



Appendix 24: Borough of Spotswood

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

1. Plan Development

After February 22, 2014, the OEM Coordinator signed an “Intent to Participate” letter and assigned a point of contact for the HMP update. This individual 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. The LPC met with the Planning Consultant on June 26th, 2015 to review the plan information and mitigation strategy. The LPC reviewed all drafts of this appendix.

Table 23-1: Borough of Spotswood Local Planning Committee Members

Name	Title	Organization
Chris Hager		Spotswood OEM
Jose Rivera		Spotswood OEM
Chief Michael Zarro	Chief of Police	Spotswood PD
Bruce M. Koch	Engineer	CME Associates
Dawn McDonald	Business Administrator	Borough of Spotswood
John Mayer	Director of Public Works	Borough of Spotswood
John Kosik	Fire Official/Code Inspector	Spotswood FD
William Andrew	Fire Chief	Spotswood FD



2. Community Profile

2.1 Physical Location

The Borough of Spotswood has a total area of 2.47 square miles and is located in the south-central region of Middlesex County, New Jersey. Spotswood is bordered by East Brunswick to the north, Helmetta and Monroe to the south, and Old Bridge to the east.

2.1.1 Hydrography and Hydrology

Spotswood borough is split between the Duhernal Lake and Manalapan Brook watersheds with a small southern portion in the Matchaponix Brook watershed, all of which are in the Raritan Basin.

Manalapan Brook and a tributary of South River make up a portion of Spotswood Borough southern boundary before joining and flowing into DeVoe Lake. DeVoe Lake then drains into South River, near the center of Spotswood. The Matchaponix Brook joins the South River within the Borough and then flows to the eastern boundary of the Borough before draining into Duhernal Lake.

2.2 History and Governance

The Borough of Spotswood was formally incorporated on April 15, 1908 from portions of East Brunswick Township. The Borough is governed under the Mayor-Council form of government, and has an elected Mayor and five Council members, all elected at-large. The Mayor and Council members are elected to serve three-year terms on a staggered basis, with three seats coming up for election every two years. The Borough Council holds monthly meetings open to the public where it discusses legislation under consideration.

2.3 Demographics

2.3.1 Population Trends

According to the U.S. Census Bureau, the population in 2010 was 8,257.¹ This is a 4.8% increase from 2000. The Borough of Spotswood has a population density of 3,642 persons per square mile. It is the 13th densest municipality within the County. A summary of major population and household characteristics may be found in the following tables.

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



Table 23-2: Borough of Spotswood Population Summary Estimates (2010 Census) ²

Population	Quantity	Percent of Municipal Population
Total Population	8,257	100
Median Age	43.5	N/A
17 years and under	1,741	21.1
65 years and over	1,564	18.9
Race		
White	7318	88.6
Black/African-American	246	3.0
Native American/Alaskan Native	9	0.1
Asian	424	5.1
Native Hawaiian/Pacific Islander	1	0
Other Race (unspecified)	105	1.3
Two or More Races	154	1.9
Hispanic or Latino	687	8.3

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 23-3: Borough of Spotswood Household Characteristics Summary Estimates (2010 Census) ³

Households	Quantity	Percent of Total
Total Households	3,128	100
Family Households (related)	2,143	68.5
Family Households w children under 18	917	29.3
Non-Family Households (unrelated)	985	31.5
Non-Family Households, living alone	848	27.1
Non-Family Households, living alone Male over 65 years	98	3.1
Non-Family Households, living alone Female over 65 years	375	12.0

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 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),

² Ibid.

³ Ibid.



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 Spotswood include (but may not be limited to) the following:

Table 23-4: Borough of Spotswood Vulnerable Population Estimates (2010)

Population Type	Population Estimate (2010 Census) ⁴
Under 5 years of age	456
Under 18 years of age	1,741
Over 65 years of age	1,564
Limited English Proficiency (LEP)	476 (equals 6.0% of population over 5 years old) ⁵
Institutionalized	0
Living in Group Quarters	246

In addition to these statistics, approximately 3.4% of the population lives below the poverty line. The mean household income is \$87,073, with the per capita income at approximately \$33,593 (2013 estimates).⁶

2.4 Land Use and Development

The Borough of Spotswood is a small developed community with relatively static land cover trends. The Borough did have over 20 percent loss in forest, which is approximately 30 acres. The area classified as urban increased by this same amount. The dominant land use is residential. Over 92 percent of the assessed parcels are considered residential.

Table 23-5: Borough of Spotswood Land Cover Summary

Land Cover Class	Percent of Total Land ⁷	2002 (acres)	2007 (acres)	2012 (acres)	Percent Change ⁸
Agriculture	0	0	0	0	0
Barren Land	0.23%	10.29	3.50	3.50	-66.03%
Forest	6.98%	138.91	111.22	107.93	-22.30%
Urban	72.84%	1084.39	1122.30	1126.24	3.86%
Water	4.79%	89.66	90.04	74.06	-17.39%
Wetlands	15.16%	222.96	219.15	234.47	5.17%

⁴ Ibid.

⁵ 2013 American Community Survey Estimate

⁶ U.S. Bureau of the Census. American Fact Finder "Spotswood Borough, NJ". <http://factfinder.census.gov/>. Retrieved 8/16/15.

⁷ Percent based on acres of land in 2012

⁸ Change is calculated between 2002 and 2012



2.4.1 Open Space

The Borough of Spotswood borders Jamesburg Park to the west, part of which is within the Borough. Approximately 20 percent of the Special Flood Hazard Area within the Borough is preserved.

2.4.2 Buildings and Development

The Borough of Spotswood has a post-war housing stock, with the majority of homes having been built between 1950 and 1970. Over 65 percent of the homes are single-family detached units.

Table 23-6: Borough of Spotswood Housing Statistics

Housing Characteristics	Estimate
Total Occupied Housing Units	3,153
Percent Owner-occupied	83.1
Percent Renter-occupied	16.9
Percent built after 2000	6.2
Percent built before 1979	74.4

2.4.3 Recent and Expected Development

The Borough reported no major development since 2010. As indicated above, land development and land use in the Borough is largely static.



2.5 Critical Facilities and Infrastructure

2.5.1 Essential Facilities

The Borough of Spotswood owns and operates a Municipal Building, a Police Station, a fire station, and a First Aid Building. The First Aid Building was damaged by Hurricane Irene, but sustained no flooding in Sandy. The other public facilities listed above have not been flooded.

2.5.2 Transportation

Primary transportation routes include County Route 615 and County Route 613. New Jersey Transit provides bus service and the New Jersey Turnpike is accessible via East Brunswick or Monroe (Exits 8A or 9). There are no commuter rails in Spotswood.

2.5.3 Critical Utilities and Infrastructure

The Borough of Spotswood is serviced by JCP&L for its electricity and PSE&G for natural gas. Water supply for residents is distributed by the Borough of Spotswood and East Brunswick. Spotswood owns and operates its own water treatment plant on George St, which sustained significant damage in Irene. The Borough also handles its own sewer infrastructure, though wastewater treatment is handled by the Middlesex County Utility Authority.



3. Hazard Identification and Risk Assessment

This section describes the natural hazards and risks that can affect Borough of Spotswood. Like all the other municipalities in Middlesex County, the Borough of Spotswood 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 Hazard Mitigation Plan (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 the County part 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 23-7 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 not included in this appendix, but are part of the County portion of the HMP.

Table 23-7
Borough of Spotswood
Hazard Identification and Prioritization

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





3.2 Flood Hazard

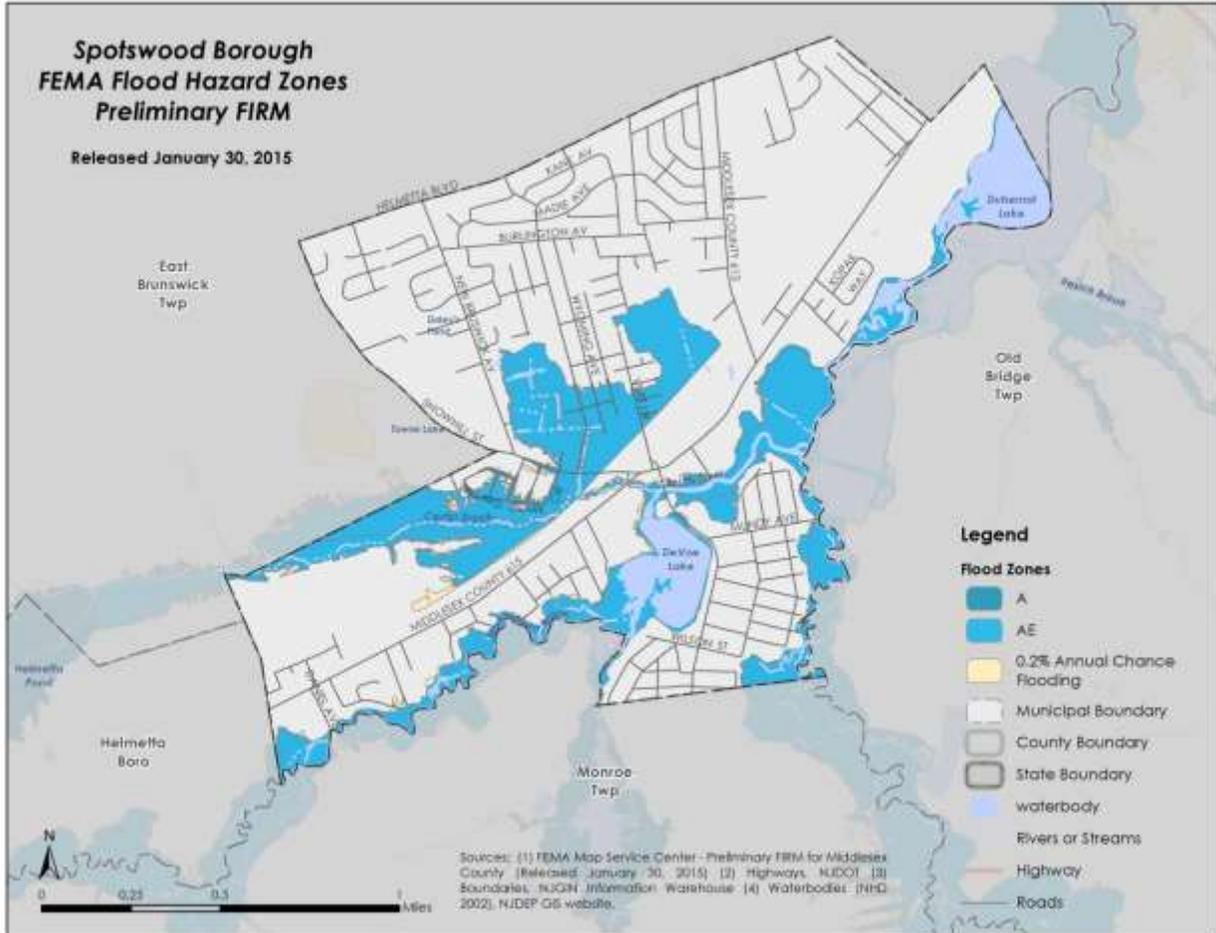
3.2.1 Type, Location, and Extent

The Borough of Spotswood is located in south-central Middlesex County. Although there are no major rivers in the jurisdiction, it has a considerable amount of floodplain, though most of this is related to two lakes in the eastern part of the Borough. The most significant source of flooding is Cedar Brook, which forms in the southwestern part of the Borough, and moves in a generally eastward direction, draining into Devoe Lake, which in turn drains into Duhernal Lake, to the northeast. There is a minor tributary to Cedar Brook, which intercepts the latter south of Snowhill Drive, and east of Destefano Avenue. As shown in Figure 23-1 below, there is a significant amount of floodplain in this area, as well as a concentration of flood insurance claims.

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. At the time the Middlesex County HMP was being updated, the effective FIRM for Spotswood 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).



Figure 23-1
Spotswood portion of FEMA Revised Preliminary Flood Insurance Rate Map
(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. The extent of the flood hazard in Spotswood is not especially severe, based on analysis of flood insurance claims. Some areas may expect occasional flooding of one or two feet, possibly more in significant events like tropical storms or nor’easters.

Table 23-8 provides basic information about floodplain and parcels subject to flooding within the jurisdiction based on the Preliminary FIRM. Note that although a large percentage of Spotswood is within the FEMA Special Flood Hazard Area (SFHA), relatively few parcels are within that zone. This is due to the large industrial area of floodplain at the north end of the jurisdiction. Although the Borough has a relatively large number of parcels for its size (and a significant amount of floodplain), a very low percentage of them are in the floodplain.

Table 23-8
Floodplain and Parcel Data for the Borough of Spotswood
(Source: FEMA Region II, Coastal Analysis and Mapping, Preliminary FIRM, September 19, 2014)

Flood hazard area	Number of Parcels
100-year (1%) floodplain	329
500-year (0.2%) floodplain	17

[Note: the table refers to parcels that are have at least 60 percent of the total area within a flood zone. 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].

Current FEMA guidance uses the term *extent* as analogous to potential severity.

3.2.2 Previous Occurrences and the Probability of Future Floods

Flood insurance claims records show that about half of the claims in Spotswood are related to Tropical Storm Irene, and the others are related to several other less significant events. The jurisdiction has experienced relatively few floods in the past. During the initial phase of this HMP, the community provided some details about the impacts of Hurricane Irene. These included road closures on Mundy Avenue at the border of Old Bridge, the lower portion of Adirondack Avenue, Devoe Avenue, Main Street and Mundy Avenue. There was reported damage at the First Aid Squad building and the water treatment plant at George Street. Some homes and small businesses were damages. East Brunswick estimated \$31,753 in costs related to law enforcement and fire department overtime, and \$35,577 in cleanup costs. This jurisdiction has no coastline so issues of sea level rise will not influence future flooding. As such, the expected future probabilities of flooding will presumably remain about the same.

The community also provided some details about road closures during Sandy. These included Kane Avenue, Brunswick Avenue, Jackson Street, Burlington Avenue, Newark Avenue, Herman Drive, all “tree” streets (Spruce, Pine, Evergreen, Oak, Elm, Chestnut, Walnut, Maple) Mundy, and Daniel Road. There was no damage to public infrastructure, according to the community information survey that was



Table 23-9
NFIP Policies and Claims

Number of Parcels:	
Spotswood:	3,128
Middlesex County:	283,276
Number of Policies In-Force:	
Spotswood:	89
Middlesex County:	4,489
Number of Claims:	
Spotswood:	35
Middlesex County:	3,478
Total Paid Claims	
Spotswood:	\$347,622
Middlesex County:	\$109,727,837
Repetitive Loss Properties:	
Spotswood:	2
Middlesex County:	429
Total Building	
Spotswood:	\$49,123
Middlesex County:	\$44,015,885
Total Contents	
Spotswood:	\$4,606
Middlesex County:	\$5,106,609
Number of Claims	
Spotswood:	4
Middlesex County:	1,322
Average Claim	
Spotswood:	\$13,432
Middlesex County:	\$37,158

completed early in the planning process.

3.2.3 Flood Impacts and Vulnerabilities to Flooding

The impacts from past floods in this jurisdiction have not been particularly significant, as discussed in the NFIP sections below. Although there are some very specific areas where certain structures are vulnerable, it is likely that future flooding will be relatively low-level.

3.2.4 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. The Borough of Spotswood has been a member of the NFIP since 1979.

FEMA NFIP statistics indicate that as of February 2015, federal flood insurance policies were in-force on 89 properties in Spotswood. Between 1978 and 2015, there have been a total of 35 NFIP insurance claims in the Borough of Spotswood, with a total claims value of \$347,622.⁹ Table X-X compares the number of policies in-force and paid claims in the jurisdiction. The table shows that Spotswood comprises about 1.9% of the NFIP policies in-force in Middlesex County.

The Borough of Spotswood 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% based on creditable activities. 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

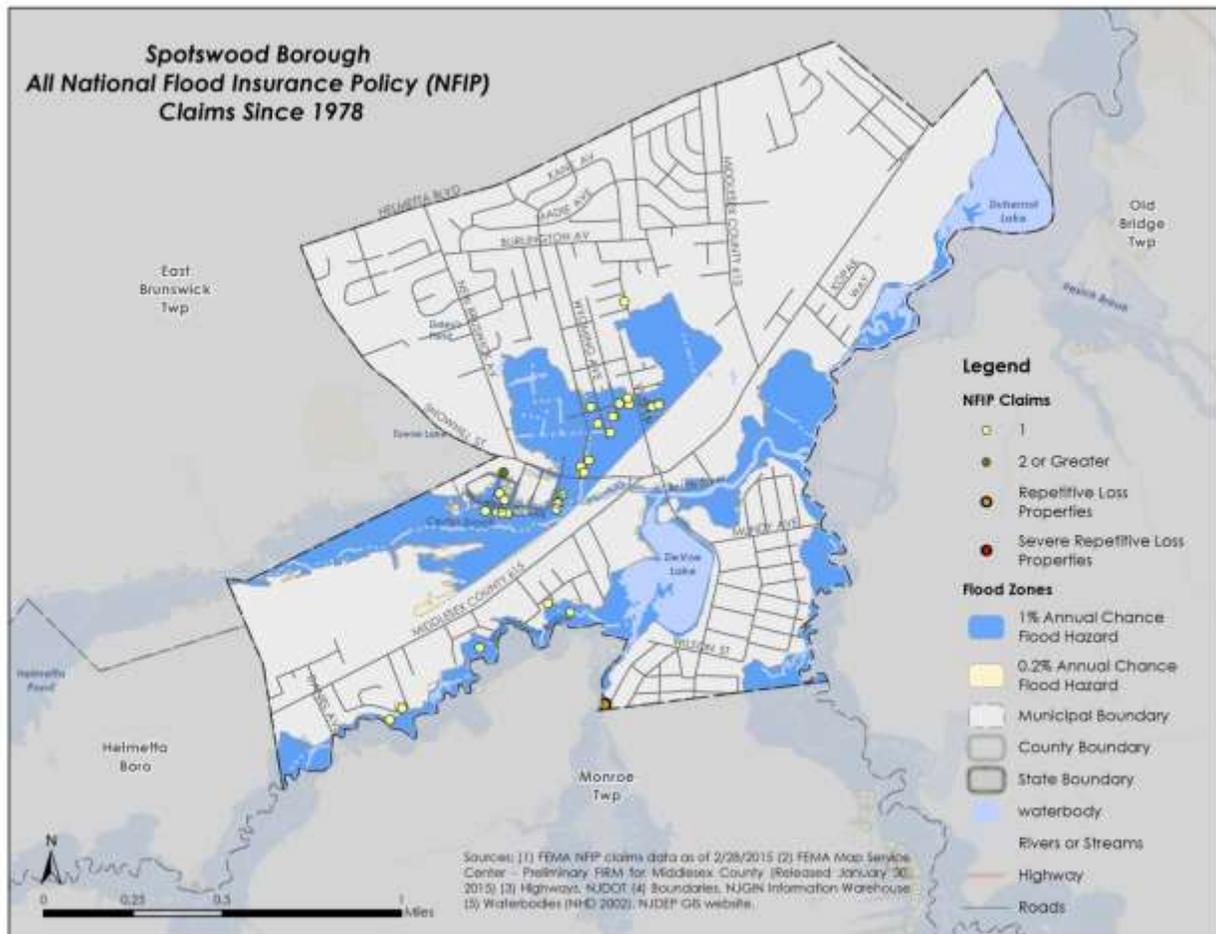
⁹ FEMA – Policy and Claim Statistics for Flood Insurance



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 23-2 shows all NFIP claims in Spotswood between 1978 and 2015.

Figure 23-2
Map of NFIP Claims in the Borough of Spotswood (1978 to 2015),
Including Repetitive Loss and Severe Repetitive Loss Properties
(Source: FEMA National Flood Insurance Program, February 2015)





3.2.5 Flood Risk to Repetitive Loss Properties in Spotswood

FEMA requires a discussion of NFIP Repetitive Loss and Severe Repetitive flood loss statistics in hazard mitigation plans. In 2012, the Biggert Waters act redefined repetitive loss property as 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. This definition is being used to prioritize properties for mitigation funding. The data about Repetitive Loss properties in this subsection are based on the previous definition. Under the revised definition above, Spotswood has no RL properties. See Section 4 of the County portion of this HMP for more details on repetitive loss properties in the County.

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 2015, Middlesex County had 429 such properties based on a query of the FEMA BureauNet NFIP interface. Of this total, two properties were located within Spotswood; this comprises less than one percent of the County total. Table 23-10 provides a comparison of the residential repetitive loss claims for Middlesex County and Spotswood. 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 two repetitive loss properties in Spotswood have accounted for a total of four insurance claims, with total losses of \$53,729. Table 23-10 provides summary repetitive loss statistics for the community. Note that there are very few claims and RL properties, and that the average claim is well below the County average.

Table 23-10
Repetitive Loss Statistics in the Borough of Spotswood and Middlesex County
(Source: FEMA National Flood Insurance Program, February 2015)

Borough/County Name	Properties	Total Building	Total Contents	Total Losses	# of Claims	Average Claim
Borough of Spotswood	1	\$23,150	\$0	\$23,150	2	\$11,575
Middlesex County	429	\$44,015,885	\$5,106,609	\$49,122,494	1,322	\$37,158

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.

Table 23-11
100-Year Risk Projection for NFIP Repetitive Loss Properties in the Borough of Spotswood

Data	Value
Period in years	7
Number of claims	4
Average claims per year	0.57
Total value of claims	\$53,729
Average value of claims per year	\$7,676
Projected risk, 100-year horizon	\$109,531

3.2.6 Flood Risk to Severe Repetitive Loss Properties in Spotswood

Severe Repetitive Flood Loss was also redefined in the Biggert Waters Act as properties that have “incurred flood-related damage for which four or more separate claims payments have been made under flood insurance coverage under this title, with the amount of each claim exceeding \$5,000, and with the cumulative amount of such claims payments exceeding \$20,000; or for which at least two separate claims payments have been made under such coverage, with the cumulative amount of such claims exceeding the value of the insured structure.” The data about Severe Repetitive Loss properties in this subsection are based on the previous definition. Under the revised definition above, Spotswood has no SRL properties.

The definition of Severe Repetitive Flood Loss (SRL) is included in the County portion of this mitigation plan. As of February 2015, there were no SRL properties in Spotswood.

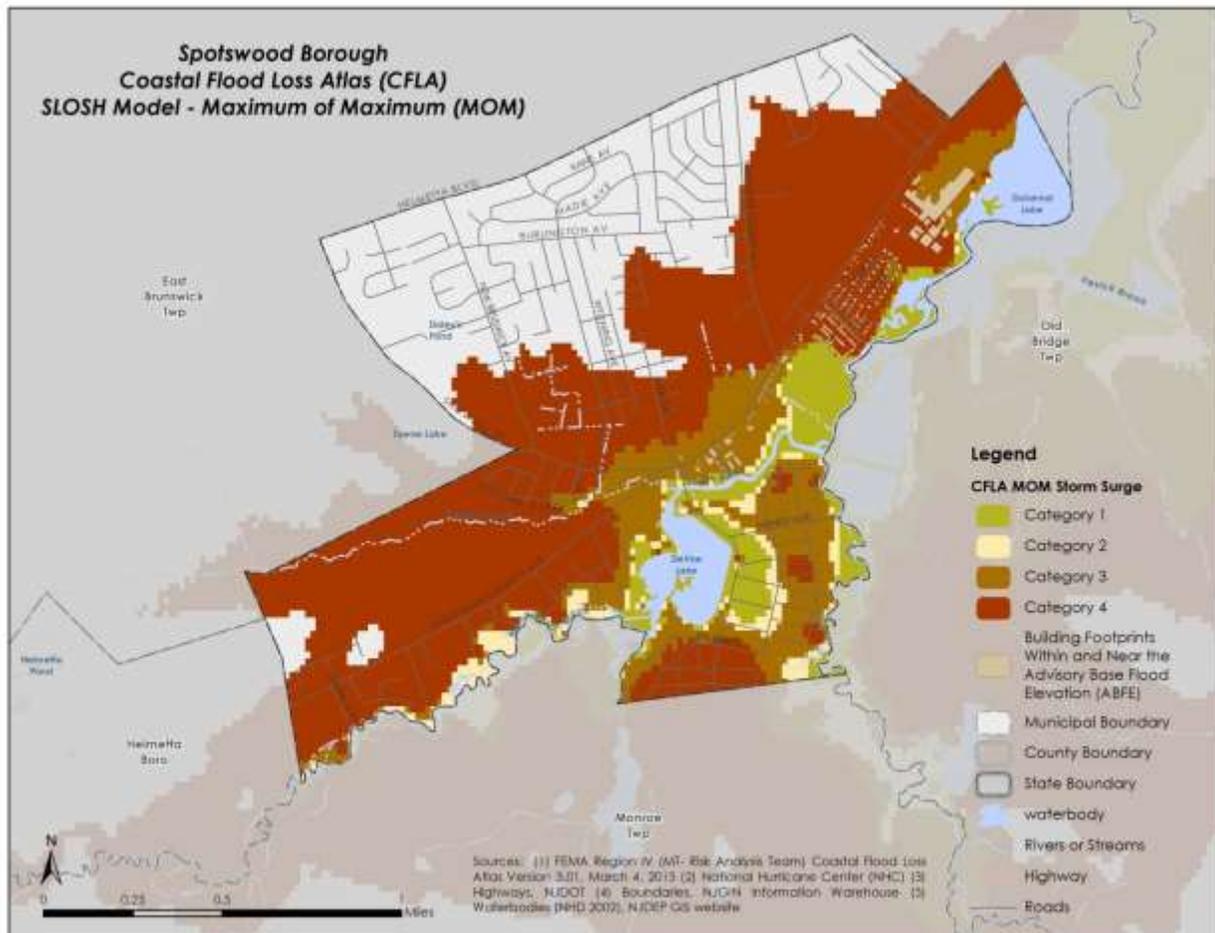
3.2.7 Storm Surge

Of the 25 jurisdictions in Middlesex County, 13 have some risk from storm surge. The Borough of Spotswood is among these, due its potential exposure to the South River, Raritan River, and Raritan Bay. Although events that may cause surge in these secondary and tertiary areas (i.e. those not directly exposed to coastline) are relatively rare, the Borough has some streets and structures in the center of the jurisdiction that are exposed to overbank flooding from Cedar Brook.

Figure 23-3 is a map of storm surge zones 1 through 4 in Spotswood. Category 1 events impact an area substantially similar to the Special Flood Hazard Areas, but highly developed areas further to the west of the river create significant risks in more significant events (Categories 2-4).



Figure 23-3
Map of Storm Surge Zones, Categories 1-4, Borough of Spotswood
(Source: FEMA Region IV, Coastal Flood Loss Atlas (CFLA) SLOSH – March, 2014)



SLOSH inundation zones from the FEMA Coastal Flood Loss Atlas (CFLA) were used to complete the storm surge vulnerability assessment for Spotswood. 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 23-12
Storm Surge Exposure Statistics for the Borough of Spotswood
(Source: FEMA Region IV, Coastal Flood Loss Atlas (CFLA) SLOSH – March, 2014, County GIS)

Storm Surge Category	Square Miles Impacted	Parcels Exposed
1	0.27	84
2	0.35	150
3	0.64	559
4	1.76	1,985

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 23-13
Assumptions for Storm Surge Risk Assessment, Borough of Spotswood

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

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.

Table 23-14
Flood Risk in Storm Surge Scenarios, Borough of Spotswood

	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	84	150	559	1,985
Scenario risk	84	150	559	1,985
Annual risk	\$219,240	\$195,750	\$364,748	\$259,043
100-year risk	\$3,128,555	\$2,793,353	\$5,204,947	\$3,696,536



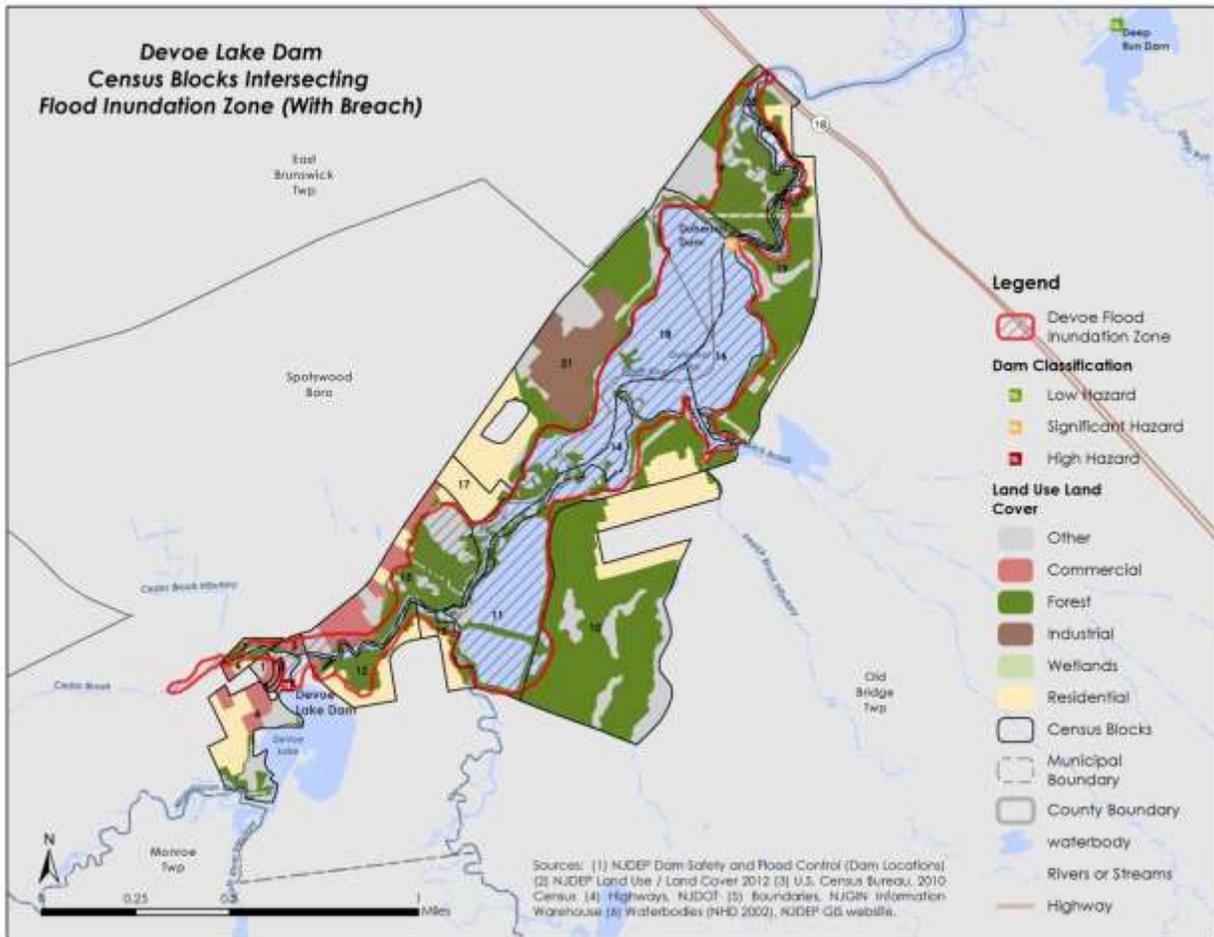
3.3 Dam and Levee Failure Hazards

This subsection briefly discusses dam failure hazards in the Borough of Spotswood. This appendix to the Middlesex County HMP includes this information because one of the State-designated high-hazard damages is located within the jurisdictional boundaries of Spotswood. There is more detailed information about the overall dam and levee failure risk in Middlesex County in the main portion of this document. There is also additional information on dam designations on the NJDEP Bureau of Dam Safety and Flood Control website. The present subsection provides some additional detail about the Devoe Lake Dam, which is located in south-central Spotswood.

High-hazard (potential) dams are defined by the State as those where failure or operational failure will probably cause loss of life and/or significant infrastructure losses. Dam failure risks have several components, including the age and condition of the dam, antecedent conditions (extreme rainfall, seismic events), downstream topography, and the type and extent of populations and infrastructure downstream. Given the number of variables involved, it is never possible to state definitively the probability of dam failure, or the consequences. However, it is possible to develop a general sense of downstream extent and populations potential affected using census block information merged with GIS-based inundation limits. For Spotswood and the Devoe Lake Dam, this process indicated that the expected dam failure flood inundation limit intersects 22 census blocks, with a total population of 1,172 and total housing units of 516. This does not suggest that any possible dam failure would necessarily impact those numbers of people and housing units, only that this is the total expected exposure. Figure 23-4 graphically shows the inundation limits and the census blocks with which the flood waters intersect.



Figure 23-4
Intersection of Census Blocks with Potential Downstream Inundation Limits, Devoe Lake Dam





3.4 Hurricanes and Tropical Storms

3.4.1 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 23-15 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 County-wide results in the main section of this HMP update.

3.4.2 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 23-16 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 23-15
Probabilistic Wind Risk in Spotswood, 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	4,027,750	\$107,680	\$41,121	\$0	\$6,420	\$0	\$2,648	\$0
Commercial	645,699	\$5,798	\$2,440	\$56	\$925	\$551	\$550	\$542
Industrial	102,949	\$616	\$340	\$51	\$41	\$6	\$3	\$10
Agricultural	39,742	\$332	\$167	\$20	\$52	\$3	\$2	\$1
Religious	38,225	\$399	\$144	\$0	\$56	\$28	\$5	\$67
Government	6,255	\$43	\$18	\$0	\$10	\$1	\$3	\$15
Education	54,310	\$448	\$190	\$0	\$80	\$17	\$3	\$41
Totals	4,914,929	\$115,314	\$44,420	\$128	\$7,582	\$606	\$3,215	\$676

Table 23-15
Probabilistic Wind Risk in Spotswood, 50- and 100-year Planning Horizons
(Source: FEMA, HAZUS-MH version 2.1)

Occupancy Class	Total Annualized Loss	50-year Risk	100-year Risk
Residential	\$157,869	\$2,178,744	\$2,252,627
Commercial	\$10,862	\$149,904	\$154,987
Industrial	\$1,067	\$14,722	\$15,221
Agricultural	\$578	\$7,973	\$8,244
Religious	\$698	\$9,634	\$9,961
Government	\$90	\$1,241	\$1,283
Education	\$779	\$10,755	\$11,120
Totals	\$171,942	\$2,372,974	\$2,453,443

Table 23-16
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	\$35,577	\$134,231	\$0	\$0	\$853,961	\$0	\$0	\$1,023,769
Hurricane Sandy	\$74,850	\$93,157	\$0	\$0	\$900	\$0	\$0	\$168,907
Total	\$110,427	\$227,388	\$0	\$0	\$854,861	\$0	\$0	\$1,192,676



3.5 Wildfire

3.5.1 Type and Extent

Compared to many other states (particularly in the west and southwest), New Jersey has a relatively low level of wildfire risk. However, the Borough of Spotswood 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.

3.5.2 Previous Occurrences and the Probability of Future Occurrences

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 X-X), and for reasons of brevity are not repeated here.

3.5.3 1.5.3 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, Spotswood is about average among jurisdictions in Middlesex County. The community has 0.15% of the extreme hazard area (0.007 square miles); 0% of the very high fuel hazard area in the County; 0.31% of the high hazard area (0.115 square miles); 0.45% of the moderate hazard area (0.115 square miles); and 0.58% of the low hazard area (0.492 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. Table 23-17 provides basic metrics about the numbers of housing units and population in the various interface and intermix areas. Data in the table is based on the 2010 census.

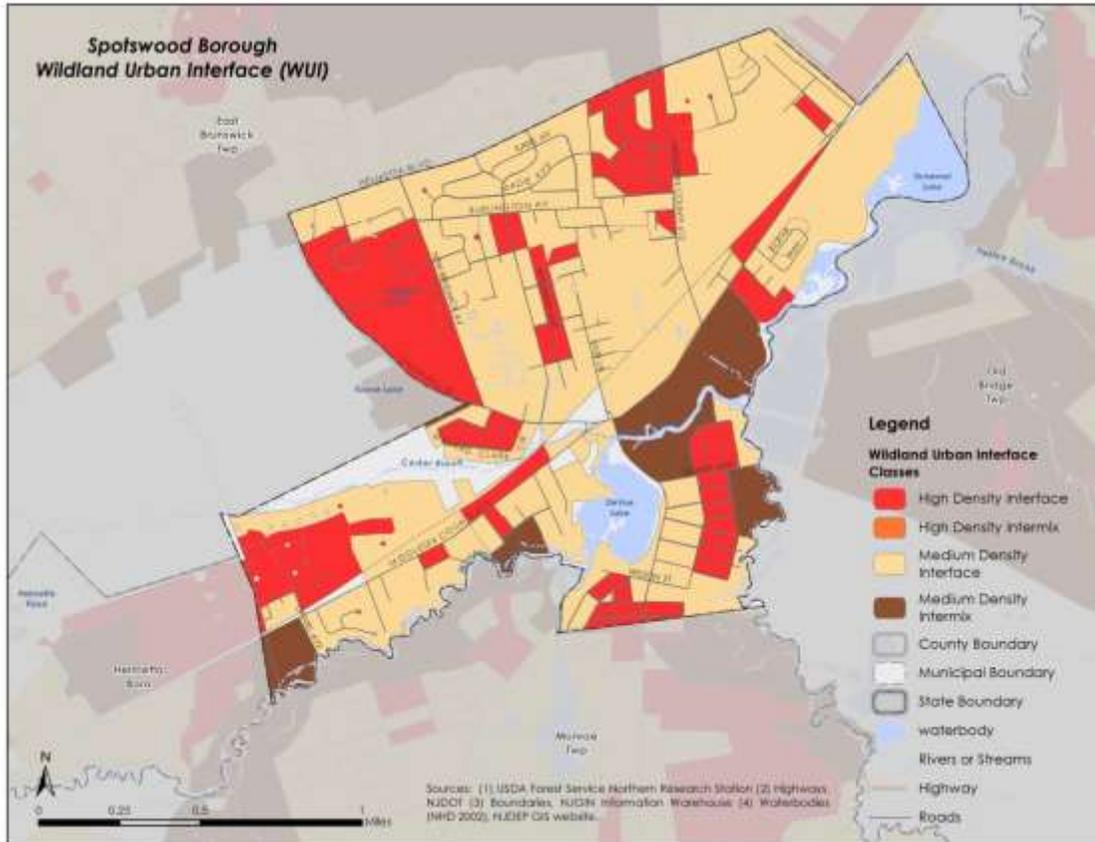
Table 23-17
Summary of Wildland-Urban Interface and Intermix Data, Borough of Spotswood

	Housing Units	Population
High-density interface	1,843	4,246
High-density intermix	NA	NA
Medium-density interface	1,804	5,134
Medium-density intermix	492	1,323



Figure 23-5 shows areas of wildland-urban intermix and interface in Spotswood. Intermix and interface areas are distributed throughout the jurisdiction, and appear to be predominantly related to parks and areas of dense vegetation in developed areas.

Figure 23-5
Wildland-Urban Wildfire High- and Medium-Density Interface and Intermix Zones, Borough of Spotswood



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.



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 Cranbury during this plan update.

4.1.1 Planning and Regulatory

Tool / Program (code, ordinance, plan)	(Yes/No)	Code Citation and Comments
Master Plan	Y	Code Book
Capital Improvements Plan	Y	Budget
Floodplain Management / Basin Plan	Y	
Stormwater Management Plan	Y	
Open Space Plan	Y	
Stream Corridor Management Plan	Y	
Watershed Management or Protection Plan	N	
Economic Development Plan	N	
Comprehensive Emergency Management Plan	Y	
Emergency Operation Plan	Y	
Post-Disaster Recovery Plan	N	
Transportation Plan	N	
Strategic Recovery Planning Report	N	
Zoning Ordinance	Y	
Subdivision Ordinance	Y	
NFIP: Cumulative Substantial Damages	Y	
Growth Management Ordinances	N	
Site Plan Review Requirements	Y	
Stormwater Management Ordinance	Y	
Municipal Separate Storm Sewer System (MS4)	Y	
Combined Sewer Overflows (CSO)	N	
Natural Hazard Ordinance	N	
Post-Disaster Recovery Ordinance	N	
Real Estate Disclosure Requirement	N	
Other [Special Purpose Ordinances (i.e., sensitive areas, steep slope)]	Y	

4.1.2 Staff/Personnel

Resources	Is this in place? (Y/N)	Department/ Agency/Position
Planning Board	Y	
Mitigation Planning Committee	N	
Environmental Board/Commission	N	
Open Space Board/Committee	N	
Economic Development Commission/Committee	N	
Maintenance Programs to Reduce Risk	Y	
Mutual Aid Agreements	Y	County, Helmetta, East Brunswick, Old Bridge
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Y	



Resources	Is this in place? (Y/N)	Department/ Agency/Position
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Y	
Planners or engineers on staff with a strong understanding of natural hazards	Y	
NFIP Floodplain Administrator	Y	
Surveyors	Y	
GIS layers and maps	Y	
Personnel trained in GIS	Y	
Personnel trained in HAZUS	N	
Emergency Manager	Y	
Grant Writer	Y	
Staff with expertise in cost/benefit analysis	Y	
Professionals trained in conducting damage assessments	Y	

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)	UNK		
Storm Ready	N		
Firewise	UNK		
Disaster/Safety Programs in/for Schools	N		
Organizations with Mitigation Focus (advocacy group, non-government)	N		
Public Education Program/Outreach (through website, social media)	Y		
Public-Private Partnerships	N		

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?	N
Do you have a line item in the Capital Improvement Budget for mitigation project funding?	N
Have you provided funding for mitigation projects identified in the hazard mitigation plan?	N
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?	Y
Does your community have an open space acquisition fund?	N
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 Borough 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
Spotswood 1: Retrofit freshwater well water pump station. George Street Pump Station.	Spotswood OEM	Ongoing. The study is underway and the project is anticipated to funded with Capital funds by the Borough.	

5.2 Other Mitigation Activities

No other actions reported at this time that are not included in the tables above or below.

5.3 Proposed Mitigation Actions

The table below details the mitigation initiatives the Borough of Spotswood 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 Borough has ranked as ‘High’, ‘Medium’, or ‘Low’, based on the evaluation criteria outlined in Section 5.

Proposed Action	Anticipated Benefits	Responsible Party	Funding or Implementation Mechanism	Estimated Cost	Timeline	Priority
Wet flood-proof EMS building	Allow for return to service quickly after floodwaters recede	OEM	Capital Funds	300,000	1-2 years	High



Remove debris from streams deposited by Sandy	Improve flow of all waterways through town	DPW	Capital Funds		1-2 years	High
Drainage channel improvements to mitigate repetitive loss	Stabilize stream banks to reduce deposition of sediment and increased debris in watercourses	DPW	Capital Funds		2-5 years	High
Dredge DeVoe Lake	Remove sediment deposits to allow proper flushing of watershed	DPW	Capital Funds		3-5 years	High
Swiftwater rescue training	Improve capacity to respond in emergency situations	OEM in cooperation with Monroe and East Brunswick	Capital Funds	Staff time		Medium
Study for improvement of culvert under railroad bridge	Enhance drainage and reduce flood caused by backing up of stormwater	Middlesex County Engineering	County resources		2-3 years	N/A
Elevation repetitive loss property if other mitigation measures do not resolve issue.	Reduce property loss	OEM	Grants		3-5 years	Medium



6. Plan Implementation

The LPC shall document, as needed and appropriate:

- Hazard events and losses in Spotswood 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 Borough.
- Copies of any grant applications filed on behalf of the Borough

Continued Public Input

The Borough of Spotswood 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 Borough of Spotswood's LPC shall ensure that:

- Copies of the latest approved Plan are available for review at Borough 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 Borough of Spotswood will post a notice on the Borough's website and invite the public to review and comment.
- For major changes involving Borough Council approval, the Borough 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 Borough Council approved the plan on [insert date]. The Borough resolution for adoption is provided below, the County's adoption resolution is provided as Appendix F of the 2014 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 Borough of Spotswood 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 OEM 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 OEM Coordinator will convene a meeting of the LPC to review and approve all changes. The Borough retains the discretion to implement minor changes to the document without formal procedures involving the Borough Council subject to local policies and regulations.

In addition to the annual progress report, the Borough of Spotswood 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.