Section 7 - Review of Mitigation Activities

7.A Planning Process and Strategy

Section 7 includes mitigation activities that would reduce the impact of various hazardous events that may occur in the Village of Mamaroneck. This planning process provides a consistent approach for local, County, State and Federal governments to work effectively and efficiently together to prepare for, respond to and recover from a hazardous event regardless of cause, size or complexity as specified under the National Incident Management system (NIMS).

As discussed in Sections 4 and 5, the primary hazards of concern are floods. The fact that flooding is rated as the most serious hazard (see Table 4-5) is due to a variety of storm hazards such as coastal storms, thunder storms, nor'easters, tropical storms, hurricanes, storm surges and other storms that threaten the village almost every year and any one of these can have a devastating impact. For example the HAZNY scorings showed in Table 4-5 show hurricanes as a moderately low hazard. This rating is due to the fact that category 3 and 4 hurricanes, the most hazardous, are the least encountered, while tropical storms are more frequent and cause limited wind damage but large scale flooding. Mitigation measures for hurricane hazards in this section are therefore covered primarily as a flood hazard. These hazards often have secondary effects such as utility failures, dam failures, transportation accidents, water supply contamination and structural collapse. The principal hazards considered for proposed mitigation measures include:

Moderately High Hazards

- Floods
- Coastal Storms (including tropical storms, nor'easters)
- Severe Storms (including thunder storms, wind)

Moderately Low Hazards

- Winter Storms (blizzards, ice storms)
- Storm Surges and Wave Action
- Hurricanes
- Utility Failure
- Dam Failure
- Water Supply Contamination

Other natural hazards like heat waves and earthquakes, technological hazards such as fires and man-caused events such as terrorism were evaluated in Section 4 of this plan. However these do not have the same frequency or level of impact as floods, coastal storms and severe storms.

In this Section we discuss the process and strategies used to develop and prioritize the mitigation activities to protect the community against the primary hazards. In Section 7.B we identify and organize the possible activities according to the goals and objectives established in Section 6. We have assigned the proposed mitigation activities to an action category and given each a general order of priority. The mitigation activity items and associated objectives are given for each goal along with their applicable hazards. All proposed activities, priorities and costs were reviewed by the Hazard Mitigation Planning Committee.

7.A.1 Mitigation Goals and Objectives

The proposed mitigation measures must help meet the goals, objectives and the criteria outlined in Section 6. Mitigation activities that contribute to meeting these goals are discussed below in Section 7.B. The six primary goals identified by the Hazard Mitigation Planning Committee are:

1. Reduce impacts of flooding.
2. Protect residents from catastrophic disasters.
3. Involve the community in identifying and implementing mitigation measures.
4. Become a member of the Community Rating System (CRS) program.
5. Heighten preparedness and response efforts for Hazards.
6. Prepare for climate change impacts on the Mamaroneck community.

The Committee identified several objectives to help meet these goals. A number of possible mitigation activities that achieve these objectives are proposed below. As discussed in Section 6, these objectives are not mutually exclusive and may apply to other goals in addition to the primary goals listed. Likewise, a mitigation action may help meet several objectives. The recommended actions will be incorporated in the action plan, which is developed in Section 8.

7.A.2 Mitigation Action Categories

Each mitigation action type is classified according to FEMA guidance under one of six categories or strategies:

- Preventive Measures (PM)
- Property Protection (PP)
- Public Information and Awareness (PI)
- Natural Resource Protection (NR)
- Emergency Services (ES)
- Structural Projects (SP)

Preventive Measures are a strategy of institutional steps that reduce the impacts from hazards, avoid or limit personal harm and decrease the loss of property value. These include administrative or regulatory actions that affect the way land, buildings and infrastructures are developed. These measures help keep problems from getting worse and may include planning, zoning, building codes, fire codes, laws, regulations, and preservation activities. Such improved zoning, building codes and updated plans will discourage future development in inappropriate areas such as flood plains or Village areas prone to flooding. Each item is identified with a 'PM' to indicate it is a Preventative Measure Activity Item.

Property Protection measures are strategies associated with the goals and objectives that protect property from damage or loss of property value. Property owners may protect buildings and properties by retrofitting structures, acquiring properties in safe areas, relocating facilities or elevating structures. Each proposed Property Protective Measure is identified by 'PP'.

Public Information activities involve informing, educating, soliciting input and advising the community, elected officials, property owners and stakeholders concerning actions in the proposed plan. These are activities that help save lives and protect property through an informed public. They include public meetings, Web Page productions, local public television, outreach programs and newspaper notices. 'PI' indicates Public Information Activities. These activities may be performed at various times and are generally associated with other mitigation items.

Natural Resources Protection activities are linked with the goal of preserving natural resources. The Village has limited open space and several natural areas are located adjacent to the Mamaroneck Harbor. Natural resource protection works to preserve or restore natural areas and the natural function of floodplain. These activities may include stream protection, vegetation

management, sediment and erosion control, water quality control, pond management or wetland management. Each proposed Natural Resource Protection Measure is identified as 'NR'.

Emergency Services actions help avoid loss of life and harm just before, during and after a hazardous event. These actions may include emergency planning, warning systems, evacuation shelters, emergency response services including the fire department, hazardous materials release teams and ambulance and first aid services. These measures minimize the impact of a hazard on people. Proposed Activity Items related to emergency services activities are designated as 'ES'.

Structural Projects involve strategies for modifying or controlling the hazard itself. This strategy includes projects such as elevating roads or flood control structures such as storm and sanitary sewers, levees, or retaining walls that direct floodwaters away from an area. The objective of this strategy is to modify or control the hazard itself. Activity Items related to structural project activities are designated as 'SP'.

7.A.3 Estimating Activity Item Costs

Detailed specifications for each activity item are not within the scope of this Hazard Mitigation Plan but will be submitted with future proposals for work and grant applications. The proposed activities represent a brief summary or conceptual plan for work items. Therefore, detailed cost estimates are not available at this time. Based on past experience, size and scope of the activity, known unit costs for similar activities or estimates based on engineering guides. These estimates may have a margin of error of +/- 25% and represent a value in current 2011 dollars.

7.A.4 Setting Priorities

An order of priority from high to low (1 to 3) has been developed for each of the mitigation actions proposed. Only three priority categories were chosen to keep decision-making easier and to promote consensus among the Committee. The criteria for analyzing the alternative priorities are based on Social, Technical, Administrative, Political, Legal, Economic and Environmental (STAPLEE) considerations provided in FEMA guidance. (See Section 6.A. for an explanation of each criteria.) These criteria and priorities will be used to further refine the Draft Action Plan in Section 8. Implementation of these actions must be socially acceptable to the community and

technically feasible. They must have the administrative resources and jurisdiction to implement them and be acceptable to political decision-makers, stakeholders, and public representatives. The activities need to be backed by legal authority and be consistent with current laws. They need to be economically affordable, cost-effective and protective of the environment.

The priorities were determined in agreement with the Village officials, the community and the Planning Committee. The highest priorities were based on those actions already started or that need to be taken before others can be implemented. Activities that were most cost-effective were rated highest. Funding resources were also important considerations. Actions that can be done using available resources or having identified sources of funds also have a higher priority. Items requiring procurement of additional local funds and resources or procurement of additional State or Federal funds would likely be planned in the future.

A high priority activity involves maximum benefits relative to the costs even though in most cases, a quantitative estimate of benefits in dollars cannot be made. Therefore qualitative judgments of benefits relative to cost were made based on the benefits listed for the objects at risk and damage estimates that are given in Section 5. The highest priority tasks are those that can be done with low costs relative to the high benefits received such as saving lives or completing a Comprehensive Evacuation Plan. Certification of the CRS Program is also a low-cost activity with an immediate effect of lowering of flood insurance rates. A benefit from lowering the rate would make the insurance more available to those who can't afford it. Projects having high costs and high benefits or high risk reduction such as storm drainage control would also have a high priority. High-cost items having a lower benefit would have a lower priority. A low-cost item such as expanding the Village website, though important, was given a lower priority because there were fewer direct property and safety benefits to the Village.

A priority is assigned to each Activity Item shown in Tables 7-1 to 7-6. Group 1 activities are the highest priority with group 3 having the lowest priority. Priority 1 activities are considered the most urgent projects to start with. As the plan is implemented these priorities are expected to change based on resource availability, funding, new information, and future community needs. Since some activity items have already started they will continue as a top priority. In addition,

many of the activities are dependent on other activities and have a higher priority. Most of the proposed items require outside funding (grants) or other assistance.

The Hazard Mitigation Planning Committee generated, reviewed and discussed the list of possible activities and proposed projects. A preliminary screening list was generated using the HAZNY analysis. (See Appendix 1.) Activities were screened out if they failed to help meet the Plan's goals and objectives formulated in Section 6. An activity item may fulfill one or more objective or goal.

These activities were proposed, reviewed and evaluated by the Committee, Village officials and the consultant. The results of these discussions are outlined in the following Sections 7.B.1 through 7.B.6. Each item includes:

- The objective of concern,
- A description of the proposed mitigation measure,
- The hazards being addressed,
- The benefits produced by the action,
- Estimated costs,
- Feasibility of implementation,
- Priority rating of 1 to 3.

7.A.5 Capability and Resources

The Village of Mamaroneck will have the responsibility, jurisdiction, capability and authority to administrate and implement most all of the mitigation activities proposed below. In some instances a neighboring community or other agency may have jurisdiction that requires a joint Memorandum of Understanding to implement the activity. The Village official in charge of a project will be responsible for interfacing with the public and appropriate neighboring jurisdictions, the County, USCOE, NY SOEM, FEMA or other agencies identified in Section 3. Responsible officials for the village that may administer these projects are shown in Figure 1-3 in Section 1.

In most cases, the village does not have financial resources or human resources to prepare the plans, studies, and engineering designs or implement public outreach and construction required for many of the activities proposed. Therefore, external agency funding for consultants, engineers and contractors will be needed to successfully implement this Hazards Mitigation Plan.

7.B Proposed Mitigation Actions

Numerous possible mitigation activities were identified and screened by the Committee and Village officials and reviewed by the community. The proposed activities are listed by their primary goal in Tables 7-1 through 7-6. Each mitigation action is summarized with its action type, key objective, associated hazards (see Sections 7.A.2 – 7.A.3), probable funding requirements and a listing of possible mitigation benefits. An action priority of 1 to 3 was assigned considering the criteria discussed above in Section 6.A.2 and Section 7.A.4. These goals, objectives and benefits listed below are consistent with and incorporate several STAPLEE criteria listed in Section 6.A and 7.A.4. Unless noted under a specific activity, no STAPLEE criteria limits the activities evaluated below.

The proposed mitigation actions are consistent with the recommendations developed in the September 2011 Draft Comprehensive Plan for the Village of Mamaroneck. A Citizens Flood Committee appointed by the Mayor has recommended short- and long-term mitigation measures.

7.B.1 Goal 1 - Reduce Impacts of Flooding

This goal is self-evident and is the primary goal in this Hazard Mitigation Plan. Since flooding is the major hazard of concern and is caused by several other specific hazards, meeting this goal will include reducing impacts from storm-specific events. Protection of people and properties from floods is first and foremost. Meeting this goal and its objectives depends on having all planning tools in place, all needed resources ready and all emergency personnel trained. The Village has identified a number of related actions that will result in a reduction of flooding. Table 7-1 lists the proposed mitigation activities, objectives, priorities, hazards mitigated and the potential benefits to promote this goal. These activity items are discussed in the following sections.

7.B.1.1 Channelization and Improvement of the Confluence in the Sheldrake and Mamaroneck Rivers

The Village plans to continue in its efforts of stream/channel improvements to improve flow capacity at the confluence of the Mamaroneck and Sheldrake Rivers in Columbus Park. This project is part of the USACE Risk Management Reevaluation study of these rivers. One proposed modification would divert the Sheldrake River upstream from the confluence of the Mamaroneck River through a concrete-lined tunnel into the West Basin of the Mamaroneck Harbor. One proposal is to construct a tunnel under Fenimore Road. The USACE will not likely favor this project but will likely recommend the Ward Avenue tunnel. The principal objective is to "implement flood control projects". Although the cost of the project is high, the long term benefits are high compared to costs of potential future losses experienced by residents if the project is not completed. Therefore, costs relative to benefits for this project are about equal. This structural project has a priority of 1. Due to the rivers' major role as source of flooding, mitigating this source will have a high benefit and a high cost for the Village.

The USACE would be the lead agency for this project. The Village administration will take the Village lead. Cost–sharing funding for the activity would come from the USACE, NYDEC and the Department of Planning, Westchester Co. NY. The project would likely require an Environmental Impact Statement. Preliminary costs estimates from the USACE were based on 1989 annual costs for the entire project, and converted to 2011 U.S. Dollars for this plan.

7.B.1.2 Inflow and Infiltration Removal

The primary hazard of concern is flooding in the Village. When storms impact the Village, storm sewers and sanitary sewers overflow and comingle. Removing inflow and infiltration (I&I) problems from storm and sanitary sewer overflow is a Preventative Measure. A principal objective is to "improve the storm water collection and drainage system." Its primary benefit is prevention of sewage infiltration into storm water. This mitigation action will result in a high benefit for community health relative to the cost of the mitigation action. The mitigation action is feasible and cost-effective. This activity is given a high priority of one.

Table 7-1. Proposed Activities to Reduce Impacts of Flooding.

Action Type*	Action Item	Primary Objective **	Priority ***	Hazards Mitigated#	Applies to Structures	Benefits/Comments	Cost ($1,000)
SP	1. Channelization and Improvement of Rivers' confluence	Implement flood control	1	Flooding	Existing	Improve storm water flow and reduce flooding, save lives	$20,735
PM	2. Inflow and Infiltration removal	Improve storm water collection and drainage	1	Flooding	Existing	Stop and prevent sewage infiltration into storm water	$2,500
PM	3. River dredging and silt removal	Implement flood control	2	Flooding	NA	Improve storm water flow	$1,000
PM	4. River debris and obstruction removal (ongoing)	Improve storm water collection and drainage	1	Flooding	NA	Improve storm water flow	$900
SP	5. Repair, raise, remove and replace bridges	Improve storm water collection and drainage	2	Flooding	Existing	Improve storm water flow, reduce street flooding	$15,000
SP	6. Redirect wing wall and refurbish bridge at Anita Ln. & Valley Pl.	Improve storm water collection and drainage	3	Flooding	Existing	Improve storm water flow, reduce street flooding. **Westchester Co. responsibility**	$750
PP	7. Enhance inspections	Improve flood-prone streets	1	Flooding	Existing	Identify problem areas, reduce street and building flooding	$50
SP	8. Continue relining storm and sanitary sewer lines	Improve flood-prone streets	1	Flooding	Existing	Improve storm and sanitary sewer water flow	$900
PM	9. Install backflow/check valves	Correct sewer backup problem	1	Flooding	Existing	Stop and prevent sewage infiltration into buildings	$950
PM	10. Change code for BFE	Update applicable codes	2	Flooding	New & Existing	Reduce flooding of buildings	$25
PM	11. Improve zoning and codes	Update applicable codes	2	Flooding	New & Existing	Reduce building in flood prone areas	$ 25

***Action Type:** **PM – Preventative Measures** **ES – Emergency Services** *****Priority:** **1 - High**
PP – Property Protection **SP – Structural Projects** **2 - Medium**
NR – Natural Resources **PI - Public Information** **3 – Low**

****Activity may also meet other goals and objectives – see text.**

 # For all primary hazards included see page 7-1, Sect. 7.A.

7.B.1.3 River Dredging and Silt Removal

The Army Corps of Engineers (USACE) recommended dredging of the Sheldrake and Mamaroneck Rivers as part of a total mitigation effort. Dredging would continue in these and other streams in the Village to remove silt which reduces the volume of water flow. Mitigation of these rivers will contribute to flood reduction. The estimated cost is $1,000,000.

Dredging the rivers is feasible; however its effectiveness in controlling flooding is limited. Therefore, this activity has a moderate priority rating of two.

7.B.1.4 Ongoing Removal of Debris and Obstructions in the Rivers, Dams and Catch Basins

As a Preventative Measure, the Village DPW would continue its ongoing short-term mitigation actions to clean and maintain catch basins. This activity is meant to "improve storm water collection and drainage. They would continue to remove debris from the Village streets, streams, dams and rivers. Mitigation of these blockages contributes to flood reduction by removing objects that obstruct flow and clog storm and sanitary sewers and grates. This activity has a high priority of one and a moderate cost of $900,000 relative to the benefits achieved. This activity is highly feasible and has been performed in past years.

The Village DPW will take the lead in this project. Funding for the activity would be requested from FEMA through Hazard Mitigation Program Grant applications, for filing with the NYSOEM. Key participants include the NYSDEC and the Planning Department, Westchester Co. NY.

7.B.1.5 Repair, Raise, Remove and Replace Bridges

The Village is in the design phase to replace the Jefferson Avenue Bridge, located in the center of the Village. A key objective is to "improve storm water collection and drainage." The current bridge has suffered extensive structural damage during past flooding events. Furthermore, the center piling of the bridge is located mid-stream in the Mamaroneck River, in an area where the river makes a number of bends. These conditions cause debris flowing downstream to get stuck in this area and reduce the normal flow capacity of the river. This backup leads to the flooding of surrounding streets and buildings.

This structural project has a high cost of $3,000,000 but will benefit the Village by reducing street flooding in the long term. The project is feasible and it has a moderate priority of two.

7.B.1.6 Redirect Wing Wall

Wing walls provide additional support and retention of stream banks and bridges. Damaged walls impede water flow and increase erosion. An objective is to "improve storm water collection and drainage." A major benefit is improvement of storm water flow that will reduce flooding. This activity is feasible with an estimated cost of $500,000. This activity is the responsibility of Westchester County, and not a Village activity.

7.B.1.7 Enhance Inspections

Inspection of buildings, structures, and other properties in the Village should have an additional focus on flood mitigation. A primary objective is to "Improve flood prone streets". A procedure should be prepared to enhance inspections. This property protection activity should include all applicable codes and zoning regulations that enhance flood protection. This item has a high priority and a proactive high benefit of identifying flood-prone areas prior to a flood event at a low cost of $50,000. A major benefit is the reduction of street and building flooding.

This is a highly feasible activity that can utilize Village employees. This activity will enable Village inspectors to efficiently identify building and zoning problems that may need mitigation.

7.B.1.8 Continue Relining and Refurbishing Storm and Sanitary Sewer Lines

This Structural Project is intended to improve flood-prone streets. The Village would continue relining and refurbishing storm and sanitary sewer lines to repair leaks and damaged sections which reduce effective drainage. This mitigation action on the sewer lines will contribute to flood reduction. There would be a significant benefit of improved flow through the sewers. Approximate costs would be around one million dollars. The priority rating is high and the activity is highly feasible.

7.B.1.9 Install Backflow/Check Valves in Service Lines of Affected Buildings

The Village will address the flooding issue of backup of raw sewage from the storm water system into residents' dwellings. The Village proposes for the homeowners to pay for and to install back flow

valves into the service lines of these dwellings thus preventing the sewage from entering buildings during flooding events. The estimated cost to complete the project is $850,000 which is small compared to future losses and exposure experienced by residents.
This activity is highly feasible and has a high priority of one.

7.B.1.10 Develop a Plan and Change Code to Base Flood Elevation (BFE) + 2 feet +.

To accommodate predicted sea level rise, residential construction must have the lowest floor including the basement elevated to more than +2 feet above the BFE. A key objective is to "update applicable codes." Flooding is the primary hazard. Utilities must also be designed and/or located to prevent water damage during flooding. Adoption of the local flood damage laws is a prerequisite for participation in the National Flood Insurance Program. The law was updated by the Village Board of Trustees in July 2007. The revised law reflects guidelines set by NYSDEC. These revisions will involve changes to the Village Zoning Code, Floodplain Management requirements, subdivision regulations, housing standards or other relevant Village Code Chapters or planning documents.

The estimated cost is $25,000 to develop the plan and change the Village codes. This feasible activity has a priority of two. Any new or revised requirements will require Board of Trustees review and approval to become incorporated as Village law.

7.B.1.11 Improve Zoning, Storm Water, Erosion and Sediment Control Codes

Several Village codes and regulations apply to protection of buildings, structures and other properties from flood damage caused by storm water and erosion. This activity includes the review and revision of all applicable codes and zoning regulations that enhance flood protection. The primary objective of this action is to "update applicable codes." The primary hazard addressed by this activity is flooding. The major benefit is to reduce building in flood prone areas. The estimated cost is $25,000. The activity is feasible and has a priority rating of two.

Development is permitted in federally mapped flood plain areas, as long as it complies with state and federal building-elevation requirements, and is compliant with Village regulations in Mamaroneck Village Code Chapter 186.

7.B.2 Goal 2: Protect Residents From Catastrophic Disasters

Avoiding loss of life and injury from disasters is a major goal for the Village. Protecting residents' property from catastrophic storm disasters is included. This goal is also aimed at mitigating losses through various property protection activities before, during and after a hazardous event occurs. Technological and man-caused hazards discussed in Sections 4 and 5 also apply and may be evaluated in future updates to this plan. Six remediation activities were identified for this Goal that meet the objectives listed in Section 6.B.2.

7.B.2.1 Raise Homes Located in the Flood Plain +2 feet and Amend Zoning Codes to Facilitate Home Raising

See Section 7.B.1.10 above for changing BFE Code. Buildings that are impacted by flooding need to be identified and funding obtained to elevate these structures to more than +2 feet above the BFE. Raising homes in the flood plain will "protect buildings from flood damage" and reduce the number of SRL properties. It requires revisions to the Village Zoning Code, Floodplain Management requirements, subdivision regulations, housing standards or other relevant Village Code Chapters or planning documents.

The feasibility of this activity is complex and has a priority rating of three. Raising a home to meet BFE requirements could be costly at $250,000 per building. Finding funds to raise individual structures may be difficult. This project would meet the objective to protect Critical Facilities, buildings and infrastructure from damage and loss. This mitigation action has a low priority, high costs and a high benefit of protecting property from a flood event. It is uncertain whether the benefits from raising an existing house would outweigh the costs. This activity has a low priority and high benefits and has a high unit cost. Its primary objective is Reduce the number of SRL properties.

The Village administration will take the lead using existing staff from the Building Department, Zooning Board and Flood Mitigation Advisory Committee. Any new or revised requirements will require Board of Trustees review and approval and incorporated as Village law.

7.B.2.2 Reinforce Existing Structures to Ensure They are Flood Safe.

It is proposed that existing structures in flood zones be reinforced to ensure they are flood safe. This Structural Project activity is intended to protect existing structures at risk from flood damage. The estimated costs of $400,000 are high and priority is 2.

7.B.2.3 Update Emergency Operation Plan and Evacuation Plan per NIMS

The Village plans to review all of its emergency plans and update and revise them where necessary to be consistent with FEMA's National Incident Management System (NIMS). This planning process provides a consistent approach for local, County, State and Federal governments to work effectively and efficiently together to prepare for, respond to and recover from a hazardous event regardless of cause, size or complexity. Updated plans will "enhance residents' awareness of emergency procedures." Members of a Committee will review and recommend revisions. The Village Police Department will take the lead in this effort. There will not be a need for funding, since all members of the Committee are Village employees and meetings will be conducted during their work days. Completion of this project should take less than a year, but the results will have long term benefits for the community. Since the project does not result in any additional expense, the cost benefit ratio is excellent. The estimate for in kind services is $30,000. The activity is highly feasible and has a priority of one.

7.B.2.4 Check Vulnerability, Stability of Waterfront Sea Wall, Docks, Pilings, Gas Tanks

Waterfront structures such as seawalls, piers, docks and service buildings are at risk of damage from storms, tidal surges, and to a lesser extent, ice jams. A key objective is to "Protect vulnerable harbor and shoreline from damage and loss." Inspections of shoreline structures in the Mamaroneck Harbor and Long Island Sound are needed to check the vulnerability and stability of piers and their pilings, docks, sea walls, service buildings, fueling stations and other shoreline structures. Benefits from this activity would include identifying structures that require repair or replacement or removal. Identifying and fixing the problems would save property from future damage.

This activity is highly feasible using Village staff resources and a waterfront building inspector consultant. This activity is given a priority rating of two. The cost is estimated to be $50,000.

Table 7-2. Proposed Activities to Protect Residents from Catastrophic Disasters.

Action Type*	Action Item	Primary Objective **	Priority ***	Hazards Mitigated#	Applies to Structures	Benefits/Comments	Cost ($1,000)
SP	1. Raise homes above BFE +2 ft. and amend zoning codes	Protect buildings from damage	3	Flooding	Existing	Protect homes from flood damage, costs per house are high.	$250/ Building
SP	2. Reinforce existing structures to ensure they are flood safe.	Protect existing structures from damage	2	Flooding	Existing	Ensures existing structures are flood safe.	$400
ES	3. Update Emergency Plan and Evacuation Plan per NIMS	Enhance residents' awareness of emergency procedures	1	All hazards	NA	Protect lives	$30
SP	4. Check vulnerability of waterfront structures	Protect vulnerable Harbor and shoreline	2	Severe storms and surges	Existing	Prevent damage to piers, docks and buildings	$50
ES	5. Procure public address system	Improve receiving communications	1	All hazards	NA	Improved communication during an emergency	$40
PI	6. Revise communications for 911 protocols	Improve receiving communications	1	All hazards	NA	Improve communication to protect residents during an emergency	$25

***Action Type:** **PM – Preventative Measures** **ES – Emergency Services** *****Priority:** **1 - High**
PP – Property Protection **SP – Structural Projects** **2 - Medium**
NR – Natural Resources **PI - Public Information** **3 – Low**
****Activity may also meet other goals and objectives – see text.** **# For all primary hazards included see page 7-1, Sect. 7.A.**

7.B.2.5 Procure a Public Address System to Announce Potential Emergencies in the Community

This Emergency Services activity requires a current system to announce a potential emergency. A new public address system is needed to warn each likely impacted neighborhood of impending flood conditions or other hazards. In the event of a flood, serious storm hazard or downed power lines, a vehicle carrying a public address system would warn the neighborhoods affected about the hazard and advise actions the people should immediately take.

The primary objective of this activity is to "Improve receiving communications" and the primary benefits would be improved communication during an emergency and protection of the public from the hazard. This is a highly feasible and flexible activity. The cost of $40,000 is relatively low in relation to the benefits of having an informed community during an emergency will help protect your family and neighbors. This activity is given a high priority.

7.B.2.6 Revise Communications Protocols Including the Reverse 911 Warning System

Reverse 911 calls are a geographically based calling system that offers the ability to quickly communicate with the public by telephone. It will ring residents to alert them of a hazard even in the middle of the night. Reverse 911 calls will not reach screened calls, blocked or unlisted numbers or cell phones unless the resident registers. It warns residents of hazards such as flooding in their neighborhood so that they can safely leave the area.

This activity has a high priority one and is highly feasible. Revision of the protocols has a low cost of 25,000 and proven high benefits.

- Reverse 911 can target specific geographic locations, warning only those people who are directly at risk.
- The system uses existing telephones to alert citizens; there is no need for people to buy a specialized warning device.
- The system can deliver text messages. This feature has the potential to warn and protect citizens who are deaf or hard of hearing.
- System administrators can add telephone numbers to the database. This can be used to add unlisted telephone numbers and cell phone numbers to the system.

On June 18, 2009 there was minor flooding on Plaza Avenue near Madison in Mamaroneck. Reverse 911 calls were sent out to residents cautioning them of the potential for flooding but some residents did not receive calls. The village will be placing a link on its website or provide forms to give residents a means for registering their phone numbers for the reverse 911 system.

7.B.3 Goal 3: Involve the Community in Identifying and Implementing Mitigation Measures

This goal includes several mitigation actions related to involvement and coordination of different agencies and jurisdictions. The community needs to be involved in the planning of these mitigation actions and be able to obtain information in their native language.

7.B.3.1 Develop a Coordination Plan for Inter-Municipality Decontamination (Decon) Preparedness

Emergency responders who have worked in a contaminated area need to go through a process of decontamination prior to leaving the area. Different municipalities and jurisdictions may have different procedures that may delay assistance of a neighboring community. This remedial activity is intended to develop a coordination plan that will be consistent between municipalities.

The key objective is to "coordinate with neighboring communities". A principal benefit is "improved communication between communities during an emergency response." The cost of this activity is $25,000. This feasible activity was given a low priority because it is limited to a small specialized group.

Table 7-3. Proposed Activities to Involve the Community in Identifying and Implementing Mitigation Measures.

Action Type*	Action Item	Primary Objective **	Priority ***	Hazards Mitigated#	Applies to Structures	Benefits/Comments	Cost ($1,000)
PM	1. Develop a coordination plan between neighboring municipalities	Coordinate with neighboring communities	3	All hazards	NA	Improve communication between communities during an emergency response	$25
PI	2. Multi-lingual educational materials	Heighten public awareness through multi-level campaign	1	All hazards	NA	Improved hazard communication with non-English speaking residents	$35
PI	3. Multi-lingual flooding preparedness manual	Enhance residents' awareness of procedures	1	All hazards	NA	Improved hazard communication with non-English speaking residents	$35
ES	4. Work with local agencies, County and Transit Authority to assist in NYC evacuation	Coordinate with neighboring communities	3	Category 2 and higher hurricane	NA	Transport large number of people out of impacted areas to save lives	$30

***Action Type:** **PM – Preventative Measures** **ES – Emergency Services**
PP – Property Protection **SP – Structural Projects**
NR – Natural Resources **PI - Public Information**

*****Priority:** **1 - High** **2 - Medium** **3 – Low**

****Activity may also meet other goals and objectives – see text.**

 # For all primary hazards included see page 7-1, Sect. 7.A.

7.B.3.2 Create Multi-Lingual Educational Materials for LMC TV, and Videos for Schools

The primary objective of this Public Information activity is to "heighten public awareness through a multi-level public relations campaign". A key tool to achieve this objective is to create bi-lingual educational materials for the community's public TV service, LMC TV. These programs will also be produced on DVD videos and distributed to Village schools. These materials will be prepared in English and Spanish and cover the primary hazards of flooding, severe storms and utility outages. The estimated cost to produce these materials is $35,000. They will explain the nature and scope of the hazard and the procedures to follow in the event that any neighborhood is impacted.

This activity is highly feasible and has a priority of one. A major benefit will be improved hazard communication with non-English residents which will protect them from the hazards of concern.

For adults in the community who do not access LMC TV or do not speak Spanish or English, a brochure will be prepared in several languages covering the principal languages spoken in the community. This brochure will contain the same basic information found on the DVD.
The costs are relatively low in relation to the benefits of having an informed community on how to protect your family and neighbors in the event of a serious hazard impact. Since the ability to reach the community at a low cost and high benefit, this activity is given a high priority.

7.B.3.3 Create a Multi-Lingual Flooding Preparedness Procedures Manual

The primary objective of this mitigation action is to "Enhance residents' awareness of emergency procedures." A key tool to achieve this objective is to prepare a bi-lingual manual in Spanish and English to aid the community in the event of serious flooding. The manual will explain the nature and scope of the flood hazard and detail procedures and evacuation routes to follow in the event that any neighborhood is impacted. It will include warning systems and locations of emergency shelters. A major benefit will be improved hazard communication with Spanish and English speaking residents which will help protect them from the hazard of concern.

The cost of $35,000 is low, the benefits are high and the action is highly feasible. The primary benefit is having an informed community knowing how to protect their families and neighbors in the event of a serious hazard impact. This activity is given a high priority.

7.B.3.4 Work With Local Agencies, Westchester County and Metropolitan Transit Authority (MTA) to Prepare for Mass Evacuation From NYC

Mass evacuation from New York City is a rare event. Some sections of the City were evacuated during Hurricane Irene in August 2011. In the event of a major disaster, NYC residents and commuters may have to evacuate to or through Westchester Co. and the Village of Mamaroneck. Mamaroneck officials will need to plan and coordinate with local agencies, officials from Westchester Co., neighboring communities, and the MTA to develop procedures pertaining to the Village's role in the evacuation.

This activity has an objective to "Coordinate with neighboring communities". The most common hazard that is likely to trigger an evacuation is a sizable hurricane. A principal benefit is the saving of lives by transporting a large number of people out of an impacted area. The cost for generating the plan for Mamaroneck's role in the plan is about $30,000. Preparing a plan is highly feasible and has a priority rating of three.

7.B.4 Goal 4: Become a Member of the Community Rating System Program

FEMA's National Flood Insurance Program/ Community Rating System (NFIP/CRS) that allows property owners in participating communities to purchase flood insurance in exchange for state and community floodplain management regulations that reduce future flood damages. Participation in this program is based on an agreement between communities and FEMA. If a community adopts and enforces a floodplain management ordinance for new construction in floodplains, the federal government will make flood insurance available within the community to mitigate flood losses. Formal approval of this Multi-Hazards Mitigation Plan is a prerequisite for the CRS approval. Once the application is completed and approved, each resident or business with flood insurance would be eligible for a reduction in insurance premiums.

Table 7-4. Proposed Activities to Become a Member of the Community Rating System Program.

Action Type*	Action Item	Primary Objective **	Priority ***	Hazards Mitigated#	Applies to Structures	Benefits/Comments	Cost ($1,000)
PP	1. File required CRS documentation	Reduce flood insurance premiums	1	Flooding	Existing	Reduced cost of flood insurance	$25
PP	2. Develop and manage the CRS program	Reduce the number of SRL properties	1	Flooding	New and Existing	Protection of buildings from flooding	$25 /yr.
PP	3. Ensure an accurate inventory of (SRL) properties	Accurately identify the number of SRL properties	2	Flooding	Existing	Reduced cost of flood insurance. Costs covered in CRS Program.	---

***Action Type:** **PM – Preventative Measures** **ES – Emergency Services**
PP – Property Protection **SP – Structural Projects**
NR – Natural Resources **PI - Public Information**

*****Priority:** **1 - High**
2 - Medium
3 – Low

****Activity may also meet other goals and objectives – see text.**

 # For all primary hazards included see page 7-1, Sect. 7.A.

The NFIP's Community Rating System is a voluntary incentive program offering flood insurance premium reductions to communities who exceed minimum requirements. Communities receive points for meeting additional requirements, and are ranked in up to 10 rating classes according to their total score. The higher the score, the greater the premium discount the community receives. Creditable activities are grouped into four categories: public information, mapping and regulations, flood damage reduction and flood preparedness.

7.B.4.1 File Required CRS Documentation

This activity addresses flooding hazards. The primary objective for this activity is to "reduce flood insurance premiums." The Village does not currently qualify for membership in the Community Rating System (CRS) Program. The Village will work with State and Federal officials to complete this documentation. The Village is already conducting some activities that provide credit points for the rating. Other activities that would generate additional points (such as public information activities) would be fairly simple and low-cost to implement.

The Village should assess its National Flood Insurance Program (NFIP) compliance, with a view to qualifying for a CRS rating of at least 7. The benefits from becoming a CRS Program member are lower flood insurance premiums. Estimated costs for this activity are $25,000. This activity is highly feasible. This rating, which requires 1,500 credit points, gives an insurance premium reduction of 15%. As of September 2010, the Village was in the process of completing its application to qualify for CRS rating program. This activity has a high priority and high benefits relative to its low cost.

7.B.4.2 Develop a CRS Program Plan and Manage the Program

See Section 7.B.4 above regarding this Community Rating System (CRS) Program. A part-time CRS coordinator on the Village staff is needed to manage a program specifying CRS requirements and procedures. A consultant may be needed to help develop the program and complete the paperwork. Its primary objective is to" reduce the number of Severely Repetitive Loss (SRL) properties" caused by flooding.

It is estimated that the annual cost for this program would be $25,000. The activity is highly feasible and has a Priority of one. A major benefit is long term protection of buildings and properties from flooding.

7.B.4.3 Ensure an Accurate Inventory of Severely Repetitive Loss (SRL) Properties

See Section 7.B.4 above regarding this CRS Program. The CRS Coordinator will work with NYSOEM to ensure an accurate inventory of (SRL) properties. There are currently 23 such properties in the Village. This program will require the CRS coordinator on the Village staff to record and manage the inventory. This activity has a moderate priority of two. The cost per year is included in managing the CRS program. Its primary objective is to "accurately identify the number SRL properties."

7.B.5 Goal 5: Heighten Preparedness and Response Efforts for Hazards

7.B.5.1 Audit Village Facilities, Equipment, and Personnel for Strengths and Weaknesses

This activity is intended to "Improve preparedness and response". This is a cost effective use of Village staff to identify needs, training for staff, emergency equipment and facilities in order to be prepared to respond to any of the hazards identified in this Hazard Mitigation Plan. This task is given a high priority. Implementation of the audit is feasible and the audit can be performed by representative of different Village departments who are involved in an emergency response. Estimated costs for this activity are about $25,000.

7.B.5.2 Relocate Equipment Impacted by Floods

The primary objective of this activity is to "Identify and move equipment to a safe location". This involves relocating land-based Public Works and Fire Department facilities and equipment impacted by floods. It is assumed the new locations are existing Village facilities. A key benefit is that facilities and equipment are accessible and protected from damage during a flood.

Transferring emergency equipment and supplies to safe facilities is given a high priority and will cost about $25,000. Its implementation is feasible since Village staff and facilities are used.

7.B.5.3 Plan for Pre-Evacuation and Staging of Emergency Equipment

A key objective for this activity is to "Improve preplanning for mitigation of hazards". The hazards covered include flooding and severe storms. Implementation of this activity will save lives by providing an effective pre-evacuation plan. A benefit of this activity is to improve preparedness for an emergency.

Table 7-5. Proposed Activities to Heighten Preparedness and Response Efforts for Hazards.

Action Type*	Action Item	Primary Objective **	Priority ***	Hazards Mitigated#	Applies to Structures	Benefits/Comments	Cost ($1,000)
PM	1. Audit village facilities resources for strengths and weaknesses	Improve preparedness and response	1	All hazards	NA	Cost effective use of Village staff	$25
PM	2. Relocate equipment impacted by floods	Identify and move equipment to a safe location	1	All hazards	NA	Protects equipment from damage and improves it's access	$25
ES	3. Plan for pre-evacuation and equipment staging	Improve preplanning for mitigation of hazards	1	All hazards	NA	Improved preparedness for an emergency	$25
ES	4. Evaluate safety and relocation of waterborne equipment	Identify and move equipment to safe location	2	All hazards	NA	Protect boats and associated emergency equipment during storms	$25
PM	5. Trim trees and limbs	Improve preplanning for mitigation hazards	1	All storm hazards	Existing	Protection of power lines, communication lines and buildings from tree damage. Con Ed Responsibility	Con Ed to pay
ES	6. Generator for emergency facility	Invest in emergency equipment	1	All hazards	Existing	Provide power to emergency facility	$125
ES	7. Purchase emergency response equipment	Invest in emergency response equipment	1	All hazards	Existing	Improved preparedness for an emergency	$150
ES	8. Relocate emergency facilities from flood prone areas	Identify and move equipment to safe location	1	Flooding	Existing	Improved preparedness for an emergency	$100

***Action Type:** **PM – Preventative Measures** **ES – Emergency Services** *****Priority:** **1 - High**
PP – Property Protection **SP – Structural Projects** **2 - Medium**
NR – Natural Resources **PI - Public Information** **3 – Low**

****Activity may also meet other goals and objectives – see text.**

 # For all primary hazards included see page 7-1, Sect. 7.A.

The Village needs to develop a plan for staging emergency equipment and supplies as part of preparation for evacuating an impacted area. This is a cost effective use of Village staff to identify needs and facilities to respond to flooding and storm hazards identified in this Hazard Mitigation Plan. This preparation will help in any flooding or storm emergency. This task is given a high priority. This activity is highly feasible and will cost about $25,000.

7.B.5.4 Evaluate Safety and Possible Relocation of Waterborne Equipment (Police, Fire, and Harbormaster Boats)

A primary objective for this Emergency Services activity is to "Identify and move equipment to a safe location". A benefit of this activity is to "protect boats and other water craft and associated emergency equipment during storms." Implementing this activity will protect watercraft used by Harbor Master, Police, Fire Department, Bay Constable and US Coast Guard.

Village staff would develop a plan for protecting water-borne equipment from major storms and storm surges. The estimated cost for this evaluation is $25,000. This preparation will help protect equipment from any flooding emergency for a low cost and a high benefit. This task is given a moderate two priority. The implementation of this activity is highly feasible.

7.B.5.5 Trim Trees and Limbs that Endanger Utility Lines

The Village will continue to work with the local energy, cable and telephone utilities in an effort to remove and trim trees and tree limbs. By taking this action, the Village is taking a proactive approach to reducing the chance that falling trees will cause future blackouts and phone outages. This will result in less financial losses to businesses, fewer school closures, and in general, less disruption of life in the Village. It will also be a cost savings for the Village, in that it will not have to spend additional funds for response and recovery from a power outage event. The benefits achieved would be long term. The cost of this project will be borne by Con Edison.

7.B.5.6 Obtain a Permanent Power Generator for Emergency Services and Facility

The Village needs to obtain a larger generator for the Emergency Medical Service (EMS) Facility. A primary objective is to "invest in emergency equipment. Keeping the EMS prepared for a disaster is a priority to the health and safety of the entire Village. This activity is intended to address any hazard that may result in power outages. The cost of the generator and its installation would be $125,000. Receipt

of this funding from FEMA is contingent on FEMA's approval of this Hazard Mitigation Plan. This activity is highly feasible pending funding. This activity has a high priority.

7.B.5.7 Purchase Emergency Response Equipment

This Emergency Services activity covers the purchase of emergency response equipment for all applicable hazards and meets the objective for investing in emergency equipment. This will improve preparedness for an emergency. It has a high priority and estimated costs of $150,000. It is highly feasible and is cost effective.

7.B.5.8 Relocate Emergency Equipment from Flood Prone Areas

There are emergency facilities in the Village that are impacted by floods. This Emergency Services activity is intended to mitigate this problem. By relocating emergency equipment from flood prone areas the Village will be better prepared for an emergency. It will be necessary to identify and move equipment to a safe location. This activity has a high priority and an estimated cost of $100,000. It is highly feasible and cost effective.

7.B.6 Goal 6: Prepare for Climate Change Impacts on the Mamaroneck Community

It is recommended that the Village develop a proactive program to reduce the negative impacts of climate change. Changes in weather patterns may include more frequent and intense coastal storms, gradual rise in sea levels and more extreme temperatures.

7.B.6.1 Review NOAA Documents, LI Sound Study and Nature Conservancy Coastal Resilience Program and Projections of Changing Weather Patterns and Coastal Impacts

Future changes in climate will need effective planning today. Habitat improvement can protect harbors and shorelines from erosion. Restricting building construction in existing open spaces or preserves prevents future damage to buildings that might have been built in these areas. Review of current studies from Federal agencies and private groups provides information on future impacts due to climate changes. The primary objective of this activity is to educate the community about climate impacts. The benefit comes from improved planning and would largely be feasible over the long term. This has a priority rating of three. The estimated cost of $25,000 would be for in house services.

Table 7-6. Proposed Activities to Prepare for Climate Change Impacts on the Mamaroneck Community.

Action Type*	Action Item	Primary Objective **	Priority ***	Hazards Mitigated#	Applies to Structures	Benefits/Comments	Cost ($1,000)
NR	1. Review documents of NOAA and organizations on coastal impacts	Educate the community about climate impacts	3	Flooding and erosion	Future and existing	Improved planning	$25
PM	2. Participate in programs to lower carbon footprint	Educate the community about climate impacts	3	Severe storms	NA	Reduced greenhouse gasses	$25
PM	3. Prepare for more severe storms	Amend applicable building and zoning codes	2	Severe storms	Future and existing	Reduced building in future flood zones.	$25
PP	4. Establish long term plan to protect coastal residential areas	Plan for long term protection for coastal residents	2	Flooding, erosion, and severe storms	Future and Existing	Coastal residential areas to be better protected from climate change impacts.	$50

***Action Type:** **PM – Preventative Measures** **ES – Emergency Services** *****Priority:** **1 - High**
PP – Property Protection **SP – Structural Projects** **2 - Medium**
NR – Natural Resources **PI - Public Information** **3 – Low**
****Activity may also meet other goals and objectives – see text.** **# For all primary hazards included see page 7-1, Sect. 7.A.**

7.B.6.2 Participate in Programs to Lower the Village's Carbon Footprint and to Minimize Impacts from Sea-Level Change

Purchasing more energy efficient automobiles and trucks for the village fleet will contribute to lowering the carbon footprint. Encouraging pedestrian and bicycle traffic will also help reduce the Village's footprint. Joining neighboring municipalities will compound the beneficial effects. Retrofitting current street lighting and municipal buildings will help reduce energy use.

The primary objective is to "Educate the community about climate impacts". The benefit of reduced greenhouse gasses considers potential changes over time. Therefore, the objectives would largely be achieved over the long term. Educating the Community about climate impacts is highly feasible. The estimated cost is $25,000. This activity is given a low priority.

7.B.6.3 Prepare for More Severe Storms

One of the primary objectives is to "amend applicable building and zoning codes." The Village will need to review and update floodplain management codes. The benefits of meeting these objectives would be reduced building in future flood zones and buildings and structures will be made more resistant to severe winds and floods.

Estimated cost for this activity is $25,000. This activity will require some expenses for a consultant to prepare the plans and run models for future coastal conditions. This feasible activity is given a medium priority of two since its benefits are long term and needs are not immediate.

7.B.6.4 Establish Long Term Plan to Protect Coastal Residential Areas

The Village needs to establish a long term plan to protect coastal residential and riverine areas that are threatened by flooding. Flooding and erosion from coastal storms are a frequent problem and may likely become more severe as an impact of future climate change. Development is permitted in federally mapped flood plain areas, as long as it complies with state and federal building-elevation requirements, and is compliant with Village regulations in Mamaroneck Village Code Chapter 186.

The estimated cost for this Priority 2 Property Protection measure is $50,000. This activity is highly feasible and would require the assistance of a planning consultant.