Appendix 3: Township of Cranford

This appendix is part of the 2016 Union County Hazard Mitigation Plan (HMP) update, and includes only jurisdiction-specific information about the Township of Cranford, which is one of the 20 municipalities within Union County that is participating in the plan update. Union County led the planning process and outreach for this update. For a detailed description of the planning process and the public outreach efforts for this update, see Section 3 of the 2016 HMP.

1. Planning Process and Participation

The County formed a Steering Committee, which was responsible for key decisions during the plan update. This committee sent a letter to the Mayor of each municipality within the County. The Mayors and local officials selected a single individual to represent the town in the broader process. This person was the point of contact for the plan update, but worked with other municipal employees, consultants, volunteers, and other stakeholders throughout the planning process. This collection of participants, considered the local planning committee, is listed below. The committee was responsible for various decisions that informed the development of this appendix, including: prioritizing the natural hazards that can affect the community, reviewing and prioritizing the mitigation actions that are included in Table 3-1, and informing community leaders about the status of the County mitigation plan update, including this appendix

Table 3-1
Township of Cranford Planning Committee Members

Name	Title	Organization
Terence Wall	Township Administrator	Township of Cranford
Steve Wardell	Public Works Superintendent	Township of Cranford
Richard Belluscio	Construction Code Official	Township of Cranford
James Wasniak	Police Chief	Township of Cranford
Carl O'Brien	Township Engineer	Maser Consulting, P.A.
Brett Peskin	Project Manager	Maser Consulting, P.A.

2. Community Profile

The Township of Cranford has a total area of 4.87 square miles and is located in central Union County, New Jersey. Major transportation routes passing through Cranford include Route 28 and the Garden State Parkway, as well as a NJ Transit Rail Line, including a commuter station.

As of 2010, the population was estimated at 22,430[1]. This is a 0.65% decrease from the 2000 population of 22, 578.[2] Figure 3-1 is a map of the Township of Cranford. See Section 2 of the 2016 Plan update for a map of Union County.

The location of Cranford was once part of the Minnisink Trail long the Rahway River that was used by Indian tribes to hunt and trade[3]. As the area was settled, mills were established along the river, providing grain to soldiers in the Revolutionary War. Over time, the farms were replaced with development and Cranford has retained its role as a transportation hub. Today Cranford is characterized as a residential community with a large commuter base.

The Township of Cranford was incorporated on March 14, 1871, created from portions of neighboring Union County municipalities. Cranford operates under a "Committee" form of governmental organization. There are five commissioners elected for three year terms and they determine the mayor and deputy mayor. The Mayor and Deputy Mayor each serve one year terms. The remaining commissioners administer departments and municipal operations. There is also a Township Administrator and department heads to oversee municipal business.

2.1 Land Use and Development

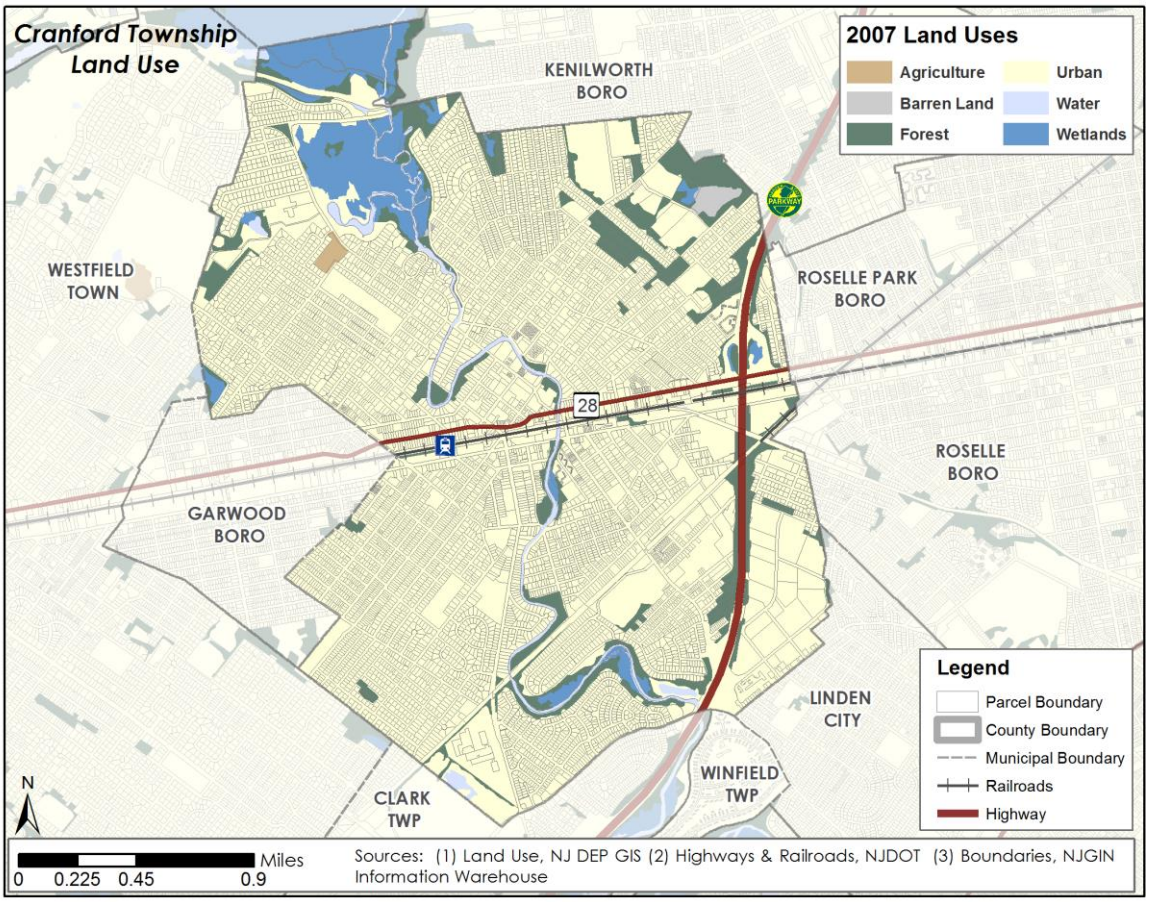
Cranford is a community of mixed use development, with 83.85 percent of its 4.87 square miles classified as urban/developed. Over 89 percent of the parcels within Cranford are classified as residential, based on tax assessment data. Between 2004 and 2012, 309 building permits were issued for residential homes within the Township. This is 3.76 percent of the total building permits issued for Union County during this time period. Just over 48 percent of these permits were for 1- and 2-family homes. Cranford has a population density of 4645 people per square mile. The 2010 census estimates that 18.5 percent of the housing within the Township was renter-occupied, lower than the County average of 30.5 percent renter-occupied properties.

[1] Township of Cranford: *Statistics*. http://www.cranford.com/township/display.asp?choice=10 Retrieved 10/9/14.
[2] U.S. Dept. of Commerce, Bureau of the Census. *Table DP-1 Profile of General Demographic Characteristics*. http://censtats.census.gov/data/NJ/0603403915640.pdf Retrieved 10/9/14.
[3] History of Cranford, New Jersey. *Highlights of Cranford History*. http://www.cranford.com/history/highlights.asp?choice=4 Retrieved 10/9/14.

Table 3-2
Land Use/Land Cover Trends (*NJDEP GIS, 2007*)

Land Cover Class	2002	2007	Percent Change	Percent of Total Land[4]
Agriculture	6.29	6.29	0.00%	0.20%
Barren Land	8.99	9.52	5.89%	0.31%
Forest	267.93	260.64	-2.72%	8.36%
Urban	2,607.13	2,613.87	0.26%	83.85%
Water	57.09	57.22	0.23%	1.84%
Wetlands	170.06	169.95	-0.06%	5.45%

Figure 3-1
Land Use/Land Cover Map,
Township of Cranford



[4] Uses the 2007 land cover values

3. Hazard Identification and Risk Assessment

This section of the Cranford Township mitigation plan appendix describes the natural hazards and risks that can affect the community. It should be noted that -- in accordance with FEMA requirements -- only the hazards with aspects that are unique to the community are included in detail in this appendix.

3.1 Background and Hazard Rankings

Like all the other jurisdictions in Union County, the Township of Cranford is potentially subject to the effects of all the hazards that are considered in this mitigation plan. However, the majority of these hazards have minimal impacts on the area, and are discussed in detail in the County part of the 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 Union County HMP update includes separate appendices for each jurisdiction, this requirement is met in the appendices, while risks that affect the entire County uniformly are discussed in the County part of the HMP.

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. Jurisdictions ranked the list of hazards as either high, medium, low, or no concern.

Table 3-3 shows Cranford's hazard rankings. The level of discussion and detail about specific hazards in this section are based on these rankings. Hazards that are ranked *high* include the most detail, and to the extent possible include probabilistic assessments of risk, i.e. likely future damages in the community based on the likelihood of occurrence. Hazards that are ranked *medium* have less detail and may in some cases refer to the main part of the county mitigation plan; they usually do not have probabilistic risk assessments, although potential future losses are discussed based on best available data. Hazards ranked *low*

Table 3-3
Township of Cranford Hazard Identification and Prioritization

Hazard	Priority
Dam failure	High
Erosion	High
Flood	High
Extreme temperature – cold	Med
Extreme temperature – heat	Med
Severe storm – winter weather	Med
Drought	Low
Earthquake / Geological	Low
Hail	Low
Hazmat release – fixed site	Low
Hazmat release – transportation	Low
High wind – tornado	Low
Ice storm	Low
Landslide (non-seismic)	Low
Severe storm – lightning	Low
Storm surge	Low
Straight-line winds	Low
Wildfire	Low

**Only the hazards ranked high and medium are analyzed in this appendix*

and *none* are not addressed in this jurisdictional appendix because they are discussed in the County part of the HMP, and there are no significant differences in risk between the County and the municipality.

3.2 Dam Failure

3.4.1 Type, Location and Extent

There are no high-hazard or significant hazard dams within the Township or immediately upstream in adjacent towns, but the Township is concerned about dam failure due to previous history of overtopping of impoundments on the Rahway within Cranford. Specifically, the Township is concerned about the existing earthen levee/dike between Nomahegan Park and Springfield Ave. Due to land use and topography within the Township, any additional overflow from the Rahway results in dangerous and often destructive flooding.

3.4.2 Previous Occurrences and the Probability of Future Events

There are not records of the previous occurrences of overtopping from this impoundment. There is no history of dam failure and all of the dams within the Township are inspected to New Jersey State standards. The levee/dike needs to be modified to reduce potential for future events. Due to the lack of records on previous occurrences, it is not possible to predict the probability of future events at this time.

3.4.3 Impacts and Vulnerability

The impoundment between Nomahegan Park and Springfield Ave on the Rahway is adjacent to residential development. The overtopping has been associated with flooding along Balmiere Parkway and adjacent neighborhoods, where there are several repetitive loss properties.

3.3 Erosion

3.4.1 Type, Location and Extent

The Township of Cranford has ranked erosion, meaning riverine and not coastal erosion, as a high hazard because of its imminent concern within the Township. The image to the right is along the Rahway, within the Township, and shows the potential damage from continued erosion along the streambanks. There are several sections of the Rahway throughout Cranford that have experienced erosion and need stabilization. However, there is not a record or accounting of all of these areas.

3.4.2 Previous Occurrences and the Probability of Future Events

Riverine erosion is a naturally occurring process within a streamshed and therefore will continue to happen within the Township. There are no records of previous occurrences within the Township. Cranford is actively working to address concerns through its mitigation strategy.

3.4.3 Impacts and Vulnerability to Erosion

Albeit erosion is listed as a hazard of high concern on municipal level, there is limited information on actual riverine erosion hazard. More information is needed to perform proper risk assessment of erosion hazard in Cranford. The erosion can result in subsidence of land and property, which may result in damage. However, it also causes deposition of sediment and debris that can constrict flows and exacerbate flooding.

Figure 3-2
Erosion along the Rahway,
Township of Cranford (*Credit: Kelly O'Brien***)**

3.4 Flood Hazard

3.4.1 Type, Location and Extent

As shown in Figure 3-3 below, the majority of the flood zones in Township of Cranford are concentrated around Rahway River, which joins with Nomahegan Brook at the northern boundary of the jurisdiction and then slowly meanders in the general southeastern directions. Most of the flooding around Rahway River occurs in its northern reach, with the low lying terrain and very wide 100-year and 500-year floodplains. The flooding is further exacerbated on Rahway River's western bank by College Branch, the tributary with its own substantial floodplain. In the middle reach, Rahway is joined by two tributaries: Gallows Hill Road Branch and Garwood Brook, whose confluences also widen the Rahway floodplain and cause additional flooding. Garwood Brook carries the floodwater eastwardly from the Garwood Township, but also causes substantial flooding in Cranford jurisdiction, due to a conveyance constriction under the Conrail Raiload tracks. In its lower reach, Rahway River's floodplain is not as wide, but the additional flooding comes to individual properties as a result of drainage problems along smaller, unnamed streams and drainage channels.

The number of flood insurance claims (1,302) and the average amount of the claims ($31,001) in Cranford suggests a very high level of vulnerability to floods in this community, in terms of both the numbers of claims versus the overall number of parcels (8,305) and the presumed severity of flooding based on the claims amounts.

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. The effective FIRM date for Union County is September 20th, 2006. There are Preliminary FIRM maps available for Union County, as of January 30th, 2015. The area within Cranford was not studied during this plan update and the Preliminary FIRM shows no change from the Effective FIRM.

Current FEMA guidance uses the term extent as analogous to potential severity. Compared to most other jurisdictions in Union County, Cranford has few flooding sources, but relatively large area of floodplain. Although it is difficult to deduce potential severity accurately, it is safe to assume that the extent of flooding in Cranford is relatively high; in more severe events such as tropical cyclones and nor'easters some areas along the upper reach of Rahway River and along the Township boundary with Garwood can expect to have more severe flooding.

Table 3-4 shows the number of parcels in The Township of Cranford with at least 60% of their area in the 100-year (1% annual) and 500-year (0.2% annual) floodplain. Although these figures offer some insight into the flood hazard in this jurisdiction, they are not particularly reliable as a risk indicator because in many cases structures and infrastructure (where the risk-producing impacts occur) are not located in the specific areas that are in the floodplain.

Table 3-4:
Flood-prone Properties

Flood hazard area	Number of Parcels
100-year (1%) floodplain	496
500-year (0.2%) floodplain	734

3.4.2 Previous Occurrences and the Probability of Future Floods

Minor flooding occurs in the Township of Cranford at least annually, although the severity of these frequent events is not significant. As discussed in the main (County) section of the mitigation plan, more significant events like tropical cyclones and nor-easters occur every few years (section citation to main plan), and can result in significant flooding. Notwithstanding the potential effects of climate change on weather patterns, the Township can probably expect to experience some level of flooding every year or two, with more significant events happening every five to ten years on average. A basic review of NFIP claims for Cranford shows a wide range of claims dates, with high concentrations related to the remnants of Hurricane Floyd in 1999, Nor'easter of 2007 and Hurricane Irene in 2011. The main County HMP includes more information about events that have impacted this area.

3.4.3 Flood Impacts and Vulnerability to Flooding

As discussed elsewhere, flood impacts in Cranford Township are very high, based on various metrics such as NFIP claims, FEMA PA Program Project Worksheets, and the known history of flooding. There is some history of flood damage to critical facilities and infrastructure in the jurisdiction, namely the Cranford First Aid Squad, the dike system, in addition to some municipal and educational buildings. The most vulnerable parts of the community are those that are in or adjacent to the floodplains of the Rahway and the tributaries mentioned above. Although the majority of flood insurance claims in this community are not categorized as repetitive losses, there are nevertheless a significant number of repetitive claims on properties north of Route 28 in the wide floodplains of Rahway River and its tributaries. There are additional clusters of flood insurance claims along the Cranford-Garwood jurisdictional boundary, as well as some additional repetitive loss properties on the lower reach of Rahway River, between Route 28 and Garden State Parkway. As shown in Table 3-5 below, the jurisdiction has had 1,302 NFIP claims since 1978, by far the highest number compared to other jurisdictions in Union County. The average amount of claims is also extremely high at $31,001, although this stems from the fact that several very significant events were responsible.

3.4.4 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). The U.S. Congress established the NFIP with the passage of the National Flood Insurance Act of 1968. The NFIP is a Federal program enabling property owners in participating communities to purchase insurance as a protection against flood losses in exchange for State and community floodplain management regulations that reduce future flood damages. Participation in the NFIP is based on an agreement between communities and the Federal Government. If a community adopts and enforces a floodplain management ordinance to reduce future flood risk to new construction in floodplains, the federal government will make flood insurance available within the community as a financial protection against flood losses. The Township of Cranford has been a member of the NFIP since 1971. Below is

Figure 3-3
Effective FIRM, Township of Cranford

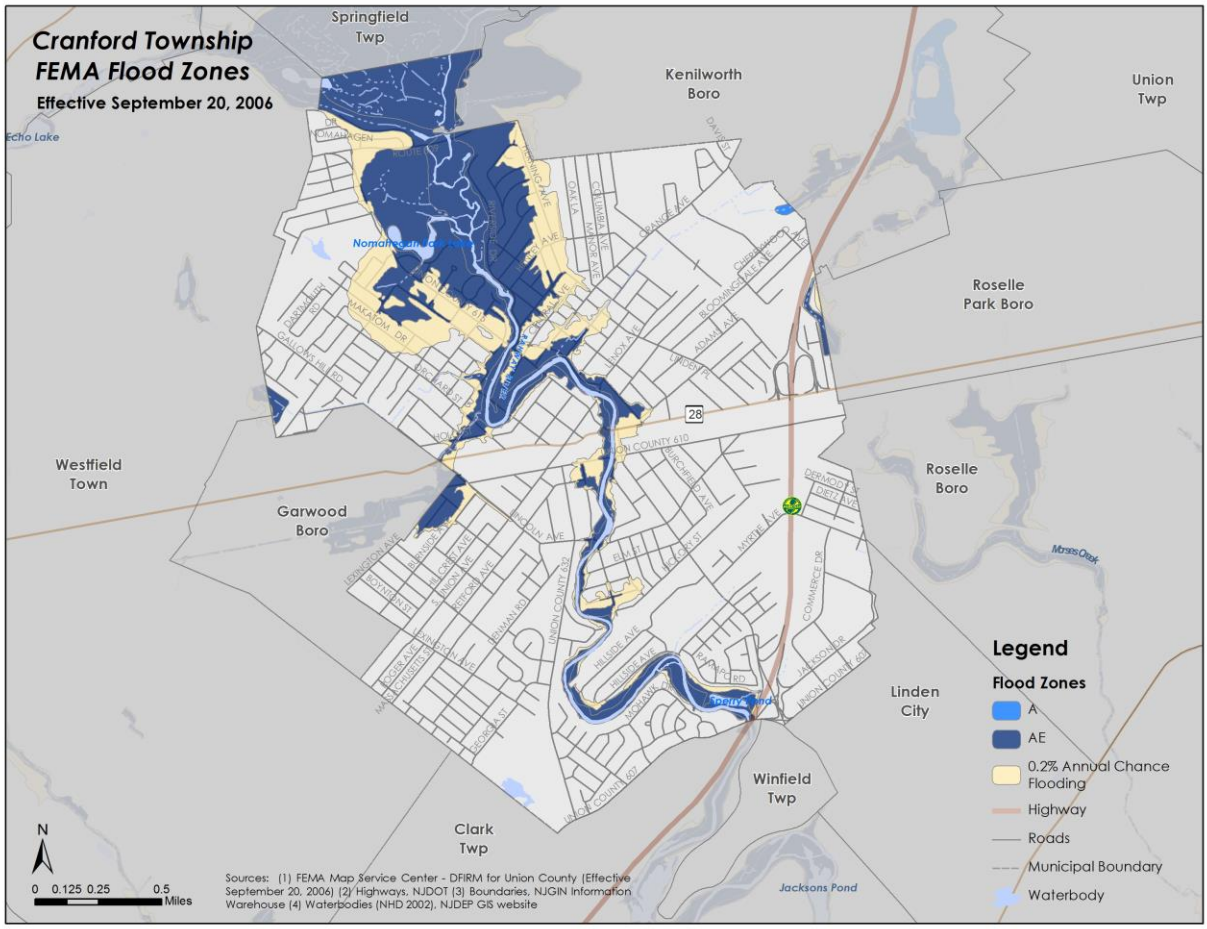


Table 3-5
NFIP Policies and Claims

Number of Parcels:	
Cranford:	8,305
Union County:	147,302
Number of Policies In-Force:	
Cranford:	860
Union County:	6,009
Number of Claims:	
Cranford:	1,302
Union County:	5,560
Total Paid Claims	
Cranford:	$40,366,800
Union County:	$96,782,279
Repetitive Loss Properties:	
Cranford:	287
Union County:	707
Total Building	
Cranford:	$26,702,810
Union County:	$46,560,646
Total Contents	
Cranford:	3,649,677
Union County:	$46,560,646
Number of Claims	
Cranford:	842
Union County:	2,061

FEMA NFIP statistics indicate that as of February 2014, federal flood insurance policies were in-force on 855 properties in the Township of Cranford. This represents a dollar value of property and contents coverage totaling $221,891,700. Between 1978 and 2014, there have been a total of 1,302 NFIP insurance claims in the Township of Cranford with a total claims value of $40,366,800. Table 3-5 compares the number of policies in-force and paid claims in the jurisdiction. The Table shows that Cranford comprises 14.3% of the NFIP policies in-force in Union County.

The Township of Cranford is not a member of FEMA's Community Rating System (CRS), a voluntary program for communities participating in the NFIP. The CRS is an incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. For CRS participating communities, flood insurance premium rates are discounted in increments of 5% based on creditable activities. CRS communities are ranked between 1 and 10, with Class 1 communities receiving a 45% premium discount.

It should be noted that NFIP claims are not a direct or completely accurate proxy for flood risk in a community. The data does not include flood damages to structures that had no flood insurance. Also, in some cases, structures or contents may have been underinsured. The NFIP claims data also does not 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.

FEMA requires a discussion of NFIP Repetitive Loss and Severe Repetitive flood loss statistics in hazard mitigation plans. The NFIP defines repetitive loss properties as those with two or more claims of more than $1,000 each during any rolling ten-year period.

The flood risk assessment method is based on analysis of NFIP data on repetitive flood loss properties The NFIP defines repetitive loss (RL) properties as those that have received at least two NFIP insurance payments of more than $1,000 each in any rolling ten-year period. As of February 2014, Union County had 707 such properties based on a query of the FEMA BureauNet NFIP interface. Of this total, 287 were located within Cranford; this comprises almost 41% of the County total. Table 3-5 provides a comparison of the residential repetitive loss claims for Union County and The Township of Cranford. 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 Township of Cranford has properties, and the total of claims on them is relatively small.

In general, the RL claims can be broken down by focusing on specific areas in the jurisdiction where flood losses are concentrated. For the reasons of practicality, the areas of concentration are defined as streets with three or more repetitive loss properties. Table 3-6 provides a summary of the streets with the most cumulative repetitive loss flood insurance claims in Cranford. The table includes the building, contents, and total claims data for the properties. Address data about individual sites is omitted for reasons of confidentiality.

Table 3-6
Flood-prone Properties

Street Name	# Claims	Average
Riverside Drive	72	$50,232
Edgar Avenue	54	$48,774
Glenwood Road	52	$36,826
Belmont Avenue	28	$60,866
Richmond Avenue	41	$37,503
Venetia Avenue	22	$68,128
Balmiere Parkway	64	$21,286
Hampton Street	25	$50,551
Central Avenue	32	$38,990
Doering Way	26	$42,159
Franklin Avenue	32	$33,797
Springfield Avenue	44	$24,257
Brookdale Road	29	$35,279
Henley Avenue	29	$34,410
Claremont Place	28	$35,626
Park Drive	21	$43,299
Normandie Place	23	$34,880
Crescent Place	29	$26,906
Summit Road	16	$45,552
Willow Street	30	$21,918
Edgewood Road	33	$18,694
West End Place	16	$26,650
Kensington Avenue	10	$41,281
Forest Avenue	10	$34,821
North Balmiere Road	12	$18,059
South Balmiere Road	8	$14,082

3.4.5 Flood Risk to Repetitive Loss Properties in Cranford

Residential flood risk is calculated by a simple methodology that uses the FEMA default present-value coefficients from the benefit-cost analysis software modules. To perform this calculation, the flood insurance claims data were reviewed to determine an approximate period over which the claims occurred. This method should be used only for very general estimates of flood risk because the NFIP data represents only part of the flood losses in any jurisdiction. This is because there are always properties that are uninsured or under-insured. Most of the flood claims in the most recent query occurred between 1996 and 2011, a period of 16 years.

As shown in Table 3-7, there have been 842 flood insurance claims in the 16-year period, for an average number of claims per year of 52.6. Based on a 100-year horizon and a present value coefficient of 14.27 (the coefficient for 100 years using the mandatory OMB discount rate of 7.0 percent), the projected flood risk to these properties is $27,070,618. It must be understood that individuals can obtain and cancel flood insurance policies, and the flood hazard depends on many variables, including the weather, so this projection is simply an estimate of potential damages. Nevertheless, it offers a useful metric that can be used in assessing the potential cost effectiveness of mitigation actions, although in this case, site-specific loss estimates are fairly small, meaning that the amount of grant funds that could be expended on projects will probably be limited.

Table 3-7:
Projected 100-year Flood
based on Past Flood Insurance Claims

Data	Value
Period in years	16
Number of claims	842
Average claims per year	52.6
Total value of claims	$30,352,487
Average value of claims per year	$1,897,030
Projected risk, 100-year horizon	**$27,070,618**

(Source: FEMA NFIP query February, 2014)

3.4.6 Flood Risk to Severe Repetitive Loss Properties in Cranford

The definition of Severe Repetitive Flood Loss is included in the County portion of this mitigation plan. As of February 2014, Cranford has 29 severe repetitive flood loss properties. Claims history for these properties is from 1996 to 2011, a period of 16 years. Table 3-8 summarizes information about the SRL properties in Cranford.

Table 3-8
Projected 100-year Flood Risk to NFIP Severe Repetitive Loss Properties in Cranford Township
Based on Historic NFIP Claims
(Source: FEMA NFIP query February 2014)

Data	Value
Period in years	16
Number of claims	123
Average claims per year	7.7
Total value of claims	$5,662,172
Average value of claims per year	$353,886
Projected risk, 100-year horizon	**$5,049,953**

3.5 Winter Weather – Extreme Cold, Severe Storm, Ice Storm

3.5.1 Type, Location, and Extent

Because the hazards severe storm – winter weather, ice storms and extreme temperatures – cold are closely related, they are combined in this subsection of the appendix. Severe storms and winter weather risks are discussed in detail in Section 4of the County portion of this mitigation plan. There are no significant differences in the type, location or extent of this hazard between the County and Cranford Township, and there are no aspects of the hazard that are unique to this jurisdiction.

3.5.2 Previous Occurrences and Probability of Future Occurrences

Previous occurrences of the severe storm-winter weather/ice storm/extreme temperature - cold hazards are discussed in detail in the County portion of this hazard mitigation plan, and for reasons of brevity are not repeated here. There are no meaningful differences between the County as a whole versus Cranford Township with regard to occurrences or the future probability of these hazards.

3.5.3 Winter Weather Impacts and Vulnerabilities to the Hazard

The impacts from these three hazards in Cranford Township are substantially similar to the County as a whole, and include lost productivity, traffic accidents, downed trees (and related power losses), medical events (such as heart attacks), and hypothermia (which rarely causes any significant or long-term problems). The community has no unique or pronounced vulnerabilities to these hazards. Like most established communities, over time Cranford Township has adapted its systems and infrastructure to minimize the effects of cold weather and associated meteorological effects. In rare cases, buildings may experience structural problems due to snow loads, and public or private infrastructure may fail due to freezing. However, these problems are usually minor and are addressed by private citizens (through their own work, or via insurance proceeds) or by the government in the case of infrastructure.

Table 3-9: Projected 100-year Flood based on Past Flood Insurance Claims

	Injuries (combined)	Deaths
Snow/sleet	$3,107,448	$352,886
Icy pavement	$2,417,618	$266,156
Snow/sleet	$2,330,305	$234,493
Total annual risk (all hazards)	$7,855,371	$853,535
50-year risk	$108,404,122	$11,778,779
100-year risk	$112,096,146	$12,179,941

Perhaps the most significant potential impacts of winter weather are traffic accidents (with related injuries and fatalities), and power losses from ice and downed trees. For the most part, damage to vehicles is addressed via private insurance, records of which are proprietary. However, there are national statistics regarding injuries and deaths related to such weather. Local values for injuries and deaths can be deduced from national statistics. Figures for Cranford Township are displayed in the table below. Refer to the County portion of this mitigation plan for source citations and an explanation of the methodology.

An additional source of risk from cold and winter weather is hypothermia deaths. Although the risk from this hazard is relatively small, it can nevertheless be calculated by deduction from national statistics. Annual deaths nationwide were obtained from a U.S. Centers for Disease Control report.[5]

Table 3-10:
Risks from Hypothermia: Annually and 50- and 100-year Planning Horizons

2010 Population	% of US	Annual Death $	50-year Horizon	100-year Horizon
22,625	0.0072%	$610,507	$8,424,993	$8,711,932

3.6 Extreme Temperature - Heat

3.5.1 Type, Location, and Extent

Heat risks are discussed in detail in Section 4 of this mitigation plan. There are no significant differences in the type, location or extent of this hazard between the County and Cranford Township, and there are no aspects of the hazard that are unique to this jurisdiction.

3.5.2 Previous Occurrences and Probability of Future Occurrences

Previous occurrences of the heat hazard are discussed in detail in the County portion of this hazard mitigation plan, and for reasons of brevity are not repeated here. There are no meaningful differences

[5] National Health Statistics Reports, Deaths Attributed to Heat, Cold and Other Weather Events in the United States, 2006-2010

between the County as a whole versus Cranford Township with regard to occurrences or the future probability of this hazard.

3.5.3 Heat Impacts and Vulnerabilities to the Hazard

Heat impacts in Cranford Township are substantially similar to the County as a whole. There are various potential impacts from this hazard, including stresses on electrical systems, damage to infrastructure such as roads, and illness/death. There are no reliable data related to the first two effects, but there is some information related to deaths from heat-related hazards from a U.S. Centers for Disease Control report[6]. As explained in the County portion of this mitigation plan, national-level data about such deaths were scaled to the local level by population.

Table 3-11
Heat-related Risks, Cranford Township
Annual, 50- and 100-year Planning Horizons

Horizon	Damages
Annual risk	$218,432
50-year risk	$3,014,356
100-year risk	$3,117,019

3.7 Public and Critical Facilities

The Township of Cranford Municipal Building and Police Headquarters parcel is within the Special Flood Hazard Area (SFHA), but the building has not yet sustained any flood damage. The water has crossed into the parking lot during a recent severe storm. Additionally, Brookside Place School is within the SFHA, but this is not the Township's property. It is the responsibility of the Township of Cranford School District.

Facility	Address	Building Assessment Value ($)	Square Footage
Orange Ave. School	901 Orange Ave.	4,373,800	100,245.26
Livingston School	75 Livingston Ave.	1,786,800	36,185.58
Walnut Ave. School	370 Walnut Ave.	2,079,500	33,791.80
Hillside Ave. School	125 Hillside Ave.	4,658,700	99,669.58
C.A.P.	135 Centennial Ave.	2,224,000	20,005.10
Pub. Lib.	224 Walnut Ave.	4,521,700	18,341.40
Mun. Bldg. & Police H.Q.	8 Springfield Ave.	1,960,500	18,456.04
Fire H.Q.		485,000	12,794.81
Cranford High School	201 West End Pl.	7,434,600	83,535.84
Bloomingdale Ave. School	200 Bloomingdale Ave	1,440,700	31,391.91
Brookside Place School	700 Brookside Pl.	7,434,600	41,676.31
Solomon Schechter School	721 Orange Ave.	0	16,854.59
St. Michael School	100 Alden St.	124,500	17,215.35
U.C. College		8,833,800	157,745.71
Shade Tree Commission		146,500	5,294.48

[6] Ibid.

4. Township of Cranford Mitigation Strategy

This section contains goals, objectives, and action items for the Township of Cranford, as part of the Union County Plan Update. The goals are similar to the goals outlined in the County plan, but the objectives are adjusted for the jurisdiction. The definitions for these terms can be found in Appendix C of the Union County Plan Update.

4.1 Goals

- Goal 1: Improve **LOCAL KNOWLEDGE** about the potential impacts of hazards, and the identification of specific measures that can be taken to reduce their impacts
- Goal 2: Improve **DATA COLLECTION, USE, AND SHARING** to reduce the impacts of hazards
- Goal 3: Improve **CAPABILITIES, COORDINATION, AND OPPORTUNITIES** to plan and implement risk reduction projects, programs, and activities
- Goal 4: Pursue a range of **MITIGATION OPPORTUNITIES**, including addressing NFIP repetitive and severe repetitive loss properties, and reducing risk to public properties and infrastructure

4.2 Objectives

- Objective 1.A: Increase risk awareness among officials and citizens.
- Objective 1.B: Maintain and improve jurisdiction-level awareness regarding funding opportunities for mitigation, including that provided by FEMA and other federal and State agencies.
- Objective 2.A: Improve the availability and accuracy of risk- and mitigation-related data at the local level, as the basis for planning and development of risk-reduction activities.
- Objective 2.B: Ensure that government officials and local practitioners have accurate and current information about best practices for hazard mitigation planning, project identification, and implementation.
- Objective 2.C: Develop and maintain detailed data about critical facilities, as the basis for risk assessment and development of mitigation options.
- Objective 3.A: Continue support of hazard mitigation planning, project identification, and implementation at the municipal level.
- Objective 3.B: Continue close coordination with the County in a range of risk-related areas, such as FEMA programs, mitigation planning, development of hazard mitigation projects, etc.
- Objective 3.C: Increase property owner participation in the National Flood Insurance Program.
- Objective 3.D: Implement activities to improve the community's CRS rating.
- Objective 3.E: Work towards increasing the integration of mitigation principles and activities in a range of local regulations, plans, ordinances and activities.
- Objective 3.F: Maintain and improve coordination with surrounding communities with regard to understanding and reducing risks.
- Objective 4.A: Facilitate development and timely submittal of project applications meeting state and federal guidelines for funding (1) for RL and SRL properties and (2) for hardening/retrofitting infrastructure that is at the highest risk.
- Objective 4.B: Maintain and enhance local planning and regulatory standards related to future development and investments.

4.3 Mitigation Strategy

4.3.1 Existing Actions

The table below lists prioritized mitigation projects and actions identified by the Township of Cranford. This is Cranford's first mitigation strategy as part of a multi-jurisdictional hazard mitigation plan; all of the projects reflect current priorities and efforts.

Mitigation Action, Program, or Project	Hazard	Priority	Implementation Mechanism	Responsible Party	Project Duration	Estimated Cost	Current Status
Construct local storm sewer, pump station and bypass storm system for Springfield Avenue Park Avenue, Belmiere Parkway, Hamptons Street, Straton Street, Central Avenue at Eastman Street, Muncee Street, Hillside Avenue, High Street, Centennial Avenue Underpass, Riverside Drive, Venetia Avenue, Edgar Road, Kensington Street, Columbia, Hurning Street, Glenwood Road, Edgewood Road, Brookside Street and Willow Street	Flood	Medium	Capital Improvement	Cranford Municipality Engineer	4-years	$12 million ($4 million for Phase 2B and $8 million for Phase 5)	Pump station and express sewers were installed in Phase 1 and Phase 2A. Phase 2B and Phase 5 have not been funded.
Storm-water management system upgrade and improvement for various Local Streets (Casino Brook, Orchard Brook, Parts of South Union Avenue)	Flood	High	Capital Improvement	Cranford Municipality Engineer	1-2 years	$500,000	Orchard Brook drainage study underway. Construction cost for improvements TBD.

Mitigation Action, Program, or Project	Hazard	Priority	Implementation Mechanism	Responsible Party	Project Duration	Estimated Cost	Current Status
Flood proofing of First Aid Squad	Flood	High	Capital Improvement	Cranford Municipality Engineer or Fire Chief	1-year	$120,000	Not completed due to funding
Storm-water management system upgrade and improvement for the Municipal Building which houses the Police Department	Flood	High	Capital Improvement	Cranford Municipality Engineer or Administrator	2- years	$200,000	Under construction
Backup Generator for Fire Department	Flood/Severe Weather	High	Capital Improvement	Cranford Municipality OEM	5-years	$85,000	Not complete-lack of funding
Armor Riverside Dike and Belmere Dike along the Rahway River	Flood/Dam Failure	High	Floodplain Management	Cranford Municipality Engineer	2- years	$1.5 million	Not complete-lack of funding
Flood proofing for Apartment complex adjacent to Orchard Brook	Flood	High	Floodplain Management	Cranford OEM	1-2 years	$180,000	Not complete-lack of funding
Upgrading Gate system at Hansel's Dam	Flood	Medium	Floodplain Management	Cranford OEM	1-year	$500,000 to 1.2 million	Not complete-lack of funding
Automate municipal flood warning system with river gages	Flood	High	Floodplain Management	Cranford OEM	1-year	$120,000	Not complete-lack of funding
Conduct all-hazards public education and outreach program for hazard mitigation and preparedness.	All	High	Emergency Management	OEM Coordinator, in coordination with County OEM	One Year	Staff Time	Not complete-lack of funding

4.3.2 New Actions

Mitigation Action, Program, or Project	Hazard	Priority	Implementation Mechanism	Responsible Party	Project Duration	Estimated Cost
Stormwater management system improvement at localized flooding areas (High and Chestnut), Willow and Brookside, S. Union and James)	Flood	Medium	Capital Improvement	Cranford Township Engineering Department	1 year	$15 million
Sluice Gate Control Modification at Stormwater Pump Station	Flood	Low	Floodplain Management	Cranford DPW	1 year	$50,000
USACE Proposed improvements to Rahway River, including 15,500 linear feet of channel improvements through Cranford	Flood	Medium	Capital Improvements	USACE	5 years	TBD
Buy-outs	Flood	Medium	Capital Improvement	USACE	5 years	TBD
Elevations	Flood	Medium	Capital Improvement	USACE	5-years	$85,000
Gage at Springfield Avenue	Flood	Medium	Capital Improvement	DPW	1 year	$50,000

4.4 Capability Assessment

As part of this plan update each town self-assessed their existing planning and regulatory tools, communication and emergency response capabilities, staff and personnel, and their capabilities to leverage municipal funds to achieve hazard mitigation planning objectives. In addition to the resources outlined below the Township of Cranford has a Flood Advisory Committee that meets monthly. The committee has been active since 1997, and is focused on flooding issues around the Township and upstream. The committee works on communication and outreach, as well as with staying apprised of regional projects such as the Army Corps of Engineer Study on the Rahway River. This capability assessment should be updated as part of the ongoing maintenance process.

4.4.1 Planning and Regulatory

Tool	Township Has (y/n)
Zoning Ordinance	Y
Subdivision Ordinance	Y
Flood Damage Prevention Ordinance (per NFIP)	Y
Special Purpose Ordinances (e.g. wetlands, critical or sensitive areas)	N
Stormwater Management Plan/Ordinance	Y
Comprehensive Plan / Master Plan	Y
Capital Improvements Plan	N
Site Plan Review Requirements	Y
Habitat Conservation Plan	N
Economic Development Plan	Y
Local EOP	Y
Continuity of Operations Plan	N
Post Disaster Recovery Plan or Ordinance	N
Wildfire Protection Plan	N
Real Estate Disclosure req.	Y – State min
Other (e.g. steep slope ordinance, local waterfront revitalization plan)	N
Freeboard	Y
Cumulative Substantial Damages	N
Shoreline Management Plan	N/A

4.4.2 Communication and Emergency Response

	Does the Township have this (y/n)
Outdoor warning system	N
Nixle	Y
Auto-Dialer/Reverse 911/Emailer	N
Social Media	Y
Website Updates	Y
Other Emergency Communications	Y
Mutual Aid Agreements	Y
Emergency Operations Center	Y
Evacuation Vehicles	Y
Swift-water rescue	N
Shallow water boats	N

4.4.4 Staff/Personnel

	Does this Township have this expertise on staff?
Staff with expertise or training in benefit/cost analysis	N
Grant Writer(s)	Y
Emergency Manager	Y
Professionals trained in conducting damage assessments	Y
Scientist familiar with natural hazards in the municipality.	N
Personnel skilled or trained in "GIS" applications	Y
Surveyor(s)	N
NFIP Floodplain Administrator	Y
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Y
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Y

4.4.5 Fiscal Capabilities

Fiscal Mechanism	Does the Township have this capability?
Community development Block Grants (CDBG)	Y
Capital Improvements Project Funding	Y
Authority to Levy Taxes for specific purposes	Y
User fees for water, sewer, gas or electric service	N
Impact Fees for homebuyers or developers of new development/homes	N
Incur debt through general obligation bonds	Y
Incur debt through special tax bonds	N
Incur debt through private activity bonds	N
Withhold public expenditures in hazard-prone areas mitigation grant programs	N

5. Plan Maintenance and Adoption

5.1 Plan Maintenance

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

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

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

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

The LPC shall document, as needed and appropriate:

- Hazard events and losses in Cranford 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,
- Any changes to local capabilities,
- Efforts to integrate the information included in this plan into other local planning mechanisms including, but not limited to, the comprehensive plan, capital improvement planning, budgeting, zoning amendments, and variance approvals,
- 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

5.1.2 Continued Public Input

The Township of Cranford is committed to incorporating public input into its ongoing hazard mitigation planning. The Flood Advisory Committee will continue to work on opportunities for education and outreach. The public have had an opportunity to comment on the Plan prior to adoption. The public will have an opportunity to comment before any changes and during the 5-year plan update. The Township will place a link to the Plan on its website. 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: Union County Office of Emergency Management c/o All Hazards Pre-Disaster Mitigation Plan Coordinator 300 North Ave East, Westfield, NJ 07090.

The Township of Cranford'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 Cranford 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.

5.2 Plan Integration

The Hazard Mitigation Plan is a critical tool to help identify vulnerabilities and develop specific projects to reduce studied risk within the jurisdiction. However, it is not the only tool that may help minimize the impact of future hazard events on the people, infrastructure, and economy in the community. Using the data included in this Plan update to inform future updates of its Comprehensive Plan, Capital Improvement Planning and annual budget, stormwater management, zoning and code updates, and variance and subdivision applications will improve the resiliency of the community and reduce future risk to persons and property. All efforts to integrate the plan into other local mechanisms can be reported to the Plan Coordinator at each annual update.

5.3 Plan Adoption

On [insert date] Union County submitted the initial draft of the 2016 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 Union County Board of Chosen Freeholders for adoption, which occurred on [insert date].

The Township Council approved the plan on [insert date]. The Township's resolution for adoption and the County's adoption resolution are provided as Appendix E of the 2016 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 D.