

SECTION 6: MITIGATION STRATEGIES

This section presents mitigation actions for the Town of Shandaken to reduce potential exposure and losses identified as concerns in the Risk Assessment portion of this plan. Shandaken Area Flood Assessment and Remediation Initiative (SAFARI) reviewed the Risk Assessment to identify and develop these mitigation actions, which are presented herein.

This section includes:

- (1) Background and past mitigation accomplishments
- (2) General mitigation planning approach
- (3) Town mitigation goals and objectives (CRS Step 6)
- (4) Town capability assessment
- (5) Identification, analysis, and implementation of potential mitigation actions for each hazard (CRS Step 7)
- (6) Proposed hazard mitigation actions (CRS Step 8)

This section addresses both mitigation actions that are specific to particular hazards, as well as those that apply to multiple hazards.

Hazard mitigation reduces the potential impacts of, and costs associated with, emergency and disaster-related events.

Mitigation actions address a range of impacts, including impacts on the population, property, the economy, and the environment.

Mitigation actions can include activities such as: revisions to and enforcement of building codes, revisions to land-use planning, training and education, and structural and nonstructural safety measures.

BACKGROUND AND PAST ACCOMPLISHMENTS

An overview of past efforts is provided as a foundation for understanding the mitigation goals, objectives, and actions outlined in this HMP. Vulnerabilities include:

- **Hamlets:** Phoenicia, Mt. Tremper, Oliverea, Shandaken, Chichester
- **Roads:** Brown Road, Oliverea Road, Deer Lane, Woodland Valley Road in Oliverea; Main Street and Bridge Street, High Street, Plank Road and Station Road in Phoenicia
- **Bridges:** Main Street Bridge and Bridge Street Bridge in Phoenicia, Route 28 Bridge in Big Indian, and multiple bridges in Pine Hill.
(Historically, there has been no loss of life but significant damage to structures and municipal infrastructure including roads and utilities have been experienced.)

FEMA defines **Goals** as general guidelines that explain what should be achieved. Goals are usually broad, long-term, policy statements, and represent a global vision.

FEMA defines **Objectives** as strategies or implementation steps to attain mitigation goals. Unlike goals, objectives are specific and measurable, where feasible.

FEMA defines **Mitigation Actions** as specific actions that help to achieve the mitigation goals and objectives.

A list of flood inundation and erosion areas is provided below to indicate the areas of concern in the town.

Table 6.1 Inundation and erosion hazard areas (this table must be regularly updated to reflect changing stream conditions and available data).

Hamlet	Hazard Type	Issues	Priority
Phoenicia	Inundation	Main Street and Bridge Street (bridges), and Station Road	High
Chichester Mt. Pleasant/ Mt. Tremper	Erosion	Stony Clove Creek (4 sites)	High
	Inundation	Esopus Creek	High
	Erosion?*	Esopus Creek	Low
Oliverea	Inundation	Brown Road, Oliverea Road, and Deer Lane	High
	Erosion	Hollow, Little Peck Hollow	High
Woodland Valley	Inundation	Woodland Valley Road	Low
	Erosion	Systemic; Fawn Hill Road, Panther Kill, Muddy Brook	Med
Shandaken	Inundation	Route 42 Flood Control Structure	High
	Erosion	Route 42 and Bushnellsville Creek	Med
Allaben	inundation/Erosion	Fox Hollow and Wettje Road	Med
Bushnellsville	Erosion	High channelized	Low
Big Indian	Erosion	Route 28 (bridge)	Low
	Inundation	Church Street	
Pine Hill	Inundation	Multiple Roads (bridges)	Low
	Stormwater	Retrofit	High
	Erosion	Various infrastructure: Rock walls and historic bridges	
Hightmount	Inundation	Potential threat with new impoundment	Low
Outside Hamlet	Erosion	Route 28 at Shandaken Tunnel	Med
Outside Hamlet	Erosion	Esopus Creek near Kinsey Road and Route 28	Low

Source: Town of Shandaken, 2013

* Post-flood cross-sections are needed to determine erosion risk related to sediment aggradation; there is a need to further explore sediment management areas throughout the watershed.

The Town, through previous and ongoing hazard mitigation actions, has demonstrated that it is pro-active in protecting its physical assets and citizens against losses from natural hazards.

Examples of previous and recent actions and projects include:

- Stony Clove Creek: Completion of channel modification in Phoenicia.
- Removal of bungalows at end of Fox Hollow Road along Esopus Creek after repeated flood damage
- Brown Road, Oliverea: Implementation of protective mitigation measures including installation of rock fill and planned re-vegetation; and the design of the Pine Hill stormwater retrofit which includes replacement of old stone tiles with stormwater conveyance.
- Woodland Valley Road: The Town is implementing three flood mitigation embankment projects.
- Townwide: The Town is supporting elevation and/or acquisition of flood prone structures in vulnerable hamlets including 39 properties targeted for post-Irene HMGP funding.

- **Levees/Other Flood Control Structures:** DEC and ACOE are evaluating restoration of the levees in Shandaken, Plank Road and Mt Tremper.
- **The Ashokan Watershed Stream Management Program,** in conjunction with the Town of Shandaken, has been actively evaluating projects to restore and mitigate damage from Hurricane Irene. Below are maps that summarize ongoing projects in the Town.

In addition, the Town is contemplating ordinances for increased code requirements for structures in floodplain, is actively preparing a flood warning and response plan, and is preparing to apply to the Community Rating System (CRS) to provide incentive to reduce flood vulnerability and reduce National Insurance Flood Program (NFIP) premiums.

These past and ongoing actions have contributed to the Town's understanding of its hazard preparedness and future mitigation action needs, costs, and benefits. These efforts provide a foundation for the SAFARI to use in developing this HMP.

GENERAL MITIGATION PLANNING APPROACH

The general mitigation planning approach used to develop this plan is based on four steps, which were used to support mitigation planning. These steps are summarized below and presented in more detail in the following sections.

- **Develop mitigation goals and objectives:** Mitigation goals were developed using the hazard characteristics, inventory, and findings of the risk assessment, and through the results of the public outreach program. By reviewing these outputs and other municipal and state policy documents, objectives tying to these overarching goals were identified and characterized into similar themes.
- **Identify and prioritize mitigation actions:** Based on the risk assessment outputs, the mitigation goals and objectives, existing literature and resources, and input from the participating entities, alternative mitigation actions were identified. The potential mitigation actions were qualitatively evaluated against the mitigation goals and objectives and other evaluation criteria. The mitigation capabilities within the Town (regulatory, administrative and fiscal) were assessed and considered in the selection and prioritization of appropriate, feasible actions. These actions were then prioritized into three categories: high, medium, and low.
- **Prepare an implementation strategy:** High priority mitigation actions are recommended for first consideration for implementation, as discussed under each hazard description in the following sections. However, based on community-specific needs and goals and available funding and costs, some low or medium priority mitigation actions may also be addressed or could be addressed before some of the high priority actions.
- **Document the mitigation planning process:** The mitigation planning process is documented throughout this plan.

FLOOD MITIGATION PLANNING GOALS AND OBJECTIVES

This section presents the hazard mitigation mission statement, planning goals, and objectives identified to reduce or avoid long-term vulnerabilities to the identified hazards.

From the Mission Statement and goals, objectives were identified, and the objectives were used in the selection and prioritization of recommended mitigation initiatives. These planning components all directly support one another. Mitigation initiatives were prioritized based on meeting multiple objectives.

Mission Statement

The mission of the Town of Shandaken's Flood Mitigation Plan (the Plan) is to develop and promote appropriate Town policy and practices to protect the residents, private property, public essential facilities and the environment from probable flood hazards.

Goals and Objectives:

The Town and the SAFARI developed these goals and objectives based on the risk assessment results, input received, and the existing authorities, policies, programs, resources, and capabilities within the Town, County and region. The mitigation goals serve as general guidelines that clarify desired hazard reduction outcomes. The goals represent a long-term vision for hazard reduction and the enhancement of mitigation capabilities.

The goals are compatible with the needs and goals expressed in other available community planning documents, including:

- New York State Hazard Mitigation Plan
- Ulster County Hazard Mitigation Plan
- Comprehensive Plan-Town of Shandaken, (2005)
- Upper Esopus Stream Management Plan (2007)
- Stony Clove Stream Management Plan (2005)

Each goal has a number of corresponding objectives that further define the specific actions or implementation steps. Objectives were developed and/or selected by the SAFARI through its knowledge of the local area, review of past efforts, findings of the risk assessment, qualitative evaluations, and identification of mitigation options.

The overall goal of the Plan is to improve the Town's capability to prepare for, respond to, recover from, mitigate against and reduce vulnerability to flooding. The plan identifies and encourages partnerships for coordinated implementation, funding, public awareness and the development of strategies for carefully planned mitigation efforts designed to protect the health, safety, quality of life, environment and economy of the Town of Shandaken.

The five mitigation goals with their respective objectives are presented below:

Goal 1. Protect Life and Property

- Objective 1-1:* Protect the ongoing operation of critical facilities and infrastructure.
- Objective 1-2:* Retrofit, purchase or relocate repetitive and severe repetitive loss assets in the Town.
- Objective 1-3:* Encourage the establishment of policies to help ensure the prioritization and implementation of mitigation actions and/or projects designed to benefit essential facilities, services, and infrastructure.
- Objective 1-4:* Implement mitigation actions that enhance the capabilities of the Town to better profile and assess exposure of floods.
- Objective 1-5:* Better characterize flood/stormwater hazard events by conducting additional hazard studies and identify inadequate stormwater facilities and poorly drained areas and maintain or improve drainage or flood control systems.
- Objective 1-6:* Develop, maintain, strengthen and promote enforcement of ordinances, regulations, plans and other mechanisms that facilitate hazard mitigation and result in a higher level of natural hazard risk reduction.
- Objective 1-7:* Ensure that development is done according to modern and appropriate standards, including the consideration of natural hazard risk.
- Objective 1-8:* Identify and pursue funding opportunities to develop and implement local flood mitigation activities.
- Objective 1-9:* Address the specific needs of vulnerable populations

Goal 2. Increase Public Awareness and Preparedness

- Objective 2-1:* Develop and implement program(s) to better understand the public's level of individual and household preparedness.
- Objective 2-2:* Develop and implement additional education and outreach programs to increase public awareness of hazard areas and the risks associated with flooding, and to educate the public on specific, individual preparedness activities.
- Objective 2-3:* Promote awareness among homeowners, renters, and businesses about obtaining insurance coverage available for flooding.
- Objective 2-4:* Develop and implement programs to inform vulnerable property owners of appropriate mitigation activities and available funding programs.
- Objective 2-5:* Provide information on tools, partnership opportunities, funding resources, and current government initiatives to assist in implementing mitigation activities.

Goal 3. Enhance Disaster Preparedness, Response and Recovery

- Objective 3-1:* Encourage the establishment of policies to help ensure the prioritization and implementation of mitigation actions and/or projects designed to benefit essential facilities, services, and infrastructure.

- Objective 3-2:* Where appropriate, coordinate and integrate hazard mitigation actions with existing local emergency operations plans.
- Objective 3-3:* Identify the need for, and acquire, any special emergency services, training, equipment, facilities and infrastructure to enhance response capabilities for flooding.
- Objective 3-4:* Review and improve, if necessary, emergency traffic routes; communicate such routes to the public and communities.
- Objective 3-5:* Ensure continuity of governmental operations, emergency services, and essential facilities at the local level during and immediately after flood events.
- Objective 3-6:* Maintain and expand shared services in acquiring, maintaining and providing emergency services and equipment.

Goal 4. Protect the Environment and Natural Resources

- Objective 4-1:* Protect and restore natural lands and features that serve to mitigate losses (including wetlands, floodplains, stream corridors, hillsides and ridge lines). Such lands should be clearly mapped and identified for protection.
- Objective 4-1:* Continue to preserve, protect and acquire open space, particularly in high hazard areas. Include hazard considerations into the prioritization strategy for land acquisition.
- Objective 4-2:* Incorporate hazard considerations into land-use planning and natural resource management and encourage hazard mitigation measures that result in the least adverse effect on the natural environment.

Goal 5. Promote Mitigation Efforts through Existing Programs and Partnerships

- Objective 5-1:* Maintain and expand shared services in acquiring, maintaining and providing emergency services and equipment.
- Objective 5-2:* Strengthen inter-jurisdiction and interagency communication, coordination, and partnerships to foster hazard mitigation actions or projects.
- Objective 5-3:* Maintain awareness of available funding and partnership opportunities
- Objective 5-4:* Serve as a model for other communities.

The Town of Shandaken Capability Assessment

A capability assessment is an inventory of a community’s missions, programs and policies; and an analysis of its capacity to carry them out. This assessment is an integral part of the planning process. It identifies, reviews and analyzes local and state programs, policies, regulations, funding and practices currently in place that may either facilitate or hinder mitigation.

A capability assessment was prepared by the Town. By completing this assessment, the Town learned how or whether they would be able to implement certain mitigation actions by determining the following:

- Types of mitigation actions that may be prohibited by law;
- Limitations that may exist on undertaking actions; and
- The range of local and/or state administrative, programmatic, regulatory, financial and technical resources available to assist in implementing their mitigation actions.
- Action is currently outside the scope of capabilities (e.g. funding)

Table 6-2 presents legal and regulatory capabilities. Table 6-3 presents the administrative and technical capabilities. Table 6-4 presents fiscal capabilities, and Table 6-5 presents the community classifications for the Town.

Table 6-2. Legal and Regulatory Capabilities

Regulatory Tools (Codes, Ordinances., Plans)	D you have this capability?	Local Authority (Y or N)	Prohibitions (State or Federal) (Y or N)	Higher Jurisdictional Authority (Y or N)	State Mandated (Y or N)	Code Citation (Section, Paragraph, Page Number, date of adoption)
1) Building Code	Y	N	N	N	N	New York State Code (IBC)
2) Zoning Ordinance	Y	N	N	N	N	Town, LOCAL LAW #2 December 1987, Chapter 116
3) Subdivision Ordinance	Y	Y	N	Y	Y	12/71 Subdivision Ordinance Section 105 Town Code
4) NFIP Protection Ordinance	Y	Y	Y	N	Y	9/9/87 Local Law #1, Chapter 77
5) Growth Management	N	N	N	N	N	
6) Floodplain Management / Basin Plan	N	Y	N	N	N	This plan will become the floodplain management plan of record for Shandaken once it is adopted by town.
7) Stormwater Management Plan/Ordinance	Y	Y	Y	Y	Y	Under NYC DEP Watershed Rules and Regulations, Stormwater Protection Plans are required for all building in the town
8) Comprehensive Plan / Master Plan	Y	Y	N	Y	Y	July 2005

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Regulatory Tools (Codes, Ordinances., Plans)	Do you have this capability?	Local Authority (Y or N)	Prohibitions (State or Federal) (Y or N)	Higher Jurisdictional Authority (Y or N)	State Mandated (Y or N)	Code Citation (Section, Paragraph, Page Number, date of adoption)
9) Capital Improvements Plan	N	N	N	N	N	
10) Site Plan Review Requirements	Y	N	N	N	N	Chapter 116 Article 8, Local Law #2 of 1997
11) Open Space Plan	Y	N	Y	N	N	Catskill Park State Land Master Plan (2008)
12) Stream Corridor Management or Protection Plan	Y	N	N	N	N	Esopus Creek Corridor Management and Protection, adopted by Town in 2008.
13) Economic Development Plan	N	N	Y	Y	N	
14) Emergency Response Plan	N	Y	Y	N	Y	Town is working on standardized response plan.
15) Post Disaster Recovery Plan	N	N	N	N	N	
16) Post Disaster Recovery Ordinance eq.	N	N	N	N	N	
17) Real Estate Disclosure	Y	N	N	N	N	NYS real estate law
18) Highway Management Plan	N	Y	N	N	N	
19) COOP/COG Plan	N	Y	N	N	N	Continuity of Operations, Continuity of Government
20) Other [Special Purpose Ordinances (i.e., critical or sensitive areas)]	Y	Y	Y	Y	N	NYC Watershed Regulations; NYS DEC, Town Zoning 116- 29 and 41, Standards Within a Flood Fringe Overlay District (as mapped by FEMA). 1993

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Table 6-3. Administrative and Technical Capabilities

Staff/ Personnel Resources	Available (Y or N)	Department/ Agency/Position
1) Planner(s) or Engineer(s) with knowledge of land development and land management practices	Y	Shandaken Planning Board
2) Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Y	Knowledgeable Town staff: Supervisor, Building Inspector and Highway Superintendent
3) Planners or engineers with an understanding of natural hazards	Y	Town and County Planning Boards, AWSMP
4) NFIP Floodplain Administrator *	Y	Code Enforcement Officer
5) Surveyor(s) hired independently as needed	Y	Hired independently as needed
6) Personnel skilled or trained in "GIS" applications	Y	AWSMP, Ulster County Department of Planning
7) Scientist(s) familiar with natural hazards in the Town of Shandaken.	Y	AWSMP, NYSDEC
8) Emergency Manager	Y	Ulster County Emergency Coordinator; Town Civil Defense Coordinator, Fire Chiefs, Police, EMS; Incident Commander
9) Grant Writer(s)	Y	SHARP, RCAP Solutions, AWSMP, M-ARK Project
10) Staff with expertise or training in FEMA benefit/cost analysis	N	NYSOEM provides support

This plan was prepared with input and under the supervision of the Town of Shandaken NFIP Floodplain Administrator who participated as a member of SAFARI and had access to all documents for review and comment throughout the planning process.

Table 6-4. Fiscal Capabilities

Financial Resources	Accessible or Eligible to use (Yes/No/Don't know)
1) Community Development Block Grants (CDBG)	Yes
2) Capital Improvements Project Funding	Yes, DWSRF for Pine Hill Water District
3) Authority to Levy Taxes for specific purposes	Fire Districts, Water Districts, Lighting, Library
4) User fees for water, sewer, gas or electric service	Yes, water
5) Impact Fees for homebuyers or developers of new development/homes	No
6) Incur debt through general obligation bonds	Yes
7) Incur debt through special tax bonds	Yes
8) Incur debt through private activity bonds	No
9) Withhold public expenditures in hazard-prone areas	Yes
10) Government mitigation grant programs (e.g. NYSDEC, FEMA)	Yes
11) Other-Catskill Watershed Corporation (CWC)NRCS Emergency Watershed Protection (EWP), Ashokan Watershed Stream Management Program (AWSMP)	Yes



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Financial Resources	Accessible or Eligible to use (Yes/No/Don't know)
grants	

TBD = To be determined.

Table 6-5. Community Classifications

Program	Classification	Date Classified
Community Rating System (CRS)	NP	NA
Building Code Effectiveness Grading Schedule (BCEGS)	NP	NA
Storm Ready	NP	NA
Firewise	NP	NA
Public Protection (ISO) Classification	Class 7B	NA

NA = Not applicable. NP = Not participating. TBD = To be determined.

The classifications listed above relate to the community's effectiveness in providing services that may impact its vulnerability to the natural hazards identified. These classifications can be viewed as a gauge of the community's capabilities in all phases of emergency management (preparedness, response, recovery and mitigation) and are used as an underwriting parameter for determining the costs of various forms of insurance. The CRS class applies to flood insurance while the BCEGS and Public Protection classifications apply to standard property insurance. CRS classifications range on a scale of 1 to 10 with class one (1) being the best possible classification, and class 10 representing no classification benefit. Firewise classifications include a higher classification when the subject property is located beyond 1000 feet of a creditable fire hydrant and is within 5 road miles of a recognized Fire Station.

- Criteria for classification credits are outlined in the following documents:
- The Community Rating System Coordinators Manual
- The Building Code Effectiveness Grading Schedule
- The ISO Mitigation online ISO's Public Protection website at <http://www.isomitigation.com/ppc/0000/ppc0001.html>
- The National Weather Service Storm Ready website at <http://www.weather.gov/stormready/howto.htm>
- The National Firewise Communities website at <http://firewise.org/>

Identification, Prioritization, Analysis, and Implementation of Mitigation Actions

This subsection discusses the identification, prioritization, analysis and implementation of mitigation actions for the Town of Shandaken.

Mitigation Action Identification – Comprehensive Review of Mitigation Activities

On December 12, 2012, a Strengths, Weaknesses, Obstacles, and Opportunities workshop was conducted with stakeholders and the working group of SAFARI. The purpose of this session was to review information garnered from the risk assessment and the public involvement strategy to identify strengths, weaknesses, obstacles and opportunities in hazard mitigation within the Town through a facilitated brainstorming session on risks, vulnerabilities, and capabilities. All information shared during this session was documented and used to help screen a broad range of potential mitigation activities.

Mitigation Alternatives

By way of a facilitated session, the SAFARI was able to develop a mitigation catalog which includes a comprehensive list of mitigation actions to be considered that met the following objectives:

- Use information obtained from the public involvement strategy;
- Use information provided in the risk and vulnerability assessment;
- Seek mitigation actions consistent with the goals and objectives of this local Plan;
- Identify mitigation actions that are within the capabilities of the Town.

The SAFARI developed a catalog of flood hazard mitigation alternatives through a facilitated process with Town staff involved in floodplain management. A session held December 12, 2012 to look at local strengths, weaknesses, obstacles and opportunities was the basis for the alternatives considered as well as the mitigation initiatives selected for implementation. The catalog represents the comprehensive range of alternatives considered for complying with Step 7 of the CRS 10-step process. The SAFARI reviewed this catalog in conjunction with the findings of public outreach efforts and the risk assessment results. The catalog was enhanced based on this review and then used by Committee to select hazard mitigation initiatives.

The catalog of flood hazard mitigation alternatives was developed to represent a broad range of alternatives to be considered for use in the planning area (CRS Step 7). The mitigation alternatives are listed in Table 6-6 through Table 6-9. The catalog presents alternatives that are categorized in two ways:

- By what the alternative would do:
 - Manipulate a hazard
 - Reduce exposure to a hazard
 - Reduce vulnerability to a hazard
 - Increase the ability to respond to or be prepared for a hazard
- By who would have responsibility for implementation:
 - Individuals
 - Businesses
 - Government.

Flood hazard mitigation initiatives recommended in this plan were selected from among the alternatives presented in the catalog. The catalog provides a baseline of mitigation alternatives that are backed by a planning process, are consistent with the goals and objectives, and are within the capabilities of the Town of Shandaken to implement. However, not all the alternatives meet all the selection criteria.

Selected Mitigation Initiatives

The Steering Committee determined that some initiatives from the flood hazard mitigation catalog could be implemented to provide flood hazard mitigation benefits. Table 10 lists the recommended initiatives, the lead agency for each, and the proposed timeline. The parameters for the timeline are as follows:

- Short Term = to be completed in 1 to 5 years
- Long Term = to be completed in greater than 5 years
- Ongoing = currently being funded and implemented under existing programs.

TABLE 6-6.		
Personal Scale	Corporate Scale	Government Scale
<ol style="list-style-type: none"> 1. Clear stormwater drains and culverts 2. Institute low-impact development techniques on property 	<ol style="list-style-type: none"> 1. Clear stormwater drains and culverts 2. Institute low-impact development techniques on property 	<ol style="list-style-type: none"> 1. Maintain drainage system 2. Institute low-impact development techniques on property 3. Sediment management and debris removal and providing regional retention areas 4. Streambank protection 5. Stormwater management regulations and master planning 6. 7. Strategize responsible land protection methods to maintain/restore natural floodplain functions

TABLE 6-7.		
Personal Scale	Corporate Scale	Government Scale
<ol style="list-style-type: none"> 1. Locate outside of hazard area 2. Elevate utilities above base flood elevation 3. Institute low impact development techniques on property 	<ol style="list-style-type: none"> 1. Locate business critical facilities or functions outside hazard area 2. Institute low impact development techniques on property 	<ol style="list-style-type: none"> 1. Locate or relocate critical facilities outside of hazard area 2. Acquire or relocate identified repetitive loss properties 3. Promote flood-compatible land uses in identified high hazard areas via techniques such as: community education; natural resource inventory; comprehensive planning; zoning provisions; floodplain protection ordinance; and the environmental review process.. 4. Adopt appropriate land development criteria 5. Institute low impact development techniques on property 6.

TABLE 6-8.		
Personal Scale	Corporate Scale	Government Scale
<ol style="list-style-type: none"> 1. Retrofit structures (elevate structures above base flood elevation) 2. Elevate items within house above base flood elevation 3. Build new homes above base flood elevation 4. Flood-proof existing structures 	<ol style="list-style-type: none"> 1. Build redundancy for critical functions or retrofit critical buildings 2. Provide flood-proofing measures when new critical infrastructure must be located in floodplains 	<ol style="list-style-type: none"> 1. Participate in CRS 2. Implement as-built regulatory requirements 3. Implement site review ordinances/requirements 4. Harden infrastructure, bridge replacement program 5. Provide redundancy for critical functions and infrastructure 6. Adopt appropriate regulatory standards, such as: increased freeboard standards, cumulative substantial improvement or damage, lower substantial damage threshold; compensatory storage, non-conversion deed restrictions. 7. Stormwater management regulations and master planning. 8. Adopt “no-adverse impact” floodplain management policies that strive to not increase the flood risk on downstream communities. 9. Update existing regulations to account for the impacts of climate change as flooding is becoming more frequent and severe.

TABLE 6-9.		
Personal Scale	Corporate Scale	Government Scale
<ol style="list-style-type: none"> 1. Buy flood insurance 2. Develop household mitigation plan, such as retrofit savings, communication capability with outside, 72-hour self-sufficiency during and after an event 3. Comply with NFIP requirements 	<ol style="list-style-type: none"> 1. Keep cash reserves for reconstruction 2. Support and implement hazard disclosure for the sale/re-sale of property in identified risk zones. 3. Solicit cost-sharing through partnerships with other stakeholders on projects with multiple benefits. 4. Develop a flood response plan 	<ol style="list-style-type: none"> 1. Participate in CRS 2. Produce better hazard maps- Create flood hazard identification maps that reflect future conditions including the probable impacts from sedimentation and climate change. 3. Develop codes and standards for bridges and culverts 4. Increase radio communication capability in Town 5. Require appropriate municipal officials to get floodplain management education and certification. 6. Implement/participate in regional precipitation monitoring networks. 7. Provide technical information and guidance 8. Enact tools to help manage development in hazard areas (stronger controls, tax incentives, and information) 9. Incorporate retrofitting or replacement of critical system elements in capital improvement plan 10. Utilize post-disaster assistance 11. Warehouse critical infrastructure components 12. Develop and adopt a continuity of operations plan (COOP) 13. Consider participation in the Community Rating System 15. Maintain existing data and gather new data needed to define risks and vulnerability 16. Train emergency responders 17. Identify critical facilities/infrastructure that require early notification during flood responses 18. Create a levee failure response plan 19. Enhance flood threat recognition capability 20. Create a building and elevation inventory of structures in the floodplain 21. Develop and implement a public information strategy 22. Integrate floodplain management policies into other planning mechanisms within the planning area. 23. Consider the residual risk associated with structural flood control in future land use decisions 24. Enforce National Flood Insurance Program requirements 26. Capture/survey high water marks after flood events.

The list of potential mitigation actions identified for this planning process, include a range of options in line with the six types of mitigation actions including:

1. **Prevention:** (planning and zoning, storm water management)
2. **Property Protection:** (retrofitting, insurance, relocation, elevation)
3. **Public Education and Awareness:** (maps, outreach projects, technical assistance and training)
4. **Natural Resource Protection:** (erosion control, wetlands protection, floodplain protection)
5. **Emergency Services:** (flood warning, flood response, critical facilities protection)
6. **Structural Projects:** (stream channel modifications, storm sewers, bridge or culvert sizing)

Though this exercise, the SAFARI was able to identify a baseline of appropriate mitigation actions backed by a planning process, consistent with the goals and objectives of the planning area, and within the capabilities of the Town. Many of the strategies identified, such as community outreach, could be applied to multiple hazards. Actions that were not selected by the Town were not selected based on the following:

- Action is not feasible



- Action is currently outside the scope of capabilities
- Action is not in line with established community goals and vision
- Action is not considered cost-effective
- Action is already being implemented

Mitigation Actions

On February 20, 2013, the SAFARI conducted a meeting to work through the hazard mitigation catalog. The resulting mitigation strategy is provided in Table 6-10 below.

Mitigation actions are activities designed to reduce or eliminate losses resulting from natural hazards.

A series of mitigation actions were identified by the Town. These actions are summarized in Table 6-10 along with the hazards mitigated, goals and objectives met; lead agency, estimated cost, potential funding sources and the proposed timeline are identified. The parameters for the timeline are as follows:

- Short Term = To be completed in 1 to 5 years
- Long Term = To be completed in greater than 5 years
- Ongoing = Currently being funded and implemented under existing programs.

Benefit/Cost Review

Section 201.6.c.3iii of 44CFR requires the prioritization of the action plan to emphasize the extent to which benefits are maximized according to a cost/benefit review of the proposed projects and their associated costs. The Town was asked to weigh the estimated benefits of a project versus the estimated costs to establish a parameter to be used in the prioritization of a project.

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**TABLE 6-10.
ACTION PLAN—FLOOD MITIGATION INITIATIVES (FMI)**

Lead Department	Possible Funding Sources or Resources	Estimated Project Cost	Time Line	Objectives	Mitigation Category	Priority
FMI-1—Continue to maintain compliance and good standing with the programmatic requirements of the National Flood Insurance Program.						
Floodplain Administrator/Cod e Official Town Supervisor/DPW/FPA/CEO	Department budgets	Low/Medium	Ongoing	1-3, 1-4, 1-6, 1-7, 4-3	Prevention	H
FMI-2—Expand watershed and multi-stakeholder coordination efforts and seek inter-local agreements or other contractual relationships in support of achieving long-term comprehensive flood risk reduction solutions.						
	Department Budgets/AWSMP	Low	Ongoing	1-4, 5-2	Prevention	L/M
Town of Shandaken and to expand on the warning system. Potential topics could include additional stream gage locations, support of gage automation at specific sites, installation of precipitation monitoring stations, formation of volunteer spotters corps.						
SAFARI, Town Supervisor, AWSMP	AWSMP/ Town Budget	Low	short term	1-3, 1-4, 5-2	Prevention	M/H
FMI-4—Assist AWSMP to create a flood model to provide data on potential stream migration and sediment locations along waterways. This will provide a basis for future flood mitigation and streambank stabilization measures. Map						
AWSMP	Grants/AWSMP	Medium	short-term	1-3, 1-4, 1-5	Prevention	H
FMI-5—Invest in flood prediction and forecast modeling to support all facets of the Town of Shandaken floodplain management program, including but not limited to flood hazard identification, flood threat recognition in support of flood notification programs, climate change adaptation, and risk assessment.						
Town of Supervisor	Department Budgets / Grants/AWSMP	Medium	short-term	1-4, 3-1, 3-3	Prevention	L
FMI-6—Develop codes and standards for existing and new culverts/bridges in Town including bridges on privately owned property.						
Code Official, Supervisor	Department budget	Medium	short term	1-1, 1-3, 1-6, 1-7	Prevention	TOWN H PRIVATE L
FMI-7—Create an inventory and establish a priority list for culvert replacement that takes into account flood depth reduction and future losses avoided.						
Town DPW	Department Budget	Low	short term	1-1, 1-3, 3-1	Prevention	H
FMI-8—Utilizing the best available data, science and technology, enhance the existing flood notification program, striving to identify a notification protocol that has real-time flood threat recognition capability.						
Emergency Management	Department Budget / Grants	Medium	short term	1-9, 3-3	Prevention	M (TIED TO FM6)
FMI-9—Utilizing the best available data, science and technology, maintain and enhance (including input of pending Digital Flood Insurance Rate Maps (DFIRMs) the user-defined HAZUS-MH model that was constructed to support this planning effort, as data becomes available and utilize the DFIRM flood depth grids to calculate estimated potential future losses to structures and critical facilities.						
Emergency Management	Department Budgets	Medium	short term	1-3, 3-1	Prevention	L/M
FMI-10—Develop a post-flood disaster action plan that establishes protocols for the Town such as substantial damage determination, the recording of perishable data (such as high water marks), grant support, staffing, continuity of operations, and recovery.						
Emergency Management /Public Works	Department Budgets / Grant	Medium	short term	1-1, 1-4, 3-1	Prevention	H



SECTION 6: MITIGATION STRATEGY

**TABLE 6-10.
ACTION PLAN—FLOOD MITIGATION INITIATIVES (FMI)**

Lead Department	Possible Funding Sources or Resources	Estimated Project Cost	Time Line	Objectives	Mitigation Category	Priority
FMI-11—Finalize and adopt a town-wide Flood Response Plan						
Town Supervisor/Emergency Management	Grants	Low	short term	1-9, 2-2, 3-3, 3-5	Prevention	H
FMI-12—Work with the Town departments responsible for implementation and maintenance of the Town's current and future infrastructure to identify flood hazard mitigation projects that are eligible for hazard mitigation grants. Once projects are identified, pursue grant funding for those projects shown to be cost-effective.						
Town Supervisor/DPW	Department Budgets	Low	short term	1-1, 1-3, 1-8	Prevention	M
FMI-13— Establish a link between the Town of Shandaken Flood Hazard Mitigation Plan and the Ulster County All-Hazards Mitigation Plan. The Flood Hazard Mitigation Plan will become the flood hazard component of the Natural Hazards Mitigation Plan upon its next update. All future updates to the two plans will occur on the same planning cycle upon plan integration.						
FPA/Emergency Management	Department Budgets, Grants,	Low	short term	4-3	Prevention	M
FMI-14—Draft a prioritized list of Town road segments and bridges that should be elevated above the 100-year floodplain and culverts that will fail under flood flow. Upgrade these structures if state or federal funds become available.						
DPW	CIP, Grants	Low	short term	1-1 1-3, 1-4	Prevention	M
FMI-15—Where feasible, consider the adoption of appropriate higher regulatory standards (including but not limited to freeboard, compensatory floodwater storage, lower substantial damage thresholds, setbacks and fill restrictions) as means to reduce future flood risk and support a no-adverse-impact philosophy of floodplain management.						
Town Supervisor, GPA	Department Budgets, Grants	Low	short-term	1-3, 1-6, 1-7	Prevention	M
FMI-16— Maintain relationship with AWSMP						
Town Supervisor	Department Budgets	Low	Long-term	5-2	Prevention	H
FMI-17—Support AWSMP's continued prioritization of riverine erosion hazard areas, especially hill slope failures and stream bank erosion areas in order to evaluate stream management feasibility.						
Town Board/FPA	Operating Budget/AWSMP	Low	Short-term	1-4, 5-2	Prevention	H
FMI-18—Participate in the Community Rating System (CRS) to further manage flood risk and reduce flood insurance premiums for NFIP policyholders. This shall start with the submission to FEMA-DHS of a Letter of Intent to join CRS, followed by the completion and submission of an application to the program once the community's current compliance with the NFIP is established.						
Town Supervisor/DPW/FPA	Operating Budget	Medium	Short-term	1-1, 1-3, 2-2, 2-3, 2-4, 2-5	Prevention	H
FMI-19— Determine if a Community Assistance Visit (CAV) or Community Assistance Contact (CAC) is needed, and schedule if needed.						
Town Supervisor/DPW/FPA	Operating Budget	Low	Short-term	5-2	Prevention	M (SEE 18)
FMI-20—Inventory monuments; obtain recommendations from local surveyors for sites for additional monuments in the area to reduce the costs of elevation certificates.						
Town Supervisor/DPW/FPA	Operating Budget	Low	Short-term	1-3, 1-7, 1-8	Prevention	H (TIED TO 65C)
FMI-21— Require and archive elevation certificates for floodplain -related building and zoning permits.						
Town Supervisor/DPW	Operating Budget	Low	Short-term	1-4, 1-7, 1-9	Prevention	H
FMI-22— Evaluate, adopt or amend local land use laws that prevent inappropriate development in areas of high flood risk and foster uses that are compatible with the anticipated flooding conditions.						
Town Supervisor/DPW/FPA	Operating Budget	Low	Short-term	1-6, 4-3	Prevention	H
FMI-23— Integrate a strong emphasis on stream corridor management in the municipal comprehensive plan, site plan review laws, zoning and other appropriate local ordinances.						



SECTION 6: MITIGATION STRATEGY

**TABLE 6-10.
ACTION PLAN—FLOOD MITIGATION INITIATIVES (FMI)**

Lead Department	Possible Funding Sources or Resources	Estimated Project Cost	Time Line	Objectives	Mitigation Category	Priority
Town Supervisor/Planning	Operating Budget	Low	Short-term	1-6, 4-3, 5-2	Prevention	L/M
FMI-24— Facilitate development of a flood damage reporting system to track types of flooding, their location and the associated costs. Database development should attempt to collect records on past floods to get started; all flooding damages should be reported even if localized. Program will require training, and administrative support to insure success.						
Town Supervisor/DPW/FPA	Operating Budget/AWSMP	Low	Short-term	1-3, 1-4	Prevention	L
FMI-25— Continue to support the implementation, monitoring, maintenance, and updating of Flood Plan.						
Town Supervisor/DPW/FPA	Operating Budget	Low	Short-term	all	Prevention	M
FMI-26— Update the Town of Shandaken’s general building stock inventory in HAZUS-MH with the new assessor’s data which was not available in electronic format at the time this Plan was written.						
Town Supervisor/DPW/FPA	Operating Budget	Low-Medium	Short-term	1-3, 3-1	Prevention	L/M
FMI-27— Support the continued improvement of the Upper Esopus Creek hydraulics and hydrology models.						
Town Supervisor/DPW/FPA/AWSMP	Operating Budget/AWSMP	Low	Short-term	1-3, 1-5, 5-2	Prevention	M
FMI-28— Support local sustainability of a watershed management organization and other working groups, eg SAFARI and Highway Management Group.						
Town Supervisor/DPW/FPA/AWSMP	Operating Budget/AWSMP	Low	Short-term	5-2	Prevention	H
FMI-29— Continue to participate in the CWC Stormwater Retrofits Grant Program to address stormwater quality issues.						
Town Supervisor/DPW/FPA/AWSMP	Operating Budget	Low	Short-term	1-8, 5-2	Prevention	M
FMI-30— Participate in future flood hazard mitigation funding programs at CWC and AWSMP.						
Town Supervisor/DPW/FPA/AWSMP	Operating Budget	Low	Short-term	1-8, 5-2	Prevention	M/H
FMI-31—Support continued characterization of flooding and erosion hazards in the tributary streams to the Esopus that have not been previously assessed.						
Town Supervisor/DPW/FPA/AWSMP	Operating Budget/AWSMP	medium	Short-term	1-3, 1-5, 5-2	Prevention	M
FMI-32—Support AWSMP in providing streamside landowners and others detailed technical information on the establishment and maintenance of riparian buffers and Continue to Support/promote long term riparian buffer protection for municipal properties and infrastructure.						
Town Supervisor//FPA	AWSMP	Low	Short-term	4-1, 4-3	Prevention	M
FMI-33— Make stream side landowners and local timber harvesters who practice forest harvest aware of the opportunity to participate in the NYC Watershed Forestry Program (WFP) to ensure that timber harvesting operations use appropriate methods to reduce or eliminate impacts to the riparian buffer and improve its condition whenever possible.						
Town Supervisor//FPA	Operating Budget	Low	Short-term	2-2, 2-4	Prevention	L (NOT MUCH LOGGING HAPPENING)
FMI-34— Encourage a community education campaign for recreational safety on the Esopus Creek. Support the placement of information kiosks at common put-in and take-out locations as a means to share pertinent information about the location of hazards.						
Town Supervisor/ UC Dept of Env	Operating Budget/ Ulster County	Low	Short-term	2-2	Prevention	L/M
FMI-35—Require NFIP Floodplain Administrator (FPA) become a Certified Floodplain Manager through the ASFPM, and pursue relevant continuing education training such as FEMA Benefit-Cost Analysis.						
Town Supervisor//FPA	Operating Budget	Low	Short-term	1-3, 1-7	Prevention	H



SECTION 6: MITIGATION STRATEGY

**TABLE 6-10.
ACTION PLAN—FLOOD MITIGATION INITIATIVES (FMI)**

Lead Department	Possible Funding Sources or Resources	Estimated Project Cost	Time Line	Objectives	Mitigation Category	Priority
FMI-36— Support periodic training sessions on flood related issues for municipal leaders, code enforcement staff, and planning boards.						
Town Board/Town Supervisor//FPA	Operating Budget/AWSMP	Low	Short-term	1-3, 5-2	Prevention	M
FMI-37— Integrate geomorphology principles in all new town projects and routine maintenance activities related to the stream system. Support trainings in stream management for highway department staff and other resource managers.						
Town Supervisor//FPA/DPW	Operating Budget/AWSMP	Low	Short-term	1-3, 1-4, 1-7	Prevention	M (ALREADY DOING THIS)
FMI-38— Continue to work on improving municipal communications network to provide complete coverage of the Town. Ensure redundancy of Town communications capabilities. Review annually.						
Emergency Services, Ulster County	Operating Budget, HLS Grants/EMPG/SHSP	Low	Short-term	3-3, 3-5, 5-2	Prevention	H
FMI-39— Request NYSEG personnel at EOC for all disasters. Set up dedicated contacts from utilities including NYSEG, Verizon and Time Warner.						
Emergency Services	Operating Budget	Low	Short-term	3-2, 5-2	Prevention	H
FMI-40— Conduct Town pre-disaster planning meeting(s), defining EOC roles and anticipated response.						
Town Supervisor//Emergency Services	Operating Budget	Low	Short-term	3-3, 3-4, 3-5	Prevention	M (ALREADY DO PART OF NIMS)
FMI-41— Streamline procedure for updating County Emergency Management of emergency activities and infrastructure damages (power, phone, road closures etc.)						
Town Supervisor//Emergency Services	Operating Budget/EMPG/SHSP	Low	Short-term	3-3, 3-5, 5-2	Prevention	H
FMI-42— Ensure dedicated phone line for town emergency management communications.						
Town Supervisor/Emergency Services	Operating Budget/EMPG/SHSP	Low	Short-term	3-3	Prevention	H
FMI-43— Craft strategy to ensure redundancy of emergency public communications capabilities. Investigate automatic emergency notifications via phone.						
Town Supervisor/Emergency Services	Operating Budget/EMPG/SHSP	Low	Short-term	3-2, 3-3, 5-2	Prevention	M
FMI-44— Create/enhance/ maintain mutual aid agreements with neighboring communities for continuity of operations and eligibility for FEMA reimbursements.						
Town Supervisor/Emergency Services	Operating Budget/EMPG/SHSP	Low	Short-term	1-8, 5-1, 5-2	Prevention	M
FMI-45— Identify and develop agreements with entities that can provide support with FEMA/SOEM paperwork after disasters; ensure qualified damage assessment capabilities and personnel – Improve post-disaster capabilities – damage assessment; FEMA/SOEM paperwork compilation, submissions, record-keeping.						
Town Supervisor/Emergency Services	Operating Budget, FEMA grants/EMPG/SHSP	Low	Short-term	5-2	Prevention	L (HAVE A LOT IN PLACE ALREADY)
FMI-46— Pursue all pre-disaster funding through FEMA Section 404.						
Town Supervisor/FPA/DPW	Operating Budget	Low	Short-term	1-1, 1-8	Prevention	H



SECTION 6: MITIGATION STRATEGY

**TABLE 6-10.
ACTION PLAN—FLOOD MITIGATION INITIATIVES (FMI)**

Lead Department	Possible Funding Sources or Resources	Estimated Project Cost	Time Line	Objectives	Mitigation Category	Priority
FMI-47— Pursue all post-disaster funding through FEMA Section 406.						
Town Supervisor/FPA/DPW	Operating Budget	Low	Short-term	1-2, 1-8	Prevention	H
FMI-48— Facilitate biannual notification to landowners who have special flood hazard areas (SFHA) located on their property.						
Town Supervisor//FPA	Operating Budget/EMPG/SHSP	Low	Short-term	2-2, 2-3, 2-5	Prevention	L/M
FMI-49— Enable command center call-in capability to Birch Creek, Stony Clove, Woodland Valley, Allaben and any newly established USGS gages.						
Town Supervisor/FPA/AWSMP	Operating Budget/EMPG/SHSP	medium	Short-term	1-4, 1-8, 3-3, 5-2	Prevention	H
FMI-50— Support new town-wide weather data collection stations as part of the flash flood warning system.						
Town Supervisor//FPA/AWSMP	Operating Budget	Low	Short-term	1-4, 1-8, 3-3, 5-2	Prevention	M/H
FMI-51— Explore funding for town-wide weather stations.						
Town Supervisor/FPA	Operating Budget, CWC funds/AWSMP/ OTHERS	Low	Short-term	1-8	Prevention	M/H
FMI-52— Work with AWSMP on flood emergency preparedness for residents.						
Town Supervisor/FPA	Operating Budget	Low	Short-term	2-2, 5-2	Prevention	H
FMI-53— Ensure regularly scheduled releases of flood emergency info, e.g. periodic, not ad hoc						
Town Supervisor//FPA	Operating Budget/EMPG/SHSP	Low	Short-term	2-2, 2-3, 2-4, 2-5	Prevention	H (PART OF CRS ALREADY)
FMI-54— Maintain generators; hard wire installation at all town buildings especially EOC and all fire houses						
Town Supervisor/DPW/Emergency Management	Operating Budget/EMPG/SHSP	medium	Short-term	1-1, 3-3, 3-5	Prevention	H
FM-55-floodproof or relocate critical town facilities.						
Town Supervisor//FPA	Operating Budget/FEMA, HLS grants	high	ShortLong-term	1-1, 1-2, 1-8	Prevention	L/M
FMI-56— Create, and conduct an annual inventory of, an emergency equipment box including lap tops, cell phones, walkie talkies, portable battery charger, list of emergency equipment and plan of attack should be on the computer and thumb drives. Explore funding – list items, cost out, apply for FEMA planning money.						
Town Supervisor/FPA/Emergency Management	Operating Budget/ FEMA, EMPG, HLS grants	Low-medium	Short-term	1-1, 3-3, 3-5	Prevention	M
FMI-57— Improve preparedness activities for care of town-sheltered dogs. Construct an emergency kennel on higher ground.						
Emergency Services	Operating Budget/ASPCA grants	Low	ShortLong-term	3-3, 5-2	Prevention	M
FMI-58— Work with regional agencies (i.e. County and SOEM) to help develop damage assessment capabilities at the local level through such things as training programs, certification of qualified individuals (e.g. code officials, floodplain managers, engineers).						



SECTION 6: MITIGATION STRATEGY

**TABLE 6-10.
ACTION PLAN—FLOOD MITIGATION INITIATIVES (FMI)**

Lead Department	Possible Funding Sources or Resources	Estimated Project Cost	Time Line	Objectives	Mitigation Category	Priority
Town Supervisor/FPA	Operating Budget	Low	Short-term/ ongoing	3-3, 5-2	Prevention	L/M (ONGOING)
FMI-59— Ensure that command staff, department heads and elected officials are up to date on their NIMS training through FEMA.						
Town Supervisor/Emergency Services	Operating Budget	Low	Short-term/ ongoing	3-3, 5-2	Prevention	H
FMI-60— Create strategy for pre-emergency parking to prevent storm isolation.						
Town Supervisor/Emergency Services	Operating Budget	Low	Short-term	3-2, 3-4	Prevention	L/M
FMI-61— Create priority list of emergency evacuation zones and a notification and action procedure.						
Town Supervisor/Emergency Services	Operating Budget/EMPG/SHSP	Low	Short-term	3-2, 3-4	Prevention	H
FMI-62— Identify and explore sheltering at government and non-government locations.						
Town Supervisor/Emergency Services	Operating Budget	Low	Short-term	3-2, 3-4	Prevention	L/M (PRETTY SOLID NOW)
FMI-63— Explore designation of Belleayre as a State/ regional shelter.						
Town Supervisor/Emergency Services	Operating Budget, American Red Cross	Low	Short-term	3-2	Prevention	H
FMI-64— Incorporate appropriate specialized individuals into town EOC staff (e.g. technical assistance from AWSMP).						
Town Supervisor/Emergency Services	Operating Budget	Low	Short-term	1-3, 3-3	Prevention	H
FMI-65—Identify properties that are potential candidates for elevation, relocation or buyout based on an evaluation of flood risks, project feasibility, and planned flood risk reduction capital projects. A list of targeted high-priority acquisitions should be prepared and annually updated. An example of a high-priority project would be a property identified by FEMA as a repetitive loss property. Once the list is established, pursue funding opportunities to implement the projects.						
Town Supervisor/Flood Plain Administrator (FPA)	HMGP/Community Development Block Grant / Federal Grants	Med	Short-term, Ongoing	1-2, 1-8	Property Protection	M (ONGOING)
FMI-65a--Support the acquisition of the 39 properties identified for post-Irene HMGP funding						
Town Supervisor/FPA	HMGP/Community Development Block Grant / Federal Grants	Low	Short-term, Ongoing	1-2, 1-8	Property Protection	H
FMI-65b--Implement public outreach to floodprone property owners to document interest in participating in acquisition or elevation projects.						
Town Supervisor/FPA	HMGP/Town Operating Budget	Low	Short-term, Ongoing	2-2, 2-4, 2-5	Property Protection	L/M
FMI-66—To support initiative # FMI-1, undertake a Repetitive Loss Area Analysis to determine the following:						
<ul style="list-style-type: none"> • Repetitive losses not captured by flood insurance data • Causes of the repetitive flooding • Assets impacted by the repetitive flooding (this would include assets such as livestock, out-buildings and rescue costs not already identified by FEMA) • Possible alternatives to remediate the repetitive flooding 						
Town Supervisor, FPA	Department Budgets, Grants	Medium	long term, depends on funding	1-3, 1-5	Property Protection	L

SECTION 6: MITIGATION STRATEGY

**TABLE 6-10.
ACTION PLAN—FLOOD MITIGATION INITIATIVES (FMI)**

Lead Department	Possible Funding Sources or Resources	Estimated Project Cost	Time Line	Objectives	Mitigation Category	Priority
FMI-67— Pursue demolition of vacant/abandoned structures in town that are subject to environmental hazards such as mold.						
DPWCEO	Grants	Medium	long term	1-2, 1-6	Property Protection	M
FMI-68—Using the best available data on flood risk, conduct outreach to property owners to alert them to the risks and ways to deal with them, to inform them about potential opportunities to mitigate the risks, and to assess their interest in participation should funding be available. Property owners who are interested in participating in one of these programs should be informed that having flood insurance might help qualify them for funding assistance.						
Town Supervisor/FPA	Town Operating Budget	Low	Ongoing	2-1, 2-2, 2-4, 2-5	Public Education	H (CRS OUTREACH)
human influences have on streams.						
AWSMP/Town Supervisor	Town operating budget/AWSMP	Low	Short	2-2	Public Education	H
abilities within the town.						
Town Supervisor/Emergency Management	Department Budget	Low	Ongoing	2-1, 2-2, 2-3, 2-4, 2-5	Public Education	18 (CRS RELATED)
FMI-71— Add tab to Town website to provide information to watershed stakeholders. Upgrade site to allow landowners interaction such as reporting stream changes, problems etc.						
Town Supervisor	Operating Budget	Low	Short-term	2-2, 2-3, 2-4, 2-5	Public Education	L/M
FMI-72—Where streambanks are being restored, explore opportunities to reestablish floodplain connectivity to improve flood water retention while simultaneously creating or restoring floodplain habitat.						
AWSMP/FPA	Grants /AWSMP	Medium-High	Short-term	1-4, 4-1, 5-2	Natural Resource Protection	L
FMI-73— Support the creation of and assist in utilizing a document that describes appropriate best stream management practices in the Ashokan watershed for emergency stream work.						
Town Board/AWSMP	Operating Budget/AWSMP	Low	Short-term	1-5, 1-7, 4-1	Natural Resource Protection	L/M
FMI-74— Utilize wetland inventory as provided by DEC to preserve flood retention capacity in the basin.						
Town Board/FPA	Operating Budget/DEC	Low	Short-term	4-1, 4-1, 4-2	Natural Resource Protection	L/M
FMI-75— Encourage and support AWSMP's physical stream monitoring program (e.g. cross sections, longitudinal profiles etc) to assist in evaluating pre- and post-flood stream conditions.						
DPW/FPA	Operating Budget/AWSMP	Low	Short-term	1-4	Natural Resource Protection	H
FMI-76— Encourage implementation of successful stream projects as verified by AWSMP'S stream monitoring program.						
Town Supervisor/DPW/FPA	Operating Budget/AWSMP/GRANTS	Low	Short-term	1-8, 4-1, 4-1, 5-2	Natural Resource Protection	M/H



SECTION 6: MITIGATION STRATEGY

**TABLE 6-10.
ACTION PLAN—FLOOD MITIGATION INITIATIVES (FMI)**

Lead Department	Possible Funding Sources or Resources	Estimated Project Cost	Time Line	Objectives	Mitigation Category	Priority
FMI-77— Encourage control of invasive species, particularly Japanese knotweed, during riparian construction projects.						
Town Supervisor/DPW/FPA/AWSMP	Operating Budget/AWSMP	Low	Short-term	4-1	Natural Resource Protection	L/M
FMI-78— Manage vegetation on critical areas such as roadside ditches and steep slopes; encourage multi-agency and public collaboration.						
Town Supervisor/DPW/FPA/AWSMP	Operating Budget	Medium	Short-term	4-1, 5-2	Natural Resource Protection	L/M
FMI-79—Support Ulster County in implementing improved radio communication system for Town.						
Emergency Management / Public Works	Emergency Management funds/Grants-HLS/EMPG/SHSP	Low	short term	3-3, 5-2	Emergency Services	H
FMI-80—Update the Town emergency response plan to reflect any changes to flood notification protocol within the Town.						
Emergency Management	Department Budget / Grant-HLS/EMPG/SHSP	Low	short term	1-9, 3-2	Emergency Services	L (AS NEEDED)
FMI-81— Provide follow-up Community Emergency Response Team (CERT) coordination.						
Emergency Management	Grants/Town/EMPG/SH SP	Low	ongoing	3-1, 3-3	Emergency Services	L
FMI-82—. Address evacuation by planning, developing, and providing signage and information regarding evacuation routes						
Emergency Management	Fees and Grants/EMPG/SHSP	Medium	short term	3-4	Emergency Services	L/M
Emergency Management	Operating Budget	Low	Short-term	3-4	Emergency Services	L/M (SEE 86)
FMI-84—Coordinate/integrate and maintain a swift water rescue team with Sheriff and fire company						
Emergency Management	Operating Budget/AFG	Low-medium	Short-term	3-3	Emergency Services	H (ALREADY EXISTS)
FMI-85—Advocate an active monitoring program for large woody debris (LWD) that focuses upon the identification and removal of debris that poses a flood hazard to infrastructure and a threat to human welfare. Identify sites for clearing and snagging to prevent woody debris build up.						
Town Board/FPA	Operating Budget	Medium	Short-term	4-1	Structural Projects	M
					Options to	
DPW, AWSMP	Department Budget, CWC grant	Medium	short term	1-1, 1-5	Structural Projects	H

AWSMP –Ashoken Watershed Stream Management Program
 EMPG-Local Emergency Management Performance Grant
 SHSP-State Homeland Security Grant Program
 PASP-Public Safety Answering Point Consolidation, Improvements, and Enhancements Grant
 AFG-Assistance to Firefighters Grant



HMPG-Hazard Mitigation Grant Program
 HMA-hazard Mitigation Assistance Program
 NYSEFP_NY State Environmental Facilities Corporation Grants
 NYDRC-New York Department of Environmental Conservation Grants.
 ASPCA-Association for the Prevention of Cruelty to Animals Grants

This benefit/cost review was qualitative; that is, it did not include the level of detail required by FEMA for project grant eligibility under the Hazard Mitigation Grant Program (HMGP) and Pre-Disaster Mitigation (PDM) grant program. This qualitative approach was used because projects may not be implemented for up to 10 years, and the associated costs and benefits could change dramatically in that time. Each project was assessed by assigning subjective ratings (high, medium, and low) to its costs and benefits, described in Table 6-7.

Costs: The project cost for each mitigation initiative was reasonably estimated (including preliminary engineering, engineering, design, construction). Costs are presented as follows: Low = < \$10,000; Medium = \$10,000 to \$100,000; High = > \$100,000. Where actual project costs could not be reasonably established at this time, a best estimate was provided:

- Low = Possible to fund under existing budget. Project is part of, or can be part of an existing on-going program.
- Medium = Could budget for under existing work-plan, but would require a reapportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
- High = Would require an increase in revenue via an alternative source (i.e., bonds, grants, fee increases) to implement. Existing funding levels are not adequate to cover the costs of the proposed project.

Benefits: Mitigation benefits are future damages and losses that would be eliminated and/or reduced by implementing the proposed mitigation project. When possible, benefits (e.g., physical damages, loss of service or function, emergency management costs, etc.) associated with the project were identified. The benefits value noted (in dollars) is the expected avoided damages and is presented as: Low = < \$10,000; Medium = \$10,000 to \$100,000; High = > \$100,000. Where benefits are not quantifiable, a best estimate was provided:

- Low: Long term benefits of the project are difficult to quantify in the short term.
- Medium: Project will have a long-term impact on the reduction of risk exposure to life and property, or project will provide an immediate reduction in the risk exposure to property.
- High: Project will have an immediate impact on the reduction of risk exposure to life and property.

Table 6-11. Project Assessment

Costs	
High	Project cost is =>\$100,000 or if unknown, existing funding levels are not adequate to cover the costs of the proposed project, and implementation would require an increase in revenue through an alternative source (e.g., bonds, grants, and fee increases).
Medium	Project cost is \$10,000 to \$100,000 or if unknown, the project could be implemented with existing funding but would require a re-apportionment of the budget or a budget amendment, or the cost of the project would have to be spread over multiple years.
Low	The project cost is <\$10,000 or if unknown, the project could be funded under the existing budget. The project is part of or can be part of an existing, ongoing program.
Benefits	
High	Project mitigation benefits are => \$100,000 or if unknown, the project will have an immediate impact on the reduction of risk exposure to life and property.
Medium	Project mitigation benefits are \$10,000 to \$100,000 or if unknown, the project will have a

Costs	
Low	<p>immediate reduction in the risk exposure to property.</p> <p>Project mitigation benefits are < \$10,000 or if unknown, the long-term benefits of the project are difficult to quantify in the short term.</p>

Using this approach, projects with positive benefit versus cost ratios (such as high over high, high over medium, medium over low, etc.) are considered cost-beneficial and are prioritized accordingly. For some of the County initiatives identified, the Town may seek financial assistance under FEMA’s HMGP or PDM programs. Both of these programs require detailed benefit/cost analysis as part of the application process. These analyses will be performed when funding applications are prepared, using the FEMA BCA model process. The SAFARIs committed to implementing mitigation strategies with benefits that exceed costs. For projects not seeking financial assistance from grant programs that require this sort of analysis, the SAFARI reserves the right to define “benefits” according to parameters that meet its needs and the goals and objectives of this plan.

Prioritization:

Section 201.c.3.iii of 44 CFR requires an action plan describing how the actions identified will be prioritized. The SAFARI, along with their contract consultant, developed a prioritization methodology for the Plan that meets the needs of the Town while at the same time meeting the requirements of Section 201.6 of 44 CFR. The mitigation actions identified were prioritized according to the criteria defined below.

- High Priority:** A project that meets multiple plan goals and objectives, benefits exceed cost, has funding secured under existing programs or authorizations, or is grant-eligible, and can be completed in 1 to 5 years (short-term project) once project is funded.
- Medium Priority:** A project that meets at least one plan goal and objective, benefits exceed costs, funding has not been secured and would require a special funding authorization under existing programs, grant eligibility is questionable, and can be completed in 1 to 5 years once project is funded.
- Low Priority:** A project that will mitigate the risk of a hazard, benefits exceed costs, funding has not been secured, and project is not grant-eligible and/or timeline for completion is considered long-term (5 to 10 years).

It should be noted that these priority definitions are considered to be dynamic and can change from one category to another based on changes to a parameter such as availability of funding. For example, a project might be assigned a medium priority because of the uncertainty of a funding source. This priority could be changed to high once a funding source has been identified such as a grant. The prioritization schedule for this Plan will be reviewed and updated as needed annually through the plan maintenance strategy described in Section 7 of this Plan.

Table 6-8 presents the results of applying the prioritization methodology presented to the set of mitigation actions identified by the Town, and includes the following prioritization parameters:

- Number of goals/objectives met by the initiative
- Benefits of the project (high, medium, or low)
- Cost of the project (high, medium, or low)
- Do the benefits equal or exceed the costs?

- Is the project grant-eligible?
- Can the project be funded under existing programs and budgets?
- Priority (high, medium, or low)

The Town's mitigation action implementation strategy includes:

- Mitigation actions for individual and multiple hazards
- Mitigation goals/objectives supported by each action.
- Implementation priority
- Potential funding sources for the mitigation action (grant programs, current operating budgets or funding, or the agency or jurisdiction that will supply the funding; additional potential funding resources are identified).
- Estimated budget for the mitigation action (financial requirements for new funding or indication that the action is addressed under current operating budgets)
- Time estimated to implement and complete the mitigation action
- Existing policies, programs, and resources to support implementation of the mitigation action (additional policies, programs, and resources identified)

Specific mitigation actions were identified to prevent future losses; however, current funding is not identified for all of these actions at present. The Town has limited resources to take on new responsibilities or projects. The implementation of these mitigation actions is dependent on the approval of the local elected governing body and the ability of the community to obtain funding from local or outside sources. Where such actions are high priorities, the community will work together with NYSOEM, FEMA and other Federal, State and County agencies to secure funds.

In general, mitigation actions ranked as high priorities will be addressed first. However, medium or even low priority mitigation actions will be considered for concurrent implementation. Therefore, the ranking levels should be considered as a first-cut, preliminary ranking and will evolve based on input from the Town departments and representatives, municipal government departments and representatives, the public, municipal government departments and representatives, NYSOEM, and FEMA as the Plan is implemented.

SECTION 6: MITIGATION STRATEGY

Table 6-12. Prioritization of Mitigation Initiatives

Mitigation Action #	# of Objectives Met	Benefits	Costs	Do Benefits equal or exceed	Is project Grant eligible?	Can project be funded under existing (Y/N)	Priority
FMI-1	3	M	L/M	Y	N	N	H
FMI-2	2	M	L	Y	N	Y-AWSMP*	L/M
FMI-3	3	M	L	Y	N	N	M/H
FMI-4	3	M	M	Y	Y	N-AWSMP*	H
FMI-5	3	M	M	Y	Y	Y-AWSMP*	L
FMI-7	3	H	L	Y	N	N	H
FMI-8	2	M	M	Y	Y	N	M (TIED TO FM6)
FMI-9	2	M	L	Y	N	N	L/M
FMI-10	3	M	M	Y	Y	N	H
FMI-11	4	M	L	Y	N	N	H
FMI-12	3	M	L	Y	N	N	M
FMI-13	1	M	L	Y	N	Y HMGP, PDM	M
FMI-14	3	H	L	Y	Y	N	M
FMI-15	3	H	L	Y	N	N	M
FMI-16	1	H	L	Y	N	N	H
FMI-17	2	L	L	Y	N	N	H
FMI-18	6	M	M	Y	N	N	H
FMI-19	1	L	L	Y	N	N	
FMI-20	3	M	L	Y	N	N	H (TIED TO 1C)
FMI-21	3	M	L	Y	N	N	H
FMI-22	2	H	L	Y	N	N	H
FMI-23	3	L	L	Y	N	N	L/M
FMI-24	2	M	L	Y	N	N	L
FMI-25	ALL	M	L	Y	N	N	M
FMI-26	2	M	M	Y	N	N	L/M
FMI-27	3	L	L	Y	N	N	M
FMI-28	1	M	L	Y	N	N	H
FMI-29	2	M	L	Y	N	N	M
FMI-30	2	M	L	Y	N	N	M/H
FMI-31	3	M	M	Y	N	N	M
FMI-32	2	L	L	Y	N	N	M
	2	L	L	Y	N	N	
FMI-34	1	M	L	Y	N	Y (HMGP, PDM)	L/M
FMI-35	2	H	L	Y	N	Y-AWSMP*	H
FMI-36	2	M	L	Y	N	Y-AWSMP*	M
FMI-38	3	H	L	Y	N	N	H



SECTION 6: MITIGATION STRATEGY

Mitigation Action #	# of Objectives Met	Benefits	Costs	Do Benefits equal or exceed Costs? (Y/N)	Is project Grant eligible? (Y/N)	Can project be funded under existing programs/budgets? (Y/N)	Priority
FMI-39	2	M	L	Y	N	N	H
FMI-40	3	M	L	Y	N	N	M (ALREADY DO -PART OF NIMS)
FMI-41	3	M	L	Y	N	N	H
FMI-42	1	H	L	Y	N	N	H
FMI-43	3	H	L	Y	N	N	M
FMI-44	3	H	L	Y	N	N	M
	1	M	L	Y	Y		
FMI-46	2	H	L	Y	N	N	H
FMI-47	2	H	L	Y	N	N	H
FMI-48	3	L	L	Y	N	N	L/M
FMI-49	4	M	M	Y	N	N	H
FMI-50	4	M	L	Y	N	N	M/H
FMI-51	1	M	L	Y	Y	N	M/H
FMI-52	2	M	L	Y	N	Y-AWSMP*	H
FMI-54	3	H	M	Y	N	N	H
FMI-55	3	H	H	Y	Y	N	L/M
FMI-56	3	H	L/M	Y	Y	N	M
FMI-57	2	M	L	Y	Y	N	M
FMI-59	2	H	L	Y	N	N	H
FMI-60	2	H	L	Y	N	N	L/M
FMI-61	2	H	L	Y	N	N	H
FMI-63	1	H	L	Y	N	N	H
FMI-64	2	M	L	Y	N	N	H
FMI-65	2	H	M	Y	Y	Y HMPG, PDM	M, ONGOING
FMI-65a	2	H	L	Y	Y	Y HMPG, PDM	H
FMI-65b	3	H	L	Y	N	Y HMPG, PDM	L/M
FMI-66	2	H	M	Y	Y	N	L
FMI-67	2	H	M	Y	Y	N	M
							H
FMI-70	5	M	L	Y	N	Y HMPG, PDM	18(CRS



SECTION 6: MITIGATION STRATEGY

Mitigation Action #	# of Objectives Met	Benefits	Costs	Do Benefits equal or exceed Costs? (Y/N)	Is project Grant eligible? (Y/N)	Can project be funded under existing programs/budgets? (Y/N)	Priority
FMI-71	4	L	L	Y	N	N	L/M
FMI-72	3	M/H	M/H	Y	Y	N	L
FMI-73	3	M	L	Y	N	N	L/M
FMI-74	3	L	L	Y	N	N	L/M
FMI-75	1	L	L	Y	N	N	H
FMI-76	4	M	L	Y	N	N	M/H
FMI-77	1	L	L	Y	N	N	L/M
FMI-78	2	L	L	Y	N	N	L/M
FMI-79	2	H	L	Y	Y	N	H
FMI-81	2	M	L	Y	N	N	L
FMI-82	1	M	M	Y	N	N	L/M
FMI-83	1	M	L	Y	N	N	
FMI-85	1	M	M	Y	N	N	M
FMI-86	2	M	M	Y	Y	Y-AWSMP*	H

Notes: H = High. L = Low. M = Medium. N = No. N/A = Not applicable. Y = Yes. TBD = To Be Determined.

HMPG-Hazard Mitigation Grant Program

PDM-Pre-Disaster Mitigation Program

AWSMP-Ashoken Watershed Stream Management Program

*"Yes" indicates the strategy is likely to fall within the objectives of the 2014-2019 SMIP grant program. Does not indicate a project will automatically be funded.