



Appendix 17: Township of Piscataway

The Township of Piscataway 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 26, 2014, the Mayor signed an “Intent to Participate” letter and assigned the OEM Coordinator as the point of contact for the HMP update. The OEM Coordinator worked with other municipal employees, consultants, volunteers, and other stakeholders through the formation of a Local Planning Committee (LPC), as listed below. The LPC 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 consultant on November 23rd to review the risk assessment and develop a mitigation strategy. In addition to the knowledge of the planning committee, the Township’s Master Plan, permit application records, and codified ordinances were used in this plan update.

Table 17-1: Township of Piscataway Local Planning Committee Members

Name	Title	Organization
Brian C. Wahler	Mayor	Township of Piscataway
Joe Criscuolo	Business Administrator	Township of Piscataway
Paul Snyder	OEM Coordinator	Township of Piscataway
Gary Gaspari	Director of Public Works	Township of Piscataway
Joseph Herrera	Supervisor of Engineering	Township of Piscataway



2. Community Profile

2.1 Physical Location

The Township of Piscataway has a total area of 12.03 square miles and is located in the northwest portion of Middlesex County, New Jersey. Piscataway is bordered by South Plainfield Township, Middlesex Borough and Dunellen Township to the north, Plainfield (Union County) to the north, Edison and Highland Park to the east, New Brunswick to the south, and the Somerset County towns of Franklin Township and South Bound Brook to the west.

2.1.1 Hydrography and Hydrology

Piscataway Township is located entirely in the Raritan River Basin and includes three major watercourses. In the northern portion of the Township, water flows in from the East, crossing into Piscataway from South Plainfield Borough via Bound Brook. Another major watercourse is the Ambrose Brook, which enters from Edison Township and then flows northwest across Piscataway. These brooks eventually feed into the Green Brook which flows southwest before draining into the Raritan River, which defines the border between Piscataway and Franklin Township

2.2 History and Governance

The Township of Piscataway was formally incorporated on February 21, 1798. The Township is governed under the Mayor-Council form of government, and has an elected Mayor and seven Council members. The Mayor is elected directly to a four-year term of office. Town Council members are elected with three at-large and four from Township wards. They are elected to serve four-year terms on a staggered basis, with two seats coming up for election every other year. The Township 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 56,044.¹ This is an 11.0% increase from 2000. The Township of Piscataway has a population density of 2,975.5 persons per square mile. It is the 16th 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 "Piscataway Township, NJ". <http://factfinder.census.gov/>. Retrieved 9/8/15.



Table 17-2: Township of Piscataway Population Summary Estimates (2010 Census) ²

Population	Quantity	Percent of Municipal Population
Total Population	56,044	100
Median Age	33.0	N/A
17 years and under	11,269	20.1
65 years and over	3,107	5.5
Race		
White	21,554	38.5
Black/African-American	11,596	20.7
Native American/Alaskan Native	173	0.3
Asian	18,744	33.4
Note: Asian Indian	10,662	19.0
Native Hawaiian/Pacific Islander	13	0.0
Other Race (unspecified)	2,011	3.6
Two or More Races	1,953	3.5
Hispanic or Latino	6,289	11.2

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 17-3: Township of Piscataway Household Characteristics Summary Estimates (2010 Census) ³

Households	Quantity	Percent of Total
Total Households	17,050	100
Family Households (related)	12,965	76.0
Family Households w children under 18	5,970	35.0
Non-Family Households (unrelated)	4,085	24.0
Non-Family Households, living alone	3,163	18.6
Non-Family Households, living alone Male over 65 years	250	1.5
Non-Family Households, living alone Female over 65 years	712	4.2

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,

² Ibid.

³ Ibid.



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

Table 17-4: Township of Piscataway Vulnerable Population Estimates (2010)

Population Type	Population Estimate (2010 Census) ⁴
Under 5 years of age	3,311
Under 18 years of age	11,269
Over 65 years of age	3,107
Limited English Proficiency (LEP)	7,800 (equals 14.6% of population over 5 years old)
Institutionalized	105
Living in Group Quarters	6,399

In addition to these statistics, approximately 5.6% of the population lives below the poverty line. The mean household income is \$103,610, with the per capita income at approximately \$32,252 (2013 estimates).⁵

2.4 Land Use and Development

The Township of Piscataway has seen an increase in density in its residential and mixed-use development. The NJDEP Land Use trends show a slight increase in the area classified as urban from 2002 to 2012 and a significant increase in Barren Land during this same period. The increase in Barren Land may be a result of a development project being in the process of construction during the creation of the data. A detailed list of the major projects that have been approved since 2010 are listed below.

Table 17-5: Township of Piscataway Land Cover Summary

Land Cover Class	Percent of Total Land ⁶	2002 (acres)	2007 (acres)	2012 (acres)	Percent Change ⁷
Agriculture	0.34%	193.00	170.29	41.43	-78.53%
Barren Land	1.28%	51.56	45.01	155.61	201.78%
Forest	10.65%	1374.36	1228.21	1291.41	-6.04%
Urban	72.60%	8511.95	8799.37	8806.96	3.47%
Water	1.45%	164.17	173.91	175.39	6.84%
Wetlands	13.69%	1836.42	1714.67	1660.65	-9.57%

⁴ Ibid.

⁵ U.S. Bureau of the Census. American Fact Finder "Piscataway Township, NJ". <http://factfinder.census.gov/>. Retrieved 9/8/15.

⁶ Percent based on acres of land in 2012

⁷ Change is calculated between 2002 and 2012



2.4.1 Open Space

Piscataway has approximately 600 acres of open space, over 20 percent of which is located in the Special Flood Hazard Area. Approximately 20 percent of the Special Flood Hazard Area is preserved.

2.4.2 Buildings and Development

Table 17-6: Township of Piscataway Housing Statistics

Housing Characteristics	Estimate
Total Occupied Housing Units	16,985
Percent Owner-occupied	66.3
Percent Renter-occupied	33.7
Percent built after 2000	10.3
Percent built before 1979	62.9

2.4.3 Recent and Expected Development

Project Name	Type	Number of Units	Locations	Known Hazards	Description/Status
	Mixed Use	595 apts/mixed-use	Old New Brunswick & Roma	None	In Development
	Residential	442	Stelton Rd	None	In Development
Aspen Ct	Residential	400	New Brunswick Ave	Near flood area of Ambrose Brook	In Development
Redevelopment of Dow Chemical	Warehousing/High Industrial	-	River Road	Flood	
The Villas at Fairway/Fairway Towne Center	Mixed-use/Transit Oriented Development	350 residential/19,300 sq retail	Stelton	None	Finished



2.5 Critical Facilities and Infrastructure

2.5.1 Essential Facilities

The Township operates several municipal facilities. The designated warming cooling centers have generators, which include the public library and the senior center.

2.5.2 Transportation

Primary transportation routes through Piscataway Township include County Route 501, 514 and 529, Route 18 and I-287. New Jersey Transit provides bus service, and there are no commuter rails in Piscataway. Piscataway is home to part of Rutgers University, including the stadium, and also hosts a large number of corporations.

2.5.3 Critical Utilities and Infrastructure

The Township maintains its sewer infrastructure. The system underwent an Infiltration/Inflow (I/I) study as part of a broader MCUA study in April 2015. There are a number of identified issues with infiltration in the system.



3. Hazard Identification and Risk Assessment

This section describes the natural hazards and risks that can affect the Township of Piscataway. Like all the other municipalities in Middlesex County, Piscataway 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 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. Municipalities ranked the list of hazards as high, medium, low, or no concern.

Table 17-7 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.

Table 17-7
Township of Piscataway
Hazard Identification and Prioritization

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

There are two dams of concern within the Township, Lake Nelson and the Piscataway Dam at Newmarket. Both of these dams have been classified as Low Hazard of Concern by the State of New Jersey, and therefore risk assessments have not been performed on these impoundments. Lake Nelson did fail in Hurricane Irene, it has since been rebuilt. The sluice gates at the Piscataway Dam were preemptively replaced in 2005. The Township continues to monitor and inspect the dams regularly. The



Township ranked Hazardous Substances as high due to the volume of industrial truck traffic that uses the 287 corridor. The Township also considers Winter Storm to be a high risk because of the challenges of snow removal and coordination of the responsible parties for clearing of roads. Given the lack of data available, a risk assessment was not performed for this hazard.

3.2 Flood Hazard

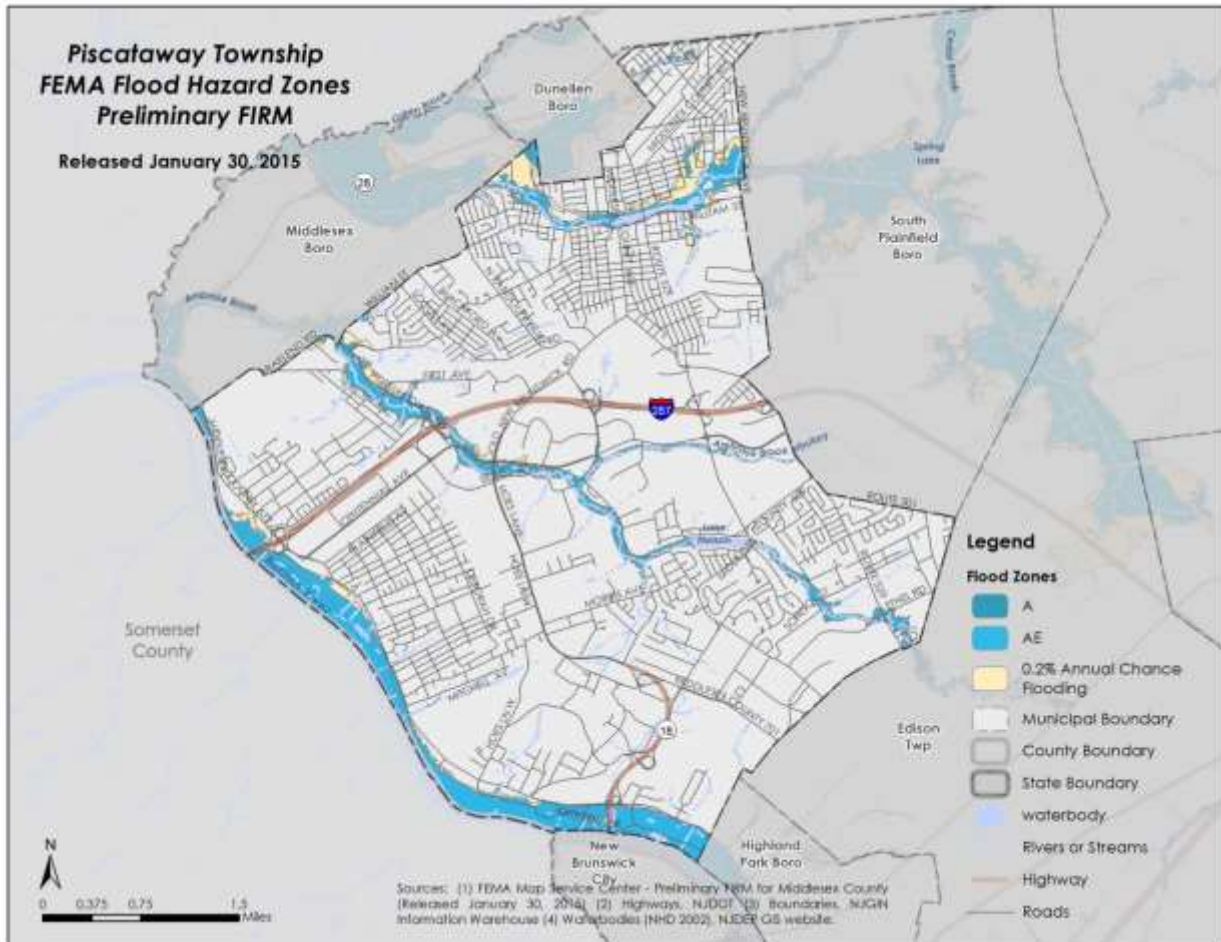
3.2.1 Type, Location, and Extent

The Township of Piscataway is located in northwest Middlesex County. The Raritan River forms the entire southern border of the jurisdiction. Although the Raritan is the predominant flood source in the community, there are two other streams that cross the jurisdiction from east to west, ultimately draining into the Raritan, west of the Township. These are Bound Brook, which cuts across the northern tip of Piscataway, and Ambrose Brook, which is approximately in the center of the jurisdiction. Flooding in Piscataway is primarily related to overbank events from the three sources above, and (as discussed below) the community is subject to surge-related flooding from the Raritan as well.

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 the Township of Piscataway 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 17-1. Nearly all the floodplain in the jurisdiction is related to the three flood sources noted above.



Figure 17-1
Piscataway portion of FEMA Revised Preliminary Flood Insurance Rate Map
(Source: FEMA Region II, Coastal Analysis and Mapping, Preliminary FIRM, January 2014)



As shown in Table 17-8 below, compared to many other Middlesex communities, there is very little floodplain in Piscataway, and very few parcels with centroids in the floodplain that does exist.



Table 17-8
Floodplain and Parcel Data for the Township of Piscataway
(Source: FEMA Region II, Coastal Analysis and Mapping, Preliminary FIRM, January 2014)

Data Type	Value
Jurisdiction area in square miles	18.95
Square miles within 100-year floodplain	1.54
Jurisdiction area within 100-year floodplain	8.13%
Number of parcels in jurisdiction	14,992
Number of parcels with centroids within 100-year floodplain	185
Parcels with centroids within 100-year floodplain	1.23%

[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].

Current FEMA guidance uses the term *extent* as analogous to potential severity. The extent of the flood hazard in Piscataway is significant in certain specific areas, although high flood depths are not as much of a concern in most other areas. In the southwestern part of Piscataway (adjacent to the Raritan and along River Road, flood extent can occasionally be as much as a few feet, and during storm surge events, potentially significantly higher. Other floodprone areas on Bound Brook and Ambrose Brook are generally not subject to depths of more than a foot or two.

3.2.2 Previous Occurrences and the Probability of Future Floods

Piscataway has endured regular floods going back to the 1970s, though overall these have not affected large numbers of properties in the community. The majority of floods are related to overbank events from the Raritan, although there is evidence of floods in several other areas of the community as well. For the most part, flood probabilities should remain about the same into the future, except that the effects of sea level rise increase the possibility of significant surges on the Raritan.

3.2.3 Flood Impacts and Vulnerabilities to Flooding

The impacts from past floods in this jurisdiction have been significant in specific areas of the jurisdiction. Significant vulnerabilities are evident in the community, particularly on the north side of the Raritan River, at the southern end of Piscataway. Although the community has relatively few parcels with their centroids in the floodplain, there are nevertheless many properties at relatively low elevations near flood sources.



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. Piscataway has been a member of the NFIP since 1984.

**Table 17-9
NFIP Policies and Claims**

Number of Parcels:

Piscataway:	14,992
Middlesex County:	283,276

Number of Policies In-Force:

Piscataway:	214
Middlesex County:	4,489

Number of Claims:

Piscataway:	154
Middlesex County:	3,478

Total Paid Claims

Piscataway:	\$1,898,906
Middlesex County:	\$109,727,837

FEMA NFIP statistics indicate that as of February 2015, federal flood insurance policies were in-force on 214 properties in Piscataway. Between 1978 and 2015, there have been a total of 154 NFIP insurance claims in the Township, with a total claims value of \$1,898,906. ⁸ Table 17-9 compares the number of policies in-force and paid claims in the jurisdiction. The table shows that Piscataway comprises 4.8% of the NFIP policies in-force in Middlesex County. Notably, the average NFIP claim in Piscataway is \$12,331, about 30% of the County average.

Piscataway 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.⁹ 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.

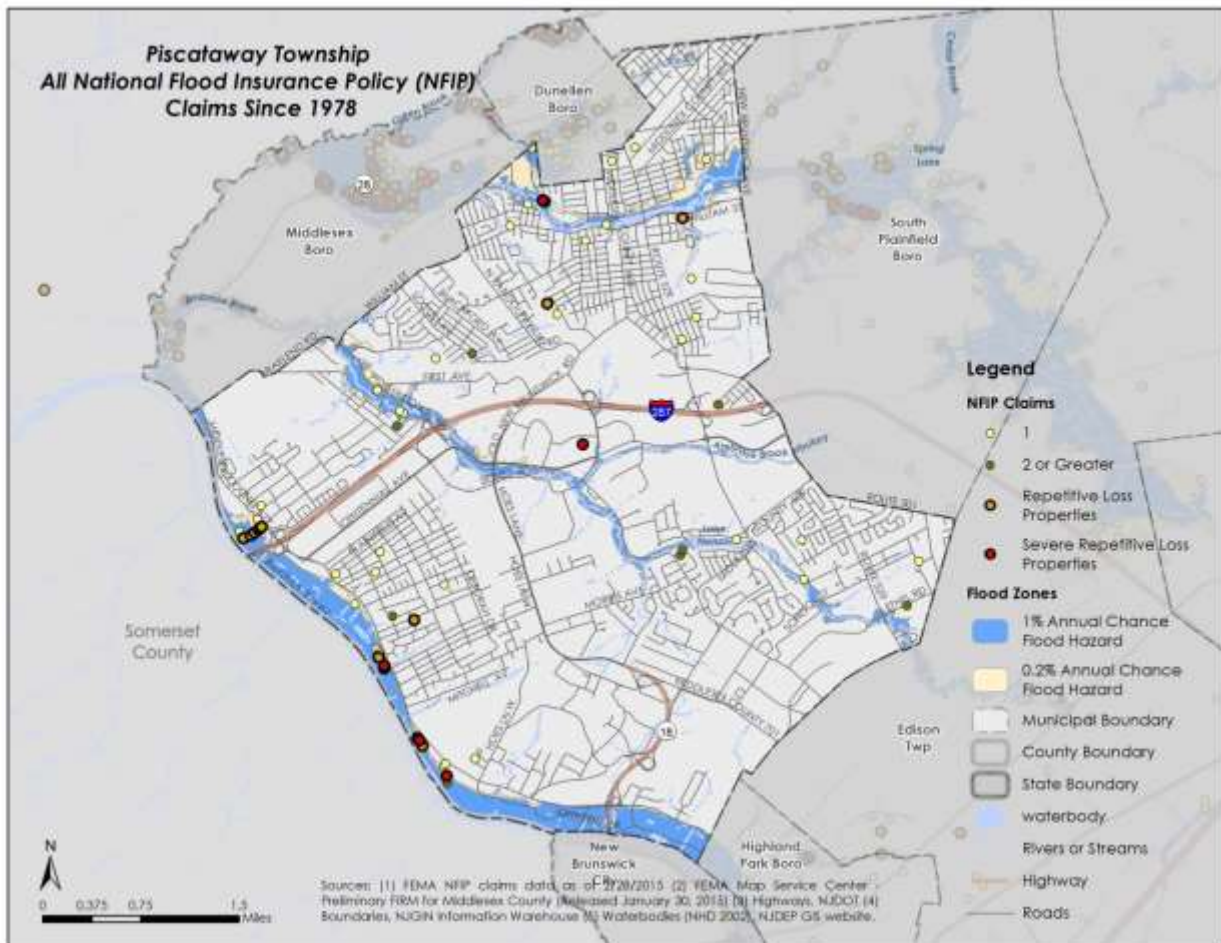
⁸ FEMA – Policy and Claim Statistics for Flood Insurance

⁹ FEMA – Community Rating System (CRS).



Figure 17-2 shows all NFIP claims in Piscataway between 1978 and 2015. The claims are widely distributed, and for the most part clearly related to known flood sources as described above.

Figure 17-2
Map of NFIP Claims in the Township of Piscataway (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 Piscataway

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, Piscataway has one RL property. See Section 4 of the County portion of this HMP for more details on repetitive loss properties in the County.

Table 17-10 NFIP Policies and Claims	
Repetitive Loss (RL) Properties:	
Piscataway:	24
Middlesex County:	429
Total Building (RL)	
Piscataway:	\$2,220,868
Middlesex County:	\$44,015,885
Total Contents (RL)	
Piscataway:	\$133,393
Middlesex County:	\$5,106,609
Number of Claims (RL)	
Piscataway:	75
Middlesex County:	1,322
Average Claim (RL)	
Piscataway:	\$31,390
Middlesex County:	\$37,158
Severe Repetitive Loss (SRL) Properties:	
Piscataway:	7
Middlesex County:	77
Total Building (SRL)	
Piscataway:	\$1,122,134
Middlesex County:	\$14,512,761
Total Contents (SRL)	
Piscataway:	\$96,951
Middlesex County:	\$910,122
Number of Claims (SRL)	
Piscataway:	34
Middlesex County:	385
Average Claim (SRL)	
Piscataway:	\$35,855
Middlesex County:	\$40,059

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, 24 properties were located within Piscataway; this comprises 5.6 percent of the County total. Table 17-10 provides a comparison of the residential repetitive loss claims for Middlesex County and Piscataway. 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 24 repetitive loss properties in Piscataway were responsible for a total of 75 insurance claims, totaling \$2,354,261. Table 17-11 provides summary repetitive loss statistics for the community.



Table 17-11
Repetitive Loss Statistics in the Township of Piscataway and Middlesex County
(Source: FEMA National Flood Insurance Program, February 2015)

City/County Name	Properties	Total Building	Total Contents	Total Losses	# of Claims	Average Claim
Township of Piscataway	24	\$2,220,868	\$133,393	\$2,354,261	75	\$31,390
Middlesex County	429	\$44,015,885	\$5,106,609	\$49,122,494	1,322	\$37,158

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

Table 17-12
Streets in the Township of Piscataway with Highest Numbers and Amounts of NFIP Claims
(Repetitive Loss Properties)
(Source: FEMA National Flood Insurance Program, February 2015)

Street Name	Building	Contents	Total	# of Claims	Average
River Road	\$862,994	\$64,338	\$927,332	28	\$33,119

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 17-13
100-Year Risk Projection for NFIP Repetitive Loss Properties in the Township of Piscataway

Data	Value
Period in years	19
Number of claims	75
Average claims per year	3.95
Total value of claims	\$2,354,261
Average value of claims per year	\$123,908
Projected risk, 100-year horizon	\$1,768,174

3.2.6 Flood Risk to Severe Repetitive Loss Properties in Piscataway

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, Piscataway has eight SRL properties. Table 17-14 provides basic information about the SRL properties in this jurisdiction. SRL properties are also shown graphically in Figure 17-2 above.

Table 7-14
Statistics on NFIP Severe Repetitive Loss Properties in the Township of Piscataway
(Source: FEMA National Flood Insurance Program, February 2015)

City/County Name	Properties	Total Building	Total Contents	Total Losses	# of Claims	Average Claim
Township of Piscataway	7	\$1,122,134	\$96,951	\$1,219,085	34	\$35,855
Middlesex County	77	\$14,512,761	\$910,122	\$15,422,883	385	\$40,059

The next table shows the road in Piscataway with the most severe repetitive loss insurance claims. For reasons of confidentiality, this mitigation plan does not show specific addresses.

Table 17-15
Streets in the Township of Piscataway with Highest Numbers and Amounts of NFIP Claims
(Severe Repetitive Loss Properties)
(Source: FEMA National Flood Insurance Program, February 2015)

Street Name	Building	Contents	Total	# of Claims	Average
River Road	\$765,048	\$64,338	\$829,386	20	\$41,469

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.



Table 17-16
100-Year Risk Projection for NFIP Severe Repetitive Loss Properties in the Township of Piscataway

Data	Value
Period in years	19
Number of claims	34
Average claims per year	1.79
Total value of claims	\$1,219,085
Average value of claims per year	\$64,162
Projected risk, 100-year horizon	\$915,597

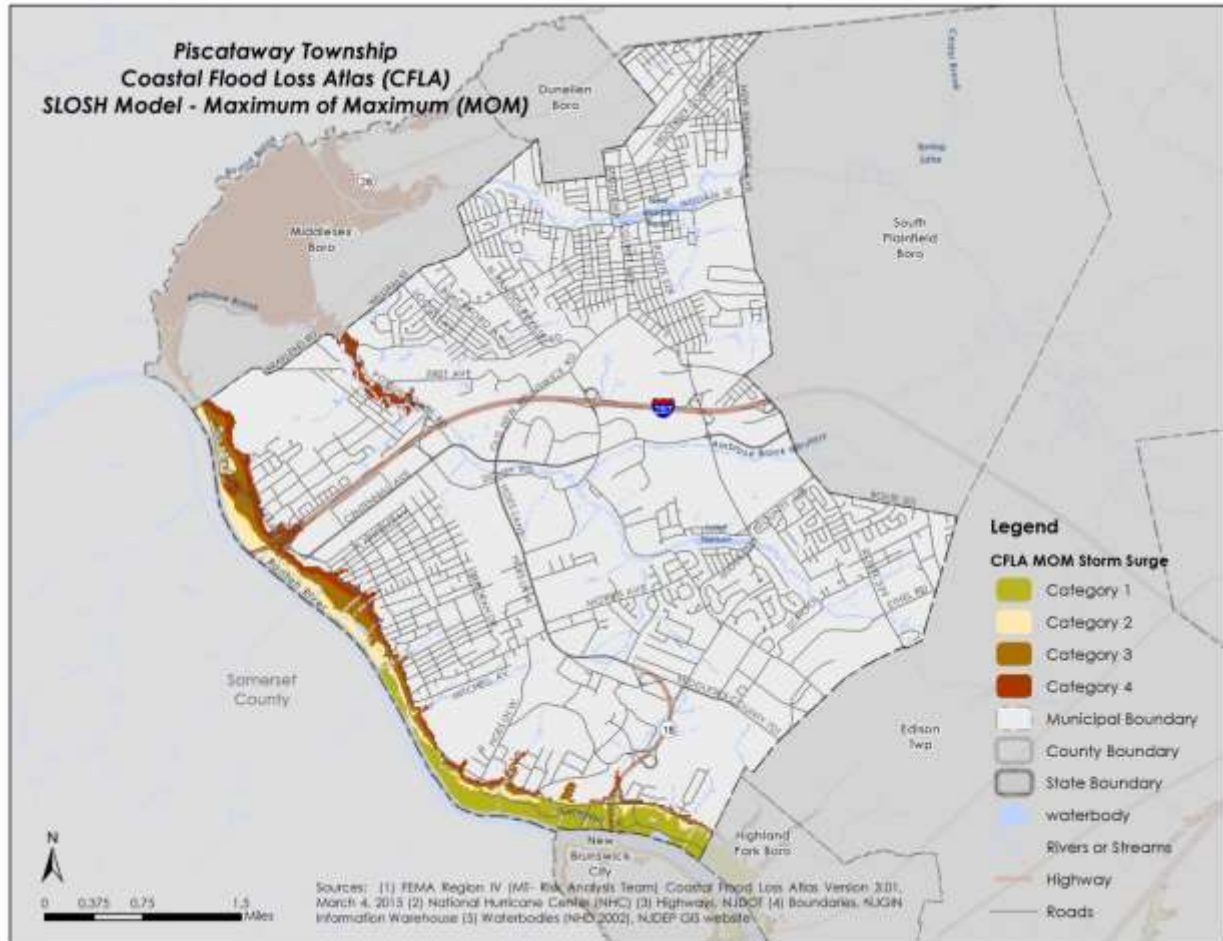
3.3 Storm Surge

Of the 25 jurisdictions in Middlesex County, 13 have some risk from storm surge. Piscataway is among these due its exposure to overbank flooding from the Raritan. Although the Township is located a few miles upstream from Raritan Bay, it remains at risk from surge effects. It is useful to discuss statistics that are clearly related to surge. Various studies and GIS analysis provide information about the jurisdiction's exposure to various levels of storm surge. Although certain discreet areas are highly exposed to surge-related flooding, overall the community is not extremely vulnerable to this hazard.

Figure 17-3 is a map of storm surge zones 1 through 4 in Piscataway. The areas affected by the various categories of storm surge are mostly limited to the northern bank of the Raritan, and do not extend significantly inland, likely due to the terrain.



Figure 17-3
Map of Storm Surge Zones, Categories 1-4, Piscataway Township



SLOSH inundation zones from the FEMA Coastal Flood Loss Atlas (CFLA) were used to complete the storm surge vulnerability assessment for Piscataway. 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 17-17
Storm Surge Exposure Statistics for the Piscataway Township
(Source: FEMA Region IV, Coastal Flood Loss Atlas (CFLA) SLOSH – March, 2014, County GIS)

Storm Surge Category	Square Miles Impacted	Parcels Exposed
1	0.469	21
2	0.821	88
3	1.096	177
4	1.420	344

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 17-18
Assumptions for Storm Surge Risk Assessment, Piscataway 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 17-19
Flood Risk in Storm Surge Scenarios, Piscataway 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	21	88	177	344
Scenario risk	\$2,740,500	\$11,484,000	\$23,098,500	\$44,892,000
Annual risk	\$54,810	\$114,840	\$115,493	\$44,892
100-year risk	\$782,139	\$1,638,767	\$1,648,078	\$640,609



3.4 Hurricanes and Tropical Storms Hazard

Based on input from the hazard ranking process, Piscataway considers hurricanes and tropical storms significant hazards, and thus there is a short discussion in the present subsection.

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 17-20 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.

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 17-21 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 17-20
Probabilistic Wind Risk in Piscataway, Estimated Risk by Category
(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	23,633,104	\$462,186	\$137,272	\$0	\$25,973	\$29	\$13,669	\$68
Commercial	6,922,123	\$44,546	\$19,331	\$645	\$7,224	\$4,186	\$3,947	\$4,242
Industrial	2,962,196	\$16,687	\$11,662	\$1,394	\$1,285	\$173	\$210	\$281
Agricultural	689,149	\$3,943	\$1,943	\$237	\$608	\$32	\$24	\$13
Religious	450,908	\$3,373	\$1,126	\$0	\$462	\$252	\$41	\$593
Government	127,496	\$750	\$346	\$0	\$171	\$9	\$51	\$490
Education	1,028,605	\$6,760	\$3,833	\$0	\$1,363	\$413	\$105	\$972
Totals	35,813,580	\$538,244	\$175,512	\$2,276	\$37,085	\$5,094	\$18,048	\$6,657

Table 17-21
Probabilistic Wind Risk in Piscataway, 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	\$639,196	\$8,821,546	\$9,120,689
Commercial	\$84,121	\$1,160,958	\$1,200,327
Industrial	\$31,692	\$437,381	\$452,213
Agricultural	\$6,800	\$93,848	\$97,030
Religious	\$5,845	\$80,673	\$83,409
Government	\$1,817	\$25,078	\$25,928
Education	\$13,445	\$185,555	\$191,848
Totals	\$782,917	\$10,805,038	\$11,171,444

Table 17-22
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	\$163,285	\$14,486	\$9,591	\$0	\$67,655	\$0	\$151,278	\$406,294
Hurricane Sandy	\$2,153,281	\$90,376	\$93,680	\$0	\$3,478	\$0	\$2,841	\$2,343,657
Total	\$2,316,566	\$104,862	\$103,271	\$0	\$71,132	\$0	\$154,119	\$2,749,951



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 Planning and Regulatory

Tool / Program (code, ordinance, plan)	(Yes/No)	Code Citation and Comments
Master Plan	Y	
Capital Improvements Plan	N	
Floodplain Management / Basin Plan	Y	Green Brook
Stormwater Management Plan	Y	
Open Space Plan	N	
Stream Corridor Management Plan	N	
Watershed Management or Protection Plan	N	
Economic Development Plan	N	
Comprehensive Emergency Management Plan	N	
Emergency Operation Plan	Y	2013
Post-Disaster Recovery Plan	N	
Transportation Plan	Y	
Strategic Recovery Planning Report	N	
Zoning Ordinance	Y	
Subdivision Ordinance	Y	
NFIP: Cumulative Substantial Damages	N	
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)]	Steep Slope	

4.2 Staff/Personnel

Resources	Is this in place? (Y/N)	Department/ Agency/Position
Planning Board	Y	
Mitigation Planning Committee	N	
Environmental Board/Commission	Y	
Open Space Board/Committee	Y	
Economic Development Commission/Committee	Y	
Maintenance Programs to Reduce Risk	Y	
Mutual Aid Agreements	Y	
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	-	
Staff with expertise in cost/benefit analysis	N	
Professionals trained in conducting damage assessments	Y	

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

4.4 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?	As appropriate
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?	N
Do you impose impact Fees for homebuyers or developers of new development/homes?	N
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 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
Piscataway 1: Mayflower Apartments waterproofing electrics	Municipal OEM	The Apartment building has worked to elevate utilities.	
Piscataway 2: Birchfield Apartments waterproofing electrics	Municipal OEM	The Apartment building has worked to elevate utilities.	
Piscataway 3: Rivercrest Apartments waterproofing electrics	Municipal OEM	The Apartment building has worked to elevate utilities.	

5.2 Other Mitigation Activities

The Township moved the Emergency Operations Center out of the basement to prevent flood damage to critical equipment and ensure operations throughout future hazard events. The Township also mitigated a pump station by elevating the mechanicals at the facility.

5.3 Proposed Mitigation Actions

The table below details the mitigation initiatives the Township of Piscataway 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 5.

Proposed Action	Anticipated Benefits	Responsible Party	Funding or Implementation Mechanism	Timeline	Priority
Elevate/acquire repetitive loss properties	Reduce property loss in high flood areas	Construction Dept/ Engineering	Grants	2-5 years	High
Wet-proof parks building	To improve recovery after flood events	Department of Public Works	Capital/Grants	2-5 years	High
Reduce infiltration/inflow in sewer system	Reduce loading in sewer system to prevent back-ups and flooding in pump stations.	Department of Public Works	Capital/Grants	2-5 years	High



6. Plan Implementation

The LPC shall document, as needed and appropriate:

- Hazard events and losses in Piscataway 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 Piscataway 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 Piscataway'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 Piscataway 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 is provided below, the County's adoption resolution is provided as Appendix X 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 X.

Plan Maintenance

The Township of Piscataway 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. Engineering Supervisor 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 Supervising Engineer 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 Piscataway 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.