30, Zone AR/A, Zone V, Zone VE, and Zones V1-V30 on the FIRM maps are part of the SFHA. FIRMs are maps that show different floodplains with different zone designations. These are primarily for insurance rating purposes, but the zone differentiation can be very helpful for other floodplain management purposes. Note that the special Flood Hazard Area (SFHA) includes only A and V Zones.

Flood Insurance Zone Designations

Following are the categories and zones designated by FEMA for the purposes of flood planning and insurance:

High Risk – Coastal Areas:

Zones V, VE and V1-V30: These are flood areas along coasts and do not apply to South Brunswick Township.

High Risk Areas:

Zone A: Areas subject to inundation by the 1-percent-annual-chance flood event. Because detailed hydraulic analyses have not been performed, no BFEs or flood depths are shown. Mandatory flood insurance purchase requirements apply.

Zones AE and A1-A30: Areas subject to inundation by the 1-percent-annual-chance flood event, determined by detailed methods. BFEs are shown within these zones. Mandatory flood insurance purchase requirements apply. (Zone AE is used on new and revised maps in place of Zones A1-A30.)

Zone AH: Areas subject to inundation by 1-percent-annual-chance shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. BFEs derived from detailed hydraulic analyses are shown in this zone. Mandatory flood insurance purchase requirements apply.

Zone AO: Areas subject to inundation by 1-percent-annual-chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average flood depths derived from detailed hydraulic analyses are shown within this zone. Mandatory flood insurance purchase requirements apply.

Zone A99: Areas subject to inundation by the 1-percent-annual-chance flood event, but which will ultimately be protected upon completion of an under-construction Federal flood protection system. These are areas of special flood hazard where enough progress has been made on the construction of a protection system, such as dikes, dams, and levees, to consider it complete for insurance rating purposes. Zone A99 may only be used when the flood protection system has reached specified statutory progress toward completion. No BFEs or flood depths are shown. Mandatory flood insurance purchase requirements apply.

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Zone AR: Areas that result from the decertification of a previously accredited flood protection system that is determined to be in the process of being restored to provide base flood protection. Mandatory flood insurance purchase requirements apply.

Zones AR/AE, AR/AH, AR/AO, AR/A1-A30, AR/A: Dual flood zones that, because of the risk of flooding from other water sources that the flood protection system does not contain, will continue to be subject to flooding after the flood protection system is adequately restored. Mandatory flood insurance purchase requirements apply.

Moderate to Low Risk Areas:

Zones B, C, and X: Areas of moderate or minimal hazard from the principal source of flood in the area. However, buildings in these zones could be flooded by severe, concentrated rainfall coupled with inadequate local drainage systems. Local stormwater drainage systems are not normally considered in the community's FIS. The failure of a local drainage system creates areas of high flood risk within these rate zones. Flood insurance is available in participating communities but is not required by regulation in these zones. (Zone X is used on new and revised maps in place of Zones B and C.)

Undetermined Risk Areas:

Zone D: Unstudied areas where flood hazards are undetermined, but flooding is possible. No mandatory flood insurance purchase requirements apply, but coverage is available in participating communities.

Several areas of South Brunswick Township are located in what the Federal Emergency Management Agency (FEMA) considers to be a flood hazard area. The floodplain in the Township has similar locations as wetlands. Thus, the floodplain in combination with the wetlands provides additional open space areas within the Township.

Location and acreage of FEMA-designated flood zones within South Brunswick Township:

Zone	Location	Area (acres)	Percent
A	Pigeon Swamp State Park, and along tributaries of Shallow Brook, Heathcote Brook, and Lawrence Brook	2033	8
A1-A30	Along mainstream of Heathcote Brook, Devil's Brook, and Shallow Brook	1697	7
B	Along outer edge of the floodplains of all streams	153	1
C	Remainder of the township	21690	85
	Totals	25572	100
Note: Areas and percentages rounded to the nearest whole number.			

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Riparian areas are transitional land areas between uplands and streams that serve a wide variety of functions. Impaired riparian zones or streams without riparian areas do not receive protection from negative influences such as polluted surface water runoff or stream bank erosion. Natural riparian areas help preserve land areas along streams, rivers and other water bodies that can be used for open space and recreational uses.

CRITICAL HABITAT AREAS

The NJDEP Endangered and Non-Game Species Program created the Landscape Project as an ecosystem level approach to identifying and protecting species habitat in the state. The program identifies critical habitat areas and ranks them by the presence or absence of priority, threatened or endangered species. The habitat areas are divided into five broad habitat types, grasslands, forested wetlands, forest, emergent wetlands and beach. These five habitat types are then mapped into habitat blocks and the habitat blocks are ranked based on the presence or absence of priority, threatened or endangered species. Specific habitat areas for bald eagle foraging areas, urban peregrine falcon nests, and wood turtles have further augmented the information gathered for the different habitat types.

The following four habitat types are all part of the Piedmont Plains landscape. This landscape encompasses all or parts of Burlington, Gloucester, Mercer, Middlesex, Monmouth and Salem counties. It is dominated by the Delaware and Raritan rivers, and is characterized by farmed areas, extensive grasslands, fragmented woodlands and tidal freshwater marshes that are among the most productive in the world. Imperiled species within this landscape include grassland birds such as the endangered upland sandpiper, and woodland raptors such as the barred owl and Cooper’s hawk. The importance of these habitat areas and ranking is to preserve not just specific threatened locations of imperiled species, but also all the critical wildlife areas that must be preserved to protect those species.

Areas of each type and rank of landscape habitats in South Brunswick Township:

Habitat Type	Suitable habitat	Priority habitat	State Threatened habitat	Total
Grasslands	907	3087	192	4186
Emergent Wetlands	837	147	4	988
Forested Wetlands	4138	1824	177	6139
Forest	5070	3674	1249	9993
Note: Area in acres, rounded to nearest whole number. The total areas do not add up to the area of the township (26,128 acres). Many habitat types overlap each other, resulting in one or more types in a particular area.				

Table CH1

Grassland – The critical area maps for grassland dependent species were generated by selecting specific land-use classes from NJDEP’s Land Use/Land Cover data set, aggregating the various, contiguous habitat patches into a single grassland habitat patch and then ranking each patch for the presence or absence of Federal and State priority, threatened or endangered species. The Land Use/Land Cover classes used are:

- Agriculture Confined Feeding Operations

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- Agriculture Cropland And Pastureland
- Agriculture Orchards/Vineyards/Nurseries/Horticultural Areas
- Agriculture Other Agriculture
- Other Urban Or Built-Up Land

South Brunswick has all of or portions of 91 distinct grassland habitat patches that either lie entirely within or that cross over into adjacent municipalities; they total approximately 4186 acres. Of these, 907 acres are suitable grasslands habitat, 3087 acres are priority grasslands habitat, and 192 acres are state threatened habitats. The suitable grassland habitat areas are located around Beekman Road in the north, between Deans' area and Pigeon Swamp State Park, and around Culver Road and Friendship Road and south of Scotts Corner Road. The priority habitat areas are located mainly west of Stouts Lane and east of US Route 130. State threatened grassland habitat is in two large patches – one around the intersection of Summerfield Boulevard and Route 522, and another at the intersection of Scotts Corner Road and Friendship Road.

Emergent Wetland – The critical area maps for emergent wetland dependent species were generated by selecting specific land-use classes from NJDEP's Land Use/Land Cover data set, aggregating the various, contiguous habitat patches into a single emergent wetland habitat patch and then ranking each patch for the presence or absence of Federal and State priority, threatened or endangered species. The Land Use/Land Cover classes used are:

- Wetlands Agricultural Wetlands (Modified)
- Wetlands Former Agricultural Wetland (Becoming Shrubby)
- Wetlands Herbaceous Wetlands
- Wetlands Severe Burned Wetlands
- Wetlands Wetland Rights-Of-Way (Modified)

South Brunswick has all of or portions of 156 distinct emergent wetland habitat patches that either lie entirely within or that cross over into adjacent municipalities that total approximately 988 acres. Of these, 837 acres are suitable emergent wetland habitat, 147 acres of priority emergent wetland habitat, and 4 acres of state threatened emergent wetland habitat. The suitable habitat is located mainly in the south of Ridge Road and the priority habitat in the northeastern and western parts of the township. The state threatened area lies within the Pigeon Swamp State Park.

Forested Wetland – The critical area maps for forested wetland dependent species were generated by selecting specific land-use classes from NJDEP's Land Use/Land Cover data set, aggregating the various, contiguous habitat patches into a single forested wetland habitat patch

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and then ranking each patch for the presence or absence of Federal and State priority, threatened or endangered species. The Land Use/Land Cover classes used are:

- Wetlands Atlantic White Cedar Swamp
- Wetlands Coniferous Scrub/Shrub Wetlands
- Wetlands Coniferous Wooded Wetlands
- Wetlands Deciduous Scrub/Shrub Wetlands
- Wetlands Deciduous Wooded Wetlands
- Wetlands Mixed Forested Wetlands (Coniferous Dominant)
- Wetlands Mixed Forested Wetlands (Deciduous Dominant)
- Wetlands Mixed Scrub/Shrub Wetlands (Coniferous Dominant)
- Wetlands Mixed Scrub/Shrub Wetlands (Deciduous Dominant)

South Brunswick has all of or portions of 233 distinct forested wetland habitat patches that either lie entirely within or that cross over into adjacent municipalities that total approximately 6139 acres. Of these, 4138 acres are suitable forested wetland habitat, 1824 acres are priority forested wetland habitat, and 177 acres are state threatened forested wetland habitat. The suitable habitat is found west of US Route 130 - along stream banks in the north and as large contiguous patches in the south. Priority habitat is found mainly around Pigeon Swamp State Park and in the southwestern part of the township. The state endangered habitat area lies within the Pigeon Swamp State Park.

Forest – The critical area maps for forest dependent species were generated by selecting specific land-use classes from NJDEP's Land Use/Land Cover data set, aggregating the various, contiguous habitat patches into a single forest habitat patch and then ranking each patch for the presence or absence of Federal and State priority, threatened or endangered species. The Land Use/Land Cover classes used are:

- Forest Coniferous Brush/Shrubland
- Forest Coniferous Forest (>50% Crown Closure)
- Forest Coniferous Forest (10-50% Crown Closure)
- Forest Deciduous Brush/Shrubland
- Forest Deciduous Forest (>50% Crown Closure)
- Forest Deciduous Forest (10-50% Crown Closure)
- Forest Mixed Deciduous/Coniferous Brush/Shrubland
- Forest Mixed Forest (>50% Coniferous With >50% Crown Closure)
- Forest Mixed Forest (>50% Coniferous With 10%-50% Crown Closure)

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- Forest Mixed Forest (>50% Deciduous With >50% Crown Closure)
- Forest Mixed Forest (>50% Deciduous With 10-50% Crown Closure)
- Forest Old Field (< 25% Brush Covered)
- Forest Plantation
- Forest Severe Burned Upland Vegetation

South Brunswick has all of or portions of 111 distinct forest habitat patches that either lie entirely within or that cross over into adjacent municipalities that total approximately 9993 acres. Of these, 5070 acres are suitable forest habitat, 3674 acres are priority forest habitat and 1249 acres are state threatened forest habitat. The suitable forest habitat is found in large contiguous patches between the western boundary of the township with Franklin Township and US Route 130. Priority forest habitat areas are located mainly between Friendship Road and Route 522, and north of Deans Rhode Hall Road and Sand Hills Road. The entire Pigeon Swamp State Park is a state threatened forest habitat.

Wood Turtle Habitat – Critical areas for wood turtles are mapped following a four-step process. First, a one-mile radius is placed around each wood turtle sighting location in Natural Heritage Program Database. A 322-meter buffer is then applied to all streams (classified as 1st order or greater) that fall within this one-mile radius. The NJDEP Land Use/Land Cover data set is then overlaid on the buffered areas and all areas classified as urban, with the exception of power-line rights-of-way, are deleted from the buffer. NJDEP Freshwater Wetland Maps are overlaid on the stream buffers, and all wetlands that intersect the buffer are clipped within the one-mile radius and are merged into the stream/buffer polygon. The final step of the process involves a detailed quality control check and revision of each polygon to ensure biological accuracy. The wood turtle model is a stand-alone layer that is not used to value habitat patches.

South Brunswick has about 2194 acres of wood turtle habitat, which includes all of or portions of 2 habitat patches that either lie entirely within or that cross over into adjacent municipalities. The wood turtle habitat patch around Farrington Lake has 3 reported sightings, and the habitat patch around the Conrail right of way has 1 reported sighting.

AQUIFERS

Ground water is water below that land surface that is stored in the cracks and spaces in rock, sand and gravel formations. Precipitation to the land surface can become ground water if it infiltrates through the soils to the saturated area, a process called ground water recharge. Ground water eventually makes it way back to the surface and provides water to springs, streams, ponds and lakes – in natural areas this ground water is the only flow in a stream during dry periods.

An aquifer is a ground water formation that can provide economically useful quantities of water to a pumping well – whether for a single home, a business, a farm or a municipality. Note that all aquifers contain ground water, but not all ground water is in aquifers! For this reason, it is important to know what portion of total ground water recharge reaches aquifers and is available for human use. The rate of recharge is not the same for all aquifers, though, 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 and less water and eventually run dry. In addition, excessive human uses can damage the surface waters to which ground water naturally flows, drying up streams during droughts.

The Aquifers of New Jersey are classified as either consolidated (rock formations, also known as bedrock) or unconsolidated (sand and gravel) aquifers. Consolidated aquifers contain ground water in fractures and sometimes pore spaces, while unconsolidated aquifers contain ground water primarily in the pore spaces between sand and gravel particles. The bedrock aquifers in New Jersey include fractured-rock aquifers of the Valley and Ridge, Highlands, and Piedmont physiographic provinces. The Piedmont province included several types of rock formations, including shale, sandstone, basalt and diabase such as the Sourland Mountains. Unconsolidated aquifers include the sand aquifers of the Coastal Plain physiographic province and the aquifers of glacial sediment exceeding 50 ft. thickness in northern New Jersey. Where aquifer formations are at the land surface with no confining layer over them, they are known as surficial aquifers. Where an aquifer is overlain by a confining layer (such as a thick clay lense) it is know as a confined aquifer and the water in it may be under pressure, able to rise up through a well all the way above the land surface (an artesian well). For instance, the Potomac-Raritan-Magothy Aquifers are a series of Coastal Plain aquifers with confining layers in between.

The Aquifers of New Jersey are also ranked by their yield rates or the gallons for minute that can be expected from wells in each aquifer. The ranking consists of a scale from A through E, as follows: A - greater than 500 gallons per minute, B - 251 to 500 gallons per minute, C - 101 to 250 gallons per minute, D - 25 to 100 gallons per minute, E – less than 25 gallons per minute.

The aquifers in South Brunswick Township are in both the Coastal Plain province and the Newark Basin part of the Piedmont province. The yield rates of the two major aquifers and their component formations are in the table below. The aquifers are distinguished by the types of materials, porosity, chemical and physical composition, and as a result, the quantity and quality of water they yield. The physical and chemical descriptions of the different aquifers systems found in South Brunswick Township are as below:

Aquifer Name	Aquifer Rank	Well Yield (gallons/minute)	Area in Township (Acres)	Percent
Brunswick aquifer	C	101 to 250	3406	13
Diabase	E	< 25	2779	11
Lockatong Formation	D	25 to 100	2462	9
Potomac-Raritan-Magothy	A	> 500	15998	61
Stockton Formation	C	101 to 250	1569	6
		Totals	26214	100
Note: Area and percent area have been rounded off to the nearest whole number.				

Table AQ1

Aquifers of the Newark Basin part of the Piedmont

Brunswick Aquifer: With an aquifer rank of “C” and an average yield of 101 to 250 gallons per minute, this aquifer is composed of sandstone, siltstone, and shale of the Passaic, Towaco, Feltville, and Boonton Formations. The water from this aquifer is normally fresh, slightly alkaline, non-corrosive and hard, containing calcium-bicarbonate and sub-ordinate calcium-sulfate waters that are associated with high total dissolved solids. This system covers about 13% of the Township, primarily along the Route 27 corridor.

Diabase: Composed of hard and dense igneous rocks, this aquifer system rarely has high-capacity wells. The system ranks “E” with an average yield of less than 25 gallons per minute per well. The ground water is stored and transmitted in fractures. Water is normally fresh, slightly- to highly- alkaline, moderately hard, and of the calcium-bicarbonate type. This system covers about 11% of the Township, primarily cutting across to the Route 1 corridor from the Sand Hill area to the Little Rocky Hill area and Kingston (including the Kingston Quarry area).

Lockatong Formation: This “D”-ranked aquifer, with an average yield of 25 to 100 gallons per minute, is composed of silty argillite, mudstone and fine-grained sandstone, and siltstone with minor limestone. The ground water is stored and transferred in fractures. Wells completed in the conglomerate facies generally show increased capacities of ground water yield. Water is normally

fresh, slightly alkaline, non-corrosive, and hard. Calcium-bicarbonate type waters dominate. The Lockatong formation covers about 9% of the Township, primarily along and east of the Route 1 corridor.

Stockton Formation: The Stockton formation, composed of arkosic sandstone, has a Middlesex county rank "C" and an average yield of 101 to 250 gallons per minute. The ground water is stored and transferred in fractures. Water is fresh, slightly acidic, corrosive, and moderately hard. Calcium-bicarbonate type waters dominate. This formation covers only 6% of the Township, primarily to the east of the Lockatong Formation and south of Route 522.

Coastal Plain Aquifers

Potomac-Raritan-Magothy aquifer system: This is the largest aquifer system in South Brunswick, covering about 61% the Township, primarily east of Ridge Road and Georges Road. The Potomac-Raritan-Magothy aquifer system has a Middlesex county rank of "A" and an average yield of more than 500 gallons per minute per well. The aquifer system is comprised of inter-bedded sand, gravel, silt and clay separated into lower, middle and upper aquifers. It includes the Raritan confining unit composed of inter-bedded sand, silt and clay. The total thickness of the Raritan in the outcrop area is 150 to 400 feet. Water is fresh, moderately hard with a near-neutral pH. Elevated iron and manganese are common. Calcium and magnesium levels decrease and sodium and potassium levels generally increase towards the southeast. Calcium-bicarbonate type waters dominate. South Brunswick Township has historically used this formation for much of its water supply, however the Township now purchases surface water supplies from other water supply systems for much of its' needs.

GROUND WATER RECHARGE AREAS

Ground water recharge is defined as the natural process of infiltration and percolation of rainwater from land areas or streams through permeable soils into water-holding rocks or unconsolidated materials (such as sands and gravels) that provide underground storage in saturated zones known as ground water; where the ground water can yield good water supplies to wells it is known as an aquifer. The Ground Water Recharge Map in this ERI is an estimation of ground water recharge for Middlesex County using the NJGS methodology from NJ Geological Survey Report GSR-32 "A Method for Evaluation of Ground-Water-Recharge Areas in New Jersey." Land-use/land-cover, soil and municipality-based climatic data were combined and used to produce an estimate of ground-water recharge in inches/year, using average annual precipitation values. Recharge was then ranked by volume (billions of gallons/year) using natural breaks in the percentage of total volume.

Most areas, unless composed of solid rock or covered by development, allow a certain percentage of total precipitation to reach the water table (the upper layer of a ground water unit or aquifer). South Brunswick is generally blessed with adequate recharge potential throughout the Township, with the notable caveat that large portions of the Township are composed of wetlands or hydric soils that generally have very limited recharge, if any. The following table shows the area of land in each recharge range:

County Rank	Range of Recharge Rate	Acres	Percent
A	15 to 18 in/yr	221	<1
B	11 to 14 in/yr	9223	36
C	9 to 10 in/yr	2915	11
D	1 to 8 in/yr	2128	8
E	0 in/yr	1186	5
L	Hydric soils	1765	7
W	Wetlands	8498	33
	Total Area	25936	100
Note: Area and percent area have been rounded off to the nearest whole number			

Table GW1

A major contributing factor in the amount of ground water recharge is the type of soils found in the area. The following table shows the series of soils found in South Brunswick Township:

County Rank	Range of Recharge	Soil Series' included

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County Rank	Range of Recharge	Soil Series' included
A	15 to 18 in/yr	Downer, Evesboro, Hammonton, Klinesville-Urban Land, Sand and Gravel Pits, Sassafras
B	11 to 14 in/yr	Chalfont, Downer, Dunellen variant, Evesboro, Hammonton, Keyport, Klinesville, Klinesville-Urban land, Lansdowne, Matapeake, Mattapex, Mount Lucas, Nixon, Nixon variant, Nixon variant-Urban land, Penn, Phalanx, Reaville, Rowland, Sand and gravel pits, Sassafras, Sassafras-Urban land, Woodstown, Woodstown-Urban land
C	9 to 10 in/yr	Chalfont, Keyport, Keyport-Urban land, Lansdowne, Lansdowne variant, Lansdowne-Urban land, Mattapex, Mount Lucas, Penn, Reaville, Rowland, Sassafras, Woodstown, Woodstown-Urban land
D	1 to 8 in/yr	Chalfont, Downer, Hammonton, Keyport, Klinesville, Klinesville-Urban land, Lansdowne, Matapeake, Mattapex, Mount Lucas, Nixon, Nixon variant, Penn, Reaville, Rowland, Sand and gravel pits, Sassafras, Sassafras-Urban land, Woodstown
E	0 in/yr	Chalfont, Psammets, Reaville-Urban land, Sassafras, Udorthents, Urban land
L	Hydric soils	Elkton, Fallsington, Fallsington variant, Humaquepts, Manahawkin, Mullica, Parsippany, Reaville variant, Watchung
W	Wetlands and Open Waters	Chalfont, Downer, Elkton, Evesboro, Fallsington, Fallsington variant, Humaquepts, Keyport, Klinesville-Urban land, Lansdowne, Manahawkin, Matapeake, Mount Lucas, Mullica, Nixon, Nixon variant, Parsippany, Psammets, Reaville variant, Rowland, Sand and gravel pits, Sassafras, Udorthents, Watchung, Woodstown

Table GW2

The quality of ground water recharged to the water table depends largely on the nature of the overlying land use. Areas with significant concentrations of septic systems, urban land or active agriculture are known to be more prone to contamination of ground water recharge, as are those Known Contaminated Sites or sites on the Site Remediation Program (SRP) Comprehensive Site List where ground water contamination has been identified. Where ground water contamination has been verified, New Jersey has a system for designating Classification Exception Areas (CEA), as institutional controls in geographically defined areas within which the New Jersey Ground Water Quality Standards (GWQS) for specific contaminants have been exceeded.

PUBLIC COMMUNITY WATER SUPPLY WELLS AND WELLHEAD PROTECTION AREAS

According to the NJDEP, "A Well Head Protection Area (WHPA) in New Jersey is a map area calculated around a Public Community Water Supply (PCWS) well that delineates the horizontal extent of ground water captured by a well pumping at a specific rate over a two, five, and twelve-year period of time for unconfined wells. Confined wells have a fifty foot radius delineated around each well serving as the wellhead protection area to be controlled by the water purveyor in accordance with Safe Drinking Water Regulations" (see NJAC 7:10-11.7(b) 1).

- Unconfined wells are completed in the uppermost-saturated aquifer at that location
- Confined wells are sunk through an impermeable stratum down into an aquifer, which is sandwiched between two impermeable strata. The majority of confined aquifers are classified as artesian because the hydraulic head in a confined well is higher than the level of the top of the aquifer. If the hydraulic head in a confined well is higher than the land surface it is a "flowing" artesian well.

Well Head Protection Area delineations are conducted in response to the Safe Drinking Water Act Amendments of 1986 and 1996 as part of the Source Water Area Protection Program (SWAP). The delineations are the first step in defining the sources of water to a public supply well. Within these areas, potential contamination will be assessed and appropriate monitoring will be undertaken as subsequent phases of the NJDEP SWAP program.

The Wellhead Protection Areas Map indicates that the NJDEP has mapped 4 Public Community Water Supply wells in South Brunswick Township as of July 2006. The South Brunswick Township Water Division owns all of the wells in the Township.

Well Name	Well Owner	Well Address	Completion Date	Depth (feet)	Well Type	Pump Rate (gallons/minute)
Well 11	South Brunswick Twp Water Division	Jamesburg Road	10/28/1963	118	Unconfined	1100
Well 13	South Brunswick Twp Water Division	Georges Road	08/03/1971	138	Unconfined	1300
Well 15	South Brunswick Twp Water Division	Broadway Road	05/01/1979	166	Unconfined	1400
Well 16	South Brunswick Twp Water Division	Miller Road	08/06/1998	170	Unconfined	1800

Well Name	Geologic Formation	Hydrologic Unit	Watershed
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Well 11	Raritan Formation - Farrington Sand member	Middle Potomac-Raritan-Magothy aquifer	Millstone
Well 13	Raritan Formation - Farrington Sand member	Middle Potomac-Raritan-Magothy aquifer	Millstone
Well 15	Raritan Formation - Farrington Sand member	Middle Potomac-Raritan-Magothy aquifer	Millstone
Well 16	Raritan Formation - Farrington Sand member	Middle Potomac-Raritan-Magothy aquifer	Millstone

Table PCWS1

The Wellhead Protection Areas include the 2-, 5- and 12-year tiers for public community wellheads and public non-community wellheads. There is only one (Well 16) public community water supply well in the Township that does not have wellhead protection areas delineated. It is unclear why NJDEP has not delineated the protection areas for this well. The DEP does not have GIS data available for public non-community well locations as well.

GROUND WATER CONTAMINATION CLASSIFICATION EXCEPTION AREAS/ WELL RESTRICTION AREAS (CEA / WRA)

The quality of ground water recharged to the water table depends in part on the presence of Known Contaminated Sites or sites on the Site Remediation Program (SRP) Comprehensive Site List where ground water contamination has been identified. Such areas, known as Classification Exception Area (CEA) and Well Restriction Areas (WRAs), are institutional controls in geographically defined areas within which the New Jersey Ground Water Quality Standards (NJGWQS) for specific contaminants have been exceeded.

The CEA list is compiled by New Jersey Department of Environmental Protection (NJDEP), Site Remediation Program (SRP), Division of Remediation Support (DRS), Information Services Element (ISE), Bureau of Information Services and Program Support (BISPS)

When a CEA is designated for an area, the constituent standards and designated aquifer uses are suspended for the term of the CEA. A public understanding of where ground water is known to be contaminated can help prevent inappropriate well placement, preventing potential health risks and can minimize unintended contaminant plume migration.

There are 15 CEAs/WRAs located within South Brunswick Township:

Name	Address (Block-Lot/s)	Area (acres)	Depth (feet)	Lead Agency	Contaminants
Amoco Service Station #60763	4020 Rt. 1 N. (85-2.05,2.11)	1.90	50	BUST	Benzene, Methyl Tertiary Butyl Ether, t-Butyl Alcohol, Toluene, Ethyl benzene, Xylenes
Amoco Service Station #670	Rt. 130 & Georges Rd.	16.73		BUST	Benzene, Methyl Tertiary Butyl Ether, t-Butyl Alcohol, Tentatively Identified Compounds, Toluene, Ethyl benzene, Xylenes
Exxon Service Station #3-2235	Rt. 1 & New Rd. (96-49.01)	0.28	25	BUST	Benzene, Methyl Tertiary Butyl Ether, t-Butyl Alcohol
Exxon Service Station #3-3032	Rt. 27 & New Rd.	0.47		BUST	Benzene, Methyl Tertiary Butyl Ether, t-Butyl Alcohol
IBM Corp-Deep Aquifer	431 Ridge Rd. (33-1.01,1.02,1.03)				Trichloroethylene, Tetrachloroethylene, 1,1,1-Trichloroethane, 1,1-dichloroethylene
IBM Corp-Shallow Aquifer	431 Ridge Rd. (33-1.01,1.02,1.03)				
K&A	Rt. 130 S. (1.21-04)	0.38		BUST	Benzene

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Name	Address (Block-Lot/s)	Area (acres)	Depth (feet)	Lead Agency	Contaminants
Properties					
Ocean Fuel Corp.	Rt. 130 N. & Fresh Ponds (31.01-29.13, 29.14)	0.40	50	BUST	Benzene, Methyl Tertiary Butyl Ether
Operating Engineers, Local 825	Deans Rhode Hall Rd.	1.19		BUST	Benzene, Methyl Tertiary Butyl Ether, t-Butyl Alcohol, Naphthalene
S. Brunswick Citgo-Bilkoo Const. Inc.	3817 Rt. 1 S. (93.01-13.11)	0.27		BUST	Benzene, Methyl Tertiary Butyl Ether
Shell Service Station	Rt. 1 & Finnegan Ln. (9202-23;154-3)	2.01	50	BUST	Benzene, Lead, Arsenic, Xylenes, Ethyl benzene, Toluene
South Brunswick Plaza Ltd.	Stouts Ln. & Rt. 1 N. (84-1.012,1.013)	3.98	50	BUST	Benzene, Xylenes, Ethyl benzene
South Brunswick Township Landfill	New Rd. (96-44)	0.26	10	BCM	Benzene, Trichloroethylene, Chlorobenzene, Chloroform
Southview Industrial Park	303 Ridge Rd. (15.01-13.111)	7.28	60	BFO-S	Trichloroethylene
SR Metro, Inc.	Ridge Rd. (43-4)	0.06		BUST	Tentatively Identified Compounds

Agency Abbreviations: BUST – Bureau of Underground Storage Tanks; BCM – Bureau of Case Management; BFO-S – Bureau of Field Operations - Southern office

Table CEA1

Currently Known Extent of Groundwater Contamination (CKE)

Currently Known Extent (CKE) of ground water pollution areas are geographically defined areas within which the local ground water resources are known to be compromised because the water quality exceeds drinking water and ground water quality standards for specific contaminants. The regulatory authority for developing CKEs is in N.J.A.C. 7:1J, entitled Processing of Damage Claims Pursuant to the Spill Compensation and Control Act. CKEs are used by NJDEP staff, water purveyors, and local officials to make decisions concerning appropriate treatment and/or replacement of contaminated drinking water supplies.

The CKE list is compiled by the New Jersey Department of Environmental Protection (NJDEP) and Site Remediation Program (SRP). In the map of ground water contamination, the CKE is NJDEP’s GIS-based spatial extent of known potable well contamination in an area (as determined by NJDEP Site Remediation staff). Of the total 229 acres, only 28.6 acres of the Smith Residence CKE are within South Brunswick Township. The majority of this area lies within Monroe Township.

NJPDES

The NJPDES Program protects New Jersey's ground and surface water quality by assuring the proper treatment and discharge of wastewater (and its residuals) and stormwater from various types of facilities and activities. To accomplish this, permits are issued limiting the mass and/or concentration of pollutants which may be discharged into ground water, streams, rivers, and the ocean. The types of regulated facilities can range from very small users such as campgrounds, schools, and shopping centers to larger industrial and municipal wastewater dischargers

Surface Water Discharge

This regulated activity involves the discharge of treated effluent from various municipal and industrial facilities directly into a river, stream, or the ocean. These facilities operate under the authority of a NJPDES permit which limits the mass and/or concentration of pollutants discharged.

The following table lists the surface water discharge points for the Township of South Brunswick.

Name of the Facility	Receiving Waters	Discharge Type	Pipe Category	Status
Exxon S/S 3-3032	Ten Mile Run via storm sewer	B4B	B4B	R
Exxon S/S 3-2235	Heathcote Brook via storm sewer	B4B	B4B	R
MCMEC - South Co Facility	Shallow Brook via pond tributary	B4B	B4B	R
MCMEC - South Co Facility	Shallow Brook via pond tributary	B4B	B4B	E
Garden State Tile Distributors	Great Ditch via storm sewer	IMI	B	E
Weldon Asphalt	Great Ditch via storm sewer	IMI	RF	X
John C Dolph Co	Heathcote Brook via storm sewer	IMI	RF	X
Glenn Spring Holdings Inc	Lawrence Brook via storm sewer	IMI	RF	R
IBM Corporation	Lawrence Brook via storm sewer	IMI	RF	R
EniChem America Inc	Cow Yard Brook via storm sewer	IMI	5G	R
Princeton Technology Center	Lawrence Brook via unnamed tributary	IMI	B	E
Mideast Aluminum Industry	Oakeys Brook via unnamed tributary & storm sewer	IMJ	B	R

Table NJPDES1

Description of Abbreviations:

Discharge Type: B4B – Petroleum hydrocarbon remediation; IMI – Industrial minor - based on the amount of pollutant(s) in the effluent; IMJ – Industrial major - based on the amount of pollutant(s) in the effluent

Pipe Category: B4B – General permit GW petroleum product cleanup; B – Industrial discharge; RF – Stormwater; 5G – General industrial site stormwater runoff

Status: R - Revoked/Terminated - Pipe no longer permitted for discharge; E - Existing in the point source permitting regions; X - Permits transferred to the Bureau of Non-point Pollution Control

Ground Water Discharge

The discharge of pollutants to the ground waters of the State is regulated by the Department under the authority of the New Jersey Water Pollution Control Act (WPCA) N.J.S.A. 58:10A. The WPCA specifies that "No person shall discharge any pollutant except in conformity with a valid NJPDES permit." The permit program is called NJPDES which stands for New Jersey Pollutant Elimination System, and the regulations are found at N.J.A.C. 7:14A.

NJPDES permits are required for discharges to ground water of both sanitary and industrial wastes, as defined in N.J.A.C. 7:14A-1.9. These permits, which limit the mass and/or concentration of pollutants discharged, are issued to sanitary and industrial facilities that have ongoing, operational discharges of wastewater to ground water. The pollution control requirements contained in NJPDES ground water permits are those conditions necessary to restrict the discharge of pollutants to the ground waters of the state and protect the public health and the environment.

Regardless of flow volume or constituent content/concentration, all industrial discharges to ground water must be authorized under a NJPDES permit or procure an exemption or non-permit determination. Sanitary discharges to ground water may be subject to NJPDES program requirements based on flow volume and method of discharge. In most cases, a Treatment Works Approval (TWA) is required prior to constructing or altering facilities associated with a NJPDES permit.

The types of discharge activities that are regulated by the Division of Water Quality and its NJPDES program include: surface impoundments; infiltration/percolation lagoons; overland flow systems; spray irrigation systems; and various types of subsurface disposal systems that are classified as underground injection systems.

The types of facilities regulated include: mines, pits and quarries; schools and hospitals; potable water treatment plants; large corporate office buildings; industrial manufacturing facilities; campgrounds and mobile home parks; food processors; and sewage treatment plants and other dischargers of wastewater that can impact ground water, including dredge spoils disposed onto land.

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The following table lists the ground water discharge points for the Township of South Brunswick.

Name of the Facility	Receiving Waters	Discharge Type	Pipe Category	Status
Dallenbach Sand Company Inc	Infiltration Pond	INF	I	E
Dallenbach Sand Company Inc	Infiltration Pond	INF	I	U

Table NJPDES2

Description of Abbreviations:

Discharge Type: INF – Infiltration lagoon, pond, spray field or other such water body.

Pipe Category: I – Various infiltration lagoons or other impoundments

Status: E - Existing in the point source permitting regions; U – Unknown (could not be determined from data available)

BROWNFIELDS AND KNOWN CONTAMINATED SITES

A Brownfield is defined under NJ state law (N.J.S.A. 58:10B-23.d) as "any former or current commercial or industrial site that is currently vacant or underutilized and on which there has been, or there is suspected to have been, a discharge of a contaminant." While this is the definition recognized in state legislation, there are many variations on this definition. Generally, brownfields are properties that are abandoned or underutilized because of either *real or perceived* contamination.

Brownfields can be a mixed blessing. At best, they are an opportunity to turn blighted areas into community assets with much of the cost coming from state funds for brownfields' reclamation. At worst, they are contaminated sites without sponsors that hamper efforts for redevelopment, especially for any land use such as housing, schools or parks that would lead to human contact with the contaminants.

The NJDEP Site Remediation Program has an excellent website with information on Brownfields (<http://www.state.nj.us/dep/srp/brownfields/>). Much of the following information is from that website supported by information specific to South Brunswick Township.

The NJDEP oversees some 23,000 contaminated sites. An estimated 10,000 of these are potential brownfield sites. Many more potential brownfields that may exist in the State are not yet before the Department for review. The NJDEP Known Contaminated Site List for 2005 listed 51 contaminated sites in South Brunswick Township. Following the statewide estimate, those 51 sites could produce about 12 to 15 brownfield sites appropriate for redevelopment or recreation development in South Brunswick Township.

NJDEP launched the "Brownfields to Greenfields" initiative in November 2002. That initiative encourages the restoration of Brownfield sites into recreational or natural areas. If a municipality, county or partnership wants to turn a Brownfield into a Greenfield; experienced NJDEP case managers can oversee remediation and revitalization efforts to help the locality comply with the Technical Requirements for Site Remediation. Assurance that the public is protected from any exposure is a key concern addressed by long term monitoring and maintenance of engineering and institutional controls when required. Funding for remediation and acquisition may be available from other parts of NJDEP, such as the Green Acres Program.

The NJDEP works with the NJ Economic Development Authority (EDA) in the implementation of the Hazardous Discharge Site Remediation Fund (HDSRF). The legislature created the HDSRF in 1993 to provide loans and grants to municipal governmental entities, the New Jersey Redevelopment Authority (NJRA), and private parties. HDSRF funding is devoted to remediating discharges of hazardous substances. Over the past ten years, the HDSRF provided over \$100,000,000 for remediation of over

1,000 sites. Municipalities may apply for grants and loans up to \$2 million per year for investigation and cleanup activities from the Hazardous Discharge Site Remediation Fund.

The New Jersey EDA plays a key role in financing these grants and loans, working with DEP to cover eligible costs and provide loan servicing. Grants are specifically provided to municipalities for a preliminary assessment (PA) and site investigation (SI) when a municipality holds the tax sales certificate or has foreclosed or has voluntarily acquired a property for redevelopment. Municipalities may obtain money to proceed with the remedial investigation (RI) if they own the property. If after conducting the PA/SI/RI a municipality wants to conduct the cleanup, low interest loans are available.

South Brunswick Township could benefit from this program by identifying contaminated sites, notifying NJDEP case managers and coming up with a plan for remediation. Often, sites can be cleaned and capped, and new surfacing for recreation areas can effectively “seal” the area. Recreation uses are also desirable for brownfields because one of the main concerns over re-use of sites is exposure. Recreation uses are almost by definition short-term exposures, a couple of hours at most for any activity, whereas residential development on re-use sites is more problematic due to prolonged exposure times on remediated sites.

Existing Brownfields and Landfills

Brownfields and landfills, polluted by former or ongoing uses, hold the potential for recreational open spaces. The NJDEP and the USEPA list 184 potentially contaminated sites in South Brunswick Township. These identified sites have been classified here into five categories:

Category	Number of sites
Known Contaminated Sites noted by NJDEP in 2005	51
Air Facility Subsystem for NJ	30
Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) or Superfund for the United States for NJ	19
Resource Conservation and Recovery Act for NJ	60
Permit and Compliance System for NJ	24
Total	184

Several state and federal statutes regulate these sites, and a site can be regulated under more than one statute at the same time. The statutes are:

State

- Brownfield and Contaminated Site Remediation Act
- Industrial Site Recovery Act
- Solid Waste Management Act
- Spill Compensation & Control Act

- Underground Storage of Hazardous Substances Act
- Water Pollution Control Act

Federal

- Comprehensive Environmental Response, Compensation and Liability Act (Superfund)
- Superfund Amendments and Reauthorization Act
- Resource Conservation and Recovery Act Corrective Action Program

New Jersey DEP Known Contaminated Sites List 2005

The KCS-NJ report is a list of sites where contamination of soil and/or ground water is confirmed at levels greater than applicable cleanup criteria or environmental standards. The data included in the KCS-NJ report are as of April 1, 2005. The KCS-NJ report is produced by the New Jersey Department of Environmental Protection (NJDEP) Site Remediation and Waste Management Program (SRWM) in response to state law N.J.S.A. 58:10-23.16-17, which requires the SRWM to prepare a list of sites that have been contaminated by hazardous substances. The report also satisfies obligations under the New Jersey New Residential Construction Off-Site Conditions Disclosure Act (N.J.S.A 46:3C1 et seq.).

Sites included in the KCS-NJ report 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 ground water at the same time. Several groups or remedial bureaus within the Site Remediation and Waste Management (SRWM) Program manage these cleanups. It is possible for more than one bureau to be involved at one site at the same time. A site being regulated under more than one statute or regulation often drives this scenario. However, this report lists only the main contact bureau for the site. The link available within this web site, titled "What Contact Bureaus Do," explains what types of sites each bureau manages and lists phone numbers for each bureau. For further information contact NJDEP's Site Remediation and Waste Management (SRWM) Program lead units, which are identified with each site listed in this database. Contact information for SRWM's lead program can be acquired at <http://www.state.nj.us/dep/srp>. Cases range in classification from B (single media contaminated, usually soils, and no ground water contamination) to D (multiple media contaminated, including ground water, with significant complexity and potential off-site contamination).

Bureau of Case Management oversees complex remedial activities that are conducted by responsible parties (usually current or former site owners or operators, but sometimes waste generators that are linked to pollution of a landfill or other contaminated site). In addition, BCM has the authority to use public funds for remedial activities, when responsible parties are recalcitrant or where immediate environmental concern situations exist and a willing or able responsible party does not exist. These sites involve multiple environmental media and/or contaminants and include ground water contamination. Remedial activities

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are conducted under the federal Superfund program, the Resource Conservation and Recover Act (RCRA) Corrective Action program, the New Jersey's Brownfield and Contaminated Site Remediation Act, the Spill Compensation and Control Act, the Solid Waste Management Act and the Water Pollution Control Act. There are two such sites in South Brunswick. Both these sites have on-site sources of contamination.

Name	Address	Source of Contamination	Remedy Status
JIS Landfill	Route 535 (Cranbury Rd)	A: On-Site Sources of Contamination	C3: Multi-Phased RA - Unknown or Uncontrolled Discharge to Soil or GW
Oxy USA Incorporated	Stouts Lane	A: On-Site Sources of Contamination	D: Multi-Phased RA - Multiple Source/Release to Multi-Media Including GW

Bureau of Southern Case Management primarily oversees environmental cleanups at sites subject to the Underground Storage of Hazardous Substances Act where remediation may involve soil and/or ground water. Sites under this program are also subject to the state's Brownfield and Contaminated Site Remediation Act, the Spill Compensation and Control Act, the Solid Waste Management Act and the Water Pollution Control Act. There are many such sites in South Brunswick.

Name	Address	Source of Contamination	Remedy Status
3781 Route 1	3781 Route 1	A: On-Site Sources of Contamination	C1: No Formal Design - Source Known or Identified-Potential GW Contamination
Block Drug Company Inc	2 Charles Court	C: Closed Sites with Restrictions	C1: No Formal Design - Source Known or Identified-Potential GW Contamination
APCO S Brunswick Georges Rd	2040 Route 130 & Georges Rd	A: On-Site Sources of Contamination	C2: Formal Design - Known Source or Release with GW Contamination
BP Service Station 670	2043 Route 130 & Georges Rd	A: On-Site Sources of Contamination	C2: Formal Design - Known Source or Release with GW Contamination
Carneglia Sunoco Incorporated	3068 Route 27	A: On-Site Sources of Contamination	C2: Formal Design - Known Source or Release with GW Contamination
Hermann Forwarding Co	Old Georges Road & Route 130	A: On-Site Sources of Contamination	C2: Formal Design - Known Source or Release with GW Contamination
Hermann Warehouse Corp	Old Georges Road & Route 130	A: On-Site Sources of Contamination	C2: Formal Design - Known Source or Release with GW Contamination
Leo's Rural Service Inc	36-60 Route 27	A: On-Site Sources of Contamination	C2: Formal Design - Known Source or Release with GW Contamination
National Railroad Passenger Corp	Ridge Road-Block 43 Lot 4	C: Closed Sites with Restrictions	C2: Formal Design - Known Source or Release with GW Contamination
Ocean Fuel Corp	Route 130 N & Fresh Ponds	C: Closed Sites with Restrictions	C2: Formal Design - Known Source or Release with GW Contamination

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Name	Address	Source of Contamination	Remedy Status
	Ave		
Operating Engineers Funds Fac.	338 Deans Rhode Hall Rd	A: On-Site Sources of Contamination	C2: Formal Design - Known Source or Release with GW Contamination
Shell Service Station #138506	3703 Route 1 & Finnegan Lane S/B	A: On-Site Sources of Contamination	C2: Formal Design - Known Source or Release with GW Contamination
South Brunswick Plaza Limited	Stouts Lane & Route 1 N	A: On-Site Sources of Contamination	C2: Formal Design - Known Source or Release with GW Contamination
South Brunswick Sq Shopping Center	Route 1 S	A: On-Site Sources of Contamination	C2: Formal Design - Known Source or Release with GW Contamination
Sunoco 0014-3479	3068 Route 27	A: On-Site Sources of Contamination	C2: Formal Design - Known Source or Release with GW Contamination

Bureau of Operation, Maintenance & Monitoring oversees the long-term operations and maintenance of remedial actions such as ground water pump and treatment systems. BOMM also reviews biennial certification reports to ensure institutional controls, such as a Deed Notice and Classification Exception Area, remain effective. Several such sites exist in South Brunswick Township.

Name	Address	Source of Contamination	Remedy Status
Bp Service Station #60763	4020 Route 1 N & New Road	A: On-Site Sources of Contamination	C2: Formal Design - Known Source or Release with GW Contamination
Exxon R/S 3-2235	Route 1 & New Road	A: On-Site Sources of Contamination	C2: Formal Design - Known Source or Release with GW Contamination
Exxon R/S 33032	Route 27 & New Road	A: On-Site Sources of Contamination	C2: Formal Design - Known Source or Release with GW Contamination
IBM Corp	431 Ridge Road	A: On-Site Sources of Contamination	C2: Formal Design - Known Source or Release with GW Contamination
South County Operations Facility	Broadway Road	A: On-Site Sources of Contamination	C2: Formal Design - Known Source or Release with GW Contamination
Columbian Chemicals Co	Stouts Lane	A: On-Site Sources of Contamination	D: Multi-Phased RA - Multiple Source/Release to Multi-Media Including GW
South Brunswick Asphalt Company	Fresh Ponds Road	C: Closed Sites with Restrictions	D: Multi-Phased RA - Multiple Source/Release to Multi-Media Including GW

Bureau of Field Operations – Southern (BFOS) is responsible for overseeing the remediation of sites located in counties of southern New Jersey, including Middlesex. The types of cleanups handled by BFO-S are considered moderate in remedial complexity, ranging from the remediation of a single source of

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contamination to several sources. The cleanup may include ground water contamination. Remediation are conducted, by responsible parties, under the state's Brownfield and Contaminated Site Remediation Act, the Spill Compensation and Control Act, the Solid Waste Management Act, the Water Pollution Control Act, the Industrial Site Recovery Act and the Underground Storage of Hazardous Substances Act. Many such sites exist in South Brunswick.

Name	Address	Source of Contamination	Remedy Status
298 Friendship Road	298 Friendship Rd	A: On-Site Sources of Contamination	B: Single Phase RA - Single Contamination Affecting Only Soils
Orchardside Estates	345 Dey Rd	A: On-Site Sources of Contamination	B: Single Phase RA - Single Contamination Affecting Only Soils
793 Ridge Road	793 Ridge Rd	A: On-Site Sources of Contamination	B: Single Phase RA - Single Contamination Affecting Only Soils
16 Spruce Lane	16 Spruce Lane	A: On-Site Sources of Contamination	C1: No Formal Design - Source Known or Identified-Potential GW Contamination
5 Riva Ave	5 Riva Ave	A: On-Site Sources of Contamination	C1: No Formal Design - Source Known or Identified-Potential GW Contamination
864 Georges Road	864 Georges Rd	A: On-Site Sources of Contamination	C1: No Formal Design - Source Known or Identified-Potential GW Contamination
Medicia Corp	30 Stults Rd	A: On-Site Sources of Contamination	C1: No Formal Design - Source Known or Identified-Potential GW Contamination
NJDOT Sand Hill Maintenance Facility	Route 1 S. Mp 18.5	A: On-Site Sources of Contamination	C1: No Formal Design - Source Known or Identified-Potential GW Contamination
Princeton Nurseries	630 745 Ridge Rd	A: On-Site Sources of Contamination	C1: No Formal Design - Source Known or Identified-Potential GW Contamination
22 Rochelle Drive	22 Rochelle Dr	A: On-Site Sources of Contamination	C1: No Formal Design - Source Known or Identified-Potential GW Contamination
28 Cardinal Court	28 Cardinal Ct	A: On-Site Sources of Contamination	C1: No Formal Design - Source Known or Identified-Potential GW Contamination
Arrow Electronics Incorporated	11 Nicholas Ct	A: On-Site Sources of Contamination	C1: No Formal Design - Source Known or Identified-Potential GW Contamination
Aerochem Research Laboratories	556 Ridge Rd	A: On-Site Sources of Contamination	C2: Formal Design - Known Source or Release with GW Contamination
GE Aerospace-Astro Space	114 Melrich Rd	A: On-Site Sources of Contamination	C2: Formal Design - Known Source or Release with GW Contamination
S. Brunswick Board of Ed	4 Executive Dr	A: On-Site Sources of	C2: Formal Design - Known Source or Release with GW Contamination

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Name	Address	Source of Contamination	Remedy Status
		Contamination	

Bureau of Northern Case Management (BNCM) (formerly BEECRA) primarily oversees remedial activities conducted in accordance with New Jersey's Industrial Site Recovery Act. This law is triggered by the sale or transfer of a property that either has or has had a regulated industrial or commercial activity, with the requirement that contamination be addressed before the new owner receives full responsibility for the property. The environmental complexity varies at these sites from soil contamination to complex ground water remediation. Sites under this program are also subject to the state's Brownfield and Contaminated Site Remediation Act, the Spill Compensation and Control Act, the Solid Waste Management Act and the Water Pollution Control Act. As an area with significant light industry, much of which was built prior to modern waste management regulations, South Brunswick has a number of sites being handled under this program.

Name	Address	Source of Contamination	Remedy Status
Block Drug Company Inc	Docks Corner Rd	A: On-Site Sources of Contamination	C1: No Formal Design - Source Known or Identified-Potential GW Contamination
BASF Corp	1065 Cranbury S River Rd	A: On-Site Sources of Contamination	C2: Formal Design - Known Source or Release with GW Contamination
Mason Display Innovations	5 Boxal Dr	A: On-Site Sources of Contamination	C2: Formal Design - Known Source or Release with GW Contamination
Essex Chemical Corporation	167 Black Horse Lane	A: On-Site Sources of Contamination	C3: Multi-Phased RA - Unknown or Uncontrolled Discharge to Soil or GW
Mideast Aluminum Industries	2300 Rte 130	A: On-Site Sources of Contamination	C3: Multi-Phased RA - Unknown or Uncontrolled Discharge to Soil or GW
American National Can Company	925 Georges Rd	A: On-Site Sources of Contamination	D: Multi-Phased RA - Multiple Source/Release to Multi-Media Including GW
Leggett & Platt Inc	3730 Rt 1 & Black Horse Ln	A: On-Site Sources of Contamination	D: Multi-Phased RA - Multiple Source/Release to Multi-Media Including GW
Parker Hannifin Corp	1290 Rt 130	A: On-Site Sources of Contamination	D: Multi-Phased RA - Multiple Source/Release to Multi-Media Including GW
Stauffer Chemical	65 Stults Rd	A: On-Site Sources of Contamination	D: Multi-Phased RA - Multiple Source/Release to Multi-Media Including GW

County Environmental Health Agency (CEHA) NJDEP has authorized certain county health departments to oversee remedial activities that involve residential home heating oil tanks that have not impacted ground water. However, No Further Action letters are still issued by the Department. The participating counties are Bergen, Camden and Hudson, but not Middlesex. In addition, all 21 counties are approved to receive certain low environmental concern cases for review and possible investigation when appropriate.

Name	Address	Source of Contamination	Remedy Status
18 Rochelle Drive	18 Rochelle Dr	A: On-Site Sources of Contamination	C1: No Formal Design - Source Known or Identified-Potential GW Contamination
302 Ridge Road	302 Ridge Rd	A: On-Site Sources of Contamination	C1: No Formal Design - Source Known or Identified-Potential GW Contamination

Initial Notice Section (INS) reviews initial applications and other administrative submissions for sites regulated under the Industrial Site Recovery Act and the Underground Storage of Hazardous Substances Act. If a site regulated under either of these two laws, has minimal environmental concerns and requires limited remedial measures, INS oversees the completion of these activities. If there are significant environmental concerns then INS forwards the case to the respective bureau based on the appropriate regulations. Only one site in South Brunswick is on the current listing.

Name	Address	Source of Contamination	Remedy Status
10 Pierson Street	10 Pierson St	A: On-Site Sources of Contamination	C1: No Formal Design - Source Known or Identified-Potential GW Contamination

EPA CONTAMINATED SITES INVENTORY

Air Facility Subsystem, NJ

The system contains the locations of stationary sources of air pollution that are regulated by the U. S. EPA, state and local air pollution agencies based on Aerometric Information Retrieval System - Air Facility Subsystem (AIRS/AFS) maintained by the US EPA. This information is used to prepare State Implementation Plans (SIPs), to track the compliance status of point sources with various regulatory programs, and report emissions estimates for pollutants regulated under the Clean Air Act.

Name	Address	Interest Type
Air Product? Polymers- Heller Industrial Park	11 Corn Road	Air Synthetic Minor
John C. Dolph	320 New Road	Air Synthetic Minor
BASF- Polymers Division	1065 Cranbury & South River Road	Air Synthetic Minor

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Name	Address	Interest Type
Dow Jones	United States 1 Ridge Road	Air Synthetic Minor
International Flavors And Fragrances	150 Docks Corner Road	Air Synthetic Minor
Sunny Delight Beverages- Heller Industrial Park	10 Corn Road	Air Synthetic Minor
Ft Dodge Animal Health- Princeton Park	9 Deer Park Drive	Air Synthetic Minor
Indal Mideast Aluminum Industry	2260 Route 130	Air Synthetic Minor
Ridge Nassau	335 New Road	Air Minor
Filmpack Plastics	266 Ridge Road	Air Synthetic Minor
Flint Ink ; North American ; Heller Industrial Park	6 Corn Road	Air Synthetic Minor
Impact Unlimited	250 Ridge Road	Air Synthetic Minor
Princeton Tech Center	431 Ridge Road	Air Synthetic Minor
Mohawk Lab Of NJ	34 Stouts Lane	Air Minor
Wyeth Ayerst Research	575 Ridge Road	Air Synthetic Minor
Cary Compounds	5 Nicholas Ct	Air Synthetic Minor
Columbian Chemicals?	29 Stouts Lane	Air Minor
Guardian Drug	2 Charles Ct	Air Synthetic Minor
Richmond Industry- Southview Industrial Park	1 Chris Ct	Air Synthetic Minor
ODACO	234 Broadway Road	Air Synthetic Minor
Brunswick Hot Mix	46 Fresh Ponds Road	Air Synthetic Minor
Wheeling Corrugating	Us Route 130 And Wheeling Road	Air Minor
Quality Egg	Route 130 And Stults Road	Air Minor
Cities Svc Slf	Stouts Lane	Air Minor
Phelps Dodge Industry	Docks Road	Air Minor
TPCO	Stouts Lane	Air Minor
International Permalite	45 Stults Road	Air Minor
Whitbread North America	131 Docks Corner Road	Air Minor
Zeneca Specialty Ink	65 Stults Road	Air Minor

Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) or Superfund for the United States

The CERCLIS Database is the Comprehensive Environmental Response, Compensation and Liability Information System that contains information on hazardous waste sites, potentially hazardous waste sites and remedial activities across the nation. This program is also known as Superfund.

CERCLIS NPL Sites

Name	Address	Status
JIS Landfill	Rte 535 Cranbury Rd	Currently on the Final NPL
South Brunswick Landfill	New Road	Deleted from the Final NPL

CERCLIS Facilities

Name	Address
Parker Andrews	Route 130 North
Mideast Aluminum	Route 130

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Name	Address
IBM	Culver Rd
Dayton Metals Stamping	P.O. Box 188 Georges Road
BASF Wyandotte Corp	Cranbury Road Rte 522
JIS Landfill	Rte 535 Cranbury Rd
South Brunswick Landfill	New Road
New Road Landfill	New Road
Spilatore	West New Road
AMF-MAARC	Schalks Station Rd/Perrine Rd
Uniroyal-Phelps Dodge	Docks Corner Rd
Cities Services Co.	Stouts Lane
American National Can Co.	Georges Road & Route 130
Essex Chemical Corporation	Black Horse Lane
Miranol Inc.	68 Culver Road
Permutit R & D Center	567 Ridge Road
NJE Corp	Culver Road
John C. Dolph Company	320 New Road
Brunswick Rubber Co	3780 U.S. Route #1

Resource Conservation and Recovery Act, NJ

RCRA regulates the management of solid waste (e.g., garbage), hazardous waste, and underground storage tanks holding petroleum products or certain chemicals. Facilities are categorized as generators, transporters and transport-storage-disposal (TSD) facilities. As a municipality with many research and development firms and some light and heavy industrial manufacturing, South Brunswick Township has many RCRA generators.

RCRA Generators

Name	Address	Interest Type
Air Prod Polymers- Heller Industrial Park	11 Corn Road	CESQG, Hazardous Waste Biennial Reporter
Pharmacopoeia	3000 East Park Blvd	Hazardous Waste Biennial Reporter, LQG
Dow Jones	United States 1 Ridge Road	Hazardous Waste Biennial Reporter, LQG
Sunny Delight Beverages- Heller Industrial Park	10 Corn Road	Hazardous Waste Biennial Reporter, LQG
Ft Dodge Animal Health- Princeton Park	9 Deer Park Drive	Hazardous Waste Biennial Reporter, SQG
Princeton Tech Center	431 Ridge Road	CESQG
Mohawk Lab Of NJ	34 Stouts Lane	SQG
Cary Compounds	5 Nicholas Ct	Hazardous Waste Biennial Reporter, SQG
Auto Lifeguard	4 Campbell Road	CESQG, Transporter
Canon Us	100 Jamesburg Road	Hazardous Waste Biennial Reporter, LQG
Princeton Chromatography	1206 Cranbury S River Rd	CESQG

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Name	Address	Interest Type
Rexam Bev Can	925 Georges Road	Hazardous Waste Biennial Reporter, LQG
Ohm Lab	464-C Blackhorse Lane	SQG
Impact Exhibits	250 Dayton Jamesburg Rd	SQG
Sonoco Prod	5 Stults Road	SQG
Kitchen Ventilation Specialty	110 Melrich Road	CESQG
Heidelberg Eastern Super Center	21 Commerce Drive	SQG
DHL Airways	1085 Cranbury Southriver Road	CESQG
Home Depot 5997	65 Charles Ct	CESQG
Aerochem Research Lab	882 Ridge Road	CESQG
E Beam Svc	32 Melrich Road	CESQG
Tech Cntrct	104 Davidson Mill Road	CESQG
Alan Wolf Assoc	3530 Route 27	CESQG
Hymedix Intl	2245 Route 130	LQG
Sandoz	2400 Route 130 N	Hazardous Waste Biennial Reporter, LQG
Brunnquell Iron Works	2396 Route 130 N	CESQG
NEC Research Institute	4 Independence Way	SQG
Gale And Wentworth	1 Independence Way	SQG
Medicia Pharm	2351 Route 130 South	SQG
Graphcorr- Heller Industrial Park	4 Corn Road	CESQG
Ropak Atlantic	2b Corn Road	CESQG
South Brunswick Twp Board Of Ed High School	750 Ridge Road	CESQG
Chiral Quest - Princeton Plaza	7 Deer Park Drive - Ste E	LQG, Transporter
Pioneer Warehouse	925 Georges Road	LQG
John C Dolph	320 New Road	Hazardous Waste Biennial Reporter, LQG
Loreal USA	35 Broadway Road	Hazardous Waste Biennial Reporter, LQG
Wakefern Food	355 Davidsons Mill Road	SQG
Sabinsa- Research And Development	1 Deer Park Drive	SQG
South Brunswick Twp Board Of Ed - Crossroads Middle School	195 Major Road	CESQG
BASF – Polymers Division	1065 Cranbury And South River Road	Hazardous Waste Biennial Reporter, LQG
Liz Claiborne	120 Herrod Blvd	SQG
AGFA	400 Heller Park Ct	Hazardous Waste Biennial Reporter, LQG
Intl Flavors And Fragrances	150 Docks Corner Road	Hazardous Waste Biennial Reporter, LQG
Pharmacopoeia	2000 Cornwall Road	Hazardous Waste Biennial Reporter, LQG
Shell SVC Station Number 7880 0104	3703 Hwy 1	SQG
Richmond Industry – Southview Industrial Park	1 Chris Ct	Hazardous Waste Biennial Reporter, LQG
Home Depot Number 5996	270 Docks Corner Road	CESQG

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Name	Address	Interest Type
Accutest Lab	2235 Route 130 South	Hazardous Waste Biennial Reporter, SQG
Mauser	2 Progress Road	CESQG
Wyeth Ayerst Research	865 Ridge Road	Hazardous Waste Biennial Reporter, LQG
Moore Busn Forms	5 Broadway Road	CESQG
Polymer Group	2351 Hwy 130	Hazardous Waste Biennial Reporter, SQG
Midway Container Svc	334 Blackhorse Lane	CESQG
Houghton Chemicals	21 Distribution Way	CESQG
Dayton Ford	Route 130	SQG
S Brunswick Board Of Ed	Route 1 Northbound & Executive	SQG
Dependable Cleaners	3191 Lincoln Hwy	CESQG
Loreal USA	77 Deans Rhode Hall Road	Hazardous Waste Biennial Reporter, LQG
United Chem Tech	1 Deer Park Drive, Site K	SQG
South Brunswick Twp Board Of Ed Upper Elementary School	635 Georges Road And Kingston Lane	CESQG

RCRA Transporters

Name	Address	Interest Type
Auto Lifeguard	4 Campbell Road	CESQG, Transporter
McMaster Carr Supply	473 Ridge Road	Transporter
R J T Transportation	72 Rowland Road	Transporter
Chiral Quest- Princeton Plaza	7 Deer Park Drive - Site E	LQG, Transporter

RCRA TSDs

Name	Address	Interest Type
Rhodia Dayton	68 Culver Road	TSD
Princeton Tech Center	431 Ridge Road	TSD
Polymer Group	2351 Hwy 130	TSD

Permit and Compliance System, NJ

The Permit and Compliance System (PCS) contains data on the National Pollution Discharge Elimination Systems (NPDES) permit-holding facilities. PCS contains information on the permitted facility, compliance schedule, outfall schedule, permit limits, discharge monitoring reports, enforcement actions and violations. The PCS data layer was developed from EPA's PCS and Locational Data Implementation Plan (LDIP) databases. These facilities discharge treated effluent to surface waters, and are directly regulated by NJDEP through the NJ Pollution Discharge Elimination Systems (NJPDES) program.

Name	Address	Interest Type
John C Dolph	320 New Road	NPDES Non-Major
Air Prod Polymers - Heller Industrial Park	11 Corn Road	NPDES Non-Major
Dow Jones	United States 1 Ridge Road	NPDES Non-Major

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Name	Address	Interest Type
Intl Flavors And Fragrances	150 Docks Corner Road	NPDES Non-Major
Sunny Delight Beverages - Heller Industrial Park	10 Corn Road	NPDES Non-Major
Mohawk Lab of NJ	34 Stouts Lane	NPDES Non-Major
Ridge Nassau	335 New Road	NPDES Non-Major
Flint Ink, North America - Heller Industrial Park	6 Corn Road	NPDES Non-Major
Southern Container - Heller Industrial Park	1 Corn Road	NPDES Non-Major
Guardian Drug	2 Charles Ct	NPDES Non-Major
Sandoz	2400 Route 130 N	NPDES Non-Major
Brunnquell Iron Works	2396 Route 130 N	NPDES Non-Major
Brunswick Hot Mix	46 Fresh Ponds Road	NPDES Non-Major
North America Packaging	7 Wheeling Road	NPDES Non-Major
Hub Servall Record Mfg	1212 Cranbury South River Road	NPDES Non-Major
Ohm Lab	195 Blackhorse Lane	NPDES Non-Major
Hermann Forwarding	9 Distribution Way	NPDES Non-Major
A And D Express	893 Old Georges Road	NPDES Non-Major
Medicia Pharmaceuticals	2351 Route 130 South	NPDES Non-Major
Garden State Tile Dist	Former Parker Andrews Site	NPDES Non-Major
Mauser	2 Progress Road	NPDES Non-Major
Lollytogs	321 Herrod Blvd	NPDES Non-Major
South Brunswick Twp	540 Ridge Road	NPDES Non-Major
Burns And Ricker	8 Nicholas Ct	NPDES Non-Major

Brownfields Resources

New Jersey has a number of useful programs for addressing brownfields contamination and redevelopment, whether for commercial, housing or recreational land uses, as listed in the following table.

RESOURCE	PROGRAM DESCRIPTION	ADMINISTERED BY
Brownfield Redevelopment Loan Program	Interim financing provided to eligible borrowers for meeting the costs of the remediation of a brownfield site.	NJEDA-Brownfields Redevelopment Office
Brownfields Assessment Demonstration	This program is designed to empower states, communities, and other stakeholders in economic redevelopment to work together to prevent, assess, safely cleanup, and sustainable reuse brownfields.	USEPA-Superfund Hotline (800) 424-9346
Brownfields Cleanup Revolving Loan Fund	This initiative is designed to empower states, communities, and other stakeholders in economic redevelopment to work together in a timely manner to prevent, assess, safely clean up, and sustainable reuse brownfields.	USEPA-Special Projects
Brownfields Economic Development Initiative (BEDI)	Provides funding for redeveloping brownfield sites providing it is used in conjunction with a Section 108 Loan Guarantee.	US HUD
Brownfields Incentive for Industrial Site Cleanup	To facilitate redevelopment agreements between developers and the Secretary of Commerce where up to 75% of the cost of remediation can be recovered by the developer of a "Brownfield" site once the project has begun to realize new state tax revenue sufficient to cover the cost of remediation. The developer must be the non-responsible party and agree to undertake and clean up the site to the satisfaction of the NJDEP, and the project must be an integral part of a local redevelopment strategy.	NJ Commerce & Economic Growth Commission
Brownfields Redevelopment	This program offers information on the various incentives for brownfields redevelopment and coordinates projects among appropriate State agencies for the expeditious reuse of these sites.	DCA-Office of Smart Growth

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RESOURCE	PROGRAM DESCRIPTION	ADMINISTERED BY
<p>Federal Empowerment Zone and Enterprise Community Program</p>	<p>Benefits that include Brownfields Tax Incentives to clean up and redevelop contaminated industrial site; relaxed eligibility for bonds.</p>	<p>US HUD-Empowerment Zone Program</p>
<p>Hazardous Discharge Site Remediation Loan and Grant program</p>	<p>The EDA works in conjunction with the DEP to assist companies involved in hazardous discharge site investigation and cleanup with loans of up to \$1 million for as long as 10 years through the Hazardous Discharge Site Remediation Fund. Municipalities may apply for grants and loans up to \$2 million per year. Eligible entities include: industrial businesses that do not have the ability to get funding on their own and are required to perform a cleanup due to closing or transferring ownership of operations; persons who do not have the ability to get funding on their own and have discharged and are responsible for a hazardous substance; and municipalities and persons who voluntarily agree to clean up a site.</p>	<p>NJEDA-Commercial Lending Division</p>
<p>New Jersey Urban Site Acquisition Program</p>	<p>Financial assistance to acquire vacant, abandoned properties that are part of a larger comprehensive urban redevelopment effort. The program will identify state and other funding sources for site preparation, construction and all other aspects of redevelopment.</p>	<p>DCA-NJRA</p>
<p>Petroleum Underground Storage Tank Remediation</p>	<p>Loans and hardship grants for remediation of all or a portion of the costs associated with the upgrade, and/or closure of tanks. Homeowners may qualify for assistance from the program for leaky oil tanks.</p>	<p>NJEDA-Commercial Lending Division</p>

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RESOURCE	PROGRAM DESCRIPTION	ADMINISTERED BY
Smart Growth Pre-development Funding	For developers undertaking commercial, industrial, office and mixed use projects in urban and developed suburban and rural communities. Projects must have municipal support and be part of a local redevelopment plan. Short-term financing will be arranged for pre-development site preparation costs (non-contamination related) including, but not limited to, land assemblage, demolition, removal of materials and debris, and engineering costs.	NJEDA-Brownfields Redevelopment Office
Superfund Technical Assistance Grants	This program provides funds to community groups so they can hire technical advisors who assist the groups in interpreting technical information concerning the assessment of potential hazards and selection and design of appropriate remedies at sites eligible for cleanup under the Superfund Program. Funds can be used at sites listed or proposed for the National Priorities List (NPL) where cleanup is under way.	USEPA – Office of Emergency Response
Technical Assistance to Brownfields	Provides technical assistance and outreach through an outreach services for communities program (TOSC) to redevelop brownfield sites.	USEPA
Underground Storage Tank Remediation, Upgrade and Closure Fund	To provide financial assistance via grants and loans to close, upgrade or remediate discharges from underground storage tanks. The fund provides for low-interest loans and grants to all eligible applicants, with the exception of public entities and non-profit businesses.	DEP - Responsible Party Site Remediation
USEPA Brownfields Demonstration Pilot program	Up to \$200,000 grants to municipalities for site identification, site assessment, site characteristics and site remediation, planning and design for areas that have an actual or threatened release of a hazardous substance or contaminant.	USEPA Region 2; Brownfields Assessment

HISTORICAL AND CULTURAL RESOURCES

Introduction

South Brunswick Township is one of the largest in Middlesex County and one of the earliest in organization. Incorporated by an act of the New Jersey Legislature in 1798, it was originally the most extensive township in the county and historically known as one of the most important townships lying south of the Raritan River.

South Brunswick's earliest settlements were due to its location on an important overland trade route, the colonial turnpike between New York and Philadelphia. Settlements grew around the taverns that were built to serve the travelers. The early settlers took advantage of fertile soils and favorable growing conditions creating a rural agricultural character of the township that lasted throughout the 18th century.

The rural nature of the Township continued throughout the 19th century, with increases in commercial and residential growth and development coinciding with the introduction of new transportation routes. The Straight Turnpike, now Route 1, was constructed in 1804 by the Trenton and New Brunswick Turnpike Company. The introduction of railroads caused significant changes, moving goods as well as people.

Twentieth century South Brunswick has witnessed a transformation with the impact of industrial technology. The New Brunswick and Trenton Fast Line began a trolley service in 1904, running parallel to the Straight Turnpike (Route 1), intersecting George's Road just north of the Five Corners intersection in Dayton. This trolley provided daily passenger and freight service. The New Jersey Turnpike opened in 1951, again roughly parallel to Route 1, on the eastern edge of the Township. One effect of the Turnpike was the transformation of the agricultural area on the southeast corner of South Brunswick to that of a burgeoning industrial development.

The relationship between the rural agrarian economy and the developing transportation routes of the various periods are clearly identifiable. Growth can be seen as following certain patterns interwoven with the fabric of the cultural and historic resources of the people of South Brunswick and the surrounding region.

Historical Background

Native American Occupation and Early European Settlement

Native Americans known as the Lenni Lenape occupied much of New Jersey, New York, Pennsylvania and Delaware¹. They were the first known inhabitants of South Brunswick and were here when the first Europeans arrived. The Lenape traveled in and through South Brunswick although no specific sites of camping and hunting have been authoritatively documented. Two major trails traversing the township were known as the Assunpink and Crosswicking Trails. An 1850 map of South Brunswick labels an

area in the southeast portion of the township to the south of Friendship Road as Indian Fields² reputed named after an 18th century Indian village located northeast of Cranbury.³

The native population was relatively small and tended not to establish permanent settlements. The Lenape had a significant impact upon the Europeans and the patterns of growth and settlement that ensued. The maximum period of interaction and exchanged between the Lenape and the Europeans took place in the 17th century, particularly during the 1680s and 1690s. After this time the Lenape population greatly declined and virtually disappeared by the early 19th century. The influx of Europeans ahs begun to accelerate during the 1660s, and sheer numbers and determination to settle and posses the land resulted in the removal of the natives. Out migration, inter-tribal warfare and warfare between natives and whites,⁴ death through disease, the small size of Indian families, and their low rate of natural increas8 all combined to reduce the Lenape population.

The net result of this process was not only European occupation and settlement along the former trails, encampments, and settlements of the Lenape, but an adaptation to a completely new environment. Over a relatively short period, trails became roads, farms and settlements were established, and important knowledge was gained through experience and from the Native Americans in regard to development and using the natural environment. The new farms and settlements were dispersed, not centralized, and were often located along travel routes and waterways, similar to the practice of the Lenape.

Colonial to 19th Century Period

The Dutch and British were the first European settlers of New Jersey. In 1664 the English took over the Dutch claims in North America, and New Jersey was divided into East and West sections, which the Duke of York granted to Sir George Carteret and Lord Berkley, respectively. These territories were further apportioned and ownership of lands granted by the English Proprietors of the territory. The Proprietors of the Eastern Division of New Jersey created Middlesex County in 1683. South Brunswick was part of the New Brunswick in 1730 when that city received a charter. A second royal charter divided New Brunswick into North and South Wards in 1763, with South Brunswick as the South Ward. Finally, in 1798, South Brunswick was made a township by act of the State Legislature.

The south Ward of New Brunswick Township, as originally surveyed, contained 36,000 acres. It was originally bounded by North Brunswick on the Northeast, South Amboy on the East, and West Windsor on the South and Franklin Township on the West and Northeast.⁵

In 1872 the Legislature first reduced the size of South Brunswick with the creation of the separate Township of Cranbury from the southern portion of South Brunswick; in 1885 it enlarged the boundaries

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of Cranbury; and in 1919 it further reduced the size of South Brunswick with the formation of Plainsboro Township. The present boundaries of South Brunswick date back to this last change.

Colonial settlement of Middlesex County and South Brunswick first developed along the trails and waterways used by the Lenape; many of the roads used today were originally Indian trails. The Assunpink Trail of the Lenape became the first road in New Jersey and the primary overland route between New York and Philadelphia, initially running between the Raritan River in New Brunswick and the Delaware River at Trenton. It was variously called the King's Highway, the Post Road, and the Upper Road, and presently known as Lincoln Highway or Route 27.

The Crosswickung Trail became an important road connecting Inion's Ferry in New Brunswick to George Rescasrick's tavern in Cranbury and later known as George's Road. For a period between 1875 and 1900 it was a toll road, called the New Brunswick and Cranbury Turnpike.

A third important road dating from this early 18th century colonial period ran from South Amboy to Cranbury and towns further south. It was called Lawrie's Road⁶ and later the Amboy Stage Road, and is now the Cranbury South River Road. These three thoroughfares were connected by present day Ridge Road, originally known as the road from Barefoot Brunson's in Kingston to the South river, which ran across the township from Kingston to Lawrie's Road just below Rhode Hall, intersecting George's Road at Crossroads.

The initial 18th century settlements in South Brunswick were located along these roads. Hamlets and towns developed around the locations of taverns. Taverns at Kingston, Rhode Hall, and Crossroads (now Dayton) served both the travelers of these first roads and also the early farms and scattered agricultural settlements of the township. Markets, fairs, and various other social and community affairs also took place at these gathering places.

South Brunswick's early settlers took advantage of fertile soils and favorable growing conditions. "During the 1780s ...South Brunswick was a landscape of scattered farmsteads with largely cleared land...over three quarters of the area ... was improved acreage, most fields and permanent pasturage."⁷ Important crops were grains, potatoes, hay, apples and peaches. Saw and gristmills were located along waterways. At Deans, an agricultural settlement on Georges Road, a mill was built around 1800 on Lawrence Brook. An earlier mill was built in the 1730s farther downstream later known as Davidson's Mill. A distillery was built at Fresh Ponds around 1780. Natural resources of forest, land, and water were developed as the population increased. Crossroads (Dayton) increased in size to serve the surrounding areas. Kingston was by far the most active and prominent village, being situated on both the heavily traveled King's Road and the Millstone River, combining both commercial activities of mills and taverns.

The rural nature of the township predominated through the 18th century. Increases in commercial and residential growth development coincided with the introduction of new transportation routes. The Straight Turnpike, now Route 1, was begun in 1804 by the Trenton and New Brunswick Turnpike Company. It was operated as a toll road until 1900. Taverns were built along this road, as with the other major thoroughfares, but with no villages or hamlets to accompany them. Kingston began to lose its prominence after commercial traffic was shifted over from the Old Post Road to the new Straight Turnpike. Part of this traffic was diverted back to Kingston and Princeton after the construction of the Princeton-Kingston Branch Turnpike about 1809 (now Raymond Road).

Transportation networks passing through South Brunswick brought significant changes. The Delaware and Raritan Canal in Kingston was completed in the 1830s. The Camden and Amboy (C&A) Railroad ran from Trenton along the Delaware and Raritan Canal to Kingston and across South Brunswick to Deans Pond was operational until January 1939. A more direct route between Deans Pond and Trenton was completed in 1863. By the end of 1865, the C&A had nearly completed laying tracks from Jamesburg to what became Monmouth Junction extending Freehold and Jamesburg Agricultural Railroad Line. At about the same time a branch railroad line was extended to Rocky Hill and known variously as the Kingston Branch or Rocky Hill Branch Railroad. These railroad lines later leased by the Pennsylvania Railroad all came together at Monmouth Junction.

By the 1870s South Brunswick had grown and become prosperous, as described in the following passage taken from an 1876 source:

South Brunswick is one of the largest and most populous townships in the County, and its citizens are among the most intelligent, industrious and thrifty. The present eminently prosperous conditions of the township, both touching its education and religious and its agricultural and financial status, is mainly attributable to the enterprise of its inhabitants. There are many pretty and substantial homes in this township and its residents bear the impress of that contentment which is nowhere so generally prevalent as in the agricultural and rural districts.⁸

Early Communities

Kingston

Kingston's location on the Lenape Assunpink Trail where it crossed the Millstone River was the prime factor, giving rise to its early prominence. The Dutch used the trail as early as 1655 to go from New Netherlands to their settlements along the lower Delaware, and by 1698 it had become a King's Highway.⁹ Kingston was one of the overnight stops on the trip from New York to Philadelphia, and several inns were built to accommodate and provide services to the travelers. George Washington and the Governors of East Jersey were known to stop in Kingston. An often-quoted story related that at one time 49 stages, loaded with passengers, halted at the Withington Tavern, where more than 400 horses were

standing in front.¹⁰ Other commercial enterprises developed here through the 18th and 19th centuries, and one historical account describes “a Presbyterian church, an academy, a common school, five stores, three hotels, a large grist mill, a saw mill, and woolen factory driven by the Millstone River,”¹¹ and another tallies, “five hundred inhabitants, a school-house, two churches, two hotels, a sash and blind factory, a lumber yard, a blacksmith shop and wheelwright shop, some stores, and a goodly number of dwellings.”¹²

The completion of the Straight Turnpike in 1805 bypassed Kingston and marked a gradual decline in its activity, although the construction of the Delaware and Raritan Canal during 1831-34 and the Camden and Amboy Railroad in 1838 stimulated a renewal of commercial traffic and businesses. An extensive number of dwellings from these 18th and 19th century times still stand in Kingston, in good condition and retaining much of the ambiance of this earlier period. Today, the Delaware and Raritan Canal is a state park.

Rhode Hall

The nucleus of this small settlement, located east of Pigeon Swamp, was a tavern established about 1730 by Scots settler David Williamson on ‘Lawries Road’ and later known as the turnpike to Amboy (present day Cranbury-South River Road). Other families who settled here were also from Scotland. A store was later added to the hamlet, and sometime between 1850 and 1876 a racecourse known as the Rhode Hall Driving Park was located nearby. Later proprietors of the tavern were Thomas McDowell in the 18th century and the Smock family in the 19th century. The Van Dyke family settled near Rhode Hall before the Revolution and descendants of this family lived here until the mid 20th century. Very little remains today of the early days of this settlement and its early activity.

Fresh Ponds

Fresh Ponds is located in the same general vicinity as Rhode Hall, at the intersection of the Davidson Mill and Fresh Ponds roads, to the north of Pigeon Swamp. The first distillery of the township is reputed to have been established there in about 1780 by Samuel Combs. Later a store, school, and a church were built in the 18th century, and approximately a dozen houses were clustered here.¹³ The old church and school still stand, with an old cemetery in the churchyard. In the past, Fresh Ponds was called Woodside or Woodville. An early attempt to drain nearby Pigeon Swamp was begun in 1780 with the construction of the Great Ditch. The local residents under the State Legislature Authority maintained the ditch until the end of the 19th century. The name Pigeon Swamp is said to have come from an 18th century owner of the swamp area, Ann Pigeon, daughter of East Jersey governor Jerimiah Bass. The swamp was also a nesting place for large numbers of passenger pigeons until their extinction early in the 20th century.¹⁴ Today Pigeon Swamp is a state natural area.

Dayton

Originally called Cross Roads, Dayton consisted primarily of a tavern on Georges Road built in 1750 by James Whitlock. Around 1780 Thomas Wetherill built an additional tavern, later known as the Wines Hotel. Early enterprises included a brick manufacture and a large nursery. The cross roads nature of the village was enhanced with the construction of the extension of the Freehold and Jamesburg Agricultural Railroad, completed in 1865-66, to connect with the Pennsylvania Railroad, resulting in the construction of the depot south of the Five Corners intersection and the change of the Crossroads name to that of Dayton in 1866. The present name was chosen in honor of William L. Dayton, an attorney for the Freehold and Jamesburg Agricultural Railroad, who had helped to settle disputes arising from the location of a railroad right-of-way. He was later a U.S. Senator, Vice-Presidential nominee, and Minister to France.

The increased commercial activity of Dayton included the construction of new hotel in 1860, and was described in 1876 as further consisting of, "two stores, two churches, a school house, a blacksmith and wheelwright shop, a hay pressing establishment, and thirty five dwellings."¹⁵ The basic character of Dayton remained that of an agricultural crossroads:

Although the population of Dayton had reached 300 by 1865, the nature of its business establishments (farm implements, two hay dealers, general store, nursery, harness maker) attests to its agricultural identity. Its manner of growth, spreading out from a crossroads, makes it typical of the hamlets of South Brunswick and, in general, of the southern part of Middlesex County.¹⁶

Deans

Deans originated from its location on both the Crosswicknung Trail (Georges Road), and Lawrence Brook. Dams were built on the brook, creating Deans Pond, and the Dean family constructed mills for lumber and grain around 1810. Like Dayton, the hamlet slowly grew, serving the local agricultural area, spreading along the crossroads, and being influence by the construction and location of the railroads and a depot on its western edge. The name of Martinsville appears on an 1850 map for this village. An 1882 history explains the change as follows:

About 1845 John H. Martin had built several houses and opened a store there and from that time onward until after the erection of the depot and the establishment of a regular railway station there to supersede a flag station, the hamlet was known as Martinsville; but when the station was opened (about 1866) the railroad company named it Dean's Station, and from it the hamlet received the name by which it's commonly called.¹⁷

In 1852 a distillery was built, a hay press in 1873, and according to the New Jersey State Gazetteer of 1875, the population of Deans was 100, with two flour mills, two saw mills, three grocers, a blacksmith, a wagon maker, a shoe maker, a justice of the peace, and daily mail delivery.¹⁸

Monmouth Junction

Monmouth Junction began to be settled around 1860 as a result of its location at the junction of three railroad branches, the New York division of the Pennsylvania Railroad, the Rocky Hill Railroad, and the Jamesburg and Freehold Agricultural Railroad. Prior to this, the 1850 map indicates this area was primarily the Longbridge Farm, dating back to the original owner Thomas Lawrence in the 18th century, and several other properties on Ridge Road, many of them belonging to the Rowland families. The original Camden and Amboy Railroad tracks completed in 1839 came up along the Delaware and Raritan Canal to Kingston and followed a northeasterly path to the area of Deans. The first depot located near Major Road and later moved to Martinsville (Deans Station).

Dean's businessman John Martin opened a public house in 1871, and by 1882 the village included a church, a store and post office, a railway station, and 14 dwellings. A local account gives an excellent portrayal of the character of Monmouth Junction around 1900:

The picture of the village and the rail line at the close of the Civil War was one of extreme activity. A second pair of rails had been added making the Pennsylvania a two track line over which ran 201 daily passenger trains and 24 freights. Locomotives were wood burning, and brakes were hand operated....It was a favorite stopping of place for salesmen, revelers came by horse drawn vehicles and by the early automobiles from Princeton University to drive and celebrate in the village.¹⁹

The Twentieth Century

The tremendous growth and changes South Brunswick has seen in the 20th century has mirrored the development of New Jersey and the nation. The first half of the 1900s reflected a gradual change from the rural farming community of the 1700 and 1800s. The coming of the New Brunswick and Trenton Fast Line trolleys in the early 1900s provided access to New Brunswick and Trenton and beyond to the villages of Dayton, Deans and farm families along its north-south route through the eastern portion of the Township much as the railroads had done for Kingston and Monmouth Junction in the 1800s. From 1900 to 1930 over a dozen development plans from several to many hundred houses, either along the trolley route or near the train stations was presented to the Township Committee. Only a few plans were implemented both accessed by the trolley: Cottageville with 20 lots on Davidson's Mill and several cemeteries on Deans Rhode Hall Road again accessed by the trolley. These projects were part of the growing prosperity felt in the United States from the early 1900s until the Depression. At the same time

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most farmers in South Brunswick had neither electricity nor running water. Children walked to their local school.

South Brunswick's transportation networks continued to advance the community's development. Railroad transportation influenced the Princeton Nurseries to locate near Kingston in the early 1900s and farmers there and around Monmouth Junction, Dayton and Deans all took advantage of the railroad for transporting their products to market. Even the trolley had a milk run early in the morning. Later bus service along Route 27, Route 1 and Georges Road provided public transportation. However, affordable personal transportation via the automobile made the biggest impact on the Township's future development. The popularity of the car led to the downfall of the trolley line. The State became active in upgrading its roads to handle the demand for better roadways. The former New Brunswick and Trenton Turnpike became the foundation for US Route 1. A new road, Route 130 supplanted Georges Road, bypassing both Deans and Dayton. In the 1950s, the New Jersey Turnpike went through the townships eastern farmland.

The prosperity of the first decades came to a halt after the financial collapse of 1929. Stagnant growth continued during the Depression followed by World War II. After the War businesses and industry changed direction to meet the need for repairing the infrastructure, increasing the housing stock and producing materials for everyday living. South Brunswick, with easy access along Route 27 and US Route 1, located in central Jersey between two large metropolitan giants was ideal for development. Its small population lived in distinct hamlets and villages with strong affinity for their own area and way of life. This changed with the advent of Kendall Park in the late 1950s. In a few short years, South Brunswick's population increased from 4,000 to over 10,000. For many there was a clash of cultures. This development brought people from larger cities with very different experiences and expectations for their new community. They came from places with many services to a place with few services. It was a cultural shock for both "communities".

What united them was the first South Brunswick High School built in 1960. The first high school along with municipal services like the police and the Library were centrally located near Monmouth Junction. Since then more housing developments and light industry have continued to expand the population, and the business community. New housing has largely been confined to the western and central portions of the township. This left rich soil on the eastern side of the township available to farming; however, demand for warehouse space adjacent to the rapidly expanding area adjacent to the New Jersey Turnpike Exit 8A has now replaced much of the agrarian culture.

Kendall Park built along Route 27 one of the Township's first "main road" offered the advantage of public transportation to New York City. It was during these same years that South Brunswick lost its public transportation provided by railroad for over 100 years. While the population of the township and its

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roadways increased, its public transportation decreased. This situation remained until a Park and Ride facility opened near Exit 8A of the New Jersey Turnpike in the 1990s.

The Township has continued to absorb immigrants first from Europe and more recently from around the world. Today South Brunswick has a diverse ethnic population of over 38,000. Census records show Hungarians, Polish, Russian, Italian immigrants moving here in the early 1900s. New immigration laws in the late 1900s brought peoples from all parts of Asia as well. There is one large high school, two middle schools and nine elementary schools. Many churches and religious organizations thrive throughout the township. The housing stock created by the many developments over a 50-year period provides a needed variety of styles and prices. Shopping centers are increasing on US Route 1 and on Route 27. Light industry exists in several areas of the township, but the growth of warehouses on the eastern side of the township is the largest growth "industry."

The 21st century already has presented new challenges to the villages and hamlets of South Brunswick. There is a new awareness of the need to protect and take care of the environment that sustains the Township. Solutions to deal with increased traffic, increased needs of residents for recreational facilities and services to a large population of young and older residents are some of the problems that will affect the future of South Brunswick.

¹ *Lenni Lenape or Delaware Indians*, Unionist-Gazette Associate Printers, Somerville, NJ 1928.

² .J.W.Otley and J. Keily, *Map of Middlesex County, 1850*, Van Derveer, Camden, NJ, 1850

³ Charles A. Philhower, "Indian Days in Middlesex County, NJ," in *Proceedings of the New Jersey Historical Society*, New Series, Vol. XII, No. 4 October, 1927.

⁴ Peter O. Wacker, *Land and People*, Rutgers University Press, New Brunswick, NJ 1975.

⁵ Everts and Steward, *Combination Atlas Map of Middlesex County*, 1876.

⁶ Named after Gawen Lawrie, a 17th century Deputy Governor who resided in Perth Amboy.

⁷ *The County of Middlesex in the Province of New Jersey During the American Revolution*, annotated map, Middlesex County Cultural and Heritage Commission. 1976.

⁸ Everts and Steward, *Combination Atlas* 1876.

⁹ Middlesex County Inventory, 1979.

¹⁰ Everts and Steward, *Combination Atlas* 1876.

¹¹ Everts and Steward, *Combination Atlas* 1876.

¹² Clayton, W. Woodford, *History of Union and Middlesex Counties, New Jersey*, Everts and Peck, Philadelphia, PA, 1882.

¹³ Clayton, W. Woodford, *History of Union and Middlesex Counties*

¹⁴ Committee of Concern for the Pigeon Swamp Area, *Pigeon Swamp*, booklet, 1964.

¹⁵ Clayton, *History of Union and Middlesex Counties*

¹⁶ Middlesex County Inventory, 1979.

¹⁷ Clayton, *History of Union and Middlesex Counties*

¹⁸ Clayton, *History of Union and Middlesex Counties*

¹⁹ R.M. Stout, Monmouth Junction, *The Town We Live In*, unpublished manuscript, South Brunswick Public Library, South Brunswick, NJ, 1962.

Historic Inventory and Assessment

NJ DEP - Historic Preservation Office

New Jersey and National Registers of Historic Places

South Brunswick Township

Introduction

The following New Jersey and National Registers of Historic Places listings include properties and historic districts in South Brunswick Township, New Jersey for which a formal action was taken by the State Historic Preservation Officer (SHPO) or designee. The listings are current through July, 2006.

The listings itemize the buildings, structures, sites, objects, and districts listed on the New Jersey Register of Historic Places (SR) and the National Register of Historic Places (NR). They also include resources that have received Certifications of Eligibility (COE), opinions of eligibility from the State Historic Preservation Officer (SHPO Opinion), or Determinations of Eligibility (DOE) from the Keeper of the National Register. These properties and historic districts all meet the New Jersey and National Register criteria for significance in American history, archaeology, architecture, engineering or culture, and possess integrity of location, design, setting, materials, workmanship, feeling and association. Properties that have been entered on the New Jersey and/or National Registers of Historic Places are listed by their historic names, which may be different from their current names. Properties that have SHPO Opinions or DOE's are listed by their historic name, when known.

State and National Register Properties

Delaware and Raritan Canal Historic District (ID#1600)

Entire Canal bed and all land 100 yards to either side of the center line (Extends through six counties from the Delaware River to the Raritan River)

Gulick House/Red Maple Farm (ID#1936)

Raymond Road, between US Route 1 and NJ Route 27

King's Highway Historic District (ID#353)

US Route 206 and NJ Route 27, between Lawrenceville and Kingston

Kingston Mill Historic District (ID#1746)

Portions of River, Herrontown, and Princeton-Kingston roads, and the Millstone River

Kingston Village Historic District (ID#2498)

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NJ Route 27, Laurel Avenue, Church Street; Heathcote Brook Road, Academy Street, etc. Also located in: Somerset County, Franklin Township

Lake Carnegie Historic District (ID#1747)

Lake Carnegie (Millstone River) between NJ Transit Princeton Branch Railroad bridge (south end) and dam adjacent to NJ Route 27 (north end)

Withington Estate (Heathcote Farm) (ID#1938)

Spruce Lane

CLIMATE AS AN ENVIRONMENTAL FACTOR

The general factors determining New Jersey climate are the state's location in the temperate zone north of the equator at approximately 40 degrees N latitude, its proximity to the Atlantic Ocean, and the passage of atmospheric weather systems across its surface. Tropical and polar air masses cross the state bringing distinct and characteristic seasonal weather conditions with them. Tropical systems bring warm, wet weather with primarily southwesterly winds from the Gulf of Mexico up the coast. Polar air masses are typically cold and dry, with prevailing winds from the northwest. The prevailing wind patterns from these air masses create airsheds whereby atmospheric and weather conditions in upwind regions influence weather and air quality conditions in downward regions.¹

South Brunswick and central New Jersey have a humid continental climate that is characterized by relatively moderate winter and summer temperatures due to proximity to the Atlantic Ocean. The average annual mean temperature is 53 degrees F, ranging from a mean monthly low of 31 degrees F for January to a high monthly mean of 74 degrees F for July.² Relatively large daily and day-to-day fluctuations occur. Humidity is generally high when compared to other regions of the country, ranging between 55% and 75%. Prevailing winds are from the west – from the northwest in winter and from the southwest in summer. These winds are comparatively light, averaging less than 12 mph for over two-thirds of the year. Sunshine is relatively abundant. The Township receives an average of about 2650 hours of sunshine annually, with a low of approximately 140 hours in December and a high of approximately 310 hours for July.

The major factors controlling the climate of central New Jersey operate seasonally. During the winter, cold air from a high-pressure system located over central Canada and the north central United States results in cold spells that may be accompanied by abundant precipitation. During the summer the “Bermuda High” pressure system, located over an area extending from the Sargasso Sea in the central region of the Atlantic Ocean to the eastern Gulf of Mexico, results in high temperatures, high humidity and thunderstorms.

Temperatures

Monthly averages of extremes in temperature and record extremes are presented in Table 3-1.

Precipitation

¹ Elizabeth A Fraser and Anne F. Morris, Getting It all Together, Association of New Jersey Environmental Commissions and the New Jersey Conservation Foundation, Mendham, N.J., 1980. Getting it All Together is an excellent reference describing the methodology for compiling an environmental resource inventory.

² A table of metric equivalents is given in Appendix B.

The average annual precipitation for this area is 44-55 inches. An average dry year will yield 36 inches of precipitation, while an average wet year will yield 52 inches. Monthly averages of precipitation and extremes of monthly and daily precipitation are presented in Table 3-3.³

Summary

The climate and local weather conditions of South Brunswick affect several areas of economic, environmental and planning concerns. Historically the area has developed a strong agricultural economy due to highly favorable growing conditions and soils. Ups and downs in production have been affected by changes in annual precipitation and temperatures. More recently, with increased development, levels of precipitation have become a central concern in planning for stormwater and aquifer recharge management.

Air Quality as an Environmental Factor

Air quality is a relative measure of the amount of noxious substances that occur in the air as part of natural or human processes. Certain airborne gasses and particulates can cause deterioration and/or destruction of biological life as well as damage to property and other physical components of the environment. Air contaminants or pollutants can then be defined as solid particles, liquid particles, and vapors or gases which are discharged into or form in the outdoor atmosphere, and which have an adverse effect upon the physical components and life of the environment. Air quality in any particular locations is influenced by contaminants discharged into the atmosphere and by regional and local climatic and weather conditions. Atmospheric conditions such as sunlight, rainfall and humidity, air turbulence, temperature differences, and wind speed and direction can disperse, intensify, or chemically change the composition of air contaminants.

Table 3-4: Principal Sources of Community Air Pollutants in Urban Areas	
Pollutant	Principal Sources
Sulfur Dioxide (SO ₂)	Electric power generation (40%) Space heating (30%) Other combustion of fuels in industrial processes (30%)
Carbon Monoxide (CO)	Motor vehicles (90%) Other combustion sources (10%)
Nitrogen Oxides (No _x)	Stationary source combustion (50%) Mobile sources (50%)

³ Tippetts, Survey of New Jersey Water Resources Development, Legislative Commission on Water Supply, State of New Jersey Trenton, N.J., 1955

Particulates (part)	Many sources, (stationary and mobile) including crushing and grinding operations and natural sources
Hydrocarbons (HC)	Motor vehicles (60%) Industrial process & evaporative losses from storage facilities (40%)
Oxidants (primarily Ozone)	Produced by action of sunlight on HC and NO _x compounds in the atmosphere

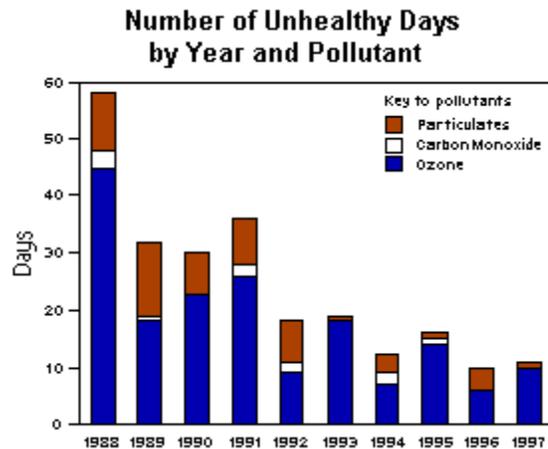
Air Quality in Middlesex County and South Brunswick

There currently are no air quality monitoring stations in South Brunswick itself; the closest stations are at Rutgers University sites in North Brunswick. South Brunswick Township, though primarily suburban and rural, is located in Middlesex County, one of the major chemical and petroleum industrial centers of the east coast and one of the most heavily traveled transportation corridors in the country.

The specific local concerns of air quality in South Brunswick are related to the levels of contaminants resulting from the traffic on major thoroughfares that traverse the Township, the NJ Turnpike and Routes 1, 130 and 27.

Trends in Air Quality

According to NJDEP's Web site (www.nj.gov/dep/airmon/taqpage.htm), air

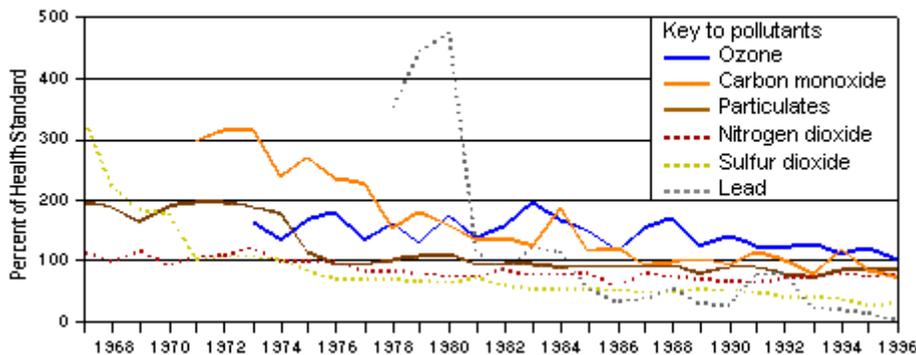


quality in New Jersey has been improving over the years. The first chart shows that unhealthy ratings were recorded on fewer than one day in thirty over the 1995 - 1997 period, compared to ten years before that, when unhealthy ratings were recorded on about one day in eight. New, more-stringent federal health standards for both ozone and particulates went into effect by 1998. These standards are more difficult for New Jersey to meet: under the new ozone standard, there were 47 unhealthy days in 1998; only 4 days would have been rated unhealthy that year under the old ozone standard. However, these standards are now being contested in federal court, which has mandated that USEPA better justify its standards.

The chart below gives a longer perspective on air quality trends in New Jersey. It shows the changes since 1967 in the levels of all the pollutants for which there are federal health standards

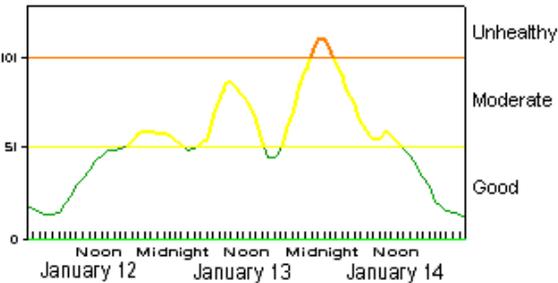
-- carbon monoxide, lead, nitrogen dioxide, ozone, particulates and sulfur dioxide. You can see that lead and sulfur dioxide regularly reached unhealthy levels 15 to 20 years ago. These pollutants now meet the national health standards throughout the state and are considered to be well under control. The particulate line in this chart shows levels below the health standard throughout the 1990's, while the chart above showed some unhealthy days due to particulates. The difference is because the unhealthy days were rated using a short-term method and standard to enable us to alert the public quickly, while the particulate levels in this long-term chart are compared to the annual health standard. Here again, however, we don't expect to be able to meet the new, more stringent particulate standard that's now in effect, even if actual pollutant concentrations don't worsen.

Maximum Pollutant Concentrations in New Jersey, 1967 - 1996



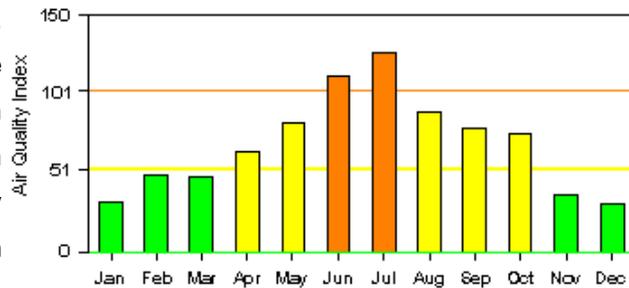
Air pollution levels also change during the day and from one season to another. These changes are due to variations in the weather and in the types and amounts of pollution that are released into the air, both in New Jersey and in states that are upwind of us.

Unhealthy Carbon Monoxide at North Bergen, 1995



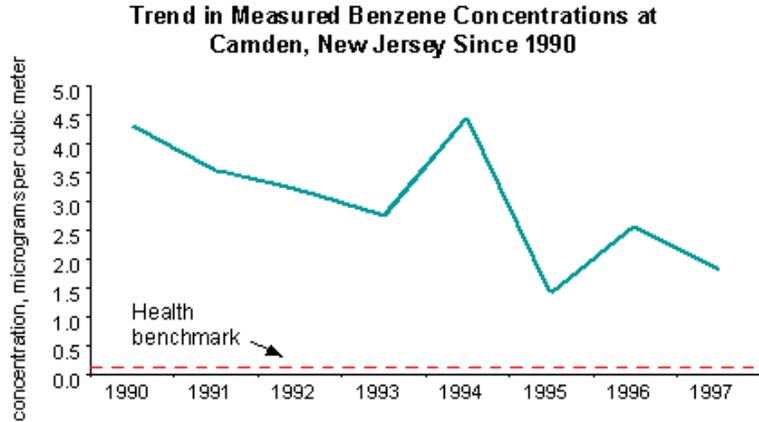
Here's an example of how carbon monoxide levels changed over several days in January 1995 at North Bergen, Hudson County. A strong temperature inversion formed, trapping the pollution close to the ground and causing it to reach unhealthy levels. There haven't been any unhealthy days due to carbon monoxide in New Jersey since this episode.

Maximum 1-Hour Ozone Concentrations at Rutgers University by Month in 1997



Ground-level ozone is formed in the air when other pollutants chemically react. High temperature and strong sunlight are needed to produce high concentrations of ozone, so you can see why ozone peaks in the summer months and is lower at other times of the year. This chart shows the highest levels of ozone at Rutgers University in East Brunswick, Middlesex County during each month in 1997.

Among the pollutants for which no health standards have been set, some have shown changes that reflect efforts to control pollution, while others have shown little or no change over the last ten years. Volatile organic compounds (VOCs) are one group of pollutants that react



chemically to form ground-level ozone. Controls on the make-up of gasoline sold in New Jersey have reduced VOC emissions and, in turn, ground-level ozone concentrations. Many of these VOCs are "air toxins," capable of causing a variety of adverse health effects ranging from lung irritation to cancer. Benzene is an air toxin that's also a VOC. It's emitted when gasoline evaporates or is burned, and from other sources. This chart shows how benzene levels have declined in Camden from 1990 to 1997. The other air toxins NJDEP measures also show a substantial decline over the same period.

NOISE

Noise pollution is recognized as a potential environmental hazard. The NJDEP has promulgated rules setting limits on levels of noise for commercial and industrial enterprises and the Township public nuisance ordinance forbids excessive (non-specialized) residential noise.

South Brunswick Township is for the most part a suburban and rural area with minimal manufacturing capacity that would create a noise problem. Therefore, most noise in the township is from three sources: transportation routes, construction and neighborhood activities. Neighborhood activity is generally transient, and construction is generally short-term. Therefore, the primary long-term noise issue in South Brunswick comes from transportation routes. The primary concern is where these routes affect residential neighborhoods. Heavy volumes of traffic on major highways and increasing amounts of traffic on residential thoroughfares call for adequate buffering between residential areas and roadways and continual evaluation of speed limits in residential areas. Vegetation absorbs sound and can provide an important buffer from sources of noise. Existing stands of trees and shrubs as well as additional plantings along roadways, in commercial zones, and in residential neighborhoods can both protect and enhance the environment relative to excessive or disruptive sound. Trees and shrubs can therefore serve a similar function with noise pollution as with air contaminants by helping to keep the atmosphere filtered and "clean".

The noise map shows where major transportation routes (primarily State and county highways and the railroad lines) are in close proximity to residential neighborhoods. These areas are primarily along the Northeast Corridor and Conrail lines, County Route 522 and State Highway 27. Additional areas are in the northeast section of the township along the New Jersey Turnpike and a few portions of State Highways 1 and 130.

South Brunswick Township, as the primary entity responsible for creation of the new Route 522, has installed sound walls between the road and neighboring residential redevelopment in several sections: on both sides just west of New Road, and on both sides between the Kingston Lane/Ridge Road junction and Georges Road. No other areas of high transportation noise potential have received sound walls, though some fences have been constructed by either developers or private landowners.

Sound walls are known to be effective for the dwellings closest to the wall, but beyond a certain distance the sound traveling over the wall will have nearly the same impact as the wall itself. Therefore, the primary use of the sound walls is to protect those with the highest decibel ratings, not those who also hear the highway or railroad noise but are more distance (one hundred yards or so).

Scenic Resources: A South Brunswick Photo Album

South Brunswick has many scenic resources, available for public enjoyment from our roads, parks and other public spaces. The Township Environmental Commission thanks Terry Caruso, William Klimowicz and Paul Murray for their suggestions on the best scenic resources. Their ideas were combined with those of the Environmental Commission in these photographs from William Klimowicz, Peter David Southgate, Dan Van Abs and Anne Zeman.

The Environmental Commission continues to seek ideas and photographs for future updates to this section. Please send your ideas to Brian Sullivan at bsullivan@sbtnj.net.

“East Side”



Pigeon Swamp
Eastern Village Association



“One in a Million” Pond
Eastern Village Association



Davidson Mill Pond – Outlet
Eastern Village Association



Van Dyke Farm
Eastern Village Association

“West Side”



Kingston Bridge
Anne Zeman



Millstone River, Kingston
Dan Van Abs



Delaware & Raritan Canal, Kingston
Anne Zeman

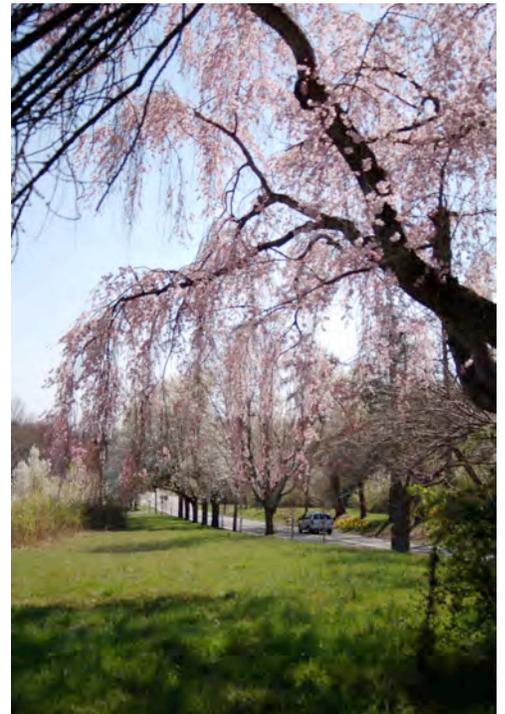


Delaware & Raritan Canal
Kingston Turning Basin
Anne Zeman



Heathcote Park

Dan Van Abs



Mapleton Preserve
Anne Zeman



Mapleton Preserve

Dan Van Abs



Freedom Trail West of Route 1
Dan Van Abs



Historic Bridge in Cook Natural Area
Peter David Southgate



View of the Cook Natural Area
Peter David Southgate

“And Other Parts of Town”



Ireland Brook
Eastern Village Association



New Road wetlands north of Sondek Park
Dan Van Abs



Lawrence Brook at Deans Rhode Hall Road
Dan Van Abs



Sondek Park trail
Dan Van Abs

Certifications of Eligibility/ Determinations of Eligibility

Princeton Nurseries Historic District (ID#1925)

Between US Route 1 and Delaware and Raritan Canal

Van Dyke Farm (ID#4473)

Davidsons Mill Road

SHPO Opinion for Potential Eligibility

Stone Abutment of Camden and Amboy Railroad (ID#3327)

Abraham Applegate House (ID#3328)

Ridge Road

Robert Bayles House (ID#3330)

Raymond Road

Benjamin M. Bayles House (ID#3331)

226 Friendship Road

Camden and Amboy Railroad Branch Line Historic District (ID#2969)

Camden and Amboy Branch Line Right-of-way from Bordentown City to Adams Lane, North Brunswick, Middlesex County

Van Pelt-Clark House (ID#3332)

123 Perrine Road

Stone Abutment (ID#3333)

Camden and Amboy Branch Railroad at Major Road

Isaac Clark House (ID#3334)

Ridge Road

James Lake House (ID#3335)

Ridge Road

John J. Lake House (ID#3336)

Ridge Road

John W. Lott House (ID#3337)

Friendship Road

Majors-Mount House (ID#3338)

192 Schalks Road

Masonry and Brick Arch Culvert (ID#3329)

Terhune Run under the Main Line of Pennsylvania Railroad (Amtrak Northeast Corridor Line)

Monmouth Junction Historic District (ID#1937)

Ridge and Old New roads and Maple and Walnut avenues

Peter Schenk House (ID#3340)

Township of South Brunswick Environmental Resource Inventory of 2007

Ridge Road

Six Mile Run Village Historic District (ID#3528)

See Main Entry / Filed Location:

Somerset County, Franklin Township
Pleasant Plains Road and NJ Route 27

Widow Woods Tavern (ID#3526)

Widow Wood's Tavern Site (28-Mi-164) (ID#1939)

3060 NJ Route 27

NJ Route 27 (3E) Bridge (SI&A#1216158) (ID#1889)

NJ Route 27 over Six Mile Run

Sixty Significant Resources in South Brunswick

In addition to the State and Nation Registers, South Brunswick commissioned a cultural resource study completed in 2003 entitled *Cultural Resource Survey, Township of South Brunswick, Middlesex County, New Jersey*. Prepared by Hunter Research Associates for the South Brunswick Township Historic Preservation Commission, this report endeavors to identify, characterize and document the Township of South Brunswick's surviving historic legacy and to provide a basic planning tool for use and support of future local historic preservation plans. The 60 Significant Resources are listed and located on Figure xx, The Historic Districts and Resources of South Brunswick Township.

SOILS CHART

The soils maps shows the location of the various major soil types of South Brunswick, denoted by the appropriate soil symbol as described on the following table:

Soil Types and Constraints to Urban Development:

Symbol	Soil Description	Constraints to Urban Development
AtsA	Atsion sand, 0 to 2 percent slopes	The seasonal high water table limits this soil for most types of community development due to risk of frequent flooding.
BhnB	Birdsboro silt loam, 2 to 6 percent slopes	Frost action potential and moderate to rapid permeability limit the soil as a site for on-site septic systems, dwellings with basements, and local roads and streets.
BhnC	Birdsboro silt loam, 6 to 12 percent slopes	Frost action potential, steep slopes and moderate to rapid permeability limit the soil as a site for on-site septic systems, dwellings with basements, playgrounds and local roads and streets.
ChcA	Chalfont silt loam, 0 to 2 percent slopes	The perched water table and permeability limit the soil as a site for septic tank filter fields, dwellings with basements, and local roads and streets.
ChcB	Chalfont silt loam, 2 to 6 percent slopes	The perched water table and permeability limit the soil as a site for onsite septic systems, dwellings with basements, and local roads and streets.
CoxA	Croton silt loam, 0 to 2 percent slopes	Extremely high seasonal water table (perched at a depth of 0 to 1 foot) severely limits the soil for all types of urban development.
DocB	Downer loamy sand, 0 to 5 percent slopes	The soil is suitable for most urban uses. However, the high water table limits its use for houses with basements and septic tank sewage disposal fields. The soil is limited for use as recreational areas by the loose, sandy surface.
DocC	Downer loamy sand, 5 to 10 percent slopes	The main limitations to use this soil as sites for dwellings and some other types of community development are poor filter, seepage and slope. The sandy surface limits recreation uses. Erosion and sedimentation are hazards in areas cleared of trees.
DoeB	Downer sandy loam, 2 to 5 percent slopes	This soil is generally suitable for most urban uses but the main limitations to use this soil for playgrounds and other recreational use are poor filter and seepage
DuxA	Dunellen moderately well drained variant sandy loam, 0 to 2 percent slopes	Seasonal high water table is the main limitation of this soil for urban development.
EkaAr	Elkton loam, 0 to 2 percent slopes, rarely flooded	The seasonal high water table, the low permeability and low strength are the main limitations of this soil. The low strength is a limitation of the soil as a site for local roads and streets.
EkbA	Elkton silt loam, 0 to 2 percent slopes	Extremely high seasonal water table (perched at a depth of 0 to 1 foot) severely limits the soil for all types of urban development.
EveB	Evesboro sand, 0 to 5 percent slopes	Runoff is very slow and the high water table can limit houses with basements and septic disposal fields. The main limitations for recreational areas are poor filter, cutbanks caving and sandiness.
EveC	Evesboro sand, 5 to 10 percent slopes	The main limitations to use of this soil as sites for dwellings and some other types of community development are poor filter, cutbanks caving, slope and sandiness.

Township of South Brunswick Environmental Resource Inventory of 2007

Symbol	Soil Description	Constraints to Urban Development
EveD	Evesboro sand, 10 to 15 percent slopes	The main limitations to use of this soil as sites for all urban uses, especially dwellings and some other types of community development are poor filter, cutbanks caving, slope and sandiness.
FavAr	Fallsington bedrock substratum variant loam, 0 to 2 percent slopes, rarely eroded	The seasonal high water table, the slow permeability of the subsoil and flooding limit the soil as a site for dwellings with basements, on-site septic systems, and local roads and streets.
FamA	Fallsington sandy loam, 0 to 2 percent slopes	The seasonal high water table is a major limitation of the soil for urban use, especially for septic systems, dwellings with basements, and roads and streets.
FapA	Fallsington loam, 0 to 2 percent slopes	The seasonal high water table, frost action and shrink-swell potential are the major limitations of this soil for urban use, especially for roads and streets.
HboA	Hammonton sandy loam, 0 to 2 percent slopes	The seasonal high water table limits this soil as a site for most urban uses, especially as a site for dwellings with basements, septic systems, recreation areas and sanitary landfills.
HbmB	Hammonton loamy sand, 0 to 5 percent slopes	Limitations of this soil for use as sites for dwellings with basements, septic disposal fields, recreation areas, and sanitary landfills are the seasonal high water table, poor filter and cutbanks caving.
HumAt	Humaquepts, 0 to 3 percent slopes, frequently flooded	These soils are poorly suited to urban uses and the main limitations are the seasonal high water table and frequent flooding (in early spring or after a heavy rainfall).
KemA	Keyport sandy loam, 0 to 2 percent slopes	Limitations for dwellings with basements, septic tank filter fields, and some recreation areas are the seasonal high water table, shrinking and swelling, slow percolation, and the high frost action potential.
KemB	Keyport sandy loam, 2 to 5 percent slopes	Limitations for dwellings with basements, septic tank filter fields, and some recreation areas are the seasonal high water table, shrinking and swelling, slow percolation, and the high frost action potential.
KeoA	Keyport loam, 0 to 2 percent slopes	The slow permeability, high frost-action potential, and seasonal wetness limit this soil for most urban uses.
KeoB	Keyport loam, 2 to 5 percent slopes	The main limitations of this soil for urban uses are the seasonal high water table (limits dwellings with basements), the slow permeability (limits on-site septic systems) and high frost-action potential (limits local roads and streets).
KepA	Keyport silt loam, 0 to 2 percent slopes	Seasonal high water table, a frost-action potential, and slow permeability limit the soil as a site for onsite septic systems, dwellings with basements, and local roads and streets.
KepB	Keyport silt loam, 2 to 5 percent slopes	Seasonal high water table, a frost-action potential, and slow permeability limit the soil as a site for onsite septic systems, dwellings with basements, and local roads and streets.
KeuC	Keyport-Urban land complex, 0 to 10 percent slopes	About 65 percent is covered with buildings and other impervious surfaces. The remainder 35 percent Keyport soil is mainly in yards and around and between structures. The disturbed areas are sandy and droughty. Areas that have been deeply excavated commonly are clayey and wet.
KkoB	Klinesville channery loam 2 to 6 percent slopes	Pervious and rippable bedrock and moderate slopes limit the soil as site for dwellings with basements, septic systems and local roads and streets.

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Symbol	Soil Description	Constraints to Urban Development
KkoC	Klinesville channery loam 6 to 12 percent slopes	Pervious and rippable bedrock and steep slopes limit the soil as site for dwellings with basements, septic systems and local roads and streets.
KkuB	Klinesville – Urban land complex, 0 to 6 percent slopes	About 60 percent is covered with buildings and other impervious surfaces. The remainder 40 percent Klinesville soil is mainly in yards and around and between structures. The disturbed areas are sandy and droughty. Available water capacity is low in undisturbed areas.
LbxA	Lansdowne moderately deep variant silt loam, 0 to 2 percent slopes	The perched water table, slow permeability, and depth to bedrock limit the soil as a site for septic systems, dwellings with basements, and local roads and streets.
LbtA	Lansdowne silt loam, 0 to 2 percent slopes	Seasonal high water table, a frost-action potential, low strength, and slow permeability limit the soil as a site for septic tank absorption fields, dwellings with basements, and local roads and streets.
LbtB	Lansdowne silt loam, 2 to 6 percent slopes	Seasonal high water table, a frost-action potential, low strength, and slow permeability limit the soil as a site for septic tank absorption fields, dwellings with basements, and local roads and streets.
LbuB	Lansdowne – Urban land complex, 0 to 6 percent slopes.	About 40 percent is covered with buildings and other impervious surfaces. The remainder is mainly in yards and around and between structures. The disturbed areas are sandy and droughty, and the undisturbed areas have high available water capacity.
MakAt	Manahawkin muck, 0 to 2 percent slopes, frequently flooded	The main limitations of this soil as sites for most urban uses are ponding, flooding, cutbanks caving and subsidence of the surface layer due to low strength.
MbrA	Matapeake silt loam, 0 to 2 percent slopes	Generally suitable for most urban uses, the permeability limits the soil as a site for septic tank absorption fields and most recreation uses.
MbrB	Matapeake silt loam, 2 to 5 percent slopes	Generally suitable for most urban uses, the permeability limits the soil as a site for septic tank absorption fields and most recreation uses.
MbuA	Mattapex silt loam, 0 to 2 percent slopes	The permeability and the seasonal high water table limit this soil for most non-farm uses, especially as a site for septic tank filter fields, dwelling foundations, and local roads and streets. Water ponds for short periods in depressions, and such areas are usually difficult to drain.
MbuB	Mattapex silt loam, 2 to 5 percent slopes	The permeability and the seasonal high water table limit this soil for most non-farm uses, especially as a site for septic tank filter fields, dwelling foundations, and local roads and streets.
MonA	Mount Lucas silt loam, 0 to 2 percent slopes	Seasonal wetness limits the soil as a site for septic tank filter fields and dwellings with basements. The low strength limits the soil as a site for local roads and streets. The shrink-swell potential limits the soil for other urban and recreation uses
MonBb	Mount Lucas silt loam, 0 to 6 percent slopes, very stony	Seasonal wetness limits the soil as a site for septic tank filter fields and dwellings with basements. The low strength limits the soil as a site for local roads and streets. The stoniness and shrink-swell potential limit the soil for other urban and recreation uses.
MonB	Mount Lucas silt loam, 2 to 6 percent slopes	Seasonal wetness limits the soil as a site for septic tank filter fields and dwellings with basements. The low strength limits the soil as a site for local roads and streets.

Township of South Brunswick Environmental Resource Inventory of 2007

Symbol	Soil Description	Constraints to Urban Development
MopCb	Mount Lucas– Watchung silt loams, 6 to 12 percent slopes, very stony	Seasonal wetness limits the soil as a site for septic tank filter fields and dwellings with basements. The low strength limits the soil as a site for local roads and streets. The stoniness, steep slopes and shrink-swell potential limit the soil for most urban and recreation uses.
MumAr	Mullica sandy loam, 0 to 2 percent slopes, rarely flooded	The main limitations for most urban uses are the seasonal high water table (from November to June), cutbanks caving and ponding on the surface due to poor drainage.
NknA	Nixon loam, 0 to 2 percent slopes	This soil is generally suitable for most urban uses.
NknB	Nixon loam, 2 to 5 percent slopes	This soil is generally suitable for most urban uses.
NkrA	Nixon moderately well drained variant loam, 0 to 2 percent slopes	Seasonal high water table and permeability limit the soil as a site for shallow excavations, septic absorption fields, and dwellings with basements.
NkrB	Nixon moderately well drained variant loam, 2 to 5 percent slopes	Seasonal high water table and permeability limit the soil as a site for shallow excavations, septic absorption fields, and dwellings with basements.
NktB	Nixon moderately well drained variant – Urban land complex, 0 to 5 percent slopes	About 60 percent is covered with buildings and other impervious surfaces. The remainder 40 percent Nixon variant is mainly in yards and around and between structures. The disturbed areas are sandy and droughty.
PbpA	Parsippany silt loam, 0 to 3 percent slopes	Seasonal high water table, low strength, and permeability limit the soil as a site for septic effluent disposal, dwellings with basements, lawns, landscaping, and local roads and streets.
PeoB	Penn channery silt loam, 2 to 6 percent slopes	Pervious and rippable bedrock and moderate slopes limit the soil as site for dwellings with basements, septic systems and local roads and streets.
PeoC	Penn channery silt loam, 6 to 12 percent slopes	Pervious and rippable bedrock and steep slopes limit the soil as site for dwellings with basements, septic systems and local roads and streets.
PenB	Penn silt loam, 2 to 6 percent slopes	Depth to bedrock and permeability limit the soil as a site for septic absorption systems and dwellings with basements.
PhD	Phalanx loamy sand, 5 to 10 percent slopes	Slope limits the soil for most recreation uses. The ironstone fragments in the subsoil limit shallow excavations.
PHG	Pits, sand and gravel	These are areas that have been excavated for sand and gravel. Trees have re-grown in some pits and some abandoned pits are used as dumps. The properties and characteristics differ from place to place. For most uses onsite investigation and evaluation are needed.
PssA	Psammments, 0 to 3 percent slopes	These soils consist of well drained soils such as sandy fill material placed in low, poorly drained areas. The properties and characteristics differ from place to place. For most uses onsite investigation and evaluation are needed.
PsuB	Psammments, waste substratum, 0 to 8 percent slopes	These are reclaimed areas or areas used as sanitary landfills where 24 to 48 inches of sandy fill material has been placed over refuse. It is subject to subsidence and uneven settling, and decomposition of the refuse causes liquid and gas formation. For most uses onsite investigation and evaluation are needed.

Township of South Brunswick Environmental Resource Inventory of 2007

Symbol	Soil Description	Constraints to Urban Development
Rh	Reaville poorly drained variant silt loam, 0 to 2 percent slopes	Seasonal wetness, permeability, severe frost-action potential limit the soil as a site for onsite septic systems, dwellings with basements, and local roads and streets.
ReA	Reaville silt loam, 0 to 2 percent slopes	The seasonal high water table and the depth to bedrock are the main limitations of the soil as a site for onsite septic systems, dwellings with basements, and local roads and streets.
Reb	Reaville silt loam, 2 to 6 percent slopes	The seasonal high water table and the depth to bedrock are the main limitations of the soil as a site for onsite septic systems, dwellings with basements, and local roads and streets.
RFA	Reaville – Urban land complex, 0 to 6 percent slopes	About 40 percent is covered with buildings and other impervious surfaces. The remainder is mainly in yards and around and between structures. The disturbed areas are sandy and droughty.
Ro	Rowland silt loam, 0 to 2 percent slopes, frequently flooded	The seasonal high water table and flooding limit the soil for many urban uses.
SacA	Sassafras sandy loam, 0 to 2 percent slopes	Suitable for most urban uses with few or no limitations.
SacB	Sassafras sandy loam, 2 to 5 percent slopes	Generally suitable for most urban uses. Limitations to some types of community development are cutbanks caving and frost action.
SacC	Sassafras sandy loam, 5 to 10 percent slopes	The main limitations of this soil for urban uses are cutbanks caving, frost action and slope.
SadB	Sassafras gravelly sandy loam, 2 to 5 percent slopes	The only limitations to use of this soil for development are cutbanks caving and frost action. The permeability in the subsoil is a limitation of this soil as a site for waste disposal. The slope and gravel content limit recreation uses.
SadC	Sassafras gravelly sandy loam, 5 to 10 percent slopes	The main limitations to use of this soil as sites for development are cutbanks caving, frost action and slope. The permeability in the subsoil is a limitation of this soil as a site for waste disposal. The slope and gravel content limit recreation uses.
SadD	Sassafras gravelly sandy loam, 10 to 15 percent slopes	The main limitations to use of this soil as sites for development are cutbanks caving, frost action and steep slope. The permeability in the subsoil is a limitation of this soil as a site for waste disposal. The slope and gravel content limit recreation uses. Erosion is a hazard due to the steep slope.
SafA	Sassafras loam, 0 to 2 percent slopes	Suitable for most urban uses with few or no limitations. Limitations for waste disposal.
SafB	Sassafras loam, 2 to 5 percent slopes	Suitable for most urban uses with few or no limitations. Limitations for waste disposal.
SapB	Sassafras-Urban land complex, 0 to 5 percent slopes	Suitable for most urban uses with few or no limitations. Soils and urbanized areas (such as concrete, asphalt, buildings or other structures) present in an intricate pattern.
UdcB	Udorthents, clayey substratum, 0 to 8 percent slopes	Used mainly for residential, commercial, or industrial developments. Due to the variability of the characteristics of this unit, onsite investigation is necessary to determine suitability for any use.
UdwuB	Udorthents, wet substratum – Urban land complex, 0 to 8 percent slopes	They are mostly found in housing developments or apartment complexes. Due to the variability of the characteristics of this unit, onsite investigation is necessary to determine suitability for any use.

Township of South Brunswick Environmental Resource Inventory of 2007

Symbol	Soil Description	Constraints to Urban Development
UR	Urban land	Nearly 80 percent of the surface is covered by buildings and other impervious surfaces. Onsite investigation is needed to determine if the land is limited by steep slopes, permeability or landfill materials.
WasAb	Watchung silt loam, 0 to 2 percent slopes, very stony	Wetness, slow permeability, and stoniness limit the soil as a site for septic systems, dwellings with basements, and local roads and streets. The stones also limit the soil for other urban and recreation uses.
WoeA	Woodstown sandy loam, 0 to 2 percent slopes	The main limitations to the use of this soil as sites for dwellings and some other types of community development, including local roads and streets, are seasonal high water table (in late winter and early spring), frost action and cutbanks caving.
WoeB	Woodstown sandy loam, 2 to 5 percent slopes	The main limitations to the use of this soil as sites for dwellings and some other types of community development, including local roads and streets, are seasonal high water table (in late winter and early spring), frost action and cutbanks caving.
WoekA	Woodstown sandy loam, clayey substratum, 0 to 2 percent slopes	The seasonal high water table (in late winter and early spring) and slow permeability in the substratum limit the soil for some urban uses.
WogA	Woodstown loam, 0 to 2 percent slopes	The main limitations to the use of this soil as sites for dwellings or some other types of community development are seasonal high water table, frost action and cutbanks caving.
WogB	Woodstown loam, 2 to 5 percent slopes	The main limitations to the use of this soil as sites for dwellings or some other types of community development are seasonal high water table, frost action and cutbanks caving.
WooB	Woodstown-Urban land complex, 0 to 5 percent slopes	Soils and urbanized areas (such as concrete, asphalt, buildings or other structures) present in an intricate pattern.

Township of South Brunswick Environmental Resource Inventory of 2007

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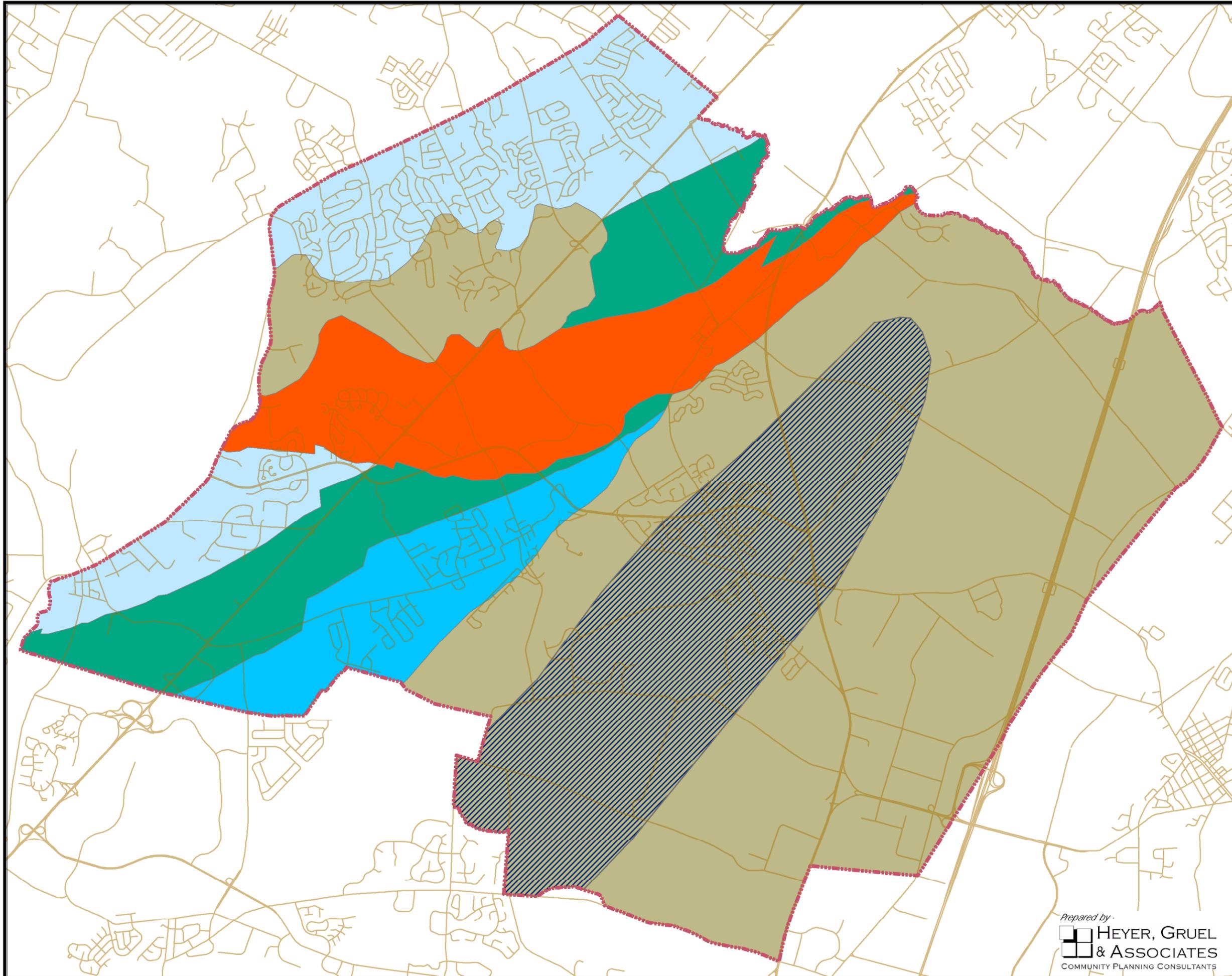
Township of South Brunswick
Environmental Resource Inventory
Aquifers

Surface Aquifer

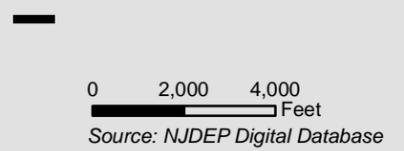
 Surficial sediment of the Coastal Plain > 50 ft thick

Bedrock Aquifer

-  Brunswick Aquifer
-  Diabase
-  Lockatong Formation
-  Potomac-Raritan-Magothy
-  Stockton Formation



Prepared by
 **HEYER, GRUEL
& ASSOCIATES**
COMMUNITY PLANNING CONSULTANTS



Township of South Brunswick
Environmental Resource Inventory
Critical Habitat Areas

Legend

 Wood Turtle

Emergent Wetland

RANK

-  Suitable Habitat (1)
-  Priority Species (2)
-  State Threatened (3)
-  State Endangered (4)
-  Federal T and E (5)

Forest

RANK

-  Suitable (1)
-  Priority Species (2)
-  State Threatened (3)
-  State Endangered (4)
-  Federal T and E (5)

Grassland

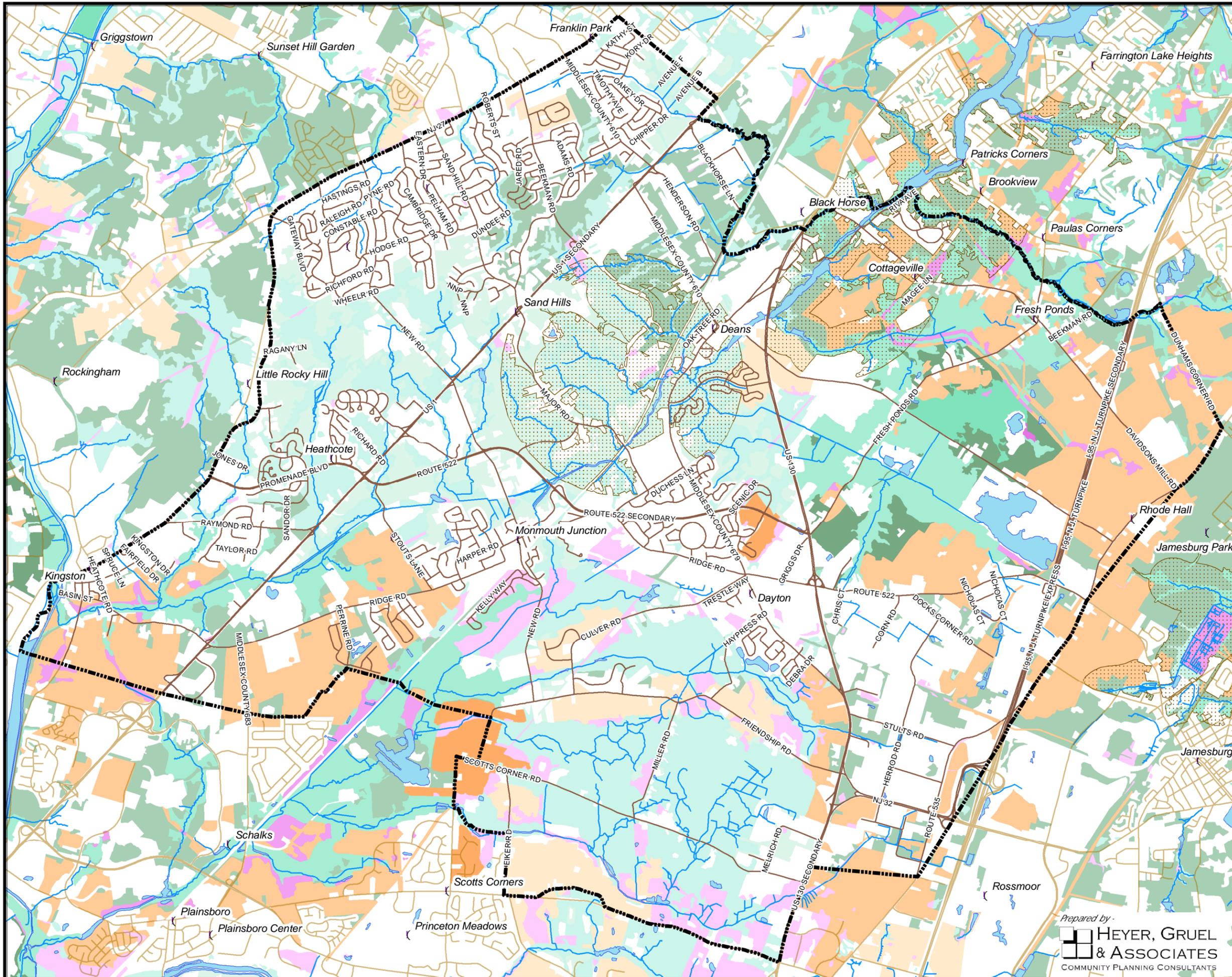
RANK

-  Suitable (1)
-  Priority Species (2)
-  State Threatened (3)
-  State Endangered (4)
-  Federal T and E (5)

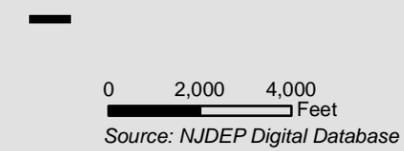
Forested Wetland

RANK

-  Suitable (1)
-  Priority Species (2)
-  State Threatened (3)
-  State Endangered (4)
-  Federal T and E (5)



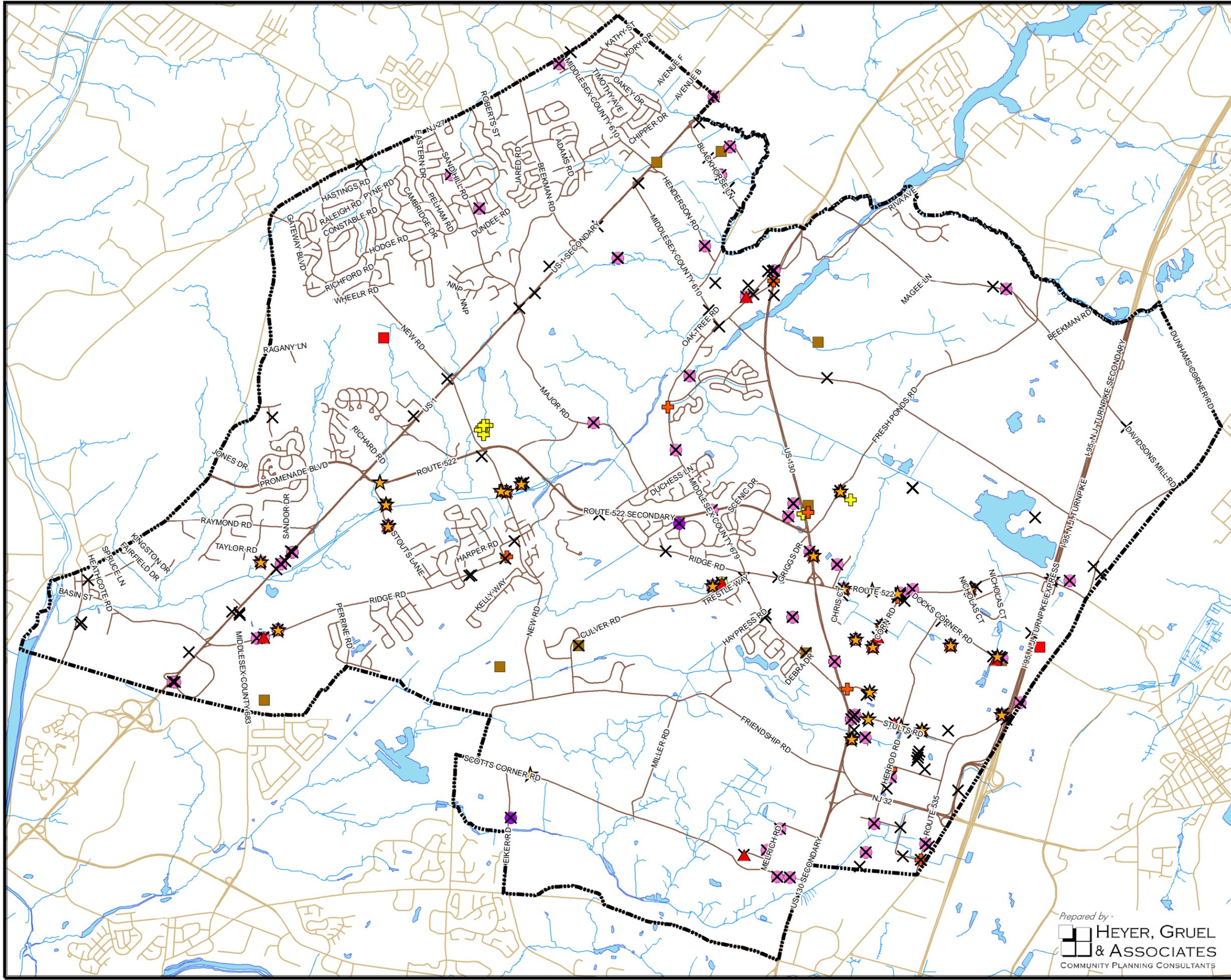
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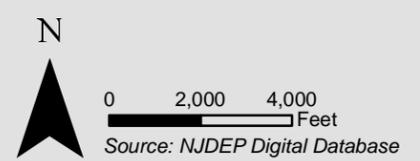
Township of South Brunswick
Environmental Resource Inventory
EPA Inventory of Contaminated Sites

EPA Inventory of Contaminated Sites

- ★ AFS Permits
- ▲ Toxic Release Inventory Reporters
- ✕ RCRA Hazardous Waste Permits
- RCRA Hazardous Waste Permits- Generators
- RCRA Hazardous Waste Permits- Transporters
- RCRA Hazardous Waste Permits- TSDs
- ⊕ Permit Compliance System Permits
- ⊕ Permit Compliance System Pipe Locations
- CERCLIS NPL Sites
- CERCLIS Facilities



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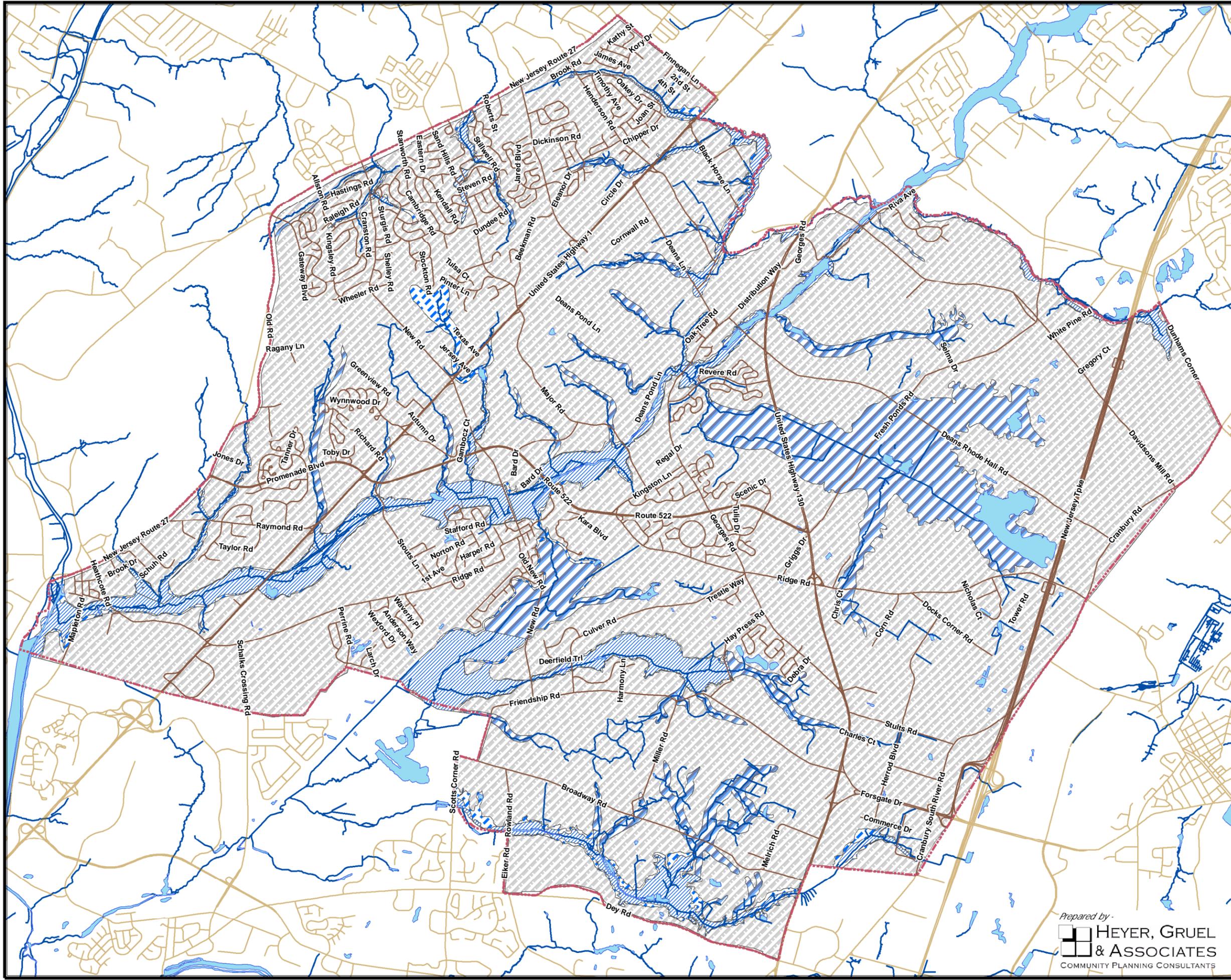


Township of South Brunswick
 Environmental Resource Inventory
 Floodplains

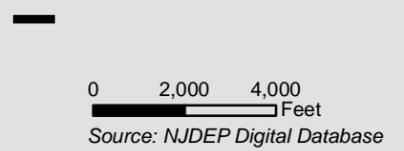
-  Surface Water
-  Streams

Flood Zones

-  A
-  A1-A30
-  B
-  C



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Township of South Brunswick
Environmental Resource Inventory
Geology

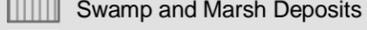
 Physiographic Provinces

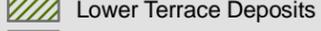
 Geological Faults

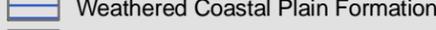
Surficial Geology

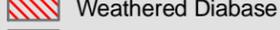
 Alluvium

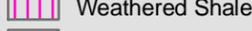
 Sand and Gravel Colluvium

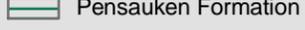
 Swamp and Marsh Deposits

 Lower Terrace Deposits

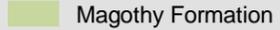
 Weathered Coastal Plain Formation

 Weathered Diabase

 Weathered Shale

 Pensauken Formation

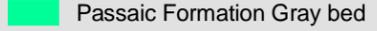
Bedrock Geology

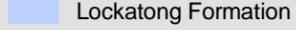
 Magothy Formation

 Raritan Formation

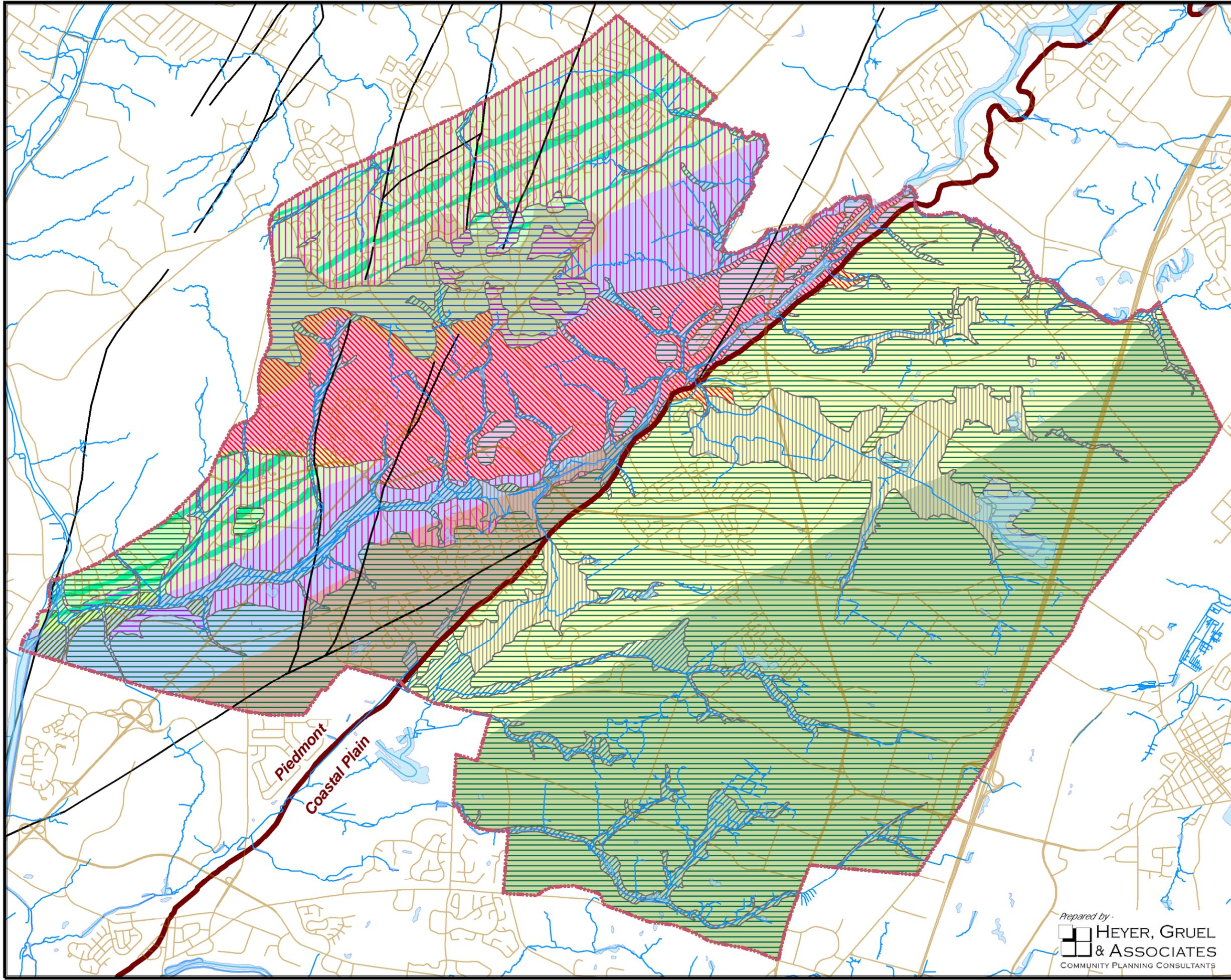
 Jurassic Diabase

 Passaic Formation

 Passaic Formation Gray bed

 Lockatong Formation

 Stockton Formation



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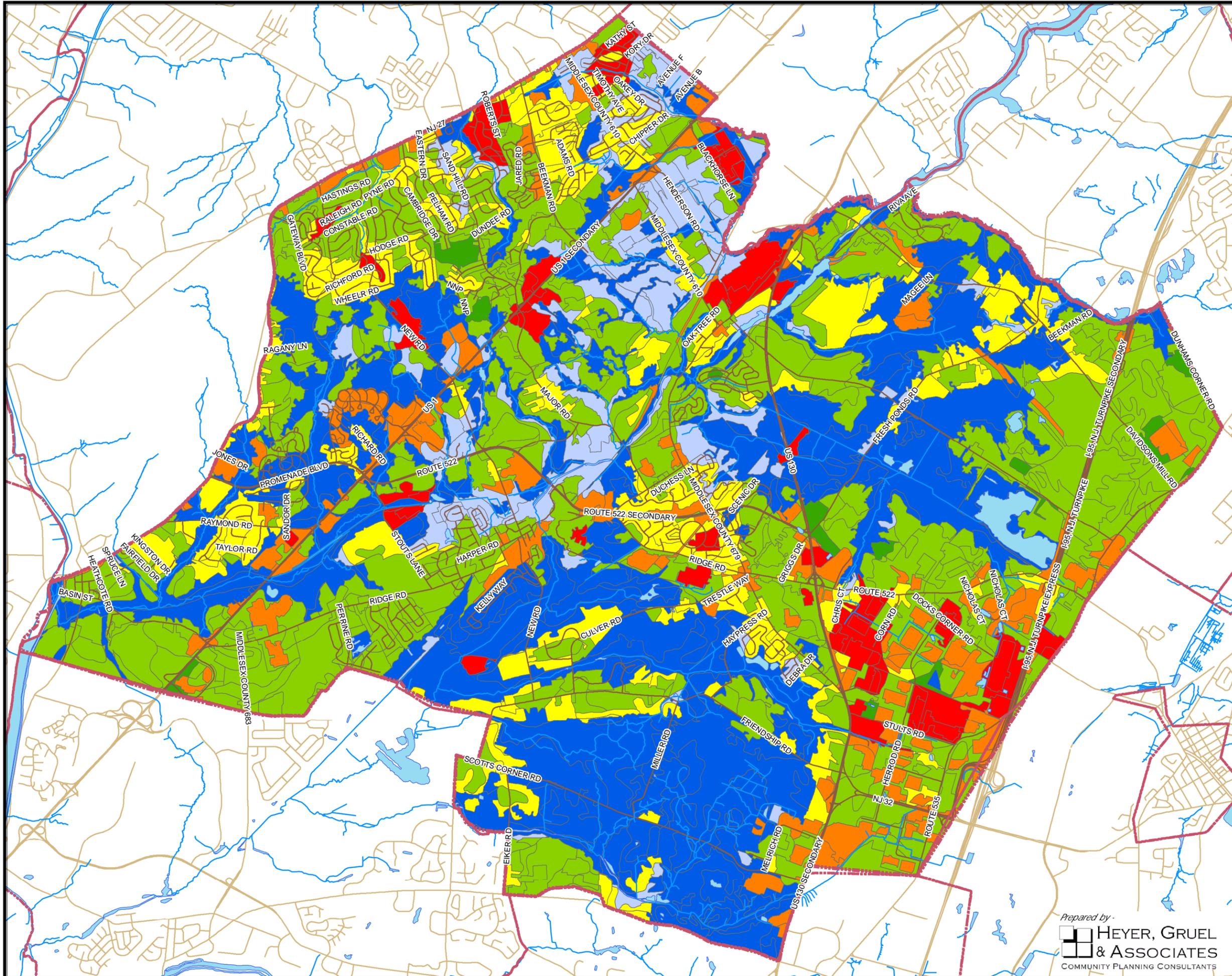

0 2,000 4,000
Feet
Source: NJDEP Digital Database

Township of South Brunswick
 Environmental Resource Inventory
 Ground Water Recharge Areas

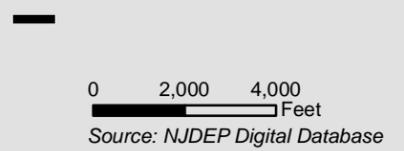
Ground Water Recharge Areas

County Ranking

- A 15 to 18 in/yr
- B 11 to 14 in/yr
- C 9 to 10 in/yr
- D 1 to 8 in/yr
- E 0 in/yr
- L Hydric Soils
- W Wetlands and Open Waters

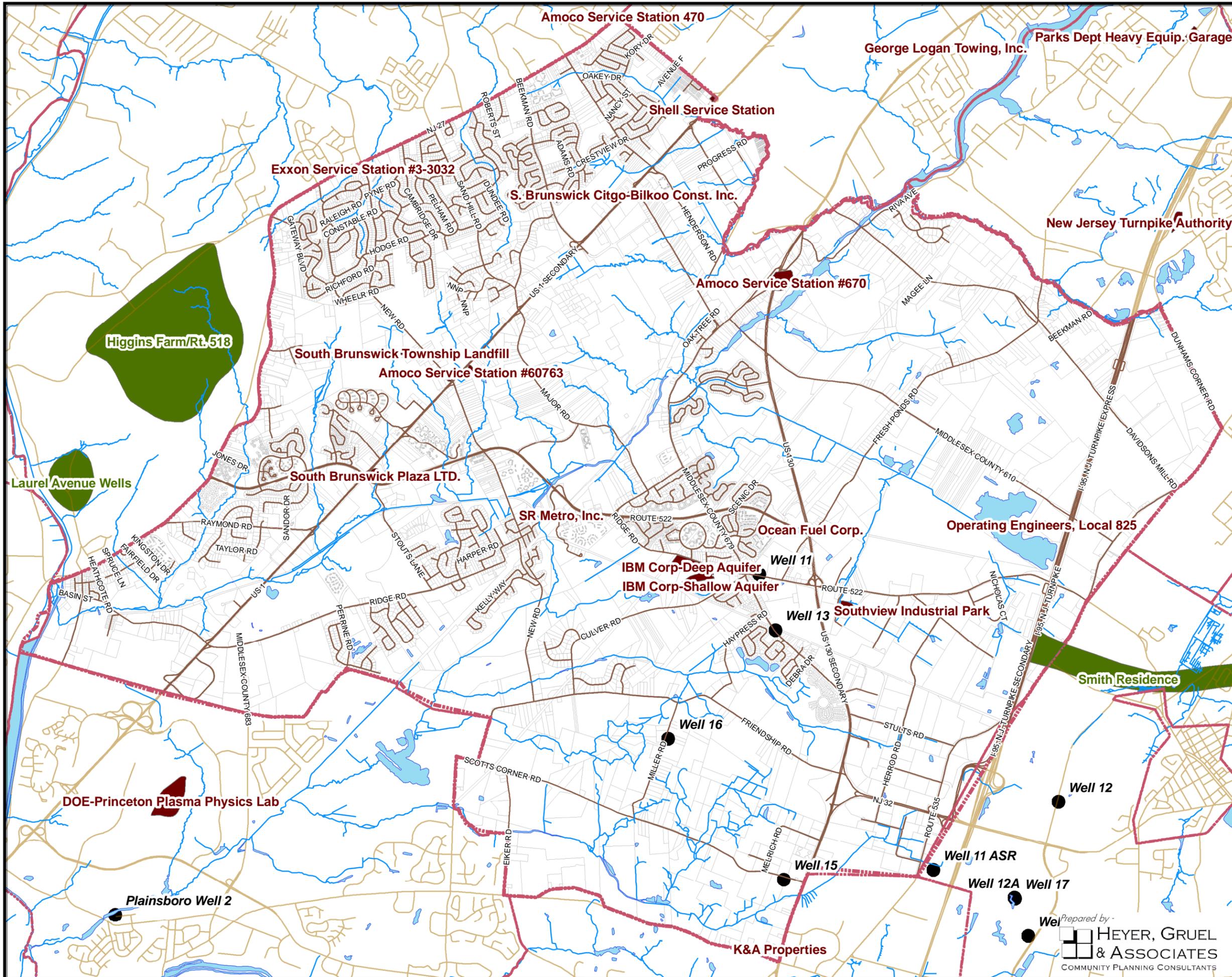


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Township of South Brunswick
Environmental Resource Inventory
Ground Water Contamination
Classification Exception Areas

-  Groundwater Contamination Classification Exception Areas/ Well Restriction Areas
-  Currently Known Extent of Groundwater Contamination
-  Public Community Water Supply Wells

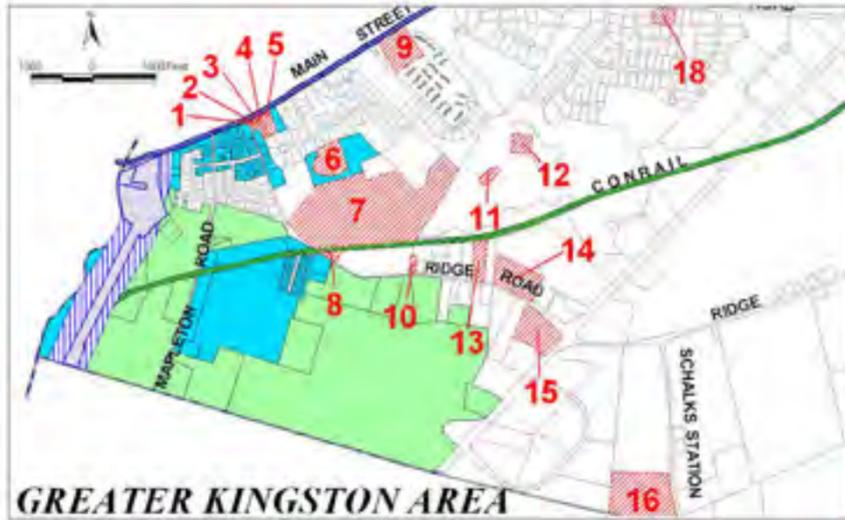


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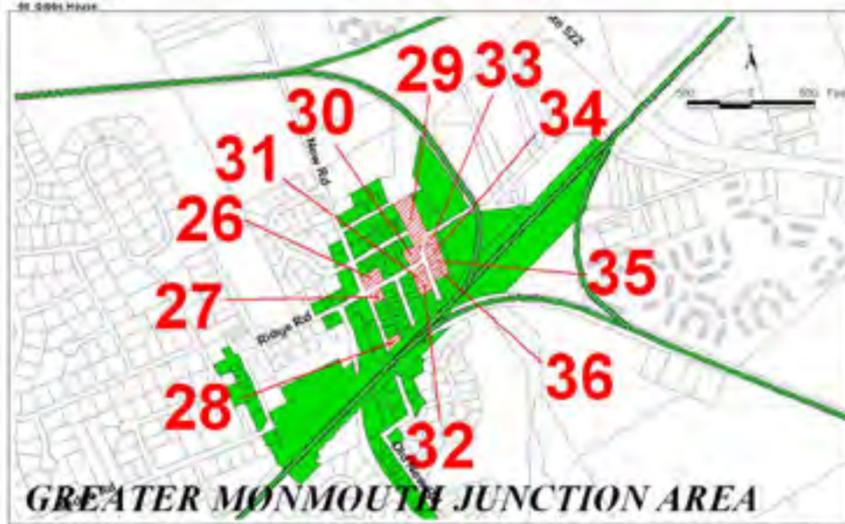
Source: NJDEP Digital Database

HISTORIC DISTRICTS AND RESOURCES

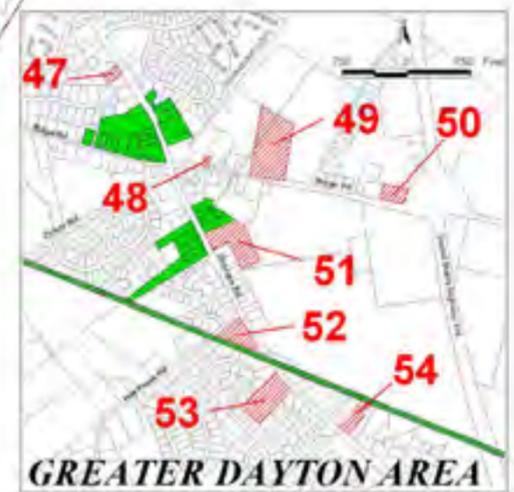
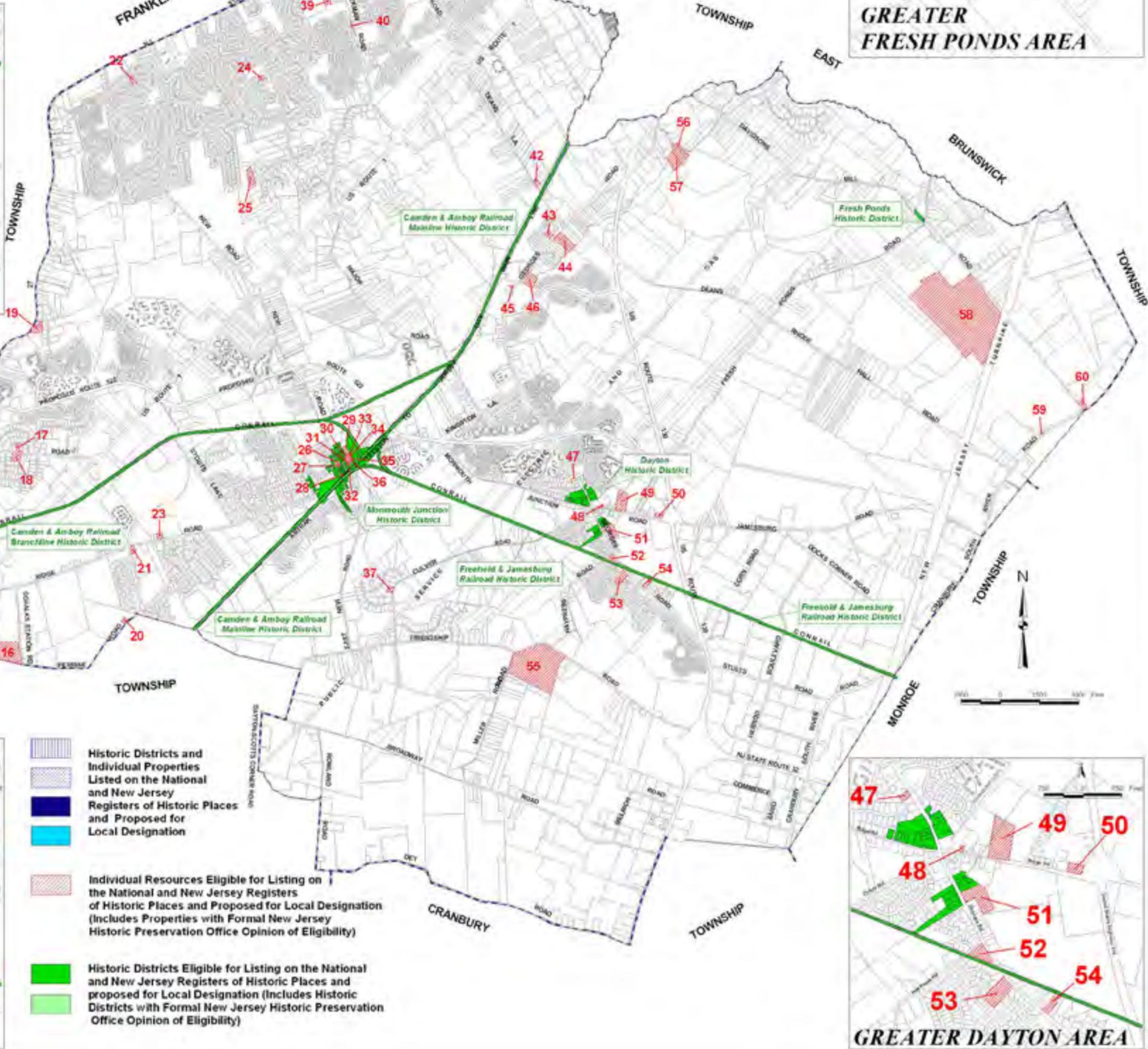
OF SOUTH BRUNSWICK TOWNSHIP MIDDLESEX COUNTY, NEW JERSEY



- Significant Historic Resources**
1. Historic House
 2. John House
 3. John C. King House
 4. W. C. Johnson House
 5. W. A. Paine House
 6. Withington & Stone Warehouse Farm
 7. Nathaniel Brock Bridge
 8. W. H. Paine House
 9. Robert Taylor House & Outbuildings
 10. Killebrew Cottage
 11. Garden Farm, 18th-Century Appleton House
 12. Appleton Farm, 18th-Century House
 13. Peter Schenk House & Outbuildings
 14. John L. Lee House (Old John's) & Outbuildings
 15. J. L. Lee House
 16. Major Albert House
 17. W. J. Taylor House
 18. Wood House Farm
 19. C. Reading House
 20. Carter House
 21. Oak Ridge School
 22. Conklin House
 23. Culver House
 24. Jackson House
 25. S. Smith House
 26. Whaleyman Cottage
 27. Mine Millard Church
 28. Old Lutheran Tavern and Store
 29. Richard Mott House and Barn
 30. Small House and Outbuildings
 31. William L. Rowland House
 32. James Condit House
 33. Small Barn
 34. Peter Johnson House
 35. Wood House Farm
 36. William Green House
 37. F. Culver House
 38. Wood Working House
 39. Jackson House
 40. Jackson Road Cemetery
 41. Woods Tavern
 42. Mott House
 43. Martin-Dwight on Estate
 44. Deane Elementary School
 45. A. Dean House, "The White"
 46. Appleton House
 47. Appleton House
 48. A. Johnson-Cooker House
 49. St. Michael's Church
 50. McDevitt House
 51. Dayton School
 52. Mott House
 53. Wetherill-Rowland House & Outbuildings
 54. Joseph Hubbard House
 55. John W. Lee House & Appleton Farmhouse
 56. Jackson House
 57. Davidson Mill Pond Dam
 58. W. Van Dyke Farm
 59. Wetherill-Rowland House
 60. S. Smith House



- Historic Districts and Individual Properties Listed on the National and New Jersey Registers of Historic Places and Proposed for Local Designation
- Individual Resources Eligible for Listing on the National and New Jersey Registers of Historic Places and Proposed for Local Designation (Includes Properties with Formal New Jersey Historic Preservation Office Opinion of Eligibility)
- Historic Districts Eligible for Listing on the National and New Jersey Registers of Historic Places and proposed for Local Designation (Includes Historic Districts with Formal New Jersey Historic Preservation Office Opinion of Eligibility)



Impervious Surface

Percent Of Impervious Cover By Land Use Polygon



2,000 0 2,000
Feet

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*The map shown here is for illustration purposes
only and is not suitable for site-specific decision
making. Information found here should not be
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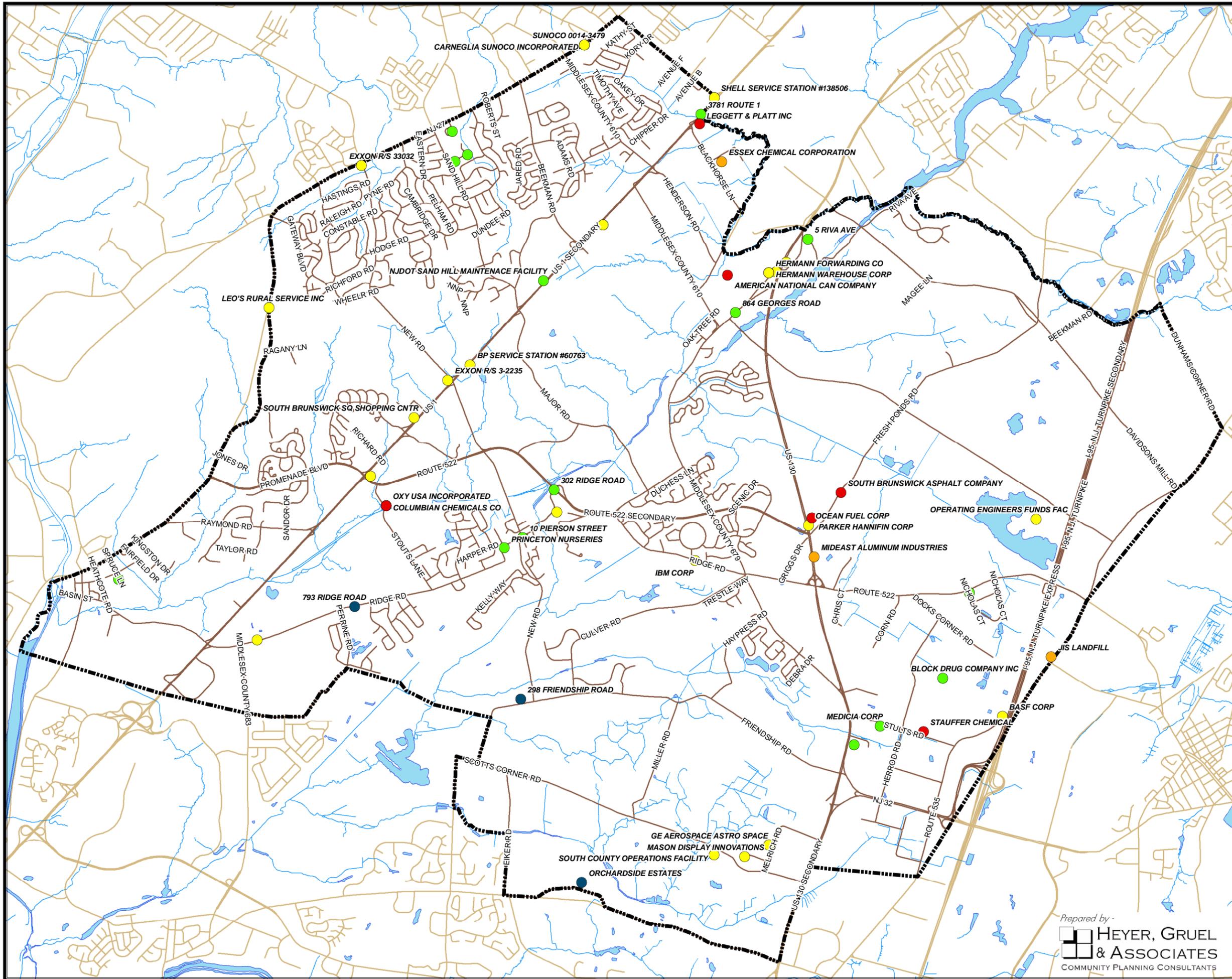
*All positions are based on the following:
NAD 83 (Horizontal Datum)
N.J State Plane Coordinate System*

February 2007

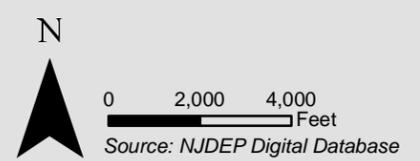
Township of South Brunswick
Environmental Resource Inventory
Known Contaminated Sites NJDEP

NJ Known Contaminated Sites 2005

- B: Single Phase RA - Single Contamination Affecting Only Soils
- C1: No Formal Design - Source Known or Identified-Potential GW Contamination
- C2: Formal Design - Known Source or Release with GW Contamination
- C3: Multi-Phased RA - Unknown or Uncontrolled Discharge to Soil or GW
- D: Multi-Phased RA - Multiple Source/Release to Multi-Media Including GW



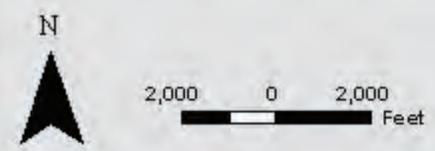
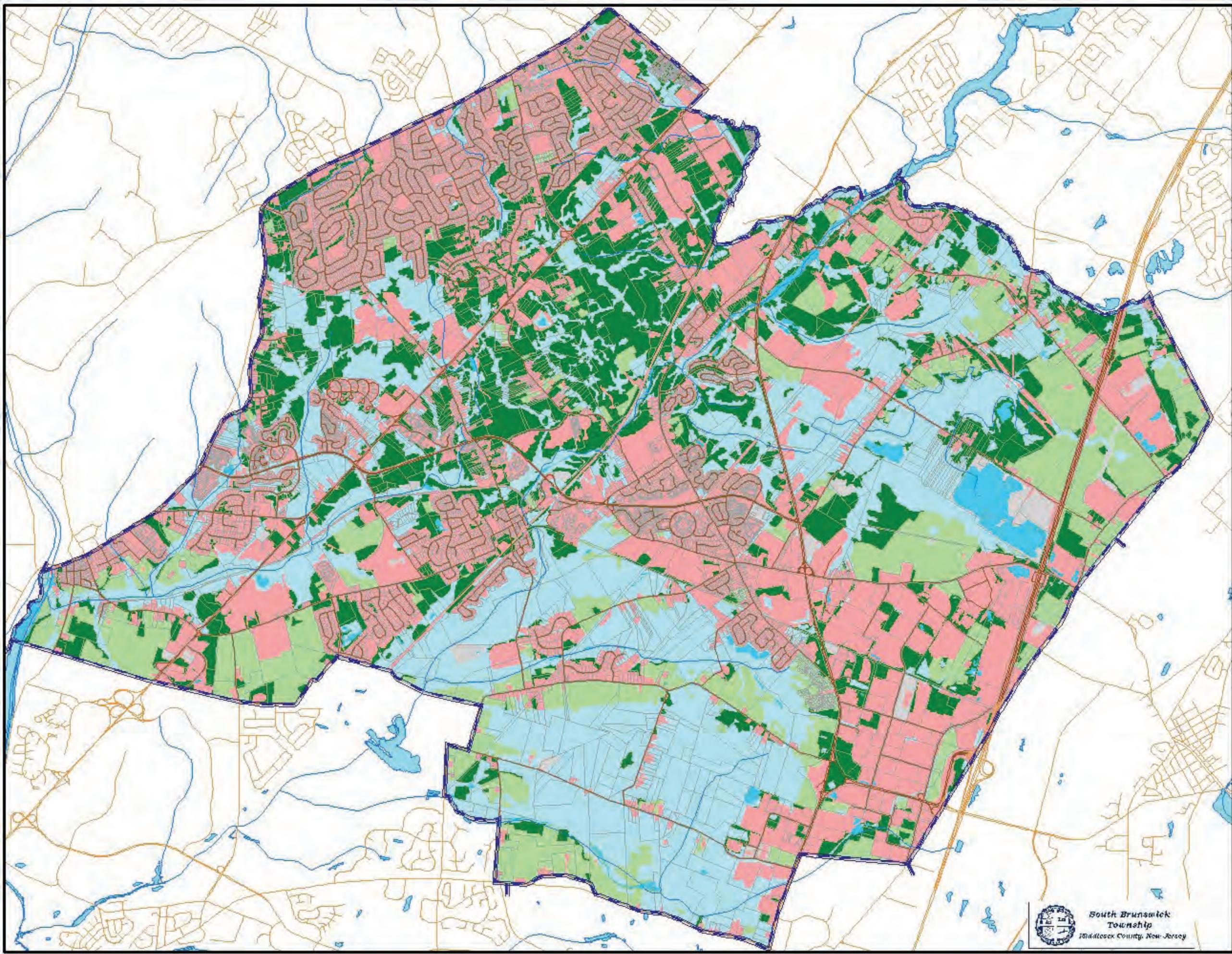
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 COMMUNITY PLANNING CONSULTANTS



Land Use / Land Cover Map

Land Use/ Land Cover

-  Agriculture
-  Barren Land
-  Forest
-  Urban
-  Water
-  Wetlands



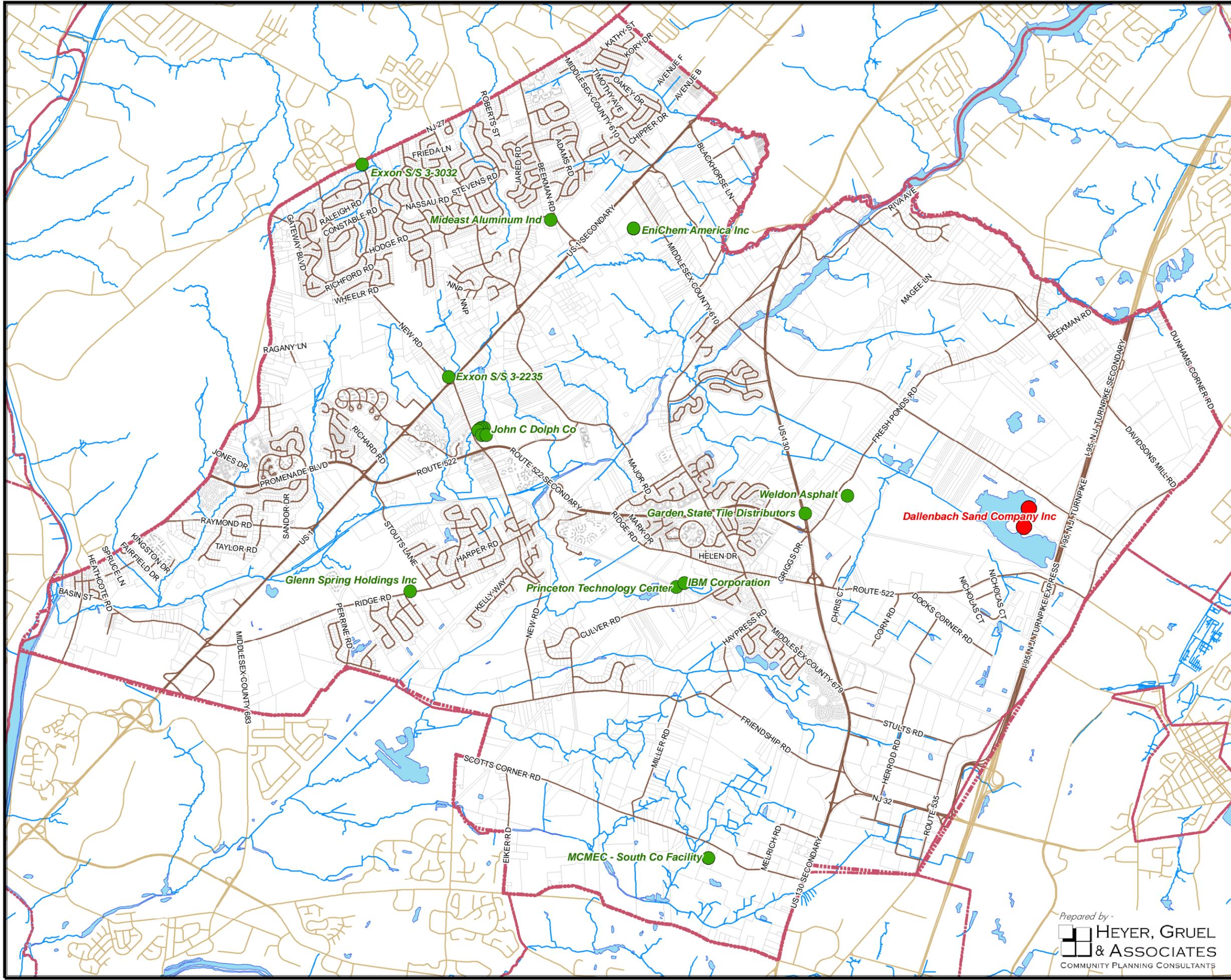
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-N.J State Plane Coordinate System*



Township of South Brunswick
Environmental Resource Inventory
New Jersey Pollution Discharge
Elimination System

- NJPDES Surface Water Discharge
- Dallenbach Sand Company Inc



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**HEYER, GRUEL
& ASSOCIATES**
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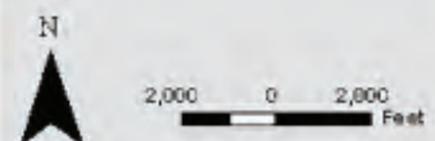
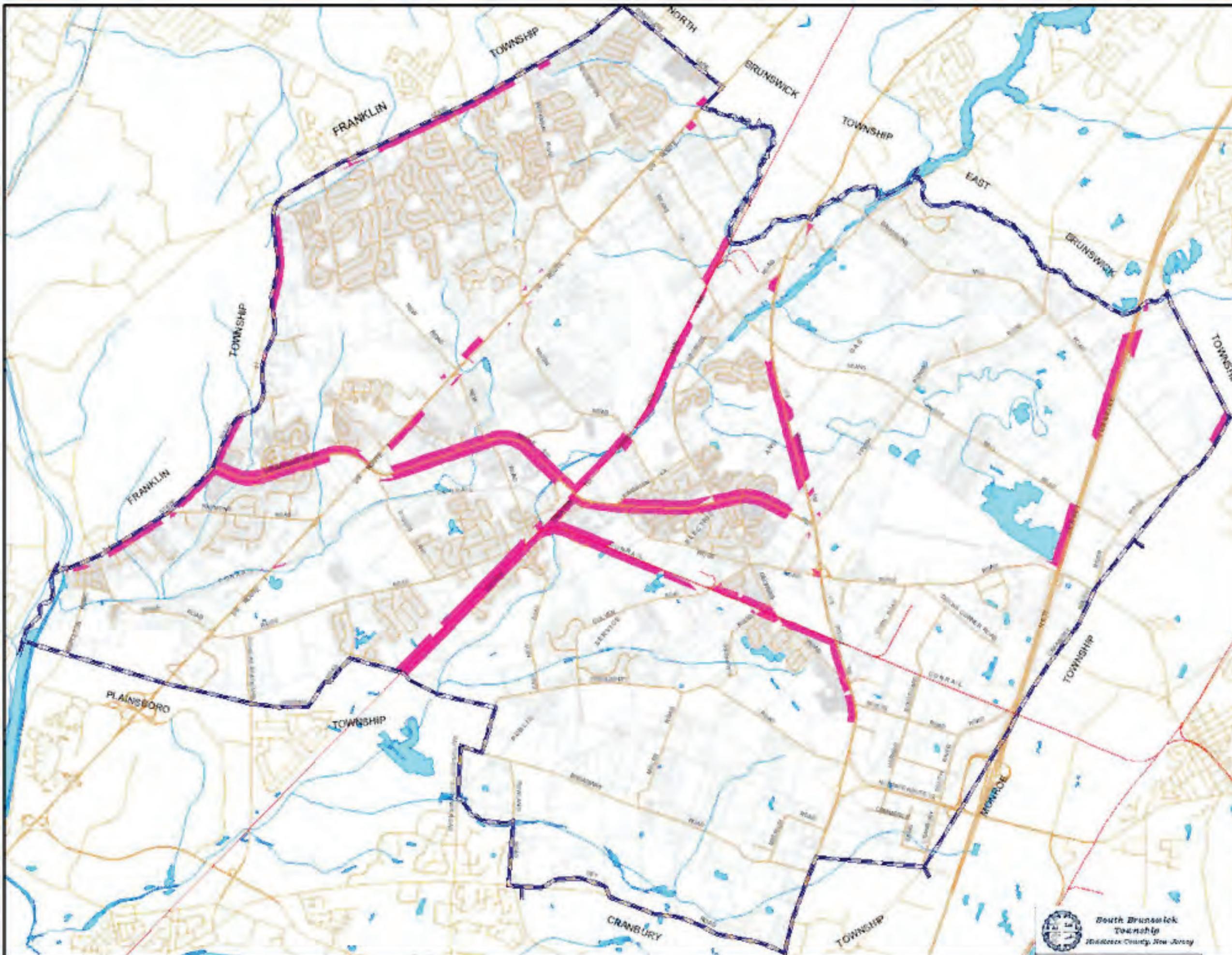
N

0 2,000 4,000 Feet

Source: NJDEP Digital Database

Noise Level

 Residential Areas
With Elevated Noise Level



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