



## Appendix 16: City of Perth Amboy

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

### 1. Plan Development

On March 13, 2014, the OEM Coordinator signed an “Intent to Participate” letter as the point of contact for the HMP update. The Police Chief/OEM Coordinator worked with other municipal employees, consultants, volunteers, and other stakeholders through the formation of a Local Planning Committee, as listed below. The local planning committee filled out the municipal worksheets included in Appendix E and worked to gather the necessary information to support the plan update. In addition to the knowledge of the LPC, the Borough’s Master Plan, Redevelopment Plans, Codified Ordinances, Strategic Recovery Planning Report, and Getting to Resilience Report were used in the formation of this appendix. The local planning committee reviewed all drafts of this appendix.

**Table 16-1: City of Perth Amboy Local Planning Committee Members**

Name	Title	Organization
Wilda Diaz	Mayor	City of Perth Amboy
Jillian Barrick	B.A.	City of Perth Amboy
Elaine Jasco	Clerk	City of Perth Amboy
Jamie Rios	Floodplain Admin.	City of Perth Amboy
Ed Scala	Code Official	City of Perth Amboy
Abraham Pitre	Fire Chief/Director	City of Perth Amboy
Larry Cattano	Police Chief/OEM	City of Perth Amboy
Leigh Anne Hindenlang	Land use Planner	City of Perth Amboy
Jill Goldy	CFO/Fiscal Rep	City of Perth Amboy
Frank Dann	Public Works Director	City of Perth Amboy
Scott Powers	EMS/ RBMC	City of Perth Amboy
George and Mary Bonilla	Floodplain Resident	City of Perth Amboy



## 2. Community Profile

### 2.1 Physical Location

The City of Perth Amboy has a total area of 5.96 square miles and is located in the eastern region of Middlesex County, New Jersey. It borders water on two sides: the Arthur Kill to the east and the Raritan River and Raritan Bay to the south. The South Amboy lies across the Raritan Bay and Sayreville lies across the Raritan River. Woodbridge borders Perth Amboy to the north and west.

#### 2.1.1 Hydrography and Hydrology

Perth Amboy City is entirely located within the Raritan River Basin. Its political boundary is defined on three sides by watercourses. To the north, Woodbridge Creek flows into the Arthur Kill, which coincides with the City's eastern boundary. The southern boundary is defined by the Raritan River as it reaches Raritan Bay. Both the Raritan River and Woodbridge Creek are tidally influenced as they flow past the Borough.

### 2.2 History and Governance

The City of Perth Amboy was formally incorporated on Dec. 21, 1784 from what was then Perth Amboy Township and Woodbridge Township. Perth Amboy is governed under the Mayor-Council form of government, and has an elected Mayor and five Council members. The Mayor is elected directly to a four-year term of office. Town Council members are elected to serve four-year terms on a staggered basis, with two or three seats coming up for election every other year. The City 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 50,814.<sup>1</sup> This is a 7.4% increase from 2000. The City of Perth Amboy has a population density of 10,806.8 persons per square mile. It ranks as the most densely populated municipality within the County. Perth Amboy has a majority Hispanic population, second only to Union City in New Jersey.

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<sup>1</sup> U.S. Bureau of the Census. American Fact Finder "Perth Amboy City, NJ". <http://factfinder.census.gov/>. Retrieved 9/4/15.



A summary of major population and household characteristics may be found in the following tables.

**Table 16-2: City of Perth Amboy Population Summary Estimates (2010 Census)<sup>2</sup>**

Population	Quantity	Percent of Municipal Population
Total Population	50,814	100
Median Age	32.4	N/A
17 years and under	13,869	27.3
65 years and over	4,704	9.3
Race		
White	25,541	50.3
Black/African-American	5,358	10.5
Native American/Alaskan Native	561	1.1
Asian	859	1.7
Native Hawaiian/Pacific Islander	27	0.1
Other Race (unspecified)	15,634	30.8
Two or More Races	2,834	5.6
Hispanic or Latino	39,685	78.1

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 16-3: City of Perth Amboy Household Characteristics Summary Estimates (2010 Census)<sup>3</sup>**

Households	Quantity	Percent of Total
Total Households	15,419	100
Family Households (related)	11,454	74.3
Family Households w children under 18	6,160	40.0
Non-Family Households (unrelated)	3,965	25.7
Non-Family Households, living alone	3,130	20.3
Non-Family Households, living alone Male over 65 years	337	2.2
Non-Family Households, living alone Female over 65 years	825	5.4

### 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

<sup>2</sup> Ibid.

<sup>3</sup> Ibid.



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

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

**Table 16-4: City of Perth Amboy Vulnerable Population Estimates (2010)**

Population Type	Population Estimate (2010 Census) <sup>4</sup>
Under 5 years of age	4,003
Under 18 years of age	13,869
Over 65 years of age	4,704
Limited English Proficiency (LEP)	17,998 (equals 38% of population over 5 years old)
Institutionalized	445
Living in Group Quarters	222

Due to the large Hispanic population, Perth Amboy’s website is also translated into Spanish, and there is the option for Polish translation as well. It is important to note that 38% of the population is estimated to have limited English proficiency.

In addition to these statistics, approximately 24.4% of the population lives below the poverty line. The mean household income is \$57,267, with the per capita income at approximately \$19,070 (2013 estimates).<sup>5</sup>

## 2.4 Land Use and Development

According to the 2003 Master Plan for the City, new development is largely constrained by wetland and Special Flood Hazard Areas. As indicated in the NJDEP Land Use/Land Cover data in Table 16-5, the growth of the urban area within the City is relatively static. There is some opportunity for in-fill, but most of the major development going forward will be redevelopment. The City has significant redevelopment efforts that are ongoing, especially to revitalize the waterfront. These efforts, as well as the plans associated with these areas, pre-date Sandy. It has been recommended in the Strategic Recover Planning Report and the Getting to Resilience Plan that the City update these documents to reflect the vulnerabilities to storm surge, sea level rise, and flooding.

<sup>4</sup> Ibid.

<sup>5</sup> U.S. Bureau of the Census. American Fact Finder “Perth Amboy City, NJ”. <http://factfinder.census.gov/>. Retrieved 9/4/15.



**Table 16-5: City of Perth Amboy Land Cover Summary**

Land Cover Class	Percent of Total Land <sup>6</sup>	2002 (acres)	2007 (acres)	2012 (acres)	Percent Change <sup>7</sup>
Agriculture	0	0	0	0	0
Barren Land	2.00%	78.38	140.49	66.08	-15.69%
Forest	4.99%	266.13	171.22	165.10	-37.96%
Urban	81.70%	2582.36	2620.13	2705.72	4.78%
Water	10.18%	338.01	335.16	337.17	-0.25%
Wetlands	1.14%	46.94	44.80	37.73	-19.62%

### 2.4.1 Open Space

The City has over 100 acres of preserved open space within the community. Approximately 25 acres of this open space is along the waterfront within the Special Flood Hazard Area.

### 2.4.2 Buildings and Development

The City of Perth Amboy is in the process of significant redevelopment. Over 70 percent of the housing stock was estimated by the American Community Survey to have been built before 1979. This is likely to decrease as the City continues to experience infill and redevelopment. It is also notable that the City has a majority of renter-occupied homes.

**Table 16-6: City of Perth Amboy Housing Statistics**

Housing Characteristics	Estimate
Total Occupied Housing Units	16,343
Percent Owner-occupied	33.6
Percent Renter-occupied	66.4
Percent built after 2000	14.4
Percent built before 1979	71.5

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

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



## 2.4.4 Recent and Expected Development

Property or Development Name	Type (e.g. Res., Comm., Mixed Use)	# of Units	Address	Parcel ID(s)	Known Hazard Zone(s)	Description/Status of Development
<b>Recent Development from 2011 to Present</b>						
Harbortown (phase 3 &4)	Residential	636	High St	Blocks 353 to blocks 353.07	AE & V Zone	Residential Development (Rental Units) Under Unit Construction
European Homes	Residential	4	Lehigh Street	Lots 1,2 & 3, Block 161	None	Residential – awaiting construction
425 Division St.	Residential/ Commercial	11	425 Division St.	Lots 12-15 & 31-34, Block 224	None	Commercial Warehouse 1 <sup>st</sup> fl., apartments 1 <sup>st</sup> & 2 <sup>nd</sup> floor-awaiting start of construction
Buckeye Terminal	Industrial	N/A	380 Maurer Rd	Lot 1, Block 456; lot 1, Block 461; Lot 1, Block 462	AE & V Zone	Oil/Gas tank farm upgraded former Chevron Property and 104 rail car siding – continued construction
Alfredo Hernandez	Residential/ Commercial	4	State St	Lots 16,17 & 18, Block 249	None	Restaurant on 1 <sup>st</sup> Fl. & 4 apartment on 2 <sup>nd</sup> Fl.- awaiting construction
Willow Pond	Residential	70	Chamberlain St	Lot 1 Block 399.04	None	Residential – under construction
Viridian - eport	Office /warehouse	N/A	High St	Lot 1.02, Block 425; Lot 3.04. Block 426; Lots 1.01,1.03 &1.05, Block 428	AE & V Zone	Office/Warehouse under construction
174 Hall Ave, LLC	Residential	5	Hall Ave	Lots 1, 2.02, Block 350	None	Residential Awaiting start of construction
<b>Known or Anticipated Development in the Next Five (5) Years</b>						
Landings	Residential	Unknown			AE & V Zone	Being redesigned due to part of property in V Zone. Status unknown at this stage.



ETC Towers LLC	Residential/commercial	50	313 State St	Lot 14, Block 126	None	Renovating 10 story high rise, fl 1-5 commercial & fl. 6-10 residential – before zoning board
Various possible Redevelopment Sites	Industrial/Commercial	N/A	Along State St on the northern end of the City		AE & V Zone	Discussion At this Point

## 2.5 Critical Facilities and Infrastructure

### 2.5.1 Essential Facilities

The City owns and operates several facilities including City Hall, Olive Street Community Center, Code Enforcement Facility, Department of Public Works, Municipal Marina, Perth Amboy Community Center, Perth Amboy Health Department, Social Services Building, Electrical Building, a public library, a Public Safety-Youth Complex, two fire stations, and an EMS building. The Municipal Mariana was significantly damaged in Sandy, as were many areas of the waterfront. This was the only public facility that was severely damaged by the storm. No other facilities are located in the Special Flood Hazard Area.

### 2.5.2 Transportation

Primary transportation routes include Routes 440 and Route 35. The Outerbridge Crossing connects Perth Amboy to Staten Island over the Arthur Kill. The Victory Bridge connects Perth Amboy to Sayreville over the Raritan River. New Jersey Transit provides bus service and the New Jersey Turnpike is accessible via Exit 11 in Woodbridge. New Jersey Transit operates a commuter train station and rails in Perth Amboy.

### 2.5.3 Critical Utilities and Infrastructure

Perth Amboy is serviced by PSE&G as its energy supplier. The City reports that service is generally reliable, except the system is vulnerable to outages during a storm event.

The water system for the City is operated under a public/private partnership between the City and United Service Affiliates-Perth Amboy (USA-PA), an operating arm of the Middlesex Water Company.

The majority of the City is a combined sanitary and storm sewer system. The northwestern section of the City has separate sanitary and storm sewers. The City is responsible for the maintenance of this system. The wastewater is treated by Middlesex County Utility Authority.



### 3. Hazard Identification and Risk Assessment

This section describes the natural hazards and risks that can affect the City of Perth Amboy. Like all the other municipalities in Middlesex County, Perth Amboy 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 16-7 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 16-7**  
**City of Perth Amboy**  
**Hazard Identification and Prioritization**

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





## 3.2 Flood Hazard

### 3.2.1 Type, Location, and Extent

The City of Perth Amboy is located in northeast Middlesex County. The Arthur Kill forms the entire eastern border of the jurisdiction; the southern border is formed by the Raritan River at its outfall to Raritan Bay. A relatively large and unnamed stream at the north end of the jurisdiction forms that border.

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 City of Perth Amboy 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 16-1.

Table 16-8 provides some basic floodplain and parcel information for the jurisdiction.

**Table 16-8**  
**Floodplain and Parcel Data for the City of Perth Amboy**  
(Source: FEMA Region II, Coastal Analysis and Mapping, Preliminary FIRM, January 2014)

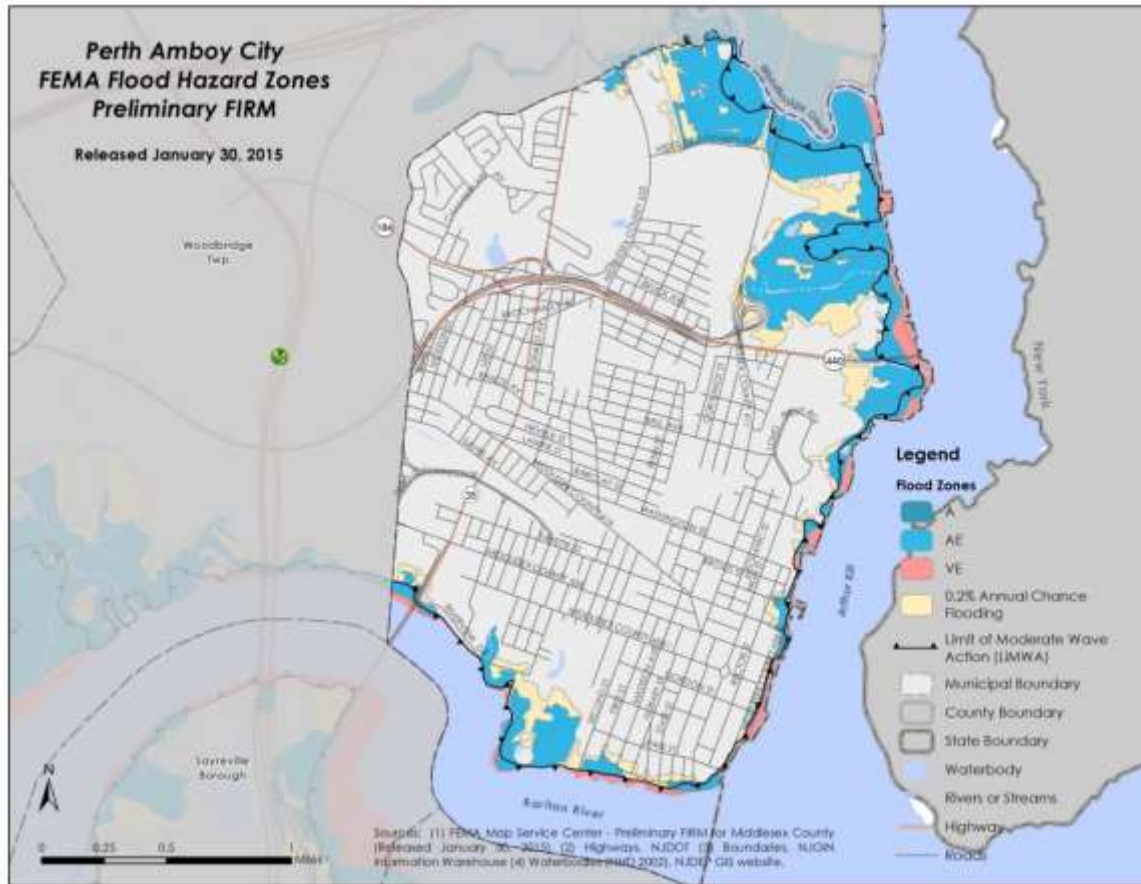
Data Type	Value
Jurisdiction area in square miles	5.17
Square miles within 100-year floodplain	0.93
Jurisdiction area within 100-year floodplain	17.94%
Number of parcels in jurisdiction	14,074
Number of parcels with centroids within 100-year floodplain	237
Parcels with centroids within 100-year floodplain	1.68%

[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. Based on a review of NFIP claims data and floodplain mapping, the extent of flooding in Perth Amboy appears to be very limited except in certain very limited areas, such as Water Street and Front Street, where it is possible for storm surge (such as that experienced in Hurricane Sandy) to produce flood depths of multiple feet.



**Figure 16-1**  
**Perth Amboy portion of FEMA Revised Preliminary Flood Insurance Rate Map**  
(Source: FEMA Region II, Coastal Analysis and Mapping, Preliminary FIRM, January 2014)



### 3.2.2 Previous Occurrences and the Probability of Future Floods

Perth Amboy has been subject to only a few significant floods in the past, although there are several discreet areas where flooding occurs fairly often. The most significant of these is an area of Kelsey Drive, which is near the Spa Spring Creek. Floods occur in that specific location very often, and the probability of them continuing to occur appears to be quite high.



### 3.2.3 Flood Impacts and Vulnerabilities to Flooding

With the exception of two specific and localized areas, Perth Amboy is not particularly susceptible to floods. Even though the community has significant coastal exposure, land rises relatively quickly away from the flood sources (Arthur Kill and the Raritan River/Bay), limiting the amount of floodplain and vulnerabilities to the hazard. However, in the area immediately adjacent to Raritan Bay and on Kelsey Drive, impacts have been significant and repetitive. Most of the ongoing flood vulnerabilities in the community are directly related to these two areas.

### 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. Perth Amboy 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 40 properties in Perth Amboy. Between 1978 and 2015, there have been a total of 37 NFIP insurance claims in Perth Amboy, with a total claims value of \$3,125,778.<sup>8</sup> Table 16-9 compares the number of policies in-force and paid claims in the jurisdiction. The table shows that Perth Amboy comprises less than one percent of the NFIP policies in-force in Middlesex County. However, flood insurance claims in the jurisdiction comprise 2.8% of the County total.

The City of Perth Amboy 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.<sup>9</sup> CRS communities are ranked between 1 and 10, with Class 1 communities receiving a 45% premium discount.

**Table 16-10**  
**NFIP Policies and Claims**

City/County Name	Number of Parcels	Number of Polices In-Force	Number of Claims	Total Paid Claims
City of Perth Amboy	14,074	40	37	\$3,125,778
Middlesex County	283,276	4,489	3,478	\$109,727,837

<sup>8</sup> FEMA – Policy and Claim Statistics for Flood Insurance

<sup>9</sup> FEMA – Community Rating System (CRS).



**Table 16-10**  
**NFIP Policies and Claims**

**Repetitive Loss (RL) Properties:**

Perth Amboy:	3
Middlesex County:	429

**Total Building (RL)**

Perth Amboy:	\$1,037,475
Middlesex County:	\$44,015,885

**Total Contents (RL)**

Perth Amboy:	\$354,927
Middlesex County:	\$5,106,609

**Number of Claims (RL)**

Perth Amboy:	15
Middlesex County:	1,322

**Average Claim (RL)**

Perth Amboy:	\$92,827
Middlesex County:	\$37,158

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

Perth Amboy:	1
Middlesex County:	429

**Total Building (SRL)**

Perth Amboy:	\$37,416
Middlesex County:	\$14,512,761

**Total Contents (SRL)**

Perth Amboy:	\$26,093
Middlesex County:	\$910,122

**Number of Claims (SRL)**

Perth Amboy:	10
Middlesex County:	385

**Average Claim (SRL)**

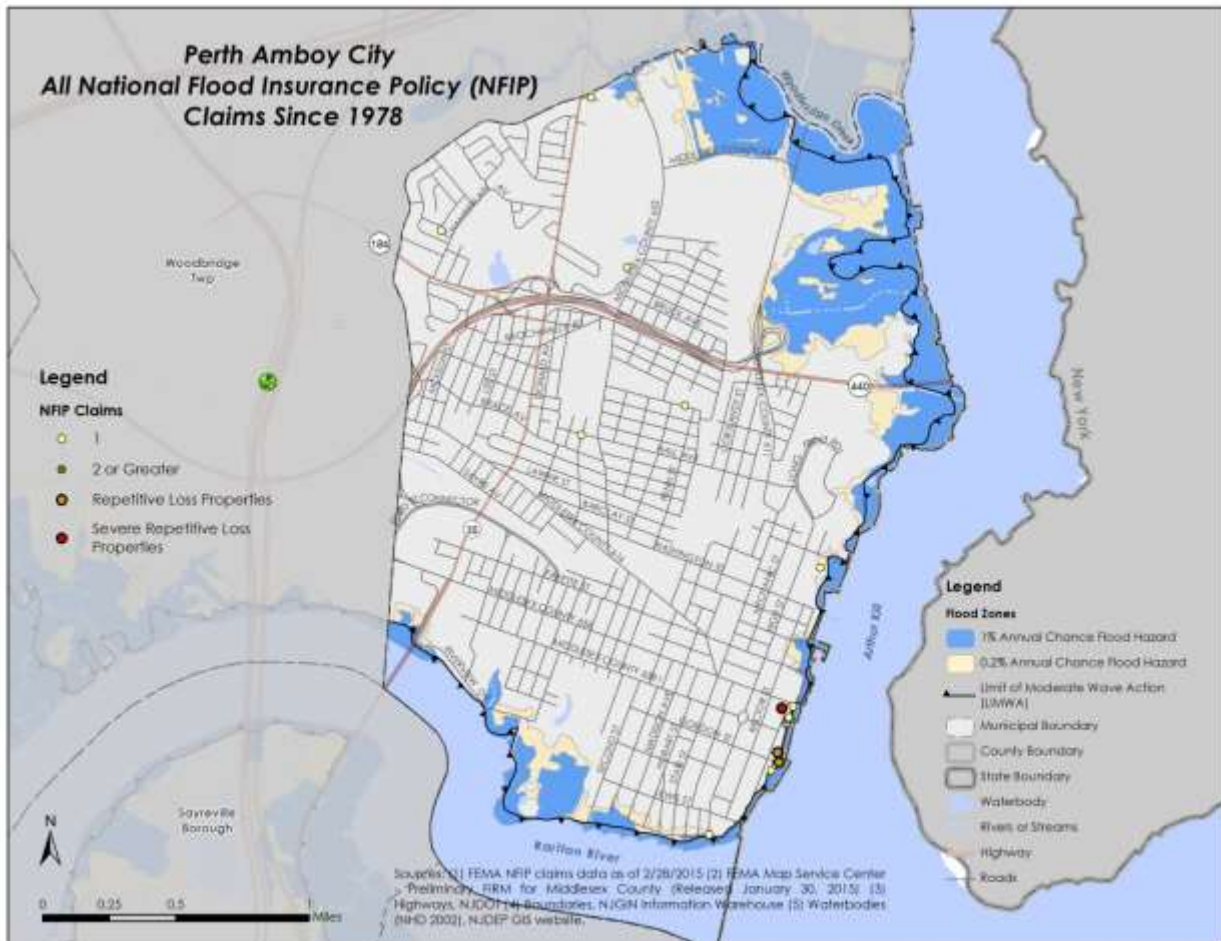
Perth Amboy:	\$6,351
Middlesex County:	\$40,059

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

Figure 16-2 shows all NFIP claims in Perth Amboy between 1978 and 2015. Claims are concentrated in the southeast part of the jurisdiction, predominantly on Water and Front Streets. There is also an area in the northern part of Perth Amboy on Kelsey Avenue that is the site of numerous flood claims. The area is periodically flooded by overbank events from Spa Spring Creek, which crosses this part of the jurisdiction in a generally southwest to northeast direction, draining into an unnamed tributary to the Raritan Bay.



**Figure 16-2**  
**Map of NFIP Claims in the City of Perth Amboy (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 Perth Amboy

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, Perth Amboy has no RL properties. See Section 4 of the County portion of this HMP for more details on repetitive loss properties in the County.

The flood risk assessment in this section is based in part on analysis of NFIP data on repetitive flood loss properties. As of February 2014, Middlesex County had 429 such properties based on a query of the FEMA BureauNet NFIP interface. Of this total, three properties were located within Perth Amboy; this comprises less than one percent of the County total. Table 16-11 provides a comparison of the residential repetitive loss claims for Middlesex County and Perth Amboy. 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 three repetitive loss properties in Perth Amboy were responsible for a total of 15 insurance claims, totaling \$1,392,402. Table 16-11 provides summary repetitive loss statistics for the community.

**Table 16-11**  
**Repetitive Loss Statistics in the City of Perth Amboy and Middlesex County**  
(Source: FEMA National Flood Insurance Program, February 2014)

City/County Name	Properties	Total Building	Total Contents	Total Losses	# of Claims	Average Claim
City of Perth Amboy	3	\$1,037,475	\$354,927	\$1,392,402	15	\$92,827
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 16-12**  
**100-Year Risk Projection for NFIP Repetitive Loss Properties in the City of Perth Amboy**

Data	Value
Period in years	21
Number of claims	15
Average claims per year	0.71
Total value of claims	\$1,392,402
Average value of claims per year	\$66,305
<b>Projected risk, 100-year horizon</b>	<b>\$946,170</b>

### 3.2.6 Flood Risk to Severe Repetitive Loss Properties in Perth Amboy

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, Perth Amboy has two SRL properties.

Table 16-13 provides basic information about the SRL properties in this jurisdiction. SRL properties are also shown graphically in Figure 16-2 above.

**Table 16-13**  
**Statistics on NFIP Severe Repetitive Loss Properties in the City of Perth Amboy**  
(Source: FEMA National Flood Insurance Program, February 2014)

City/County Name	Properties	Total Building	Total Contents	Total Losses	# of Claims	Average Claim
City of Perth Amboy	1	\$37,416	\$26,093	\$63,509	10	\$6,351
Middlesex County	77	\$14,512,761	\$910,122	\$15,422,883	385	\$40,059

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



**Table 16-14**  
**100-Year Risk Projection for NFIP Severe Repetitive Loss Properties in the City of Perth Amboy**

Data	Value
Period in years	21
Number of claims	10
Average claims per year	0.48
Total value of claims	\$63,509
Average value of claims per year	\$3,024
<b>Projected risk, 100-year horizon</b>	<b>\$43,156</b>

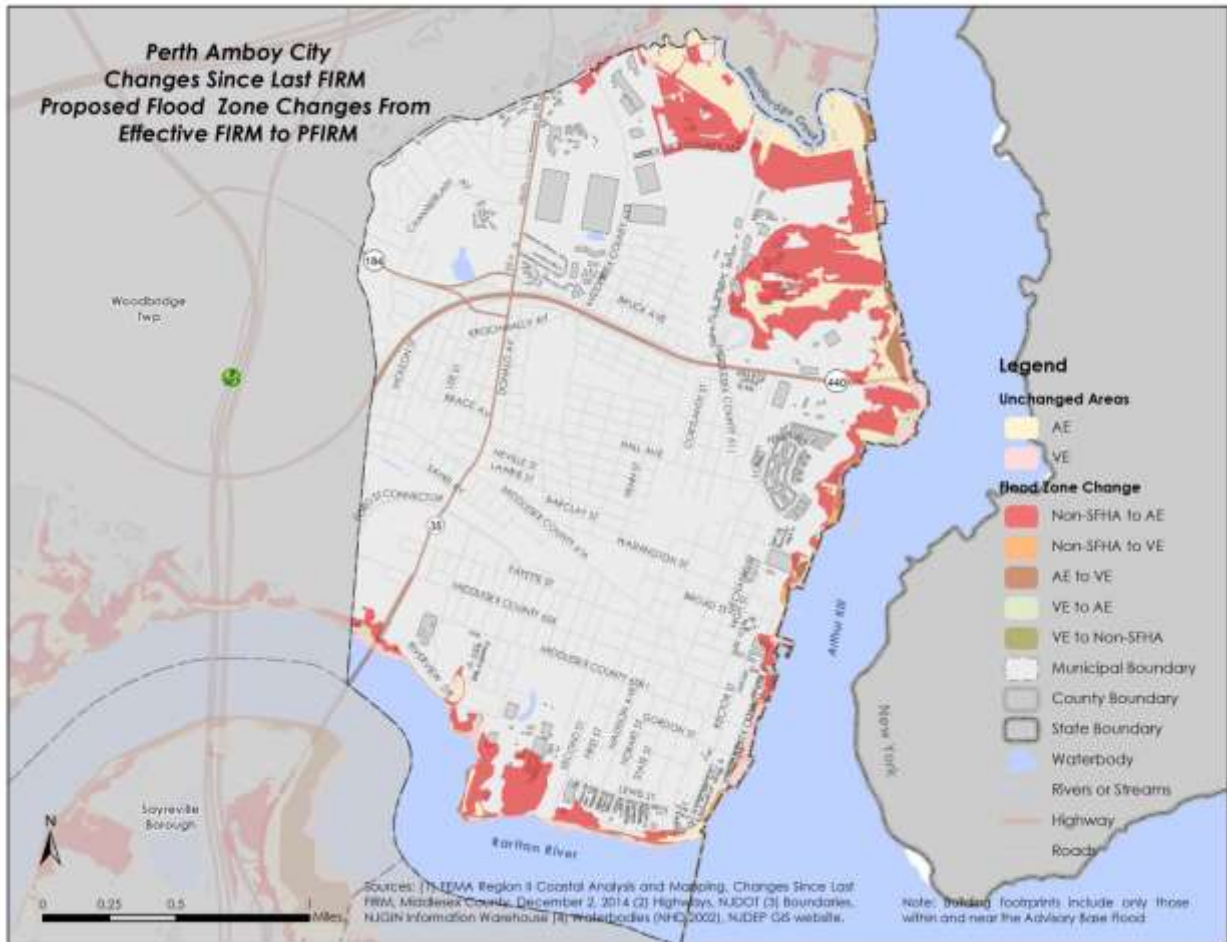
### 3.2.7 Changes in Floodplain Boundaries

Prior to Sandy in 2012, FEMA had begun a coastal flood study to update Flood Insurance Rate Maps (FIRMs) and Flood Insurance Study (FIS) reports for portions of New York and New Jersey, including Middlesex County, using improved methods and data to better reflect coastal flood risk. Much of the resulting information is publicly available from the [FEMA Region II Coastal Analysis and Mapping](#) website. Figure 16-3 below indicates changes in various flood zones in South Amboy. The Changes Since Last FIRM (CSLF) dataset compares information shown on the preliminary FIRM with that of the effective FIRM. This includes a comparison of the floodplain boundaries and zones, Base Flood Elevation changes, and where applicable, the regulatory floodway. See the main body of the 2015 Middlesex County Plan update (Section 3.3.7) for additional information about the CSLF dataset.





**Figure 16-3**  
**Changes in Floodplain Boundaries in the Borough of Perth Amboy**  
(Source: FEMA Region II, Coastal Analysis and Mapping, Preliminary FIRM, September 19, 2014)



### 3.3 Storm Surge

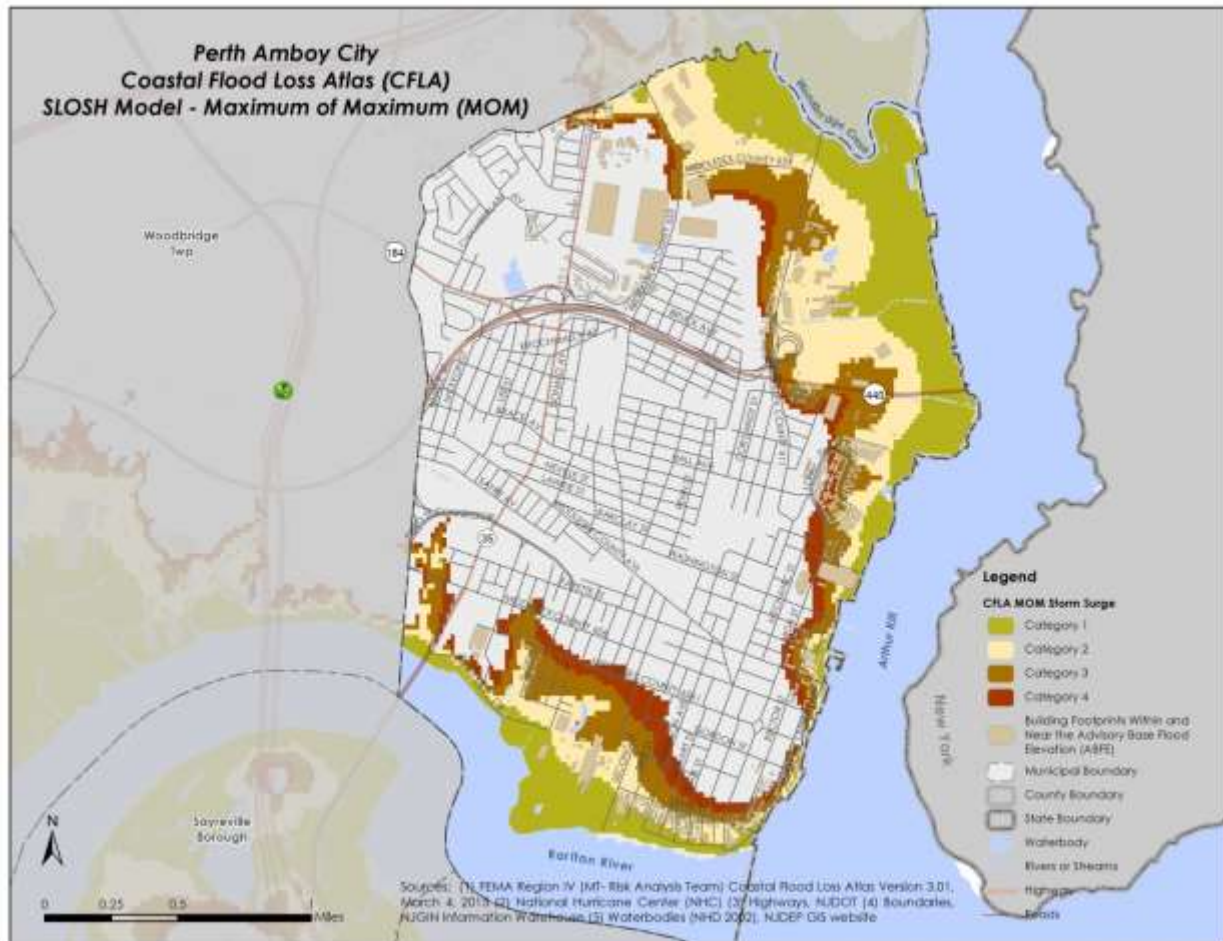
Of the 25 jurisdictions in Middlesex County, 13 have some risk from storm surge, including Perth Amboy, due to its exposure to Arthur Kill, the Raritan River and Woodbridge Creek to the north. All of these sources have the potential to produce surge effects under the right circumstances. It is useful 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.

Figure 16-4 is a map of storm surge zones 1 through 4 in Perth Amboy. Although areas in the northeast part of the jurisdiction appear very susceptible to various categories of surge, these are largely low-lying commercial properties (tank farms) that are not the responsibility of the City. There is a relatively wide



area at the south end of the jurisdiction that would clearly be impacted by nearly every surge category. The effects of sea level rise are likely to exacerbate this effect in the future.

**Figure 16-4**  
**Map of Storm Surge Zones, Categories 1-4, City of Perth Amboy**  
(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 Perth Amboy. 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 16-15**  
**Storm Surge Exposure Statistics for the City of Perth Amboy**  
(Source: FEMA Region IV, Coastal Flood Loss Atlas (CFLA) SLOSH – March, 2014, County GIS)

Storm Surge Category	Square Miles Impacted	Parcels Exposed
1	0.69	180
2	1.26	871
3	1.66	1,943
4	1.86	2,506

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 16-16**  
**Assumptions for Storm Surge Risk Assessment, City of Perth Amboy**

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 16-17**  
**Flood Risk in Storm Surge Scenarios, City of Perth Amboy**

	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	180	871	1,943	2,506
Scenario risk	\$23,490,000	\$113,665,500	\$253,561,500	\$327,033,000
Annual risk	\$469,800	\$1,136,655	\$1,267,808	\$327,033
100-year risk	\$6,704,046	\$16,220,067	\$18,091,613	\$4,666,761



## 3.4 Hurricanes and Tropical Storms Hazard

Based on input from the hazard ranking process, Perth Amboy 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 16-18 show a range of loss categories across the top row versus "occupancy classes" on the first column. The occupancy classes are various land uses that are represented in HAZUS. The last two columns indicate the projected 50-year and 100-year risks, i.e. the total amount of damage over those planning horizons. The figures are based on annualizing losses, then discounting them to present value using the software. There is more detailed information about the calculations and 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 16-20 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 16-18**  
**Probabilistic Wind Risk in Perth Amboy, 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	17,933,439	\$415,572	\$81,876	\$0	\$29,592	\$24	\$26,377	\$57
Commercial	4,102,145	\$46,197	\$22,349	\$550	\$7,599	\$4,884	\$4,137	\$5,479
Industrial	1,567,500	\$15,480	\$11,898	\$1,597	\$1,113	\$198	\$198	\$316
Agricultural	26,006	\$274	\$143	\$17	\$42	\$3	\$2	\$1
Religious	389,572	\$4,935	\$1,936	\$0	\$693	\$314	\$61	\$738
Government	111,006	\$1,157	\$616	\$0	\$261	\$11	\$73	\$811
Education	173,176	\$1,731	\$787	\$0	\$313	\$65	\$13	\$154
<b>Totals</b>	<b>24,302,844</b>	<b>\$485,345</b>	<b>\$119,605</b>	<b>\$2,165</b>	<b>\$39,613</b>	<b>\$5,500</b>	<b>\$30,861</b>	<b>\$7,555</b>

**Table 16-19**  
**Probabilistic Wind Risk in Perth Amboy, 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	\$553,498	\$7,638,825	\$7,897,862
Commercial	\$91,194	\$1,258,572	\$1,301,251
Industrial	\$30,800	\$425,072	\$439,486
Agricultural	\$483	\$6,661	\$6,887
Religious	\$8,676	\$119,739	\$123,799
Government	\$2,930	\$40,437	\$41,809
Education	\$3,062	\$42,264	\$43,697
<b>Totals</b>	<b>\$690,643</b>	<b>\$9,531,570</b>	<b>\$9,854,791</b>

**Table 16-20**  
**FEMA Public Assistance Expenditures in Tropical Storm Irene and Hurricane Sandy, by Category**  
(Source: FEMA Region II, Public Assistance)

Event Name/Public Assistance Category	A	B	C	D	E	F	G	Total
Tropical Storm Irene	\$48,939	\$95,116	\$2,878	\$0	\$1,562	\$31,938	\$0	\$180,433
Hurricane Sandy	\$191,642	\$1,606,728	\$17,912	\$0	\$119,375	\$394,983	\$7,014,648	\$9,345,288
<b>Total</b>	<b>\$240,580</b>	<b>\$1,701,845</b>	<b>\$20,790</b>	<b>\$0</b>	<b>\$120,937</b>	<b>\$426,920</b>	<b>\$7,014,648</b>	<b>\$9,525,721</b>



## 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	YES	
Capital Improvements Plan	YES	
Floodplain Management / Basin Plan	YES	
Stormwater Management Plan	YES	CHAP. 383, 384 CITY ORDINANCE
Open Space Plan		
Stream Corridor Management Plan		
Watershed Management or Protection Plan	YES	CHAP. 383, 384 CITY ORDINANCE
Economic Development Plan		
Comprehensive Emergency Management Plan	YES	
Emergency Operation Plan	YES	
Post-Disaster Recovery Plan	NO	
Transportation Plan	YES	EOP
Strategic Recovery Planning Report	YES	
Zoning Ordinance	YES	SECTION 430
Subdivision Ordinance	YES	
NFIP: Cumulative Substantial Damages	YES	SECTION 430
Growth Management Ordinances		
Site Plan Review Requirements	YES	
Stormwater Management Ordinance	YES	
Municipal Separate Storm Sewer System (MS4)	NO	
Combined Sewer Overflows (CSO)	YES	
Natural Hazard Ordinance		
Post-Disaster Recovery Ordinance	NO	
Real Estate Disclosure Requirement		
Other [Special Purpose Ordinances (i.e., sensitive areas, steep slope)]		

### 4.1.2 Staff/Personnel

Resources	Is this in place? (Y/N)	Department/ Agency/Position
Planning Board	YES	
Mitigation Planning Committee	NO	
Environmental Board/Commission	NO	
Open Space Board/Committee	NO	
Economic Development Commission/Committee	YES	
Maintenance Programs to Reduce Risk		
Mutual Aid Agreements	YES	INDIVIDUAL DEPARTMENT/ OEM
Planner(s) or Engineer(s) with knowledge of land development and land management practices	YES	



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	YES	
Planners or engineers on staff with a strong understanding of natural hazards	YES	
NFIP Floodplain Administrator	Yes*	CODE ENFORCEMENT JAMIE RIOS
Surveyors	YES	
GIS layers and maps	YES	
Personnel trained in GIS	YES	
Personnel trained in HAZUS		
Emergency Manager	YES	
Grant Writer	YES	
Staff with expertise in cost/benefit analysis	YES	
Professionals trained in conducting damage assessments	YES	

#### 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)	IN PROGRESS		
Building Code Effectiveness Grading Schedule (BCEGS)			
Public Protection (ISO Fire Protection Classes 1 to 10)	YES	4	01/27/14
Storm Ready	YES		
Firewise	NO		
Disaster/Safety Programs in/for Schools	YES		
Organizations with Mitigation Focus (advocacy group, non-government)	YES	COUNTY	
Public Education Program/Outreach (through website, social media)	YES		
Public-Private Partnerships	YES		

#### 4.1.4 Fiscal Capabilities

	Yes/No
Do you have a line item in your operating budget for mitigation project funding?	
If no, will you look at mitigation actions when allocating funding in the future?	
Do you have a line item in the Capital Improvement Budget for mitigation project funding?	
Have you provided funding for mitigation projects identified in the hazard mitigation plan?	
Does your town have the authority to Levy Taxes for specific purposes?	
Does your town have user fees for water, sewer, gas or electric service?	
Do you impose impact Fees for homebuyers or developers of new development/homes?	
Does your community have an open space acquisition fund?	
Do you use bonds to finance projects (general obligation bonds, special tax bonds, private activity bonds)	



## 5. Mitigation Strategy

This section describes what projects, initiatives, and other actions the City 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.

Action	Status	Responsible Party	Estimated Cost	Funding or Implementation Mechanism	Timeline	Priority
Shelter enclosure/wind screen to protect critical response equipment at Municipal Marina	Has not been completed due to lack of funding. Will be pursued in the future	Perth Amboy	\$100,000	PDM-C & HMGP	6 months	High

### 5.2 Other Mitigation Activities

The City is working on several efforts to reduce its risk to future storm events. These include an update to the City’s Master Plan, which incorporates information regarding its risk and vulnerability to natural hazards in its land use planning. The City is also continuing efforts to ensure power duplicity at critical facilities and utilities. The City secured an HMGP grant for a generator for the Senior Center as a Primary Shelter location. Additionally, the City is currently working on entering the CRS program. It had a Community Assistance Visit in 2015.

### 5.3 Proposed Mitigation Actions

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





Proposed Action	Anticipated Benefits	Estimated Cost	Responsible Party	Funding or Implementation Mechanism	Timeline	Priority
Working with NJDEP develop a public outreach program to educate communities and residents that are subject to inundation as a result of storm surge	Improve resident capacity to mitigate for storm surge risk and prepare for hazard events	Staff time	OEM	Existing resources		High
Use Storm Surge map from HMP or United States Army Corps for community outreach and education	Improve knowledge and capacity by using best available data	Staff time	Engineering/ OEM	Existing resources		High
Conduct all-hazards public education and outreach program for hazard mitigation preparedness	Improve awareness and capacity	Staff time	OEM	Existing resources		High
Update all Waterfront Redevelopment Plans to incorporate resiliency to storm surge and flood risk	Reduce future risk to new development and redevelopment projects	Staff time	Planning	Existing resources		High
Elevation or acquisition of homes at risk for repetitive flooding or severe storm surges	Reduce risk to existing structures from future storms	Varies	Engineering	Grants		High
Reinforce Landings seawall	Reduce risk to existing structures		Engineering	Capital		High



## 6. Plan Implementation

The LPC shall document, as needed and appropriate:

- Hazard events and losses in Perth Amboy 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 City.
- Copies of any grant applications filed on behalf of the City

### Continued Public Input

The City of Perth Amboy 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 City of Perth Amboy's LPC shall ensure that:

- Copies of the latest approved Plan are available for review at City 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 City of Perth Amboy will post a notice on the City's website and invite the public to review and comment.
- For major changes involving City Council approval, the City 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 City Council approved the plan on [insert date]. The City 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 City of Perth Amboy 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 City retains the discretion to implement minor changes to the document without formal procedures involving the City Council subject to local policies and regulations.

In addition to the annual progress report, the City of Perth Amboy 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.