



## Appendix 4: Township of East Brunswick

The Township of East Brunswick participated in the 2015 Middlesex County Hazard Mitigation Plan (HMP) update. This appendix includes the locally-specific information about the Township. The following sections detail the planning process and participants; the current population, building stock, and land development trends; hazards that specific to the Township and corresponding risk assessments; the Township’s mitigation strategy, and a local capability assessment.

### 1. Plan Development

On December 14, 2014 date, the OEM Coordinator signed an “Intent to Participate” letter and assigned a point of contact for the HMP update. The Coordinator worked with other municipal employees, consultants, volunteers, and other stakeholders through the formation of a Local Planning Committee, as listed below. The local planning committee filled out the municipal worksheets included in Appendix E and worked to gather the necessary information to support the plan update. Members of the LPC met with the Planning Consultant on June 25<sup>th</sup>, 2015. The LPC reviewed all draft and made necessary changes to this appendix.

**Table 4-1**  
**Township of East Brunswick Local Planning Committee Members**

Name	Title	Organization
Austin C. Kosik, Jr., CEM	Emergency Management Coordinator	East Brunswick Township
David Stahl	Municipal Mayor	East Brunswick Township
James White	Municipal Administrator	East Brunswick Township
Keith Kipp	Manager Engineering Services	East Brunswick Township
Dan Losik	Director - Dept. of Public Works	East Brunswick Township
Michael Reissner	Director – Dept. of Parks	East Brunswick Township
Nennette Perry	Municipal Clerk	East Brunswick Township
Ed Grobleny	Construction Official	East Brunswick Township



## 2. Community Profile

### 1. Physical Location

The Township of East Brunswick has a total area of 24.27 square miles and is located in the central region of Middlesex County, New Jersey. It is bordered by the Raritan River and New Brunswick to the north, Sayreville, South River, Old Bridge, Spotswood and Helmetta to the east, Monroe and South Brunswick to the south, and North Brunswick and Milltown to the west.

A number of important transportation routes cross through East Brunswick, to include the New Jersey Turnpike (as well as Exit 9 Interchange and the Joyce Kilmer Service Area), Route 1, Route 18, County Route 535, and County Route 527. New Jersey Transit provides bus service. There are no commuter rails in East Brunswick although Conrail serves commercial sites.

#### 2.1.1 Hydrography and Hydrology

The Township of East Brunswick is located within the Raritan River Basin. It has a number of significant waterbodies within or adjacent to the Township. The Township borders are coincident with Ireland Brook and the Lawrence Brook on the western side. Farrington Lake, on the Lawrence Brook separates the Township from North Brunswick. The Township is tidally influenced in the northern portion of the Township, along the Lawrence Brook, South of Weston's Mill Pond. Part of the eastern boundary is determined by the South River, downstream of Duhernal Lake. This stretch of the river is also tidal. The southeastern part of the Township, adjacent to Helmetta, drains into the Manalapan Watershed, the Cedar Brook is the primary tributary in this area of the Township, which drains from Helmetta Pond.

### 2. History and Governance

The Township of East Brunswick was formally incorporated on February 28, 1860. Prior to incorporation, East Brunswick was part of Monroe and North Brunswick Townships. The Township is governed under the Mayor-Council form of government, and has an elected Mayor and five Council members. The Mayor is elected directly to a four-year term of office. Town Council members are elected to serve four-year terms on a staggered basis, with elections every other year. The Township Council holds monthly meetings open to the public where it discusses legislation under consideration.

## 3. Demographics

### 2.3.1 Population Trends

According to the U.S. Census Bureau, the population in 2010 was 47,512.<sup>1</sup> This is a 1.6% increase from 2000. The Township of East Brunswick has a population density of 2,190 persons per square mile. It is

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<sup>1</sup> U.S. Bureau of the Census. American Fact Finder "East Brunswick Township, NJ". <http://factfinder.census.gov/>. Retrieved 8/16/15.



the 20th densest municipality within the County. A summary of major population and household characteristics may be found in the following tables.

**Table 4-2**  
**Township of East Brunswick Population Summary Estimates (2010 Census) <sup>2</sup>**

Population	Quantity	Percent of Municipal Population
Total Population	47,512	100
Median Age	42.5	N/A
17 years and under	11,461	24.1
65 years and over	6,422	13.5
<b>Race</b>		
White	32,954	69.4
Black/African-American	1,890	4.0
Native American/Alaskan Native	48	0.1
Asian	10,835	22.8
Native Hawaiian/Pacific Islander	6	0
Other Race (unspecified)	798	1.7
Two or More Races	981	2.1
Hispanic or Latino	3,184	6.7

Population statistics may further reveal potential vulnerabilities in the community. The following table details the distribution of two groups included in vulnerable population analyses (children and the elderly) according to household description. Residents living alone, particularly the elderly, may have fewer coping mechanisms and resource than those in household groups, therefore may constitute a demographic that could require assistance in mitigating their vulnerability.

**Table 4-3**  
**Township of East Brunswick Household Characteristics Summary Estimates (2010 Census) <sup>3</sup>**

Households	Quantity	Percent of Total
Total Households	16,810	100
Family Households (related)	13,174	78.4
Family Households w children under 18	6,245	37.2
Non-Family Households (unrelated)	3,636	21.6
Non-Family Households, living alone	3,187	19.0
Non-Family Households, living alone Male over 65 years	342	2.0
Non-Family Households, living alone Female over 65 years	1,086	6.5

### 2.3.2 Vulnerable Populations

Vulnerable populations include those groups that may require special assistance, considerations, accommodation or other needs during emergency events to facilitate their effective and safe

<sup>2</sup> Ibid.

<sup>3</sup> Ibid.



compliance with emergency instructions. This includes, but is not limited to, those individuals needing mobility assistance (strollers, wheelchairs, etc.), those with financial needs (cannot afford hotel rooms, food, necessities, during evacuation periods, etc.), those requiring translation or interpretation services to understand emergency information (non-English-speaking populations, Deaf and hard of hearing), persons considered legal minors, those persons with cognitive impairments, persons with specialized medical needs (electric dependent equipment, refrigerated medications, use of Personal Assistants for routine and basic care, medical transportation needs, etc.), and populations with social disadvantages other needs that may require unique considerations during emergency events.

Identifiable vulnerable populations in East Brunswick include (but may not be limited to) the following:

**Table 4-4**  
**Township of East Brunswick Vulnerable Population Estimates (2010)**

Population Type	Population Estimate (2010 Census) <sup>4</sup>
Under 5 years of age	2,190
Under 18 years of age	11,461
Over 65 years of age	6,422
Limited English Proficiency (LEP)	6,060 (equals 13.2% of population over 5 years old)
Institutionalized	221
Living in Group Quarters	14

In addition to these statistics, approximately 4.2% of the population lives below the poverty line. The mean household income is \$104,493, with the per capita income at approximately \$44,470 (2013 estimates).<sup>5</sup>

<sup>4</sup> Ibid.

<sup>5</sup> U.S. Bureau of the Census. American Fact Finder “East Brunswick Township, NJ”. <http://factfinder.census.gov/> . Retrieved 8/16/15.



## 4. Land Use and Development

The Township of East Brunswick strives to minimize the risk to person and property within the municipality. For this reason the Township has regulations and policies in place to limit development in floodprone, environmentally sensitive, and high-risk areas. Since the 2010 Hazard plan East Brunswick has experienced minimal development, which is likely more a reflection on economic climate than opportunity within the Township. Unlike many places within the County, East Brunswick is a community that is still developing and expanding its residential areas.

East Brunswick is a young residential community, with only 61 percent of its 8,798 acres classified as urban/developed. As seen in the table below, there has been a loss in agricultural land within the Township since 2002 and an increase in urbanized land. There has also been a loss in barren land, which is also a sign of growth.

Over 82 percent of the parcels within East Brunswick are classified as residential based on tax assessment data. According to the New Jersey Department of Community Affairs, in 2014, 447 building permits were issued for residential homes within the Township. 424 residences are multi-family units. The Township has taken measures to reduce potential risk to new properties through land use and subdivision regulations and zoning. Areas of the Township that are known to be wet or floodprone have been zoned to lower intensity uses. This is in addition to a flood damage protection ordinance and stormwater management requirements

### 2.4.1 Open Space

The Township of East Brunswick has a number of parks, preserves, and conservation areas. This totals an estimated 2,202 acres within the Township. A few of these areas, including the Ireland Brook Conservation Area and Lenape Park are in the Special Flood Hazard Area. Approximately, 9.8% of the open space is floodplain, which means that over 27% of the floodplain in the Township is preserved.

**Table 4-5**  
**Township of East Brunswick Land Cover Summary**

Land Cover Class	Percent of Total Land <sup>6</sup>	2002 (acres)	2007 (acres)	2012 (acres)	Percent Change <sup>7</sup>
Agriculture	4.06%	690.38	600.89	582.05	-15.69%
Barren Land	2.94%	480.24	469.94	421.19	-12.30%
Forest	19.40%	2843.14	2708.36	2781.55	-2.17%
Urban	61.36%	8521.57	8801.29	8798.42	3.25%
Water	2.64%	355.98	372.55	378.24	6.25%
Wetlands	9.61%	1448.68	1386.97	1378.56	-4.84%

<sup>6</sup> Percent based on acres of land in 2012

<sup>7</sup> Change is calculated between 2002 and 2012



## 2.4.2 Buildings and Development

The Township is still developing, so the majority of the housing stock is new construction. According to the 2013 American Community Survey, an estimated 4 percent of the houses were built before 1979. This means the majority of the homes are post-fire and built with modern building code requirements. This reduces the vulnerability of the Township's building stock to known hazards.

**Table 4-6: Township of East Brunswick Housing Statistics**

Housing Characteristics	Estimate
Total Occupied Housing Units	16,762
Percent Owner-occupied	82.3
Percent Renter-occupied	17.7
Percent built after 2000	28.2
Percent built before 1979	4.0

## 2.4.3 Recent and Expected Development

The Township did not report any recent major development since 2010.

## 2.5 Critical Facilities and Infrastructure

### 2.5.1 Essential Facilities

The Township's public facilities include the Township Administration Building, the Library, the Police and Senior Citizen Center. These facilities are located in a single complex, not located adjacent to any known hazard area. Additional facilities include three fire stations, Rescue Squad Headquarters, and a public works department. The Township does not have a function Emergency Operations Center at this time. Additionally, the Township recognizes that these facilities are vulnerable to power outages and is working on securing generators to maintain critical operations and provide comfort stations for its residents.

### 2.5.2 Transportation

East Brunswick is transected by the New Jersey Turnpike and Route 18. County Road 535 connects East Brunswick to South River before reaching Sayreville. There is no railroad line within the Township.

### 2.5.3 Critical Utilities and Infrastructure

The Township manages its own sewer service areas. The system has grown in the past 25 years, but it is still relatively young infrastructure. The Township's water is serviced by Middlesex Water Company, JCP&L and PSE&G both provide electric service and PSE&G is the local gas utility. The Township reports that PSE&G service areas experienced power outages for longer duration, in previous events.



### 3. Hazard Identification and Risk Assessment

This section describes the natural hazards and risks that can affect the Township of East Brunswick. Like all the other municipalities in Middlesex County, East Brunswick is potentially subject to the effects of all the hazards that are considered in this mitigation plan. However, only a few of these hazards have significant impacts that are unique to the community. The remaining hazards are discussed in detail in the County part of this mitigation plan. FEMA mitigation planning guidance requires that County mitigation plans include a risk assessment section that “assess[es] each jurisdiction’s risks where there vary from the risks facing the entire planning area” (44CFR 201.6 (c) (2) (iii)). Because the Middlesex County HMP update includes separate appendices for each municipality, this requirement is met in the appendices, while risks that affect the entire County uniformly are discussed in Section 4 of the HMP.

#### 3.1 Background and Hazard Rankings

One of the first steps in developing jurisdictional appendices was for participating municipalities to review and prioritize the hazards that can affect them. This was done based on how often a hazard has occurred, how significant effects have been in the past, the difficulty and cost of recovering from such events. The planning team also reviewed hazard-specific data at the jurisdiction level to provide communities with insight about which hazards would be afforded detailed risk assessments. Municipalities ranked the list of hazards as high, medium, low, or no concern.

Table 4-7 shows community hazard rankings. To the extent possible, the level of discussion and detail about specific hazards in this section are based on these rankings. However, in many cases there is insufficient hazard information available at the level of the jurisdiction to allow detailed discussion or risk estimates. For some hazards there is limited jurisdiction-level tabular data included in the County portion of the HMP, and users should refer to those subsections for more detail. The hazards marked with asterisks in the table above are included in this appendix; the others are included in the County portion of this HMP, but not discussed in detail here. The Township has ranked earthquakes as a high hazard because of their potential impacts if a severe earthquake were to occur along the faultline. In recent history the Township reports that there have been 3 minor earthquakes in the area. More information on the risk and impacts for this hazard are detailed in Section 4 of the HMP.

**Table 4-7**  
**Township of East Brunswick**  
**Hazard Identification and Prioritization**

<b>Hazard</b>	<b>Priority</b>
Coastal Erosion	Low
Dam/Levee Failure	High
Drought	Medium
Earthquakes	High
Extremely High Temps	Medium
Extremely Low Temps	Medium
Floods	High*
Geological Hazards	Low
Hurricanes/Tropical Storms	High
Nor’easters	High
Power Outages	Medium
Severe Weather	Medium
Hazardous Substances	Medium
Wildfire	Low*
Winter Storm	Medium



## 3.2 Flood Hazard

### 3.2.1 Type, Location, and Extent

East Brunswick Township is located in central Middlesex County. There are various rivers, streams, lakes and tributaries that both border and cross this medium-sized jurisdiction. These include: the Raritan River, which forms part of the Township’s northern border; the South River, which makes up part of the eastern border; Farrington Lake and Westons Mill Pond, which are adjacent to the western side of the Township; Sawmill Brook, which partially crosses the northern end of the jurisdiction in an east-west direction; and Ireland Brook, which meanders across the south-central part of the Township.

One of the best resources for determining flood risk in a jurisdiction is Flood Insurance Rate Maps (FIRMs), which are produced by FEMA. The FIRM is the official map of a community on which FEMA has delineated both the special flood hazard areas (1% annual chance of flooding) and the risk premium zones applicable to the jurisdiction.<sup>8</sup> At the time the Middlesex County HMP was being updated, the effective FIRM for the Township of East Brunswick is dated July 6, 2010. While the effective FIRM is the approved map and is used for regulatory purposes, the Middlesex County hazard mitigation plan update was developed in 2015, and the best available flood mapping at that time was the FEMA revised Preliminary Flood Map (released on January 30, 2015). This map is shown below in Figure 4-1. It clearly shows that all the 100- and 500-year floodplain in the jurisdiction.

Interestingly, there is a relatively small amount of 100-year floodplain associated with these sources. Table 4-8 provides some basic jurisdiction and floodplain statistics.

**Table 4-8**  
**Floodplain and Parcel Data for East Brunswick Township**  
(Source: FEMA Region II, Coastal Analysis and Mapping, Preliminary FIRM, September 19, 2014)

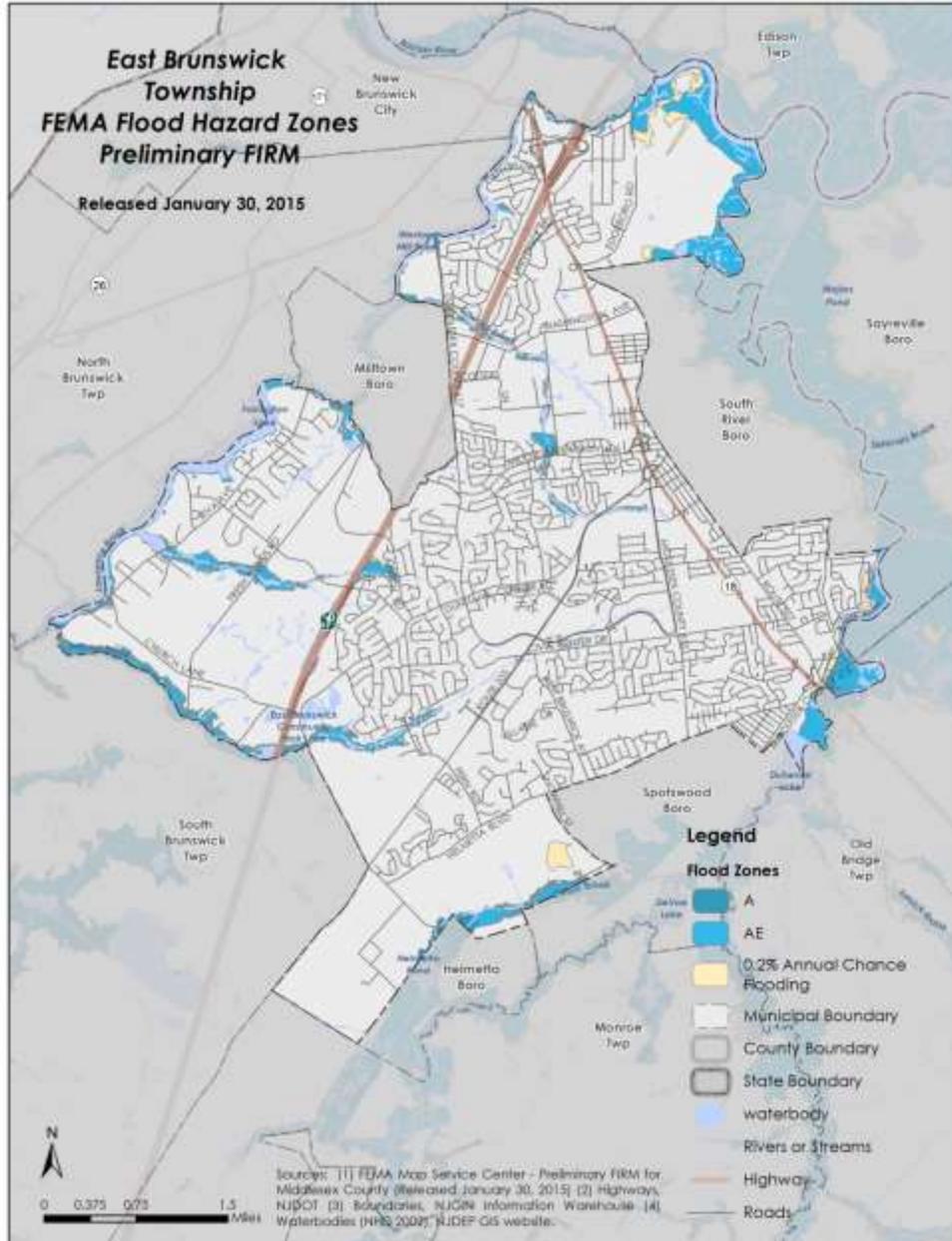
Data Type	Value
Jurisdiction area in square miles	22.41
Square miles within 100-year floodplain	1.74
Percentage of jurisdiction within 100-year floodplain	7.76%
Number of parcels in jurisdiction	19,236
Number of parcels with centroids within 100-year floodplain	184
Percentage of parcels with centroids within 100-year floodplain	0.95%

[Note: the table refers to centroids, which are the geographic center of a parcel. This is a better indicator of flood exposure than simple intersection with the floodplain, although it does not necessarily mean that any structures or infrastructure are within the boundaries of the Special Flood Hazard Area].

<sup>8</sup> FEMA online - Floodplain Management. Flood Insurance Rate Map (FIRM) definition



**Figure 4-2**  
**East Brunswick portion of FEMA Revised Preliminary Flood Insurance Rate Map (January, 2015)**  
**(Source: FEMA Region II, Coastal Analysis and Mapping, Preliminary FIRM, September 19, 2014)**



Current FEMA guidance uses the term *extent* as analogous to potential severity. Overall, the extent of the flood hazard in this community is not significant. However, in one specific area on the eastern side of the jurisdiction, there is clearly the possibility of several feet or more of flooding if a sufficiently severe storm surge were to impact the South River.



## 1. Previous Occurrences and the Probability of Future Floods

A review of flood insurance claims data shows that nearly all significant flooding in East Brunswick is in a relatively small area west of the South River, and slightly north of Keystone Park. The large majority of flood insurance claims in the community are related to Tropical Storm Irene (2011) and Superstorm Sandy (2012). Although Irene and Sandy were relatively low probability events, the potential effects of sea level rise on storm surge appear to increase the likelihood of such events occurring in the future. During the initial phase of developing this HMP, East Brunswick provided information indicating that the community experiences flooding at a few locations during relatively common rain events. These sites include Route 18 and Arthur Street, and Route 18 and Cranbury Road. East Brunswick occasionally must close Route 18 because of flooding.

## 2. Flood Impacts and Vulnerabilities to Flooding

The impacts from past floods in this jurisdiction have been significant in localized areas, but minimal elsewhere. Specific streets (discussed below) appear highly vulnerable to overbank flooding from the South River, particularly during significant events such as tropical storms and hurricanes, which may result in extreme rainfall and surge.

## 3. National Flood Insurance Program and Repetitive Loss Properties

To provide a sense of the flood risk in a community it is also beneficial to summarize the policies in force and claims statistics from the National Flood Insurance Program (NFIP). There is a discussion of the NFIP in the County section of this hazard mitigation plan. East Brunswick has been a member of the NFIP since 1982.

**Table 4-9**  
**NFIP Policies and Claims**

<b>Number of Parcels:</b>	
East Brunswick:	19,236
Middlesex County:	283,276
<b>Number of Policies In-Force:</b>	
East Brunswick:	197
Middlesex County:	4,489
<b>Number of Claims:</b>	
East Brunswick:	88
Middlesex County:	3,478
<b>Total Paid Claims</b>	
East Brunswick:	\$2,076,455
Middlesex County:	\$109,727,837

FEMA NFIP statistics indicate that as of February 2014, federal flood insurance policies were in-force on 197 properties in East Brunswick. Between 1978 and 2014, there have been a total of 88 NFIP insurance claims in the jurisdiction, with a total claims value of \$2,076,455.<sup>9</sup> Table 4-9 compares the number of policies in-force and paid claims in the jurisdiction. The Table shows that East Brunswick comprises 2.5% of the NFIP policies in-force in Union County.

East Brunswick is not presently a member of the Community Rating System (CRS), a voluntary program for communities participating in the NFIP. The CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. For CRS participating communities, flood insurance premium rates are discounted in increments of 5%

<sup>9</sup> FEMA – Policy and Claim Statistics for Flood Insurance



**Table 4-10**  
**NFIP Policies and Claims**

**Repetitive Loss (RL) Properties:**

East Brunswick:	16
Middlesex County:	429

**Total Building (RL)**

East Brunswick:	\$1,168,529
Middlesex County:	\$44,015,885

**Total Contents (RL)**

East Brunswick:	\$85,307
Middlesex County:	\$5,106,609

**Number of Claims (RL)**

East Brunswick:	38
Middlesex County:	1,322

**Average Claim (RL)**

East Brunswick:	\$32,996
Middlesex County:	\$37,158

**Severe Repetitive Loss (SRL) Properties:**

East Brunswick:	1
Middlesex County:	77

**Total Building (SRL)**

East Brunswick:	\$213,904
Middlesex County:	\$15,512,761

**Total Contents (SRL)**

East Brunswick:	\$33,000
Middlesex County:	\$910,122

**Number of Claims (SRL)**

East Brunswick:	5
Middlesex County:	385

**Average Claim (SRL)**

East Brunswick:	\$49,381
Middlesex County:	\$40,059

based on creditable activities.<sup>10</sup> CRS communities are ranked between 1 and 10, with Class 1 communities receiving a 45% premium discount.

It should be noted that NFIP claims are not a direct or completely accurate proxy for flood risk in a community. The data does not include flood damages to structures that had no flood insurance. Also, in some cases, structures or contents may have been underinsured. The NFIP claims data also does not include any damages to public facilities, which may be insured via other means (such as self-insurance or non-FEMA policies); such damages may also be addressed through other federal programs such as FEMA’s Public Assistance Program.

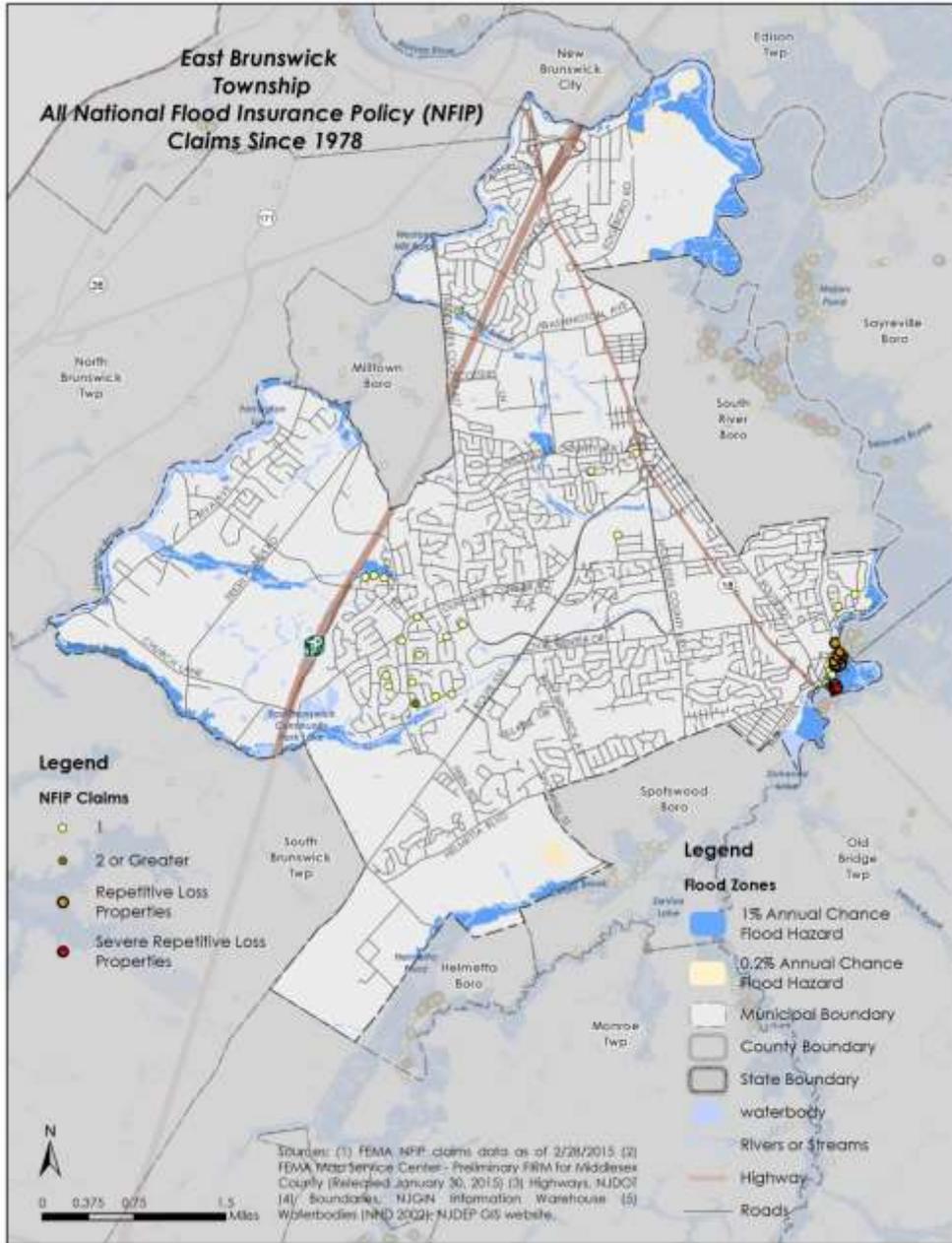
Figure 4-3 shows all NFIP claims in East Brunswick between 1978 and 2014. With a few exceptions, nearly all the claims are concentrated in an area west of the South River, north of Keystone Park. Flooding in these areas appears to be related to overbank events from the South River.

There is an area of single claims east of I-95 and west of Cranbury Road (near East Brunswick Community Park), but based on a review of the data, these are mostly unrelated to major events, i.e. the flooding that caused the damage may be anomalous and related to specific local conditions. These areas do not appear to be prone to repeat damage.

<sup>10</sup> FEMA – Community Rating System (CRS).



**Figure 4-3**  
**Map of NFIP Claims in East Brunswick Township (1978 to 2014),**  
**Including Repetitive Loss and Severe Repetitive Loss Properties**  
**(Source: FEMA Region II, Coastal Analysis and Mapping, Preliminary FIRM, September 19, 2014)**





#### 4. Flood Risk to Repetitive Loss Properties in East Brunswick

FEMA requires a discussion of NFIP Repetitive Loss and Severe Repetitive flood loss statistics in hazard mitigation plans. A repetitive loss property is a structure covered by a contract for flood insurance made available under the NFIP that has incurred flood-related damage on two occasions, in which the cost of the repair, on average, equaled or exceeded 25% of market value of the structure at the time of each such flood event.

The flood risk assessment in this section is based in part on analysis of NFIP data on repetitive flood loss properties. As of February 2014, Middlesex County had 429 such properties based on a query of the FEMA BureauNet NFIP interface. Of this total, 16 properties were located within East Brunswick; this comprises 3.7 percent of the County total. Table 4-11 provides a comparison of the residential repetitive loss claims for Middlesex County and East Brunswick. The tables below include the number of repetitive loss properties, building and contents damages, the total number of claims, and the average claim amounts.

The 16 repetitive loss properties in East Brunswick were responsible for a total of 38 insurance claims, totaling \$1,253,836. Table 4-12 provides summary repetitive loss statistics for the community.

**Table 4-11**  
**Repetitive Loss Statistics in East Brunswick Township and Middlesex County**  
(Source: FEMA National Flood Insurance Program, February 2014)

City/County Name	Properties	Total Building	Total Contents	Total Losses	# of Claims	Average Claim
Township of East Brunswick	16	\$1,168,529	\$85,307	\$1,253,836	38	\$32,996
Middlesex County	429	\$44,015,885	\$5,106,609	\$49,122,494	1,322	\$37,158

The next table shows the streets in East Brunswick with the most insurance claims. For reasons of confidentiality, this mitigation plan does not show specific addresses.

**Table 4-12**  
**Streets in East Brunswick Township with Highest Numbers and Amounts of NFIP Claims**  
(Repetitive Loss Properties)  
(Source: FEMA National Flood Insurance Program, February 2014)

Street Name	Building	Contents	Total	# Claims	Average
Main Street	\$246,680	\$184	\$246,864	6	\$41,144
Oak Street	\$145,342	\$14,205	\$159,547	6	\$26,591
River Road	\$209,768	\$3,250	\$213,018	14	\$15,216
Squire Street	\$566,738	\$67,668	\$634,406	12	\$52,867

The next table provides the results of a simple risk projection for repetitive loss properties. This is done by annualizing past insurance claims and using this as the basis for estimating future losses. This method employs standard FEMA statistical techniques, and may be used for developing a sense of flood risk, i.e.



total future losses over the 100-year planning horizon. The results below should be considered general and preliminary. It is possible to complete more accurate risk assessments for specific projects using FEMA software and methodologies, combined with information about sites and facilities.

**Figure 4-13**  
**100-Year Risk Projection for NFIP Repetitive Loss Properties in East Brunswick Township**  
(Source: FEMA National Flood Insurance Program, February 2014)

Data	Value
Period in years	21
Number of claims	38
Average claims per year	1.81
Total value of claims	\$1,253,836
Average value of claims per year	\$59,706
<b>Projected risk, 100-year horizon</b>	<b>\$852,011</b>

## 5. Flood Risk to Severe Repetitive Loss Properties in East Brunswick

The definition of Severe Repetitive Flood Loss is included in the County portion of this mitigation plan. As of February 2014, East Brunswick had one property that fell under this definition, and all of Middlesex County had 77. Table 4-14 provides basic information about the SRL property in this jurisdiction. SRL properties are also shown graphically in Figure 4-3 above.

**Table 4-14**  
**Statistics on NFIP Severe Repetitive Loss Properties in the Township of East Brunswick**  
(Source: FEMA National Flood Insurance Program, February 2014)

City/County Name	Properties	Total Building	Total Contents	Total Losses	# of Claims	Average Claim
Township of East Brunswick	1	\$213,904	\$33,000	\$246,905	5	\$49,381
Middlesex County	77	\$14,512,761	\$910,122	\$15,422,883	385	\$40,059

The next table shows the results of a simple risk (future losses) projection for severe repetitive loss properties. This is done by annualizing past losses and using this as the basis for estimating future losses. This method uses standard FEMA techniques, and may be used for developing a sense of flood risk. The results below should be considered general and preliminary. It is possible to complete more accurate risk assessments for specific projects using FEMA software and methodologies.



**Figure 4-15**  
**100-Year Risk Projection for NFIP Severe Repetitive Loss Properties in Township of East Brunswick**

Data	Value
Period in years	21
Number of claims	5
Average claims per year	0.24
Total value of claims	\$246,905
Average value of claims per year	\$11,757
<b>Projected risk, 100-year horizon</b>	<b>\$167,778</b>

## 6. Storm Surge Hazard

Of the 25 jurisdictions in Middlesex County, 13 have some risk from storm surge. The Township of East Brunswick is among these, due its exposure to the Raritan River. Most of the land area subject to storm surge is undeveloped, and includes a large landfill in the far northeastern part of the jurisdiction. Previous Occurrences and the Probability of Future Occurrences

Figure 4-4 is a map of storm surge zones 1 through 4 in East Brunswick. Because of the local topography, even significant Category 4 events impact relatively small areas immediately adjacent to flood sources.

SLOSH inundation zones from the FEMA Coastal Flood Loss Atlas (CFLA) were used to complete the storm surge vulnerability assessment for East Brunswick. The initial analysis included calculating the land area and parcels within Categories 1 - 4 for the jurisdiction. This portion of the risk assessment approach matches the vulnerability assessment completed for the State of New Jersey 2014 Hazard Mitigation Plan. Knowing the land area within each zone can help determine the overall impact to buildings and other infrastructure in the region a result of storm surge.

**Table 4-16**  
**Storm Surge Exposure Statistics for the Township of East Brunswick**  
(Source: FEMA Region IV, Coastal Flood Loss Atlas (CFLA) SLOSH – March, 2014, County GIS)

Storm Surge Category	Square Miles Impacted	Parcels Exposed
1	1.68	620
2	2.76	2,952
3	3.49	4,828
4	4.30	5,879

There is no reliable open-source information that allows assignment of specific probabilities to surge categories, so certain assumptions must be made in order to complete a risk assessment. The next table shows the assumptions used in a simple risk calculation for storm surge.



**Table 4-17**  
**Assumptions for Storm Surge Risk Assessment, East Brunswick Township**

Data Type	Value
Structures per parcel	1
Structure replacement value/s.f.	\$150
Contents replacement value/s.f.	\$75
Assumed square footage of average structure	2,000

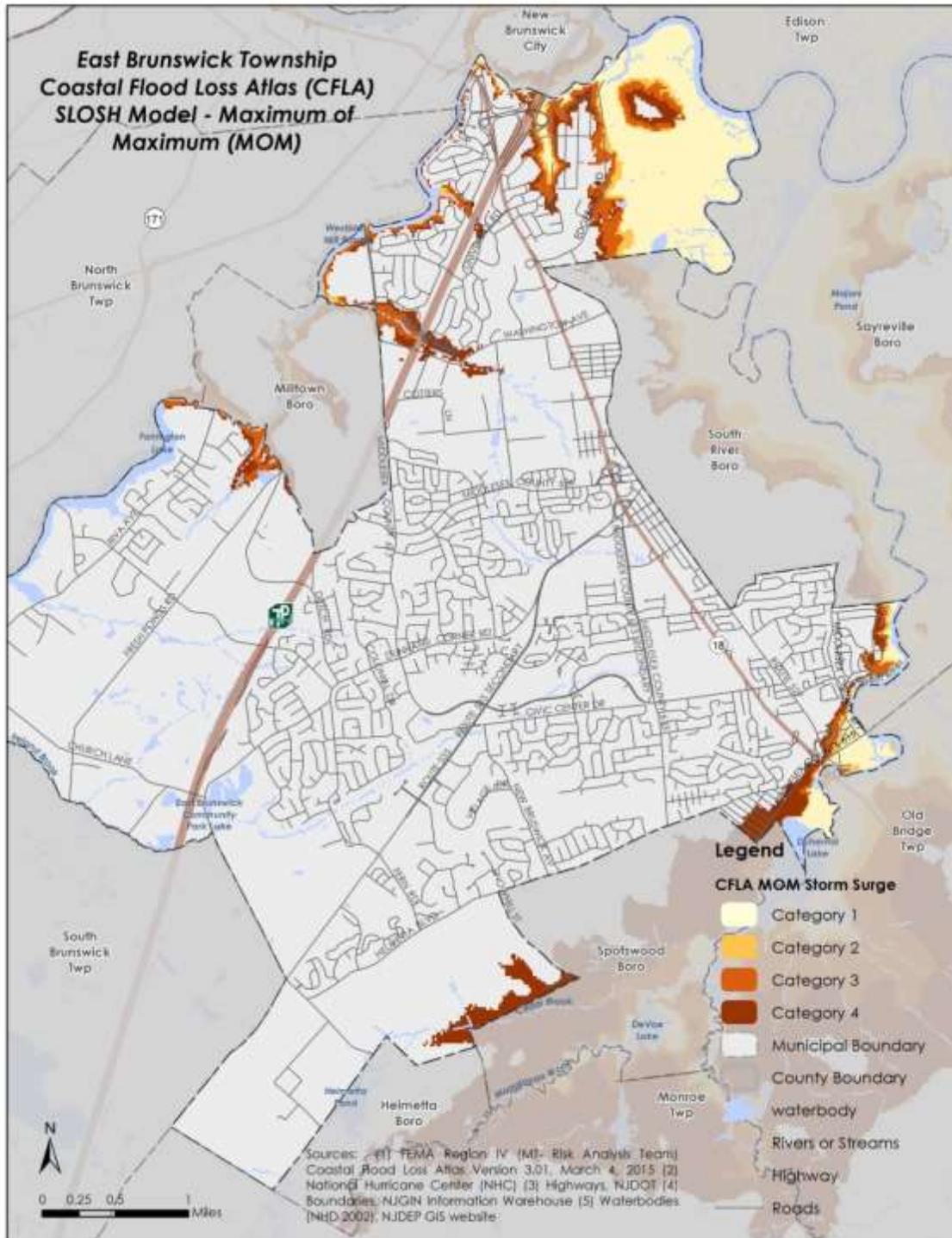
**Table 4-18**  
**Flood Risk in Storm Surge Scenarios, East Brunswick Township**

	Category 1	Category 2	Category 3	Category 4
Assumed annual probability	2%	1%	0.5%	0.01%
Assumed flood depth (feet)	1	2	3	4
Number of parcels impacted	182	276	474	1,093
Scenario risk	\$23,751,000	\$36,018,000	\$61,857,000	\$142,636,500
Annual risk	\$475,020	\$360,180	\$309,285	\$142,637
100-year risk	\$6,778,535	\$5,139,769	\$4,413,497	\$2,035,423

The risk assessment is then based on FEMA depth-damage functions, i.e. indications of the percentage damage at a given flood depth for structure and contents. The main section of the mitigation plan includes a detailed description of the methodology. The results are intended only to provide a general sense of potential losses.



**Figure 4-4**  
**Map of Storm Surge Zones, Categories 1-4, Township of East Brunswick**  
(Source: FEMA Region IV, Coastal Flood Loss Atlas (CFLA) SLOSH – March, 2014)





## 2. Hurricanes and Tropical Storms

### Hurricane Wind Risk Estimates

There are three significant hazards related to hurricanes, tropical storms, and to a lesser extent, nor'easters. These are: floods, storm surge, and high winds. Both floods and storm surge are addressed in the flood section of the present municipal appendix, as well as the County section of the hazard mitigation plan update. This subsection provides a preliminary quantification of hurricane wind risk based that was generated by FEMA's HAZUS-MH software (version 2.1, 2014). The calculations in Table 4-18 show a range of loss categories across the top row versus "occupancy classes" on the first column. The occupancy classes are various land uses that are represented in HAZUS. The last two columns indicate the projected 50-year and 100-year risks, i.e. the total amount of damage over those planning horizons. The figures are based on annualizing losses, then discounting them to present value using the software. There is more detailed information about the calculations and Countywide results in the main section of this HMP update.

### FEMA Project Worksheets from Tropical Storm Irene and Hurricane Sandy

Following many natural disasters, FEMA engineers and field teams complete formal assessments of damage to community assets, and document these in project worksheets (PWs). The PWs are the basis of FEMA Public Assistance grants for repairs. There are seven categories of damage, indicated by the letters A through G. These are: A – debris removal; B – emergency protective measures; C – roads and bridges; D – water control facilities; E – public buildings; F – utilities, and; G – recreational facilities/other. The categories and amounts of the PWs are listed in Table 4-19 below for Tropical Storm Irene and Hurricane Sandy. Note that in some cases there are multiple different organizations in a community that are applicants for FEMA Public Assistance. In order to simplify the table, the PW amounts for all applicants in a community are combined.

**Table 4-19**  
**Probabilistic Wind Risk in East Brunswick, 50- and 100-year Planning Horizons**  
(Source: FEMA, HAZUS-MH version 2.1)

Occupancy Class	Total SF	Building Damages	Contents Damages	Inventory Loss	Relocation Cost	Business Income Loss	Rental Loss	Lost Wages
Residential	23,885,722	\$642,847	\$208,956	\$0	\$38,026	\$87	\$15,415	\$204
Commercial	8,523,482	\$72,977	\$31,746	\$827	\$11,970	\$7,810	\$6,873	\$8,007
Industrial	1,938,154	\$15,442	\$11,097	\$1,679	\$996	\$197	\$183	\$323
Agricultural	124,988	\$1,062	\$541	\$66	\$165	\$11	\$7	\$4
Religious	412,608	\$4,256	\$1,548	\$0	\$598	\$297	\$53	\$698
Government	192,572	\$1,668	\$909	\$0	\$366	\$14	\$84	\$1,724
Education	506,538	\$4,240	\$1,823	\$0	\$768	\$169	\$31	\$398
<b>Totals</b>	<b>35,584,064</b>	<b>\$742,493</b>	<b>\$256,619</b>	<b>\$2,572</b>	<b>\$52,890</b>	<b>\$8,583</b>	<b>\$22,645</b>	<b>\$11,359</b>



Occupancy Class	Total Annualized Loss	50-year Risk	100-year Risk
Residential	\$905,534	\$12,497,275	\$12,921,065
Commercial	\$140,211	\$1,935,046	\$2,000,664
Industrial	\$29,917	\$412,879	\$426,880
Agricultural	\$1,855	\$25,607	\$26,476
Religious	\$7,450	\$102,824	\$106,310
Government	\$4,765	\$65,759	\$67,989
Education	\$7,431	\$102,548	\$106,026
<b>Totals</b>	<b>\$1,097,162</b>	<b>\$15,141,938</b>	<b>\$15,655,410</b>

**Table 4-20**  
**FEMA Public Assistance Expenditures in Tropical Storm Irene and Hurricane Sandy, by Category**  
(Source: FEMA Region II, Public Assistance)

Event Name/Public Assistance Category	A	B	C	D	E	F	G	Total
Tropical Storm Irene	\$3,326,358	\$924,332	\$367,507	\$0	\$31,785	\$5,589	\$884	\$4,656,455
Hurricane Sandy	\$330,492	\$176,079	\$98,763	\$0	\$0	\$0	\$0	\$605,334
<b>Total</b>	<b>\$3,656,850</b>	<b>\$1,100,411</b>	<b>\$466,270</b>	<b>\$0</b>	<b>\$31,785</b>	<b>\$5,589</b>	<b>\$884</b>	<b>\$5,261,789</b>

### 3. Wildfire

#### Type, Location, and Extent

Previous occurrences of the wildfire hazards at the County level are discussed in detail in the main portion of this hazard mitigation plan see Section 4, and for reasons of brevity are not repeated here. Compared to many other states (particularly in the west and southwest), New Jersey has a relatively low level of wildfire risk. However, the Township of East Brunswick is one of several jurisdictions in the County that has an elevated risk of wildfire compared to most other jurisdictions. As explained in the County portion of this plan, wildfire risk is a more dynamic phenomenon than other hazards. This is because risk is created by both static conditions such as the amount of burnable vegetation and the degree of wildland-urban interface, as well as changeable factors like the weather and presence of fuel load. Any truly accurate risk assessment for this hazard must consider real-time conditions. See the Wildfire section in the main plan for more details.

#### 1. Wildfire Impacts and Vulnerabilities to the Hazard

The present subsection considers two of the static factors as the basis for a risk discussion. The first of these is the presence of fuel hazard in the community. In this respect, East Brunswick is well above



average among jurisdictions in Middlesex County. The community accounts for 8.98% of the extreme fuel hazard in the County (0.42 square miles); 6.11% of the very high fuel hazard area in the County (0.341 square miles); 4.84% of the high hazard area (0.580 square miles); 5.51% of the moderate hazard area (0.416 square miles); and 6.73% of the low hazard area (5.722 square miles).

The second wildfire risk factor is the amount of wildland-urban *interface* and *intermix* in the community (see main plan for definitions). Interface areas are those where the built environment is immediately adjacent to potential wildfire fuel sources, and intermix areas are those where potential fuel sources are spread throughout. As indicated in Table 4-21, East Brunswick is well above the County jurisdictional average in these categories, and thus may be considered at relatively higher risk based on these measures. Data in the table is based on the 2010 census.

**Table 4-21**  
**Summary of Wildland-Urban Interface and Intermix Data, Township of East Brunswick**

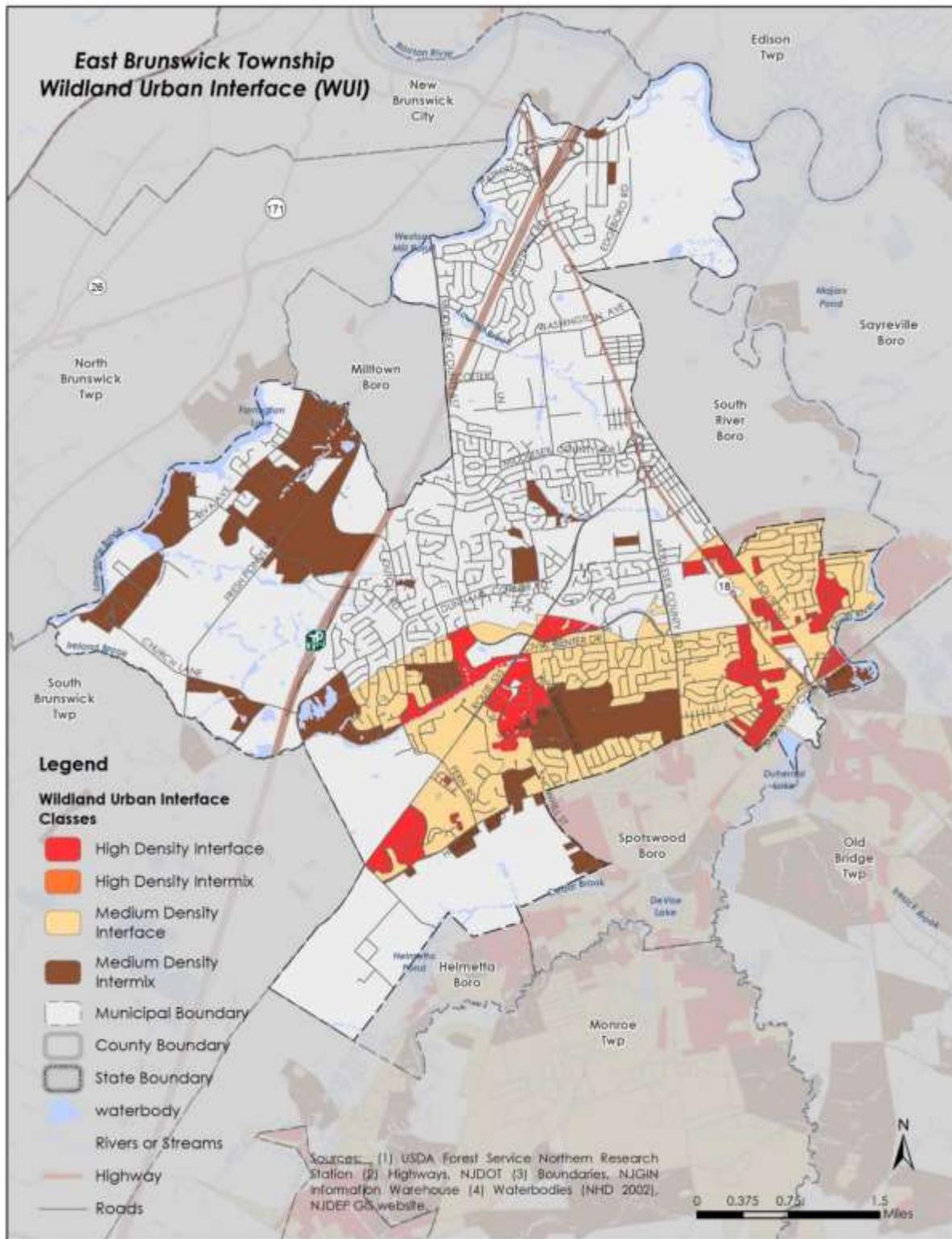
	Housing Units	Population
High-density interface	4,108	9,833
High-density intermix	6	2
Medium-density interface	12,706	4,259
Medium-density intermix	3,347	1,141

Figure 4-5 shows areas of wildland-urban intermix and interface in East Brunswick. Most of the intermix and interface areas are in the southern and western parts of the jurisdiction. Based on analysis of aerial photography, most of the interface is created by the presence of Frost Woods Park, Jamesburg Park, and Ireland Brook Conservation Area, although there are some limited areas of increased density of trees in neighborhoods as well.

Absent a more detailed evaluation of fuel loads and characteristics of the structures that are near burnable areas it is not possible to complete a quantitative risk assessment of the wildfire hazard. The areas of highest vulnerability are clearly those nearest to vegetation, but, generally speaking, fire detection and suppression capabilities are very good in this area of the country, and this significantly reduces wildfire risk.



**Figure 4-5**  
**Wildland-Urban Wildfire High- and Medium-Density Interface and Intermix Zones, Township of East Brunswick**





## 4. Capability Assessment

Each community within the planning area has a unique set of capabilities and priorities that affect its mitigation strategy. The following tables detail the capabilities assessed for the Township of East Brunswick during this plan update.

### 4.1.1 Planning and Regulatory

Tool / Program (code, ordinance, plan)	( Yes/No)	Code Citation and Comments
Master Plan	Y	May 2015
Capital Improvements Plan	Y	Annually
Floodplain Management / Basin Plan	Y	228-30 Flood Damage Prevention Ord.
Stormwater Management Plan	Y	March 9, 2005
Open Space Plan	Y	March 7, 2001
Stream Corridor Management Plan	N	
Watershed Management or Protection Plan	N	
Economic Development Plan	N	
Comprehensive Emergency Management Plan	Y	
Emergency Operation Plan	Y	January 2013
Post-Disaster Recovery Plan	N	
Transportation Plan	N	
Strategic Recovery Planning Report	N	
Zoning Ordinance	Y	Chapter 228
Subdivision Ordinance	Y	Chapter 192
NFIP: Cumulative Substantial Damages	Y	
Growth Management Ordinances	N	
Site Plan Review Requirements	Y	Chapter 192
Stormwater Management Ordinance	Y	Chapter 192-53
Municipal Separate Storm Sewer System (MS4)	Y	
Combined Sewer Overflows (CSO)	N	
Natural Hazard Ordinance	Y	Critical Areas 228-224E, 228-229.3
Post-Disaster Recovery Ordinance	N	
Real Estate Disclosure Requirement	N	
Other [Special Purpose Ordinances (i.e., sensitive areas, steep slope)]	N	

### 4.1.2 Staff/Personnel

Resources	Is this in place? (Y/N)	Department/ Agency/Position
Planning Board	Y	Planning & Engineering
Mitigation Planning Committee	N	
Environmental Board/Commission	Y	Planning & Engineering
Open Space Board/Committee	N	
Economic Development Commission/Committee	N	



Resources	Is this in place? (Y/N)	Department/ Agency/Position
Maintenance Programs to Reduce Risk	N	
Mutual Aid Agreements	N	
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Y	Planning & Engineering
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Y	Planning & Engineering
Planners or engineers on staff with a strong understanding of natural hazards	Y	Planning & Engineering
NFIP Floodplain Administrator	Y	All Communities are required to have NFIP Administrator
Surveyors	Y	
GIS layers and maps	Y	Planning & Engineering
Personnel trained in GIS	Y	Planning & Engineering
Personnel trained in HAZUS	Y	Planning & Engineering
Emergency Manager	Y	Emergency Management
Grant Writer	N	
Staff with expertise in cost/benefit analysis	Y	Planning & Engineering
Professionals trained in conducting damage assessments	Y	Planning & Engineering

#### 4.1.3 Education/Outreach and Community Classifications

Program	Do you Participate in/Use this Program (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	N		
Building Code Effectiveness Grading Schedule (BCEGS)	N		
Public Protection (ISO Fire Protection Classes 1 to 10)	Y		
Storm Ready	N		
Firewise	Y		
Disaster/Safety Programs in/for Schools	Y		
Organizations with Mitigation Focus (advocacy group, non-government)	N		
Public Education Program/Outreach (through website, social media)	Y		
Public-Private Partnerships	Y		

#### 4.1.4 Fiscal Capabilities

	Yes/No
Do you have a line item in your operating budget for mitigation project funding?	N
If no, will you look at mitigation actions when allocating funding in the future?	Y
Do you have a line item in the Capital Improvement Budget for mitigation project funding?	N



Yes/No	
Have you provided funding for mitigation projects identified in the hazard mitigation plan?	
Does your town have the authority to Levy Taxes for specific purposes?	Y
Does your town have user fees for water, sewer, gas or electric service?	Y
Do you impose impact Fees for homebuyers or developers of new development/homes?	N
Does your community have an open space acquisition fund?	Y
Do you use bonds to finance projects (general obligation bonds, special tax bonds, private activity bonds)	Y



## 5. Mitigation Strategy

This section describes what projects, initiatives, and other actions the Township has undertaken or plans to implement to reduce risk and loss within its jurisdiction. This includes the status of previously identified actions and any other projects that have been completed since the 2010 Plan was adopted. The additional actions were determined by the LPC based on self-determined priorities and experience.

### 5.1 Past Mitigation Actions

The table below lists the mitigation projects and actions that were included in the original 2010 Plan.

Mitigation Action	Responsible Party	Status	Review Comments
East Brunswick 1: Propose regionalized coordination of dam releases on Manalapan Brook/ Develop Standard Operating Procedures	County and Municipal OEM	Same – Work in Progress	A SOP needs to be adopted by each Municipality and County.
East Brunswick 2: Harden Memorial School to FEMA 361 Standards	Municipal OEM	Same	Awaiting Funding
East Brunswick 3: Backup power (generator) and/or utility protective measures for Memorial School	Municipal OEM	Same	Awaiting Funding
East Brunswick 4: Develop “All Hazards” public education and outreach program for hazard mitigation and preparedness	County and Municipal OEM	In progress	This is an ongoing effort.
East Brunswick 5: Property acquisition/elevation of 2 properties located on Squire St. and Yorktown Road.	Municipal OEM	Completed	
Generators for critical facilities (water pump station)	OEM	Completed	

### 5.3 Proposed Mitigation Actions

The table below details the mitigation initiatives the Township of East Brunswick would like to pursue to minimize future effects of hazard events. These actions have been determined through a local assessment of current risk and needs. The LPC met with the Plan Consultant to review all hazard and



risk assessment data and evaluate the strategy. These initiatives are dependent upon funding and may change based on municipal priorities and future hazard events.

For each new mitigation action, the Township has ranked as 'High', 'Medium', or 'Low', based on the evaluation criteria outlined in Section 7.

Proposed Action	Anticipated Benefits	Responsible Party	Funding or Implementation Mechanism	Timeline	Priority
Elevation/acquisition of repetitive loss properties in Township	Reduced flood risk	OEM	Grants/Open Space Funds	1-5 years	High
Acquire generator for municipal complex	Continued operation during and after storm events	OEM	Capital Improvements	1-2 years	High



## 6. Plan Implementation

The LPC shall document, as needed and appropriate:

- Hazard events and losses in East Brunswick and the effects that mitigation actions have had on impacts and losses,
- Progress on the implementation of mitigation actions, including efforts to obtain outside funding for projects,
- Any obstacles or impediments to the implementation of actions,
- Additional mitigation actions believed to be appropriate and feasible,
- All public and stakeholder input and comment on the Plan that has been received by the Township.
- Copies of any grant applications filed on behalf of the Township

### Continued Public Input

The Township of East Brunswick is committed to incorporating public input into its ongoing hazard mitigation planning. The public will have an opportunity to comment on the Plan prior to any changes and during the 5-year plan update. The annual progress reports will be posted on the County mitigation website in addition to the adopted Plan.

All public comments and input on the plan will be recorded and addressed, as appropriate. Opportunity to comment on the plan will be provided directly through the County's website. Public comments can also be submitted in writing to the County's HMP Coordinator. All public comments shall be addressed to: Middlesex County Office of Emergency Management c/o All Hazards Pre-disaster Mitigation Plan Coordinator, 1001 Fire Academy Drive, Sayreville, NJ 08872.

The Township of East Brunswick's LPC shall ensure that:

- Copies of the latest approved Plan are available for review at Township Hall along with instructions to facilitate public input and comment on the Plan.
- Public notices are made as appropriate to inform the public of the availability of the Plan, particularly during Plan update cycles.
- For minor changes to this appendix, the Township of East Brunswick will post a notice on the Township's website and invite the public to review and comment.
- For major changes involving Township Council approval, the Township will use its standard public notice procedures inviting the public to review the document and provide feedback.

### Plan Adoption

On [insert date] Middlesex County submitted the initial draft of the 2015 Plan Update to NJOEM for review and comment. After addressing NJOEM comments in the document, the HMP was resubmitted for final consideration and approval by NJOEM and FEMA. FEMA approved the plan on [insert date],



and the Plan update was forwarded to the Middlesex County Board of Chosen Freeholders for adoption, which occurred on [insert date].

The Township Council approved the plan on [insert date]. The Township resolution for adoption and the County's adoption resolution are provided as Appendix F of the 2015 HMP update. Following adoption, the plan update was resubmitted to FEMA for final approval, which occurred on [insert date]. The FEMA approval letter is included as Appendix G.

## Plan Maintenance

The Township of East Brunswick will review this Appendix of the County's hazard mitigation plan appendix each year and give the County's HMP Coordinator an annual progress report. The Emergency Management Coordinator is responsible for convening the LPC, initiating the plan review, and submitting the annual progress report. The LPC may use worksheets #1 and #3 in the FEMA 386-4 guidance document, to facilitate the review and progress report. FEMA guidance worksheets are provided in Appendix H. Local progress reports shall be provided to the County HMP Coordinator at least two weeks prior to the annual plan review meeting.

Additionally, the LPC will convene and review the plan when major hazard events impact the jurisdiction, potentially yielding opportunities for mitigation grant funding, or when new information suggests that plan elements do not accurately reflect the community's risk or its mitigation priorities.

If necessary, the Emergency Management Coordinator will convene a meeting of the LPC to review and approve all changes. The Township retains the discretion to implement minor changes to the document without formal procedures involving the Township Council subject to local policies and regulations.

In addition to the annual progress report, the Township of East Brunswick will provide Middlesex County with a copy of the written notice of any changes to the jurisdictional appendix at the time such changes are implemented.